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Editorial Office: Rzeszów University of Technology, The Faculty of Management,
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FROM THE EDITORIAL COMMITTEE

We are giving you the next 28th 2 (2021) issue of the Scientific Journal of the Faculty of Management at the Rzeszow University of Technology entitled “Humanities and Social Sciences”.

The aim of the Publisher is to raise the merits and the international position of the quarterly published by the Faculty of Management, that is why we are still developing the cooperation with foreign team of reviewers, as well as an international Scientific Council. The Editors have also attempted to apply for international databases; currently the quarterly HSS is indexed in **Index Copernicus Journal Master List, The Central European Journal of Social Sciences and Humanities (CEJSH) ERIH PLUS, DOAJ and EBSCO**.

The Journal has been also included in the list of projects qualified for funding under the **“Support for scientific magazines program”**.

The articles published in this publication are devoted to the broader issues of the humanities and social sciences. They are the result both of theoretical and empirical research. The subjects covered vary considerably and reflect the interdisciplinary nature of the Journal. We do hope that the papers published will meet your kind interest and will be an inspiration to further research and fruitful discussions.

On behalf of the Editorial Board of “Humanities and Social Sciences” we would like to thank the Authors for sending the outcomes of their research. We would like to express particular gratitude to the Reviewers for their valuable feedback that greatly contributed to increasing values of the scientific publications.

With compliments
Editorial Committee

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Aldona Małgorzata DEREŃ[1]

THE OODA LOOP AS AN INSTRUMENT FOR DEVELOPING INTELLECTUAL PROPERTY STRATEGIES IN SMES

Intellectual property is closely related to the processes of creation and to the development and use of acquired knowledge, experience, and competence. It is also the result of human creativity, creativity, entrepreneurial behaviour, ideas, and inventions. The dynamics of the business environment, which should be considered both in macro- and micro-economic terms, forces companies to strive for continuous modification and diversification of economic and financial strategies. This same principle also applies to intellectual property strategies, which can be used not only in creating wealth but also in attaining competitive advantage for an enterprise. This article proposes the creation of intellectual property strategy based on the OODA loop, a model of a continuous process under continuous observation. All decision-making processes usually take place parallel to one another. The essence of the model is synchronization between observation and orientation; between orientation, decision and action; and the impact of actions taken by observation are assumed to be monitored. Basing creation of an intellectual property strategy on the OODA loop as proposed here is recommended for SMEs in Poland.

Keywords: enterprise, strategy, creative strategy, intellectual property, OODA loop.

1. INTRODUCTION

Intellectual property is a concept that refers to unique, value-creating creations of human creative and creative expression. From a legislative point of view, we are talking about a certain category of goods created through an intellectual process, which have been incorporated in a material form and are protected. In other words, intellectual property is a set of rights resulting from human activity, especially in the literary, artistic, scientific and industrial fields. These rights include: patents, protection rights covering utility models, industrial designs, trademarks, geographical indications, topography of integrated circuits (industrial property), copyrights and related rights and know-how (confidential technical, technological, economic, organizational information). Obtaining intellectual property rights means granting the person or persons entitled exclusive rights whose duration may be unlimited (rights inalienable in copyright, right of protection for a geographical indication), or which may be limited in time (invention patent, right of protection for a utility model,

[1] Aldona Małgorzata Dereń, DSc, PhD, Associate Prof., Faculty of Computer Science and Management, Wroclaw University of Science And Technology, Poland; e-mail: aldona.deren@pwr.edu.pl. ORCID: 0000-0002-2377-4573.

right of protection for a trademark, right of registration for a design, right of registration for an integrated circuit topography). In any case, substantive exclusive rights are territorially limited, for example to the territory of a country, group of countries, geographical region. On the other hand, intangible rights are not limited in time and space (the author of the work is everywhere and remains forever). By obtaining a material exclusive right, the right holder acquires the right to use the object of protection exclusively for profit or professional purposes (monopoly) in the territory to which the right applies. The limitation in time of the monopoly for categories of intellectual property related to technical innovation is intended to allow competition and dissemination. The formal granting of property rights to creative human work has allowed to exploit the commercial value of human ingenuity and creativity. The results of creative work have become a resource that can be used to exchange or share rights with different types of business partners in a complex network of strategic relationships. This allows the creation and marketing of new and improved goods and services on more than just a single market.

In recent years, intellectual property has become a key resource in almost all sectors of the global economy. In short, intellectual property is becoming increasingly strategic. The growing importance of these "resources of the mind" raises questions about how best to use them to achieve the goals of the companies that create and control them. In this situation, it becomes necessary for organizations to develop strategies that exploit and maximize the value of their intellectual property assets.

The aim of this study is to describe the issues of developing an effective intellectual property strategy in relation to SMEs in Poland. The resultant aim of the article is to describe the course of the process of formulating this strategy using the OODA loop developed by military strategist Colonel John Boyd (https://pl.wikipedia.org/wiki/OODA, 2020).

2. INTELLECTUAL PROPERTY STRATEGY

As already mentioned, intellectual property is closely related to the processes of creation, development and use of acquired knowledge, experience and competence and is the result of human creativity, creativity, entrepreneurial behaviour, ideas and invention. Intellectual property is distinguished by the fact that its economic value can be determined and it is subject to legal protection (Blair, Cotter, 2005).

The perception of intellectual property as a resource with specific characteristics (attributes) allows to show its specific character, which is often difficult to understand from the point of view of tradition, supported by established rules and standards of treating material resources as a fundamental basis for management. And such attitudes dominate in small and medium enterprises.

Meanwhile, the features (properties) of intellectual property, and above all its close connection with man, allow for differentiation and specificity of shaping intellectual property as a resource (Dereń, 2014). The most important of these characteristics are: independence, incalculability, indivisibility, usefulness, ability to protect and ability to commercialize. This is a feature of bringing intellectual property to a form that allows it to sell on the market and compete. This ability is dynamic, variable and dependent on many factors. It is aimed at absorbing intellectual knowledge and creative skills in the production process to successfully market them as product(s). Y. S. Rajan (2002) defines commercialisation as "creating added value for ideas, research results, technology and new product". A feature of intellectual property is also strategicity. In the most general terms,

the strategicity of the resource is to ensure the survival and development of the company, which should be reflected in the change of strategic position in the sector. The resource-based strategy should therefore take into account all the intangible resources of the organisation that are conducive to achieving the strategic objectives. Nowadays, intellectual property and the ability of an organisation to multiply and protect it play a key role in the collection of intangible resources that determine the success of an enterprise.

The strategy of intellectual property may vary depending on the size of the organisation. Large companies with significant financial resources often seek a strategy based on acquiring and maintaining a large number of patents (patent portfolio). However, for most start-ups or SMEs, developing and building a large patent pool can be disproportionately costly.

Any discussion of an intellectual property strategy must be considered as part of the organisation's strategy. It is therefore necessary to define the objectives of this strategy. It is quite common to refer to 'achieving sustainable competitive advantage' as a goal, sometimes 'sustainability' is mentioned. In other words, the organisation's strategy is to develop a range of activities that will allow the company to generate a sustainable profit stream. An effective strategy will allow the company to achieve sustainable profits, which are higher than those of its competitors.

The basic profit formula:

$$\pi = (P \times Q) - C$$

And yes: Profit (π) is income (Price times quantity) minus Costs.

Thus, the organisation's strategy is to develop a range of activities that will enable the company to sustainably achieve higher prices than its competitors (P), increase its market share (Q) and/or maintain lower costs (C) than its competitors. As part of the organisation's strategy, the intellectual property strategy must pursue the same objectives. It must make a significant contribution to the company's profit generation. Therefore, an IP strategy consists of developing a range of activities using IP to enable the company to sustainably achieve higher prices, increase market share and/or maintain lower costs than its competitors.

An intellectual property strategy can contribute to a company's profitability by enabling it to maintain and increase its market share. As a rule, after making a choice, customers choose products that provide a combination of price, features and performance that meets their needs. Companies that are able to differentiate their products in a way that benefits their customers and is difficult or impossible for competitors to replicate are likely to gain disproportionate market share. One example is Gillette, which has maintained more than 70% market share of razor blades thanks to continuous innovation, patent protection and investment in branding. Apple iPhone and iPad products hold 30% and 50% of the US smartphone and tablet market respectively. And Apple is very aggressive in enforcing its intellectual property rights to maintain its leading position in features it considers important for consumers. It also maintains a strong and continuous branding campaign to strengthen its market position.

An intellectual property strategy can contribute to a company's profitability by helping to keep costs lower than those of its competitors. This can be achieved in two main ways. First, companies can achieve lower costs through production or service technologies that

are protected from competition by intellectual property. In some cases it is appropriate to protect trade secrets, while in others patent protection is the best strategy.

In many industries, competition is based on cost minimisation, especially in commodity industries where the product is relatively undifferentiated from that of the competitor. In these circumstances, product performance, functions and brand are usually less important when customers make purchasing decisions. Consequently, there is no justification for higher prices and attempts to do so directly lead to a loss of market share. In these industries, anyone with a cheap production or service system will have the highest profit margins. The low cost producer is free to lower its price and take over market share. Proper application of an intellectual property strategy can help companies to achieve a sustainable cost advantage and directly contribute to the profitability of the organisation.

An intellectual property strategy can also be an effective tool in achieving lower technology costs than competitors. In many markets, the cost of technology is a significant and growing part of the total cost of goods sold. In markets with complex technology, companies' products include solutions and technologies developed at home and licensed. In such cases companies are forced to trade in technology in order to bring their product to market. Access to the required technology is obtained through licensing agreements and reciprocal agreements. In some industries, such as consumer electronics, the total cost of access to technology (including patent royalties) can represent 20–30% of the sales price of the product and in some product categories, such as smartphones, can be even higher. Companies that are able to achieve the lowest "technology cost" through a favourable royalty balance can maintain higher profit margins than their competitors (Dereń, Skonieczny, 2017). The balance of technology payments covers not only the cost of accessing a competitor's technology, but also technology owned by non-manufacturing entities. Companies that effectively manage their licences can also maintain higher margins and profits.

The considerations set out above referred to the objectives of the intellectual property strategy. The key question is what is the nature of the strategy and how to develop it? What is the way to choose to make the strategy achieve its objectives and contribute to the competitiveness of the company and its sustainable profitability?

The strategy of intellectual property is creative because, as J. Skonieczny (2019) notes, every strategy of an organization, regardless of its conditions, method of development and methods used, is always creative.

Similarly, R.S. Kaplan and D. P. Norton (2010) speak about the role of creativity in the organization's strategy. P. Norton believe that:

> whatever methodology is adopted, the result of formulating a strategy is to establish a course of action that distinguishes the company's position and offer from its competitors, so that it can achieve a lasting competitive advantage leading to first-class financial results...

W. Dyduch (2013) writes that the creative strategy is future-oriented and goal-oriented, leaving room for discovering the individual potential of the participant in the organisation and unplanned paths and ways to achieve organisational goals. The creative nature of the intellectual property strategy makes its creation a process of searching for and combining various solutions to achieve specific organizational goals. As W. Dyduch writes, a creative strategy can be seen as taking steps outside the established framework and as an invitation

to adopt a more eclectic approach to a product, organisation, or sector, and to constantly switch between different strategic approaches.

The creative nature of intellectual property means that it is open to a variety of organisational cultures, especially those where even the edges of ideas and values are born. This strategy is not about creating simple, stuntless solutions that could be used in the organisation in the long term.

Developing a creative intellectual property strategy is a process of learning from mistakes combined with enthusiasm for new ideas. The profile of this strategy is based on the multiplicity and diversity of opinions and views. It is not possible to create this strategy on the basis of standard schemes, as this excludes the specificity and characteristics of intellectual property treated as an intangible asset of the organization. This strategy cannot be developed in the traditional way, which originated from the ancient army leadership, the scheme of analysis, planning and rigid implementation of decisions made. Even on the day after carefully planned decisions are made, the external environment of the company may be completely different. In the author's opinion, the intellectual property strategy is first of all a way of thinking, a way of observing the environment inside and outside the organization, giving meaning to the collected information and acquired knowledge, is a kind of wisdom of the organization.

In order to answer the question of how to create such a strategy, what actions to choose in order for this strategy to contribute to the company's competitiveness and sustainable profitability, it is necessary to start with the organization's strategy. Unfortunately, in many small and medium sized national enterprises it simply does not exist or is in a very general form. On the other hand, what is (or should be) the developed strategy of the enterprise is crucial for defining the profile of intellectual property strategy.

It is not easy to define what an enterprise's strategy is, especially if one sets out the enterprise's business activity in a broad social context, or if one introduces many factors that are difficult to define and predict precisely (Kasprzycki at al, 2008). In the literature on the subject, the enterprise's strategy is most often defined as the entirety of actions taken by its management to set the main objectives, formulate a general concept of functioning and define the ways and means of action to achieve these objectives.

It can also be said in the most general sense that the strategy is to ensure the survival and development of the company, which should be reflected in a change of position in the sector. The strategy should therefore take into account all the factors that favour and hinder the achievement of the objectives. Nowadays, in the set of factors determining a company's success, a key role is played by its intellectual potential, its ability to expand and protect it. In other words, intellectual resources nowadays determine the market position of a company in the sector.

The complexity and specificity of intellectual property, the various connections and organisational conditions of a company, its industry, institutional and market location, as well as existing relations with the competitive environment have a significant impact on modelling intellectual property strategies.

The intellectual property strategy also depends on the size of the organisation. It is different in large companies with significant financial resources, and different in small and medium-sized enterprises with limited resources.

3. OODA LOOP

The OODA (Observe-Orient-Decide-Act Observation-Orient-Decide-Act) is a model of the adaptive decision making cycle developed by military strategist Colonel John Boyd at the turn of 1970–1980. This model was adopted in the doctrine of the US military. Its essence consists of four basic areas of information processing, which are observation, orientation, decisions and actions.

Observation – consists in collecting data on various aspects of the environment in which the organization operates. One of the key streams of observation is observation of feedback related to decisions and actions taken.

Orientation – is overlaying the collected information on the current conceptual model describing the environment and synthesizing the premises (stimuli) for making decisions and actions. The process of orientation is fundamental to the effectiveness with which the whole OODA cycle is implemented. Cultural conditions (organizational culture of the company), innate features, experience and routine of employees have an impact on the speed and precision of actions, as well as on reacting to changes taking place. The ability to analyze and synthesize allows to consciously change conceptual models used by people in the assessment of the situation and to act effectively even where reflexes and experience do not reach.

Decisions – in the case of decisions taken deliberately and non-routineously, there is a choice/rejection of one of the options for action. Decisions can also be reflexes, in which case the action is (or is rejected) "automatic".

Action – it is undertaking (consciously or reflexively) the realization of one of the previously worked out scenarios. When starting to interact with the environment, the decision itself is, in a way, tested in practice (providing additional data and premises). The conceptual model which is the basis of orientation is also tested. The action allows to learn and adopt to a variable and not fully understood environment.

The information processing in all four of these areas is in principle parallel. According to the creator of the OODA concept, the essence of the loop is the synchronization between observation and orientation; between orientation, decision and action; and finally, the monitoring of the impact of actions taken through observation. J. Boyd himself presents it in his briefing "The Essence of Winning and Loosing" as follows:

> Pay attention to how orientation influences observation, decisions and actions, on the other hand it is itself shaped by feedback and other phenomena appearing in our area of observation. Also, pay attention to how the whole loop (not only orientation) creates a continuous, multi-faceted, interconnected process of anticipating, sensing, correlating and rejecting[2].

The fundamental strategy related to the practical application of the OODA loop in warfare consisted in the creation of mechanisms allowing for the use of key factors such as: pilots' training, innate abilities of each of them and the fighters they used. F86 jets, on which

[2] J. Boyd did not leave any written material behind. He was a practitioner and popularized his concepts and ideas mainly through his briefings, such as: Patterns of Conflicts or The Essence of Winning and Loosing. Towards the end of his life, he published a 12-page essay from Zt. Destruction and Creation. It is a work devoted to the process of creating and disintegrating conceptual models in the process of learning and shaping reality. Cf. [Access: 15.04.2020]. Access on the internet: https://pl.wikipedia.org/wiki/John_Boyd_(1927%E2%80%931997).

American pilots flew, provided much better visibility from the cockpit than MIG and 15 opponents. They were much more agile at higher speeds. Therefore, J. Boyd claimed that the technical advantages of the equipment combined with the skills of a handful of pilots meant that the best of them could react much faster to the enemy's maneuvers, causing confusion and inappropriate reactions during combat, which ultimately led to loss of control over the situation. As J. Boyd noted (https://pl.wikipedia.org/wiki/OODA, 2020).

Flying on fighters and running a business are different and incomparable activities, but the OODA loop (model) has gained popularity as a helpful tool to understand today's uncertain and turbulent business environment. The OODA series, although developed by the fighter pilot, is, according to Steve Blank, the basis for concepts such as Customer Development and Lean Startup (product management in uncertain conditions). Observation-Orientation-Decision-Action is also a model of strategic thinking in modern, highly competitive business (Blank, Dorf, 2013).

Can such a pattern of thinking be applied to intellectual property, which is an important component of building competitiveness and market advantage. It is an attribute of a modern economy, and uncertainty about the possibility of obtaining and enforcing protection of rights exposes entrepreneurs and the whole economy to significant losses. This issue is particularly relevant for SMEs. Research conducted by the author in the SME sector in 2015 and 2019 indicate that the knowledge and awareness of the importance of these resources is so low that it limits the development perspective of most of these enterprises as innovative organisations. This weakness may be prevented by developing an intellectual property strategy based on the OODA loop.

4. DEVELOPING AN INTELLECTUAL PROPERTY STRATEGY BASED ON THE OODA LOOP

The creative nature of the intellectual property strategy means that its development is not a one-off or periodic action, but a continuous decision-making process. The creativity itself is a two-dimensional process consisting of search-and-research and diagnostic-analytical elements (Skonieczny, 2019). The creative potential of a company, its employees and its material and non-material resources have an impact on the shape of the organisation's strategy and its component, which is the intellectual property strategy. This is very accurately illustrated by the description of the strategy developed by J. Boyd and called the OODA loop. The strategy observes what is happening in the environment (inside and outside the organisation), orientates itself in situations, collects facts and analyses circumstances of their creation. Only then he decides on the way of action and makes appropriate decisions. The results of these actions are then observed and the strategist goes through the OODA loop again.

The concept of the OODA loop translates directly into a continuous process of developing an intellectual property strategy in the following diagram:

Observation – the development of an intellectual property strategy starts with a thorough analysis of the internal and external environment. The analysis of the environment within an organisation is primarily a clear indication of what constitutes added value for the company (e.g. specific software, distinctive product name etc.). Further, determining the amount of intellectual resources at the disposal of companies (both own and purchased or licensed solutions, devices, etc. are taken into account).

An analysis of the environment within an organization is also a determination of what is planned to be created as a result of creative work. It will allow to indicate in which direction the company will develop.

Internal observation requires the monitoring of an organisation's performance in the field of intellectual property creation, including obtaining information on R&D results and innovation activities undertaken.

Knowledge of what is happening in the external environment includes querying information about the technological environment, customer needs, competitors' activities, partner's ecosystem and legal environment. The search for information about existing technological solutions is made possible by Internet databases containing data about existing and submitted solutions. It is also reasonable to use patent literature, as it not only assesses the protective capacity of innovations, but also prevents the duplication of research results (balancing open doors) and provides information about the intellectual potential of competition. In the case of small and medium-sized enterprises, it can be recommended to use a professional advisor – a patent attorney.

Orientation – this is a process of analysing and filtering relevant and up-to-date information among people in the organisation who need to know it. Choosing which information is most important, who needs it and who is able to make the best use of it is crucial for preparing the staff implementing the intellectual property strategy.

Decision – understanding and analysis of processes taking place inside and outside the organization allows to design decisions concerning the way the organization operates with respect to intellectual property. Decision making is at the heart of the IP strategy, and must be aligned with the overall strategy established by the organisation. The outcome of the decision-making process may be a formal or informal strategic plan that should at least set out the priorities and objectives for the organization's activities with respect to intellectual property.

Action – The actions taken to implement the Intellectual Property Strategy start already at the stage of creating innovations protected by intellectual property rights, through the creation of intellectual property resources, and further on the choice of formal mechanisms for the protection of intellectual property. These activities culminate in the introduction and use of these resources on the market. These activities can focus on product development and customer location, which will allow the company to achieve higher margins. A unique technological solution can be obtained through own research, purchased or licensed from another entity. On the other hand, having a patent monopoly allows you to become a leader controlling the market, and a deliberate pricing policy gives you a chance to achieve high margins.

5. SUMMARY

Intellectual property is the entirety of the creations of the human mind, the results of creative work, talent, imagination, creativity and inventiveness, and specific expenditures (time, financial and material capital, current state of the art). When these products are created in an organization, they are used as intangible resources in the production of subsequent goods and services. As Roger D. Blair and T.F. Cotter (2005), intellectual property is distinguished by the fact that its economic value can be determined and it is protected by law. When knowledge resources become subject to intellectual property rights,

it is possible to derive financial benefits from the distribution and use of those resources – sale, transfer, commercialisation.

The dynamics of the business environment, which should be considered both in macro- and micro-economic terms, forces companies to strive for continuous modification and diversification of economic and financial strategies. This also applies to the intellectual property strategy, which can not only be "(...), (...) used to create wealth, but most of all the competitive advantage of the enterprise" (Nogalski, Rybnicki, 2001).

Despite the lack of access to capital, lack of experience and rather low level of economic knowledge of entrepreneurs and often lack of development strategy, small and medium-sized enterprises are characterized by a dynamic transition to the environment. It is generally believed that these organisations are able to react fastest to changing needs and preferences of potential customers. They have an accurate understanding of the market situation and therefore are more easily involved in specific investment projects. For large entities, operating on small markets may not be profitable, hence they often give way to small or medium-sized companies. However, in order for them to operate in niche markets and markets with smaller potential, they must have not only an overall strategy, but also an intellectual property strategy, which is its component. The creation of this strategy can be based on the OODA loop. This model is a continuous process and operates on a continuous observation basis. All decision making processes usually take place parallel to each other. The essence of the model is the synchronization between observation and orientation, between orientation, decision and action, and monitoring the impact of actions taken by observation.

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Krzysztof GAWRYSIAK[1]
Rafał MIĘTKIEWICZ[2]

TACIT KNOWLEDGE IN MILITARY SERVICE ACTIVITIES

This paper reports on a part of a broader and more comprehensive research study (i.e., research designed to answer additional research questions and requiring additional research methods to be employed than those reported herein) carried out from May 2017 to January 2019 and aimed at determining the impact of the Experience Use System[3] on the operational capabilities, organizational culture, and approaches to knowledge management in the Polish Armed Forces. To carry out this part of the research, a survey was administered to professional soldiers and employees of the Ministry of National Defence, and the goal of the research was to determine "how much of the information needed to perform your duties do you have in your head." This study is based on the findings of independent investigations by Stephen Hawking of Cambridge University, Nick Bontis of McMaster University, and Robert Kelley of Carnegie-Mellon University.

Keywords: organizational learning; knowledge management; information stored in mind; diagnostic survey; statistical analysis.

This paper is a report of part of broader and more comprehensive research (more problem questions and research methods) carried out from May 2017 to January 2019, aimed at "Diagnosis of the impact of the Experience Use System on the improvement of operational capabilities, organizational culture and approach to knowledge management in the Polish Armed Forces". The goal was to conduct a survey in which professional soldiers and employees of the Ministry of National Defence were asked: "How much of the information needed to perform your duties do you have in your head". This study is based

[1] CDR (OF-4) Krzysztof Gawrysiak, PhD, Commander Adjunct, Maritime Operations Section, Department of Command and Maritime Operations of the Polish Naval Academy of the Heroes of Westerplatte, 69 Śmidowicza St, 81-549 Gdynia; e-mail: k.gawrysiak@amw.gdynia.pl. ORCID: 0000-0001-9083-4364.

[2] CDR (OF-4) Rafał Miętkiewicz, PhD, Commander Adjunct, Maritime Operations Section, Department of Command and Maritime Operations of the Polish Naval Academy of the Heroes of Westerplatte, 69 Śmidowicza St, 81-549 Gdynia; e-mail: r.mietkiewicz@amw.gdynia.pl (corresponding author). ORCID: 0000-0002-3129-7092.

[3] The Experience Use System is the Polish national equivalent of the NATO Lessons Learned allied system and is one of the organizational learning tools of the Polish Armed Forces. By integrating knowledge management processes (identification of observation, analysis, dissemination) and change management (planning implementation of corrective actions and setting tasks, implementation of corrective actions, verification of corrective actions), it improves the effectiveness of tasks performed at all levels of command and in all functional components (areas).

on the findings of independent investations by Stephen Hawking of Cambridge University, Nick Bontis of McMaster University, and Robert Kelley of Carnegie-Mellon University.

1. INTRODUCTION (GROUNDS FOR INITIATING STUDIES)

In almost every aspect of human life, both at work and in private, there has been a notable increase in the amount of available information. Rough estimates indicate that the last hundred years of human development have generated more information than the entire history of mankind. This was confirmed by research conducted by Stephen Hawking, who compared the number of scientific publications published during the 20th century. He stated that in 1901 there were about nine thousand; half a century later in 1950, almost ninety thousand; in 2000, this number exceeded nine hundred thousand (Hawking, 2002), as shown in Table 1.

Table 1. Scientific publications in selected years of the 20th century

Year	1901	1950	2000
Number of publications	9000	90 000	900 000

Source: (Hawking, 2002).

The amount of information generated in the 21st century was so large that Stephen Hawking stopped measuring the number of publications. With the development of information technologies that enabled data and information archiving, analyses expressed in computer logic memory units began. At the beginning of the 21st century, he estimated that more than a million bits of data and information are added each second (Hawking, 2002). This trend is reflected in and confirmed by the findings of Stephen Hawking's research on the doubling of information gathered and developed by mankind. In the publications at the turn of the millennium, the most frequently quoted statements are: “every seven years” or “every five years”. At that time, Nick Bontis predicted that in 2010, all the codified knowledge of mankind would double every 11 hours (Bontis, 2001).

Essentially, people are both the creators and beneficiaries of information, holders of knowledge, and often wisdom. The existence, survival, and development of humanity are closely related to the development of the human intellect, knowledge, and thus to the amount of gathered and properly used information. High dynamics in this area, confirmed by the results of scientific research, create both opportunities (civilizational development) and challenges (at this stage, the use of the term “threat” would not be justified). Unfortunately, human capabilities to perceive, remember, and use information do not develop as rapidly. The human central nervous system is incomparably more complex than the architectural conditions of library development or the development of electronic databases using computer hardware and software.

In the face of increasingly complex and advanced analytical activities undertaken by people, requiring access to huge and reliable repositories of information raises the question: what percentage of information is needed to perform duties that we store in an intangible way (“in our own heads”)? This value is supplemented up to one hundred percent by information in tangible form: memos, drawings, diagrams, documents, publications, monographs, etc. in printed or electronic form.

The above results overlap with results indicating a decreasing IQ in each subsequent generation (up to 7 points). This hypothesis was based on a sample survey of male recruiters aged 18-19 years, Norway nationals, as part of an IQ test, which is an integral part of the service. The analysis showed that among the generation born after 1975, not only did the Flynn effect stop[4], but within one generation the quotient dropped by as much as 7 points (Grygiel, 2019).

On the other hand, there are theories concerning the content of such tests which do not conform to modern conditions, especially the ubiquitous achievements of technique and technology. Attention is drawn to the issues of differentiation of crystallized intelligence, which includes learned matters, and liquid intelligence, which includes inborn abilities to use logic (Bednarek, 2019).

This problem was addressed among knowledge workers by Robert Kelley, who over three decades beginning in the mid-1980s, asked one question to a diverse and wide range of respondents: "What percentage of the knowledge you need to do your job is in your head?". In 1986, the average answer was 75%. In the next study, conducted after eleven years, he achieved a result of 15-20%, showing a decisive downward trend. The next study, conducted after the next nine years in 2006, showed the continuation of this trend, but it was difficult to expect significant changes at an already low rate, and the final result was only 8–10% (Goleman, 2007). Figure 1 provides an appropriate overview.

Figure 1. Summary of the results of tests carried out by Robert Kelley

Source: https://rapidbi.com/training-learning-development-is-dead/ [Access: 09.02.2019].

The quoted results of Robert Kelley's research may seem surprising, especially when they are applied to the entire population. The key to understanding them, however, is to explain the concept of the "knowledge workers" who were surveyed and whom the results concern. To this end, it is worth quoting the definitions of knowledge management classics, namely Thomas Hayes Davenport of Harvard University and Peter Drucker of New York University. Thomas Davenport states that a knowledge worker is a person with an appropriate education and professional experience and a high level of expertise, and the work they do requires them to produce and distribute knowledge (Davenport, 2005). Peter Drucker for (Elliman, Eatock, Spencer, 2005), on the other hand, describes a knowledge

[4] Flynn effect – an upward trend in IQ, named after researcher Jamess Flynn, indicating a 3 point increase in IQ value in people in one decade of the 20th century.

worker *as a person who puts into work what he or she learned during systematic education (concepts, ideas, and theories), as opposed to a person who puts into work manual skills or physical strength*. The interpretation of Peter Drucker's definition must take into account the changes that have occurred both in the labor market and in education and training systems since it was first published more than half a century ago.

In view of all this, the question posed by Robert Kelley with regards to the specific organizations or institutions in question remains unanswered. Moreover, the result of such a measurement can form the basis for certain actions aimed at changing training processes, professional development, and the development of knowledge management tools.

In the Polish Armed Forces, following the path of transformation and the example of the Atlantic Alliance, the importance of knowledge is recognized. There is a strong emphasis on meeting the needs of training and intellectual development of soldiers and military employees as the most important resources of the Ministry of National Defence. Members are equipped with numerous knowledge management systems and tools implemented in the internal, departmental, secret ICT network Milnet-Z, which enables mutual contacts and access to appropriate information resources to allow for the effective performance of tasks.

Today's combat environment is characterized by unprecedented dynamics and the saturation of information reaching commanders at all levels from a variety of sources. Additionally, a significant part manifests as so-called information noise. On the one hand, military personnel are equipped with computer systems, analytical tools, and procedures for action in the event of anticipated threats; on the other hand, they operate in a time deficit and under pressure from public opinion (media coverage of the war broadcast live). The high level of automation of command processes introduces unprecedented possibilities to analyze many factors to determine the proper military operations. Another important element is the dynamic development of autonomous technologies widely used in each military branch.

A learning institution which analyses the results of its own activities and draws conclusions from the actions taken (Lessons Learned) employing modern tools aimed at building scenarios of situation development – Strategic Defence Review (foresight) – aims to continuously improve its effectiveness and adapt to dynamic environments. Ever-growing databases, including those which collect conclusions from key elements of military activities, on the one hand, enable quick access to resources, and on the other hand, require the acquisition of additional knowledge and skills related to their handling.

In this extremely broad context, an awareness of how much of the information necessary to perform official duties soldiers and military employees have in their heads is a justified research problem.

2. METHODOLOGY OF CONDUCTING THE DIAGNOSTIC SURVEY

In the **quantitative study** conducted, questionnaires were used which allowed the use of statistical methods[5] both in the field of descriptive statistics and mathematical statistics (Kołodziej, 2013). Taking the above into account, in the conducted survey, a **quotient** (ref.

[5] Statistics – the science of quantitative methods of studying the properties of a population, which deals with the research (collecting, ordering, and analysing) of data about the characteristics of a population.

Bielecka, 2011) **measurement scale** – expressed as a percentage – was used, with a step of 10 percentage points (Table 2).

Table 2. Survey question and adopted measurement scale

How much of the information needed to perform your duties do you have in your head?	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Source: the authors.

Since social sciences usually have finite but very large populations[6], it was necessary to **select an appropriate sample**[7] to ensure its **representativeness**[8]. In this study, all soldiers and employees of the Ministry of National Defence, about 150,000 people, constituted the entire population. Taking into account the **substantive and non-substantive criteria of sample selection**, a **random** (Kołodziej, 2013, pp. 45-46) (probabilistic) sample was obtained to guarantee its representativeness. Surveys in the form of questionnaires were conducted from May 2017 to January 2019, and the analysis of the summaries prepared on the basis of survey **metrics** confirmed the assumptions made above. For example, Table 3 presents the characteristics of respondents in terms of command level and corps, and its graphical representation is shown in Figure 2.

Table 3. Characteristics of respondents in terms of command level and corps

#	**Measure**	**Distribution**					
1	**Command level**	Political and military		Strategic and operational		Tactical	
	Number of respondents	22		83		362	
2	Corps	Navy	Land Forces	Air Force	Special Forces	Territorial Defence Forces	Other
	Number of respondents	41	244	31	25	37	89

Source: authors' findings.

Interpreting the numerical and graphical data, it may be concluded that the respondents served/worked at all levels of command, in all corps, in proportions that reflect the actual division of the Ministry of National Defence. The most numerous were the soldiers and workers of the Land Forces, which are the largest branch of the Armed Forces. According to the proportions of the headcount of the different branches of the military, the smallest group of respondents were Special Forces soldiers, whose actions differed significantly

[6] Population size is the number of statistical units.

[7] A statistical sample is a subset of the statistical units of a population which are directly subjected to statistical observation and which have been specifically selected from the population.

[8] The realization of this postulate absolutely requires the knowledge of the structure of the entire population.

from the range of operational units. The activities of Special Forces are largely based on instinctive reactions to specific tactical situations in the immediate vicinity of enemy forces or resulting from highly secretive activities.

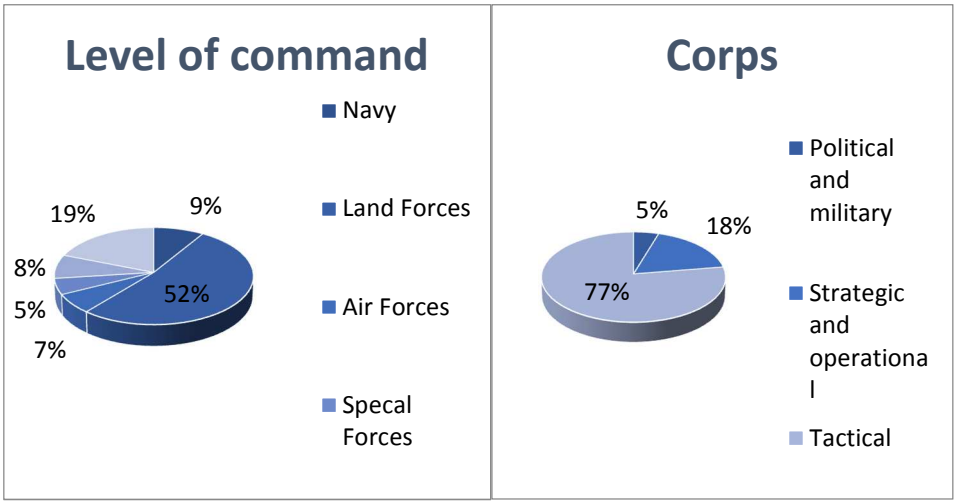

Figure 2. Pie charts presenting the level of command and corps of respondents

Source: authors' findings.

Equally important as the qualitative context described above is the quantitative aspect, i.e. **the minimum sample size**, which guarantees that the maximum estimation error in the study does not exceed *d*, with a confidence level of *1-α*. In the present case, the minimum sample size was determined based on **the estimated average value using the mean**, by sampling without replacement (Zięba, 2012). It therefore depends on the following factors (Kołodziej, 2013):

- **population size** – number of statistical units in the total population – employed in the Ministry of National Defence – about 100,000 soldiers and about 44,000 military workers (Kozubal, 2017);
- **predicted share of the studied phenomenon in the population** – preliminary predictions of the surveyor relating to the measured phenomena. The research is innovative in nature, and it does not refer to other similar or related research, nor has it been preceded by preliminary research. Therefore, in accordance with the methodology of conducting statistical surveys, a value of 50% has been assumed;
- **assumed confidence level –** the value of the confidence level is derived from the components of the measurement result. It is usually assumed as one of three values: 68%, 95%, or 99,9%; in social studies, it is usually p = 95% (α = 0.05) (Babbie, 2007). This indicates a 95% probability that the actual value of the measured parameter is within the specified range of the expanded uncertainty of measurement[9];

[9] However, this does not translate directly into the certainty that any particular obtained interval contains the true value.

- **standard estimation error** - a permissible measurement error that indicates how much the results obtained in a partial test may differ from the actual value in the entire population. Social science studies assume a value of 3%, 5%, or 7%. A standard estimated error of 5% is accepted which is sufficient.

Formula 1 is used to calculate the minimum sample size:

$$n_{min} = \frac{P(1-P)}{\frac{d^2}{z^2} + \frac{P(1-P)}{N}} \qquad \textit{formula 1}$$

where: n_{min} – minimum sample size;
N – entire population size: N = 144 000;
P – predicted share of the studied phenomenon in the population: P = 0.5;
Z – value calculated for the confidence level of 95%: Z = 1.96;
d – standard estimation error: d = 0.05.

Accordingly, the minimum sample size (formula 2) of 384 was calculated.

$$n_{min} = \frac{0.5(1-0.5)}{\frac{0.05^2}{1.96^2} + \frac{0.5(1-0.5)}{144\,000}} = 383.14 \qquad \textit{formula 2}$$

In the survey conducted from May 2017 to January 2019, 467 respondents took part, and the minimum sample size was met.

3. STATISTICAL ANALYSIS

The results of the answer to the question "How much of the information needed to perform your duties do you have in your head?" provided by respondents are summarized in Table 4 and graphically reflected in Figure 3.

Table 4. Frequency distribution of answers to the question "How much of the information needed to perform your duties do you have in your head?"

Value of the characteristic – x_i	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Total
Number of indications – n_i	0	0	15	31	24	89	87	102	79	32	8	467

Source: authors' findings.

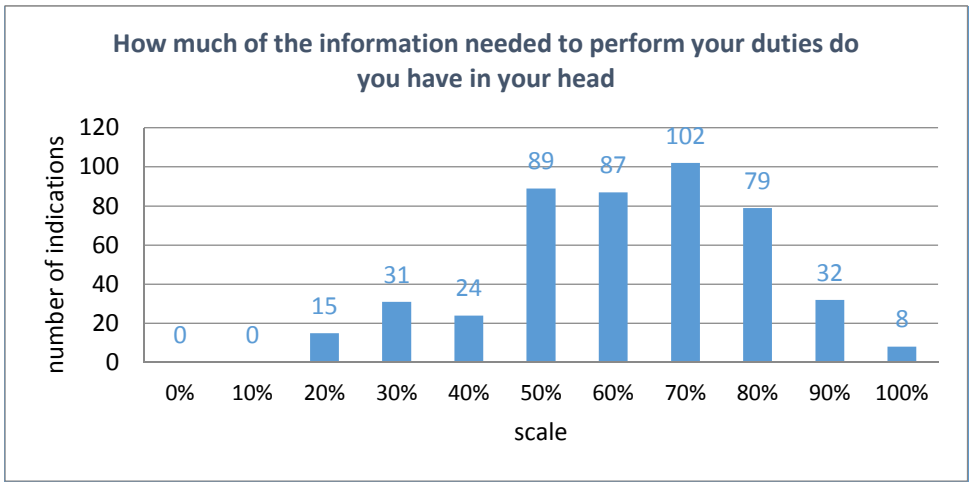

Figure 3. Histogram showing the distribution of answers to the question: "How much of the information needed to perform your duties do you have in your head?"

Source: authors' findings.

Based on the presented data, it can be concluded that the most frequent answer, i.e. given 102 times, was 70%. The next three most frequently chosen answers, 50%, 60%, and 80%, were close to the first one. On the other hand, 0% and 10% were not selected at all. Of the selected answers, respondents chose 100% (8 times) and 20% (15 times) least frequently, at a distance of eight points from each other. A rough analysis of the compiled data shows that there were some slight deviations from the normal standard distribution in the studied distribution. A more detailed analysis requires appropriate calculations and the necessary compilations to enable more precise conclusions to be drawn.

3.1. Measures of central tendency (position)

Arithmetic mean $\bar{x}$ is defined as the quotient of the sum of the value of a measurable characteristic and the number of units of the studied population. In the present case, the calculation of the arithmetic mean will allow the determination of what specific, average value of this characteristic assumes in the sample tested. The arithmetic mean was calculated according to formula 3 (Sobczyk, 2000):

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{k} x_i\, n_i = \mathbf{0.6210} \qquad \textit{formula } 3$$

where: $\bar{x}$ – arithmetic mean;
x_i – values of the characteristic for i = 1, 2, 3, ..., k;
n_i – number of units adopting the value x_i for i = 1, 2, 3, ..., k;
n – number of all tested units.

Calculating the arithmetic mean of a tested characteristic allows us to state that the **average answer to the question: "How much of the information needed to perform your duties do you have in your head?" was 62.10%.**

The median *M(x)* is a number that divides the population into two parts in such a way that half of the units adopt values less than or equal to the median, and the other half have values greater than or equal to it. An odd number of respondents (467) responded to the questionnaires, which was taken into account during the selection of the relation used to calculate the position of the median – formula 4 (Sobczyk, 2000):

$$\boldsymbol{p_{npa}} = \frac{n_{npa} + 1}{2} = \frac{467 + 1}{2} = \mathbf{234} \qquad \textit{formula 4}$$

where: p_{npa} – median position for an odd number of units;
n_{npa} – odd number of units.

After applying the obtained result to the frequency distribution of answers to the question "How much of the information needed to perform your duties do you have in your head?", the median position was found to be 60% (Table 5).

Table 5. Frequency distribution of answers to the question "How much of the information needed to perform your duties do you have in your head?" with the median highlighted

Value of the characteristic – x_i	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Total
Number of indications – n_i	0	0	15	31	24	89	87	102	79	32	8	467
Median position	234							234				468

Source: authors' findings.

The above results the median to be calculated based on a frequency distribution using formula 5:

$$\boldsymbol{M(x)} = \frac{1}{2}\left(x_p + x_{p+1}\right) = \frac{1}{2}(0.6 + 0.7) = \mathbf{0.65} \qquad \textit{formula 5}$$

where: $M(x)$ – median (middle value);
x_p – characteristic corresponding to the position of the median p;
x_{p+1} – characteristic corresponding to the position of the median $p+1$.

Calculating the median (middle value) of the tested characteristic allows us to conclude that at least 233 respondents felt that they had 65% or less of the information needed to perform their duties in their heads, and at least 233 respondents felt that they had 65% or more. A simpler interpretation of the median obtained could be as follows: half of the respondents felt that they had 65% or less information needed to perform their duties in their heads, while the other half said that they had 65% or more.

Dominant *D(x)* is the value of the characteristic that occurs most frequently in a given population (this research problem) or with the highest probability. The most frequently

occurring value indicated by respondents was indicated in the distribution (Table 6) (Sobczyk, 2000).

Table 6. Frequency distribution of answers to the question "How much of the information needed to perform your duties do you have in your head?" with the dominant highlighted

Value of the characteristic – x_i	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Total
Number of indications – n_i	0	0	15	31	24	89	87	102	79	32	8	467

Source: authors' findings.

Indication of the dominant (the most common value) of the tested characteristic allows us to conclude that **the most frequent answer to the question: "How much of the information needed to perform your duties do you have in your head" was 70%.**

The $Q_k(x)$ quartiles divide the population into four equal (proportional) 25% portions. Since an odd number of respondents (467) took part in the questionnaire, formulas 6, 7, and 8 were used to calculate the position of quartiles (Sobczyk, 2000).

$$\boldsymbol{p_{k1npa}} = \frac{k_1 \cdot (n_{npa} + 1)}{4} = \frac{1 \cdot (467 + 1)}{4} = \mathbf{117} \qquad \textit{formula 6}$$

$$\boldsymbol{p_{k2npa}} = \frac{k_2 \cdot (n_{npa} + 1)}{4} = \frac{2 \cdot (467 + 1)}{4} = \mathbf{234} \qquad \textit{formula 7}$$

$$\boldsymbol{p_{k3npa}} = \frac{k_3 \cdot (n_{npa} + 1)}{4} = \frac{3 \cdot (467 + 1)}{4} = \mathbf{351} \qquad \textit{formula 8}$$

where: p_{kinpa} – median position for an odd number of units, where i = 1, 2, 3;
k_i – quartile, where i = 1, 2, 3;
n_{npa} – odd number of units.

The obtained results were marked on the frequency distribution (table 7) of answers to the question: "How much of the information needed to perform your duties do you have in your head?"

Table 7. Frequency distribution of answers to the question "How much of the information needed to perform your duties do you have in your head?" with the quartile positions highlighted

Value of the characteristic – x_i	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Total
Number of indications – n_i	0	0	15	31	24	89	87	102	79	32	8	467
Quartile positions	117					117 (234)		117 (351)		117 (468)		468

Source: authors' findings

In view of the above, quartiles were calculated using formulae 9, 10, and 11 based on the frequency distribution.

$$\boldsymbol{Q_{k1}(x)} = x_p + \frac{k_1}{4}\left(x_{p+1} - x_p\right) = 0{,}5 + \frac{1}{4}(0{,}6 - 0{,}5) = \mathbf{0{,}525} \qquad \textit{formula 9}$$

$$\boldsymbol{Q_{k2}(x)} = x_p + \frac{k_2}{4}\left(x_{p+1} - x_p\right) = 0{,}6 + \frac{2}{4}(0{,}7 - 0{,}6) = \mathbf{0{,}65} \qquad \textit{formula 10}$$

$$\boldsymbol{Q_{k3}(x)} = x_p + \frac{k_3}{4}\left(x_{p+1} - x_p\right) = 0{,}8 + \frac{3}{4}(0{,}9 - 0{,}8) = \mathbf{0{,}875} \qquad \textit{formula 11}$$

where: $Q_{ki}(x)$ – quartile, where i = 2, 3, 4;
x_p – value of the characteristic corresponding to the position of the quartile p_{ki};
k_i – quartile, where i = 1, 2, 3, 4;
x_{p+1} – value of the characteristic corresponding to the position of the quartile $p_{ki} + 1$.

The results showed that the first quartile was 52.5%, the second quartile was 65%, and the third quartile was about 87.5%. After comparing the calculated median and quartiles, the second quartile had the same value as the median. Therefore, the interpretation of this result has already been presented before. The fourth quartile, on the other hand, was not subjected to calculations and analysis because it was the quartile that closed the sample. To conclude, the calculation of the values of the second and third quartiles of the tested characteristic allows us to assume that **at least 117 respondents felt that they had 52.5% or less of the information needed to perform their duties in their heads, and at least 117 respondents felt that they had 87.5% or more.**

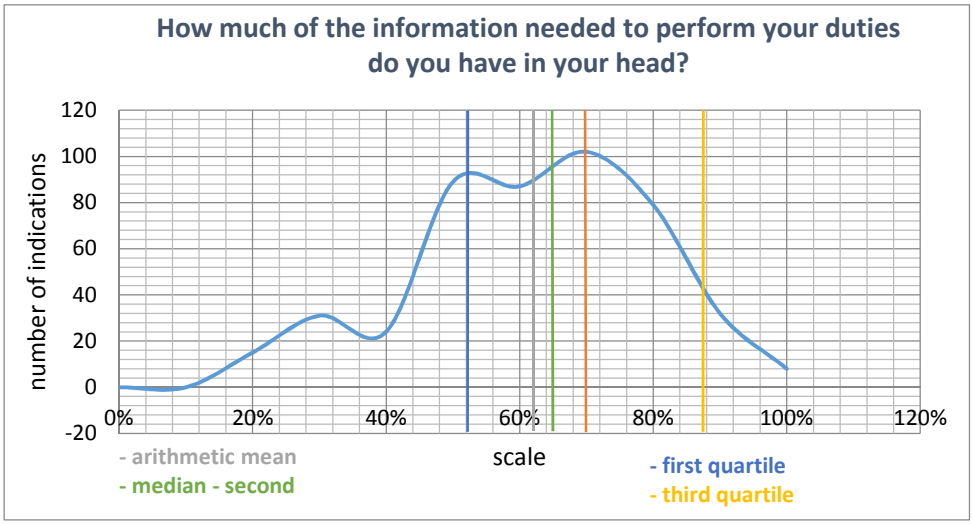

Figure 4. Plot showing the distribution of answers to the question: "How much of the information needed to perform your duties do you have in your head?" with measures of central tendency (position): arithmetic mean, median, quartiles, and dominant

Source: authors' findings.

A simpler interpretation of the quartiles obtained could be as follows: **one-fourth of the respondents felt that they had 52.5% or less information for the performance of their duties in their heads, and one-fourth had 87.5% or more.**

A summary of the conclusions, including measures of central tendency (position), has been presented in graphical form in Figure 4.

3.2. Measures of variability (dispersion), skewness (asymmetry), and kurtosis (concentration)

Calculated measures of variability (dispersion), skewness (asymmetry), and kurtosis (concentration) are necessary to complete the statistical analysis. However, considering that their interpretation in this study is merely complementary, the results of the calculations are presented in Table 8.

Table 8. Results of calculations of statistical measures of respondents' answers to the question "How much of the information needed to perform your duties do you have in your head?"

#	Measure	Result
	Measures of variability (dispersion)	
1.	**Variation $s^2(x)$**	**0.0325**
2.	**Standard deviation $s(x)$**	**0.1803**
3.	**Classical coefficient of variation $V(x)$**	**0.2903**
4.	**Quarterly deviation $Q(x)$**	**0.1750**
5.	**Positional coefficient of variation $V_p(x)$**	**0.2692**
	Measures of skewness (asymmetry)	
6.	**Classical coefficient of asymmetry A(x)**	**-0.3390**
7.	**Positional coefficient of asymmetry $A_p(x)$**	**0.2857**
8.	**Skewness coefficient**	**0.1**
	Measures of kurtosis (concentration)	
9.	**Concentration coefficient $K(x)$**	**2.5455**
10.	**Excess coefficient $g(x)$**	**-0.4545**

Source: authors' findings.

The calculated variance at the level of 0.0325 allows us to state that **there are small differences between the mean and individual results, and the dispersion is small.** A standard deviation of 0.1803 indicates that the **test results deviate on average by 18.03% from the arithmetic mean, which makes it possible to determine that they fall within the typical range of variability and that their spread around the mean is moderately low.** The classical coefficient of variation of 0.2903 allows us to conclude that the **dispersion of distribution is low**. A quarter deviation of 0.175 allows us to conclude that the **deviation of the value of the characteristic from the median among the units from 25% to 75% of the measured characteristic is small**. The positional coefficient of variation was 0.2692, which confirms the conclusion drawn based on the classical coefficient of variation that the **dispersion of distribution is weak - respondents were slightly differentiated in terms of the answer to the question: "How much of the information needed to perform your duties do you have in your head?"**

Taking into account the absolute values of the classical coefficient of asymmetry and positional coefficient of asymmetry, which were 0.3390 and 0.2857 respectively, as well as the positive value of the skewness coefficient equal to 0.1, it can be concluded **that the**

distribution has a very weak right-handed asymmetry. There are slightly more than half of the respondents who, when answering the question "How much of the information needed to perform your duties do you have in your head?" indicated an answer with a value lower than the arithmetic mean.

The interpretation of the results of the concentration coefficient and the negative excess coefficient calculations, which were 2.5455 and -0.4545 respectively, is as follows: **the values of the answer to the question "How much of the information needed to perform your duties do you have in your head?" were less centered around the mean than in a normal distribution, and their line was flatter than that of a normal standard distribution.**

4. SUMMARY

It is worth making a short analysis of what the result of the diagnostic survey indicates, in response to the question "How much of the information needed to perform your duties do you have in your head?" Of course, detailed interpretations of the arithmetic mean $\bar{x}$ (62.1%), the median *M(x)* (65%), the dominant *D(x)* (70%), and the first (52.5%) and third (87.5%) quartiles $Q_k(x)$ were presented over the course of the statistical analysis. On the other hand, some general conclusions can be drawn from them.

First, it should be stressed that the result of this type of study may be very widely considered due to its nature, being both primary (research) and secondary (control). For research, the survey results should be considered in association with the area of operation of an organization. In an organization in which the majority of personnel resources perform their tasks in the materially defined production, in a frontline "battlefield" environment similar to the armed forces, personnel should be expected to have in their heads a significant amount of information necessary to carry out their duties.

The results showed that the vast majority of respondents defined the knowledge in their heads, which is necessary for the performance of their duties, at levels of 50% to 80%. There was a sharp increase in the distribution between the group of respondents estimating the amount of knowledge between 20% – 30% and 50%. The results obtained from most groups showed the need to support the actions taken with the information provided by the outside world. Further questions can be formulated at this point, concerning the self-assessment of soldiers, especially those who indicated in their answers that the range of information in their possession fully covers the demand for the information necessary for the execution of tasks (100%).

Knowledge resources will, of course, be different for soldiers of the general military subdivisions of the Land Forces, for submarine seamen or frigate commanders, and for fighter pilots (specialty). The knowledge resources necessary for effective operations must also be considered from the point of view of the tier and levels of command. There are significant differences between the responsibility of a platoon commander, a company commander, and a division or army commander, which goes hand in hand with their expected amount of knowledge.

Soldiers, and especially commanders, receive more and more information provided in an unprecedented way. The number of sensors and media which overload communication systems with mega-data of different levels of confidentiality is increasing. A soldier, commander, or recipient of such information may easily become reliant on it or, in contrast, begin to ignore it (Latiff, 2018). A kind of dependence on the results of computer systems

calculations may result in the loss of creative thinking and independence in decision-making (Latiff, 2018). This is one of the main threats to effective command.

It is difficult to imagine a worker stopping production, or a soldier stopping combat operations due to a lack of knowledge about what should be done and what should happen next. In such a case, the survey result indicating that respondents have in their heads a negligible percentage of information necessary to perform their duties indicates a need to take action aimed at improving training and professional development processes.

In the case of control, on the other hand, the survey results may indicate whether the introduced knowledge management solutions are effective, whether it is justified to implement further complicated and expensive knowledge management tools, or whether decisions are required concerning a systemic, organizational approach to knowledge management of the rank of, e.g., strategy.

Overall, the results of the presented survey can be seen directly as a measure of a certain statistical characteristic in an organization, and also as an indicator for possible further research and undertaking specific activities – implementing necessary changes in the field of knowledge management.

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Magdalena INGLOT[1]

FREQUENCY OF OCCURRENCE OF ORGANISATIONAL MANAGEMENT DYSFUNCTION: FROM THE PERSPECTIVE OF YOUNG PEOPLE ENTERING THE LABOUR MARKET

The article deals with issues directly related to organizational irregularities. Its aim is to investigate the degree of exposure of young people to organizational dysfunctions, as there is now a clear research gap regarding the scale of the problem in this group of employees. The article presents successively why young workers are particularly exposed to this type of phenomena. The essence and causes of the problem are shown. An attempt was made to systematize organizational dysfunctions. The most important threats resulting from irregularities are also presented. In addition, on the basis of quantitative research, an attempt was made to determine the scale of the problem among people with short work experience and the effects of these organizational dysfunctions in this social group were examined. A full understanding of the mechanisms involved in the occurrence of organizational irregularities is very important from a social point of view as it can help to reduce the scale of the problem.

Keywords: organisational pathology, organisational dysfunctions, young workers.

1. INTRODUCTION

Capital is an indispensable element of the functioning of any organisation. It allows the realisation of a company's strategy and the production of added value. It is also a decisive factor in competitive advantage. Until recently, cost optimisation that enables to generate savings was considered the most frequently used to build the company's position in the market. Over the years, however, it turned out that global market shock has changed the perception of strategic planning, risk and business (PARP, 2015). More and more attention is paid to human capital as one of the most important values. Competent and experienced employees characterised by energy, persistence and resourcefulness (King, 2005) can be the best ones for crisis situations and unforeseen events.

There are often numerous irregularities in human resource management. These behaviors are called organisational dysfunctions. By definition, one of the meanings of dysfunction is incorrect phenomena and processes in social life, but this term can also be applied to business relationships (Kamińska, 2014). In this case, it concerns all phenomena that are inconsistent with statutory law, generally accepted social and ethical principles.

[1] Magdalena Inglot, MSc, Department of Projects Management and Security Policy, Faculty of Management, Rzeszow University of Technology, 10 Powstańców Warszawy Ave., 35-959 Rzeszow; e-mail: m.inglot@prz.edu.pl. ORCID: 0000-0001-5859-1366.

This type of behavior is fostered by the development of civilization, which contributes to exerting pressure on the efficiency of action, the alienation of the individual in society or the extension of working time. Seemingly, these phenomena in the initial stage may be beneficial for enterprises, but over time, they have a destructive impact on employees and, consequently, on organisations. In the literature on the subject, there are many publications dealing with the problem of organizational dysfunctions, but there is a clear research gap regarding the scale of this problem affecting young workers. Young people, who start their careers, are particularly vulnerable to the effects of dysfunctional behaviour. They are often characterized by enthusiasm and commitment, but they do not have enough experience. When they ecounter organisational pathologies, they are often unable to cope with such problems. This leads to negative effects in their further professional careers, but it may also impact on their private life. That is why it is so important to fully understand the mechanisms associated with the occurrence of organisational irregularities. This can significantly reduce the scale of the problem.

The aim of the article is to show the influence of organisational irregularities on the functioning of enterprise culture with particular emphasis on the determinants of occurrence and the effects they may cause. Moreover, it is necessary to examine to what extent young people are exposed to organisational dysfunctions.

2. THE DETERMINANTS OF ORGANISATIONAL PATHOLOGIES

Dysfunctions can disrupt the proper functioning of the enterprise and adversely affect its social system. They can take place over a long proid of time, which in turn leads to waste in a moral or (and) economic sense (Pasieczny, Glinka, 2016), exceeding the limits of social tolerance and resulting in the reduction of effectiveness (Choroszczak, 2015).

Pathologies in social groups most often come from problems and disorders in interpersonal relationships. When interpreting the sources of this type of behavior, it is appropriate to carry out comprehensive analysis of the knowledge provided by various fields: psychology, sociology, anthropology, medicine or organisational behavior (Van Fleet, Griffin, 2006). An unequivocal classification of the causes of organisational dysfunctions is not easy, because the abuses usually occur when several factors appear simultaneously and are dependent on the specificity of enterprises. Most often, however, the common element turns out to be the lack of compliance with the principles of cooperation, such as trust, responsibility and proper communication (Lewicka, 2011).

The organisations that do not create a space for discussion, considering problems or accepting the possibility of making mistakes, exert a strong emphasis on their employees (Wells, 2006). In connection with the above, there may be abuse in organisations occurs between managers and subordinates. This phenomenon is most common in centralized organisations where the management has a strong influence on the organisational climate, strategy and structure (Kets De Vries, Miller, 1984).

There are many mistakes made by employers, such as relying too much on procedures, disregarding proven solutions in the pursuit of new products, shifting responsibility for any mistakes and a lack of willingness to obtain knowledge from employees. On the other hand, firmness and rationalization in decisions made by managers may be perceived as ruthlessness and unfairness (Pasieczny, 2012). Such an opinion is not always justified due to the lack of full information among employees. That is why it is so important to present and properly justify decisions.

Paradoxically, the law turns out to be another element contributing to the emergence of organisational dysfunctions. Defective legal regulations and improperly functioning state institutions are assessed as one of the basic barriers to ethical management (Szczupaczyński, 2011). Following only the regulations may turn out to be insufficient, as there are often inconsistencies or ambiguous provisions. That is why it is so important to strengthen them with ethical codes (Singh, Prasad, 2017).

Moreover, the source of organisational pathologies, which are synonymous with organizational dysfunctions, may be the actions undertaken in response to the crisis. The crisis is associated with strong competition and a struggle for a position on the market. The situation often requires ruthless and aggressive behaviour. The company, to a large extent, focuses on the implementation of tasks that are to contribute in the first place to the survival on the market. Such an approach helps in achieving market stabilization, but it is not necessarily accompanied by social and humanistic success (Miklaszewski, 2013). Unethical behaviour becomes a means to achieve goals. An integrated and trustworthy team characterized by honesty and trust often transforms into a group focused only on the tasks set. It is worth noting, however, that the situation may often be the opposite and that pathological organisations may cause the various types of crises, including even the industrial ones (Miller, 1988).

It often turns out that employees who have experienced organisational pathologies later commit abuses in the work environment by themselves (Lewicka, 2011). Certain dysfunctions determine subsequent dysfunctions. Employees justify the committed abuses by unethical behavior of their co-workers. The internal consent and the lack of adequate regulations and ethical standards make difficult to prevent and detect disfunctions in enterprises. A thorough understanding of the cause of the problem helps to determine the reason, this type of situation arose and to deduce why young people are participants in the abnormalities.

3. THE CLASSIFICATION OF IRREGULARITIES IN ENTERPRISES

It is not easy to clearly classify abuses and dysfunctions in enterprises. Deviations can take many forms, vary in intensity, and may also depend on the type of enterprise. Moreover, the procedure of the occurrence of irregularities is usually not repetitive. Irregularities can often penetrate one another then their division will also be blurred. However, the adoption of a certain system enables researchers to arrange distant problems and issues (Szostek, 2015). The most common and comprehensive classification is considered to be the typology proposed by S. L. Robinson and R. J. Bennet (1995). This classification will allow for the identification of organizational pathologies with the strongest impact in order to examine the scale of the related problem. These dysfunctions require a quick and decisive response.The groups of dysfunctions were distinguished, differing in terms of the strength of their impact on the environment and their influence on the organisation or other employees:

1. Production irregularities:
    a. Taking excessive breaks,
    b. Leaving early,
    c. Intentionally working slow,
    d. Wasting resources.

2. Property dysfunctions:
   a. Accepting kicbacks,
   b. Sabotaging equipment,
   c. Stealing from company,
   d. Lying about hours worked.
3. Political irregularities:
   a. Showing favouritism,
   b. Blaming co-workers,
   c. Gossiping about co-workers,
   d. Competing non-beneficially.
4. Personal aggression:
   a. Verbal abuse,
   b. Sexual harassment,
   c. stealing from co-workers,
   d. Endangering co-workers.

Production dysfunctions are characterized by relatively low harmfulness and they are classified as moderate deviations. Their common feature is always waste. Employees perform their duties incorrectly, which hinders to achieve the company's goals and strategy. The examples of such behavior include devoting working time to private affairs, insufficient attention to tasks, being late and misusing company assets (Slowak, Regenfelder, 2016). The abuses of this type often result in the irregularities of greater harmfulness (Szostek, 2016) and require the need to conceal the inconvenient facts.

Property dysfunctions are significantly harmful to the company. This group includes sabotage, corruption, economic theft or the use of stimulants in the workplace. The sabotage is an international and destructive influence on an organisation's performance (Ambrose, Seabringht, Schminke, 2002). Its causes may be related to the desire to take control, a manifestation of thoughtlessness or an act of helplessness when other forms of protest did not bring the desired results (Bugdol, 2007). The sabotage can manifest itself through a destruction of the work environment, a passive attitude or a lack of commitment. The theft applies to both tangible goods and intellectual property (Payne, Gainey, 2004). As for enterprises, it is often associated with the risk of stealing items related to key competences. The corruption is each time meeting the expectations of third parties using positions and people receiving an undue advantage in return (Bartosz, 2019). Unfortunately, in practice, it is often tolerated despite verbal condemnations (Graycar, 2015). This phenomenon disrupts the functioning of market mechanisms, disturbs economic development, and endangres the image of the organisation. The use of stimulants in the workplace is also a problem for many organisations. This happens despite bans and sanctions (Olak, Bonusiak, 2012). These types of pathologies reduce the concentration of employees, physiological disorders or are often the causes of accidents.

Political irregularities include low-harm interpersonal acts. They may concern gossip, favouritism, protection, surveillance and reporting. The surveillance is the exercise of supervision over an employee without his consent (Ibrahim, 2016). An initiator may be the employer, but also other associates. In the latter situation, the phenomenon turns into reporting. However, this activity is not always the same as informing. Gossips play a significant role in the social and economic system. They can affect both business situations and interpersonal relationships. The gossip can become a form of aggression and turn into a conflict (Bugdol, 2007). Favouring and patronage are elements of the abuse of power.

They are related to better treatment of stakeholders due to private considerations. Nepotism is even an narrower phenomenon because it only affects family members (Rosicki, 2012). All these processes are harmful because they do not build a culture of trust.

The last area in the typology of organisational dysfunctions is personal aggression. It may cause a very strong threat to interpersonal relationships. This group of pathologies includes sexual harassment or mobbing. The first one is a form of discrimination. This phenomenon includes unacceptable sexual behavior, such as unwanted sexual comments, gestures or sexual activities (Quick, MsFadyen, 2016). In this way, aggressors create an intimidating, hostile and offensive work environment that threatens the employees' sense of security (Burn, 2019). Another threat with equally serious consequences is mobbing. It is concerned with deliberate mental abuse that affects social relations, communication, the current work and life situation. It manifests itself in prolonged and unfounded harassment, terror and psychological violence (Kowal, Pilarek, 2011). The purpose of this procedure is to humiliate, intimidate and limit the ability of defense. The phenomenon is based on manipulation and leads to the social isolation of a victin, self-depreciation, powerlessness and separation from co-workers (Duffy, Sperry, 2007). These irregularities not only have negative consequences for the individual and the entire organisation, but also violate human dignity.

4. THE CONSEQUENCES OF ORGANISATIONAL DYSFUNCTIONS

One of the most common consequences of organisational irregularities is chronic stress of the employee (Kessler, McGonagle, 1990). The fear caused by negative stimulus contributes to psychological destabilization. The consequences of these actions affect the mental and physical spheres of a person. In practical terms, stress is associated with exhaustion, tension, and the feeling of being unable to solve a difficult situation (Leśniewska, 2015). At the time of its occurrence, physiological and biochemical changes take place. Stress is an inseparable element of life, but it is more isible in professioal work. It is a desirable phenomenon because it promotes the generation of motivation and has a stimulating function, but after exceeding the limit of the optimal level of stress, the effectiveness drops significantly (Quillian-Wolver, Wolwer, 2011). This happens very often among employees who are affected by organisational abuse, particulary in cases of unhealthy competition, reporting, surveillance or mobbing, i.e. interpersonally targeted irregularities.

The people most susceptible to stress are the ambitious employees with high expectations , a great sense of mission, a strong commitment, for whom the inability to achieve the set goals causes a significant dissonance (Bańkowska, 2016). These employees are characterized by negating their own load limit. It is especially often noticeable among the people starting their professional careers. The difficult situation related to the occurrence of organisational dysfunctions, combined with these features, can clearly affect the mental health of employees. It was found that 10% of mental disorders are associated with occupational diseases (Leśniewska, 2015). This phenomenon is particularly noticeable in Japan, where due to professional problems, approximately 2,100 people took their own lives in 2016 (Kalińska, 2017). It is 8.94% of all suicides (Pacholczyk, 2020). This shows the scale and reality of the problem.

Chronic stress can turn into professional burnout. It is associated with long-term involvement in emotionally burdensome matters and manifests itself in physical, mental

and emotional exhaustion (Maslach, Schaufeli, Leiter, 2001). The phenomenon of occupational burnout is dynamic. It consists of the five stages (Kraczla, 2013). The first phase is connected with physiological complaints. Then there is a social disturbance related to the problems in interpersonal relationships. The third phase is associated with intellectual disorders such as the difficulties appear in information processing and logical thinking. The next stage concerns the behavioral changes associated with the decline of responsibility. The last phase is loss of faith in the values one believe in. Then one feels an inner void. Professional problems and irregularities disrupt the employee's private life and are associated with emotional exhaustion. Another suggestion to classify the symptoms of burnout is loss of commitment, irritation towards colleagues, lack of concentration, use of stimulants and a feeling of "emptiness" (Maslach, 2011). The burdens resulting from this phenomenon are also transferred beyond the organisational boundaries (Acar, Aupperle, 1984).

In these cases, the companies have to cope with the reduced productivity and more absenteeism due to illness. It is also characteristic to increase the probability of making mistakes and problems with timeliness. In extreme cases, it may even lead to strikes. If an employee decides to resign, then the company bears the costs of the severance pay, the recruitment and the training of a new employee (Ostrowska, Michcik, 2014). Indirectly, by examining the frequency of these effects, conclusions can be drawn about the frequency of irregularities. Such stimulation will also be carried out in the study. All these effects can be counteracted by eliminating irregularities in the organisation.

5. THE SCALE OF THE PROBLEM OF ORGANISATIONAL PATHOLOGIES IN RELATION TO THE PEOPLE ENTERING THE LABOUR MARKET – THE RESEARCH RESULTS

The research was conducted in order to better understand the scale of the occurrence of organisational irregularities affecting people starting their careers. It was made by using the CAWI method based on gathering information through interviews in electronic form, applied in conducting quantitative research (Nowak, 2007). The selected technique allows for a reliable measurement, and the study results can be generalized. The survey covered issues related to dysfunctions at the organizational and interpersonal levels. According to the classification, those characterized by high harmfulness were selected. The influence of dysfunction on the occurrence of chronic stress or occupational burnout was examined. The survey questions had a closed structure. They were directed to internet groups associating employees. It was noted that people taking part in the study should not work for more than 2 years. The study was conducted at the 95% confidence level, and the maximum error of this analysis is 6.79%. 223 people took part in the survey. The study group included 152 women (68.16%) and 71 men (31.84%). All responses were received in April 2020.

The study finds that for 78.9% of those people the attachment to work was conditioned by the necessity to obtain funds for daily living. Over 40% of respondents declared that they did their job only because they were not able to find a better offer. Only 37% of people were satisfied with the atmosphere in their workplace. Over 32.7% of respondents claimed that work gave them the opportunity for personal development. Moreover, 15% of people surveyed had concerns about the difficulties associated with changing jobs. Only 12.1% of respondents declared satisfaction from the received salary. As other benefits related to the performance of professional activities, the most frequently mentioned advantages were

a benefit package, flexible working hours and a position corresponding to one's own interests. The results are shown in Figure 1.

It turned out that candidate favouritism during recruitment process is still a significant problem. Over 41.2% of respondents declared that the companies where they worked employed the family or friends of the management staff. Less than 20% of participants said that they have no knowledge of this dependency. The scale of the problem may be even greater.

In fact, 63.3% of respondents experienced the symptoms of workplace bullying, relate to the use of long-term and unfounded psychological violence. Most respondents declared that they received an excessive amount of work.

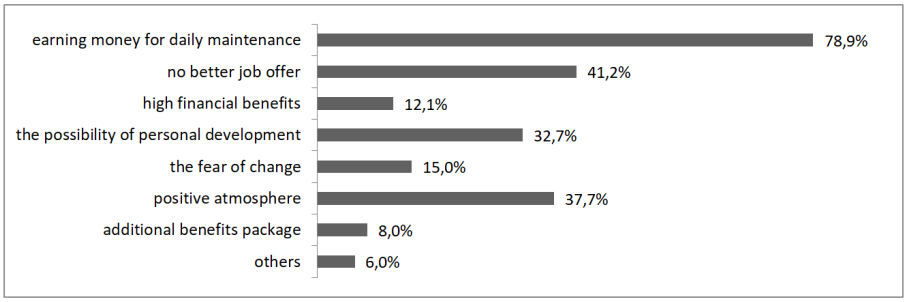

Figure 1. The determinants of performing work in the current position

Source: The author´s own work based on the research results.

Another serious problem is unjustified criticism – over 32.7% of respondents encountered this phenomenon. About 18.1% of the people experienced wrong questioning of competences for a long time. Over 10% were insulted and socially isolated from other employees. Only 6% of people surveyed said that they experienced at least four symptoms of mobbing at the same time, which indicates a very serious problem. Most respondents who experienced these behaviors were forced to continue working because they earned a living. That is why it is particularly difficult to stop this circle of aggression.

Another significant problem is sexual harassment. Almost 50% of respondents experienced its manifestations. The most common problem concerns comments regarding appearance and clothing. About 36.2% of respondents met them in the workplace. Erotic jokes were experienced by 32.7% of respondents. Only 3% of young employees declared that they received sexual offers while performing their professional duties and this group included only women. Over 6% of the respondents experienced an attempt of physical contact, and also in this case, those people declared that their current job was necessary for them to obtain funds for daily living.

The performance of professional duties is often accompanied by stress. The phenomenon intensifies in particular when irregularities occur. Already 8% of people who started their professional activity, declared that they felt stressed at a very high level. This group mainly includes the people for whom their work provides the possibility of daily living. Most of respondents (38.2%) were accompanied by moderate stress. Only 9% people surveyed described the level of stress in the performance of professional duties as very low.

Chronic stress can be one of the causes of burnout in the workplace. Only 34% of those who started their careers said that they have never experienced any the symptom of professional burnout. About 40% of respondents felt irritation towards their colleagues. About 23.1% of people talked about the lack of commitment. The problems with concentration had 27.6% of respondents. Only 8% of people surveyed couldn't cope with a given situation and used stimulants to improve their well-being. About 26.6% of respondents admitted that they experienced the feeling of "emptiness". Only 4% of all respondents noticed at least the four symptoms, which might indicate an advanced stage of occupational burnout.

What is more, respondents stated that the role of management is very important in preventing organisational irregularities. Over 75% people surveyed assessed that the management with their actions, decisions and approach can significantly counteract the occurrence of this type of behavior. Only 13% of those people claimed that the role of managers in this area was small or not at all. It proves the enormous role of the management staff, as well as the responsibility for proper functioning and proper relations between employees.

6. CONCLUSIONS

People who have just started their professional careers are much exposed to organisational dysfunctions. This is due to the lack of professional experience and limited employment opportunities. Young people most often take up their professional activity due to the necessity to obtain funds for daily living. In this case, the position of the employer is much higher.

This contributes to the occurrence of chronic stress, which, according to the research, affects about 30% of the young workers, and to occupational burnout, which is also a significant problem in this social group. Over 60% of employees surveyed experience workplace bullying. Usually, people who present their situation as the most difficult in terms of the abuses are forced to do so by a complicated financial situation. Managers should be aware of the fact that employees affected by organisational irregularities are much less effective which negatively affects the functioning of the organisation.

Certainly, the issues discussed in the article still require the further development in the form of qualitative research, but the scale and reality of the problem and its negative effects for people just starting their professional activity are clearly signaled. The fight with days functions makes since for the empoloyees who can derive satusfaction from their work and the management staff who cares about the efficiency and image of a team, so it is worth paying a lot of attention and interest to this issue.

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Damian LISZKA[1]
Paweł WALAWENDER[2]

COOPERATION TOWARDS SUPPORTING DUAL EDUCATION SYSTEMS (VOCATIONAL EDUCATION)

This article reports the results of research performed during the "DUAL. Transnational cooperation towards supporting dual education in vocational education and training institutions" (DUAL) project implemented by a consortium of labour market institutions located in Poland and Belgium. The aim of the research was to determine the status the attractiveness and quality of the current vocational education offered at the regional level, preparation of students for the transition from the education system to the local labour market, implementation of dual education by schools, and the required module in vocational counselling in schools in the Subcarpathian voivodeship, including in the context of counteracting NEET (i.e., not in employment, education or training) phenomenon. The research, carried out as part of the DUAL project, permitted identification of trouble spots within Subcarpathia in the context of vocational education, and the conclusions from the research will be used to support educational institutions as well as to construct recommendations for labour market institutions.

Keywords: dual education, vocational training, unemployed youth, labour market, NEET.

1. INTRODUCTION

Bringing vocational education closer to the requirements of the labor market is essential to increase its effectiveness. An effective solution to achieve this goal is to combine education at school with internships, apprenticeship, or other form of work within a company. It is the so-called "dual education system", which is very widespread in countries that are highly developed economically; such as Germany, Austria, Switzerland and France.

Dual education is not limited to secondary education. It is often implemented in higher education as practice-oriented university programmes (Alli, Nillson, 2015), or even in courses for youth who are learning English as their second language (Le Menestrel, 2020). A revival of enthusiasm for dual vocational education and training can be observed in the European Union since the start of the global financial crisis (Šćepanović, Martín Artiles, 2020).

[1] Damian Liszka, PhD, Institute of Philosophy and Sociology, The Pedagogical University of Krakow; e-mail: damian.liszka@up.krakow.pl. ORCID: 0000-0002-2192-1672.
[2] Paweł Walawender, PhD, Institute of Philosophy and Sociology, The Pedagogical University of Krakow; e-mail: pawel.walawender@up.krakow.pl (corresponding author). ORCID: 0000-0003--4573-5759.

Dual vocational education is based on the close cooperation between two partners: the company and the vocational school. The partners share the responsibilities related to the education of the students. The school imparts theoretical knowledge and the company assumes the responsibility for practical training. Students spend several days a week within the company, where they learn and perform tasks similar to those they will occupy themselves with in the future, once they become full-fledged employees of companies (German dual education system, http).

There are some terminological inaccuracies in Polish publications and scientific studies which hinder developing an unambiguous position in relation to the definition of dual education (Bura, Barańska, Cieślik, 2014).

The common basis for defining dual education is acknowledgment – its "duality", understood as:

- the duality of places of learning (schools / organizers of vocational education and training as well as companies providing training), which are jointly responsible for the implementation of theoretical and practical training,
- the duality of entities (public and private ones) that are jointly responsible for policy and practice in the field of vocational education and training.

The basis for the definitions used in European and international literature is the duality of places of learning (Nogueira, 2014).

According to UNESCO, "the dual education system is designated »dual« as within its framework the process of apprenticeships in a company as well as vocational training in a vocational school are combined into one course" (Nogueira, 2014).

In turn, according to Cedefop, the term "dual education system" can be used interchangeably with the terms "alternate training", "apprenticeship" or "work-based learning" (Nogueira, 2014).

The difficult situation of young people in the labor market requires solutions that support their transition from education to employment. There are high hopes for the advancement of a work-based learning system in the workplace. Although there are work-based learning programs in place in all EU member states, their scale, popularity and results vary considerably. To date, there is no single apprenticeship model and in most member states this system is definitely not the primary pathway to vocational education and training (German dual education system, http).

One of the attempts to solve this problem was the project entitled "DUAL. Transnational cooperation towards supporting dual education in vocational education and training institutions"[3] carried out by a consortium of labor market institutions from Poland and Belgium[4]. Its aim was to develop and implement solutions supporting the adaptation of

[3] Project No. POWR.04.03.00-00-W338/16, co-financed by the European Union under the European Social Fund.

[4] Project "DUAL. Transnational cooperation towards supporting dual education in vocational education and training institutions" (DUAL) was carried out in the period between 1st August 2017 to 30th April 2020 by the leader of Educare Et Servire Foundation, Vlaams Agentschap voor Ondernemersvorming – SYNTRA Vlaanderen (transnational partner, a Belgian government organization), as well as national partners: BD Center sp. z o. o. (until 31st December 2018), Pedagogical University of Krakow (from 18th January 2019). Its goal was for at least 30 entities from 16 voivodeships in Poland to develop and implement new solutions, supporting the adjustment of vocational education and training systems to the needs of the labor market, facilitating the transition of students from vocational schools to the employment stage, and aimed at assisting

vocational education and training systems to the needs of the labor market, facilitating the transition of vocational school students from the education stage to the employment stage. The focus of attention for implementers of the project included individuals in the NEET category[5].

One of the initial stages of the project's implementation was the research stage. The research pertained to Poland and was aimed at determining the status quo in terms of: the attractiveness and quality of vocational education offered at the regional level, the preparation of students for the transition from the educational system to the local labor market, the implementation by schools of the idea of dual education, as well as the an obligatory module on career counseling in schools within the Subcarpathian voivodeship, including in the context of counteracting the NEET phenomenon. The purpose of this article is to present the conclusions of these analyses.

As a result of taking up such extensive research problems, the results and conclusions presented in this study only cover topics related to vocational education. On the other hand, topics related to career counseling in schools, career development paths chosen by students and their preparation for work in real employment conditions, as well as the NEET phenomenon may be the subject of a separate analysis. The aforementioned issues were researched in the DUAL project, but the interpretation of the results is not part of this article.

2. METHODOLOGICAL ASSUMPTIONS AND THE RESEARCH SAMPLE

The research phase of the project was carried out in the period from November 1, 2017 to March 31, 2018 in Subcarpathian voivodeship. The methodology was applied based on the concept of triangulation (combining research techniques). The following techniques were employed:

a) analysis of the data of existing educational documentation (desk research), primarily regarding the vocational education system and the situation in the labor market in Poland,
b) moderated discussions during six focus group interviews (FGIs) with employees of educational, counseling, and career counseling institutions (n = 33), as well as five FGIs with young people: students, graduates, including those belonging to the NEET category within the ages of 18–29 (n = 40), from the Subcarpathian voivodeship area.

The common denominator of the research was determination of the existing state: the attractiveness and quality of vocational education offered at the regional level, the preparation of students for their transition from the education system to the local labor market, the implementation of the idea of dual education by schools, as well as the implementation of an obligatory module on career counseling in schools in Subcarpathian, including in the context of counteracting the NEET phenomenon. The analysis of the material obtained during the research took place from January 15, 2021 to February 28, 2021 using a secondary data analysis (desk research) method. This is a social research technique that assumes the analysis of existing and available data and is not related to the acquisition of new information, but to the organizing, processing, and analysis of the collected data, both external and internal (Boguszewski, Makowska, 2013, in: Chmiel, 2018).

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so-called NEET youth over 18 years of age in acquiring professional qualifications. Ultimately, the solutions were implemented by 75 institutions.

[5] More on this topic: (Liszka, Walawender, 2021).

The desk research report on dual education within vocational training and educational institutions by Chmiel was formulated in March 2018. The subject of the analysis was specifically the following issues:

a) the situation of Polish vocational education before 1999;
b) the assumptions of the 1999 reform of the education system (in the context of changes in vocational education);
c) the state of Polish vocational education after political changes;
d) the assumptions of the latest education system reform in 2017 (mainly in the field of vocational education);
e) the principles for the functioning of the dual education model (Chmiel, 2018).

Focus Group Interviews with 33 employees of institutions, related to education or vocational activation from Subcarpathian voivodeship, were carried out in Rzeszów in the period from January 30, 2018 to February 16, 2018. The FGI technique is one of the qualitative methods used in social research, as opposed to quantitative methods such as surveys which use standardized questionnaires and conduct research on large samples. A group interview of intentionally selected respondents in the proposed category (meaning they were not a statistical representation of any population) and situated in one place enables the collection of empirical data generated through a discussion with the participation of the researcher (moderator). The discussion may be recorded on a voice recorder or a video camera. Data obtained in this way can be analyzed in many aspects with the use of appropriate tools (Maison, 2001, in: Broszkiewicz, 2018a).

Each of the 6 FGI groups (consisting of 5 or 6 participants) was selected in such a way that the respondents constituting it possessed experience in with: students and graduates of VET schools, and NEET youth between the ages of 18 to 29. Recruitment for the study was carried out using publicly available lists of institutions.

Research problems (in the context of vocational education) focused primarily on issues such as:

a) obtaining participants' views on the vocational education system developed after the 1999 reform;
b) verifying the level of knowledge on the topic of education system reform assumptions in 2017;
c) assessment of the dual education system (advantages and disadvantages);
d) identification of potential threats in the context of achieving the goals of the dual education system (Broszkiewicz, 2018a).

The interview was based on a partially structured non-questionnaire discussion guide comprised of 12 questions (sample questions connected to VET education) asked during FGIs:

- How do you assess the level of adaptation of the current (i.e. shaped after the 1999 reform) education system in our country (including education at its respective levels) to the requirements of the modern labor market?
- In this context, what were the advantages of this system and what were the disadvantages?
- What, according to you, are the reasons for undertaking education reform that introduces dual education, as well as the purposes underlying these changes?
- What are the advantages of introducing a dual education system? What are the expected benefits of its introduction?

- Which social categories can benefit most from its introduction?
- Which trades can specifically benefit from this type of solution?
- What are the possible disadvantages of a dual education system?
- What elements are missing in the assumptions adopted by this system?
- What might the potential negative consequences of its introduction be?
- What barriers may stand in the way of achieving the goals that are set for a dual form of education?
- What measures can be taken to remedy these problems? (Broszkiewicz, 2018a).

The participants constituted a group diversified in terms of basic socio-demographic characteristics, such as: age, gender, place of residence, and workplace (see Table 1). Thanks to such a diversity of research participants, learning the opinions of respondents from very different perspectives was made possible.

Table 1. Characteristics of the FGI participants (institution employees)

Characteristic		**n**	**%**
Sex	Female	30	90.9
	Male	3	9.1
Education level	ISCED 5-8	32	96.7
	ISCED 4	1	3.3
Age	18-29	7	21.2
	30-49	18	54.6
	50-64	8	24.2
Residency (Subcarpathia)	City area	30	90.9
	Rural area	3	9.1
Workplace	Public institution – VET school	1	3.0
	Public institution – psychological and pedagogical counseling center	2	6.0
	Public institution – district job center	6	18.2
	Non-governmental organization – vocational training and professional activation institution	12	36.4
	Commercial enterprise – vocational training and professional activation institution	12	36.4

Source: Own study based on research results.

The 5 Focus Group Interviews (FGIs) totaling 40 respondents: VET students (n = 14), VET graduates (n = 15) and 18-29 year old NEET youth (n = 11) residing in the Subcarpathian area, were carried out in Rzeszów between the 14th of February 2018 and the 20th of March 2018. Each FGI group consisted of 8 participants. Survey respondents were selected from among candidates who, on the day of the study, were students or graduates of the vocational education system, or who had previously attended such a system and belonged to the NEET category (NEET status had priority in determining the respondent's status). Here, the “NEET” acronym refers to an individual who was not employed, not participating in the education system, and did not participate in additional training courses at least 4 weeks before participating in the study (Liszka, Walawender, 2018). The main sampling technique was RDS (Respondent Driven Sampling), which is an extension of the “snowball sampling” method. It consists in the recruiter attempting to reach

several people who meet the criteria for participating in the project, in two/three different peer groups. These people (the so-called “seeds”) suggest subsequent potential candidates from their group.

Research problems related to vocational education focused mainly on issues such as:

a) overall assessment of the level of education in schools being attended or were attended by the respondents;
b) respondents' experiences with practical education;
c) assessment of the assumptions of the 2017 education reform (primarily in the context of vocational education) (Broszkiewicz, 2018b). The interview was based on a partially structured non-questionnaire discussion guide with 11 questions. Sample questions connected to vocational education training asked during the focus group interviews:
   - How do you generally assess the level of education in the schools from which you graduated?
   - In your opinion, what are the advantages and disadvantages of such schools? What could possibly be improved in their operation?
   - Did you have the opportunity to participate in apprenticeships during your education? If so, how would you rate it in terms of size, organization, teacher preparation and content?
   - If not, do you notice the lack of such activities?
   - How do you assess the assumptions of the reform enabling vocational education at two levels, i.e., in 1st and 2nd degree trade schools?
   - In your opinion, what should the relationship between schools and employers be, i.e., how should this cooperation proceed in order for such an education system to be effective? (Broszkiewicz, 2018b).
   - The vocational education training students, graduates, and NEET youth participants constituted a group diversified in terms of basic socio-demographic characteristics (see Table 2).

Table 2. Characteristics of the FGI participants (VET students, graduates, and NEET youth)

Characteristic		**n**	**%**
Sex	Female (VET students/VET graduates/NEET)	18 (6/7/5)	45.0
	Male (VET students/VET graduates/NEET)	22 (8/8/6)	55.0
Education level	ISCED 5-8	8	20.0
	ISCED 4	8	20.0
	ISCED 3	9	22.5
	ISCED 2	15	37.5
Age	18-24	25	62.5
	25-29	15	37.5
Residency (Subcarpathia)	City area	28	70.0
	Rural area	12	30.0
Educational status	VET students	14	35.0
	VET graduates (working or studying)	15	37.5
	NEET	11	27.5

Source: Own study based on research results.

After the interviews a total of 11 text transcriptions had been obtained from the FGIs. The transcriptions, as well as the written "desk research" report (Chmiel, 2018), have been used for conducting in-deep data analyses using the desk research method (by the authors).

3. RESEARCH RESULTS

3.1. Changes in the structure of vocational education in Poland as a result of the 1999 reform

The education reform of 1999 was aimed at, among others, the promulgation of general education in Poland as well as to increase the percentage of people with higher education in the society. As regards changes to the structure of formal education, a new type of school was introduced – middle school (Chmiel, 2018), obligatory after completing six years of primary school. In turn, after graduating from middle school, students could continue their education in 3-year general education or specialized high schools (vocational, completely eliminated from 2012 to 2015), 3 or 4-year technical high schools, 3-year basic vocational schools, or 3-year special education schools which prepared students with moderate or severe mental disabilities as well as students with multiple disabilities for work. After graduating from high school or technical high school, the graduate could commence with the matriculation examination ("matura" in Polish) and, after passing it, continue their schooling in higher education (Górecka, 2007). On the other hand, a graduate of a 3-year basic vocational school, in order to commence the matriculation examination and continue their studies, was required to first complete a 2-year supplemental general high school or a 3-year supplemental technical high school. The period of education necessary to commence the matriculation examination was therefore at least 2 years longer for graduates of basic vocational schools than for people choosing an educational path which included high school or technical high school immediately after graduating from middle school.

As part of the assumptions of the vocational education reform introduced in 2017, the period of schooling necessary for students of first degree (which replaced basic vocational schools) and second degree (introduced as a new type of school) vocational schools to commence the matriculation exam and then proceed to higher education was 5 years (3 years first degree + 2 years second degree), similar to the period of study in a technical high school. This time frame is also comparable to the period of study in a 4-year high school; since a graduate of a second degree vocational school, in the course of their study, and in addition to a high school diploma, is able to obtain two professional qualifications, which is not possible for students during their studies in high school.

3.2. Educational preferences of Poles after political transformation

Education reform and other factors related to political transformation in Poland, such as the introduction of an "open market economy" and the bankruptcy of numerous state-owned enterprises, led to a decrease in the demand for highly qualified manual laborers and an increase in the demand for white-collar workers in newly created professions (Sondergaard et al., 2012). This triggered a change in the educational preferences of Poles and their shift from vocational education to schooling in general high schools and subsequently, at university, increasing the educational aspirations of society and the so-called "educational boom" consisting in the growing popularity of higher education in the country (Chmiel, 2018). Among EU countries, the largest increase in the percentage of people with higher

education occurred- from 15% in 2001 to 42% in 2013 in the 25-34 age group; whereas there was an increase from 24% to 36% in the entire EU27 (Lis, Miazga, 2014).

The respondents of the FGI interviews (employed individuals) supported the findings of the desk research. When asked to evaluate the education system that was shaped as a result of the 1999 reform, indicated that in their opinion the previous system rewarded aspirations for obtaining higher education while at the same time disparaged basic vocational education (a total of 11 individual statements from 6 FGI groups). According to the respondents, this was an unfavorable process, as it led to a situation in which obtaining a higher education diploma, no matter at what level or major, and also often chosen regardless of the candidate's skills or interests, resulted in an increase in the graduate's sense of social prestige. The assumptions of the 1999 reform, according to the respondents, also led to flooding of the Subcarpathian labor market with unemployed graduates of faculties for which employers had no need (e.g., law, administration, pedagogy), while on the other hand resulted in a reduction in the number of professionals in professions such as: locksmith, plasterer, sheet metal worker, welder, for which there was a real demand by employers (7 statements of employed individuals from 5 FGI groups). The above-mentioned conclusions regarding a lack of employees in the Subcarpathian labor market with practical skills related to the performance of a specific profession are also confirmed by a desk research report from 2018 (Chmiel, 2018).

The significant promulgation of general education after the 1999 reform and an increase in the percentage of Poles with higher education proceeded at the expense of lowering the status of vocational education. The share of students choosing general high schools increased between 1991 and 2010 from 23% to 41%, while the percentage of students choosing basic vocational schools decreased from 43% to 15%, whereby it was only 13% in 2005/06 (Chmiel, 2018). The percentage of technical high school graduates changed to a minor degree: between 1995 and 2013, it decreased from 25% to 21%, while the share of people with basic vocational education decreased from over 30% to 15% (Lis, Miazga, 2014). While in 1992 more students left basic vocational schools (248,000) than in schools finishing with a matriculation examination (220,000), in the following years the number of graduates from "matriculation" schools began to increase. In 2004, the number of high school graduates was over eleven times higher than the number of basic vocational school graduates (458,000 to 40,200) (Tworzydło et al., 2018). The number of basic vocational schools in Poland also began to decline. In 2005, there were 5,009 of in total, while in 2015 - only 4,026 (Chmiel, 2018). Numerous stereotypes regarding vocational schools, as well as the students and teachers in these schools, spread throughout society. Vocational schools, as compared to general high schools, began to be perceived as schools of a lower caliber, intended for students who were less successful in their previous education. Likewise, the professionally active graduates of these schools began to be perceived as employees with low social prestige (Kwiatkowski, 2013). They earned the least because the market was saturated with laborers and craftsmen. Skills that could not be provided by vocational schools, such as a knowledge of foreign languages, began to be appreciated in the labor market (Szafraniec, 2011). It coincided with the demographic boom and the economic slowdown between 1997–2002 and the related liquidation of many jobs. Factories that maintained and provided employment for graduates collapsed (Chmiel, 2018). The survey respondents confirmed the findings from desk research of the existence of social stereotypes pertaining to vocational education (8 individual statements from employed individuals

from 4 FGI groups; 7 statements from students, graduates and NEETs from 4 FGI groups). Indicated impositions on young people were:

- beliefs about the higher value of high schools than basic vocational schools;
- notions, that only individuals with such low ambitions, abilities, and skills attend such schools;
- assertions that nothing but those individuals who can't handle high school find their way into vocational schools.

It was also indicated that students of vocational schools were ashamed to talk about their education or learned profession, while students of middle schools who chose basic vocational schools in their further education paths were embarrassed to admit it to their peers.

3.3. Operation of vocational schools and a decline in the importance of vocational education

The loss of prestige of vocational education was caused not only by political transformation, the implementation of the assumptions of the education reform of 1999 or its stereotypical perception by society, but also by the activities of the bodies operating vocational schools. The offer proposed by school directors did not meet the real needs of the regional labor market or the demand reported by students (Szafraniec, 2011), and was created through a prism of the organizational, human resources and infrastructural capabilities of a given entity. This often led to a situation in which the curriculum included training in surplus occupations and industries with high unemployment (Chmiel, 2018). This is also confirmed by survey research conducted in 2015 by the Supreme Audit Office of 354 bodies operating schools, which indicated that the choice of fields of study was primarily determined by: available premises and equipment required for practical vocational training (68%) as well as available teaching staff and their qualifications (44%) (Supreme Audit Office, 2015). In view of such a supply-based model of organization of vocational education, students did not acquire the qualifications and practical skills expected by employers during their studies (Chmiel, 2018). In addition, the group interview respondents (employed individuals) indicated that the mismatch between the schools' offer and the real needs of employers, as well as the self-approach of vocational school staff (especially teachers) to changes in the labor market, described in one statement as their "reluctance to change", are problematic. This problem was indicated by a small number of respondents (a total of 4 individual statements from employed individuals from 2 FGI groups). Two respondents identified factors independent of schools that may also be the cause of the problem, such as the unpredictability of the labor market or too long a period of training, during which the demand for professions may change. On the other hand, FGI respondents who were students, graduates of vocational education and NEETs especially drew attention to the teachers, who for many years had provided the same scope of information and did not take into account the changes in a given industry as well as the labor market (4 statements from 2 FGI groups in total).

After the education reform of 1999, training in vocational schools was comprised of general, theoretical and vocational education, which could be implemented through theoretical training and apprenticeships. Practical skills classes, as part of the vocational education system, were usually conducted at the school (e.g., in workshops or school workrooms), while apprenticeships were most often organized at the employer's premises in real working conditions (Chmiel, 2018). In Subcarpathia, apprenticeships were relatively

most often held in school workrooms (64%). The exposure of the student to actual working conditions at the premises of the employer occurred in 54% of the cases (Tworzydło et al., 2018). The FGI research participants clearly emphasized that the advantage of vocational schools when compared to schools providing only a general education program is the possibility of combining theoretical knowledge with the practical skills required by employers (statements appeared in each of the 6 FGI groups of working people and in 5 FGI groups of students, graduates and NEETs). In principle, both students and graduates assessed the practical skills training of a profession positively (in terms of the number of hours and quality), both in basic vocational schools and technical high schools (17 statements from 5 FGI groups). However, opinions about too many theoretical classes in relation to practical skills classes did occur (4 statements in 3 FGI groups). In the case of the respondents, apprenticeships were conducted mainly at school or educational institutions. However, the apprenticeships that took place beyond the school – in companies – were most appreciated (Broszkiewicz, 2018b). Nevertheless, students and graduates (including NEETs) drew attention to the numerous negative aspects in the organization of apprenticeships by schools, which were held in the workplace. These were: a mismatch between the apprenticeship program and the learning profile at school (8 statements in 4 FGI groups), instructing trainees to perform simple activities that do not require the qualifications acquired in vocational schools (for example: moving objects, sweeping the floor, digging holes in the ground, organizing documentation, making coffee), or also not delegating any tasks within the framework of the apprenticeship (8 statements in 4 FGI groups), or the excessive formalization of apprenticeship documentation (2 statements in 2 FGI groups).

4. SUMMARY AND DISCUSSION

On the basis of the analysis of the research carried out as part of the DUAL project in 2018, within the context of vocational education, some trouble spots were identified in Subcarpathia:

- the stereotypical perception of vocational school as the choice for less able students,
- adjusting the courses of study to the capabilities of a given school, and not to the actual needs of the regional labor market,
- the unsatisfactory preparation of vocational teachers to the ever-changing requirements in the field of learning a given profession,
- the unreasonable “theorization” of vocational education as well as too few courses of a practical vocational training nature,
- the improper organization of apprenticeships, based on the most straightforward work outsourced to apprentices, which do not allow for an increase in competences within a given profession as well as a mismatching between the apprenticeship program and the field of study,
- the promotion of education of a general nature at the expense of vocational training, which has led to a decline in the professional labor market as well as an increase in the number of unemployed higher education graduates.

The primary postulates of the 2017 reform include: increasing the prestige of vocational education in Poland, better adapting it to the needs of the labor market, increasing the number of hours of practical skills education, or implementing a dual education system in schools. The bodies operating vocational schools, apart from the systemically implemented

solutions, may also employ other tools, including those developed under programs co-financed by the European Social Fund (ESF). For instance, in Poland such programs include the so-called "Operational Knowledge, Education, and Development Program" (the acronym "POWER" in Polish) and Axis IV programs ("social innovations and transnational cooperation") managed by public Intermediate Bodies (IBs): The Ministry of Development (POWER 4.1 and POWER 4.2 intervention campaigns) and the Center for European Projects (POWER 4.3 Intervention campaign) (Liszka, Walawender, 2019). An example of such tools useful for supporting VET after the 2017 education reform in Poland may be developed in the DUAL project co-financed by the ESF under the POWER 4.3 campaign; 16 reports (1 report for each region of Poland) for VET teachers and school directors, as well as other vocational educational and training institutions with recommendations for the creation of new or modifications to existing curricula in order to fulfill the postulate of dual education and cooperation with local or regional employers, Practical Training Centers (CKP)[6]. In each report, vocational school directors can find a detailed characteristic of the voivodeship (including a demographic portrait of the region, trends in the fields of education and upbringing, or the characteristics of the NEET group), a description of the economic situation in the voivodeship, the main assumptions of the 2017 education reform, or the results of a labor market analysis and curricula in terms of the requirements of the labor market. The recommendations regarding the creation or modification of curricula in accordance with the assumptions of the dual education system and the requirements of the labor market should be particularly useful for bodies operating vocational schools (updated in 2020). Recommendations taking into account the demand for professions or the developmental perspective of given trades, often indicating workplaces leading the way in a given region, conclusions from research conducted by voivodeship labor offices and local and regional strategies, as well as the infrastructure of schools and vocational training institutions. Reports, as well as other project products, are an example of good practice from Poland, as they are the effect of cooperation between commercial institutions, non-governmental organizations, and public entities (a higher learning institution from Poland and a government agency from Belgium) in the development of solutions supporting vocational education within the country.

The qualitative research findings emphasized some basic issues of the dual education system in Poland. The findings can be seen as an initial diagnosis of the current educational situation, and can provide guidelines to identify areas for some future research. Future research would be conducted as a representative quantitative research which would use more factors and would include different target groups (for example, employers, future employees, or policymakers) to include their input on the problems of dual education.

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Eugeniusz MOCZUK[1]
Larisa FEDONIUK[2]
Artur POLAKIEWICZ[3]
Arkadiusz LEŚNIAK-MOCZUK[4]

POSSIBLE MEANS OF ESCAPE FOR EVACUATION FROM DANGEROUS LOCATIONS VS. THE SAFETY OF THE OCCUPANTS OF THESE PLACES. SOCIOLOGICAL ANALYSIS ON THE EXAMPLE STUDENT SURVEY AT THE RZESZÓW UNIVERSITY OF TECHNOLOGY

The aim of this paper is to analyse Rzeszów University of Technology students' familiarity with the emergency exits in the buildings where they attend classes and their knowledge of the evacuation routes from these buildings in the event of a construction disaster, fire, terrorist attack, or other possibly dangerous phenomenon. The analyses described are based on scientific research carried out on a population of 249 university students, to whom a survey regarding this subject was administered. Study findings indicated that respondents' familiarity with emergency exit locations in buildings and knowledge of emergency evacuation procedures for public utility buildings were at a very low level. It is therefore recommended that efforts aimed at ensuring student preparedness should evacuation from university buildings be necessary be increased and that university threat alert systems be improved.

Keywords: evacuation from buildings, emergency exits, sociological research, disaster, fire, terrorist attack.

1. INTRODUCTION

Considering the existence of broadly understood natural and social disasters occurring in the modern society, there is a necessity to analyze the problem of evacuation from

[1] Eugeniusz Moczuk, Associate Prof. in the Department of Humanities and Social Studies at the Rzeszow University of Technology, e-mail: e.moczuk@prz.edu.pl (corresponding author). ORCID: 0000-0002-5447-6966.
[2] Larisa Fedoniuk, Prof. DSc, PhD. Medical Biology Department. I. Horbachevsky Ternopil National Medical University (Ukraine). ORCID: 0000-0003-4910-6888.
[3] Artur Polakiewicz, MA in the Department of Humanities and Social Studies at the Rzeszow University of Technology, e-mail: polakiewicz@prz.edu.pl. ORCID: 0000-0002-5999-8202.
[4] Arkadiusz Leśniak-Moczuk, MA in the Faculty of Law at University of Bialystok. ORCID: 0000--0001-7758-5519.

emergency sites, especially when there is a possibility to prepare and plan for emergency. It is important to indicate that the aforementioned issue is the domain of safety sciences, which, in turn, covers problems of crisis management and health and safety.

In broad terms, emergency evacuation is an urgent displacement of people away from an area that contains an imminent threat, an ongoing threat or a hazard to lives or property to safer locations. In narrow terms, in turn, it movement of people away from locations affected by specific single disasters, such as fire, floods, earthquakes, tsunami or even wars. Typical elements of an evacuation process is its planning and displacing people, animals and property to safe locations, as well as providing them with protection from hazards (Grocki, 2014).

The following study focuses on the evacuation of people from public utility buildings. The analysis is both theoretical and empirical, whereas its main element is the sociological research on the evacuation from university facilities in situation containing a hazard to lives or property, carried out among students of Rzeszow University of Technology. The main research question addressed in the conceptualization phase referred to respondents' knowledge of emergency exits in university buildings and respondents' opinions on evacuation possibilities in the buildings where they attend classes. The research conducted in Rzeszów were preceded by a similar study carried out at I. Horbachevsky Ternopil National Medical University in Ukraine. The comparison of the results provided by both studies may be of great value.

2. BASIC DEFINITIONS RELEVANT TO EVACUATION OF PEOPLE COMPARED TO DEFINITIONS IN CRISIS MANAGEMENT

Before one starts to analyze the issue of evacuation from hazardous locations, there is a need to establish the definition of evacuation in the first place. It means that we have to approach the problem from two perspectives: the first one refers to its legal and technical aspects, whereas the second one to social and psychological ones. Therefore, the evacuation from hazardous locations may be analyzed from the perspective of risk management (Gil, 2001; Kaczmarek, 2010).

So what is the actual definition of *evacuation*? According to paragraph 1 of the Guidelines of the Chief of National Civil Defence of the Act of 17 November 2008 on procedures of evacuation of people, animals and property in case of massive threat, the evacuation is an urgent displacement of people and property away from an area that contains an imminent or ongoing danger to safe locations (Wytyczne, 2008). In fact, most definitions of evacuation mentioned in the Polish academic literature approach this term in a similar way. As an example, the Glossary of Safety Terms describes the evacuation as a planned displacement (removing, taking out, transporting away, bringing out) of people, all sorts of material goods and farm animals from areas or buildings that contain an imminent or ongoing threat of the effects of military actions or disasters, in order to protect, provide assistance (help) and limit material loss (Słownik, 2008). Krzysztof Przeworski, on the other hand, defines evacuation as a planned displacement of people, farm animals and material goods, including removing, taking out, transporting away and bringing them out of areas or buildings that contain an imminent or ongoing threat of the effects of military actions or disasters in order to protect, provide assistance (help) and limit material loss (Przeworski, 2002). According to Joanna Filaber

> evacuation *(Lat. evacuatio – emptying, disappearance)* is a planned movement of people and property away from a place that contains an ongoing hazard to lives, to a safe location. It is one of the primary actions aimed at providing protection to life and health of people and animals as well as saving material goods, including landmarks and important documentation in case of the occurrence of hazard to lives or property. The evacuation may be carried out in different stages of dangerous occurrences (Filaber, 2015).

Franciszek Mroczko indicates that

> the aim of the evacuation is to protect life and health of people and animals as well as save citizen's property, whereas it may be carried out in various stages of dangerous occurrences. It means that it should be started just after the occurrence of a dangerous situation or in case of an imminent threat – launched as a preemptive strike" (Mroczko, 2012).

According to Patrycja Głogowska, Patrycja Zdrojewska and Hubert Wagner the evacuation is one of the elements of the process of saving people, animals and property from locations that contain an ongoing threat to lives. It is moving people, animals and property away from war or natural disasters-affected areas (Głogowska, Zdrojewska, Wagner, 2016).

One may arrive at a conclusion that the abovementioned definitions include some common elements: evacuation of people, animals and property, planned displacement of people, animals and property, as well as the aim of the evacuation which is protection from danger. What is also common for these definitions is the missing element – they do not mention anything about the preparation of people to emergency situations, i.e. training them how to behave in case of fire, flood or other dangerous situations (Grocki, 2014).

Marek Barć indicates the spatial aspect of the evacuation process, which consists in the movement of people and animals as well as transportation of material goods away from regions that contain and ongoing threat to safer location (Barć, 2017). Joanna Filaber, on the Rother hand, points out the temporal aspect of evacuation, which is carried out among people who have already been injured in a dangerous situation or are at a direct risk of being injured in an ongoing threat of danger. Nevertheless, the evacuation may be preventive, which means that it may be carried out from areas and buildings in case of an imminent incident resulting from the occurrence of various disasters (flood, chemical disaster) or the effects of military actions undertaken during the war (Filaber, 2015).

Definitions of evacuation adopted in countries experiencing a wider variety of emergencies than the ones in Poland take into account other details of this process. National Health Service Organization (NHS) defines evacuation as "removal, from a place of actual or potential danger to a place of relative safety, of people and (where appropriate) other living creatures" (NHS, 2015).

According to the Australian Institute for Disaster Resilience (AIDR)

> the evacuation is a risk management strategy that may be used to mitigate the effects of an emergency on a community. It involves the movement of people to a safer location and their return. For an evacuation to be effective it must be appropriately planned and implemented (Emergency, 2018).

This definition adds the issue of safe locations and indicates the possibility to return to places where the evacuation started after the disappearance of emergency.

Mass Evacuations in Natural Disasters (MEND) informs that the evacuation is the rapid movement of people away from the immediate threat or impact of a disaster to a safer place of shelter. It is commonly characterized by a short time frame, from hours to weeks, within which emergency procedures need to be enacted in order to save lives and minimize exposure to harm (The MEND 2014). Moreover, it may be defined as a

> the temporary movement of people to a safer location in order to mitigate the effects of an emergency or disaster on a community" or "the organized, phased, and supervised withdrawal, dispersal, or removal of civilians from dangerous or potentially dangerous areas, and their reception and care in safe areas (The MEND, 2014).

In that case, the definitions include temporal aspects of the evacuation, i.e. evacuation's temporality, time of decision-making process, and, what is more, they mention the care of evacuees.

The evacuation from the incident's area should be carried out in a way that not only allows to displace evacuees from a given place, but also provides them with protection from additional hazards to life and health. Therefore, in order to ensure an effective evacuation and it supervision, it is essential to prepare an appropriate evacuation plan. It needs to specify both the concept of the performance of the evacuation, depending on actual settings, and resources necessary for the accomplishment of this task. The main condition of the effectiveness of the plan is its timeliness, which needs to be verified by a regular stocktaking of resources and analysis of the adopted solutions (Filaber, 2015). Marek Barć additionally indicates that there are three stages of evacuation: a) 1st stage evacuation, which is a rapid movement of people, animals and property away from the immediate unforeseen threat, to a safer place. b) 2nd stage evacuation, which is a previously planned movement of people, animals and property from areas adjacent to plants, hydraulic structures, flood zones or other buildings that present potential risk in case they are damaged or experience a fatal breakdown, c) 3rd stage evacuation, which is a previously prepared movement of people, animals and property in case of an increased defence readiness of a state and the occurrence of any threat to the state security or war (Barć, 2017).

The MEND Guide names the following types of evacuation (The MEND, 2014):

1. Mandatory – an evacuation ordered and directed by authorities when it is judged that the risk to a population is too great to allow them to remain where they are, and where sheltering in place would likely entail a higher level of risk. This places a duty of responsibility on authorities to ensure that people have the information and assistance needed for safe and timely evacuation and that evacuees are cared for.
2. Advised – an official evacuation advisory message may be issued to enable early response and informed decision-making by the population at risk on whether and when to evacuate. An advisory may precede a mandatory order to evacuate as the level of the threat and the risk associated with the alternative of sheltering in place increases.
3. Spontaneous – when people evacuate their current location due to actual or perceived risk using their own means (self-evacuation) and without (or before) being officially

advised or directed to do so. This may include people who leave areas outside a designated evacuation zone (also known as "shadow" evacuations).

4. Mass – it implies the evacuation of whole communities, neighborhoods or geographical areas. The scale and complexity of such evacuations creates the potential for emergency response capacity in a given jurisdiction or country to be overwhelmed and the necessity for coordination across one or more jurisdictions to effect the evacuation and sheltering of evacuees.

One may also mention self-evacuation, in which case, a person may evacuate a hazardous location, before being officially advised or ordered to, by using their own means to take with them not only their family members, but also property, and return to places where the evacuation started after the disappearance of emergency. Such evacuees may use their own means of transport or off-road vehicles, heavy goods vehicles, buses, ships, houseboats, boats or even planes. There is also a group of people with critical transportation needs, who do not have access to any means of transport, live far away from other people or have lost the ability to self-evacuate as a result of the occurrence of the hazardous event. They need special assistance in leaving the location affected by a disaster, provided by specialized institutions or services, including military, fire department or civil defence (Planning, 2019).

Magdalena Masłowska-Szczerba proposes a different classification of evacuation, in which she differentiates evacuation of people and evacuation of property. This classification method addresses five types of evacuation and evacuees' behaviour, including (Masłowska--Szczerba, 2015):

1. In case of evacuation of people: a) spreading, i.e. self-evacuation from areas with dense population to self-chosen locations, that happens before being officially advised or ordered to evacuate, or at the initial phase of evacuation process, b) dispersion, i.e. a planned movement of people to locations advised by the civil defence services, with the use of own or public means of transport, c) withdrawal, i.e. movement of people during military action or natural disasters organized by the military or rescue operation's leaders, sometimes referring only to specific groups of civilians, d) evacuation transfer, i.e. movement of people across the evacuation area in search of a temporary shelter or food or drinking water supplies, or fuel, e) anarchic evacuation, i.e. emergency escape of people unfamiliar with any rules of planned movement of people or resistant to act according to them.
2. In case of evacuation of people: a) spreading, i.e. movement of valuable property at risk of damage to chosen safe locations in a given area by staff members responsible for its evacuation, b) dispersion, i.e. movement of property away from the hazardous site to previously chosen and prepared locations in a given area, c) withdrawal, i.e. transportation of movable property out of the evacuation zone, organized by the military leaders in case of military actions, war, rescue operations during flood, fire, construction disaster, or other occurrences threatening the peace, d) evacuation transfer, i.e. transportation of property across the evacuation in order to place it in a temporary shelter, e) anarchic evacuation, i.e. spontaneous throwing out of property through the windows of a building, moving in case of emergency situation out of the building area, without any previously prepared plan or against its guidelines.

The evacuation should also include transportation of animals from the danger zones. It refers to service animals, assisting animals, pets, working dogs, as well as livestock.

Moreover, one should also take into account the evacuation of wild animals, exotic animals, zoo animals, laboratory animals, animals from shelters and breeding animals. When it comes to service animals, they are evacuated with together their owners, whereas animals assisting blind persons are evacuated together with their owners and placed in locations dedicated for people. Other animals ought to be evacuated to safe locations, away from the danger zones (Planning, 2019).

Franciszek Mroczko points out that,

> unprepared and chaotically conducted evacuation may do more harm than good. It may happen that the evacuation turns out to be the most effective way to save life and it has to be undertaken without regard to dangers and inconveniences resulting from it. Nevertheless, when ordering an evacuation one has to apply the voluntary principle. It is the citizen who decides if they want to evacuate or not. They can only take the right decision if they are appropriately trained and informed about the type and level of danger, its potential effects, appropriate manners, etc. Regardless of the citizen's decision, rescue services are no allowed to leave them unattended (Mroczko, 2012).

The process of planning and organizing an evacuation needs to specify the sequence in which people are evacuated, starting with mothers with children, pregnant women, people with disabilities, people form health care centers, children from orphanages, chronic and terminally ill patients from hospitals, patients from nursing homes as well as the elderly and the infirm (Filaber, 2015). Therefore, it is essential to create an evacuation plan for the most vulnerable and unable to handle emergency situations on their own, due to their physical and psychological limitations. Such groups include among others (Pałubicka-Florczak, Borucka, 2010):

1. Priority 1 goes to people with sight impairment who a) have a developed spatial memory of the immediate surrounding and when hearing the announcement of the evacuation they are prone to follow the route that they are familiar with, which may lead them to the source of danger. That is why, they should be assigned with a person that would take care of them and take them to a safe location, b) get disoriented easily and tend to panic, c) do not see hazard zones, including dangling electrical wires and construction elements that they may hit and thus make the evacuation impossible, d) are unable to get to the assembly points alone if being forced to leave the hazard zone.
2. Priority 2 goes to people with speech and hearing impairment who: a) have not developed spatial imagination, b) are able to head to assembly points that are precisely marked by visible escape routes.
3. Priority 3 goes to children and the youths who a) due to being emotionally immature may create a risk for extremely different patterns of behaviour in case of emergency, including, among others, insubordination, hiding or running away from the educator, b) should be prepared and trained in an entertaining way, in order to become familiar with evacuation procedures used in case of emergency.

The evacuation is a comprehensive and complicated task. Nevertheless, it has to become subject of research, especially when taking into account the fact that society has not developed sufficient habits necessary for leaving quickly emergency sites, both in open areas, the ones with limited access, as well as in buildings.

Another issue is the evacuation of people from sites seized with fire, regardless of whether it refers to a burning building or fire in the forest, grass or other open space area (Brushlinsky, Sokolov, Wagner, 2010).

Nikolay Bruschlinsky, Sergei Sokolov and Peter Wagner claim that, "a fire is an uncontrolled process of burning, which is harmful both the society and the environment" (Bruschlinsky, Sokolov, Wagner, 2016). Tomasz Sawicki defines fire as an uncontrolled spreading of fire dangerous both for people and buildings, whereas its conditions include: a) combustible material, b) oxidant, c) heat, d) necessary chain reactions (Sawicki, 2008). Mirosław Kosiorek, on the other hand, indicates that,

> a fire is a thermal decomposition of combustible materials impossible to be controlled in time and space. Basic physic-chemical process occurring during the fire is fast oxidation, which generates great amount of heat. The impact of a fire on a building is an accidental action (Kosiorek, 2015).

In case of fire the risk factors include: a) increased temperature and heat flux density, b) toxic combustion products, c) smoke, d) lack of oxygen, e) damage of the building construction or its elements (Sawicki, 2004).

Next to the definition of *a fire*, the professional literature mentions also: a) fire hazard, which refers to the risk of an uncontrolled burning process, i.e. fire causing damage in society, environment and the protected site, b) the risk of fire, i.e. a quantitative analysis of the possibility of fire hazards and its effects, using relevant physio-chemical parameters, c) managing the risk of fire, i.e. the development and implementation of system of measures (engineering, economic, social and others) that reduce the risk of fire to an acceptable level, d) fire safety, i.e. the level of protection of a facility against fire, in which case the total risk of fire does not exceed relevant critical values (Bruschlinsky, Sokolov, Wagner, 2016).

Among specific characteristics of a fire there are: a) in most cases (except for secondary effects of atmospheric and seismic phenomena) fire is caused by human activity, b) it does not produce direct mechanical effects, but brings about changes in the environment of a building and its surrounding, whereas mechanical effects on the building's construction are secondary. Thus, a fire triggers changes in: a) thermal conditions, b) pressure, c) the chemical composition of the atmosphere (decreasing the oxygen level and combustion products toxicity), d) visibility (smoke). The abovementioned factors influence users and construction of a building, as well as its entire surrounding. There is also a possibility that a fire results in a serious environmental contamination. In such case, the environmental situation in various areas, building parts and premises is changed. This state depends on a number of factors, such as: a) the ability of a structure to transmit loads in conditions of major thermal impact, b) properties of building envelopes, c) spatial planning solutions, d) type and number of stored combustible materials, e) type and distribution of building materials, f) installations in a building used to extinguish fire (fire-extinguishing systems) and reduce spread of smoke (fire ventilation) (Kosiorek, 2015).

It is worth mentioning that the phenomena occurring during fire indoors include mainly heat and mass transfer between the fuel and the surrounding. An indoor fire may spread in various ways, depending on the room geometry, its ventilation and type of fuel engaged in the burning process. The development process of indoor fire starts from the ignition of combustible materials that generates a great amount of energy as a result of a spreading fire. During that stage, fire is controlled mainly by fuel, and the burning process produces not

only energy, but also toxic combustion products. Hot fire gases are surrounded by cold air, which, as a result of density differences between hot fire gases and the air, gives rise to a convection column transporting combustion products in the direction of a room's ceiling. The fire convection column leads to the creation of a layer of hot fire gases and their spread in the entire room. Within this stage, the physical phenomena occurring in the hot fire gases layer near the ceiling include mainly the formation of heat fluxes with large temperature gradients, which have a thermal effect on building's construction and chemical phenomena, including the formation of various toxic compounds harmful for the human body (Porowski, 2016).

There are three main stages of an indoor fire (Porowski, 2016):

1. 1st stage: The development of fire (the so called pre-flashover stage). It is characterized by a low average temperature and a relatively slow pace of development, depending mainly on the reaction to fire of materials directly in contact with the source of fire. From the moment of ignition, the burning material heats the nearest surrounding, which results in spread of fire. The process of burning produces more and more hot combustion products filling a room.
2. 2nd stage: Fully developed (the so called post-flashover stage). During that stage a fire is engulfing all of its available fuel sources and the entire room is filled with flames.
3. 3rd stage: Decay. It starts when temperature of fire drops to 80% of the peak burning temperature.

The process of transition from the development stage of fire to the fully developed fire is called a flashover. The development of an indoor fire and its relevant parameters typical for a given fire scenario, depend on many factors, such as: a) place of the occurrence of fire in respect of distribution of combustible materials in a room, b) type and amount of combustible materials in a room, c) possible chemical reactions between the materials in case their packaging are damaged in course of fire, d) placement of combustible materials in relation to walls, ceilings, etc. e) possibilities of oxygen supply, f) presence and effectiveness of fire-extinguishing equipment and fire-extinguishers, g) changes in burning properties of materials as a result of aging, h) other factors (Porowski, 2016).

To sum up, the evacuation from hazardous sites is a complicated process, therefore, it is not only essential to train the appropriate behaviour patterns in emergency situations, but also to introduce preventive measures.

3. METHODOLOGICAL APPROACH AND CHARACTERISTICS OF THE STUDY POPULATION

The study was conducted from January 2018 to March 2018 in the form of an auditorium questionnaire, among first-year students in selected departments of Rzeszow University of Technology. A similar study has been prepared at I. Horbachevsky Ternopil National Medical University in Ukraine.

The respondents of the study were students of the following fields of study: Internal Security at the Faculty of Management, Transport at the Faculty of Mechanical Engineering and Aeronautics, Computer Engineering at the Faculty of Electrical and Computer Engineering. In the end, 252 questionnaires were analyzed (Greń, 1975). From a methodological point of view, the maximum percentage error accounted for 5.0% for a 0,95 confidence level (Szreder, 2004). The study was supposed to provide information

about respondents knowledge of emergency exits in the buildings and possibilities of evacuation from the university facilities. It is worth mentioning that the statistical data was collected with the use of Statistica programme, whereas the analytical procedure consisted first of all in coding of the received survey questionnaires and then generating statistical data in Statistica, which calculated the correlation between quantitative traits, using chi-square independence test and Pearson correlation coefficient. The following study refers to a study carried out in 2015 by Artur Woźny, Piotr Saja, Magdalena Dobosz, Andrzej Pacana, Marcin Zawada (Woźny, Saja, Dobosz, Pacana, Zawada, 2016).

The main research hypothesis of the study is: respondents knowledge of emergency exits in the buildings and possibilities of evacuation from the university facilities is very limited.

The characteristic of the population included in the study was limited to three independent variables: age, sex and place of residence. The distribution in respect of respondents personal data is presented in the tables.

The first analyzed variable is age of the respondents. It is presented in Table 1.

Table 1. Respondents' age

Specification	Frequency	%
Up to 21 years	183	72.6
22 and above	69	27.4
Total	252	100.0

The data show that 72.6% of respondents are up to 21 years old, whereas 27.4% are 22 and above. Therefore, they are students of the early years of studies, who, however, already have some knowledge about appropriate behaviour patterns in emergency situations, and know how to move around given university buildings.

Another variable is sex of the respondents. It is presented in Table 2.

Table 2. Respondents' sex

Specification	Frequency	%
Female	101	40.1
Male	151	59.9
Total	252	100.0

According to the data presented in Table 2, women accounted for 40.1% of the respondents, whereas men for 59.9%. The lack of balance between men and women results from the fact that technical universities, in comparison to other types of universities, are dominated by men, with the exception of the Faculty of Management, where the percentage of female students is the biggest of all faculties.

The last analyzed variable is place of residence of respondents. It is presented in Table 3.

Table 3. Respondents' place of residence

Specification	Frequency	%
Urban Area	104	41.3
Rural Area	148	58.7
Total	252	100.0

The analysis of the data shows that 41.3% respondents declare that they live in the city, whereas 58.7% in the country. This results is also understandable due to the fact that most students of Rzeszow University of Technology are from the broadly understood Podkarpackie region, which is characterized by a large rural population.

4. STUDENTS OF THE RZESZOW UNIVERSITY OF TECHNOLOGY AND EVACUATION FROM PUBLIC UTILITY BUILDINGS

At the beginning, the respondents were asked if they are able to give the location of emergency exits and if they know how to behave if the fire alarm goes off in a building where they currently are. Table 4 presents the distribution of answers to the abovementioned questions.

Table 4. Respondents' knowledge of emergency exits and proper behaviour in case of fire alarm

Specification	Frequency	(%)
Strongly Agree	55	21.8
Rather Agree	159	63.1
Rather Disagree	23	9.1
Strongly Disagree	2	0.8
Neutral	13	5.2
Total	252	100.0

According to the data, 84.9% respondents (Strongly Agree and Rather Agree altogether) have considerable knowledge of the location of emergency exits and proper behaviour in case of fire alarm going off, whereas 10.0% respondents (Strongly Disagree and Rather Disagree) do not have it. 5.2% has no opinion on that matter. Therefore, one may get to the conclusion, that the vast majority of respondents is convinced that their knowledge of the evacuation procedures in a given building is satisfactory, whereas 10% respondents admits that their knowledge on that is very limited. Nevertheless, the greatest paradox is the fact, that the respondents admitted in the discussion with the interviewer that, first of all, they have never experienced an emergency situation forcing them to evacuate from a university building, and, moreover, evacuation plans are available on each building floor, so in case of emergency situation they can always familiarize themselves with them. When the interviewer asked them, if they do not think that it might be too late to get to know the emergency routes, they claimed, that they will run in the same direction as everyone else.

In order to establish the correlation between the dependent and independent variables, they were compared with each other. Considering the limitations of the paper's length, the abovementioned variables are presented in a condensed form. Therefore, we may conclude that no independent variables have in any way influenced the fact that the respondents have considerable or limited knowledge of emergency exits or behaviour patterns in case of a fire alarm[5].

Another question asked by the interviewer was about the emergency exit signs, i.e. if the emergency route signs are legible and clear, and if there are fire-extinguishers in university facilities. Distribution of the answers is presented in Table 5.

Table 5. Respondents' opinion that a given university building has legible and clear emergency route signs, as well as fire-extinguishers

Specification	Frequency	(%)
Strongly Agree	96	38.1
Rather Agree	141	56.0
Rather Disagree	5	2.0
Strongly Disagree	0	0.0
Neutral	10	4.0
Total	252	100.0

As the study shows, 94.1% respondents is convinced that a given university building has legible and clear emergency route signs, as well as fire-extinguishers (Strongly Agree and Rather Agree altogether), whereas only 2.0% is of the opinion that they do not have in-depth knowledge on that (Strongly Disagree and Rather Disagree altogether), and 4.0% respondents stays neutral. The distribution of answers contains a very positive information, that the emergency route signs are in the buildings and moreover they are placed in clearly visible locations. Similarly to the previous question, the dependent variable was compared with independent variables. The analysis indicates that no independent variables have in any way influences the fact that the respondents are convinced that a given university building has legible and clear emergency route signs, as well as fire-extinguishers[6].

The next question that the responders were to answer was about their opinion on the statement that a given university building has emergency exit signs that are clear and unambiguous. The distribution of the answers is presented in Table 6.

The presented data show that 90.1% respondents is of the opinion that a given university building has clear and unambiguous emergency exit signs (Strongly Agree and Rather Agree altogether), only 3.2% thinks the opposite (Strongly Disagree and Rather Disagree

[5] Age: (χ^2) = 5.166748826, (number of degrees of freedom (lss) = 4, statistical significance (pi) = 0.05). Probability Distribution (Pr) = 0.270611928. No correlation. Sex: (χ^2) = 3.945848291, (lss = 4, pi = 0.05). Pr = 0.413384091. No correlation. Place of residence: (χ^2) = 4.205084443, (lss = 4, pi = 0.05). Pr = 0.378961609. No correlation.

[6] Age: (χ^2) = 1.480487102, (lss = 3, pi = 0.05). Pr = 0.686781164. No correlation. Sex: (χ^2) = 3.673632563, (lss = 3, pi = 0.05). Pr = 0.298930888. No correlation. Place of residence: (χ^2) = 1.12096046, (lss = 3, pi = 0.05). Pr = 0.773201676. No correlation.

altogether) and 6.7% has no opinion on that matter. It is a very positive result due to the fact that it proves that the university buildings are properly marked. As in case of the previous question, the dependent variable was compared with independent variables. The analysis indicates that only the place of residence variable influences respondents' opinion that a given university building has clear and unambiguous emergency exit signs. It means, that more students living in a city, in comparison to students living in a country, is of the opinion that a given university building has clear and unambiguous emergency exit signs. The remaining variables do not have any impact on that opinion[7].

Table 6. Respondent's opinion that a given university building has clear and unambiguous emergency exit signs

Specification	Frequency	(%)
Strongly Agree	77	30.6
Rather Agree	150	59.5
Rather Disagree	8	3.2
Strongly Disagree	0	0.0
Neutral	17	6.7
Total	252	100.0

Last but not least, the respondents had to say if they have ever participated in any evacuation drills in a given university building, OHS training on recognizing alarm signals and using fire-extinguishers conducted by experts. Distribution of the answers is presented in Table 7.

Table 7. Respondents' participation in evacuation drills in a given university building, OHS training on recognizing alarm signals and using fire-extinguishers conducted by experts

Specification	Frequency	(%)
Strongly Agree	96	38.1
Rather Agree	54	21.4
Rather Disagree	31	12.3
Strongly Disagree	61	24.2
Neutral	4	4.0
Total	252	100.0

[7] Age: (χ^2) = 1.61579301, (lss = 3, pi = 0.05). Pr = 0.675814143. No correlation. Sex: (χ^2) = = 4.081548253, (lss = 3, pi = 0.05). Pr = 0.252791967. No correlation. Place of residence: (χ^2) = 7.846846921, (lss = 3, pi = 0.05). Pr = 0.049285266. There is a correlation between the dependent variable and place of residence. Pearson correlation coefficient = 0.220929466, low correlation.

When analyzing the results, 59.5% respondents have participated in evacuation drills in a given university building as well as OHS training on recognizing alarm signals and using fire-extinguishers conducted by experts (Strongly Agree and Rather Agree altogether), whereas 36.5% has never taken part in such trainings (Strongly Disagree and Rather Disagree altogether), and 4.0% has no opinion on that subject. In order to find a correlation between the dependent variable and independent variables, they were compared with each other. As the study shows, no independent variables have in any way influenced the fact that the respondents participated in evacuation drills in a given university building as well as OHS training on recognizing alarm signals and using fire-extinguishers conducted by experts[8].

One of the next questions was about the knowledge of assembly points in case of emergency. Distribution of the answers is presented in Table 8.

Table 8. Respondents' knowledge of assembly points in case of emergency

Specification	Frequency	(%)
Strongly Agree	9	3.6
Rather Agree	52	20.6
Rather Disagree	71	28.2
Strongly Disagree	55	21.8
Neutral	65	25.8
Total	252	100.0

The data presented above show that 24.2% respondents have some knowledge of assembly points in case of emergency situation (Strongly Agree and Rather Agree altogether), whereas 50.0% do not have such knowledge (Strongly Disagree and Rather Disagree). 25.8% responding students do not have opinion on this matter. The dependent variable was put together with independent variables in order to find a clear collocation. It was observed that no independent variables have in any way influenced the fact that the respondents have knowledge of assembly points in case of emergency situation[9].

The respondents were also asked about the ways of cutting off electricity and gas supplies in a given university building. Table 9 presents distribution of the answers.

[8] Age: (χ^2) = 4.318647131, (lss = 4, pi = 0.05). Pr = 0.364595914. No correlation. Sex: (χ^2) = 2.991840835, (lss = 4, pi = 0.05). Pr = 0.559191744. No correlation. Place of residence: (χ^2) = 4.458741594, (lss = 4, pi = 0.05). Pr = 0.347467731. No correlation.

[9] Age: (χ^2) = 4.978598589, (lss = 4, pi = 0.05). Pr = 0.289500471. No correlation. Sex: (χ^2) = = 6.937190431, (lss = 4, pi = 0.05). Pr = 0.139244886. No correlation. Place of residence: (χ^2) = 3.640024819, (lss = 4, pi = 0.05). Pr = 0.456908958. No correlation.

Table 9. Respondents' knowledge of a way of cutting off electricity and gas supplies in a given university building

Specification	Frequency	(%)
Strongly Agree	8	3.2
Rather Agree	27	10.7
Rather Disagree	79	31.3
Strongly Disagree	133	52.8
Neutral	5	2.0
Total	249	100.0

The analysis of the received results allows to get to a conclusion that 13.9% respondents knows how to cut off electricity and gas supplies in a given university building (Strongly Agree and Rather Agree altogether), 84.1% do not have that kind of knowledge (Strongly Disagree and Rather Disagree altogether), and 2.0% remains neutral. The dependent variable was compared with independent variables, and it was concluded, that no independent variables have in any way influenced respondents' knowledge of ways of cutting off electricity and gas supplies in a given university building[10].

The last question addressed to the respondents was if they have ever read the procedure for handling emergencies issued by the Crisis Management Center. Table 10 presents distribution of the answers.

Table 10. Respondents' familiarization with the procedure for handling emergencies issued by the Crisis Management Center

Specification	Frequency	(%)
Strongly Agree	26	10.3
Rather Agree	71	28.2
Rather Disagree	85	33.7
Strongly Disagree	58	23.0
Neutral	12	4.8
Total	249	100.0

As can be seen from the data presented above 38.5% respondents have read the procedure for handling emergencies issued by the Crisis Management Center (Strongly Agree and Rather Agree altogether), 56.7%, however, did not have the opportunity to become familiarized with it (Strongly Disagree and Rather Disagree altogether). 4.8% respondents do not have any opinion on this matter. The comparison of the dependent

[10] Age: (χ^2) = 4.60070763, (lss = 4, pi = 0.05). Pr = 0.330772604. No correlation. Sex (χ^2) = = 4.651008252, (lss = 4, pi = 0.05). Pr = 0.325015357. No correlation. Place of residence: (χ^2) = 1.613004238, (lss = 4, pi = 0.05). Pr = 0.806452988. No correlation.

variable and independent variables has shown, that no independent variables have in any way influenced respondents' familiarization with the procedure for handling emergencies issued by the Crisis Management Center[11].

5. CONCLUSIONS

When summarizing the discussion on emergency evacuations we need to indicate that the study described in the following paper referred to evacuation in narrow terms, i.e. movement of evacuees from burning buildings. The study has shown that the hypothesis that respondents' knowledge of emergency exits in the university buildings and possibilities of evacuation from the university facilities, is very limited, has been confirmed. Therefore, the respondents claim that they know where the evacuation exits are located and how to behave in case of fire alarm in a university building where they currently are, but they are not able to express that knowledge clearly. They point out, however, that the emergency route signs are legible, clear and unambiguous. According to the research, not every respondent had an opportunity to participate in any evacuation drills in a given university building, OHS training on recognizing alarm signals and using fire-extinguishers conducted by experts, which is not a very positive information. Moreover, knowledge of assembly points in case of emergency, similarly to knowledge of ways of cutting off electricity and gas supplies in a given university building, is very limited. The same refers to respondents' familiarization with the procedure for handling emergencies issued by the Crisis Management Center.

The following study leads to the conclusion that knowledge of evacuation in a narrow sense, is currently on a very low level, which definitely means, that knowledge of any type of evacuation from hazardous sites is also very limited. It is a very pessimistic observation resulting from the following study.

One may only hope that there will be no need for evacuating students from university buildings and, what is more, relevant services are well prepared for every possible emergency situation occurring in university buildings.

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[11] Age: (χ^2) = 1.262252726, (lss = 4, pi = 0.05). Pr = 0.867746579. No correlation. Sex: (χ^2) = = 8.76314477, (lss = 4, pi = 0,05). Pr = 0. 06730021. No correlation. Place of residence: (χ^2) = = 5.858889438, (lss = 4, pi = 0.05). Pr = 0.209937251. No correlation.

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Hanna SOMMER[1]
Grzegorz ZAKRZEWSKI[2]

"Subdue the earth"[3]
– that is, about changes in the natural environment of man,
eco-awareness in the minds of the young people from Podkarpacie
as exemplified by the implemented investment of constructing the Vistula Spit canal.

SECURITY IN THE CONTEXT OF ENVIRONMENTAL CHANGE: SPLITTING THE VISTULA SPIT CANAL

This article is an attempt to organise information, both historical and geographical, related to construction of the Vistula Spit canal, including fragmentary reports from the construction site. Provided the investment schedule is not disrupted, this project will be in its final implementation phase at this article's time of publication. From the beginning, the project has been highly controversial, with not only politicians, but also spatial planners, economists, and, above all, environmentalists scrutinising it in great detail.

The investment process related to the project is the product of successive and effective activities aimed at completing construction through associated investments. Each stage of this process has been affected by legal regulations of various legal branches (construction, water, environmental protection, etc.), and the effects of these regulations have become interwoven. When the project is completed, its components–hydrotechnical structures, bridges, locks, breakwaters, fairway, silting island, and waterfowl refuges–will not be subject to evaluation, only its complexity. Anthropopressure is omnipresent, and environmental reports following completion of the investment will analyse the environmental impact of the Vistula Spit canal.

This article reports the findings of research conducted among young inhabitants of Podkarpacie whose aim was to examine their attitudes toward the investment made in Vistula Spit canal's construction and to assess its justifiability. Study respondents assessed its impact on the security of Poland and on ecological safety, the opportunities for a revival of tourism in the region following the canal's completion, and the state's information policy concerning its construction.

Keywords: anthropopressure, ecology, Vistula Spit, security.

[1] Hanna Sommer, PhD, Associate Professor, Department of Humanities and Social Sciences, Faculty of Management, Rzeszów University of Technology, 8 Powstańców Warszawy Ave., 35-959 Rzeszów; e-mail: hansom@prz.edu.pl (corresponding author). ORCID: 0000-0001-7208-7641

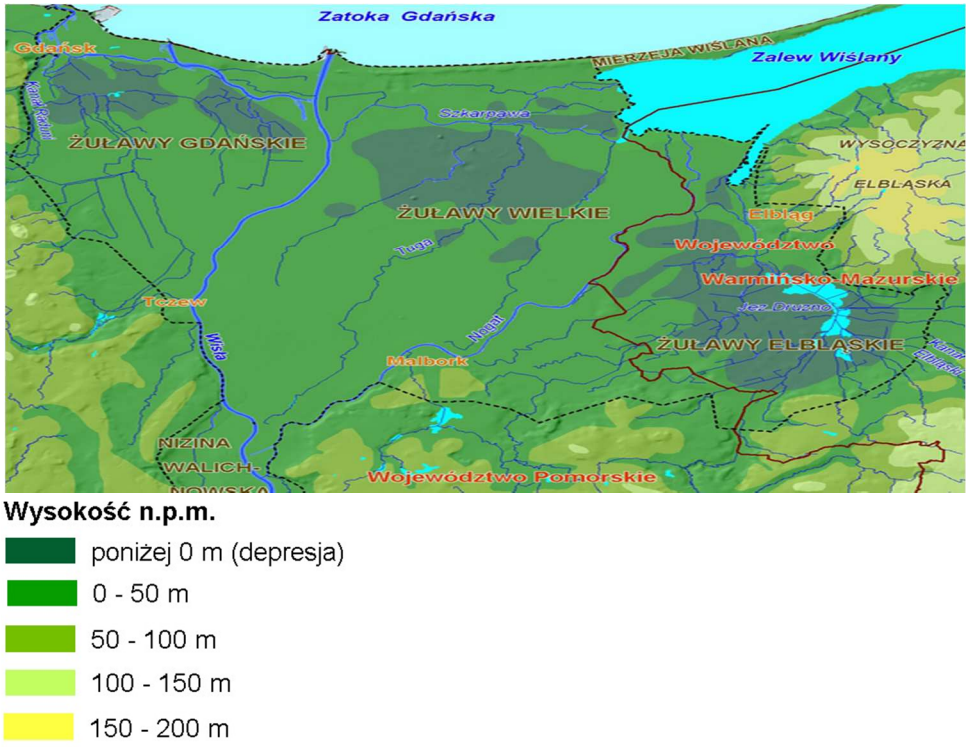
[2] Grzegorz Zakrzewski, PhD, Eng., Gdansk Higher School of Humanities, 16 Kopernika St, 80-208 Gdańsk; e-mail: grzegorz574@wp.pl. ORCID: 0000-0002-0945-5322.

[3] Gen 1:28.

1. INSTEAD OF INTRODUCTION - GEOGRAPHICAL AND HISTORICAL DESCRIPTION

Żuławy Wiślane (a place name translatable as "Vistula Fens") is a Holocene alluvial plain; the process of delta growth began 5–6 thousand years ago through the formation of new alluvial fans with frequent changes in the course of the beds of numerous branches of the Vistula; at the same time, Vistula Spit was formed, therefore the formation of Żuławy Wiślane took place within the boundaries of the lagoon, not the sea bay; this process ended in the 19th century. – the main current of the Vistula changed from the Nogat to the Leniwka river and forced its outlet through the Wisła Śmiała (a distributary river), and after the Nogat river had been cut off by a sluice gate and the canal nearby Świbno had been built as well as the Martwa Wisła and Szkarpawa rivers had been closed, the waters of the Vistula were channelled directly to Gdańsk Bay (https://encyklopedia.pwn.pl/haslo/Zulawy...).

Figure 1 shows the division of Żuławy Wiślane.



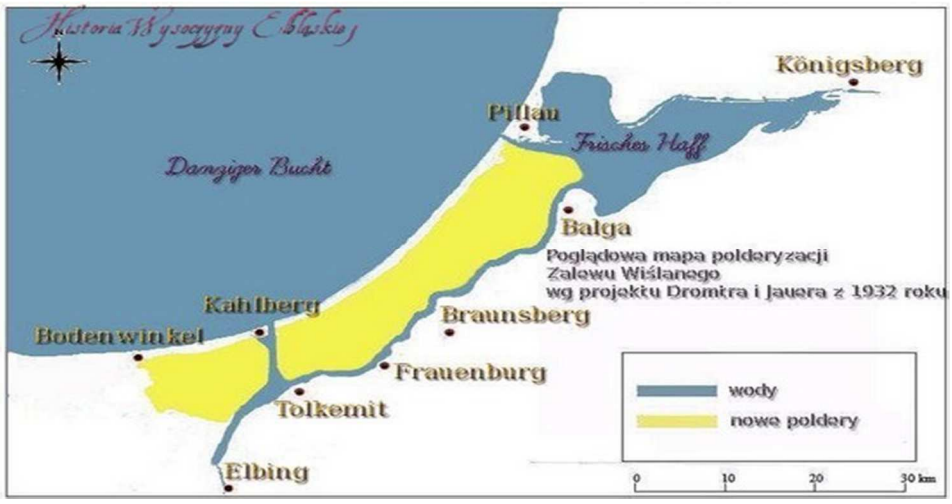
Picture 1. Division of Żuławy Wiślane

Source: http://www.rzgw.gda.pl/cms/site.files/image/ProgramZulawski/MapaDuza1.jpg [Access: 10.01.2020].

The wetlands and depression areas in the Żuławy Wiślane were covered by drainage works by the Dutch settlers in the 14th century. The desire to drain further polders in the Żuławy and later in the Vistula Lagoon dates back to that moment.

> Floods have affected this land since time immemorial. In the 16th century there were 21, in the 17th century – 38, in the 18th century – 41, and in the 19th century – 35 floods. In 1945, the entire Żuławy was flooded by the retreating German troops. The population settling here struggled to have them drained for a long time. Even in 1950, crops were harvested while standing in the water for hours (https://www.tygodnikprzeglad.pl...).

In 1874, a famous urban architect of Gdańsk – Julius Albert Licht, presented a vision of draining the Vistula Lagoon with a system of polders, which the Elbląg City Council returned to in 1932 (https://www.historia-wyzynaelblaska.pl/niemieckie...). Figure 2 presents the project of engineers: Herbert Dromtra and Otto Jauer "Memorandum concerning the drainage of the Vistula Lagoon and cutting a canal across the Vistula Spit in the area of Krynica Morska" The canal across the Vistula Spit does have its history. The plan was first drawn up in 1577 when Stefan Batory, King of Poland, was at war with the city of Gdańsk. He ordered that the possibility of cutting a canal across the Vistula Spit and the construction of a military port in the city of Elbląg be studied. The most convenient site was found to be near the village of Vogelsang (Skowronki).



Picture 2. The project of engineers: Herbert Dromtra and Otto Jauer "Memorandum concerning the drainage of the Vistula Lagoon and cutting a canal across the Vistula Spit in the area of Krynica Morska"

Source: https://www.historia-wyzynaelblaska.pl/niemieckie-plany-osuszenia-zalewu-wi-lanego-i-przekopu-przez-mierzej--wi-lan-.html [Access: 10.01.2021].

2. PROJECT DESCRIPTION

The new navigation canal, which will be created after digging across the Vistula Spit, will improve access to the port of Elbląg and the Vistula Lagoon ports. It will guarantee Poland free access from the Vistula Lagoon to Gdańsk Bay, circumventing the Strait of Baltiysk controlled by Russia, as shown in Figure 3. The area of the Vistula Lagoon is 838 km^2 (Poland owns 328 km^2, the rest belongs to Russia), extends for a total length of 90.7 km and is the largest coastal water body in the southern Baltic Sea. It is a very shallow body of water, with the maximum depth of 5.1 m (measured south-east of the Strait of Baltiysk), the average depth of which is 2.6 m. This body of water accumulates a relatively small volume of water – approx. 2.3 km^3, and its bottom is poorly diversified (http://portalgis.gdansk.rdos.gov.pl/waly...). The lagoon is separated from the open waters of the Baltic Sea by the Vistula Spit, a 55 km long sandy peninsula.

Picture 3. New shipping channel created after ditching Vistula Spit

Source: https://businessinsider.com.pl/wiadomosci/przekop-mierzei-wislanej-zgodnie-z-planem-rusza-budowa-mostu-nowe-nagranie-z-placu/pw4c2gs [Access: 10.01.2021].

The construction of a waterway which will connect the port in Elbląg with the Gdańsk Bay entails major changes in the natural environment (Sommer, Zakrzewski, 2017a). A new road system will be built on the Vistula Spit with two bridges allowing the passage over the canal. Table 1 presents the basic data of the hydrotechnical and road structure.

Table 1. Basic technical data of investment

Channel length	1350 m
Max. channel width	120 m
Channel depth	5 m
Sluice chamber length	200 m
Sluice width	25 m
Sluice gate	2 main gates 2 emergency gates
Communication above channel	2 swing bridges
Channel length on: Vistula Lagoon River Elbląg	 10,176 km 10,381 km
Area of artificial island	180 ha

Source: based on own resources: https://businessinsider.com.pl/wiadomosci/przekop-mierzei-wislanej-zdjecia-z-budowy-budowa-dwoch-nowych-wysp/dkt6t8f [Access: 31.01.2021]; http://www.port.elblag.pl/article/show//207/budowa-drogi-wodnej-laczacej-zalew-wislany-z-zatoka-gdanska-%E2%80%93-kwiecien-2020-roku [Access: 31.01.2021]

As a result of the works associated with the construction of the fairwater to the port of Elbląg, the Vistula Spit will become an island and an artificial island will be created in the Vistula Lagoon. The new silting island is called Estyjska (Aestian). The name was selected in a national competition held by the Ministry of Marine Economy and Inland Navigation. Its name invokes the Old Prussian name of the Vistula Lagoon (https://pomorska.pl/na-zalewie-wislanym-powstaje-sztuczna-wyspa-estyjska/ar/c7-15197214). The artificial – silting island is formed from the spoil excavated during the deepening and widening of new waterways in the nature protection area Natura 2000, and is a compensation for the interference in the environment. A closed nature reserve, an avian habitat, will be created and it is planned to be inaccessible to tourists (Sommer, Zakrzewski, 2017b).

3.HISTORY OF CONSTRUCTION

Like every other construction project, it had its own planning and consultation process, which did not incite any negative emotions among the public. It was only in the second decade of February 2019, when within 5 days foresters cut down about 10,000 trees growing in a 200-meter strip between the Gdańsk Bay and the Vistula Lagoon (https://www.portalmorski.pl/zegluga...), that the mass media presented footage exposing the magnitude of the investment (See more: Sommer, Zakrzewski, 2020). For the first time, while standing atop a dune, which was previously covered by a forest, it was possible to see both the Gdańsk Bay and the Vistula Lagoon at the same time. As of today, the works are proceeding as planned and the completion date of the crosscut, i.e., 2022, is not at risk. The press follows the construction development on a regular basis and provides the attentive reader with new arguments (https://www.money.pl/gospodarka/przekop-mierzei...). Currently, there is a rapidly developing discourse regarding the purposefulness of this investment.

4. AUTHORS' OWN RESEARCH

The authors undertook the task of examining the recognizability of the investment consisting in cutting a canal across the Vistula Spit among students of the Institute of Agricultural Sciences, Environment Protection and Formation at the University of Rzeszów. 108 people took part in the study. They decided to participate in a web survey conducted using the CAWI method. Recruitment for the online survey is very quick, feasible via e-mail. The survey used a questionnaire consisting of 15 basic questions and 3 demographic questions.

The formulation of the research problem is the first step in research planning. A research problem is an intellectual incentive which triggers a response in the form of scientific research. The following research problem was formulated during the studies conducted as a part of this article:

- How do the respondents evaluate the justifiability of cutting a canal across the Vistula Spit?

When the research problem had been formulated in detail and the researchers precisely defined the objectives of their research and research questions, the next step was to formulate the research hypothesis, that is, suppositions about the current situation. The planned research should be used to confirm or reject these suppositions. When we gather evidence for our suppositions, the hypothesis becomes true.

The following hypothesis was formulated for the research problem presented in the study:

- The construction of the canal is an element in the national security strategy – it will allow the unrestrained access to the Vistula Lagoon and exit from it.

The first question the respondents were asked concerned their attitude towards the completion of the investment consisting in cutting a canal across the Vistula Spit. They were asked if they supported this project. The results are shown in Figure 1.

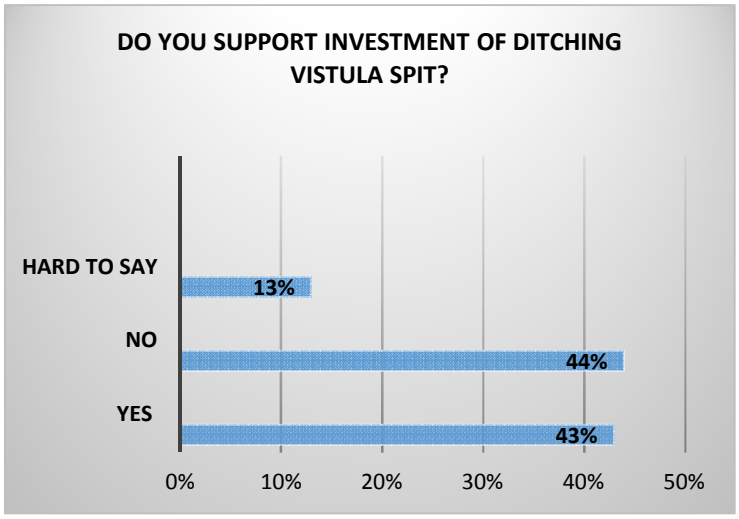


Chart 1. Approach of surveyed towards investment of ditching Vistula Spit

Source: based on own resources.

The respondents did not unequivocally support or oppose the completion of the Vistula Spit investment. The responses for and against were distributed evenly. 43% of the respondents were in favour of this investment, 44% were against, and 13% were unable to take a position on this matter. An inconclusive assessment may result from the information appearing in the media message, which is also inconclusive. It can be presumed that the people who were unable to take a position on this issue did not have sufficient knowledge on the discussed subject.

In their justification of the investment, the respondents pointed out that the canal will serve tourism and create jobs, especially in Elbląg and its vicinity. It would also strengthen Poland's military position in the relations with Russia.

On the other hand, the people who were against this investment most often emphasised its negative impact on the natural environment, including both the Vistula Spit and the Vistula Lagoon. They also considered it to be unprofitable.

Another issue that the respondents were enquired about concerned their evaluation of the chances for a tourism revival in the region upon the completion of the investment. The results are shown in Figure 2.

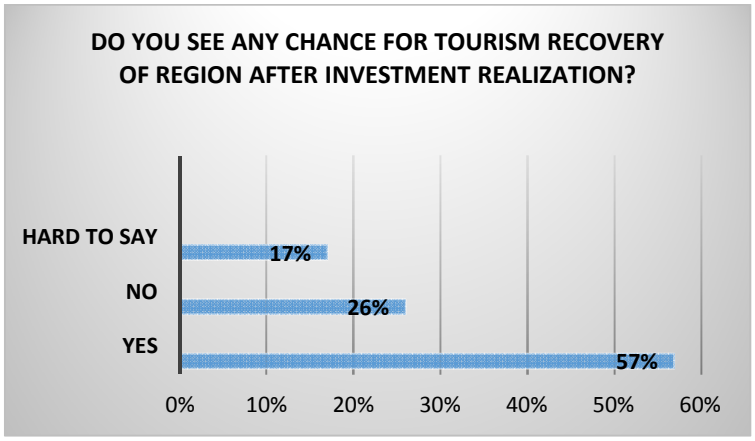


Chart 2. Rating of chance for tourism recovery of region after investment realization

Source: based on own resources.

As many as 57% of the respondents perceives an opportunity for the region's tourism revival after the investment is completed, 26% do not see such a chance, while 17% were unable to take a stance on the analysed issue. More than half of the respondents believe that Elbląg and the port may count on the development of tourism, especially with regard to yachting and windsurfing, once the canal has been cut. Sceptics, on the other hand, believe that the canal may lead to a decline in tourists' interest in the well-established and constantly developing tourist facilities located on the Vistula Spit.

The next question asked to the respondents concerned the matter of gaining independence from Russia's decision regarding the passage through the Strait of Baltiysk. The results are presented in Figure 3.

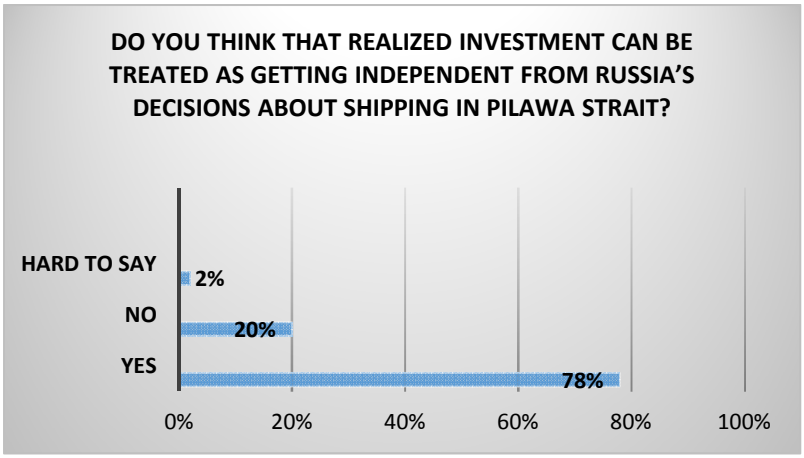


Chart 3. Rating of chance on getting independent from Russia's decisions about shipping in Pilawa Strait

Source: based on own resources.

As many as 78% of respondents believed that the canal would render shipping in the Vistula Lagoon independent of Russia. Such freedom is not perceived by 20% of the respondents, and only 2% were unable to assess the issue. Such an attitude demonstrated by the respondents may be surprising, but it may be a consequence of the statements made by Russians who see no economic benefits in cutting the canal. In their view, it is an exclusively political initiative, possibly having a hidden agenda of military or geostrategic nature.

Another question put to the respondents involved the justifiability of building the Vistula Spit canal. The results are shown in Figure 4.

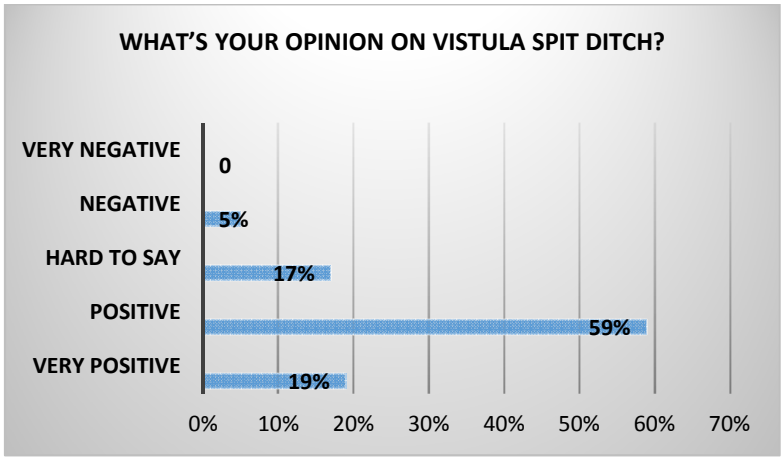


Chart 4. Rating of Vistula Spit ditch

Source: based on own resources

The opinions of the respondents on the justifiability of building the Vistula Spit canal are overwhelmingly positive. As many as 59% of respondents assessed this investment as good and 19% as very good. This demonstrates that the arguments appearing in the media are convincing, since respondents who do did not have direct contact with the canal project recognised the grounds for its construction. 17% of the respondents were unable to make such an assessment. It may be concluded that they did not have enough knowledge on the analysed topic. Only 5% of the respondents assessed this project negatively. The results of the research are unquestionably influenced by the social debate, which has aroused strong emotions among the commentators. It is associated with the economic viability of this investment and its impact on the environment.

In the next question, the respondents were asked to evaluate their emotions in relation to the analysed investment.

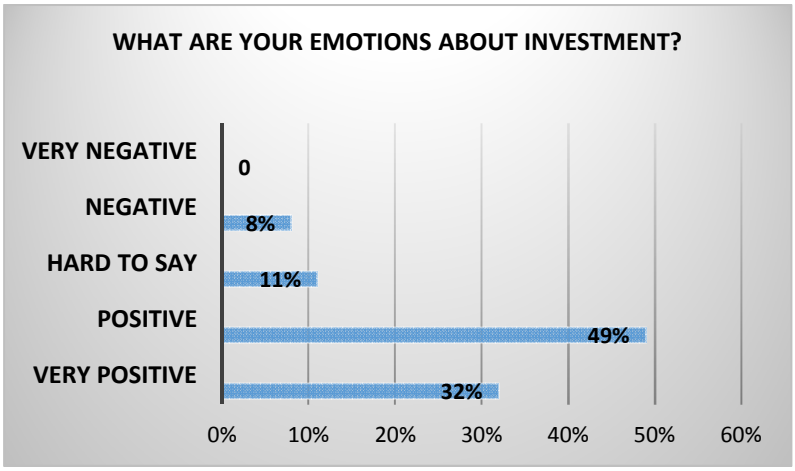


Chart 5. Rating of emotions about Vistula Spit ditch

Source: based on own resources.

Young inhabitants of Podkarpacie express favourable opinions with regard to the analysed investment. As many as 49% of them positively assess their attitude towards the investment, while 32% are strongly in favour. Among the participants, 11% could not define their emotions, and 8% assessed them negatively. Seeking justification for such results, reference can be made at this point to the public debate and media coverage. Such an amount of positive attitudes and feelings towards the investment demonstrates that the respondents' knowledge, stemming from their fields of study, may also have contributed to such assessment.

Another aspect that the respondents were interviewed about was the environmental assessment of the investments. The results are presented in Figure 6.

As far as the evaluation of the investment in terms of ecology is concerned, as many as 48% of the respondents were not able to assess it unequivocally. The indications stating that it is an ecological structure amounted to 22%. Likewise, the indications whereby it is not an ecological project oscillate around 20% and the ones whereby it is rather not ecological

at 9%. None of the respondents replied firmly that the investment in question is ecological. It is problematic to justify such answers of the respondents when almost half of them are not able to make an unambiguous assessment and only 29% considered it as non-ecological and 22% as rather ecological. It can be assumed that the presented attitude of the study subjects stems from limited knowledge and uncertainty associated with the subject area. This may result from the fact that the construction of the crosscut has been a very controversial topic right from the outset.

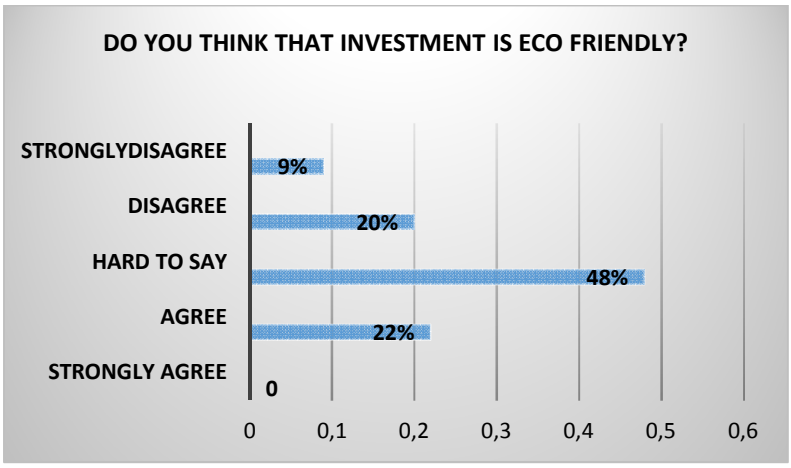


Chart 6. Rating of investment eco friendliness

Source: based on own resources.

Another question asked to the respondents referred to the improvement of Poland's security. The results are shown in Figure 7.

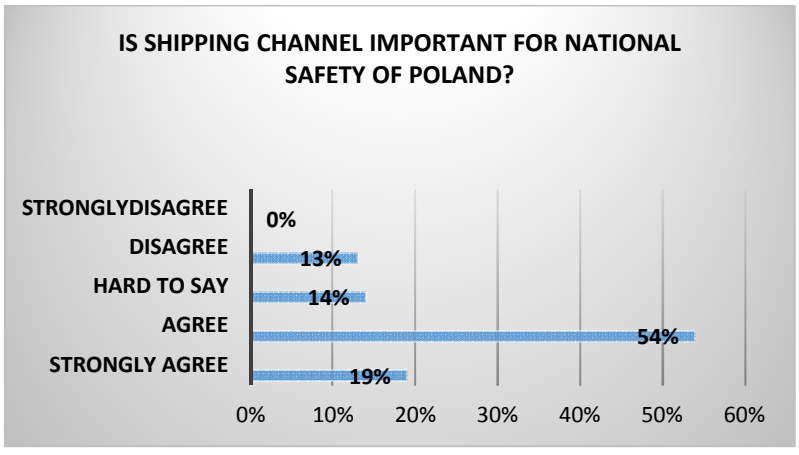


Chart 7. Rating of investment national safety for Poland

Source: based on own resources.

The respondents definitely assessed the investment as crucial for Poland's security. As many as 54% considered it to be important and 19% as highly important. 14% were unable to take a position on this issue, while 13% stated that the issue would not affect the security of our country. Such assessment of the construction of the Vistula Spit canal is undoubtedly influenced by the geopolitical situation, which changed after the annexation of Crimea by Russia. Therefore, ensuring public security and border protection has become a priority.

In the next question the respondents evaluated the State's information policy on the implemented investment. The answers are presented in Figure 8.

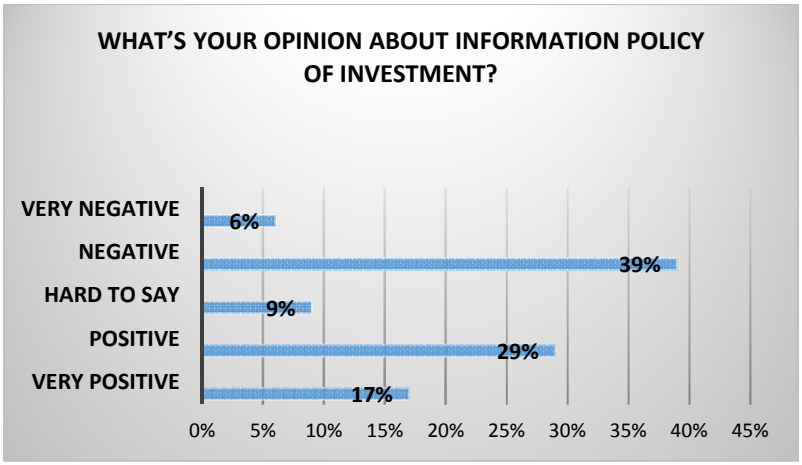


Chart 8. Rating of information policy of investment

Source: based on own resources.

It can be said that the respondents' answers were distributed among individual indications. 45% of respondents evaluated the state's information policy rather negatively, 39% negatively and 6% definitively negatively. 29% of respondents gave a positive assessment and 17% a definitely positive assessment, which in total gives us 46% of positive opinions. Only 9% did not assess the information policy in question. Such choices may have been influenced by the issue of the State's information policy, which may be assessed as a multi-vector one. It is an outcome of the country's internal information war. The commonality of various theses on any given topic presented in the media, especially on the Internet, is so immense that it can definitely influence the public perception of such project.

5. CONCLUSIONS

The results of the research conducted among young inhabitants of Podkarpacie may be surprising in some respects. The respondents did not unequivocally support or oppose the completion of the Vistula Spit investment. However, the vast majority sees an opportunity to boost tourist traffic in the region after the investment has been completed. More than half of the respondents believes that the port and city of Elbląg may count on the development of tourism, especially with regard to yachting and windsurfing, after the completion of the

canal crosscut. As many as 78% of respondents agreed that the canal would make shipping in the Vistula Lagoon independent from Russia. The respondents' views on the justifiability of building the Vistula Spit canal are overwhelmingly favourable. Young people express positive emotions towards the investment in question. However, the respondents were unable to unequivocally evaluate the investment in terms of ecology. On the other hand, they assessed the investment as definitely relevant for the security of Poland. As for the evaluation of information policy, the responses were distributed proportionally. The State's information policy on the examined subject was assessed negatively by 45% of respondents, and 46% gave it a positive assessment.

Various statements assessing the investments associated with the Vistula Spit canal can be found in the media. The project has aroused controversy from the very beginning, among others because the investment costs are high, and the expected benefits for the economy – "meagre". The favourable impact of the canal on tourism and creating jobs, especially in Elbląg and its vicinity, is indicated as its advantage. It will also allow for strengthening Poland's military status in relations with Russia. On the other hand, the sheer unprofitability and harmfulness of the canal for the natural environment are listed among its disadvantages. The fairway through the Vistula Spit is the flagship investment of the current administration, and its main goal is to ensure national security. Economic and ecological arguments were relegated to a secondary position. The investment into cutting a canal across the Vistula Spit is an arena of political conflict. It is possible to get lost in the maze of controversy surrounding this project.

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Agata WOJCIECHOWSKA[1]

USE OF PROJECT MANAGEMENT IN CREATING AND DEVELOPING A START-UP

This article's purpose is to present the assumptions underlying an integrated, agile-line approach to management of a start-up project and to propose a model for the management of such an innovative project. In addition to the theory related to project management and start-ups, this article discusses existing project management methods and their uses and compares them with typical needs of start-ups. To analyse the above-mentioned goal and yield reliable research results, a qualitative method was used, i.e., interviews with specialists and practitioners from the project management and start-up industries. As a result of the research, a model is proposed, including its phases and documents and tools necessary to each phase. Future research should be developed in a practical direction, i.e., it should be based on failed start-ups.

Keywords: project management, start-up, management, methodology project management.

1. INTRODUCTION

Globalisation, innovation and technological change play a key role in shaping the current labour market model (Balcerowicz-Szkutnik, Sroka, 2020). As a result, the market is a constant change, and each company meet new threats and opportunities. Changes create new needs and direct the company to define the objectives necessary to achieve a competitive advantage. The whole process of action and the way to reach the desired state is called a project (Małyszek, 2020). Projects can have a variety of forms, once they were only of a constructional and technical nature but nowadays they occur in all areas of human activity. The development of projects in all areas of activity was forced by changes in the functioning of the organization and an increase in information resources (Szmigiel, Strojny, 2015). The project can also be an innovative process, which the company creates to build a new image or a product (Wijmans, 2021). Along with the emerging need for dynamic changes, there was also a need to learn how to manage innovative projects, which it is necessary to combine to develop a model suitable for a given company and project. The literature lacks the use of both agile and linear methods at the same time. Innovation is any improvement of the current state or creation of a new product/service. An innovation has a key role, but not every change can be considered as an innovation. It is primarily to create a solution or introduce a change that is necessary and practical (Bukowski, Szpor, 2012).

[1] Agata Wojciechowska, MSc, Department of Project Management and Security Policy, Faculty of Management, The Rzeszów University of Technology, 10 Powstańców Warszawy Ave., 35-959 Rzeszów; e-mail: a.wojciecho1@prz.edu.pl. ORCID: 0000-0001-7075-2767.

Along with the concept of innovation, comes the concept of start-up, which is defined as a temporary organization looking for a viable and scalable business model (Blank, 2013). There is no clear action path for a start-up, and we don't know when it becomes a company, but it is certain that a start-up is the initial stage of a project (Blank, 2012). Moreover, in recent years it has also developed as a scientific discipline (Berkun, 2006). Adaptation to change is a key element in the activities of current companies and organizations, while project management allows to manage change.

The purpose of the article is to present the assumptions of an integrated agile-line approach to the management of a start-up project, to indicate the possibilities, project specifications and to present a proposed model of innovative project management, which has been verified and refined on the basis of expert interviews. A research problem that will be explained is: How to manage a startup project? There is no clearly defined way in the literature on how to start a project and manage it with project management. In this article, the authors try to present many methods and types of related solutions so that the reader can easily and consciously combine them with each other and decide for himself which method will be most beneficial for the type of organization he knows or will be able to act. Understanding the needs of the organization provides many opportunities and allows it to become competitive.

Start-up is a process of continuous learning and experimentation, and the very cycle of management of a start-up project requires continuous verification of ideas and consists of the following phases (Brzeziński, 2009): discovery, precision of ideas, business justification, product/service development, testing and market. R. A. Baron and R. A. Henry indicate the stages of the entrepreneurial process, emphasizing in the first stage creative thinking and high risk, the second stage belongs to people who are communicative, able to build a portfolio of clients and survive and stay in the market in crisis and the last stage, which is the transition to a mature company (Baron, Henry, 2011). These processes are similar to each other and have almost identical steps. Regardless of the approach, this is a project that will not always be successful (Kubera, 2016).

Innovative designs should be repeatedly tested to ensure that the problem existing in the market is solved and adapted to the changes required by the aftermarket customer (Clarke, 1997). A product or service created in an innovative process should be effective, easy to use, reliable, flexible and meet the emotional expectations of the customer (Engle, 2013). Expectations can be met when we perform tests and collect feedback from potential customers (Chandrashekar, Mungila Hillemane, Satyanarayana, 2013).

People who start a business, have the opportunity to take advantage of many funding opportunities to exclude financial failure, can take advantage of the power of the Business Angel. Such a person helps to commercialise or financially support a product/service (Arundale, 2007). Start-up is an innovative activity, but the authors of books and articles present only the successes of large companies, forgetting about the very process of creating and managing a start-up. (Start-up Latin America 2016: building an innovative future, 2016).

It is difficult for scientists to define innovation, it results from the development of the market or dynamic changes, while the most important aspect was quoted by Z. Orbik, pointing to the most important aspect that hinders the definition of innovation, i.e. taking into account new phenomena, objects and processes. (Orbik, 2017).

For this reason, the authors begin to explore the concept of innovation and combine it with project management. Currently, the innovative process of innovation is defined as activities necessary to develop modern and practical solutions (Wziątek-Kubiak, 2011).

2. TYPES OF PROJECT MANAGEMENT METHODOLOGIES

A project is defined a goal-oriented process and its achievement is either a success or a failure (Maduss, 2006). Project management was created in response to the needs of innovative ventures when traditional methods proved insufficient (Pawlak, 2006). Project management is a universal methodology that can be used in organizations with different characteristics, e.g. National Aeronautics Space Administration). Traditional project management methodologies are called linear/cascade and are based on the project life cycle and sequential actions, they work well in situations where the purpose and technique of action are clearly defined and there is little probability of changes (Szmigiel, Strojny, 2015). They do not allow for the possibility of significant changes during the project.

The search for methods adapted to projects characterized by variability began. In response to this need, agile project management methodologies have been used. In addition to innovation and variability, they are characterized by shortening the time of product delivery and adapting to a turbulent environment (Wirkus, Zejer, 2017).

In the traditional approach we can distinguish: PMI, PRINCE2 and IPMA. Whereas in the agile approach: SCRUM, KANBAN and LEAN. Figure 1 shows the division of approaches to project management.

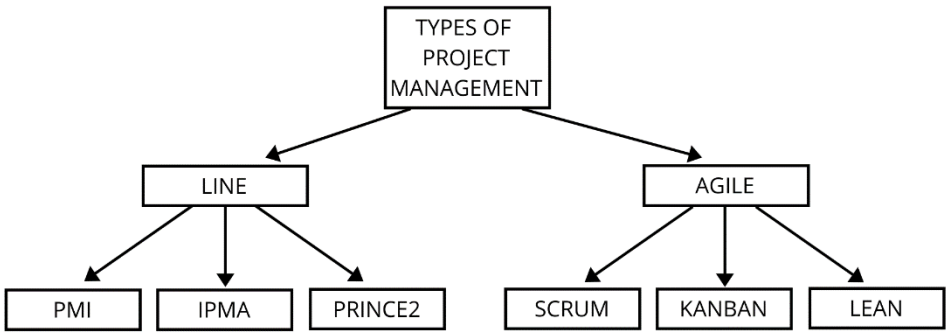

Figure 1. Types of project management

Source: own study.

PMI's methodology is a set of rules and standards for project management, which has been defined and arranged in the publication A Guide to the Project Management Body from Knowledge (PMBOK® Guide) (Wirkus, Zejer, 2014). PMI gives the possibility to characterize many processes and dependencies and gives the possibility to choose the necessary from among 42 presented e.g. monitoring, initiation or planning processes (Project Management Institute, 2008).

International Project Management Association is an organization that focuses on the activities of a manager, his or her competences and sets standards for three areas: project, program and portfolio, which are divided into three areas (perspective, people and practice).

PRINCE2 as the third of the linear methodologies that contains four main elements: principles, themes, processes and project environment, based on principles such as continuous business case studies, use of experience, defined roles and responsibility tools, step-by-step management or product orientation. It sets out guidelines on how to verify the project in terms of business relevance. PRINCE 2, on the other hand, precisely defines the organizational structure and the lack of flexibility of adjustment to a given organization (Wirkus, 2014).

The agile methodology, which is SCRUM, is characterized by orientation towards the project's stakeholders, providing functionalities that are specified at the time of subsequent iterations of the project with the client, and the schedule consists of short value creation processes. This method allows for flexible organization of work in order to react quickly to changes (Szmigiel, Strojny, 2015). SCRUM specifies the role in the project and imposes participation in frequent team meetings, which are called sprints. The KANBAN approach is also agile and bases its actions on visualization of the whole process, through KANBAN tables, dividing tasks into: to do, in progress, tests, completed tasks. The approach is also associated with the "no chair" meeting method and retrospection, which help to better understand the mistakes and improve the project (.system-kanban.pl,2020). The advantages of agile methods are also the transparency of the project, short, clearly defined tasks, and no waste and delivery of the product/service actually needed by the customer. In addition to the disadvantages, there is the need for constant supervision and control and the involvement of all employees.

Start-up is an innovative project, without developed schemes, so they are necessary to work out, in such a way as to meet the actual needs of the customer, a ready-made scheme can be applied, but it may lead to delays and a significant slowdown in the implementation process, due to a different specificity of the project (Chmielarz, 2012). The complete lack of a schedule may lead to the idea's collapse and its completion, therefore it is necessary to introduce work planning regardless of the methodology chosen.

3. RESEARCH METHODOLOGY

The purpose of the article is to present the assumptions of an integrated agile-line approach to the management of a start-up project, to indicate the possibilities, project specifications and to present a proposed model of innovative project management. Defining the purpose of the article allows the author to specify the direction of research and the research problem, i.e. the state of ignorance of an objective nature (Apanowicz, 2002). The research problem that will be explained is: How to manage a start-up project? The research was carried out by means of an expert interview, which is a qualitative method and allows to know the exact approach of practitioners and their way of thinking (Stemplewska-Żakowicz, 2010). The research problem will be specified through the following detailed research questions:

1. What elements of the project management methodology can be used to manage a start-up project?
2. What techniques support the preparation and implementation of a start-up project?
3. What documents support the preparation and implementation of a start-up project?

The participants of the expert interview were specialists and professionals in the field of project management and start-ups. These practitioners have dealt with the issues of project

management, start-ups, and innovation on a daily basis and cooperate with many companies throughout Poland. The expert interviews were conducted with three specialists:

- Jacek Strojny,
- Bartosz Jadam,
- Marcin Drozd.

Jacek Strojny is a specialist in project management, the second person, Bartosz Jadam, who closely cooperates with start-ups and knows its specifics, and the third specialist, Marcin Drozd, who founded a start-up and knows its specifics very well. The questionnaire consisted of 9 open ended questions. The interviews were conducted using the semi-structured interview method, which addressed many aspects related to project management and start-ups:

- the concept of start-up, the concept of project management and understanding of project management in start-up,
- ideal phases of an innovative project,
- documents necessary in particular phases of the start-up project,
- avoiding waste in innovative undertakings,
- the project start-up will turn into a process-proven company,
- the most desirable competence/skills of a manager, including a start-up, project manager, company owner,
- desired competence and skills of project team members,
- the possibility of carrying out a start-up project through the cascade model phases,
- the need for innovation on the market.

The interview allowed for exploring the topics and getting to know the project management process, the process of creating / creating a start-up as well as verifying the management model proposed by the author and refining it based on the practical knowledge of experts. This knowledge is of key importance due to the fact that the concept of a start-up is not precisely defined in science. The concept is young and everyone interprets it in their own way, therefore many aspects on which further research can be based are missing. Start-up is defined as an innovative project, characterized by a lack of linearity, which allows to combine research with the concept of project management (Sońta-Drączkowska, 2018). The life cycle of a start-up is specific because it combines existing processes, implemented and used in companies with non-existent or emerging ones (Kałowski, Wysocki, 2017). The expert interview led to the development of the necessary elements of the management process for an ideal agile-line model for managing a start-up project.

4. RESEARCH RESULTS

The first questions was about the definition of a start-up, project management and project management in start-up. The terms are understood differently by each of the specialists, start-up by Jacek Strojny is considered to be a project in which one can base less on the knowledge gained so far, and project management is leading from the idea to the creation of the final product. Whereas project management in a start-up is managing uncertainty and discovering what innovation is supposed to consist in, you cannot run a project linearly, but agilely, which translates into selected methods and techniques. The second specialist, Bartosz Jadam, understands project management as information management and a place to make mistakes, while a start-up is any undertaking that does not have repetitive solutions. This specialist thinks that project management in a start-up is

a clue that has to be adjusted to the specificity of the project. The third specialist described a start-up as an IT or Fine-tech company that is focused on the effect of scale in a very short period of time with a degree of innovation. He specified project management as a tool to help run the company and linked project management in a start-up with the concept of "kaizen", i.e. improvement of all possible aspects of the business and an innovative approach to company management.

The second question was about defining the stages in a start-up project. Each of them pointed out that it is not the name that matters, but the activities contained in them and the use of agile instead of linear methodologies. The first specialist defined three phases, following the standard phase model, the initial phase/idea then the transition to a phase of clarification and implementation, which are ongoing at the same time and the transition to a phase of closure of the start-up, in which the business moves on to repetitive processes and schemes of activities. The start-up specialist has defined the phases in a similar way, but has included specific actions in them. The first phase is also an idea/initiative in which iteration, market research, definition of the value to be delivered to the customer occurs. He defined the next phase as value identification, including identifying needs and trying out a tool for a problem that may occur during implementation. This phase determines the transition to the next related product identification, including the creation of methods and procedures to reach the customer, the phase of making mistakes, looking for ideal solutions and making key decisions. During the value identification phase and product identification there are several iterations, until the product value is specified. The last phase that Bartosz Jadam has defined is product implementation and market entry. The third specialist on the basis of a start-up created by him briefly defined three phases. The first one is to check the market and the parameters we want to provide, then to determine the recipients and possibilities of technology implementation, as the last phase he defined fundraising. He emphasized the fact of providing solutions at cost on an ongoing basis to test the product with the customer.

Another of the questions concerned documents necessary in particular phases of the start-up project. All specialists unanimously determined that the most important document is the one in which the saved ideas will be saved, e.g. in the form of Google Disc. The database with your own ideas should be created together with each project, additionally Jacek Strojny described transferring analyses and ideas to schemes as necessary imaging to find the missing elements. For Bartosz Jadam the issue of product description is very important, if the creator is not able to include the description of the idea on one page, he will probably never be able to sell the product. Legal documents concerning intellectual property are also important to protect the start-up from both internal and external risks, additionally Jacek Strojny believes that the ideal document would be a project card that would allow to prepare the start-up in different ways of financing, which would avoid lack of financing, because in the case of EU grants the tranches of the loan must be clarified according to the schedule, and e.g. Business Angels do not need a linear approach, but the very description of the idea and sale is necessary. Additionally, Marcin Drozd drew attention to the necessity of the changes and bad decisions in the project in order not to repeat the mistakes that have already occurred. Documentation is necessary in the project according to all specialists, everyone has defined different documents, but unanimously believe that it is not possible to specify in which phase which document should be in. It all depends on the specifics of the project and the matching of specific phases to the start-up.

The next elements was the avoiding waste in innovative undertakings. Creating the above mentioned documents during a start-up project helps to avoid wastage, thanks to that:

- determining the risk and its dimension,
- using other people's experience,
- understanding the market/competition and the needs of potential customers,
- not to follow "blindly" the goal set at the beginning of the project,
- focusing on the essential elements of the project.

Start-up is a project that should be relatively fast until completion, but it is very difficult to determine the exact framework when such a moment occurs. Bartosz Jadam specified that a start-up stops being a start-up when it stops "pivoting", the target market is defined, sales and changes start being made based on external clients. When entering the phase of introducing modifications in the project understanding, the start-up becomes a company. On the other hand, Jacek Strojny described the transition from a start-up to a company in a slightly different way, as a transition to the established schemes and use of standardized solutions and processes. Repeatable schemes include product sales, marketing, product manufacturing process. A completely different approach was presented by Marcin Drozd, according to which at the beginning a company is created and then it goes into a start-up, because every activity must be a company from the legal point of view, it should be registered. The company is transformed into a start-up at the moment when the activity reaches the effect of scale.

At the end, the issues of the desired competences of a project manager, cascading a start-up and the need to implement innovations were discussed. All experts agreed on the project team and its inter-disciplinarity and the selection of people for the team depending on its specificity. The most important features mentioned were communicativeness, determination, creativity and organization. The experts approved the fact that a start-up can be managed through a standard cascade model, i.e. initiation, planning, implementation, completion, but it needs to be modified accordingly, e.g. by combining the planning and implementation phase. The last stage of the interview raised the issue of the importance of innovation among the entities currently operating on the market. Innovation is not necessary for functioning on the market, but proactivity is equally important.

5. SUMMARY

Innovative project should develop by working on errors, phases in the start-up project should be adjusted to its specificity, the most important thing is to iterate with the prototype many times during the start-up and acquire skills. The first phase is the idea itself and its definition, the next phase is iteration, learning and multiple tests with the product/service recipient. The third phase should include the finalisation, i.e. it is the stage when the final product is released for sale in the process. The proposed structure of the phases of an innovative project is presented in the following figure 2.

The proposed phases of an innovative project are similar to those already existing in the literature, e.g. M. Rogers' model consists of six phases presented in Figure 3, including: need / problem, research, development, commercialization, diffusion and the consequences of adopting an innovation. Rogers emphasizes that the phases, depending on the needs, may occur in a different order (Beausoleil, 2018). The innovative project management model proposed in the article contains a significant difference – the deeming cycle, i.e. the process of continuous learning. This approach is based on agile management and the design thinking

approach and consists in working on the product in such a way as to satisfy the user, not only at the end of the project, but at every stage of it, and delivering visible work progress. The iterative approach is used in scrum and combined with the standards of cascading project management methodologies, i.e. clearly defined stages, allows to maximize the benefits of the project.

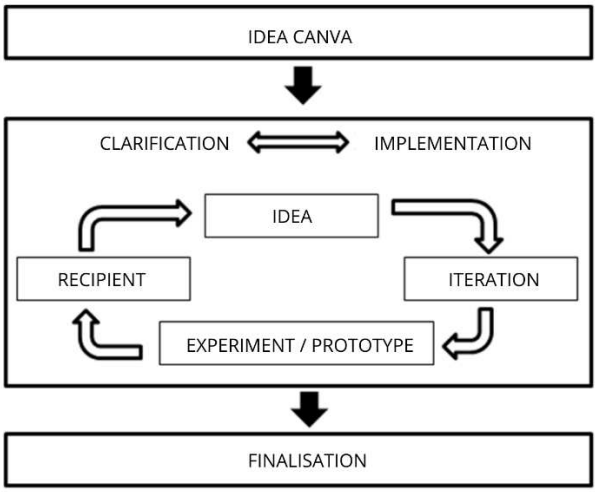

Figure 2. Proposed phases of an innovative project

Source: own study.

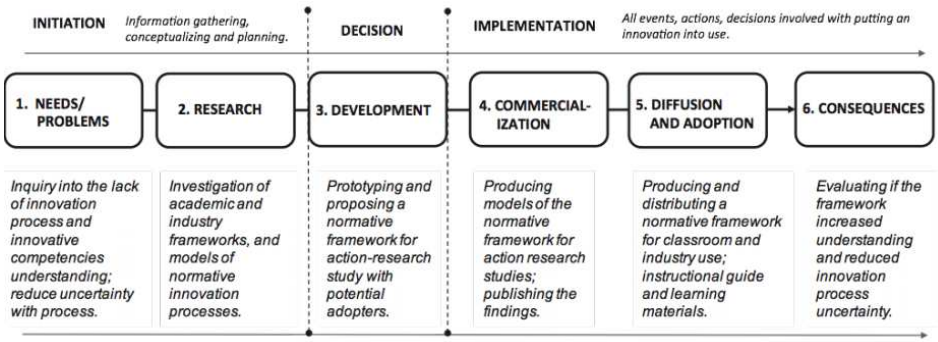

Figure 3 Adaptation of E. Rogers Innovation development process for this normative framework

Source: Rogers Everet M. (1995), Difusion of innovations, New York

When shaping an approach to the management of a start-up project, it is important to take into account internal and external factors of the company, i.e. an analysis of competitors and stakeholders should be carried out regardless of the type of methodology. The innovation project management model contains many features of agile but also linear

methodologies, however, applied in different stages of the project life cycle. As already mentioned in the case of start-ups financed from the public sector, it is important to plan the schedule and budget on a linear basis, as it is necessary to ensure payment deadlines in a given organizational unit. The model created is only a concept and can be verified in further research.

The work on an innovative project is characteristic, but it can use existing elements of project management methodologies, both linear and agile. The process which is an innovative project should also include control methods to verify possible changes and decide whether they are beneficial. The best way to continuously verify is to use the SCRUM methodology, which has short sprints in the tools, so you can easily reach the real problems. One of the techniques that can be used is short-term planning in agile methodologies, but for a project to work it is also necessary to develop a schedule that has its direct origins in linear methodologies. Below is table number 1 presenting proposed documents and tools in particular phases of a start-up project.

Table 1. Documents and tools needed in the various phases of a start-up project

Phase name	**Documents/tools**
Canva idea	• Business Model Canvas, • Idea Box Google, • Market survey.
Clarification and implementation	• Kanban table • Thought map, • Work shedulde, • Product specification, • Document securing intellectualy property, • Document with a description appriopriate to the selected funding, • Document with failures and successes of the project.
Finalisation	• Finally product specification, • Salse concept.

Source: own study.

Documents presented in the table 1 should also be included in the individual phases. They are to make the work easier and faster. In the first phase it is worth to use the Business Model Canvas tool and Google Drive, in which ideas and solutions will be written. The next stage is a good time to use the kanban table/thought map, simple work schedule and description of failures and successes. The last phase should include, first of all, the final specification of the product and the developed sales model. From the linear approach it is worth to use the structured documentation and already developed action plans. Agile approach should be the main template for activities related to the innovative project due to variability and high risk.

In the case of a start-up, the most important thing is not that the project goes according to the planned phases, but that it develops a product/service that the customer wants to buy. The use of project methodologies facilitates the implementation of appropriate tools and techniques in a start-up.

The main problem during the research was access to information, nowadays there is a significant part of literature on project management on the market, but it focuses on the same issues. There is a lack of issues in the literature concerning the possibility of modifying a given concept. Additionally, start-up is a quite young concept and not defined in the literature, thus the explanation of the concept is quite complicated, also because every specialist or scientist understands start-up and its activities in different ways. The literature should contain more items on the contemporary start-up scene, so that the management model can be defined more. The second important problem is the creation of new value, because in the case of start-ups and their management there are large discrepancies in the concepts, moreover, it is not defined as a separate legal activity and there is no strictly defined framework for the transition to a process-oriented company.

The article focuses on the presentation a proposal for a start-up management system using project management methodologies. This topic is nowadays one of the most important because many start-ups are created and project management strengthens its position as a scientific field. In the future it is worth to develop this topic of work by carrying out research that goes in the direction of development to combine agile and linear approaches. The integration of both approaches and the refinement of the model and its adaptation to innovative ventures will be possible in case the research will also be conducted on start-ups in relation to their effectiveness. Due to the fact that there are a large number of emerging start-ups, testing the failure factors would be the most appropriate course of action.

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Agata WOLANIN[1]

SELECTED VARIABLES RELATED TO THE QUALITY OF LIFE IN CANCER

The aim of this article is to present cancer as a serious, life-threatening chronic disease that strongly impacts all aspects of a patient's quality of life, including the physical, psychological, social, and spiritual ones. This theoretical article describes selected variables related to the quality of life of a cancer victim during the processes of diagnosis and treatment. These variables include stress and coping with the specific stress of having cancer, appraisal of the disease, acceptance of illness, and social support. Also discussed is the role of the variables listed above in quality of life in cancer and current research on these connections. Implications of the presented theory and research indicate that cancer affects quality of life in all areas and that the process of adaptation to the disease is facilitated by adopting adaptive coping strategies, appraising the disease as a challenge rather than as a threat or loss, accepting the inevitable limitations to everyday life, and seeking and using various sources of social support.

Keywords: quality of life, cancer, coping with stress, illness' appraisal, acceptance, social support.

1. INTRODUCTION

Cancer as a psychosomatic, systemic and multifaceted disease carries a great threat to the quality of life in many aspects, including physical, social, mental and spiritual. Illness puts a man before dealing with fear of the future and death. Stress affects a sick person at all stages of treatment, starting with the decision to consult a physician about disturbing symptoms, undergoing diagnostic tests and treatment, as well as in the period after treatment. Cancer is often seen as a systemic disorder that results from an imbalance in the biological, psychological, social and spiritual dimensions. However, the involvement of psychological factors in the initiation and course of cancer is not yet fully understood (Chojnacka-Szawłowska, 2012).

The type of cancer, stage of the disease, biological properties and effects of treatment affect the emotional responses of patients to the disease. At the psychological level, cancer causes uncertainty, an unstable emotional state of a sick person, a change in the perspective of the future and carries the risk of dying and death. At the spiritual level, cancer puts you in a position to rethink your personal values and the importance of life. At the interpersonal level, cancer threatens a sense of belonging to a family, close relationships and relationships

[1] Agata Wolanin, PhD, Rzeszow University of Technology, The Faculty of Management, Department of Humanities and Social Sciences, 12 Powstańców Warszawy Ave., 35-959 Rzeszów; e-mail: a.wolanin@prz.edu.pl. ORCID: 0000-0001-7679-9232.

with society, such as work or social activity, and evokes a sense of abandonment, loneliness, marginalization and even stigmatization. The impact of the above factors on patients' quality of life varies depending on the phase of the disease and its course (Grassi et al., 2007). In the biological sphere, cancer causes discomfort associated with the side effects of the disease and its treatment. In the psychological area, the impact of the disease concerns personality and the use of coping strategies. Cancer in this sphere contributes to the feeling of anxiety, as well as to asking questions about the meaning of life. In the social area, however, it affects social relations. Because cancer is a systemic disease, the various factors in this model (biological, social, and psychological and spiritual) have common areas affected by the disease (Grassi et al., 2007).

A general psycho-oncology research model is presented by Jimmie Holland (1998). The independent variables include cancer understood as a disease process and treatment effects. The dependent variables include the quality of life in the areas of: physical, psychological, social, professional and sexual, and the traditionally recognized variable, which is survival time. Holland also distinguishes 4 categories of mediating variables in this model that modify the impact of disease and treatment on quality of life and survival. The first category includes personal variables: socio-demographic data, personality and styles of dealing with personal problems, including ways of dealing with difficult situations as well as previous life experiences, life attitudes, sense or lack of meaning and purpose of life, faith, religion, worldview. The second category of mediating variables are medical variables, such as doctor-patient relationships, treatment context, patient's choice of treatment and rehabilitation, and patient behavior towards disease and treatment. The third category includes social variables, i.e. social support and the role of the family. The fourth category refers to variables related to stress of life (e.g. concomitant diseases, loss situations, accumulation of life-threatening life events in a short time). According to Holland, determining the role and importance of mediating variables of this model for shaping the quality of life of people suffering from cancer will allow both to explain the impact of the disease on the quality of life, but also to develop principles and techniques of influencing patients to improve their quality of life. Holland's model takes into account interventions affecting mediating variables, including known psychotherapeutic forms and crisis interventions, as well as new forms of help specific to psycho-oncology.

2. STRESS DURING THE DIAGNOSIS AND TREATMENT OF CANCER

The quality of life in cancer patients depends largely on the stress they experience from the disease and its treatment. Tumors are seen as extremely stressful diseases. Many patients experience symptoms of stress occurring in the form of depression, anger and anxiety associated with the progression of the disease and the threat of death. Juczyński (2000) presented a stress model for cancer patients related to the diagnosis, treatment period and time after cancer treatment. Diagnosis of the disease is usually a process that starts with suspecting the possibility of the disease occurring. Stress associated with suspicion of cancer occurs as a result of observing certain symptoms of the disease and the associated need to decide whether to undergo diagnostic tests. Some people treat all disturbing symptoms as a clear signal of cancer, others downplay them. Stress associated with noticing the symptoms of the disease causes the use of specific coping strategies. It can be acceptance, which increases fear and anxiety, which is associated with the assumption that

it is definitely cancer. Another strategy is to deny the existence of a potential disease, which gives temporary relief and reduces negative emotions (Juczyński, 2000).

Diagnosis of cancer is associated with patient confrontation with a real threat to life. Therefore, undergoing diagnostics and verification of unclear symptoms can cause severe anxiety and, as a consequence, avoid and delay contact with a doctor, temporarily giving a sense of comfort (Chojnacka-Szawłowska, 2012).

After deciding to undergo diagnostics, there is a stage of stress related to testing. It is stressful for the patient to test and wait for the results. The patient's attention is absorbed by the current situation and waiting for its clarification. A negative test result, excluding cancer, causes relief and discharge of emotions, while a positive result leads to the next stage – stress associated with confirming the disease.

The most obvious effects of confirming cancer are depression and anxiety (Juczyński, 2000). The diagnosis of a malignant tumor meets the criteria of and may contribute to post-traumatic stress disorder (APA, 1994, after: Chojnacka-Szawłowska, 2012). Also earlier traumatic experiences may cause a more negative assessment of the disease situation and worse adaptation to treatment (Chojnacka-Szawłowska, 2012). It is estimated that 40-60 percent of cancer patients have symptoms that meet the criteria for adaptive disorders, depression or post-traumatic stress disorder (after Grassi et al., 2007).

At this stage, most patients go through the stages of emotional responses to the disease described by Kübler-Ross (1979). The first of these is shock and disbelief, which lead to the formulation of denials (e.g. “it's impossible; it can't be cancer”). Another reaction is anger and self-resentment. It is the result of realizing the fact of getting sick and is accompanied by the question “Why me?”, “Why it happened to me?”. The next stage of reaction to the disease is depression and despair, anxiety, helplessness and anger with crying, sleep and appetite disorders. This causes temporary inability to perform their current roles. This phase can last for many weeks, but most patients accept the new situation over time and achieve good adaptation. The presented course and order of the stages of reaction to the disease is not rigid. Some quickly reach the final stage of acceptance, while others remain in the earlier stages of experiencing emotions that are reaction to the disease for a long time.

The next stage which is the source of strong stress is the period of treatment of the disease. Stress in this phase is associated with the treatment used and its side effects. One of the greatest stressors is stay in the hospital itself (Cohen and Lazarus, 1979, after: Juczyński, 2000). The most important problems causing stress during hospitalization are difficulties in information processing, in the scope of doctor-patient communication and in access to social support. Stress reduces memory capacity and difficulties in understanding new terms provided by medical staff. This promotes a sense of threat and ignorance about the course of the disease and its treatment and prognosis. Patient's trust in the doctor and support from relatives are of great importance in the treatment process (Juczyński, Szamburska and Czechowicz, 1997). The high quality of communication between the doctor and patient facilitates consent to treatment and compliance with recommendations. In turn, detachment from one's own environment and contacts with loved ones increases stress.

Stress is also caused by the type of treatment used. The basic methods of treatment include surgery, chemotherapy and radiation (Juczyński, 2000). Anxiety associated with the procedure is caused, among others, by the expected treatment result, expected complications, narcosis, fear of losing control over one's own behavior after the drugs used

(de Walden-Gałuszko, 2011). Operations in cancer patients cause more anxiety in anticipation of surgery and greater sense of powerlessness after surgery than in patients suffering from other diseases. Some patients willingly accept drastic surgery, expecting greater effectiveness and chances for recovery after it. Surgical procedures cause changes in the image of self and body, they also cause changes in social and sexual functioning. They also affect marital and professional relationships and cause anxiety in social situations (Silberfarb and Greer, 1982). Mutilation is particularly stressful, such as limb amputation, stoma, gynecological tumors resulting from infertility or removal of facial tumors. Stress associated with surgery may exacerbate the course of diseases for psychiatric patients, e.g. schizophrenia, affective disorder and anxiety neurosis (de Walden-Gałuszko, 2011).

Nausea and vomiting are among the most stressful effects of chemotherapy. About 25 percent of patients develop these symptoms by conditioning them by associating unpleasant symptoms with a hospital room, smell, etc. (Juczyński, 2000). Other side effects that constitute a stressful situation for the patient include hematological changes, hair loss and sexual disorders, including menopause and infertility (de Walden-Gałuszko, 2011). Patients undergoing chemotherapy treatment often experience anxiety, resentment, anger and depression. There are also cognitive, emotional, psychomotor disorders, consciousness disorders and decreased libido (de Walden-Gałuszko, 2011). Stress occurring during radiotherapy may be associated with a sense of "mystery" of this method of treatment, an idea of the harmfulness of radiation, thinking about "inoperable" cancer, fear of radiation overdose or failure of the apparatus (de Walden-Gałuszko, 2011).

The last stage of stress associated with the disease is the post-treatment phase. The period after treatment is sometimes perceived by patients as a threat of recurrence of the disease, and in some patients this stress does not even eliminate complete cure. Experience of the disease often causes psychological and social problems for many months or even years to come. On the other hand, some people also experience positive changes at this time, for example, a reevaluation of life (Juczyński, 2000).

Both the diagnosis of the disease and its treatment are a difficult situation and require mental adaptation. Patient resources, such as the strategies used to manage stress in the face of a serious illness and the ability to accept the current situation, and social resources in the form of support facilitate adaptation to the situation of the disease and can promote a higher quality of life.

3. COPING WITH CANCER

The concept of coping treated as a conscious strategy of responding to stressful events appeared in the early 1970s. The most important theoretical approaches to coping with disease stress include the stress transactional concept of Lazarus and Folkman (1984), Hobfoll's theory of resource conservation (2006) and Schwarzer's future-oriented coping (2001).

Hobfoll's theory of conservation of resources (2006) says that people strive to obtain, maintain, protect and develop valuable things, i.e. resources. Stress appears in the event of a loss of resources or threat of loss, and in the absence of an increase in resources after investing them. Loss of resources has a much greater impact on a person's well-being than their profit. A disease situation is often a threat of loss, a real loss of resources, and a lack of profit when investing resources in treatment.

Schwarzer's future-oriented coping concept (2001) includes anticipative coping (focused on a difficult event that will certainly occur soon), preventive coping (applies to negative events that may or may not occur in an undefined future) and proactive coping (includes building resources, personal development for future challenges, not the current threat situation). In a disease situation, in addition to reactive coping, there is also future-oriented coping, e.g. aroused by fear of disease deterioration or recurrence.

One of the theories most commonly used to explain coping with disease stress is the cognitive concept of Lazarus and Folkman. According to the transactional stress theory of Lazarus and Folkman (1984), in a stressful situation a person makes a primary and secondary appraisal of stress sources and coping possibilities. Stress in this approach is a complex relationship of disturbing the balance between requirements and capabilities, assessed by a person as exceeding resources or threatening well-being. The initial appraisal of the stressful situation includes assessment as a threat, challenge and harm / loss. Possibilities of removing the causes of stress, alleviating its effects, are made during so-called secondary appraisal, i.e. assessment of stress sources and own resources. To restore balance between themselves and the environment, man assesses his competences, material resources and social support. Performing a secondary appraisal may prompt you to take an activity related to changing the stress transaction, called coping with stress. In Lazarus and Folkman's theory, coping means “the cognitive and behavioral efforts of the subject to meet specific external and / or internal requirements, assessed as exhausting or exceeding the resources of the individual” (after: Heszen- Niejodek, 2000).

The authors of the concept presented two functions of coping. The first is the task function and concerns focus on the problem, such function is fulfilled by e.g. active coping, planning, problem solving, suppressing competitive activities, seeking instrumental support (Kozaka, 2010). The second concerns the regulation of emotions (e.g. minimizing danger, wishful thinking, positive expectations, humor, seeking emotional support) (Kozaka, 2010). Lazarus and Folkman's concept has been enriched with other coping methods, e.g. focus on approaching - avoidance (Endler and Parker, 1990), e.g. search vs information avoidance, acceptance vs helplessness. An important element was also the distinction of the role of positive emotions in the coping process and based on them coping focused on meaning, such as seeking benefits, setting adaptive goals, reformulating priorities (Folkman, 2008). The benefits of using these strategies, such as personal development, relate to goals, values and beliefs that are associated with spiritual coping (Folkman, 1997).

3.1. Coping strategies in cancer

Classifications of coping processes usually take one of two forms (Juczyński, 2000). The first of these focuses on counseling and directing the orientation and activity of a person to solve the problem and control the emotions associated with it. The second approach is focused on coping methods that express cognitive and behavioral strategies. The combination of both approaches is the classification of Moos and Schaefer (1993, after: Juczyński, 2000), who present an integrated approach to coping processes.

Understanding stress and dealing with cancer is usually closest to Lazarus and Folkman's transactional stress theory (1984). Disease as a stressful situation is also called distress, i.e. a multifactorial, unpleasant emotional experience with psychological, social and spiritual background (Holland, 1998). The goal of coping with cancer is to adapt to disease and treatment.

The best-known model for dealing with the diagnosis of cancer includes five coping strategies: helplessness – hopelessness, anxiety preoccupation, denial / avoidance, acceptance and fighting spirit (Watson et al., 1988). Stoic acceptance, also called fatalism, expresses recognition of the seriousness of the disease and accepting it as what fate has brought. Denial, also called positive avoidance, means that the patient using this strategy does not believe in the severity of the disease and the threat it brings. Helplessness and hopelessness express passivity and surrender to the disease, and the patient believes that he cannot do anything about it. The attitude of the fighting spirit encourages us to treat the disease as challenge and a desire to fight it. Anxiety preoccupation is expressed through constant concern and thinking about the disease and assigning any change to the disease significance. The presented forms of mental adaptation constitute a construct that results from the combination of assessing the threat caused by the disease and methods of coping with the disease.

Active coping strategies are more often associated with better adaptation to the disease situation, and thus with patients' quality of life than less active strategies (e.g. Pearman, 2003; Kershaw et al., 2004; Juczyński and Chrestowska-Jabłońska, 1999), although it may depend on the specific situation of the patient, e.g. if it is not possible to remove the source of stress or reduce its intensity, avoidance strategies can also be adaptive. According to Lazarus (2000), none of the coping strategies are automatically more adaptive, and the level of its adaptability depends on the specific situation.

Chojnacka-Szawłowska, (2012) indicates two tasks needed to be implemented in the process of coping with the disease. The first is to deal with the disease itself and related problems, such as pain. The second task is dealing with life that has changed due to illness, among others securing a moderate emotional balance and maintaining a satisfactory self-image.

Some patients seek while others avoid information about their illness. Information-oriented behavior can be a stress coping strategy. The patient's approach to information about the disease has made it possible to distinguish two styles of cognitive coping (Juczyński, 2000). The first is the style of information search, which involves dealing with danger by seeking information about the threat, which reduces anxiety and uncertainty. This style is based on vigilant observation (monitoring) (Chojnacka-Szawłowska, 2012; Heszen-Niejodek, 1991). Searching for information about the disease is associated with a tendency to confront and combat negative factors.

The second style of coping is to avoid threat information. Information-avoiding patients tolerate uncertainty well, mainly due to distraction, while an excess of information causes fear (Heszen-Niejodek, 1991). This style is based on the suppression of warnings (blunting) (Chojnacka-Szawłowska, 2012; Heszen-Niejodek, 1991). Information avoidance is associated with a tendency to withdraw and flee. In the face of a serious illness, both confrontational and escape styles are more effective than passivity and resignation (Juczyński, 2000).

It is estimated that between 30 and 90 percent of people in difficulty turn to religion (Pargament, 1997). A form of coping with a difficult situation can be religious coping with stress, which means a process in which a person seeks meaning by referring to the religious sphere, i.e. God, the community of the Church or other believers (Pargament, 1997). The concept of religious coping with stress was based on the stress concept of Lazarus and Folkman (1984). Coping in this concept involves positive religious strategies, e.g., perceiving a stressful situation as an opportunity to approach God or seeking and giving

spiritual support, and negative religious strategies, e.g., perceiving difficult events as a punishment from God (Pargament, 1997). Positive religious strategies are associated with a lower level of emotional distress and a lower severity of psychosomatic symptoms (Pargament, Koenig and Perez, 2000). However, the use of negative religious strategies is associated with many psychopathological symptoms, among others with anxiety disorder and depression (McConnel, Pargament, Ellison and Flannelly, 2006). Religion can be an important resource in dealing with cancer. In the study of patients suffering from prostate cancer and their wives, it turned out that women who used a strategy of dealing religiously together with their sick husbands had a greater decline in dysfunctional, impulsive problem solving. Such results were obtained only in couples turning to religion in dealing with prostate cancer (Yoshimoto, Ghorbani and Baer, 2006).

4. APPRAISAL OF THE DISEASE

The importance assigned to the disease by the patient depends, among others on the clinical form and severity of the disease, diagnosis, dynamics of symptoms and disease progression. Janowski, Steuden, Kuryłowicz and Nieśpiałowska-Steuden (2009) indicate that certain subjective variables are also important, such as the complex and dynamic cognitive structure referred to as the concept of the illness (Kulczycki, 1971), the picture of the disease (Heszen-Niejodek, 2000) and disease theory (Leventhal, Meyer, Nerenz, 1980). On the basis of transactional stress theory (Lazarus and Folkman, 1984), the assessment of the importance of one's own illness can be seen as one of the processes mediating between the stressful situation of the appearance of the disease and its effects (Janowski et al., 2009). To be able to talk about a stressful event, there must be a cognitive interpretation of the situation, i.e. primary appraisal (as harm / loss, threat or challenge). In the event of a health emergency, the initial appraisal may have an impact on the appraisal of coping options, the application of specific coping strategies and the effectiveness of solving the entire stressful relationship, taking into account somatic, psychological and social costs (McCrae, 1984).

Studies on the relationship between the primary assessment of a stressful situation and coping with stress by cancer sufferers were meta-analyzed (Franks and Roesch, 2006). Initial assessments were operationalized as a threat, challenge or obstacle / loss. Coping is defined as problem or emotion oriented strategies, as well as the general orientation of coping through approaching or avoiding. Assessment of the disease as a threat turned out to be related to problem-oriented coping. Illness as an obstacle / loss was associated with avoidance. Assessment of the disease as a challenge turned out to be related to problem-focused coping and coping through approaching.

5. ACCEPTANCE OF THE DISEASE

Chronic diseases, among others cancers, impose various restrictions in everyday life of patients. Reconciliation and adaptation to unavoidable changes can be difficult. The determinant of adaptation to life with a chronic disease is acceptance of the disease (Janowski, Kurpas, Kusz, Mroczek and Jedynak, 2013;). Acceptance of the disease means recognizing and understanding the limitations and losses associated with it (Basińska and Kasprzak, 2012). Therefore, the acceptance of the disease determines the emotional way of functioning in the disease and adapting to it, which is manifested in a low intensity of reactions and negative emotions related to the disease. The greater the acceptance of the disease, the better the adaptation and the less psychological discomfort.

In the study of patients with breast cancer, accepting the reality of the situation they were confronted with allowed them to predict their higher emotional well-being (Carver et al., 1993). The study of Polish women (Kamińska et al., 2014) compared the degree of acceptance of the disease of patients with breast cancer depending on the type of treatment. The highest level of disease acceptance was observed in patients after radical mastectomy and subsequent hormone therapy. Lower disease acceptance was associated with breast-conserving surgery and chemotherapy. The study of patients after mastectomy (Bąk--Sosnowska, Oleszko and Skrzypulec-Plinta, 2013) showed that greater acceptance of the disease situation is conducive to anxiety preoccupation and greater support provided to the patient by the family.

Greater acceptance of the disease has been associated with less anxiety and a greater propensity to reevaluate the difficult situation. Acceptance of the diagnosis of the disease by women with breast cancer allowed to predict better adaptation in the long term, as opposed to avoidance-oriented strategy, which was a predictor of greater fear of cancer recurrence (Stanton, Danoff-burg and Huggins, 2002).

6. SOCIAL SUPPORT

Interest in the issue of social support has been observed since the 1980s. The concept of support means access to various forms of assistance for a person in a difficult situation. According to Sęk and Cieślak (2011), initial research on social support indicated positive relationships between this phenomenon and health and dealing with difficult situations, but over time it turned out that support is not always unambiguously beneficial. Therefore, attempts were made to specify this concept and deeper theoretical analysis of this complex phenomenon.

Juczyński (2014) indicates two dominant concepts of social support. The first of these is a structural approach and includes objectively existing and available social networks that provide sources of support, such as family and friends. The second concept of support is a functional approach, that is, it relates the definition of social support to the function and quality of social relationships that are undertaken in difficult situations.

In stressful and crisis situations, people often seek and use social support. The impact of support on the crisis situation is explained by two effects: main (direct) and buffer (indirect). The main effect of support is that support directly contributes to adaptation to difficult situations by affecting stressors, or modifies the perception of stress. The buffer effect of social support means that support reduces tension, reduces stressors and mitigates the effects of stress (Juczyński, 2014). Works devoted to the topic of social support most often relate to its functional relationships with life stress (Sęk and Cieślak, 2011).

Social support can be understood and measured in three ways (Juczyński, 2014). The structural approach defines the properties of social networks, that is, the relationship between a person and his social environment. They are measured by assessing the size, density and structure of the network. The functional approach defines support through resources that are provided by others and help in a difficult situation. In this approach, questionnaire support is measured. The structural and functional approach to social support does not include the feeling of support by the recipient. The subjective assessment of support is included in the perceptual approach, which takes into account the feeling of being supported. It is measured using self-report questionnaires.

Many studies on stress and its effects indicate that social support reduces stress levels and its negative effects. The positive effect of support on physical health is also confirmed (Ganster and Victor, 1988). Support affects health both directly and indirectly through cognitive and behavioral variables associated with immunity and cardiovascular reactivity (Knoll and Schwarzer, 2011).

In the study of mental and social resources and their relationship to well-being in cancer patients, the relationship between perceived availability of social support for subjective well-being, impact on well-being after 9 months and change in well-being over time was examined. Social support was important in terms of well-being and predicted well-being changes over time (Pinquart and Fröhlich, 2009).

In the study of variables most closely related to the quality of life of people suffering from advanced cancer (Rodríguez, Mayo and Gagnon, 2013), among 65 variables (individual and environmental factors, biological factors, symptoms, functions, perceived overall health) the most important related factor with social quality of life turned out to be social support. The following variables after social support, important for the quality of life were general health perceptions, energy, social functions, psychological and physical functions.

In the study of the importance of various types of support in coping with cancer (Michałowska-Wieczorek, 2006) social support and supersonic (transpersonal) support were included. Social support was understood as resources provided by other people, i.e. emotional and practical support as well as social integration. Transpersonal support means supersonic trust, expressing the spiritual life orientation of the individual. It refers to the resources of supersonic reality, identified with God, a higher power or the cosmos. In terms of perceived support, women achieved higher results than men in all support indicators, especially social integration and transpersonal trust. Social support was negatively linked to the destructive strategies of coping with cancer, i.e. helplessness-hopelessness and anxiety preoccupation. Transpersonal trust was positively associated with positive re-evaluation and fighting spirit, i.e. adaptive and active strategies in coping with the disease. In the men surveyed, practical support and transpersonal confidence explained 45 percent of the variation in terms of a lower propensity to use non-adaptive strategies for dealing with cancer. Social support explained 14 percent of the variability in adaptive coping strategies. The surprising result was that less social integration was associated with more active disease management. The use of strategies of helplessness and hopelessness in dealing with cancer by men was most strongly associated with a lack of practical support, i.e. specific help in everyday life matters. In women, adaptive coping strategies, i.e. the fighting spirit and positive reevaluation of the disease were positively associated with transpersonal trust and a sense of social integration. Helplessness-hopelessness and anxiety preoccupation have been associated with a lack of emotional support in women.

7. CONCLUSIONS

Cancer has a comprehensive impact on patients. It constantly generates stress through the symptoms and effects of the disease itself, unpleasant side effects of treatment, the need to change lifestyle and hospital stays, the need to wait for the results of diagnostic and control tests. The disease is also associated with confrontation with the fear of deterioration of health, being dependent on the environment and death. The presence of cancer affects the quality of human life in all areas. In the physical sphere, it causes the need to cope with

pain, fatigue and other side effects of the disease and its treatment. In the social sphere, it causes limitations in family, friendly and professional contacts due to hospitalization and still perceiving cancer as a disease threatening and causing anxiety. In the mental area, cancer often causes anxiety and depressed mood and anger, and also affects self-image. In the spiritual area, the disease affects the sense of meaning in life. Adapting to the difficult situation of the disease facilitates the use of adaptive coping strategies, appraising the disease as a challenge rather than threat or loss, accepting the inevitable limitations in everyday life, and seeking and using various sources of support.

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