



CRACOW  
UNIVERSITY  
OF ECONOMICS



# RESTRUCTURING MANAGEMENT

MODELS – CHANGES – DEVELOPMENT



EDITED BY

MAREK DZIURA, ANDRZEJ JAKI, TOMASZ ROJEK

# **RESTRUCTURING MANAGEMENT**

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MODELS – CHANGES – DEVELOPMENT

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# **RESTRUCTURING MANAGEMENT**

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Edited by  
Marek Dziura, Andrzej Jaki, Tomasz Rojek





*wydawca*

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## INTRODUCTION

Successful restructuring and reorganization of an organization require good prior preparation, good planning which will address all the programmatic needs, support services which are needed to advance those organizational goals, good planning of the workforce and brilliant communication skills.

Organization leaders find it highly important to change the way these units operate for a few reasons, such as changing priorities of units, enhancing the effectiveness of organizations, addressing the budget reductions, initiating new programs, etc.

In this book, the authors discuss some of the reasons, strategies and benefits of organizational restructuring. It presents a few of the causes of restructuring an organization. There are numerous reasons why we should reorganize a structure, among which we can mention the fact that it will boost efficiency and keep technology up to date.

In the world we live in today there is only one thing that is constant: change. Companies that do not want to change tend to face huge risks in the line of production and that it will become obsolete with time, too. Therefore, businesses also experiment with new types of products, explore and enter new markets, visit new customers on a regular basis.

Businesses always want new areas so that they can boost sales, increase the capacity and shed the divisions which do not add much value. All of these initiatives will need corporate restructuring strategies. If an enterprise comes with a new product line, it will require to introduce changes in their system, hire new experts who are familiar with the line of business and place them in high positions with other interventions.

There are traditional systems of organizations that follow the same old nine-to-five working hours tradition. However, there are other requirements that could trigger organizational restructuring, for example, having new and good methods of work such as telecommunicating, having new systems and policies which could change the culture of one's workplace, etc.

The presence of telecommunicating employees or temporary employees could require an overhaul of all the management parameters, benefits,

compensations of the administration, etc. The new methods of working make it vital to put emphasis on the results instead of the methods, to have a strong policy of communication and report relationships.

Innovations in technology, the process of working, materials and other factors tend to influence your business and workplace in several ways. It also needs to restructure the organization with time. For example, the enterprise resource planning which links the whole system and the procedures of an organization by boosting the power of IT could need an overhaul of the procedures and systems. Failure to do so could result in the system of the company as well as the procedures that will turn more discordant and obsolete with time.

There are times when restructuring exercises can result from whims and other fancies of the owners. For example, the company could have a new owner who would like his stamp or even some personal authority and style in the business.

The restructuring will allow the owner to start afresh and in that way he will be able to have better control. It will also allow him to reshuffle the key personnel and provide some power to all lieutenants who are trusted. He may also be able to pre-empt any of the inefficiencies that are caused by the previous owner in order to sell even more.

There are some basic principles and strategies we must keep in mind before we plan the restructuring of the organizational structure and design and before making final decisions.

1. *Align the organizational structure:*

All organization restructuring has to be aligned to the strategy. This could seem slightly self-evident to some of you but there are some organizations that fail to do so. For example, if local conditions happen to be an important factor, you should concentrate on local sales as well as marketing functions instead of a centralized behemoth which tries to create a matrix using a few local elements.

2. *Cut down on the complexity:*

If we put things in simple terms, then complexity does cost quite a lot of money. If the organizational design and structure is complex, a product is complex and will offer a transactional process, the added cost of complexity shall also drag the performance a little further.

However, there are three things that will help you in the organizational design. Some important principles you should remember include the avoidance of making the roles of leadership too confusing or complex. Also remember to minimize the use of matrices. If we do not, it could cause the lack of clear direction.

3. *Focus on having better activity:*

Always remove any sort of inefficiency that could hamper the process of organization restructuring. This means that you have to know what people are

doing at this point so that the chances of danger can be reduced. We must have good understanding of the tasks by roles. This will also ensure that value-added activities have been thrown out when removing a role is required. Similarly, when it comes to duplication and redundant activity, it can be easily removed at the time of restructuring the company.

4. *Creating roles that are feasible:*

We must always remember that business restructuring strategy. When you are applying downsizing strategies, restructuring the organization or reducing the headcount, make sure that you understand the workload of these employees. But understand that there is a difference between downsizing and restructuring an organization. This may also help you design the roles which are neither heavy nor too light. Furthermore, you must remember that the role design should always take a close look at grouping skills. Packing a role with many distinct skill sets will reduce the number of candidates.

5. *Balance your work and the load of managers properly:*

When we speak of the management loading, we actually talk about a lot of hard work. It could be troublesome in some cases. It is often the inability of some managers to focus on leadership tasks because of the expected output requirements. For example, the time which is spent on monitoring as well as coaching could lead to several issues and errors caused by the staff itself. As a result of this, the manager ends up resolving the problem. To avoid it, it is important to balance three elements that include the staff which is directly supervised and managed, the ability of the staff to do work without any supervision and the amount of work that managers have to do to stay on top of their activities. The good thing about the company restructuring plan is that the cost of operations could decrease in the future. An example can be used to explain this. Payroll expenses will be much lower if the businesses have dismissed some of the employees. Likewise, there are outsourced operations which are usually less expensive than those in the system of in-house labour. When a business eliminates a few layers of management during the process of communication, a decision-making and restructuring strategy could be introduced. For example, the records could become much easy to access if a business plans to implement a filing system, that is to computerize.

To sum up the aforementioned principles and guidelines, as well as considering the current trends and conditions in the economic environment, the need for changes in the processes of managing contemporary economies and organizations is becoming even more urgent. It refers both to the evolution of the management concepts, methods and instruments used so far and to the



implementation of totally new solutions in that respect. Therefore, the primary aim of this publication is the presentation, analysis and exemplification of the conditions of the functioning of contemporary economy, identification of its determinants, as well as the presentation of the concepts, models and tools of managing contemporary economies and organizations in the conditions of the changing economic, social and political environment, with special regard to the role of restructuring, contemporary business models and project, development and change management processes. Partial problems leading to the achievement of this aim are exposed in the form of the following three parts of the presented work:

- I. Project Management and Business Models.
- II. Change Implementation within Enterprises.
- III. Restructuring and Development of Economies and Enterprises.

This book is a theoretical, methodological and empirical study, the aim of which is the presentation and systematics of the scientific and practical output concerning selected thematic areas, the discussion and critical assessment of this output, as well as the presentation of own reflections and proposals with regard to the analyzed issues and problems. The publication is a result of many years' cooperation of the Department of Economics and Organization of Enterprises of the Cracow University of Economics with the representatives of various Polish and foreign scientific centers and individuals representing the economic practice.

Handing over the discussed work to the Readers we express our belief that the publication in the presented form is fully justified, both from the theoretical-cognitive, practical and didactic point of view. It may be a point of reference for new reflections, inquiries, polemics, analyses and a critical discussion over the presented problems. The commitment of a large circle of the Authors has enabled the presentation of the discussed issues in a broad and multi-threaded way. As the scientific editors of this work, we would like to express our gratitude to all the Authors for accepting the invitation to co-create the publication and share the findings of the research conducted by them with the Readers.

*Marek Dziura, Andrzej Jaki, Tomasz Rojek*

**PART I** **PROJECT MANAGEMENT**  
**AND BUSINESS MODELS**



## Chapter 1

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Wrocław University of Science and Technology, Poland

# MANAGEMENT COLORS

*Future organizations will be dominated  
by soft skills.*

J. Berridge

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### SUMMARY

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The chapter discusses various management paradigms. Then in this paper its new concept, i.e. turquoise management, has been analyzed. Further on, the links between turquoise management and green management were discussed. Finally, the differences between two management concepts – pluralistic greenery and evolutionary turquoise were pointed out.

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### Introduction

Management is most often understood as the process of planning, organizing, leading, controlling the work of members of an organization, and using all available resources of the organization to achieve its goals. There are currently five business management models, i.e. red, amber, orange, green and turquoise management model.

The aim of the study is to analyze management paradigms with particular emphasis on turquoise management. Conceptual and analytical methods were used in the study, as well as the method of analyzing source materials and available literature on the subject of considerations.

The American psychologist Clare W. Graves laid the foundations of the concept of Spiral Dynamics in the 1950s. focused on by Don Beck, Chris Cowan and Ken Wilber. On its basis, Frederic Laloux, in his book “To work differently,” created his own colour system for marking individual levels of development.

The theory of Spiral Dynamics says that human nature is changeable. People are constantly developing and are able to adapt to the environment under the influence of external factors, creating new, more comprehensive and extensive models of the world. These models allow them to solve new, more complex problems. Each new world model (spiral level) transforms and embraces the previous one. Beck and Cowan divided and described subsequent levels using so-called vMEME (memes) – systems of basic views, values and beliefs that can be used to describe the development of entire cultures and a single person. This model uses the metaphor of a spiral, not stairs, because each subsequent level contains all previous ones<sup>1</sup>. So Turquoise, according to the Graves' concept, is the first level of the "second layer". All representatives of previous levels, known as "first layer" levels, believe that their worldview is the only right one, which is why everyone from the Turquoise level finds it difficult to communicate with them<sup>2</sup>.

## Management Paradigms

Frederic Laloux reviewed management styles<sup>3</sup>. Around 10,000 years ago, humanity started organizing itself in chiefdoms. In this time there came the first real organizations, which are labeled Red Organizations. This book "*Reinventing Organizations*" by Frederic Laloux shows how companies have evolved along a spectrum of paradigms – from red to the new turquoise organization. Author – Frederic Laloux – distinguished 5 organizational types (Fig. 1), as:

- Impulsive Red characteristic of mafia or street gangs. This style dominated mainly in antiquity (currently it is an anachronistic style). It is characterized by extortion of obedience, it is dominated by punishment and fear.
- Conformist Amber whose main feature is a rigid hierarchy divided into formal roles. The proverbial 'carrot and stick' model is a form of motivation in such management culture. This form of management exists e.g. in the armies or in the Church.
- Achievements Orange, in which the company resembles a machine focused on achieving goals. This style is characterized by a hierarchical structure,

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<sup>1</sup> Kirov N., Kirovado N., *Do "turkusy" trzeba dojrzeć! Czyli gdzie zaczyna się świadome przywództwo? (You have to mature for „turquoise”! So where does conscious leadership begin?)*, pp. 18-23, <https://kirov.pl/wp-content/uploads/2017/10/2017-10-Nadejda-Kirova-Nikolay-Kirov-%C5%9Awiadome-przyw%C3%B3dztwo-do-Turkusy-trzeba-dojrze%C4%87-Personel-i-Zarz%C4%85dzanie.pdf> : [access: 25.09.2019].

<sup>2</sup> *O przywództwie słów kilka (About the leadership of the words a few)*, <https://agilepmo.pl/en/o-przywodztwie-slow-kilka/> : [access: 10.09.2019].

<sup>3</sup> Laloux, F., *Pracować inaczej (Reinventing Organizations)*. Przekład Matek Konieczniak. Wydawnictwo Studio EMKA, Warszawa 2015, pp. 24-68.

while this structure remains open to promotion and all other autonomous forms of organization.

- Pluralistic Green. It is a style that focuses on maintaining harmony and a sense of community within the organization, where the leader enters into the role of mentor, teacher, not dictator. Although many decisions are made at lower levels, the company hierarchy is preserved. Such an organizational model is close, for example, to social movements.
- Evolutionary Turquoise (Teal). It is a holistic concept of perceiving a man with all his needs. Not only professional but also private needs are important. Work must not only provide livelihoods, but it should also be a source of pride. Frederic Laloux characterizes this style as follows: “When we act in deep honesty and respond positively to our calling, the universe does everything to help us.” It is an organization without a boss.

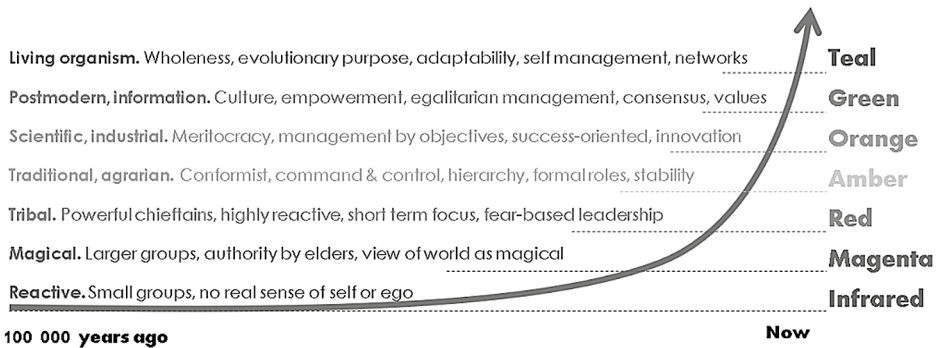


Figure 1: Management Paradigms

Source: Teal School, <https://www.tealschool.se/teal/> : [access: 25.09.2019].

## The Essence of Turquoise Management

The term turquoise management (teal management) was created together with Frederica Laloux’s research. Turquoise refers to the nomenclature used in the integral theory of American sociologist Ken Wilber („teal” in Wilber, meaning blue-green). He is associated with the theory of satisfying needs<sup>4</sup> and corresponds to the „need for self-realization” in Maslow’s pyramid. Turquoise is the first stage of development in which „the fact of the evolution of consciousness and the view that it has gained momentum, moving towards increasingly complex and

<sup>4</sup> Pietrzyk S., *Turkusowe organizacje – zorganizowana anarchia (Turquoise organizations – organized anarchy)*, Benefit 2016, nr 12(58), p. 16.

improved ways of dealing with the world<sup>5</sup> is accepted. Laloux<sup>6</sup> pointed to three elements, the so-called milestones in which awareness of human traits led to the development of a groundbreaking form of management in turquoise. These are:

- **self-management** – the abolition of the relationship between the employer and the employee, as a superior, and subordinates, and thus the complete liquidation of the hierarchy. Solutions based primarily on interpersonal relationships.
- **wholeness** – employees’ use of their own competences and experience, based on being simply themselves in accordance with the principle that the kind of people we are at home, let’s also be at work. Additional value is the employees’ bringing emotions and self-fulfillment.
- **evolutionary purpose** – own life is the priority. Understanding the evolution of the organization and the goals of the company will help looking around and listening to the environment.

Turquoise is the name that describes the seventh level of consciousness, the so-called free individual. If a person has reached this level of consciousness, it means that<sup>7</sup>:

- their worldview is open, tolerant and focused on the world, including company, partnership and work-lifebalance,
- wants to work to develop and realize their passions, wants to be flexible, wants to overcome various challenges, exchange with other tasks,
- Money does not count for them, but self-realization, honesty and authenticity.

The turquoise management model, as J. Kordziński puts it, “can be compared to an organism where each cell performs a specific role. And everything has a main goal: a healthy, well-functioning organism”<sup>8</sup>. Since turquoise is a certain level of consciousness, often such organizations are closer to green management, in which “the level of consciousness is suspended between classic corporations and turquoise organizations”<sup>9</sup>. So when we talk about turquoise management, we look at the world from a broader perspective. This means that “turquoise will occur when we subjugate our ego, when its fears, desires and ambitions cease to

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<sup>5</sup> O przywództwie słów kilka (*About the leadership of the words a few*), op. cit.

<sup>6</sup> *Turkusowe zarządzanie dla turkusowych liderów (Turquoise management for turquoise leaders)*, <https://brief.pl/turkusowe-zarzadzanie-dla-turkusowych-liderow/> : [access: 18.07.2019].

<sup>7</sup> Dębowski A., *Zagrożenia turkusowych organizacji – cienie turkusku (Threats to turquoise organizations – shades of turquoise)*, Benefit 2016, nr 12(58)/2016, p. 18.

<sup>8</sup> Kordziński J., *Turkusowe zarządzanie – czyli szkoła wspólnych działań w dobie zmian (Turquoise management – a school of joint activities in the age of change)*, Wolters Kluwer, Warszawa 2016, [www.wolterskluwer.pl](http://www.wolterskluwer.pl) : [access: 11.07.2019].

<sup>9</sup> Karczewski P., *Między zielenią a turkusem (Between greenery and turquoise)*, <https://dwanasciepytan.pl/blog-o-turkusowych-organizacjach-talentach-i-spelnieniu-zawodowym/miedzy-zielenia-a-turkusem/> : [access: 28.11.2018].

rule our lives. When we achieve a sense of abundance, that is, we learn to trust the abundance of life. There are two ways of living, in fear and lack as well as trust and abundance. As we reduce our need to control people and events, we will take every failure, an unpredictable event as a development opportunity<sup>10</sup>.

## Differences Between Pluralistic Greenery and Evolutionary Turquoise

When discussing modern management systems, it is impossible not to show differences between them. The table below presents the most important of them, resulting from: organizational structure, role of the leader, metaphor (figurative comparison), decision making method, meaning of emotions, organizational culture and common values.

Table 1: Pluralistic Green and Evolutionary Turquoise

DIFFERENCES	PLURALISTIC GREEN	EVOLUTIONARY TURQUOISE
STRUCTURE	Hierarchical with delegating responsibility and decision-making to the lower regions of the structure. The structure is headed by managers.	Moving away from hierarchy and structure in favor of self-managing teams linked by network dependencies. At the head of the structure are coaches, mentors, supporting teams when needed.
LEADER	Leader in service, he is a mentor, teacher who creates safe working conditions for his mentees and supports them in all matters requiring help.	None, there are colleagues here. People's self-awareness is at a level that causes rejection of fear, anxiety and following the inner voice.
COMPARISON	Metaphor of the family – „we are one big family” or „you enter our family”.	Living organism – a complicated system with countless network of connections and at the same time the sum of many autonomous systems.
DECISIONS	Consensus, and thus a long and arduous decision-making process. Consensus blurs the responsibility.	Responsibility for the decision is taken by the person taking the role in which the decision is needed. This person is the best specialist in the team, so others simply trust that the decision is the best that can be made in the circumstances.
EMOTIONS	Glorifies emotions as a source of strength and energy, rejects an analytical, rational approach based on data, facts and numbers.	Holistic approach to the surrounding reality, taking into account the full range of available states and attitudes. It uses both emotions and spirituality, as well as reason and analysis.
ORGANIZATIONAL CULTURE AND COMMON VALUES	Decisions are made through the prism of the common good and belonging, and maintaining existing harmony, they do not take into account the individual, internal needs of its members.	Decisions can be considered with the help of intuition and based on internal criteria, they are consistent with our worldview and values.

Source: Based on Karczewski P. 2018 and *Turkus czy zieleń* (Turquoise or green), <https://turkusorg.pl/turkus-czy-zielen/> : [access: 30.09.2019].

<sup>10</sup> *O przywództwie słów kilka (About the leadership of the words a few), op. cit.*



As the table above shows, both turquoise and green organizations are based on responsibility for their own actions, on interpersonal relationships, as well as on organizational culture and faith in the employee's potential. Importantly, this evolutionary turquoise distinguishes significantly from pluralistic greenery in the fact that there is no superior and subordinate („father” and „child”) in it. All people make individual decisions and, from their own choices, engage in various tasks, performing and assigning themselves functions, rather than filling the position. What's more, it's important to gain experience and learn and develop. In turquoise organizations, individual skills that can be developed and expanded are all that counts.

On the other hand, the green management style assumes the inclusion of all employees in democratic decision making, which, as shown in the table above, does not exclude the hierarchical structure of the organization. An important issue in this style of management is the exchange of information, which provides a sense of belonging to the organization while maintaining existing harmony. Green management style does not preclude the development of an organization while respecting the natural environment and active action to promote the “green way of thinking”<sup>11</sup>. Therefore, it can coexist in many cases together with pro-ecological management, which also proposes raising ecological awareness and cooperation for the common good. It is therefore believed that a pluralistic green management style can contribute to the creation of a green economy<sup>12</sup>, whose development and complement is turquoise management which emphasizes the identity and purpose of an organization as a separate entity. Turquoise organization is changing and adapting in response to circumstances in order to achieve the organization's goal.

## Conclusion

Based on the above analysis, it should be pointed out that recently there has not been the most optimal management model. An excellent model is the one that gives the best business results at a given stage of the company's development.

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<sup>11</sup> Blikle A., *Doktryna jakości. Wydanie II turkusowe. Rzecz o turkusowej samoorganizacji (The doctrine of quality. Turquoise II edition. It's about turquoise self-organization)*, Wydawnictwo Onepress, Warszawa 2018, p. 59.

<sup>12</sup> Sulich A., *The Green Economy Development Factors*, [in]: Vision 2020: Sustainable Economic Development and Application of Innovation Management from Regional expansion to Global Growth. Proceedings of the 32nd International Business Information Management Association Conference (IBIMA) / Soliman Khalid S. (Ed.), 2018, International Business Information Management Association (IBIMA) pp. 6861-6869.

The turquoise paradigm is an innovation in the management system. This new approach to management requires changing the mindset and freeing oneself from old beliefs and experimenting with the new vision of reality.

In turquoise management, order is reversed, and this means that the most important is authenticity, living in harmony with yourself, moving from external assessments to an internal sense of equity. What's more, you don't strive for recognition, success, wealth and belonging, but for a well-lived life.

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# REFRAMING PROJECT MANAGEMENT FOR SMART ENTERPRISES

## SUMMARY

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In era of digital economy is changing concept and development of enterprises. Fast using of emerging technologies, especially smart technologies needs to review existing models related to designing and functioning of enterprises. It starts from project management needed for smart enterprises. The aim of the chapter is to include new approaches for reframing project management of smart enterprises. For it are analyzed methods and approaches described in subchapter 2 (theoretical background). Novelty is approach for reframing project management (subchapter 3, and the final new result is dynamic model of project management for smart enterprises, presented in subchapter 4).

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## Introduction

We now live in era of fast changing related to approaches, goals, technologies, resources. One of a new approach is „smartness” in most human activities. A common assumption is availability of using it is solution for problem related to risks, resilience, competitiveness, growth, complexity etc. of enterprises functioning. In this circumstances enterprise has to transform into smart enterprise, according concept of Industry 4.0 and Industry 5.0.

A transformation of „classical” enterprise into smart enterprise is provided by a lot of projects leaded by concept of project management. This concept is general and has to be reframed for smart enterprises. It is purpose of the research. The aim of the chapter is to include new approaches for reframing project management of smart enterprises..

This methodoligy is based on using a lot of methods and approaches described in chapter 2 (theoretical background) and 3 (approach for reframing project management). At the end, in chapter 4 is presented dynamic model of

proposed approach. In conclusion are presented basic assumptions, results and expectations of the new approach.

## Theoretical background

### Smart enterprise

A smart enterprise is one kind of digital enterprise. According<sup>1</sup> in this survey were analyzed over 2,000 participants from nine mayor industrial sectors and 26 countries.

For purpose of our research were interesting finding that lack of digital culture and training in cca 50% and it is the biggest challenge facing enterprises.

The biggest component was lack at a clear digital operations visions and support/ leadership from top management (cca 40%), as well as unclear economic benefit and digital investments (38%) and high financial investment requirements (36%).

In<sup>2</sup> is analyzed business transformation towards digitalization and smart systems. Authors emphasized 17 reasons and needs for digital transformation of enterprises. Using BITTMAS maturity model is defined methodology to develop a roadmap and the necessary measures related to: (1) data collection, (2) decision making, (3) analysis, (4) maintenance, and (5) sensors. Also, are defined 18 training modules for smart environment.

In purpose of adapting and benefiting from cognitive computing and AI (Artificial Intelligence), Deloitte<sup>3</sup> surveyed 1.100 IT(Information Technology) and line – business executives from US companies in year 2018. Answers of respondents were that enterprise software is most popular and easiest path to Artificial Intelligence (AI).

Sandkuht K. (2016)<sup>4</sup> cited smart enterprise as „a new bread of computing companies focusing on enabling knowledge workers to process and analyse massive amounts of heterogeneous data and to collaborate and monitor things

In analysis of IoT and CPS (Cyber-Physical Systems) for Industry 4.0 in context of enterprise and process modelling is emphasized relationships among organisation, processes, platforms and products of enterprises. Also, enterprise architecture management has domains, business functions, business objects, and

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<sup>1</sup> PWC (2016). *Industry 4.0: Building the digital enterprise*, www.pwc.com /industry4.0

<sup>2</sup> Vladut G., *Business Transformation Towards Digitalization and Smart Systems*, Annals of Reviews and Research, Juniper Publishers 2018.

<sup>3</sup> Deloitte, *State of AI in the Enterprise*, 2nd Edition, Deloitte Development LLC 2018.

<sup>4</sup> Sandkuht K., *CPS, IoT and Industry 4.0 for the Smart Enterprise: What are the implications for enterprise and process modelihg?* PROMOS Workshop (EDOC 2016), Viena 2016.

service which related strategy (strategic goals, business plan, strategic initiatives & projects, and organisation), processes (business processes, data, business rules), systems (user interface, applications and data base), and technology (middleware, system-software, network, and hardware).

In Damjanović-Behrendt V. (2018)<sup>5</sup> is analyzed lifecycle data models for Industry 4.0 enabling technologies. The idea of Smart Manufacturing started from the following concepts:

- CIM (Computer Integrated Manufacturing),
- RMS (Reconfigurable Manufacturing Systems),
- Smart Factory based on IoT and embeded intelligence, Ubiquitous Factory and reference architecture.

In Filipov V., Vasilev P. (2016)<sup>6</sup> is analysed role of MOM (Manufacturing Operations Management) and MES (Manufacturing Execution Systems) for Industry 4.0. In this approach are included different other concepts as CPS (Cyber Physical Systems), CPPS (Cyber Physical Production Systems), FCS (Final Capacity Scheduling), for horisontal and vertical integration into:

- Smart supply chains,
- Smart products CPS,
- Smart machines CPPS, and
- Smart services.

For smart enterprises are used different business models (Ibarra D., Ganzarain J., Igartna J.I. 2017)<sup>7</sup> based on following approaches:

1. Service – oriented approach,
2. Network – oriented approach,
3. User – driven approach.

Based on work of Schonhaler F. (2015), in Hitpass B., Astudillo H. (2019)<sup>8</sup> authors analyzed orchestration of standardized business processes as collaborative processes integrated with: (1) standardized Cloud services (Internet of Services – IoS), (2) best practice business processes, and (3) standardized CPSs – Cyber Physical Systems. In this approach are emphasized values for Industry 4.0 concept with using Balanced Score Cards, BI and BPM/Process Mining.

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<sup>5</sup> Damjanović-Behrendt V., *Lifecycle Data Models for Smart Automotive and Smart Manufacturing*, Members of the IoT4CPS Consortium, Wien 2018.

<sup>6</sup> Filipov V., Vasilev P., *Manufacturing operations management – the smart backbone of Industry 4.0*, Proc. Scientific Conf. „Industry 4.0“, Year 2016 (xxiv), Vol.1, pp. 71-76.

<sup>7</sup> Ibarra D., Ganzarain j., Igartna J.I., *Business Model innovation through Industry 4.0*, *Manufacturing* 22 (2018), pp.4-10.

<sup>8</sup> Hitpass B., Astudillo H., *Editional Industry 4.0 Challenges for Business Process Management and Electronic – Commerce*, *Journal of Theoretical and Applied Electronic Commerce Research* 2019, Vol.14, Iussue 1, pp.1-3.

Authors Sharma M., Mohapatra S. (2018)<sup>9</sup> highlined five essentials of intelligent operations:

1. Innovative talents,
2. Data – driven backbone,
3. Leveraging the power of the Cloud,
4. Applied intelligence, and
5. Smart partnership ecosystem.

This approach is supported by 5G Technology (Landry T. 2018)<sup>10</sup> for areas impacted in Smart Enterprises: (1) employees, (2) green facilities, (3) operations, (4) safety and security, (5) building a smart enterprise to support 5G.

### **Project management**

For effective project management is important to commit stakeholders (Weaver P. 2010)<sup>11</sup>.

These authors proposed Stakeholder Circle methodology with activity in center and team working outside. On the periphery are current stakeholders and wider potential stakeholder community.

A quality assurance of the project is based on developing assurance activities, with appropriate metrics related by requirements, specifications, assurance activities, and metrics based on objectives.

Besides quality, resilience is one of higher important concepts in project management in new era (Blay K.B. 2017)<sup>12</sup>. Using concept of organisational resilience is possible to measure: (1) adaptive capacity, coping ability, flexibility, persistence, (2) antecedents for disruption management in projects and organizational resilience, and (3) consequences/ recovery (vulnerability reduction, response, and readiness).

Based on the principles of Lean Product Development Process is-proposed methodology for building a project-driven enterprise.

All previous analysed literature source are based on concept of Requirement Engineering (RE). In Young R. (2004)<sup>13</sup> are developed types of requirements and skills and characteristics of on effective Requirements Analysis (RA).

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<sup>9</sup> Sharma M., Mohapatra S., *Follow my Lead: Business that lead with Intelligent Operations will actualize greater value and higher customer satisfaction to become truly future – ready*, Accenture Business Journal for India 2018, pp.1-10.

<sup>10</sup> Landry T., *Smart enterprises: Navigating 5G*, JMA Wireless 2018.

<sup>11</sup> Weaver P., *Area projects, mega problems: Challenges of Global Mega Projects Innovations & Creativeness for Project Excellence*, Mosale Project Services Pty Ltd, Australia 2010.

<sup>12</sup> Blay K.B., *Resilience in projects: definition, dimensions, antecedents and consequences*, Doctoral Thesis, Loughborough University 2017.

<sup>13</sup> Young R., *The Requirements Engineering Handbook*, ARTECH HOUSE, Inc., MA, 2004.

### **Project complexity**

A complexity has impact especially on large infrastructure projects. Authors analyzed managers perception of complexity and scientific perception of complexity and further managing dynamic complexity and dynamic management with five x – factors: (1) higher order of cooperation, (2) project champions, (3) competent people making the difference, (4) capability to find unique management solutions, and (5) using windows of opportunity (Herogh M., Vesterveld E. 2010)<sup>14</sup>.

For analyse of complexity in organizations (George M., Wilson S. 2004)<sup>15</sup> is emphasized that complexity is silent killer of profit and growth. Authors see that complexity could be a strategic weapon and through complexity analysis they quantifying and prioritizing the complexity opportunities in phases: (1) identity strategic complexity targets, (2) map and quantify the impact of complexity, and (3) build a complexity value agenda.

### **Project leadership**

A greater complexity and associated risks and vulnerability of projects need a new concept of project leaderships. It is now more dependent on skills, behaviour, knowledge and values (apm, 2018)<sup>16</sup>. After synthesis of the interviews authors developed eight leadership survival skills: (1) anticipating, (2) judgement and decision making, (3) seeing it all, (4) building credibility and confidence, (5) being organisationally intelligent, (6) learning, (7) resolving conflicts culture and (8) environment. These competence of leaders are divided into three levels. After competency framework analysis is possible to intersect: (1) project leadership, (2) project management, and (3) general organisation leadership. In intersection are: communication, decision making, execute, risk, self, stakeholders, effective team building, drives vision and purpose.

Authors distinguished six key differentiators of successful megaprojects leaders: (1) strategic mindset, (2) communication in all its forms, (3) business acumen, (4) balanced

decision making, (5) political intelligence and (6) change leadership. Also, top three critical competences of successful megaproject leaders are:

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<sup>14</sup> Herogh M., Vesterveld E., *Playing with Complexity: Management and Organisation of large infrastructure projects*, Doctoral Thesis, Erasmus University, Rotterdam 2010.

<sup>15</sup> George M., Wilson S., *Conquering Complexity in Your Business*, Mc Graw – Hill, New York 2004.

<sup>16</sup> APM, *Project leadership: skills, behaviors, knowledge and value*, Association for Project Management, UK 2018.



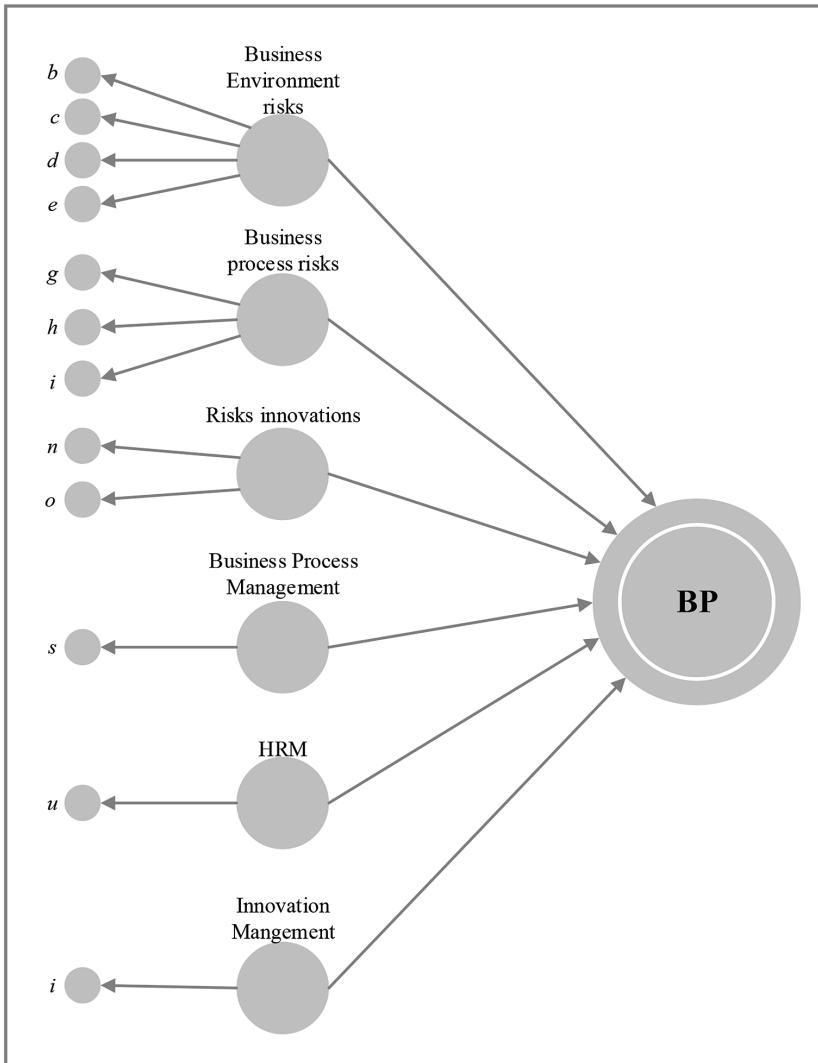


Figure 1: Variables and leadership concept for industry 4.0

Source: Own research.

1. Process competences with side of owner leaders (stakeholder management, project organisation, and project life cycle management) and build-side leaders (project organisation, project life cycle management, and governance),
2. Productivity competence with mutual competence (project communication, reliability, efficiency), and
3. People competencies with team building, integrity and etics, as well as tenacity/tough-mindedness and relationship building.

4. In Arsovski, Z., Arsovski, S., Rejman Petrovic, D. (2018)<sup>17</sup> is analyzed leadership concept for Industry 4.0 (*figure 1*).

Authors developed base model consists six variables):

V1 – Strategic Management,

V2 – Quality Management,

V3 – Quality Leadership,

V4 – Process/Product Quality

V6 – Spiritual Quality Leadership, and

V14 – Synchronicity Level.

After simulating the relations in the model using Artificial Neural Network they find that spiritual leadership becomes a new and very important of quality performances in enterprises and among variables are significant impacts. That means with increasing these variables is possible to significantly improve quality as competitiveness factor.

Franc H.W., Sarcina R. (2009)<sup>18</sup> analyzed messages for facilitators and lateral leaders with 16 elements, as well as didactics and curriculum. After analysis of tools they emphasized growing experience as base for transition from unconscious incompetence to unconscious competence.

### Knowledge and AI

Organisational impacts of Knowledge Management (KM) and future of KM are analyzed in (Becerra-Fernandez I., Sabherwal R. 2010)<sup>19</sup>. For our research especially is important analysis of leadership of KM and assessment of knowledge, related to project management.

Business Intelligence (BI) is unavoided part of smart enterprises. In Turban E. et al. (2011)<sup>20</sup> is analyzed changing business environments and computerized decision support, as well as a framework for Business Intelligence (BI). Authors emphasized data mining for BI, text and web mining, and BI implementation.

After analysis of models and concepts of life and intelligence authors in Kennedy J., Eberhart R. (2001)<sup>21</sup> introduced evolutionary computation theory and paradigms and stated the particle Swarm and collective intelligence and mode up from social learning.

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<sup>17</sup> Arsovski, Z., Arsovski, S., Rejman Petrovic, D., Information and Communication Technologies Based Business Models, *Monograph Knowledge Economy, Society*, Cracow University of Economics, Cracow 2018.

<sup>18</sup> Franc H.W., Sarcina R., *Building Leadership in Project Network Management*, Springer 2009.

<sup>19</sup> Becerra-Fernandez I., Sabherwal R., *M.E. Shapre*, Armonk, New York 2010.

<sup>20</sup> Turban E. et al., *Business Intelligence: A Managerial Approach*, Prentice Hall, Boston 2011.

<sup>21</sup> Kennedy J., Eberhart R., *Swarm Intelligence*, Morgan Kaufman Publishers, San Francisco 2001.

This approach is convenient for leadership of mega projects and dynamic large scale enterprises.

### Approach for reframing project management

After 50 years anniversary of the Club of Rome our civilisation has to review achieving the Sustainable Development Goals. The question is does transformation is feasible (Kapoor S., Begashaw B., 2018)<sup>22</sup> with using smart/intelligent solutions. For it is developed concept of Reframing Organizations. The basic idea is that now in era of higher complexity, changes, insufficient resources etc. is not enough small improvements. Solution is radical changing base of business.

In area of project management it means that is necessary to include more intelligence in all phases, supported by new concept of leadership, knowledge management, organizational development, and all of them with ICT and Artificial Intelligence. In big or mega projects with pressure for achieving a goals related to time and budget, as well as quality and reliability/resilience of the project management, a reframing concept is necessary (figure 2).

In our research is analysed the first process, i.e. reframing project management. According PMBOK this process is realized through five sub-phases with one previous phase related to interface with planning and regional/business architecture.

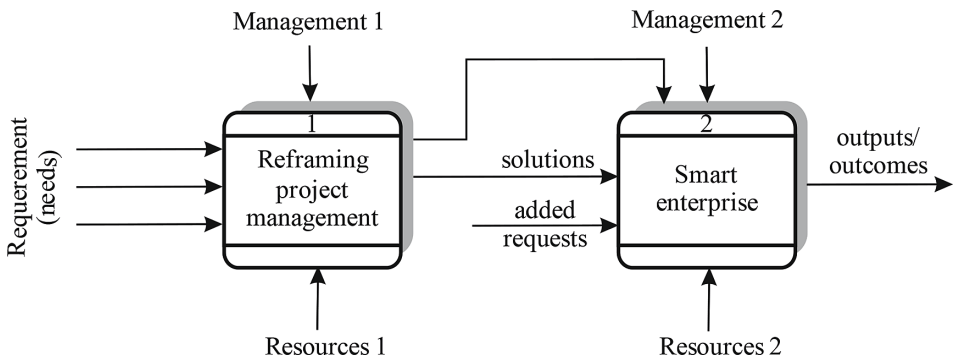


Figure 2: Process – based reframing

Source: Own research.

<sup>22</sup> Kapoor S., Begashaw B., *Transformation is feasible*, Stocholm Resilience Centre Report, Stockholm 2018.

In critical points are included interfaces but it is not sufficient for complex project as related to smart enterprises. A reframing of project management includes following areas and smart methods/techniques/tools, smart resources, smart people and phases (*figure 3*).

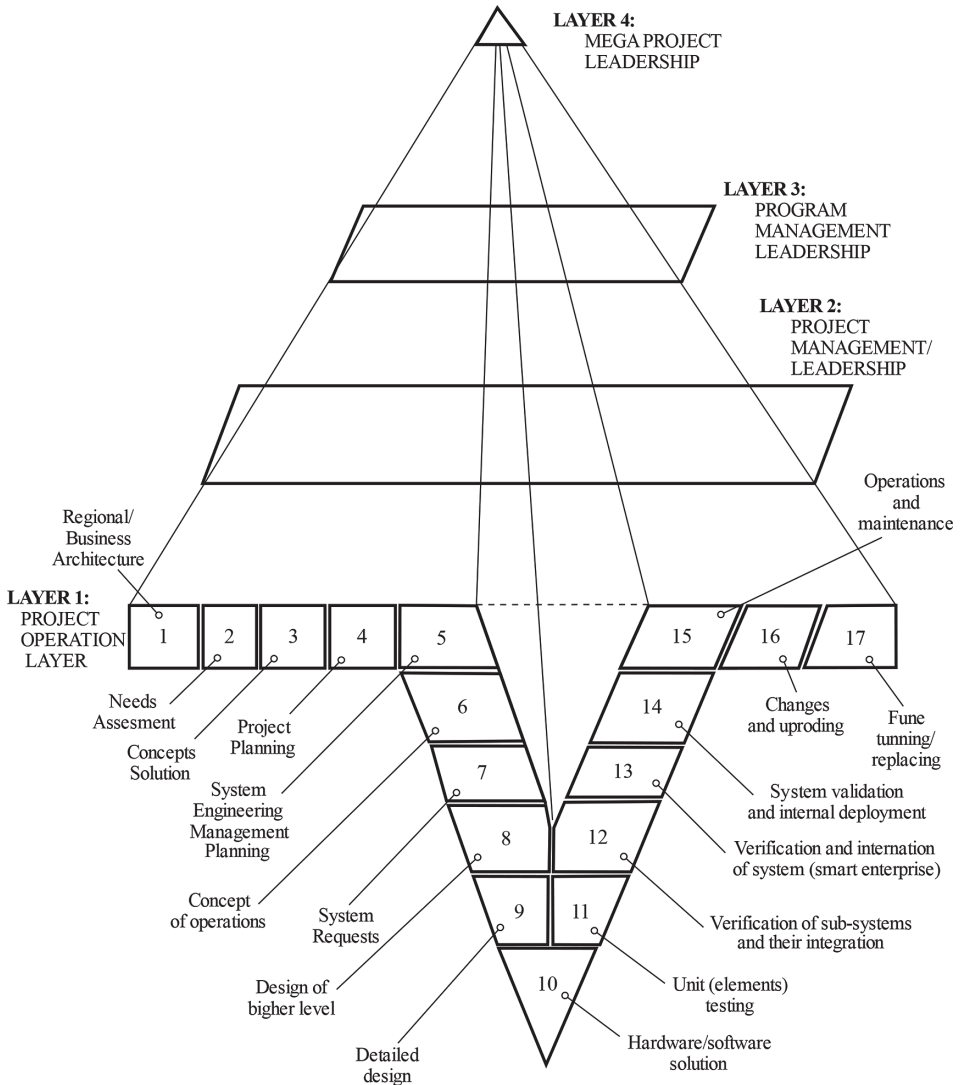


Figure 3: Concept of four-layers project management  
Source: Own research.

On the *figure 3* in layer 1 is presented operation of the project life cycle.

In phase 1 is used different methods from area of regional/business modeling related to architecture of smart enterprise. One of frequently used is enterprise architecture frameworks, based on CIMOSA model dedicated for modelling and analysing under turbulence.

In phase 2 is used method Requirements Engineering (RE). For selection of concepts could use Fuzzy approach or AI. In next phase (Project planning) is used tools/techniques based on dedicated software, with optimisation of resources, according time and costs. For system engineering-management planning phase is used methods, including AI, in area of information management and Decision Support Systems (DSS). Concept of operations is based on intelligent business process modelling (Oussena, S. 2018)<sup>23</sup>. For it, based on business process analysis, is developing process model and Business Process Management (BPM) model (Chang, J. F. 2016)<sup>24</sup> and (Kapoor, S., Begashaw, B. 2018 )<sup>25</sup>.

In this model are included IoE (Internet of Everythings), IoT (Internet of Things), sensors, actuators (robots, automated devices, etc). System requests (phase 6) is analysed by Fuzzy AHP approach and assessed key requests for project using appropriate AI (a.e. Genetic Algorithms).

Next phases (9 – 17) are supported by combined engineering and management methods with ICT and AI.

In layer 2 is project management/leadership. For it is used general Process-based Organization Design Model<sup>26</sup> with relationship between process owner and process teams, with process advisor. For purpose of project management in this organisational structure is necessary to include project organisations.

In this layer the project of smart enterprise is divided into sub-projects (a.e. smart technology, smart specialization, smart energy, smart products, etc.). Each of sub-manager has to be leader of his sub-project.

Theory of leadership in era of Industry 4.0 is emerging. Now leaders have to use:

- Complexity leadership theory,
- Smart leadership,
- Spiritual leadership,
- Swarm leadership, etc.

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<sup>23</sup> Oussena S., *Towards Intelligent Business Process Modeling*, University of West London, Connected Ed., London 2018.

<sup>24</sup> Chang J. F., *Business process management systems: strategy and implementation*. Auerbach Publication, Taylor and Francis Group 2016.

<sup>25</sup> Kapoor S., Begashaw B., *Transformation is feasible*, Stocholm Resilience Centre Report, Stockholm 2018.

<sup>26</sup> Hernaus T., *Process-Based Organization Design Model Theoretical Review and Model Conceptualization*, 2008.

In layer 3 is project program management/leadership. For it is emphasized roles of project, with deeper relation with project sponsors and project budgeting.

In layer 4 is general project management/leadership.

This roles of general project management/leadership are defined using leadership process model and conceptualization leadership processes. The proposed reframing project management for smart enterprises, explained in this chapter, is combination of methodological and technological elements. Only on this approach is possible to solve complex problem of smart enterprise according desirable goals (time, budget, reliability, quality, openness, etc.).

### Dynamic model of project management for smart enterprise

An initiative for smart enterprise is possible to model using causal loop diagram and stock and flow maps. Using work of Sterman<sup>27</sup> in *figure 4* is presented feedback flow map for smart enterprise project.



Figure 4: Feedback Flow Map for Smart Enterprise Project initiative  
Source: Own research.

A starting point is vision of smart enterprise which is defined with interaction of project leaders/management with stakeholders. Depend from rate of smartness is impact of smart enterprise. It is the first assumption in the proposed model. Other assumptions are related to goals and a final smarter enterprise achieved (*figure 5*).

Based on proposed reframed methodology for project management of smart enterprise is defined model presented in *figure 4* realized through:

1. Analysis of causal loop-diagram and stock and flow maps, and
2. Designing the model structure and haset the hasetion.

In the next hase will performing:

- a) The model testing and validation with:
  - Model structure verification test,

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<sup>27</sup> Sterman J.D., All models are wrong reflections on becoming a systems scientists, *System Dynamic Review* 2002, 18(4), 501-531.

- Model parameter verification test, and
  - Model extreme-condition verification,
- b) The stock and flow diagram for the Smart Enterprise KPI model.

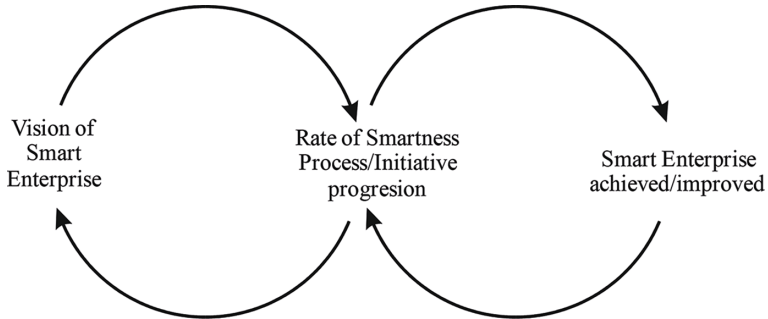


Figure 5: Causal Loop Diagram for the Smart Enterprise initiative  
Source: Own research.

The proposed model of mega project management (*figure 6*) has seven key flows:

- 1) Adjustment with strategic decisions,
- 2) Invesnent of stakeholders,
- 3) Assessment of needs and context,
- 4) Concept design of smart enterprises,
- 5) Selection of concepts of smart enterprises,
- 6) Project planning of smart enterprises, and
- 7) Assessment of effects of using smart enterprise,
- 8) These key flows are connected twenty two variables. After analysis of state and values of variables is possible to predict effect of using smart enterprises in phase of projet design.

For supporting execution of the proposed model could be used:

- Modern nonlinear optimisation techniques for an optimal control of system dynamics model,
- Binary regression models,
- Statistical methods based on regression models, as partial least square structural equation modeling,
- Artificial Neural Networks,
- Genetic Algorithms, etc.

These methods and techniques partly are included in appropriate commercial software packages.

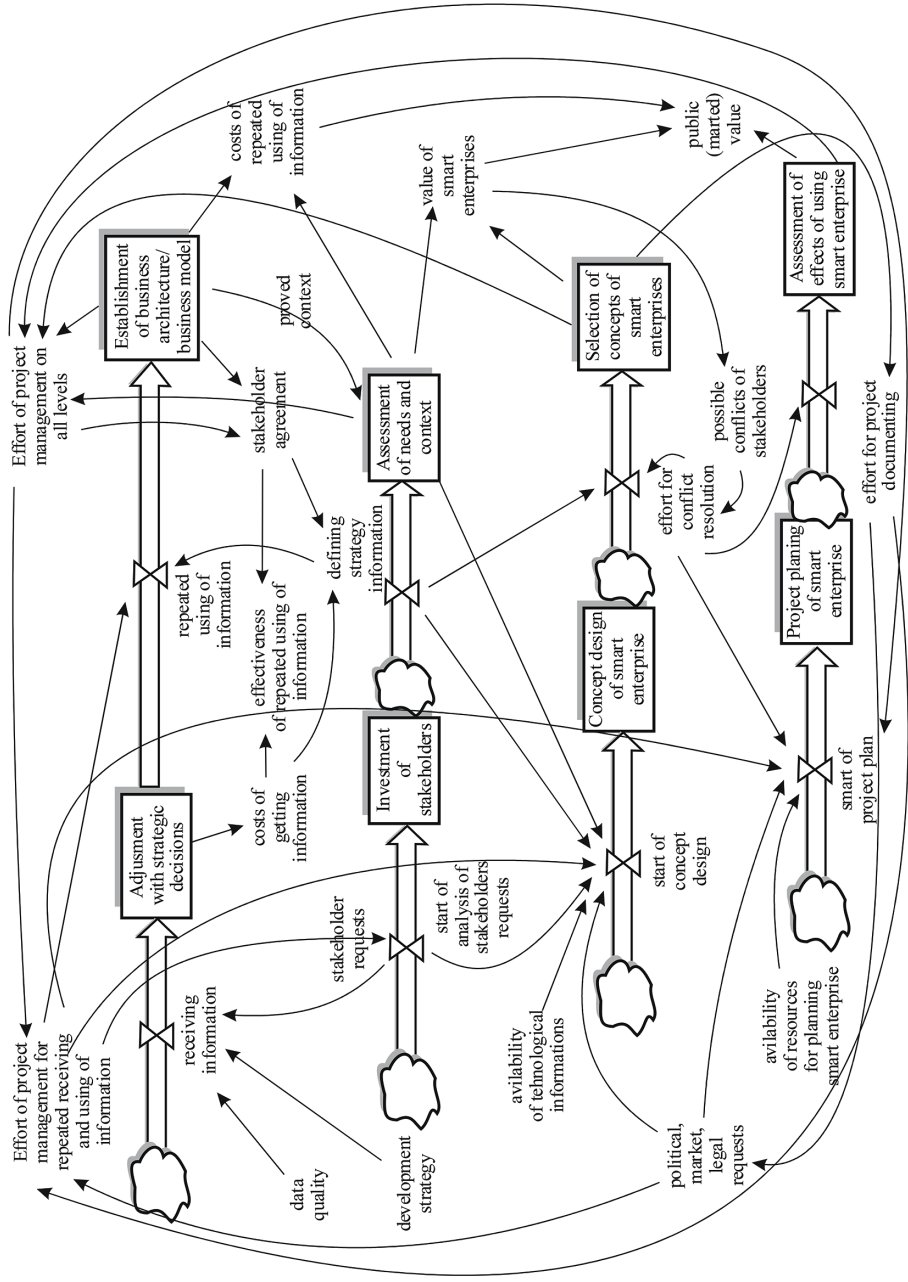


Figure 6: Dynamic Model of project management of smart enterprises  
Source: Own research.



## Conclusion

A “classical” project management is not enough for effective and efficient large scale, complex, mega projects. For it is proposed the new methodology for smart enterprises, as one type of this kind of projects.

After analyzing referent literature we find that in this research have to be include, methods of qualitative and quantitative research, modeling methods, and new approach to leadership and architecture of management in three levels. In this new approach is more included also role of stakeholders, quality, risks, vulnerability, and resilience of project management. Defined dynamic model based on Sterman’s work introduced a lot of variables needed for goal-oriented project management.

In next research we plan to investigate relations in proposed model and, using software support, to simulate achieving of goals with changing stated variables and eventually new variables according context analysis.

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# CRITICAL FACTORS FOR SUCCESSFUL PROJECT IMPLEMENTATION: THE CASE OF SERBIAN MANUFACTURING FIRMS

## SUMMARY

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Most modern businesses conduct their operations through projects. Numerous evidence indicates that project management has become a key activity in most contemporary organizations, especially when it comes to manufacturing companies. In order to monitor the achievement of the set project goals, it is necessary to identify the factors that influence the successful implementation of the project, called critical success factors. As the empirical evidence is limited, the paper presents the results of a preliminary study conducted on the territory of Serbia. The subject of the research is to determine the critical factors for successful implementation of projects, as well as whether there is a statistically significant difference in the perception of managers, who are engaged in manufacturing companies, of different types of ownership.

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## Introduction

Numerous evidence indicates that project management has become a key activity in most modern organizations<sup>1</sup>, especially when it comes to manufacturing companies<sup>2</sup>. The project is its own endeavor<sup>3</sup>, which has a wide range of goals, which contains internal and external actors and is implemented in different

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<sup>1</sup> Belout A., Gauvreau C., *Factors influencing project success: the impact of human resource management*, International Journal of Project Management, 2004, No. 22(1), pp. 1-11; Pinto J. K., Slevin D. P., *Critical factors in successful project implementation*, IEEE transactions on engineering management, 1987, No. 1, pp. 22-27.

<sup>2</sup> McCollum J. K., Sherman J. D., *The effects of matrix organization size and number of project assignments on performance*, IEEE Transactions on Engineering Management, 1991, No. 38(1), pp. 75-78.

<sup>3</sup> Pinto J. K., Slevin D. P., 20. *Critical Success Factors in Effective Project implementation\**, Project management handbook, 1988, No. 479, pp. 167-190.

sectors within the enterprise<sup>4</sup>. In addition, specify the undertaking must be completed within a defined timeframe, using a certain amount of funds, to achieve the expected level of performance<sup>5</sup>.

As the project represents a powerful means of creating economic value<sup>6</sup>, enhancing competitive advantage and providing numerous benefits for the company<sup>7</sup>, it is necessary to provide a path to its successful realization. There are numerous studies that assess the success of the project<sup>8</sup>, as well as identifying the elements that need to be managed in order to achieve the desired results. According to Inaiat, Melhem, and Esmaily (2014)<sup>9</sup>, there is consensus among members of the scientific and professional public that the degree to which project objectives are met is influenced by the presence or absence of certain factors, which should be closely monitored for their impact on project performance. Therefore, Cleland and King<sup>10</sup> and Martin<sup>11</sup> identified a number of critical success factors (CSFs), or factors, whose effective management can improve the chances of successful project implementation.

Although numerous theoretical models have been cited in the literature, which represent the conceptual frameworks of the project management process, there is relatively little empirical evidence on how to manage and implement projects<sup>12</sup>. In addition, despite the recognized importance of CSFs, few studies have been conducted to identify CSFs for specific project types, determine the relationship between these factors and project success<sup>13</sup>, and how CSFs can affect project performance in today's business environment<sup>14</sup>. Therefore, the paper presents the results of preliminary research in manufacturing companies in Serbia. The main

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<sup>4</sup> Belout A., Gauvreau C., *op. cit.*

<sup>5</sup> Pinto J. K., Slevin D. P., *op. cit.*

<sup>6</sup> Hussein B. A., Ahmad S. B., Zidane Y. J., *Problems associated with defining project success*, Procedia Computer Science, 2015, No. 64, pp. 940-947.

<sup>7</sup> Gomes J., Romão M., *Improving project success: A case study using benefits and project management*, Procedia Computer Science, 2016, No. 100, pp. 489-497.

<sup>8</sup> McLeod L., Doolin B., MacDonell S. G., *A perspective-based understanding of project success*, Project Management Journal, 2012, No. 43(5), pp. 68-86.

<sup>9</sup> Inayat A., Melhem H., Esmaily A., *Critical success factors in an agency construction management environment*, Journal of construction engineering and management, 2014, No. 141(1), 06014010.

<sup>10</sup> Cleland D. I., King W. R., *Systems analysis and project management*. McGraw-Hill, New York 1975.

<sup>11</sup> Martin C. C., *Project Management: How to Make It*, Work (New York: AMACOM, A Division of American Management Associations, 1976), p. 241.

<sup>12</sup> Pinto J. K., Slevin, D. P., *op. cit.*

<sup>13</sup> Ika L. A., Diallo A., Thuillier D., *Critical success factors for World Bank projects: An empirical investigation*, International journal of project management, 2012, No. 30(1), pp. 105-116.

<sup>14</sup> Pacagnella Jr. A. C., da Silva S. L., Pacífico O., de Arruda Ignacio P. S., da Silva A. L., *Critical Success Factors for Project Manufacturing Environments*, Project Management Journal, 2019, No. 50(2), pp. 243-258.

objective of the paper is to identify the critical factors for successful project implementation, with special emphasis on the difference in the perception of managers, engaged in manufacturing companies, of different ownership structures.

The chapter consists of several parts. The introductory remarks are followed by a review of the literature, with particular reference to the various CSFs groups that influence the successful implementation of the project. The next part of this chapter is devoted to the research methodology, which was conducted on the territory of Serbia. Subsequently, the results of the research and discussions are presented. Finally, concluding considerations are given.

## Literature review

Most modern businesses conduct their operations through projects<sup>15</sup>. Projects represent large, expensive, unique, risky ventures<sup>16</sup> that have the following characteristics: limited budget, schedule, quality standards and a range of complex and interconnected activities<sup>17</sup>. In addition, projects are often carried out in a turbulent, unpredictable and dynamic environment, and an important role is played by the project manager, who has the responsibility of achieving superior project results with a limited budget, by engaging available resources within a given timeframe<sup>18</sup>.

Given the characteristics and nature of projects, as a kind of endeavor, particular attention should be paid to the implementation process, which involves the successful development and implementation of activities to achieve the desired results. Therefore, for the project implementation process to be successful, a wide range of human, budgetary and technical factors need to be considered. A project is generally considered successful if the following criteria are met: (1) activities are carried out in the established order (time criterion); (2) activities are realized using available financial resources (monetary criterion); (3) the realization of the planned activities achieves the objectives originally set (the criterion of effectiveness); (4) the project results achieved meet the client's requirements (client satisfaction criteria)<sup>19</sup>.

Since defining the criteria and methods for measuring project success is a very demanding and complex task<sup>20</sup>, a category of critical success factors (CSFs)

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<sup>15</sup> Kerzner H., *Strategic planning for project management using a project management maturity model*, John Wiley & Sons, New York 2002.

<sup>16</sup> Pinto J. K., Slevin, D. P., *op. cit.*

<sup>17</sup> Belout A., Gauvreau C., *op. cit.*

<sup>18</sup> Pinto J. K., Slevin, D. P., *op. cit.*

<sup>19</sup> Pinto J. K., Slevin, D. P., *op. cit.*

<sup>20</sup> Baccarini D., *The logical framework method for defining project success*, Project management journal, 1999, No. 30(4), pp. 25-32.

has been introduced in the literature, which represent characteristics, conditions or variables that can have a significant impact on project success<sup>21</sup>. CSFs can be defined as inputs that directly or indirectly contribute to the successful implementation of a project, that is, represent important project drivers that must be synchronized in order to ensure that the project is completed on time with the desired results<sup>22</sup>.

Different studies have identified different CSFs, with no consensus among members of the scientific and professional public about the unique classification and relevance of the factors given for successful project implementation<sup>23</sup>. Traditionally, the success of a project has been viewed on the basis of a comparison of the individual project performance achieved and the planned performance<sup>24</sup>. Although there are different theoretical models, most studies highlight the traditional so-called “*iron triangle*”, which includes three ingredients important for success, namely cost, time and quality<sup>25</sup>. According to Pinto and Mantel (1990)<sup>26</sup>, the success of a project can be seen through the prism of the three following dimensions: (1) efficiency of the implementation process, which is an internally oriented measure of project team performance, which involves adherence to a defined schedule of activities, implementation of activities according to the available budget, fulfillment of technical project goals and maintaining a harmonious working relationship within the team and organization; (2) the perceived quality of the project, which includes the project team’s perception of the value and usefulness of the project results; (3) client satisfaction, which can be characterized as an external measure of the performance of the project and its team.

In addition to the presented success criteria, Schultz and Slevin (1973)<sup>27</sup> concluded that managerial support was an important factor in achieving the pro-

<sup>21</sup> Milosevic D., Patanakul P., *Standardized project management may increase development projects success*, International journal of project management, 2015, No. 23(3), pp. 181-192.

<sup>22</sup> Alias Z., Zawawi E.M.A., Yusof K., Aris N. M., *Determining critical success factors of project management practice: A conceptual framework*, Procedia-Social and Behavioral Sciences, 2014, No. 153, pp. 61-69.

<sup>23</sup> Fortune J., White D., *Framing of project critical success factors by a systems model*, International journal of project management, 2006, No. 24(1), pp. 53-65.

<sup>24</sup> Gemünden H. G., *Success factors of global new product development programs, the definition of project success, knowledge sharing, and special issues of project management journal*, Project Management Journal, 2015, No. 46(1), pp. 2-11.

<sup>25</sup> Gomes J., Romão, M., *op. cit.*

<sup>26</sup> Pinto J. K., Mantel S. J., *The causes of project failure*, IEEE transactions on engineering management, 1990, No. 37(4), pp. 269-276.

<sup>27</sup> Schultz R. L., Slevin, D. P., *Implementation and organizational validity: An empirical investigation*. Institute for Research in the Behavioral, Economic, and Management Sciences, Purdue University 1993.

ject goals. Beck (1983)<sup>28</sup> emphasizes the role of top managers, who should support the implementation of planned activities, while providing guidance for greater efficiency. Manley (1975)<sup>29</sup> shows that the degree of commitment of a manager to a given project contributes to eliminating resistance, mitigating conflict and providing support in the event of a crisis. In addition, the high intensity of competition has contributed to highlighting the importance of the human factor for the success of projects. In addition to a competent top manager, it is necessary to build an effective working team for successful project implementation<sup>30</sup>.

Since the implementation of projects involves the participation of various internal and external actors, in addition to the role of the manager, the interests of other stakeholders should be included in the analysis. Specifically, the perception of different stakeholders, both internal and external, is considered an important factor because different people will experience success in different ways<sup>31</sup>. Important external stakeholders include suppliers, which is why it is necessary to develop different mechanisms (bonuses and fines) that should be incorporated as an important item in the contract with suppliers<sup>32</sup>. Since suppliers have a very important role in project management, the selection process is important, which will have a direct impact on the degree of success achieved. This process must be carefully managed, taking into account aspects such as quality, price, level of service, warranty options, available capacity, and even geographical location<sup>33</sup>. In addition to supplier relationships, the success of the project also depends very much on the level of client engagement. The higher the level of client involvement in project activities, the easier it is to identify requirements, establish quality criteria and reduce the need for change, and therefore achieve the desired results<sup>34</sup>.

Carrying out activities within a specific project involves the use of different equipment, especially when it comes to manufacturing companies. For example, the implementation of advanced technology, which characterizes the fourth industrial revolution, contributes to significant improvements in production ef-

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<sup>28</sup> Beck D. R., *Implementing top management plans through project management*, Project Management Handbook, 1983, pp. 166-184.

<sup>29</sup> Manley J. H., *Implementation attitudes: A model and a measurement methodology*, *Implementing operations research/management science*, 1975, pp. 183-202.

<sup>30</sup> Todryk L., *The project manager as team builder: Creating an effective team*, Project Management Institute 1990.

<sup>31</sup> Belout A., Gauvreau C., *op. cit.*

<sup>32</sup> Bubshait A. A., *Incentive/disincentive contracts and its effects on industrial projects*, *International Journal of Project Management*, 2003, No. 21(1), pp. 63-70.

<sup>33</sup> Luzon B., El-Sayegh S. M., *Evaluating supplier selection criteria for oil and gas projects in the UAE using AHP and Delphi*, *International Journal of Construction Management*, 2016, No. 16(2), pp. 175-183.

<sup>34</sup> Pacagnella Jr. A. C., da Silva S. L., Pacifico O., de Arruda Ignacio P. S., da Silva A. L., *op. cit.*



iciency and effectiveness<sup>35</sup>. However, advanced technology is a novelty for employees within the company, and therefore needs to be adequately prepared to maximize performance<sup>36</sup>. Therefore, it is proposed to define different training programs, with the aim of developing new and improving existing knowledge and skills of employees and thus improving the level of readiness to use more efficient modern technological solutions in their daily work<sup>37</sup>.

More recent research indicates that a wide variety of CSFs exist, such as: (1) scope of control, (2) top management support, (3) team member engagement, (5) resource availability, (6) risk management, (7) utilization business opportunities, (8) financial resources<sup>38</sup>. According to Pacagnella et al. (2019)<sup>39</sup> lists several groups of critical success factors for projects in the manufacturing sector, namely: human resources factors, organizational factors, stakeholder relations factors, project management factors, structure and technical factors aspects.

Based on the given literature review and previous empirical research, it is possible to identify several groups of CSFs, which were used for the purpose of research conducted in the territory of Serbia. First of all, financial factors should not be left out as important determinants of the success of each project, as most projects face the problem of limited financial resources<sup>40</sup>. Secondly, besides financial resources, human resources are also important, among which the support of top management<sup>41</sup> is singled out, without which it is almost impossible to achieve the desired results. Third, in the era of advanced technologies<sup>42</sup>, it is necessary to ensure that employees are ready to use modern technological solutions. Fourth, it refers to the relationships built with external stakeholders, such as suppliers and clients, that have a dominant influence on project performance<sup>43</sup>.

<sup>35</sup> Butschan J., Heidenreich S., Weber B., Kraemer T., *Tackling hurdles to digital transformation—The role of competencies for successful industrial internet of things (IIoT) implementation*, International Journal of Innovation Management, 2019, No. 23(04), 1950036.

<sup>36</sup> Abstein A., Heidenreich S., Spieth P., *Innovative work behavior: The impact of comprehensive HR system perceptions and the role of work-life conflict*, Industry and Innovation, 2016, No. 21(2), pp. 91-116.

<sup>37</sup> Zhong R. Y., Xu X., Klotz E., Newman S. T., *Intelligent manufacturing in the context of industry 4.0: a review*, Engineering, 2017, No. 3(5), pp. 616-630.

<sup>38</sup> Gomes J., Romão M., *op. cit.*

<sup>39</sup> Pacagnella Jr. A. C., da Silva S. L., Pacífico O., de Arruda Ignacio P. S., da Silva A. L., *op. cit.*

<sup>40</sup> Belout A., Gauvreau C., *op. cit.*

<sup>41</sup> Gomes J., Romão M., *op. cit.*

<sup>42</sup> Butschan J., Heidenreich S., Weber B., Kraemer T., *Tackling hurdles to digital transformation – The role of competencies for successful industrial internet of things (IIoT) implementation*, International Journal of Innovation Management, 2019, No. 23(04), 1950036.

<sup>43</sup> Belout A., Gauvreau C., *op. cit.*

## Methodology

In order to determine the relevance of the identified groups of critical success factors, a preliminary survey was conducted in the territory of Serbia. The main objective of the research is to determine the perception of managers on the relevance of CSFs for successful project implementation. In addition, the aim is to determine whether there is a statistically significant difference in the perception of managers, engaged in manufacturing companies, of different types of ownership.

The research involved employees in managerial positions in manufacturing companies that are active in the territory of Serbia. The sample was created on the basis of data published by the Business Registers Agency. By accessing the database on the web site of the Agency for Business Registers (<https://apr.gov.rs>), 146 active manufacturing companies were randomly selected, and a questionnaire was distributed electronically to them, specifically designed for the purpose of this research. As the main drawback and limitation in conducting the empirical research is the closeness of external communication companies, the response came from 54 managers of selected manufacturing companies.

The questionnaire, as a research instrument, consists of two sets of questions. First, questions are formulated, related to basic company information (i.e. ownership structure, number of employees, etc.), as well as information on how the production process is organized and the existing form of automation. The second part is about a set of statements, concerning CSFs for successful project implementation. In fact, respondents were asked to state their views on a five-point Likert agreement scale, with the aim of determining the level of significance of individual groups of CSFs. The data collected were processed with the help of the SPSS software package, with the results of descriptive statistics analysis, reliability analysis and ANOVA test below.

## Research results and discussion

Table 1 presents the results of the descriptive statistical analysis (mean and standard deviation) and the results of the reliability analysis (Cronbach's alpha coefficient). Based on the arithmetic mean results, a conclusion can be drawn about the degree of relevance of the given CSFs, with the highest values being identified in the case of stakeholder factors (mean = 4.1574). Therefore, respondents believe that built relationships with customers, as well as relationships with suppliers are of particular importance for successful implementation of projects, since the level of realization of the defined goals depends on the degree of involvement of these stakeholders. Although the digitalization era has largely begun, respondents are

still not sufficiently aware of the importance of using modern technological tools, as evidenced by the results presented in Table 1 (mean = 3.6620). Cronbach's alpha coefficient values range from 0.687 to 0.733, with the values shown being considered satisfactory<sup>44</sup>.

Table 1: Descriptive statistics and reliability analysis

Factors	Mean	Standard deviation
<b>Financial factors: Cronbach's alpha = 0.727</b>		
Cost of introducing a new production system	4.0556	0.83365
Costs of training employees to introduce a new production system	3.7407	0.73164
Cost of purchasing new equipment and machinery	4.3148	0.79679
Cost of hiring a consultant	3.2037	0.78619
Average	3.8287	0.7871
<b>Managerial factors: Cronbach's alpha =0.733</b>		
Willingness of employees to accept and participate in the introduction of a new production system	3.6852	1.07850
Providing the necessary resources (tangible and intangible) for the introduction of a new production system	4.2407	0.72516
The time it takes to introduce a new production system	3.9444	0.89899
Ease of introducing a new production system	3.7222	0.97935
Average	3.8981	0.9205
<b>Technological factors: Cronbach's alpha =0.687</b>		
Availability of necessary equipment and machinery	4.3148	0.77275
Employees' ability to use information and communication technology	3.7222	0.78708
Employee competence in managing digital applications (eg Google Drive, Dropbox, Podio, LinkedIn ...)	3.2407	0.77545
Employees' ability to work with modern business tools (eg e-mail, chat, instant messaging, blogs, micro-blogs, social networks)	3.3704	0.83092
Average	3.6620	0.7916
<b>Stakeholder factors: Cronbach's alpha =0.691</b>		
Finding and choosing suppliers	4.2593	0.67810
Improving product quality from a customer perspective	4.2963	0.79217
Providing value to the customer	4.1481	0.81048
Strengthening the image of the organization in public	3.9259	0.90807
Average	4.1574	0.7972

Source: Author's research.

Analyzing the structure of the sample by type of ownership of manufacturing enterprises, 33 domestic private companies, 13 foreign private companies and

<sup>44</sup> George D., Mallery P., *SPSS® for Windows® step by step: A simple guide and reference*. Allyn & Bacon 1999.

8 public companies are singled out. Table 2 shows the ranking results depending on the type of ownership. The values of the arithmetic mean shown in the table indicate that foreign private companies consider the stakeholder factors to be the most important for successful project implementation, while, as in the previous case, the lowest value was identified in the case of technological factors, especially when it comes to domestic private enterprises at territory of Serbia. Managerial factors are second, with the highest value being recorded in the case of companies dominated by foreign private equity.

Table 2: Rang of CSFs

CSFs	Domestic private companies	Foreign private companies	Public companies
Financial	4.068182	4.461538	4.03125
Managerial	3.780303	4.307692	3.71875
Technological	3.704545	4.153846	3.8125
Stakeholder	3.606061	3.711538	3.8125

Source: Author's research.

In order to identify a statistically relevant difference in the perception of managers engaged in manufacturing companies of different types of ownership, an ANOVA test was conducted. The results presented in Table 3 show that there is a statistically relevant difference in respondents' attitudes regarding all groups of CSFs, except in the case of technological factors.

Table 3: Results of the ANOVA test

CSFs	F	Sig.
Financial	2.964*	0.061
Managerial	5.743***	0.006
Technological	0.479	0.622
Stakeholder	4.279**	0.019

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$

Source: Author's research.

## Conclusion

The results of the conducted analyzes enable the creation of a list of critical factors for successful implementation of projects. There is consensus among the managers of the analyzed manufacturing companies regarding the relevance of certain critical success factors. Specifically, stakeholder-related factors come

first. Having repeatedly confirmed that stakeholders' perceptions of success diverge, it is undoubted that successful project implementation is a complex and multifaceted problematic situation, with the interests of stakeholders, especially suppliers and clients, having an important impact. In addition, the contribution of the research is reflected in the importance of technological factors. Although the results obtained are not fully expected and are not in line with contemporary trends in the business world, it is concluded that in the future it is necessary to pay more attention to the application of modern technology and to improve the competence of employees in the company to apply these solutions in their daily work.

Therefore, the presented research results have important theoretical and practical implications. Given that the existing theoretical models in the literature point to different groups of CSFs, the classification given in this paper particularly emphasizes the importance of intangible factors as well as technological factors. Based on the results obtained, it is possible to gain insight into important elements of project management that need to be effectively managed in order to improve the effectiveness of project implementation. In particular, attention should be paid to improving the digital literacy of employees, ensuring the implementation of modern technological solutions, which have become a necessary precondition for survival in today's era called Industry 4.0.

Since a preliminary study has been carried out, it has some limitations. Sample size may be a limiting factor. The small number of respondents is not suitable for generalization, and it would be desirable to include other companies and their managers in future research. However, it should not be overlooked that a large number of companies are closed to external communication and that long and rigid procedures for providing additional information about the business of the company are frequent. By increasing the number of respondents in future research, it would be possible to make comparisons of the results obtained, thus reaching a comprehensive conclusion on the enterprise's readiness to implement modern technologies, as well as the relative importance of particular groups of CSFs.

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# CHARACTERISTICS OF MANAGEMENT IN CRATIVE INDUSTRIES IN THE LIGHT OF BUSINESS MODEL

## SUMMARY

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Chapter describes characteristics of management in creative industries. It concentrates especially around ambidexterity and the need for integrative concepts of management in creative industries. On the basis on literature, the model of management in creative industries and business models in creative industries were presented. It is noteworthy that questions of creative industries characteristics and management in creative industries are connected through the problem of linking between art and commerce, creativity and business process. Above mentioned characteristics of management in creative industries arise due to dissimilarity of business models in creative industries too.

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## Introduction

In the report: „Investing in Creative Industries: A guide for Local Authorities” prepared by UK Government, Department of Culture, Media and Sport, creative industries are defined as: “those industries which have their origin in individual creativity, skill and talent which have a potential for job and wealth creation through the generation and exploitation of intellectual property”<sup>1</sup>. According to this report creative industries cover thirteen industries such as: TV, radio, software, computer games, film and video, music, advertising, art and antics, crafts, designer fashion, design, publishing and performing arts<sup>2</sup>. There are also other models of creative industries: symbolic text model, concentric circles model and WIPO (World Intellectual Property Organization) copyrights model. Symbolic text model is based on the approach to the culture which

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<sup>1</sup> DCMS, *Investing in creative industries – a guide for local authorities*, UK Government, Department of Culture, Media and Sport, London 2009, p. 4.

<sup>2</sup> DCMS, *op. cit.*, p. 4.



came into existence in the Europe, where so called “high” arts or “serious” arts are seemed as more important for society, than popular culture. In this sense creative industry is described as: “The processes by which the culture of a society is formed and transmitted are portrayed in this model via the industrial production, dissemination and consumption of symbolic texts or messages, which are conveyed by means of various media such as film, broadcasting and the press”<sup>3</sup>. In the concentric circles model, the emphasis was put on the value, which cultural goods have and the level of cultural content included in them. So products of creative industries can have high degree of cultural content instead of commercial content and then these products are classified closer to the core of concentric circles model. Creative arts in the form of music, sound or text and image constitute above mentioned the core of the model. So every products of creative industries originate from art and therefore creative industries are so important and are distinguished from other sectors<sup>4</sup>. Finally the last model – WIPO copyrights model – is based on the assumption that intellectual property rights are embodiment of human creativity. Hence creative industries are defined as: “industries involved directly or indirectly in the creation, manufacture, production, broadcast and distribution of copyrighted Works”<sup>5</sup>.

Statistics Poland also gives definition of creative industries as “business entities involved in the creation and sale of goods and services that arise as a result of indirect consumption of cultural resources (culture is inspiration and creative contribution to their formation), require creative input and often bring cultural content; these are activities connected with design, architecture, advertising and translations”<sup>6</sup>. Much more broader and complete definition of creative industries was given by UNCTAD (United Nations Conference on Trade and Development). According to this organization “creative industries:

- are the cycles of creation, production and distribution of goods and services that use creativity and intellectual capital as primary inputs;
- constitute a set of knowledge-based activities, focused on but not limited to arts, potentially generating revenues from trade and intellectual property rights;
- comprise tangible products and intangible intellectual or artistic services with creative content, economic value and market objectives;
- stand at the crossroads of the artisan, services and industrial sectors; and

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<sup>3</sup> UNCTAD, *Creative economy report – the challenge of assessing the creative economy. Towards informed policy making*, United Nations Conference on Trade and Development, New York 2008, p. 6.

<sup>4</sup> UNCTAD, *op. cit.*, p. 5.

<sup>5</sup> UNCTAD, *op. cit.*, p. 5.

<sup>6</sup> GUS, *Przemysły kultury i kreatywne w latach 2014-2016*, Główny Urząd Statystyczny, Warszawa, Kraków 2018, p. 31.

— constitute a new dynamic sector in world trade”<sup>7</sup>.

According to J. Hartley: „creative industries are enterprises that monetize (creative) ideas in a consumer economy. (...) They represent (...) coherent social effort to gear up individual talent to an industrial scale”<sup>8</sup>. According to J. Howkins: “It is best to restrict the term “creative industry to an industry where brain work is preponderant and where the outcome is intellectual property”<sup>9</sup>. Abundance and diversification of definitions of creative industries results in the need for classification of definitions and concepts. One of such classification was proposed by U. Dubaraitė i G. Startienė. According to these authors first group of definitions concerns approach creative industries in which creativity and personal skills are the focal point. The second group of definitions concerns sectors comprising creative industries. And third group of definitions is connected with the role of creative industries in economy<sup>10</sup>. Other classification was made by K. Goto<sup>11</sup>. In his paper three dimensions was set apart: economy and culture, art and commerce, nonprofit and for-profit. The first dimension means that some of definitions concentrate on creativity as the source of economic wealth and others concern the role of creative industries in production and distribution of cultural goods or providing with cultural activities. In the second dimension was collected definitions concerning with relationships between art and commerce. First of all creation of cultural content should be understood as characteristic of creative industry. There are also some connections between art and commerce. Namely production in creative industries is consisted of two processes: creation of content and delivery of content. The process creation is accomplished by artist and the delivery process is realized by businessperson. In the third dimension the emphasis was put in to the existence of two types of activity – directed and not directed for profit – in creative industries. Hence creative industries cover actions being the part of state policy concerning cultural heritage and also includes commercial ventures<sup>12</sup>.

Study was made with the use of literature review from publication bases such as Google Scholar, Web of Science and SCOPUS. Literature sources were analyzed and described. On the basis of this analysis hypothesis were made.

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<sup>7</sup> UNCTAD, *Creative economy report – Creative Economy: A Feasible Development Option*, United Nations Conference on Trade and Development, New York 2010, p. 8.

<sup>8</sup> Hartley J., *Creative industries*, /In:/ *Creative industries*, [ed.] J. Hartley, Blackwell Publishing Ltd., Malden USA, Oxford UK, Victoria Australia 2005, p. 114.

<sup>9</sup> Howkins J., *The Mayor’s Commission on the Creative Industries*, /In:/ *Creative industries*, editor: J. Hartley, Blackwell Publishing Ltd., Malden USA, Oxford UK, Victoria Australia 2005, p. 119.

<sup>10</sup> Daubaraitė U., Startienė G., *Creative industries impact on national economy in regard to subsectors*, *Procedia – Social and Behavioral Sciences*, 2015, 213, p. 130.

<sup>11</sup> Goto K., *Defining Creative Industries*, /In:/ *Creative Economy: Tax Incentives for the Creative Industries*, editors: S. Hemels, K. Goto, Springer Science+Business Media, Singapore 2017, pp. 17-19.

<sup>12</sup> Goto K., *op. cit.*, pp. 17-19.

## **Ambidexterity as characteristic of management in creative industries**

Dynamic environment of company making its activity in creative industries determines an approach to management. It generates continuously pressure on innovativeness, but normal activity of each organization requires stability and effectiveness. Therefore managers in creative industries seek balance between innovativeness and effectiveness. It could be named as the need for exploration and exploitation of knowledge. Aspiring to innovativeness and effectiveness in the same times means the choice between competing priorities. Specific ability of organizational system consisting in achieving competing goals is named as ambidexterity. This ability is especially important in creative industries. Above mentioned need for knowledge exploitation and knowledge exploration comes from specific relations between creative industries and knowledge economy. In some sense creative industries could be named child of knowledge economy, because creative industries like film or music industry are based on intellectual properties, whose are the main part of knowledge economy. But also knowledge economy is expanded by creative industries. Therefore this double role of creative industries makes the ambidexterity of companies in creative industries so important ability of organization. It is noteworthy that achieving innovativeness needs improving creativeness but achieving effectiveness requires high level of efficiency. It generates problem of low coherence between qualitative original effects of creative work and quantitative and measurable effects of economic aspects.

Relations are especially important aspect of management in creative industries and relationship management in creative industries also requires ambidexterity. First of all internal relations are equally important as external relations. Secondly situations of competing priorities concern both internal relations, and external relations. The tension exists in the area of internal relations between the necessity of new ideas creation and standard operating procedures complementation by employees. However in external relations tension exists in the choice between competition and coepetition with other companies in sector.

After relations, approach to strategy of development is important in management in creative industries. Because of high uncertainty, companies in creative industries are more flexible than bounded to standardized process. But these companies as each organization have to have some procedures allowing them to make business repetitive to keep the rational level of productivity. It is because these organizations as other organizations need resources to make its activity and these resources (by nature) are limited. Unique character of business in creative industries requires the flexibility, improvisation and an opportunity-

seeking approach and because of that it is based on knowledge and requires knowledge generation by nonstandard activities. Finally strategy of development is based more on flexibility and perspective of emerging strategy than on planned actions and standard planning process therefore it is high tension for managers leading business in creative industries<sup>13</sup>.

To sum up, company in creative industries should be oriented more on internal relations than external relations, because employees being the part of company inside are simultaneously the source of creative potential of the company. And because of high volatility and variability of environment companies in creative industries have to improve flexibility as core competence, it is more probably that managerial practices in these companies are oriented more on informal than formalized managerial practices<sup>14</sup>.

However case study research made by J. Radomska, S. Silva, shows that external relations are no less important like internal relations because companies make creative activity in cooperation and what is also important, that external relations are managed also in formal and flexible manner. Relations' creating is especially important in creative industries. And what is interesting, that although degree of formality is low companies in creative industries use management tools in field of project management, management of processes and customer relations. Even approach to directing is informal advanced management methods are used. Therefore ambidexterity is visible in management practices in creative industries. Management relies on connecting formal and informal approach with improving external and internal relations<sup>15</sup>.

Management of competing activities requires comprehensive model of management.

## Management model in creative industries

Ambidexterity understood as ability to manage conflicting activities requires complex management system including both formal and informal management tools, directed both on process and creativity management. It note worthy that are specific characteristics of creative industries that should be considered when talking about enterprise management in creative industries. First of all creative industry is especially engaged in the process of new value creation in comparison with manufacturing. It is because creative industry originates from art, culture

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<sup>13</sup> Radomska J., Silva S., *The Balance Between Formal and Informal Managerial Practices – Managing Ambidexterity in Creative Industries*, "Polish Journal of Management Studies", 2018, Vol. 18, No. 2, p. 261-262.

<sup>14</sup> Radomska J., Silva S., *op. cit.*, p. 263.

<sup>15</sup> Radomska J., Silva S., *op. cit.*, pp. 266-267.

and artistic work. Secondly creative work requires access to highly diversified resources in the same time or period. It should be also noted that there are many different products and services being an output of activity in creative industries such as: visual arts, publications, performance art like theatre or opera, recordings, TV films, computer games or fashion. It is also important that products of creative industries have expressive value. It means that these products emerge as result of aesthetic, spiritual or emotional experience so not only functionality (but in some cases it is also important) decides about market value of these products. Changing trends, fashions and people fascinations are the next characteristic of creative industries. Detecting them is crucial for getting strategic advantage in creative industries and also for surviving the business. It is very important for the question of management in creative industries that creating product needs artistic work, but providing this product to the customer requires traditional material resources. For example painting the pictures requires creativity, but showing this picture to potential buyers requires building the gallery, which is material resource. And finally the nature of relations between companies in creative industries is very complex, what is due to high differentiation of subjects operating in the creating sector namely private owned companies, state institutions or agencies and international organizations<sup>16</sup>.

General concept of creative industries is based on the assumption that creative industry is the linking between economy and art. It is the type of service relying on providing art to people (to put it simply). Therefore enterprises in creative industries combine creative, artistic work with normal business running and economic issues. It is often mentioned that creative industries influence on jobs and wealth creation. It seems that modern management rules like elimination of hierarchy, changing in roles and positions, team work, open communication could be particularly useful for management in creative industries. The use of intangible resource is the focal point of contemporary management, therefore knowledge management became popular stream in theory and practice of management. There are many business based on knowledge like IT companies, advisory, training and education, pharmacology, electronics, biotechnology and also many business typical for creative industries like TV and radio stations, film or music industry, producing of computer games etc. Therefore highly skilled knowledge workers are wanted in these sectors. Also managers should form specific conditions in companies to improve and utilize the potential

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<sup>16</sup> Morawski M., Piepiora Z., Rogala P., *Model of Enterprise Management in the Creative Industries on the Basis of Empirical Research*, [56](https://scholar.google.pl/scholar?hl=pl&as_sdt=0%2C5&q=MODEL+OF+ENTERPRISE+MANAGEMENT+IN+THE+CREATIVE+INDUSTRIES+ON+THE+BASIS+OF+EMPIRICAL+RESEARCH&btnG=(6.12.2019), p. 2.</a></p>
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of professionals. Outside knowledge, creativity is special factor of competitive advantage, but in creative industries it is usually individual creativity of talented artists, therefore traditional management approach based on direct control seems to be ineffective or even harmful. Teamwork, open communication, knowledge sharing, freedom and autonomy at work are much more effective motivation tools for creators than pressure and control.

Research shows specific characteristics of social environment in companies operating in creative industries. Especially relations with colleagues play important role, commitment to organization is high, people are open to new concepts, ideas and ways of thinking, formal approach to processes accomplishment and terminology. Companies in creative industries are specific as well as organizations, because internal boundaries are dimmed by informal communication channels, majority of employees is engaged in knowledge processes like knowledge acquisition or knowledge sharing and has professional knowledge supported by professional education, there are conditions for creative thinking and proposing new ideas and discussing on them<sup>17</sup>.

Taking into account above considerations, model of enterprise management in creative industries, according to M. Morawski, Z. Piepiora, P. Rogala should be combined from modern concepts of management such as: "Culture of Knowledge Sharing, Knowledge Workers Management, Team Organizational Forms, Advanced Production Technology & Communication"<sup>18</sup>. These elements make innovation process possible. This process has its beginning in knowledge management and advanced productions techniques. This combination generates specific involvement and knowledge resources, whose are the base of new ideas and concepts. Grounding creativity on knowledge makes ideas especially valuable for people who implement them into practice. But the knowledge is only the material for farther process of creation and innovation. Creativity needs unconventional thinking and knowledge sharing based on organizational culture supporting close relations between employees and teams building in organization. And finally implementation of ideas requires project organization in which people being the part of the team can implement their ideas to practice, what is the essence of innovation. It is also noteworthy that effective communication in this model is the base of creativity and innovativeness<sup>19</sup>.

Specificity of management in creative industries arises due to specificity of business models in creative industries.

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<sup>17</sup> Morawski M., Piepiora Z., Rogala P., *op. cit.*, pp. 2-3.

<sup>18</sup> Morawski M., Piepiora Z., Rogala P., *op. cit.*, p. 4.

<sup>19</sup> Morawski M., Piepiora Z., Rogala P., *op. cit.*, p. 4.

## Business models in creative industries

There are many definitions of business model. According to D.J. Teece “A business model describes the design or architecture of the value creation, delivery and capture mechanisms employed”<sup>20</sup>. In accordance with definition proposed by R. Casadesus-Masanell and J.E. Ricart “An organization’s business model is an objective (real) entity: choices are made in every organization, all of which will have consequences. The particular set of choices an organization makes about policies, assets and governance – and their associated consequences are the organization’s business model, because they determine <<the logic of the firm, the way it operates and how it creates value for its stakeholders>>.”<sup>21</sup> In the business model concept of M.W. Johnson, C.M. Christensen, and H. Kagermann: “A business model, from our point of view, consists of four interlocking elements that, taken together, create and deliver value.”<sup>22</sup>. These elements are: customer value proposition, profit formula, key resources, key processes<sup>23</sup>. According to M. Morris, M. Schindehutte, J. Allen “A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets.”<sup>24</sup> Definition formulated by S.M. Shafer, H.J. Smith, J.C. Linder, sounds “a business model as a representation of a firm’s underlying core logic and strategic choices for creating and capturing value within a value network.”<sup>25</sup> According to C. Zott and R. Amit “The business model can then be defined as ‘the structure, content, and governance of transactions’ between the focal firm and its exchange partners”<sup>26</sup>. Quite different understanding of business model was presented by S.G. Winter and G. Szulanski. They defined business model as: “typically a complex set of interdependent routines that is discovered,

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<sup>20</sup> Teece D.J., *Business Models, Business Strategy and Innovation*, “Long Range Planning”, 2010, No. 43, p. 191.

<sup>21</sup> Casadesus-Masanell R., Ricart J.E., *From Strategy to Business Models and onto Tactics*, “Long Range Planning”, 2010, No. 43, p. 201.

<sup>22</sup> Johnson M.W., Christensen C.M., Kagermann H., *Reinventing Your Business Model*, “Harvard Business Review”, 2008, December, p. 60.

<sup>23</sup> Johnson M.W., Christensen C.M., Kagermann H., *op. cit.*, pp. 60-61.

<sup>24</sup> Morris M., Schindehutte M., Allen J., *The entrepreneur’s business model: toward a unified perspective*, “Journal of Business Research”, 2005, 58.p. 727.

<sup>25</sup> Shafer S.M., H.J. Smith, J.C. Linder, *The power of business models*, “Business Horizons”, 2005, 48, p. 202.

<sup>26</sup> Zott C., Amit R., *The Fit Between Product Market Strategy and Business Model*, “Strategic Management Journal”, 2008, No. 29, p. 3.

adjusted, and fine tuned by “doing.”<sup>27</sup> Finally in the world known book dedicated generation of business models written by A. Osterwalder and Y. Pigneur and other authors, it was given the following definition of business model: “Business model describes reasons standing behind the way in which organizations generates value and make sure and take profits from this generated value.”<sup>28</sup>

If business model is centred on client, it has to be adapted to sector in which company operates. Therefore it is necessary to provide business models typical for creative industries. Interesting concept was elaborated by P. Dziurski. He based his concept on the classification of creative industries given by NESTA and business model schema elaborated by M.W. Johnson, C.M. Christensen and H. Kagermann. Creative service providers such as design offices or advertising agencies are the first group of businesses operating creative industries. Providing services protected by intellectual property rights is the value for clients. Fees for services are the source of revenues and expenditures being the results of service accomplishment are the main costs. Abilities and knowledge are key resources, but relationships or strong brand are also important. Creative content providers such as music producers or publishers are the second group. Content creating for a wide public is here the main value. But selling or licensing the content is the main source of revenues. Content creating and marketing are the main categories of costs. Key resources are in this case quite different. Knowledge and abilities, brand, reputation, management system play important role too, but financial resources and equipment are important resources in the creative content providers group. Above mentioned processes are utilized in such processes as creating and designing, production and marketing. Creative experience providers such as theatre producers, concerts and festivals organizers are the third group. Offering products or services being the form of experience is the value for client. Revenues are gained in the form of pay per use or advertising. Expenditures on products/ services preparation and marketing are costs in this group of firms. Also in this group, intangible resources such as: knowledge and skills, relations, management system, strong brand and reputation are dominant type of resources, but financial resources are also important. Looking in to the matter of key processes the following activities are important: creating and designing, production, events organizing, marketing. Creative originals producers are the fourth group. An original goods producing is in this case the value for clients. Revenues are gained from selling these goods, but fixed costs are the dominant part of costs, what

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<sup>27</sup> Winter S.G., Szulanski G., *Replication as Strategy*, “Organization Science”, 2001, Vol. 12, No. 6, November-December, p. 731.

<sup>28</sup> Osterwalder A., Pigneur Y., *Tworzenie modeli biznesowych*, Wydawnictwo Helion, Gliwice 2010, p. 18.



is due to the need for maintaining equipment required for production. In this case, machines and equipment are the main resources, intangible resources are still relevant. Key processes cover activities from idea to final product such as: creating, designing, production and selling<sup>29</sup>.

There are also several studies conducted in the field of business model in creative industries. In the two studies of this field, P. Klimas examined key activities among game developers using different business models<sup>30</sup> and key resources exploited by these companies<sup>31</sup>. M. Tomczyk and M. Wojtkiewicz described business model of Incubator of Culture<sup>32</sup>, P. Landoni et. al. analyzed business model innovations along the life-cycle of cultural and creative firms<sup>33</sup>.

On the basis of literature review, the following hypothesis can be made:

1. Business model of company in creative industries depends on type of activity and product.
2. There are similarities between business models of different companies in creative industries
3. Activities and resources connected with information and play important role in business models of companies in creative industries.

Above mentioned hypothesis should be tested on the wide sample of differentiated companies operating in creative industries.

## Conclusion

Ambidexterity seems to be the focal point of considerations of characteristics of management in creative industries. It is because the linking of art and commerce is the nature of creative industries. Art is expression of human creativity; commerce is repeatable process in which value is provided to customers in exchange for revenues. Therefore effective management in creative industries requires integrative concepts such as knowledge management and business model. Knowledge is essential resource in every business model in

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<sup>29</sup> Dziurski P., Modele biznesowe w przemyśle kreatywnych, Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, nr 420, Wrocław 2016, p. 86

<sup>30</sup> Klimas P., *Game Developers' Business Models – the Key Activities Exploration*, „International Journal of Contemporary Management” 2018, Volume 17, pp. 108-111.

<sup>31</sup> Klimas P., *Key Resources in Game Developers' Business Models*, „Journal of Management and Financial Sciences”, March 2018, Volume XI, Issue 31, p. 142.

<sup>32</sup> Tomczyk M., Wojtkiewicz M., *Business Model of Culture and Creative Industries Incubator in creating social innovation*, /In:/ *The Role of Cultural Institutions and Events in the Marketing of Cities and Regions*, [ed.] E. Domański, Wydawnictwo Uniwersytetu Łódzkiego, Łódź 2016, p. 198.

<sup>33</sup> Landoni P., Dell'Era C., Frattini F., Messeni Petruzzelli A., Verganti R. and Manelli L., *Business Model Innovation in Cultural and Creative Industries: Insights from Three Leading Mobile Gaming Firms*, Technovation, 2019, pp. 22-24.

creative industries. It is needed for creative and commercial activity. Knowledge, unconventional thinking and open communication are the base for creativity and innovativeness. But these elements are equally important for management in creative industries, where standard operating procedures are realized. Finally it should be not forgotten, that products and services in creative industries are complex and therefore require cooperation with many people and organization and it requires concentration on relations building.

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# THE SELECTED TOOLS IN CONTROLLING OF PRODUCTION

## SUMMARY

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The chapter presents the importance of controlling in the management process, as well as the possibilities of its application in a production company. These issues are presented both in the layer of cognitive theory. The purpose of the chapter was included in its title, because special attention was paid not only to the legitimacy of using the idea of controlling in a production company as a concept supporting management of the production process, but also selected tools used in practice of controlling selected tools supporting planning, control and control of the production process. It is worth noting that publications dealing with the subject of linking IT tools with controlling solutions are still relatively few. This constituted an important premise for the creation of this study, because in the authors' opinion this subject is still valid and the dissemination of knowledge on this subject, as well as the search for optimal solutions in this regard, is justified. Proper preparation and implementation of production supported by controlling solutions together with appropriate tools determines the proper functioning of this process and thus contributes to the increase in the effectiveness of management and the effectiveness of the production company as a whole.

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## Introduction

The pressure to achieve better results in the need for more effective management tools. In enterprises conducting production activity, the attention is focused in particular on the correct course of the manufacturing process. Despite the fact that the production process is rather in the centre of attention of engineers, along with the development of information technologies supporting manufacturing and logistics systems and the need to shorten product life cycles – as a quick response to market needs – the production process has also been treated as an area of cost minimization and an important competitive advantage factor. Elements of the new view on production have become, inter alia, strategic production management, logistics, quality management, environmental protection, as well as striving for greater integration and mutual analysis of technical, organizational and economic aspects of production. Production management

functions such as the need for proper planning, control and production control have come to the fore. In the new operating conditions, therefore, new information requirements of the production management have also succeeded by providing relevant information to make the right decisions and to support the coordination of production planning, control and control processes.

Considering the above, it is possible to indicate solutions supporting the enterprise's aspiration to skilfully set and achieve goals while increasing the efficiency of operations. The implementation of tasks oriented both at the result and at the management process, and thus achieving higher efficiency and controlling solutions that can be implemented in the enterprise facilitates effectiveness of operations. It is not without reason that it is pointed out that controlling is a harmonized system of activities, especially in the areas of planning, controlling, processing and collecting information, which supports the process of measuring and assessing the economic situation of an enterprise.

The main purpose of this publication is to indicate the possibility and legitimacy of using controlling in a production company as a tool supporting the management of the production process, as well as to present in the theory of knowledge applied in the practice of controlling selected tools supporting the planning, control and control of the production process.

### **The importance of controlling in company management**

Attempting to synthetically indicate the legitimacy of using controlling tools in the process of planning and controlling production, as well as controlling the course of its implementation in the first place, it is purposeful to discuss the essence and understanding of controlling in both theory and practice of management. Understanding controlling as a tool with which management can control the result (expected effect) of a company seems to be very short and accurate. E. Mayer and R. Mann present such a statement treating controlling as a control process which is oriented on the result (effect) of the enterprise which it intends to achieve. This result is achievable through planning, control and reporting. The purpose of this is to ensure the survival and development of the company, which in turn is to ensure employment stability and strengthen the incentive function in the company<sup>1</sup>. Controlling uses for this the tools and mechanisms that are used in the management system, so the goal of controlling is to increase the efficiency and effectiveness of the management process and

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<sup>1</sup> Mann R., Mayer E., *Controlling w twojej firmie*, Wyd. Prawnicze, Warszawa 1991, p. 7.

to strengthen the company's adjustment to changes occurring both inside and outside<sup>2</sup>. This goal is achievable by:

- increasing the company's ability to set and achieve long-term goals and the resulting short-term goals,
- increasing the efficiency of operations, i.e. the rational use of tangible and intangible resources of the organization in the implementation of tasks that are to lead to achieving the set goals,
- consistent implementation of the management process functions.

The ability to set and achieve real goals determines higher efficiency. In this process, controlling takes into account the principles of rational and effective management of enterprise production factors. In this way, controlling is to facilitate the implementation of the organization's overarching goals (survival and development), taking into account the principle of economic efficiency. Goals included in budgets are implemented on an on going basis by separate responsibility centres forming a decentralized organization. These goals are coordinated at all levels of the management process (covering the entire organizational structure of the enterprise) so that they are consistent and internally unarguable. Taking into account the variability of the operating conditions of the company, controlling shapes the system of goals so that the system is flexible and relatively quickly adaptable to emerging changes in the environment of the company. Finally, it should be noted that controlling places great emphasis on the need for a consistent implementation of the functions of the management process, striving to eliminate common dysfunctions in the management process.

This is done through the implementation of the objectives set out in the plans (budgets) and relevant corrective actions that take place in the monitoring and control system through: reports, causal analysis of deviations and post-audit information created on their basis<sup>3</sup>. Controlling solutions focus on both organizational and economic aspects of the company. They coordinate activities in the field of management, in particular in the field of planning and control, as well as processing and collecting information. It is worth emphasizing that controlling is future-oriented, i.e. it focuses the attention of managers on achieving lasting business success, and this is only possible through the ability to set achievable goals of the company and to achieve these goals, i.e. to lead to effective operation.

Great importance in controlling is also attributed to processes of control and coordination of activities, which means that controlling itself creates an integrated enterprise management system. It is based on properly selected

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<sup>2</sup> Weber J., *Einführung in das Controlling*, Schäffer-Poeschel Verlag, Aus. 6, Stuttgart 1995, p. 50.

<sup>3</sup> *Controlling funkcynny w przedsiębiorstwie*, Ed. by: Sierpińska M., Oficyna Ekonomiczna, Kraków 2004, pp. 12-14.

controlling tools (among which the most important are: budgeting; reporting; system of assessing responsibility centres; task rewarding; system of creating, analysing and sending information), which support making decisions and actions serving the achievement of both short and long term goals long-term<sup>4</sup>.

This confirms not only the legitimacy of implementing controlling in the enterprise, but also indicates its high effectiveness in the practical functioning of enterprises. A properly functioning controlling system administers the enterprise, in a sense leading to its self-regulation, thus contributing to lowering costs and improving the economic results of the enterprise<sup>5</sup>.

### **The aims of controlling in the process of planning, controlling and controlling production**

Production controlling is identified with economic control of the production process. However, it influences the course of the production process not only in economic terms, but also in organizational and information terms. Due to the fact that production budgets result from sales budgets and are strictly subordinated to these budgets – production controlling directly or indirectly also affects the assortment structure and the amount of production. From this point of view, it can be stated that functionally separated production controlling does not contradict the main goal of controlling an enterprise, because it serves to ensure, in the given conditions, the most optimal implementation of economic tasks of the entire enterprise<sup>6</sup>. According to R. Eschenbach, production controlling supports the planning, implementation and control of industrial production settings through information and system development<sup>7</sup>. In addition, W. Ossadnik considers production controlling as a system designed to coordinate the activities of production managers, contributing to the achievement of the company's goals by supporting production process managers by providing them with the necessary information to make the right decisions<sup>8</sup>. The subordination of the production budget to the sales budget is therefore crucial in controlling. It is necessary to

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<sup>4</sup> Vollmuth H. J., *Controlling. Planowanie, kontrola, kierowanie*, Agencja Wydawnicza Placet, Warszawa 1995, p. 13.

<sup>5</sup> More on this topic: Krzemiński P., *Znaczenie funkcji controllingu w procesie zarządzania przedsiębiorstwem* /In:/ *Organizacja i Zarządzanie, Zeszyty Naukowe Politechniki Śląskiej*, 2017, No 108, pp. 215-228; Krzemiński P., *Organizacyjne obszary zmian związane z wdrażaniem systemu budżetowania w przedsiębiorstwie*, /In:/ *Controlling w zarządzaniu przedsiębiorstwem*, Ed. by: Duraj J., Omega-Praxis, Łódź–Spała 2001, pp. 205-215.

<sup>6</sup> See: Nowosielski S., *Controlling w obszarze produkcji*, Prace Naukowe Akademii Ekonomicznej we Wrocławiu, Wrocław 2002, No 956, pp. 111-112.

<sup>7</sup> More on this topic: Eschenbach R., *Controlling*, Schaffer-Poeschel Verlag, Stuttgart 1996.

<sup>8</sup> More on this topic: Ossadnik W., *Controlling*, R. Oldenbourg Verlag GmbH, München 1996.

pay attention to the economic consequences of decisions taken in the production sphere. Among other things, they entail monetary expenses and freezing cash in connection with the creation of inventories (and this in turn with the quality of production), as well as generate and shape the level of costs associated with used and consumed factors of production in the form of materials, work of employees, machines and equipment, energy, etc. Without taking into account this close relationship between sales and production, it would be difficult to achieve economic efficiency or adequate economy of production factors throughout the entire production company. Thus, in production processes, information support resulting from the production controlling system is for decision-makers coherent production plans (subordinated to sales plans), production resource plans and resulting production process plans and production control.

It can be pointed out that so far for some enterprises the main goal in the area of the production process was / is to strive for the most effective use of production capacity, which was / is reflected in mass-production or mass production. For another group of enterprises, the main goal in this area was / is to strive to shorten the production cycle in the product manufacturing process, which in turn allows for the best adaptation to customer expectations and a more effective competitive battle<sup>9</sup>. Controlling helps in the implementation of these challenges, and in particular functionally separated production controlling together with the tools used to implement the tasks set for controlling production.

Therefore, it can be pointed out in the first place that the basic task of production controlling is participation in the preparation of information constituting the decision-making basis for undertaking specific production activities on its own or commissioning their implementation outside, after assessing the profitability of these projects. Another important task of production controlling is to examine the possibilities of implementing modern tools and technologies supporting the production process from the point of view of their impact on the cost structure and logistics process of the production process<sup>10</sup>. Then the task of controlling is to supervise and control the correctness of the process of allocating production orders in accordance with the order of objectives and assumptions adopted in partial operating budgets (the order of performing operational tasks). Thus, already here you can notice the care of production controlling over the consistent implementation of the organizational, planning,

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<sup>9</sup> Kardasz A., *Controlling produkcji – wybrane zagadnienia*, /In:/ *Rachunkowość a controlling. Controlling obszarów działalności przedsiębiorstwa*, Prace Naukowe Akademii Ekonomicznej we Wrocławiu, Akademia Ekonomiczna, Wrocław 2001, No 902, pp. 40-41.

<sup>10</sup> See: Filimoniuk J., *Zadania i organizacja controllingu – uwarunkowania związane z jego wdrażaniem w polskich przedsiębiorstwach*, /In:/ *Controlling w zarządzaniu przedsiębiorstwem*, Ed. by: Sikorski J., Wydawnictwo Uniwersytetu w Białymstoku, Białystok 2002, p. 236.



control, coordination and information functions in managing the production process. Further tasks on which controlling production focuses include:<sup>11</sup>

- identification and compliance with standards of consumption of production factors and time standards in the implementation of the tasks adopted,
- cost optimization resulting from the implementation of manufacturing processes in connection with the implementation of budgets,
- and thus the optimal use of production capacity (matching production capacity, minimizing the length of production cycles, minimizing downtime, etc.),
- updates of the work progress status by monitoring (controlling) the degree of implementation of the planned tasks,
- short delivery times,
- flexibility of manufacturing processes.

The above controlling tasks indicate the multitude of decision parameters and the high degree of complexity of the decision-making process in the area of production management, and in addition to the growing demand for information, there is a need to coordinate manufacturing plans and processes, as well as their control. All this together is ultimately intended to carry out the production controlling function.

Therefore, taking into account the wide area of interest of production controlling, according to the authors, it can be narrowed down to two basic areas, i.e. the first area, which will include tasks related to the system for planning, controlling and controlling the production process, while the second area (about which a bit more broadly in the next point of this study) it will cover tools that can be used in the production management process, and in particular tools (solutions) supporting the implementation of production controlling tasks in the process of planning, controlling and controlling the production process<sup>12</sup>.

### **Selected tools supporting production planning control and control used in controlling production**

Contemporary tools used in controlling production arose as a result of the evolution of knowledge related to the management of the production process, as well as practical experience in the field of production activity. These tools were

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<sup>11</sup> See also: Durlik I., *Inżynieria zarządzania część I. Strategie organizacji produkcji. Nowe koncepcje zarządzania*, Placet, Warszawa 2004, pp. 199-203.

<sup>12</sup> Also presents a similar view: Nowosielski S. /In:/ Nowosielski S., *Procedura wprowadzania controllingu w obszarze produkcji /In:/ Rachunkowość a controlling. Controlling obszarów działalności przedsiębiorstwa*, Prace Naukowe Akademii Ekonomicznej we Wrocławiu, Wrocław 2001, No 902, p. 84.

initially developed in the area of warehouse management (Kanban, JIT<sup>13</sup>), then transforming into the inventory management method in the form of MRP / MRP I<sup>14</sup>, then expanding the scope of management with the area of enterprise material resources (MRP II<sup>15</sup>), to finally cover all areas and enterprise resources, including finance and business management as a whole MRP III<sup>16</sup>/ERP<sup>17</sup>. They are based on various concepts supporting the areas of management in the warehouse and production sphere, which were known and used much earlier. However, they supported ongoing operations and selected areas of this activity because they had limited possibilities of use in production planning and control due to the lack of support for data processing by fast and efficient IT systems. Currently, these tools and methods (concepts) appear mainly in the form of integrated IT systems supporting the manufacturing activities of enterprises in the areas of planning, control and production control and warehouse management in conjunction with sales, logistics and finance of the company in both the short and long term. Integrated production management tools of the MRPIII / ERP class already combine into a comprehensive system the issues of forecasting sales volume and delivery dates with scheduling of production batches, which in turn with the periodic occurrence of demand for materials and other production factors. Following the evolution of the development and usefulness of these tools in the production management process, the tools supporting warehouse management and the production process in the form of Japanese Kanban and Just in Time methods will first be briefly characterized.

Kanban is a method of organizing the supply of materials and components in the manufacturing process at the time when the actual demand for them occurs. Each workstation, wanting to accomplish its task, “pulls” materials (components, semi-finished products) from the previous workstation based on order cards (motion cards). However, it is not possible for the previous position to “push” production resources further (to the next position) until the next position is released from the previous task and sends to the position preceding the order cards. Therefore, it is a tool that is more applicable in the organization that it controls selected production areas of the “pull” (or “upstream”) type. It is based on the flow of documents in the form of two types of order cards (KAN production orders – with a specified production volume, and BAN flow orders (traffic) – allowing the picking of materials from delivery and their flow to a workstation). On their basis, the necessary quantities of materials, subassemblies

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<sup>13</sup> JIT – *Just in Time*.

<sup>14</sup> MRP I – *Material Requirements Planning*.

<sup>15</sup> MRP II – *Manufacturing Resource Planning*.

<sup>16</sup> MRP III – *Money Resource Planning*.

<sup>17</sup> ERP – *Enterprise Resource Planning*.

and other components used in the manufacturing process are provided<sup>18</sup>. These cards were / are used for ongoing management of the quantity and time of material flow, supporting in this area primarily the organizational and control function of warehouse management.

In turn, Just in Time in the original version is a production concept assuming the elimination of warehouse, inter-operational and completed production. Therefore, it already provides some support in the organization and planning of manufacturing activities. This concept is mainly used in stream production and automated flexible lines and mass production sockets. There are many reasons for adopting the Just in Time assumptions, among which the most important can be identified. First of all, the lack of inventories is to eliminate warranty buffers (protecting against the effects of unforeseen disruptions in the supply of materials) or compensatory buffers (compensating for the quantitative and temporal differences in the supply of materials) that exist in the case of maintaining inventory, thereby masking serious organizational and technical shortcomings in the production process. . Secondly, the lack of inventory and the liquidation of the buffers indicated above forces high care in terms of timeliness and quality of delivered components and manufactured products (liquidation of defective supplies, liquidation of production of defective products). Finally, the liquidation of inventories offset by timely deliveries of materials is expected to contribute to reducing the costs of operating the company, freeing cash previously frozen in inventories, increase care in the implementation of manufacturing processes and improve the quality of manufactured products (lead to zero-free production). In this way, according to Just in Time assumptions, it is easier to plan and to some extent control manufacturing activities, which is therefore highly organized and coordinated, in terms of time, material (between workplaces) and economic (impact of production factors on financial results and quality). In addition, the importance of high quality of production implemented in the thinking system of every employee means high self-control, thanks to which the control function of the production management process is implemented. Unfortunately, the Just in Time concept in its "pure" form is not only very difficult to implement (mainly for economic, technical and mental reasons), but even impossible to implement in technical, organizational and cultural conditions different from Japanese<sup>19</sup>. However, this does not mean that there is no possibility of using solutions of this concept at all, in practice European companies are

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<sup>18</sup> See: *Organizacja i sterowanie produkcją*, Ed. by: Brzeziński M., Placet, Warszawa 2002, p. 458.

<sup>19</sup> More on systems *Kanban* and *Just in Time* /In:/ Durlík I., *Inżynieria zarządzania część I ...*, op. cit., pp. 225-229; Liwowski B., Kozłowski R., *Podstawowe zagadnienia zarządzania produkcją*, Oficyna Ekonomiczna, Kraków 2006, pp. 105-108.

successfully using adapted versions of the Just in Time method, especially in flexible pipelines and mass production systems between production departments and production cells..

MRP / MRP I is a system of planning production inventory taking into account the reduction of inventory, however, without a comprehensive approach to managing the production process. These systems were created as a result of searching for effective methods of ordering and obtaining materials and components for production needs. The starting point for this tool is the planned production schedule covering the types and sizes of tasks for the company's production cells, on the basis of which material needs are determined in terms of type, quantity and time, as well as ways of satisfying these needs (processes related to orders and storage). The idea of MRP / MRP I is to track inventory levels and maintain their levels so that their storage or warehousing time in the production process is as short as possible while maintaining the continuity of the manufacturing process. In the MRP / MRP I assumptions, the components necessary to carry out production tasks according to the schedule are to be separated in time and space (production sphere) and delivered to work stations in a sense exactly on time (as in the Just in Time assumptions) without unnecessary storage and storage, however, without completely disposing of the stock of materials, but thus minimizing their size. The MRP / MRP system is based on three basic sources of information, which are: production schedule, product structure and data on inventory (department, position). However, in order to obtain the expected results, the correct operation of the system depends on the high accuracy and correctness of data included in the production schedule and inventory levels. In the case of incorrect or inaccurate data, the system will plan the wrong components and incorrectly determine the quantities to be ordered. Therefore, it was noticed that it was necessary to enable the control function consisting in comparing plans with the results of their implementation in order to use the acquired information in the next stages of production planning and material orders. However, the MRP / MRP I system no longer realizes these possibilities, it does not provide feedback on the implementation of planned orders.

Therefore, the MRP / MRP I method was then expanded to include planning of the remaining production resources and analysis of these resources with the implementation of the feedback between the production resource planning process and the actual production process. The methodology resulting from these changes was called MRP II. In addition to the planning function, MRP II also took into account the need to carry out a control function of the degree of implementation of tasks of production processes and supplies of materials as an indispensable element of verifying the correctness of the implementation

of planned tasks in order to update the production schedule (production plan updates), and thus all related tasks planned in it in the sphere of production and material supplies, so that the inventory of materials and work in progress does not increase unnecessarily. The controlling solutions used here / most often use the forecasting budgeting method with relatively short time intervals (weekly, monthly, quarterly). The MRP II standard was developed by APICS<sup>20</sup> and, according to this association, MRP II covers such areas as:<sup>21</sup>

- production and sales planning (*SOP – Sales and Operation Planning*),
- distribution planning (*DRP – Distribution Resource Planning, DRP*),
- demand management (*DEM – Demand Management*),
- capacity planning (*CRP – Capacity Requirements Planning*),
- production plan scheduling (*MPS – Master Production Scheduling*),
- working environment management (*IOC – Input / Output Control*),
- workshop aids (*TOL – Tooling*),
- managing the product structure subsystem (*BMS – Bill of Material Subsystem*),
- material transaction subsystem management (*ITS – Inventory Transaction Subsystem*),
- Material Requirements Planning (*MRP*),
- management of the runoff schedule subsystem (*SRS – Scheduled Receipts Subsystem*),
- supply (*PUR – Purchasing*),
- simulation (*SIM – Simulation*),
- system performance measurement (*PM – Performance Measurement*),
- production control (*SFC – Shop Floor Control*).

The IT support of the MRP II system enabled acceleration of planning processes, control and verification of the degree of implemented production tasks, obtaining feedback, as well as current and quick updating of production plans (schedules) and material supplies related to the production process. This increased the actual possibilities of controlling the production process and the supply of materials, but it should be remembered that although the effects in this sphere of management were measurable, it was still short-term support and obtained in selected areas of the manufacturing sphere. This also led to additional benefits in the form of the possibility of including warranty or compensation buffers, however, with economically low levels of stocks of materials and work in progress, then the possibility of delaying and / or accelerating the production

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<sup>20</sup> APICS – American Production and Inventory Control Society.

<sup>21</sup> More on the topic: Landarter V. D., Gray C. D., *MRP II Standard System*, Olivier Wight Publication, 1989; Parys T., *MRP II przykładem systemu zintegrowanego*, „Informatyka” 1998, No 9, pp. 24-27.

process and completing orders depending on demand, or in finally created a starting point for the possibility of long-term development planning taking into account the production factors of the production company<sup>22</sup>.

The effects obtained as a result of using MRP I and MRP II solutions in the scope of planning, control and control of material resources and the manufacturing process have resulted in a growing and wider interest in controlling tools of this class. At the same time, the growing support of MRP II by IT systems in combination with the idea of controlling enabled the quick and comprehensive linking of other important operating conditions with the production process, i.e. sales with production, production with production potential (tangible and intangible production factors), and production potential with capabilities production, etc. It contributed to better, i.e. more effective and efficient implementation of the functions of organization, planning and control in the manufacturing sphere, as well as increased the degree of time and material coordination of implemented production processes. Feedback control information allowed to update not only the production plans (schedules), but all related plans of basic processes and derivatives, and any changes in the demand and market conditions associated with production, production factors (tangible and intangible, tangible), financial and personal), material management or logistics not only in quantitative terms, but also in terms of value (revenues and costs of activities). The new system obtained in this way was called MRP III / ERP. It can be pointed out that the ERP system is a comprehensive system supporting enterprise control in the full scope of its activity (as a whole), from sales planning, then production and supply, through production management (quantitative and valuable), financial management, human and material resources to sales and distribution of products and support for after-sales service (service). It enables full application of the controlling budgeting concept using the total budget structure, i.e. its operational and financial part. Thus, the ERP system gives the ability to monitor in real time the activities carried out in all functional areas of the company, which allows conducting ongoing analysis of factors critical to the company's operations such as rhythm, efficiency, production quality or customer satisfaction and profitability. ERP covers the entire production and distribution processes, integrates various areas of enterprise operations, improves the flow of information crucial for its functioning and allows you to instantly respond to changes in demand. This information is updated in real time and available when the decision is made<sup>23</sup>.

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<sup>22</sup> More on the topic MRP I and MRP II /In:/ Parys T., *Systemy informatyczne wspomagające zarządzanie*, „PAR” 2012, No 7/8 2012, pp. 44-51; Durlik I., *Inżynieria zarządzania część I ...*, op. cit., pp. 210-225; *Organizacja i sterowanie produkcją ...*, op. cit., pp. 434-440.

<sup>23</sup> More on the topic: Kijewska A., *Systemy informatyczne w zarządzaniu*, Politechnika Śląska, Gliwice, 2005.

Thus, it creates the possibility of actual control not only of the manufacturing activity and the results obtained from this activity, but ultimately the control of the enterprise's activity as a whole. This system together with the concept of controlling is no longer limited to only selected areas of production processes and short-term approach, because through its complexity and coverage of the entire enterprise, it consistently performs the functions of the management process at all its levels, i.e. strategic (long-term) and operational (short-term), and the tactical (current) level identified in production. It should also be noted that for the ERP system there is no formal standard as it is in the case of MRP II, which means that the system has different construction, and thus, and functionality, depending on the manufacturer's or the client's needs. The ERP system is a solution that arose as a result of the evolution of management support systems and is still subject to it, making it an ideal tool that can be used in the controlling concept.

## Conclusion

Controlling pays great attention to the creation of an appropriate information base, because at all stages of planning, implementation and control it is necessary to have an information basis, communication ties and coordination of all elements of the management process. It is indicated that ERP class systems currently form the most advanced group of integrated systems supporting enterprise management. As described above, these class systems support the entire enterprise controlling function and integrate and coordinate all areas of its activity. They are an IT solution that has been created as a result of several decades of evolution of systems supporting material supply management and production management. ERP systems not only absorbed the MRP / MRP I / MRP II methodology, but added new elements related to the effectiveness of managing factors of production, such as managing liquidity, managing free cash or analysing the profitability of capital investments. Together with the concept of controlling, ERP class systems enable accurate planning, control of implementation and analysis of processes occurring within the enterprise. Obtained results of analyses can be generated in a very short time (so-called real), and additionally, this system together with controlling solutions allows obtaining information generated not only ex post (past) but also ex ante (future) – which is extremely important for supporting the decision-making process and the ongoing implementation of the correction system in response to changing operating conditions (control) and, consequently, the implementation of the controlling function of controlling the enterprise's activity and its results.

Therefore, it is worth promoting the idea of controlling and recommending the implementation of its solutions in enterprises, because it has very wide

possibilities of application in virtually every organization. This is due to its universalism characterized by the possibility of structuring, subjective and objective flexibility, full temporal adaptability and appropriate access to information. What's more, the idea of controlling may cover the entire enterprise or a part of it in a selected subject and / or subject cross-section. Thus, in the opinion of the authors of this publication, the search for solutions and tools that can be used in the controlling concept is justified, because supporting the concept of controlling with appropriate IT tools will ultimately contribute to the proper functioning of controlling solutions in the organization, and as a consequence will increase the effectiveness of management and the effectiveness of the functioning of the company as a holistic system.

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# ADVANTAGES AND OBSTACLES TO IMPLEMENTING ROBOTIC PROCESS AUTOMATION IN THE ENTERPRISES\*

## SUMMARY

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The aim of the study is to present a wide spectrum of applications the solution such as Robotic Process Automation into various areas of the enterprise. The study will expand this knowledge to present the advantages, drawbacks and barriers to the implementation of RPA. Getting to know the article will allow a wider look at the use of Robotic Process Automation, what in practice the most often leads to identifying RPA with the accounting department. The information included in the study will prove that this is not a true.

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## Introduction

Together with the development of technology, the owners of manufacturing enterprises felt the need to build machines and devices that could be able to contribute increase the efficiency or productivity when replacing employees at work. However, before it was thought about increasing the efficiency or productivity, manufacturing companies sought ways to increase profits and reduce labor costs. Undoubtedly, a breakthrough in the field of robots was made by George Devol, who created the world's first programmable robot for use in industry<sup>1</sup>. The electric trolley, presented in 1954, was used to carry materials used in industrial production. What is more, the first forms of automation were introduced to the business more than a dozen years ago. Then the automation

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<sup>1</sup> Koczy S., *Edukacyjne możliwości stosowania robotów humanoidalnych*. /In:/ *Człowiek w obliczu szans cyberprzestrzeni i świata wirtualnego*, Red.: Bednarek J., Difin, Warszawa 2014, pp. 74-76.

found its application in processes including data archiving, scanning or digitalization<sup>2</sup>.

## Definitions of the Robotic Process Automation

The term *Robotic Process Automation* (RPA) was first used by P. Fersht<sup>3</sup>. He is referred to as the father of the RPA, because of the report published in the 2012, which is the first research in the RPA area. Fersht is widely recognized as the pioneering voice of analysts that fuelled the evolution of the Robotic Process Automation industry. Together with D. Brain, they prepared the publication titled *The RPA Bible*, in which they define the essence of the functioning of RPA as: “process-centric nature and compatibility with legacy IT make it a key driver for business transformation”<sup>4</sup>. Robotic Process Automation is a modern technology, that automates repetitive business processes using software or applications with the use of devices equipped with a graphical user interface, thus stimulating the work of a human<sup>5</sup>. This process can be performed based on data and rules applicable in a given process. Another definition states that Robotic Process Automation is a set of algorithms that perform the same tasks<sup>6</sup>. To a large extent, a robot is a script of various levels of complexity, which requires automatic execution of tasks for the IT system. This solution is often called a *bot* or a *robot*. A. Sobczak defines RPA as a software class that automates business processes<sup>7</sup>. What is more, it is worth noting that robotization is the next stage in the evolution of automation<sup>8</sup>. The robot can be programmed in such a way that after finishing work, it sends information to specific people, to report the progress of work carried out, as well as about control activities that should be

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<sup>2</sup> Jański J., *Fabryki informacji? Outsourcing stawia na robotyzację procesów biznesowych*. Retrieved on July 6, 2019, from <https://www.karierawfinansach.pl/arttykul/wiadomosci/fabryki-informacji-outsourcing-stawia-na-robotyzacje-procesow-biznesowych>.

<sup>3</sup> Sobczak A., *Czy RPA jest faktycznie martwe – czyli głos w dyskusji branżowej na temat przyszłości Robotic Process Automation*. Retrieved on July 3, 2019, from <https://robonomika.pl/czy-rpa-jest-faktycznie-martwe-czyli-glos-w-dyskusji-branzowej-na-temat-przyszlosci-robotic-process>.

<sup>4</sup> Fersht P., Brain D., *The RPA Bible. Advanced Topics*, HfS and Symphony, 2017, p. 6.

<sup>5</sup> Sobolewski B., *Przewaga na wielu polach*, „Harvard Business Review Polska”, 2017, vol. 178-179, p. 81.

<sup>6</sup> *Robotic Process Automation przygotowuje firmę na wyzwania przyszłości*, Pricewaterhouse Coopers. Retrieved on July 7, 2019, from <https://www.pwc.pl/pl/pdf/robotic-process-automation.pdf>.

<sup>7</sup> Sobczak A., *101 pytań i odpowiedzi nt. robotyzacji procesów biznesowych*. Retrieved on July 3, 2019, from <https://robonomika.pl/101-pytan-i-odpowiedzi-nt-robotyzacji-procesow-biznesowych-wersja-w-formie-publicacji-pdf>, p.6.

<sup>8</sup> Nesterak J., Gąsiorek P., *Implementacja robotic process automation w przedsiębiorstwie. /In:/ Zarządzanie restrukturyzującą: innowacyjność i konkurencyjność w obliczu zmian*. Red. A. Jaki, S. Kruk, Towarzystwo Naukowe Organizacji i Kierownictwa. Dom Organizatora, Toruń 2019, ss. 275-287.

carried out in case of unconventional situations. Bot created in such a way, in the case of an exception, which he cannot cope with, will return the action to a man who in this case work is irreplaceable<sup>9</sup>. The RPA definition was also prepared by PwC, which defines RPA as “non-invasive software, built” over “software that the company already uses”<sup>10</sup>.

RPA is a tool, which support laborious and repetitive business processes. This is not a solution that in the long-term will work in strategic business activities, but it can be a complement to it<sup>11</sup>. Speaking about Robotic Process Automation, the word robotic automatically directs the recipient's thoughts to the humanoid character of the robot, and as mentioned above, it is only a software or application. Thanks to this implementation of RPA does not require additional space or special positions or separate computers. It is worth noting that Robotic Process Automation should be more associated with tools that improve manual work, such as Excel, or Business Intelligence tools that generate reports, rather than with systems that cover all business processes in an ERP class unit<sup>12</sup>.

### Application of Robotic Process Automation into enterprises

High efficiency of Robotic Process Automation can be observed primarily in activities aimed at entering data, especially from one system to another<sup>13</sup>. The number of exceptions in such a process by definition should be strictly limited. The application created in the form of bot performs the same manual and repetitive tasks as the employee. The simplest of such activities can include: copying data from one system to another, supplementing the appropriate headings, sending messages electronically, or work on many programs at the same time, e.g. ERP or Microsoft Office systems<sup>14</sup>. Robotization of processes is therefore used in the automation of tasks with a high degree of repeatability, routine and low

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<sup>9</sup> Aalst van der W.M.P., Bichler M., Heinzl A., *Robotic Process Automation*, “Business & Information Systems Engineering”, 2018, Vol. 60, Issue 4, pp 269–272; Chandler S., Power C., Fulton M., van Nueten N., *Who minds the bots? Why organisations need to consider risks related to Robotic Process Automation*. PricewaterhouseCoopers, London 2017; Willcocks L., Lacity M., Craig A., *Robotic Process Automation: Strategic Transformation Lever for Global Business Services?*, Case Report, 2017, Vol. 7, Issue 1, pp. 17-28.

<sup>10</sup> *Robotic...*, op. cit.

<sup>11</sup> Moczyróg, M., Rutyna, D., *Roboty wkraczają do biur*, „Harvard Business Review Polska”, 2017, Vol. 178-179, pp.78-83.

<sup>12</sup> *20 Best RPA (Robotic Process Automation) tools in 2019*. Retrieved on July 3, 2019, from <https://www.guru99.com/robotics-process-automation-tools.html>.

<sup>13</sup> Jesthhasan R., Malcolm T., Zarkadakis G., *Trzy sposoby automatyzacji pracy*, „Harvard Business Review Polska”, 2017, Vol. 178-179, p. 16.

<sup>14</sup> Sobolewski B., *Przewaga na wielu polach*, „Harvard Business Review Polska”, 2017, Vol. 178-179, p. 81.

complexity<sup>15</sup>. One should be aware that the progressive technology of RPA will significantly influence both the modelling of business processes, management of enterprises and their resources, as well as their organizational structures. Undoubtedly, the nature of the work of low-level employees will change, especially those whose duties fit perfectly with the idea of repetitive robotics. Robotic Process Automation can find a solution in various areas of the company's operation. The most common is the use of RPA in accounting or finance, and even broadly understood administration. However, this is not the only area of the enterprise where you can meet with business processes involving repetitive office activities. Robotic Process Automation can be used in such departments as IT, Claims Department or Human Resources.

The areas of activity in which office work can be used are presented below. In the case of the administration department, the robot can enter data into accounting systems (e.g. adding new contractors, filling in files). The robot will work without problems when working on CRM, ERP or workflow systems. In the accounting department, it is possible to ask the robot to issue invoices, or ask to send them to recipients using e-mail addresses. The robot can also make simple postings and thus can postpone payments to the company's bank account. In the area of finances it can prepare transfers while a person only checks the correctness of prepared orders and approves their finalization. An example of using an office robot in the accounting department can be a small accounting office that has benefited from this solution. In this case, the robot once a month logged into two systems to charge employees, generate a payroll and record salaries. Speaking about salaries, go to the next department – Human Resources. The Pirxon company states that the robot is able to verify the number of days actually worked per month. Therefore, it can prepare reports, ready to calculate employee salaries. What is more, the robot can prepare contracts for new employees. Such automation definitely shortens the process of introducing an employee to the company. In the IT department, the robot supports employees in integrating various incompatible systems. In logistics, robots can verify the state of their inventory and control orders and deliveries. In the sales and marketing department, the robot can prepare and monitor offers, analyze competition prices and update price lists. In the customer service department, the robot can supplement databases, verify them, and search for potentially new clients. On the other hand, in the complaints department, the robot can verify the rights of the complainant, pre-validate the complaint, carry out the selection of complaints or inform the customer about the current status of the complaint via e-mails sent<sup>16</sup>.

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<sup>15</sup> Jesthhasan R., Malcolm T., Zarkadakis G., *Trzy...*, op.cit., p. 16.

<sup>16</sup> *Robotyzacja w biznesie. gdzie pracują roboty?*. Retrieved on July 3, 2019, from <https://pirxonrobot.com/pl/blognews/blog/>

The above examples indicate that the use of RPA tools has a wide range of possibilities. Thanks to continuous technology improvements, office work can cover larger areas of repetitive work. Time recovered as a result of these applications can be used for activities aimed at obtaining a long-term competitive advantage. In that place, new opportunities are opened up, and the area of activities is expanding day by day.

## **Advantages and benefits of RPA implementation**

The possibility of using Robotic Process Automation in various business areas attracts potential investors. It is natural that with the investment in a virtual employee, enterprises have huge expectations for this solution. The following is a classification of the advantages of RPA in four points of view: PricewaterhouseCoopers (PwC), Pirxon Inc. and two proprietary classifications based on the place of gaining benefits in the enterprise and broken down into the measurable and unmeasurable advantages of RPA.

The first set of benefits is presented by PwC, distinguishing economic benefits, related to human resources, improvement of control and quality as well as flexible implementation of tasks. Under the first benefit, the company understands the reduction of operating costs and the return on investment. The benefits associated with human resources are perceived in connection with the robot's work 24 hours per day. Improvement of quality and control is associated with the automation of manual processes, as a result of which the reduction of errors translates into an increase in quality and thus an increase in customer satisfaction. Flexible implementation in the case of PwC is understood not only as the application of RPA in various time variants and scale of tasks in the company, but also as an opportunity to conduct experiments on RPA. On the other hand Pirxon Inc. considers the greatest benefits of using Robotic Process Automation to increase productivity while reducing operating costs. In addition, the company emphasizes the remaining benefits noticed after the implementation of office robots such as an increase in productivity by 30%, or a reduction of errors by 21%. Also distinguished: simplification and ordering of processes, reduction of the customer service cycle by 90% in the case of deliveries, quick return of investment outlays and continuous work of the robot<sup>17</sup>. Another important element is the release of employees' potential, which guarantees a significant competitive advantage.

The third classification of the advantages of RPA is based on the identification of various aspects of the robot's implementation and within these areas an indication of the advantages of RPA (table 1).

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<sup>17</sup> *Robotic...*, op.cit.

Table 1: Classification of RPA benefits according to different aspects of application

Areas	Benefits
Technical aspect	<ul style="list-style-type: none"> <li>– the robot runs smoothly between the systems in the company</li> <li>– the robot easily logs in from the system to the system</li> <li>– RPA implementation is tailor-made for the company's needs</li> <li>– the process is organized as part of the implementation</li> </ul>
Financial aspect	<ul style="list-style-type: none"> <li>– fast and relatively cheap robotization of processes</li> <li>– reduction of operating costs</li> <li>– reduction of labour costs and reduction of employment</li> <li>– getting returns on investment in a relatively short period of time</li> </ul>
Personal aspect	<ul style="list-style-type: none"> <li>– robot works 24 / h</li> <li>– the robot always works in the same way</li> <li>– the robot never gets tired</li> <li>– the robot does not get sick and does not go on vacation</li> <li>– the creative potential of the team is released</li> </ul>
Process aspect	<ul style="list-style-type: none"> <li>– elimination of activities burdened with the risk of error</li> <li>– automation of repetitive processes</li> <li>– increase in efficiency</li> <li>– increase in productivity</li> <li>– saving time</li> <li>– speed of work with a large amount of data</li> <li>– the flexibility of using RPA in different time zones</li> <li>– scalability of operations eg 500 invoices vs 5000 invoices</li> <li>– the ability to get many reports in a short time</li> </ul>
Image aspect	<ul style="list-style-type: none"> <li>– maintaining a competitive position on the market</li> <li>– building long-term advantage over competitors</li> <li>– competitiveness and speed of customer service</li> <li>– increase in the quality</li> <li>– increase in customer satisfaction</li> </ul>

Source: own study and Grzegorzczak, M., *Polskie przedsiębiorstwa boją się botów*, Puls Biznesu, 2017, Vol. 192, p. 8; Moczyróg M., Rutyna D., *Roboty wkraczają do biur*, „Harvard Business Review Polska”, 2017, Vol. 178-179, pp. 78-83; Sektor Nowoczesnych Usług Biznesowych w Polsce – Raport 2018, Związek Liderów Usług Biznesowych – ABSL. Retrieved on July 3, 2019, from [https://absl.pl/wp-content/uploads/2018/06/raport\\_absl\\_2018\\_PL\\_180527\\_epub-1.pdf](https://absl.pl/wp-content/uploads/2018/06/raport_absl_2018_PL_180527_epub-1.pdf), p. 7.

As a result of identification of benefits resulting from the implementation of RPA solutions, they should be classified due to the measurability and non-measurability of benefits (table 2).

Table 2: Classification of benefits resulting from the application of RPA to measurable and unmeasurable

Measurable advantages	Unmeasurable advantages
Increased competitive advantage	Building the image of a modern company
Employment reduction	Arrangement the business process
Elimination of errors occurring in processes	Freeing the potential of employees
Increased efficiency	Increased employee satisfaction

Source: own study

## Barriers of implementation of RPA

The barriers to RPA implementation were defined in the *Embracing robotic automation during the evolution of finance report*<sup>18</sup>, prepared by ACCA (the Association of Chartered Certified Accountants)<sup>19</sup>, CA ANZ (Chartered Accountants Australia and New Zealand)<sup>20</sup> and KPMG<sup>21</sup>. The survey was conducted among 2700 representatives of such positions as CEO, CFO, financial controller, finance manager, accountant or auditor presenting such areas of business as: corporations, financial services, public sector, non-profit sector, Business Process Outsourcing (BPO). The study proved that the challenges encountered in implementing RPA are definitely different from those anticipated. Despite the rapid development of this solution and even the emergence of its next generation of RPA II, there are still areas that are being discovered and improved. The key is reliable cooperation based on mutual trust between the service provider and the service recipient. The study also highlighted challenges such as: employee fears of implementation, which is the biggest barrier to implementing RPA. This is understandable because employees are primarily concerned about losing their job. Therefore, the key is to familiarize employees with the implementation process and even involve them in the process itself. Another challenge is the lack of knowledge among the implementers on how to combine RPA solutions with other solutions used in the enterprise. An important obstacle is the inability to manage robots, which is acquired only during their service. What is more, the consequences of activities without coordination at the level of the whole company in the management of robots are low quality, unnecessary redundancies and excessive supply of new “bots” deployed in various business units<sup>22</sup>. The problem can easily be solved by assigning a specific employee responsibility for the results of the bot and controlling the changes made on it.

The challenges defined by the respondents of the studies under discussion are as follows<sup>23</sup>:

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<sup>18</sup> *Embracing robotic automation during the evolution of finance*, ACCA & CA ANZ & KPMG; ACCA; London 2018. Retrieved on July 3, 2019, from <https://www.accaglobal.com/lk/en/professional-insights/technology/embracing-robotic-automation-during-the-evolution-of-finance.html>

<sup>19</sup> ACCA is an association of professional accountants and professionals representing the financial industry around the world.

<sup>20</sup> CA ANZ is an organization of 120 000 professionals from Australia and New Zealand focusing on the education of members as well as engaging in advocacy and leadership in areas of public interest that affect the economy and national and international markets.

<sup>21</sup> KPMG is a global company offering a full range of services to organizations from many industries, governments and non-profit sectors.

<sup>22</sup> *Embracing...*, op. cit., p. 25.

<sup>23</sup> *Embracing...*, op. cit., p. 26.



- having older IT systems impeding implementation,
- low level of IT security to secure implementation management,
- problems with identifying the most suitable processes for RPA,
- the occurrence of the risk of atypical processes, weakening the possibility of control,
- poor transparency regarding ownership and responsibility for the RPA process,
- difficulties in measuring the rate of return on investment,
- problems in clearly defining the goals of RPA implementation.

Why do companies still have concerns about the implementation of RPA and postpone the decision to implement this solution? The results of the study suggest that the hesitation in the adoption of this technology lies in the lack of basic knowledge about its operation<sup>24</sup>. According to the study, this problem does not only concern small entities, but also to a large extent also includes enterprises whose estimated capital is greater than USD 50 million. Pirxon reached similar conclusions while working on the first edition of the Polish report *The level of robotization of Office Companies in Poland prepared in 2017*<sup>25</sup>. From among the surveyed enterprises, most of them are afraid of a long time of implementing such solutions. Responding to the concerns of the surveyed entities, Pirxon puts in the report that based on the implementations made for that time – the full implementation of Robotic Process Automation takes up to 12 weeks. The company also examined the attitude of enterprises to this tool before and after implementation, reaching conclusions that the overall picture of RPA and the full value of implementation is noticeable only in the post-implementation period. This is evidenced by the fact that before the robot's work, only 3.1% of companies that do not yet have this solution saw the potential to automate 60% of processes covering the area of their companies' operations. When implementing the test version of the robot, the index increased to 4.2%, while after implementation, this potential was already noticed by 36.4% of companies<sup>26</sup>.

## Conclusion

Robotic Process Automation is defined in many ways, depending on the needs and expectations of the definer. Implementers recognize the different properties of this solution, striving to obtain the best effects of implementing

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<sup>24</sup> *Embracing...*, op. cit., p.17.

<sup>25</sup> *Poziom robotyzacji biurowej firm w Polsce – Raport 2018*. Retrieved on July 3, 2019, from [https://pirxonrobot.com/wp-content/uploads/2018/11/RAPORT-Pirxon\\_Poziom-robotyzacji-biurowej-w-Polsce-1.pdf](https://pirxonrobot.com/wp-content/uploads/2018/11/RAPORT-Pirxon_Poziom-robotyzacji-biurowej-w-Polsce-1.pdf); Pirxon – Stowarzyszenie SPIN, 2018.

<sup>26</sup> *Poziom...*, op. cit., pp. 7-8.

RPA. Implementation is not difficult and complicated, however, the success and efficiency of such an undertaking is strictly conditioned by the nature of cooperation between the investor and the contractor, the degree of process complexity, the number of exceptions to the rules contained in the process, which is affected by accurate process mapping. Implementation is possible in many areas of business – wherever there is repetitive work – not only in the accounting department, as is usual. Thanks to the wide range of RPA applications, the benefits of this solution can be noticed in a broad perspective, but one should also be aware of the disadvantages and barriers to implementing this solution. Only a thorough understanding of the challenges that may arise during implementation will allow successful implementation of RPA.

Well implemented robot can reduce a significant number of full-time jobs, which from the point of view of operating costs is an advantage of this solution. Everything depends on the automated process, the area it covers, the scale of operation and the size of the enterprise. However, not all companies intend to reduce workplaces. This is demonstrated by the report on the Modern Business Services Sector in Poland 2018 prepared by the Association of Business Service Leaders ABSL<sup>27</sup>. The survey was conducted among 214 companies employing approximately 155,000 employees in Business Process Outsourcing, Shared Services Centers, Information Technology and Research and Development services centers in Poland. To the question regarding the existence of an employment reduction plan as a result of the implementation of RPA and AI solutions, eight out of 106 enterprises answered in the affirmative, which means that just over 8% of the surveyed enterprises declared an employment reduction plan. The remaining 98 entities intend to retrain current employees<sup>28</sup>. A significant determinant to undertake the implementation of RPA is that the implementation of this type of solution can reduce employment costs. According to Pirxon, the robot can replace two full-time jobs<sup>29</sup>. A discrepancy can be seen here, as PwC declares to replace the robot with up to 15 jobs<sup>30</sup>. Where can the big difference come from? One of the reasons may be a significant difference in the scale of operations of both companies. In addition, in the case of PwC, a global company, the surveyed data have an international reach, which can equal the diversity of surveyed objects representing different world economies. In the case of Pirxon S.A. the surveyed entities are most often of a national nature, so one geographical

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<sup>27</sup> *Sektor Nowoczesnych Usług Biznesowych w Polsce – Raport 2018*, Związek Liderów Usług Biznesowych – ABSL. Retrieved on July 3, 2019, from [https://absl.pl/wp-content/uploads/2018/06/raport\\_absl\\_2018\\_PL\\_180527\\_epub-1.pdf](https://absl.pl/wp-content/uploads/2018/06/raport_absl_2018_PL_180527_epub-1.pdf), p. 7.

<sup>28</sup> *Sektor...*, op. cit., p.46.

<sup>29</sup> <https://pirxonrobot.com/pl/blognews/blog/>, Retrieved on July 3, 2019.

<sup>30</sup> *Robotic...*, op. cit.

area of prosperity of the surveyed companies is taken into account. With this perspective on implementation of RPA, this article should be completed in order to be aware of the wide spectrum of RPA applications, the diversity to which RPA flexibly adapts, or the scale of action that a programmed robot is able to process.

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**Part II** **CHANGES IMPLEMENTATION**  
**WITHIN ENTERPRISES**



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# AGILE ACTIVATION OF INDIVIDUALS PREPARES FOR “INVASION” OF ARTIFICIAL INTELLIGENCE

## SUMMARY

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In today's world of excessively rising laws, rules, regulations, instructions and procedures, work keeps becoming more and more routine. In overwhelming routine, people are not required to think, they grow passive, disengaged, and tend to act foolishly. Hence the advantage of artificial intelligence (AI) is growing over human work. The author's bottom-up improvement methods based not on action, but on abandoning actions that could be identified as counterproductive or useless, have been successfully used on many private, public and civic projects, and can be easily used for preparation for the inevitable spread of the AI. The paper summarizes those methods that invariably make the activated individuals to „infect“ others, paving the path of improvement for people, projects and organizations, and also society, with essentially no cost. Proposed preparation for the „invasion“ of the AI includes providing an offer of voluntary self-participation. Activated people, experiencing the power of determining their own values and principles will experience the revival of their own intelligence and will to engage. The mental part, based on self-established values and principles, triggers the offered „agility“ of action. Activated individuals will be more prepared to assume their upcoming role of a human as the active user, participant or developer of more new, empowering tools co-created with logical machines.

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## Introduction

In today's world of excessively rising laws, rules, regulations, instructions and procedures, work keeps becoming more and more routine. In overwhelming routine, people are not required to think, they grow passive, disengaged, and tend to act foolishly. Hence the advantage of artificial intelligence (AI) is growing over human work, especially in form of artificial neural networks that have been established already as so far uncontested learning systems.



An American recession in 1980's triggered replacement of Keynesian Economics by Milton Friedman Monetarism bringing increased business i.e. economic activity and speed of reaction but also side effects of unprecedented growth of administration, increased costs of project and programs, as well as costs of running organizations. The new approach presented advantages of increased business (i.e. economic activity and speed of reaction) to correct economic upsets<sup>1</sup>. It also produced side effects of a seemingly unstoppable growth of government debt as well as the beginning of massive replacement of managing engineers by administrators of larger engineering projects, in construction and in technology organizations<sup>2</sup>.

The author's bottom-up improvement methods based not on action, but on abandoning actions that could be identified as counterproductive or useless, have been successfully used on many private, public and civic projects, and can be easily used for preparation for the inevitable further spread of the AI<sup>3</sup>.

Proposed preparation for the „invasion” of the AI does not involve much effort. It is enough to just provide an offer of voluntary self-participation. Activated people, experiencing the power of determining their own values and principles will experience the revival of their own intelligence and will to engage. The mental part, based on self-established values and principles, triggers the offered „agility” of action.

Behavior of activated individuals invariably „infects” others, paving the path of improvement for people, projects, and organizations, with essentially no cost.

### **Some Results of Early Digitization in the 1980s – 2000s**

In the industrial design and construction, IT appeared at a time when excesses of deregulation were used by the rulers to give administrators a green light to take power and start transforming technocracy into an incomparably easier to control bureaucracy.

The author ran an 85-person automation department in a company providing design and construction of industrial facilities.

The company's owners have mistakenly invested in the prototype application of digitization of drawings. It resulted mainly in bureaucratisation of design and

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<sup>1</sup> Friedman M., Jacobson Schwartz A., *Money and Business Cycles*, Review of Economics and Statistics, 45(1), Part 2, Supplement, 1963.

<sup>2</sup> Jekielek, J., *Structured Streamlining to Enhance Pro-Development Activity of Public and Civic Organizations [In:] International Academic Conference on Pro-development Activity of Public and Civic Organizations*, Institute of Public Affairs of the Jagiellonian University, Cracow 2012.

<sup>3</sup> Jekielek J., *The Use of Nutshell Models to Enhance Teaching Outcomes*, 35<sup>th</sup> ASEE/IEEE Frontiers of Education Conference, Indianapolis 2005.

the counterproductive effect, i.e. raising costs and extending the design process, contributing substantially to the collapse of the company.

Similarly, although on a larger scale, the transformation of the Ontario Hydro power plant looked alike.

The massive, uncritical use of IT to plan and control a series of construction mega-projects resulted in even three times the cost overrun and twice exceeded time of completion, plus many unfinished items (this time without the company's downfall, because the mostly unaware taxpayers would endure everything.)<sup>4</sup>

The author's involvement in one of such a projects led to the development of the 'J curve' presented on Figure 1.

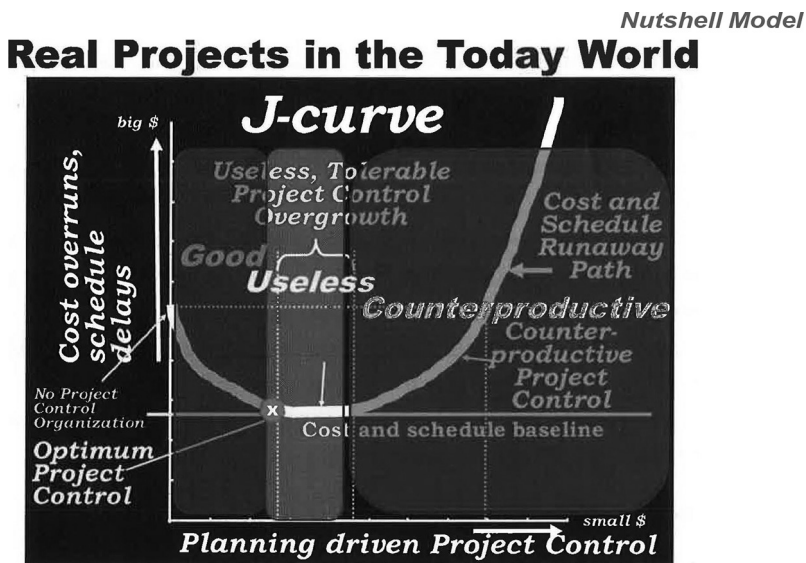


Figure 1: Development of the 'J curve'

Source: own study based on Jekielek J., *Control Systems Professional: A Transition from the Technical to the Managerial Role*, 'International Society of Automation ISA2002 Technical Conference' 2002.

A Fig.1 J-curve represents overall project costs (big \$) as a function of planning driven project control costs (small \$). The cost and schedule baseline depicts conditions of the cost and schedule found in the project Execution Plan.

The point of an optimum project control (marked with 'x') indicates that the project control is limited to the minimum required to remain at the baseline.

<sup>4</sup> Jekielek, J., *Structured Streamlining for Enterprise Improvement [In:] Knowledge Economy-Society. Global and Regional Challenges of the 21st Century Economy*, Cracow University of Economics, and Cracow 2013.

The point of an optimum project control (marked with ,x') indicates that the project control is limited to the minimum required to remain at the baseline.

Any further growth of project control is useless but tolerable as long as there are no overall cost overruns/schedule delays caused by it; beyond that it becomes counterproductive increasing cost without adding any value. Any further project control effort increase results in project cost/schedule overruns that may follow a runaway path.

Since project planning drives project control, over-planning (usually excessive fragmentation of project tasks and locating them in unrealistic distant future) automatically creates conditions of the overgrowth of project control<sup>5</sup> .

Project over-planning and the resulting project control overgrowth are often caused by the management's search for total control encouraged further by the excessive fragmentation of project tasks and determining them in unrealistic, distant future; automatically creating conditions of the overgrowth of project control.

Search for total control is deeply rooted in the unstoppable drive for perfection embedded firmly in human nature. Herbert Simon did not see any place for perfection in the real-world decision-making reality; his 'theory of bounded rationality demanded that decisions should be "satisficing" (Simon's linguistic contribution: a combination of "satisfy" and "suffice") i.e. good enough<sup>6</sup>.

Dangers of administering are humorously demonstrated by Erich Fromm using his own perpetual transformations as a professor from friendly helper into ruthless machine for exams, in 'Thoughts on Bureaucracy'<sup>7</sup>.

## How Projects Used to Work

Up to the 80's Engineers managed projects very simple way. Project all engineering discipline progress, including all manpower (cost component) were plotted on the so-called "S-curve" as shown on Figure 2. The author led several projects done exceeding requirements of content, cost and schedule, closing his discipline project work at some 95% and negotiating support for the customer on an hourly basis. That would allow meeting project scope and even exceeding it by adding many last moment customer additions.

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<sup>5</sup> Jekielek J., *Structured Streamlining for Enterprise Improvement, [In:] Knowledge Economy-Society. Global and Regional Challenges of the 21st Century Economy*, Cracow University of Economics, and Cracow 2015.

<sup>6</sup> Simon, H., *Models of Bounded Rationality*, Vols. 1 and 2. MIT Press, Cambridge, Massachusetts, 1982.

<sup>7</sup> Fromm, E., *Thoughts on Bureaucracy*, Management Science 16, #12, 1979.

Success of projects depended more on the ability of meeting of the minds of participating people; flourishing engineering intuition would trigger people creativity. Informal, relaxed atmosphere could transform administrative meetings into entertaining happenings where open minds could often trigger paths to unexpected solutions.

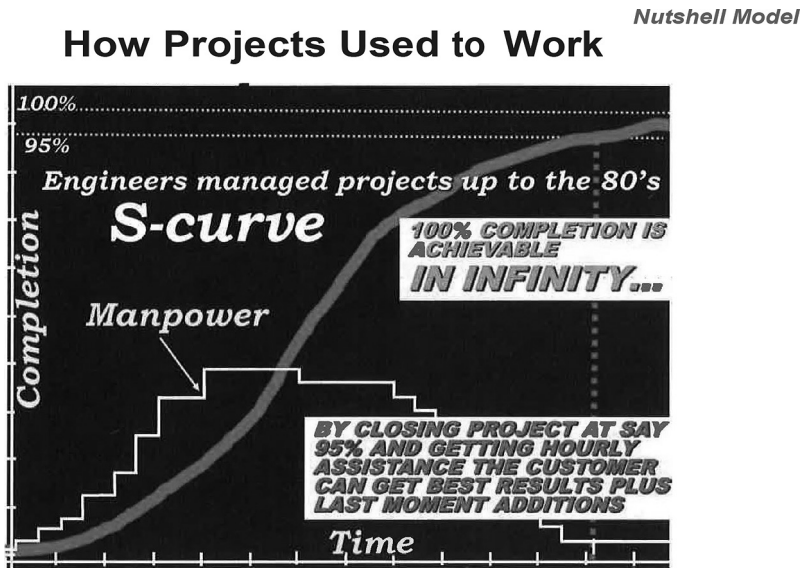


Figure 2: How Projects Used to Work: S-Curve

Source: based on Jekielek, J., *Control Systems Professional: A Transition from the Technical to the Managerial Role*, International Society of Automation ISA2002 Technical Conference" 2002.

### Digitization triggered 'Economics of Excess'

Agile Project Management practice slowly spreads its reach to larger projects. It is based on the extensive use of IT tools and is not discussed in this paper. This article adds another individual-centered agility enhancement approach applicable to individuals, projects and organizations.

Managing engineers, with help from the administrative personnel, were used to operating in a freer, analog, and imperfect world with its ambiguity, mistakes and errors. That lost world could have been called 'Economics of Moderation'.

In that world, project costs, execution time and content including project quality have been much better meeting the established targets, with incomparably lesser delays, errors and eventual compromises so often seen on digitized, over-controlled projects.

Administration has been focused on numbers, dates and form driven perfect world. Yet, since the 1980's project and construction costs, as well as cost overruns, have been increasing contribution to inflation of GDP figures (that was helping to show higher economy results) and to the accelerating the government debt. The over-planned, over-budgeted, over-scheduled, over-controlled, and generally over-administered world had begun and still silently exists today e.g. on nuclear projects. That world has been called by many of those who were managing projects prior to the 1980's, as well as many others later, as "Economics of Excess".

## **Top-down vs. Bottom-Up Improvement Methods**

Top-down Improvement Methods, to mitigate escalation of costs and schedules, have been tried, with no success, one by one. They were typically arbitrary and demotivating, based on the collective approach, for example with invariably forced training. Bottom-Up methods, based on the individual, have been introduced, tried, and improved by the author for many years in large and small companies, in various programs and on many projects. In that approach, individuals 'self-activate', by voluntary 'mental' methods and 'agile' actions, improving them and influencing their surroundings. With or without organizational acceptance they automatically also support (all deemed to be useful) top-down improvement activities.

Bottom-up methods have been used by the author as a natural way of managing a team in the adverse organizational environments. They trigger natural teamwork in any organization.

## **Methods Of Bottom-Up Improvement to be used for Activation**

### **Mental**

1. Value system, the most important starting point allowing to see problems as challenges and challenges as opportunities; self-determined, non-negotiable but updatable. It is merely providing a solid base allowing for instant, balanced reaction to the perpetually changing circumstances.
2. Operating principles, self-determined, non-negotiable but updatable. Ditto, helping in fast decisions needed to resolve upcoming controversies and conflicts that always show up.
3. 'Take control and ownership', developed and solidified in one's own mind. Accepting even not the best-formulated project as own, allows for negotiating improvement and getting the best result.

4. Reprioritization, developed, with time becomes instinctive. This is the most active mental effort that has to be quickly triggering action, often demanding persuasive negotiation of contents and deadlines with the affected parties.

### **Agile**

5. „Play” in action – creating a joyful work environment.
6. ‘Nutshell models’ (models of the essence of things), rather advanced aids.
7. Critical reflection – confronting all existing and supplementing for the solution.
8. Minimized compliance – confronting all existing to arrive at a ‘good enough’ solution.
9. Infrastructural self-organizing, organizing without organizational participation.

### **Conclusion**

In today’s world of excessively rising laws, rules, regulations, instructions and procedures, work keeps becoming more and more routine. In overwhelming routine people are not required to think. They tend to act foolishly; hence the advantage of artificial neural networks over human work is growing.

Preparing for an „invasion” of the AI does not have to involve too much effort. It is enough to provide an offer for those willing to activate themselves for the sake of their own as well as their surroundings. Inspiring behavior will invariably start to „infect” others. Those experiencing the power of determining their own values and principles will note their growing power of influence on the surrounding world. They will experience a revival of their intelligence and the will to engage. The mental part, based on self-established values and principles, triggers the „agility” of action.

Activation of individuals, the basis for bottom-up improvement methods, will help in adopting the latest role of a human as an engaged user of tools co-created with logical machines. Such co-creation starts showing up in the current applications of artificial neural networks.

It is just about living in full, rebuilding intelligent behavior, and triggering missing engagement. Activated individuals will be more prepared to assume their latest role of a human as the active user, participant or developer of more new tools co-created with logical machines. Such co-creation shows up clearly e.g. in the current applications of the artificial neural networks. P.S. In the eternal „master and apprentice” story, logical machines are joining human apprentices. Those new perfect learners have a drawback: they lack

identity and self-awareness. Humans, in their obsession with becoming a god, so far could not, after decades of attempts, to create artificial intelligence that has, or could develop its own identify or self-awareness. Scientists still do not know exactly what human identity or awareness is, or where it could be located. More and more scientists believe that it is not in the human body.

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# SPECIFICS OF USING SCRUM METHODOLOGY IN SOFTWARE DEVELOPMENT

## SUMMARY

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SCRUM is an iterative and incremental methodology for agile software development. The basic stage of software development with this method is “sprint”, for which the work content and the sprint target are defined. Sprint implementation is controlled by a daily scrum supported by the tools helping the teams to organize their daily scrum meeting. The article deals with different types and features of scrum board usage. In the end it is devoted to the overall trend of using SCRUM methodology in practice.

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## Introduction

SCRUM is an iterative and incremental methodology for agile software development. The basic stage of software development with this method is “sprint”, for which the work content and the sprint target are defined. Sprint implementation is controlled by a daily scrum supported by the tools helping the teams to organize their daily scrum meeting. The article deals with different types and features of scrum board usage. In the end it is devoted to the overall trend of using SCRUM methodology in practice.

Scrum is process framework used primarily for creating, delivering and maintaining of soft-ware products. Scrum assumes that software development is too complex and unpredictable to accurately plan. The agile scrum framework is set on the philosophy of empiricism, which says that all knowledge comes from the experience and based on that all decisions are made in advance. This requires empirical process control to ensure visibility, control and adaptation of all scrum activities. This is achieved through an iterative and incremental development process shown in Fig. 1: The scrum stands on three main principles:



1. *Transparency* says that all participants should possess all the data needed for making adequate and well-grounded decisions. Information has to be clear and expressed by the common language so everyone is able to understand. Any discrepancy requires immediate discussion and resolution.
2. *Inspections* identifies the potential issues, which may occur in the scrum process. Not only it helps the team to check the progress towards the sprint goal but it also serves as a detection of unwanted variances.
3. *Adaption* goes hand in hand with the inspection. Once the undesirable variance is detected the whole process needs to be adjusted as soon as possible to minimize the implications.

## SCRUM Methodology

Scrum is a framework helping the teams to organize their work. It allows the teams to adjust the scrum based on their needs. Nevertheless, it has also defined several keystones. Main of them are events, artifacts and roles, which are associated to each team member.

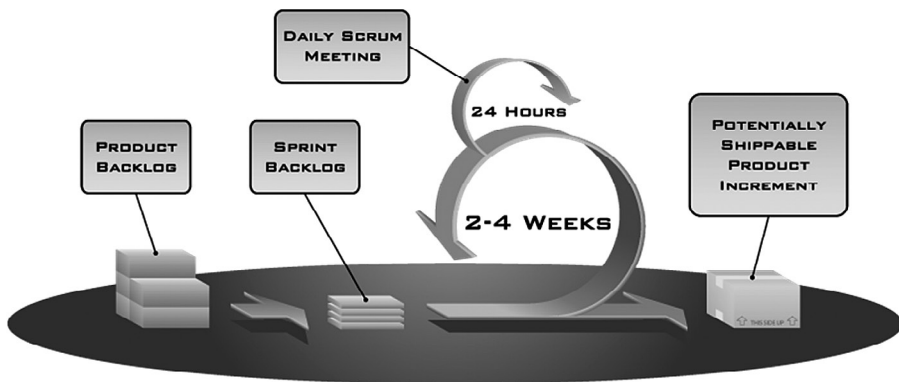


Figure 1: SCRUM Process Overview

Source: Rubin, K. S., *Essential Scrum: A Practical Guide to the Most Popular Agile Process*, Addison-Wesley Professional, An Arbor 2012.

## SCRUM Process Description

Scrum project starts with a vision of the system to be developed as shown Fig. 1. The software development process according to the scrum method can be divided into four basic development phases with their activities as shown Fig. 2.

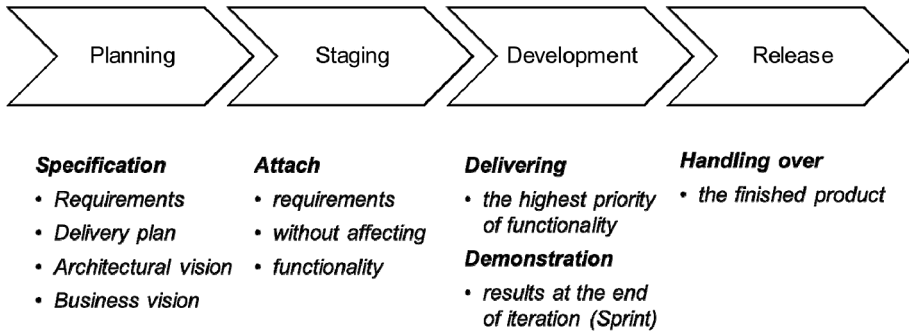


Figure 2: SCRUM Phases

Source: own study.

### SCRUM Structure

The SCRUM methodology has a structure that is divided into three parts, as shown in Fig. 3. Parts of the structure are as follows

1. *Project Team*, which consists of the following four roles: SCRUM Master, Product Owner, Development Team Member and Customer.
2. *Events*, where are the main Sprint and Daily SCRUM Meeting.
3. *Artefacts*, that make up the Backlogs and Releases.

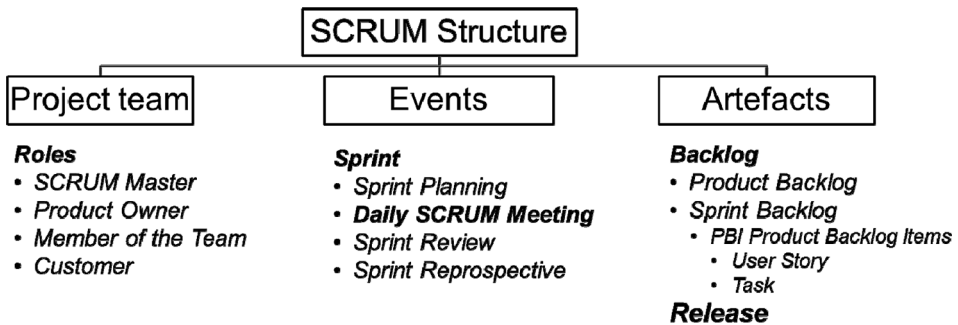


Figure 3: SCRUM Structures

Source: own study.

### SCRUM Performance Monitoring

The ensure of continuous monitoring of the scrum development process through appropriate set of measures is crucial to visibility, inspection, and adaptation. The following measures of progress are usually used<sup>8</sup>:

<sup>8</sup> Chlopecký J., Kratochvíl M., Rolčíková M., *Decision making influence of some macroeconomic factors concerning prospective sales of fine silicon carbide [In:] Proceedings of 15th International Multidisciplinary Scientific GeoConference SGEM, Albena 2015, pp. 171-178.*

1. *The actual velocity* represents gradually the amount of work accomplished in each Sprint. The planned velocity was estimated by the Scrum team at the beginning of each Sprint and the actual velocity is calculated at the end of the Sprint. The goal of the team is to keep as little difference as possible between these variables so that the planned velocity should be estimated considering the actual velocity of previous Sprints and there should be no changes in development team in the middle of the project.
2. *The Sprint burn-down chart* represents the amount of work remaining that needs to be accomplished till the end of the Sprint.
3. As an additional indicator is sometimes used *EVM (Earned value Management)* that provides the values of schedule performance index (SPI) and cost performance index (CPI) on a daily basis, thus enabling immediate response in the case of deviation from the plan, which can be especially useful when longer Sprints are used. Computation of SPI and CPI requires collection of only one additional base measure, i.e., the number of hours spent on each task between two consecutive Daily Scrum meetings<sup>9</sup>.

Daily Scrum meetings serve as a main means of empirical process control in order to ensure visibility, inspection, and adaptation. Team members inform each other about the current state of the project. Well performed daily scrum should meet these objectives:

- commitment is shared;
- each member's status is expressed to the team and all spectators;
- all current impediments are addressed and remove steps are initiated;
- team members are supportive to each other which leads to the strong team;
- sprint focus is adapted and next direction is established.

During the sprint period the team needs to know, how the sprint runs and what they are able to deliver in the current increment. For these purposes is used scrum board. SCRUM board is graphical representation of the state of the current sprint which helps the team make sprint backlog items visible. It is the central place where the whole team can see and record the progress towards the sprint goal. The board can be visualizing as a table containing set of columns and user stories. Each story is divided into multiple tasks which represent the actual sprint backlog. Tasks are visualized as a yellow card as shown Fig. 4. Cards are movable among the columns which analogically changes their state. At the beginning of the sprint all the work is not started therefore it is placed in the 'To do' column. As the sprint goes, cards are sequentially moved from the left to the right based

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<sup>9</sup> Mahnic V., Vrana I., *Using stakeholder-driven process performance measurement for monitoring the performance of a Scrum-based software development process*, El-ektrotehniski vestnik, 74(5), 2007, 241–247.

on the work progress. Each column represents specific state which is assigned to the cards inside of it. Mostly the common default state are<sup>10</sup>:

- ‘To Do’ – for not started work,
- ‘In progress’ – for work which has been started but not finished,
- ‘Testing’ – for work which has been done but is currently being tested,
- ‘Done’ – for completed work.

From the quick look it should be clear which work is finished and what is left, who is currently working on specific tasks and if the team is able to finish the work in the sprint and deliver the increment<sup>11</sup>. The content of the board is not strict and should be adjusted based on the team needs in order to visually display all the valid information related to the team work.

	To do	In progress	In testing	Done
Story 1	□ □		□	□
Story 2		□ □	□ □	□ □
Story 3	□	□ □		

Figure 4: Example of Classic SCRUM Board

Source: own study.

In practice there is a trend where scrum teams adopt some key Kanban principles in their project when dealing with the work visualization<sup>12</sup>. Kanban is like scrum methodology used for managing the work. While in scrum the work is always planned and executed in the time intervals called Sprints, there is no such a thing as a sprint in Kanban<sup>13</sup>. Instead, Kanban uses explicit limits which are applied on the different states of the workflow. These limits restrict the maximum amount of work entering the state which allows the teams to optimize their capacity. One of the main features enhancing the scrum process is making the flow of work more visual as shown Fig 5.

<sup>10</sup> SCRmstudy, *A Guide to the Scrum Body of Knowledge (SBOK Guide)*. Phoenix 2016, VMEdU, Inc.

<sup>11</sup> Šochová Z., *Jak vypadá Scrum Board* [Online] 2013, Available at: <https://soch.cz/blog/management/agile/scrum-management/jak-vypada-scrum-board/> <https://explore.versionone.com/state-of-agile/versionone-12th-annual-state-of-agile-report>

<sup>12</sup> Planview LeanKit, *Kanban vs. Scrum: Jaké jsou rozdíly?* [Online], 2018, Available at: <https://leankit.com/learn/kanban/kanban-vs-scrum/> [cited 2019-01-15].

<sup>13</sup> Kniberg H., Skarin, M., *Kanban and Scrum making the most of both*, USA 2010, C4Media.

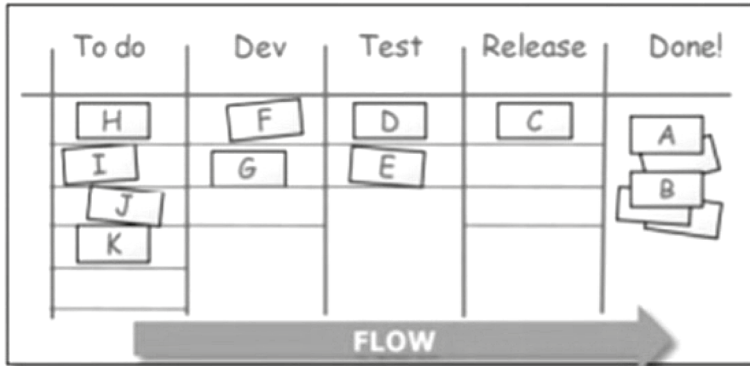


Figure 5: Example of Kanban SCRUM Board

Source: own study.

One of the original approaches of scrum board visualization is using physical board. This technique includes all forms from crafting own paper-based board to reusing wall, win-dow or even magnetic whiteboard. One of the greatest advantage is their high customization. Physical scrum boards are able to convey all the information team might need, because it depends only up to the human creativity. The board is mostly located in the team's room. This may serve as a good referencing point so everybody is on the same page with the current sprint status. The board is updated by the team members and reviewed regularly on daily scrum meetings. One of the main flaws of this type of scrum board is its availability<sup>14</sup>. It expects the whole team to be located at the same location, otherwise it might be difficult for some members to reach and update it remotely.

If is development team geographically distributed is appropriate to use digital type of board which in most cases can run in the internet browser therefore are available from the different locations in the world. These type of boards serve as an emulators of the physical boards. The main principle is to copy the look and feel of the physical boards. Instead of physical cards moving between the columns the mouse or keyboard is used to move the virtual cards on the screen. Not all digital scrum boards are standalone. In most cases they are part of complex agile tool as Atlassian, Microsoft, CA Technologies and ColabNet.

<sup>14</sup> Ministr, J., Stevko M., *The IT Service Continuity Management Principles Implementation by Method A2 [In:] Proceedings of 17th Interdisciplinary Information Management Talks*, Jindrichuv Hradec 2009, Czech Republic, pp. 131-140.

## Using SCRUM in Practice

The VersionOne report<sup>15</sup> states that the most widely used agile software development tool in year 2017 was the Daily Standup, which is used by 90 percent of software companies in the whole. As main reasons of adopting agile approach states the next five findings:

- *Accelerate software delivery (75%)*
- *Manage changing priorities (65%)*
- *Increase productivity (55%)*
- *Better business/IT alignment (49%)*
- *Increased software quality (46%)*

As main benefits of adopting agile approach states the next five findings

- *Manage changing priorities (71%)*
- *Project visibility (66%)*
- *Better business/IT alignment (75%)*
- *Delivery speed/Time to market (62%)*
- *Team productivity (61%)*

VSB – Technical University of Ostrava realized scrum research in Czech Republic, which was attended by 3.800 respondents. As main reasons for adopting scrum were reported:

- *Consistency of processes and procedures (70%)*
- *Implementation of a common tool across development teams (60%)*
- *Use of agile consultants or coaches (58%)*

As main benefits for adopting were reported:

- *Possibility of manage changing priorities (73%)*
- *Increase of team productivity (65%)*
- *Project visibility (71%)*

In all of the above findings, lead to conclusion that The level of scrum usage in the Czech Republic and the world is no different. Further, that SCRUM and agile approach help software companies around the world to improve their work

## Conclusion

The use of SCRUM improves the communication among the team members and maximizes co-operation. A key factor in the success of such a managed project is the good management of sprints through everyday meetings (stand ups).

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<sup>15</sup> VersionOne, *12th annual state of agile report* [Online], 2018, Available at: <https://explore.versionone.com/state-of-agile/versionone-12th-annual-state-of-agile-report> [cited 2019-01-22].

The quality of these meetings is strongly influenced by the way and the visualization of the project. The successful management of individual Sprint is usually supported by physical or digital boards. The choice of using this tool depends on the possibilities of the development team, which generally going to the digital boards that usually are integrated into the complex Enterprise agile planning Tools.

Appropriate visualization helps to organize work of team by considering its preferences and special knowledge. From the Product Owner's and SCRUM Master's point of view it is most important that the software development process becomes visible, controllable, and manageable. All problems are immediately detected during Daily Scrum meetings and can be removed as soon as they emerge.

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# ECONOMIC EFFECTS OF THE INCREASE IN THE MINIMUM WAGE FOR THE POLISH ECONOMY

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## SUMMARY

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The paper presents the vectors of change in the minimum wage in Poland in 2009-2019 and the planned wage changes until 2024. During the study period, the minimum wage grew faster than the average wage in the enterprise sector and in the national economy. The share of the minimum wage in the average wage increased by almost 10 percentage points. In 2024, the minimum wage will exceed 60% of the average wage in the national economy and will reach the level of fair wage. The much faster increase in the minimum wage than in the average wage will not be without its impact on the state of the national economy. It can contribute to the growth of consumption and GDP as well as modernisation of the economy. At the same time, it may stimulate labour costs and inflation, leading to increased unemployment in regions with the lowest wages.

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## Introduction

The issue of the amount of the minimum wage is contentious in Poland. There are numerous arguments for and against the state setting the national minimum wage and the government increasing it systematically. The main premise for determining the minimum wage level is the need to determine the minimum requirements for entrepreneurs employing employees. A certain reasonable level of the minimum wage is a precondition for decent work and respect for the employee. The entrepreneur should generate enough added value to pay employees the lowest wage. Apart from employees, the added value is shared with the state budget, providers of capital and the company itself, so as to not only ensure simple reproduction of assets used but also generate such a value of the financial surplus that its retained earnings allow the company to grow.

Poland has a uniform monthly minimum wage for the entire country, and a uniform wage rate per hour of work. However, the purchasing power of such

wages varies widely across different sectors of the economy and different regions of the country. The paper presents changes in the minimum wage and the relationship between the minimum wage and the average wage in the enterprise sector and in the national economy. The main goal of the article is to present the economic effects of the rapid increase of the minimum wage and its share in average wages in the economy.

In calculating the relationship between the minimum wage and average wage in the enterprise sector and in the Polish economy in 2009-2019, the author used data from statistical yearbooks. In order to assess the effects of the increase in the minimum wage, the author used published estimates and her own analyses of the area under research.

### **Motivational function of pay**

The management of each company is tasked with effectively motivating employees, orienting this motivation to specific goals and maintaining this motivation. Motivation consists in a conscious and deliberate influence on people's behaviour by creating means and possibilities of realising their systems of values and expectations. Without a doubt, motivation is a kind of driving force that directs every person, triggers specific actions and makes the person undertake to perform tasks. People who start work are motivated to get a certain income to support themselves and their families. In the motivational process, it is important not only to stimulate people to act, but also to maintain an appropriate level of commitment to the work process. Employees must feel involved in what they do, they must identify with the company's goals. To achieve this, business entities should attach more and more importance to the motivational function.

Existing publications identify four major functions of remuneration<sup>1</sup>:

- income generating – remuneration is a source of income for staff and their family,
- cost generating – remuneration is a cost to the company and has a significant impact on the price of a product or service,
- motivational – remuneration can be used to direct employees' interests to activities expected by the employer and consistent with the company's goals,
- social – providing employees with at least a minimum wage and properly shaping payroll-related relationships in the company, as well as ensuring good relations between subordinates and managers which are conducive to effective work.

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<sup>1</sup> Borkowska S. (red), *Motywować skutecznie*, Instytut Pracy i Spraw Socjalnych, Warszawa 2004, pp. 49-50.

Reasonable remuneration is a factor that offers people a sense of job satisfaction and belonging to the company as well as the opportunity to develop and implement their aspirations and plans. However, attention should be paid to the need for a broader treatment of remuneration in the context of investment in human capital. Giving the employee pay is a kind of investment that requires outlays. The company expects that these outlays will bring certain profits within a specified period<sup>2</sup>.

Work motivation is underpinned by two basic factors: the need for material benefits and the need for job satisfaction. These factors are mutually complementary. Needless to say, remuneration is the basic tool for employees to obtain material benefits. Remuneration which is attuned to the effort contributed and appreciated by superiors should make the employee feel needed in the company. This aspect is relevant for stimulating employees' involvement in the implementation of their tasks and improving work efficiency.

From the point of view of human resources management, the main payroll functions according to S. Borkowska<sup>3</sup> include:

- attracting the right employees,
- retaining them in the organisation, i.e. preventing the outflow of competent and desirable employees,
- stimulating employees to achieve good results of their work,
- employee development – broadening the scope of their knowledge and skills, teaching them new kinds of behaviour e.g. related to the use of new technologies.

The role of the last of these functions is systematically gaining prominence due to the growing importance of knowledge and competences as key factors of building companies' and employees' competitive advantage. Increased competition in international markets especially that from multinational companies necessitates lifelong learning.

The most important and universal motivational tool addressed to all employees in the company is the base pay. The role of the base pay is to pay for work-related requirements (level of arduousness, qualification requirements, scope of responsibility)<sup>4</sup>. Companies should establish a clear and transparent remuneration system, which will be acceptable to employees, as this will create a sense of fairness. The base pay should be attuned to employees' position and

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<sup>2</sup> Listwan T. (ed.), *Zarządzanie kadrami*, C.H.Beck, Warszawa 2010, p. 188.

<sup>3</sup> Borkowska S., *Skuteczne strategie wynagrodzeń – tworzenie i zastosowanie*, Oficyna a Wolters Kluwer business, Warszawa 2011, p. 31.

<sup>4</sup> Tyrańska M., *Metodyczne aspekty analizy i oceny systemu motywacyjnego*, „Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie”, 2013, nr 915, pp. 23-41.

competences. If such remuneration is appropriate to the conditions of the labour market then companies can reach for non-pay methods of motivation.

Salary alone is not enough to rationally motivate employees. To achieve rational motivation, it is necessary to properly combine the right remuneration system with all the factors that increase motivation. These include tangible and intangible motivators. Non-pay motivators, on the one hand, strengthen the value of the incentivising effect of pay-related stimulators, and on the other, act autonomously and are particularly effective in relation to employees with highly developed social needs and the need for self-fulfilment<sup>5</sup>. These motivators can be divided into tangible and intangible. Their function is to strengthen pay-related motivation and make employees feel that their efforts are appreciated and rewarded in this way.

Non-pay material incentives include insurance schemes, retirement schemes, health care plans, co-financing of education, company car, laptop, mobile phone, co-financing of rest, gym passes and numerous other benefits. For these motivators to fulfil their motivational function they must be suited to the needs of employees. They should therefore ensure that employees meet their own needs by promoting health, ensuring financial security, ensuring job security, providing ways of socialising (corporate incentive events, picnics) and recognising achievements (to satisfy esteem needs). To this end, companies use prizes, gifts, souvenirs, praises, congratulations, medals, etc. Properly selected motivators should encourage employees to perform their tasks reliably, participate in the life of the company and behave in ways that meet its various needs<sup>6</sup>. Non-pay motivators shape employee awareness. In addition, they prompt employees to undertake more ambitious tasks, increase productivity and quality of work, extend the scope of their competences and abandon an attitude of passivity, procrastination and timidity.

### **Assessment of the planned increase in the minimum wage**

The minimum wage is a statutory minimum amount of remuneration that the employer is obliged to pay to the employee for work done. A salary below the minimum wage constitutes an infringement of employee rights. The minimum wage is the same for the whole country, and is an amount below which employers must not pay a full-time employee. The minimum wage is determined annually for the following year. By 15 June, the Council of Ministers sets the amount of the minimum wage for the following year acting on a recommendation of the Minister

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<sup>5</sup> Kopertyńska M., *Motywowanie pracowników. Teoria i praktyka*, Placet, Warszawa 2008, p. 199.

<sup>6</sup> Jachnis A., *Psychologia organizacji*, Difin Warszawa 2008, p. 66.

of Family, Labour and Social Policy. This amount is then proposed to the Social Dialogue Council. The above bodies agree the final amount of the minimum wage in the course of negotiations, among others, based on the inflation rate during the previous year and that planned for the next year, information on household spendings and information on the economic situation of the country, taking into account such factors as employment level, labour productivity, GDP growth, etc.

The minimum wage is the amount of the monthly remuneration paid and includes:

- base pay, which can be specified in terms of a monthly, hourly or piecework rate or as a performance-related commission,
- prizes and bonuses in accordance with the regulations, but only when paid as part of the remuneration rather than on the grounds of distinction,
- holiday pay,
- compensatory pay, which is disbursed on account of a reduction in pay arising from an accident in the workplace or an occupational disease.

Starting on 1 January 2019, the rules governing the calculation of the minimum wage were changed. The amount of the minimum wage cannot now include:

- benefits such as: seniority bonus, bonuses for functions performed or working conditions etc.
- jubilee bonuses,
- retirement bonuses or disability bonuses disbursed due to retirement or inability to work,
- remuneration and bonuses for overtime work,
- allowances, e.g. for washing clothes,
- holiday benefits and benefits that are financed from the company's social benefit fund.

Senior employees will benefit from the seniority bonus for night work and working conditions being outside the minimum wage. Under the previous arrangement, young employees earned almost the same as employees with longer work experience.

According to the Central Statistical Office (GUS) data for 2018, the number of employees in the national economy whose remuneration did not exceed the minimum wage amounted to 1.5 million people, or 13% of all persons employed on a contract of employment or 3.8% of all Poles (including children and pensioners)<sup>7</sup>. This ratio has remained unchanged since 2002.

Data in Table 1 show the share of minimum wage in the average monthly wage in the enterprise sector and in the national economy. In 2009-2019, the wage in the enterprise sector was 5.7% higher on average than the average wage in the

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<sup>7</sup> Podwysocki T., *Placa minimalna – FAQ*, [www.stat.gov.pl](http://www.stat.gov.pl) (28.11.2019).

national economy. The share of the minimum wage in the average wage in the national economy increased from 41.1% in 2009 to 45.6% in 2018. The minimum wage level of 2 600 PLN legislated for 2020 will be higher than in the previous year by as much as 15.6% and its share in the average wage in the national economy will increase from 45.6% to almost 50%. In 2024, the minimum wage is to be 4 000 PLN and its share in the average wage in the national economy will exceed 60%, which means that it will reach the level of fair pay. According to experts, fair pay should be at the level of 60% of the average wage in a given country. Fair pay is at the intersection of economic, cultural and social values. This is connected with the management philosophy adopted in the European Union, as well as with the values and the socio-political system promoted in the EU. However, Article 13 of the Polish Labour Code (Code 2018) on fair pay is so vague that it does not oblige companies to do anything but merely to comply with the minimum wage. In Poland, the commitment to implement the fair pay principle enshrined in the code is only implemented in relation to job positions of key importance – managers, specialists. For other positions, it is a left to be decided in the future<sup>8</sup>.

Table 1: Share of the minimum wage in the average monthly wage in Poland's enterprise sector and the national economy in 2009-2019.

Year	Minimum wage	Gross average wage in the enterprise sector	Share of the minimum wage in the average wage in the enterprise sector in %	Average monthly wage in the national economy in PLN	Share of the minimum wage in the average wage in the national economy in %
2009	1276	3325	38.4	3103	41.1
2010	1317	3435	38.3	3225	40.8
2011	1386	3605	38.4	3400	40.8
2012	1500	3728	40.2	3522	42.6
2013	1600	3837	41.7	3650	43.8
2014	1680	3980	42.2	3783	44.4
2015	1750	4121	42.4	3900	44.9
2016	1850	4277	43.2	4047	45.7
2017	2000	4530	44.1	4277	46.8
2018	2100	4852	43.3	4585	45.8
Q 3 2019	2250	5150	43.7	4932	45.6
2020*	2600	-	-	5237*	49.6*

\* 2020 forecast

Source: author's own calculations based on [www.wynagrodzenia.pl](http://www.wynagrodzenia.pl) and <https://wynagrodzenia.pl/gus/dane-roczne> (accessed 10.12.2019)

<sup>8</sup> Herman A., Oleksyn T., Stańczyk J., *Zarządzanie respektujące wartości – Raport z badań*, Difin, Warszawa 2016, p. 62.

Forecasts indicate that the average gross wage in the national economy in 2020 will be 6.2% higher than in 2019, while the minimum wage will increase by 15.6%. This will increase the share of the minimum wage in the average wage in the national economy to almost 50%. In 2020, the rate for one man-hour will also increase from PLN 14 to 17 PLN. The introduction of a minimum hourly rate contracts of mandate and contracts to perform a specific task has received positive reviews. It will increase the quality of services rendered in industries employing low-skilled employees. These include security and catering companies, as well as cleaning companies. However, setting a minimum hourly rate for contracts of mandate and self-employment work can have a negative impact on women's employment. Research shows the majority of workers who draw the lowest pay is female. Women are also more often employed on temporary contracts. However, this situation does not arise from discrimination on the grounds of gender – it arises from the structure of the labour market. Women with low qualifications are more likely to be paid minimum wage rates. Given that salaries will increase in the wake of the introduction of the minimum hourly rate, fewer people will receive a higher pay for their current work<sup>9</sup>.

Table 2: Comparison of the pace of changes in the minimum wage, average wage in the enterprise sector and in the national economy in 2009-2019 (%)

Year	Minimum wage	Increase in the minimum wage, in %	Increase in the average wage in the enterprise sector, in %	Increase in average wage in the national economy, in %
2009	1276	13.3	4.4	4.0
2010	1317	6.6	3.3	3.9
2011	1386	5.2	4.9	5.4
2012	1500	8.2	3.4	3.6
2013	1600	6.7	2.9	3.6
2014	1680	5.0	3.7	3.6
2015	1750	4.2	3.5	3.1
2016	1850	5.7	3.8	3.8
2017	2000	8.1	5.9	5.7
2018	2100	5.0	7.1	7.2
Q 3 2019	2250	7.1	6.1	7.6
2020	2600	15.6	-	6.2

Source: author's own calculations based on [www.wynagrodzenia.pl](http://www.wynagrodzenia.pl) (accessed 10.12.2019) and GUS data

<sup>9</sup> Kulisa B., Sierpińska M., *Kierunki zmian w obszarze płacy minimalnej oraz ich skutki*, /In:/ *Zarządzanie przedsiębiorstwem. Analiza współczesnych uwarunkowań, koncepcji i determinant*. Ed. by: R. Borowiecki, T. Rojek, Fundacja Uniwersytetu Ekonomicznego w Krakowie, Kraków 2016, p. 175.



In 2021, the minimum wage is expected to rise to 3 000. PLN, i.e. it is to be 15.4% higher than in 2020. In 2024, the minimum wage is forecast to reach 4 000 PLN, rising by 53.8% on 2019 to be three times higher than in 2010. Such a large increase in the minimum wage will not be without its impact on the national economy.

### **Effects of the increase in the minimum wage in the Polish economy**

Views on the effects of an increase in minimum wages in the economy differ. Attention is being drawn to both the good and bad effects of the increase. The effects can be considered from the macro- and microeconomic side. Wage increases can be a way to counteract a slowdown in economic growth. An increase in the minimum wage will increase consumer purchasing power, which contribute to GDP growth. This expected direction of changes is corroborated by social transfers from the 500+ programme. As a result of faster growth of wages than of the GDP, the share of wages in the GDP will increase, but this may lead to pressure on wages in the public administration and a burden on the state budget with additional fixed costs. This, in turn, will entail an increase in the budget deficit and the need to issue government bonds to cover it. The emergence of a larger pool of risk-free government bonds on the debt market will make investors less likely to buy risky corporate bonds. This, in turn, will squeeze companies out of the debt market, which will limit their inflow of investment financing and may thus slow down the country's economic growth.

A surge in the minimum wage entails an increase in costs for employers in both the private and public sectors (Table 3). In 2023, trade costs will increase by more than 10%, with an 8.4% increase in the area of industrial production. It should be added, however, that market conditions favouring employees mean that many companies, e.g. large retail chains, must increase their salaries to even find people willing to work in them. Under such conditions, the wage pressure is enormous. In retail chains in 2018, the average wage exceeded 3 000 PLN gross. Large retail chains were forced to raise wages to retain existing employees and recruit new ones. Significant salary increases were also made in the construction industry. They were necessitated by the need to meet the deadlines for the performance of contracts and avoid contractual penalties, and the lack of employees to perform simple work. In large construction companies, wages are much higher than the minimum wage. However, employees of small subcontractors are paid low wages.

An increase in the salaries of employees paid the minimum wage will result in a flattening of salaries and demands from employees in senior positions for an increase in their pay. Therefore, labour costs in business entities will increase.

Employers can pass on part of the rising labour costs to consumers. Rising prices of consumer goods and services can send inflation up. However, it should be remembered that the increase in product prices may be slowed down by international competition and the fact that entities operate within the EU market and WHO. However, the increase in prices of local services will not be stalled by these factors to the same extent as an increase in the prices of consumer goods. If the increase is not passed on to product prices, company profits will fall. This will be the price to be paid for the health and contentment of society, not just healthy individuals. The increase in the minimum wage gives the weakest earners a lasting financial security, which directly translates into people's psychological well-being<sup>10</sup>.

Table 3: Increase in operating costs of business entities caused by increasing minimum wage

Item	Number of people drawing the minimum wage in 1 000s	Total cost to employers in billion PLN		Increase in costs in 2023 compared to 2019, in %
		2019	2023	
Trade	406	13.2	23.5	+10.3
Industrial production	331	10.8	19.1	+8.4
Construction	216	7.0	12.5	+5.5
Security and cleaning services	110	3.6	6.4	+2.9
Transport, storage	106	3.4	6.1	+2.7
Other	350	11.4	20.2	+8.9
Total	1520	49.0	87.9	+38.9

Source: *Koszty wzrostu płacy minimalnej poniosą pracodawcy*. „Rzeczpospolita”, 2019, no. 211 of 10 September 2019, p. A1.

The increase in the minimum wage will result in an increase in benefits for which the minimum wage is the calculation basis, which will add another burden upon the costs of enterprises arising from severance payments, compensation, pension contributions and other mandatory components of labour costs (Table 4). Higher pay and higher inflation also mean increased revenue for the social security system (ZUS), the national health care system (NFZ) and the state budget as it benefits from increased VAT.

The increase in the minimum wage will force business entities to abandon their policy of grounding their activities in cheap labour. Investments in new machines, automation and robotisation will contribute to the increase in labour productivity. So modernised, the economy will ensure higher pay for a qualified workforce. Currently, many university graduates are forced to pursue simple jobs that do not require special qualifications or to look for a job abroad. Some

<sup>10</sup> Szahaj A., *Kapitalizm wyczerpania*, Książka i Prasa, Warszawa 2019, p. 78

economists say, however, that higher pay will cause companies to face a lack of funds to implement new investment projects. Still, entrepreneurs will be forced to replace the ever more expensive labour force with machines and algorithms that replace people in performing simple, repetitive tasks. For example, in the security industry, after the introduction of the hourly minimum wage, thousands of janitors in buildings will be replaced by monitoring systems. It should be added that the impact of pay increases on investments may vary regionally. In large cities, in the conditions of a labour market favourable to the employees, the processes of replacing the employee with machines may be faster than in small cities and towns where micro firms dominate. If companies increase the scope of business processes automation, it may affect the labour market as employment falls, which will be beneficial for the economy, as labour resources are predicted to shrink in the face of the already manifest decline in the birth rate. The influx of labour from abroad may alleviate this problem, but such workers are usually low-skilled, which in the conditions of continuing computerisation and robotisation will not have a beneficial effect.

Table 4: Effects of increase in the minimum wage

Description	2020	2021	2024
Planned amount of minimum wage	2 600 PLN	3 000 PLN	4 000 PLN
Maximum severance pay upon dismissal	39 000 PLN	45 000 PLN	60 000 PLN
Minimum amount of compensation for discrimination or mobbing	2 600 PLN	3 000 PLN	4 000 PLN
Maximum amount of training benefit for a person dismissed from work	5 200 PLN	6 000 PLN	8 000 PLN
Amount of allowance for night work	3.10 PLN	3.57 PLN	4.76 PLN
Maximum basis for calculating contributions to pension and disability pension funds for people on full-time parental leave	2 600 PLN	3 000 PLN	4 000 PLN
Maximum basis for calculating contributions to pension and disability pension funds for people on part-time contracts upon their taking parental leave	1 950 PLN	2 250 PLN	3 000 PLN
Basis for calculating contributions from entrepreneurs claiming preferential rates of ZUS contributions	780 PLN	900 PLN	1200 PLN
Preferential retirement insurance contribution	152.26 PLN	175.68 PLN	234.24 PLN
Preferential disability insurance contribution o	62.40 PLN	72.00 PLN	96.00 PLN
Preferential sickness insurance contribution	19.11 PLN	22.05 PLN	29.40 PLN
Preferential accident insurance contribution (at 1.67 % interest rate)	13.03 PLN	15.03 PLN	20.04 PLN

Source: Guza Ł., *Wyższa pensja podniesie też dodatki i składki*, Dziennik Gazeta Prawna, no. 175 of 10 September 2019, p. A4.

An increase in the minimum wage can have a positive impact on the labour market. Pay is the basic factor with which to limit professional inactivity and promote the pursuit of a better paid job. Higher pay will therefore encourage professionally inactive people to take up work, at the same time contributing to

an increase in professional activity among women. It should be noted that a high minimum wage can make it difficult for inexperienced people, people with low qualifications or those who live in regions with low pay to take a job. A high level of pay does not allow entrepreneurs to generate sufficiently high added value to make it profitable to run a business and hire employees. The way out of this situation for entrepreneurs may involve going into the shadow economy or hiring part-time employees in order not to raise the pay.

The impact of the minimum wage on the level of unemployment raises the most questions. Critics of the increase argue that a high minimum wage growth will increase unemployment in low-wage areas. Some jobs for low-skilled workers will disappear from the labour market altogether. Some of the workers will remain unemployed because they do not have the qualifications needed to get a better paid job, others will find work in the shadow economy and usually a small part will find other employment on the labour market. Entrepreneurs in the shadow economy will accept the minimum wage, but their competitive edge on the market will improve because they do not pay taxes to the state revenue. Entrepreneurs who will try to pass this increase in the minimum wage on to product prices will lose. Products manufactured in the shadow economy will be more competitively priced. A higher minimum wage may contribute to the elimination of some of the lowest-paid jobs<sup>11</sup>.

World Bank experts have made similar observations on how an increase in the minimum wage impacts unemployment. They state that the impact of the increase in the minimum wage on the level of employment is higher in vulnerable groups, among young people entering the labour market and in economically underdeveloped regions of the country. According to the World Bank, the minimum wage at around 40% of the national average does not carry much risk, but above this level, the risk of negative impacts on employment increases, especially in times of an economic slowdown. The group at risk consists primarily of people who earned less before the increase in the minimum wage to 50% of the national average – currently that involves around 22% of employees. The impact of a rising minimum wage on employment, however, depends on many factors<sup>12</sup>.

In Poland, these factors involve primarily the economic situation in EU countries, especially in Germany, as the volume of demand and the level of export depend on the situation in these markets. Demand for products from both the

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<sup>11</sup> Rozwadowska A., *Wyższa płaca minimalna bez wpływu na poziom bezrobocia?* <http://wyborcza.biz/biznes/1,147666,20209441,wyzsza-placa-minimalna-bez-wplywu-na-wzrost-bezrobocia.html#ixzz4D0XoRaRs> (23.11.2018).

<sup>12</sup> Ibidem.

domestic market and foreign markets affects the volume of investment and the creation of new jobs. Other factors include flexibility of the labour market, level of unemployment benefits, amount of taxes, legal stability and ways of stimulating the unemployed.

According to World Bank experts, a rise in the minimum wage can reduce poverty only marginally because poverty affects primarily the unemployed – around 60% of poverty-stricken people do not work. The remaining 40 percent (working poor) are primarily self-employed. They are on average three times more exposed to poverty than employees. The poverty-stricken group also includes high earners who are the only breadwinners. These are mostly men from families with many children, in which women look after children. The key to solving the poverty problem seems to lie in an increase in women's economic activity rather than the rapid increase in the minimum wage.

## Conclusion

To sum up, it should be emphasised that determining a rational level of the minimum wage is a challenging issue. Policy makers must make decisions on the minimum wage taking into account the pros and cons of a rise in the minimum wage. Too low a level of the minimum wage will cause it to have a demotivating character, which, in some regions of Poland, will not encourage people to take up work. An excessive minimum wage will result in a reduction in wage disparities among employees, but will not increase the motivational value of pay for various groups of employees whose pay will approach the minimum wage. Hence, the negative economic effects of an excessive increase in the minimum wage may outweigh the benefits.

The introduction of a guaranteed minimum hourly pay for employees working on civil law contracts seems to be justified. However, it may give rise to the risk that civil law contracts will be replaced by civil contracts, and contracts of mandate will be replaced by contracts to perform a specific task for which it is difficult to determine the number of hours worked. Enforcing a minimum rate for civil law contracts may violate the principle of free choice of contract type. In addition, it may inflate the shadow economy, which undermines economic competitiveness.

In 2009-2020, the increase in the minimum wage exceeded the increase in the average wage, which led to an increase in the share of the minimum wage in the average wage from 41.3 to 49.7%. In 2019-2024, the minimum wage is to increase by over 50.0% putting it in excess of 60% of the average pay, which, according to international estimates, means that the minimum wage in Poland will reach the level of fair pay. This will not be without its economic impact. An

increase in labour costs may send prices up, especially those of local services and boost inflation. At the same time, revenues to the state budget, ZUS and NFZ may increase. The rapid increase in the minimum wage will also have an impact on the labour market. It can lead to a loss of jobs in regions with the lowest pay, but it can also force entrepreneurs to modernise the economy and replace the workforce with modern technologies and machinery.

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# NETTING AS A SETTLEMENT TOOL IN INTERNATIONAL ENTERPRISES\*

## Summary

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The chapter highlights the problem of the international clearing process among internationalized enterprises. The author briefly presents basic forms of international settlements. There is emphasis on an increasingly popular tool supporting international settlements – netting. There are presented advantages as well as disadvantages of the multilateral offsetting process. The aim of this study is to identify financial savings in international settlements resulting from the use of netting solution and to assess the influence of multilateral setoff within a capital group on mitigating the mutual financial risk in international settlements. Multilateral Setoff Analysis and Financial Results Simulation methods have been in this study.

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## Introduction

Internationalization is nowadays a common or even quite natural phenomenon for enterprises. It has become one of the main driving forces of the geographical expansion of business operations. Foreign and even global growth is now an integral part of the economic system of countries. In order to achieve success and become a leader in their respective industries, companies must open up to new markets and adapt to changes governing a dynamic environment. Individual markets differ not only in terms of economic conditions, but also in terms of legal and geographical conditions, and oftentimes offer to foreign investors more favourable conditions than those existing in the local market.

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Internationalization presents many advantages, nevertheless, functioning on the global market is a big challenge for enterprises and poses many obstacles. Amongst them are complicated and expensive international settlements. However, financial institutions which deal with creating instruments and tools aimed at supporting complex transactions are in place. One of the solutions gaining global popularity is netting – a tool supporting international settlements for enterprises, consisting of mutual setoff of liabilities and receivables between business entities.

### International settlements

International settlements are a natural effect of the evolution of commercial transactions. Along with the development of an enterprise, there occurs a possibility of cooperation with enterprises operating in various parts of the world. Hence, a need arises to conduct various forms of settlements, depending on their specificity. Such types of undertakings used to carry some risk, and their coordination was initially much more difficult. At present, however, banks, taking advantage of their many years' worth of expertise, have managed to develop numerous mechanisms and instruments allowing for maximum reduction of risks resulting from such transactions.

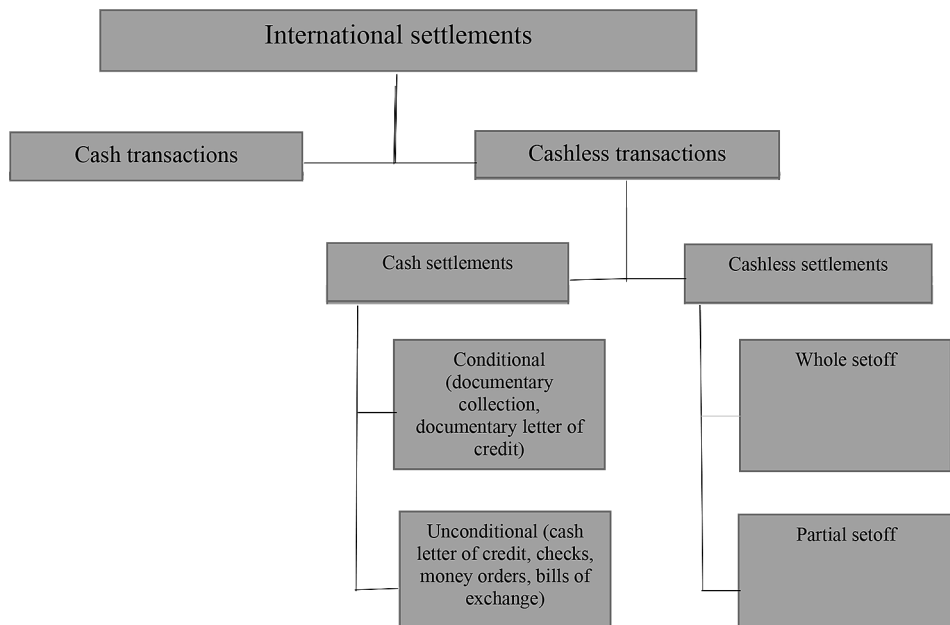


Figure 1: Forms of international settlements

Source: own study on the basis of Grzywacz J., *Financial settlements of enterprises in foreign trade*, Wydawnictwo Difin, Warsaw 2003, p. 15

Along with growing internationalization, many payment methods have been developed, which limit the possibility of mutual risk otherwise present in international transactions. Generally, cross-border transactions may be performed in a cash (foreign currency) or cashless (non-foreign currency) manner, as shown in Figure 1.

### Characteristics and types of netting

Netting is based on offsetting mutual receivables and liabilities, which are expressed both in the same or, most often, in different currencies, in order to minimize the number of transactions exposed to an exchange rate risk. The purpose of applying netting is therefore to manage currency positions in such manner to derive the lowest number of transactions. The method is intended chiefly for large enterprises and capital groups which perform numerous international transactions in different currencies. Thanks to this method of settlement, the exchange rate risk of transactions as well as transaction costs are reduced due to the smaller number of actually performed transfers<sup>1</sup>.

Netting is not regulated in any manner by banking or tax law. The provisions of the Polish Civil Code solely describes the netting mechanism, explaining that at the time when two entities are both debtors and creditors towards each other, each party may deduct its own receivables from the receivables of the other entity<sup>2</sup>. However, the law does not specify the number of entities between which such receivables may be offset. The basis for the classification of netting is the number of entities participating therein.

The literature puts forward a division of mutual setoff into bilateral netting consisting of concluding an agreement between two entities belonging to the same capital group, and multilateral netting<sup>3</sup>, which involves the participation of at least three entities in the settlement process.

In the process of bilateral netting, entities offset mutually open currency positions, while settling the unsettled portion in the form of payment. Transactions between two entities are often performed without the participation of a settlement centre<sup>4</sup>. Such type of setoff may occur in two variants – both entities have the same base currency or have different currencies, as shown in Figure 2.

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<sup>1</sup> Kosztowniak A., Misztal P., Pszczółka I., Szelągowska A., *Finance and international settlements*, C.H.Beck Publishing House, Warsaw 2009, p. 300

<sup>2</sup> The Polish Civil Code of 23 April 1964, the Official Journal of Laws no 16, item 93, as further amended, Art. 498 annotation no 50

<sup>3</sup> Sierpińska M., *The role of offsetting in settlement of receivables of enterprises*, The Polish National Conference Materials, Legnica 11.09.2001, Volume I, Legnica 2001, p. 36

<sup>4</sup> Kosztowniak A., *Finance...*, *ibid.*, p. 301

The above figure shows the simplest possible netting settlement. The enterprise no 1 has an invoice payable to the enterprise no 2 for the amount of USD 200, while the company no 2 has liabilities towards the enterprise no 1 for the amount of USD 300, therefore, in the place of transfers, only one transfer will be made for the amount equalling the difference in liabilities between enterprises<sup>5</sup>.

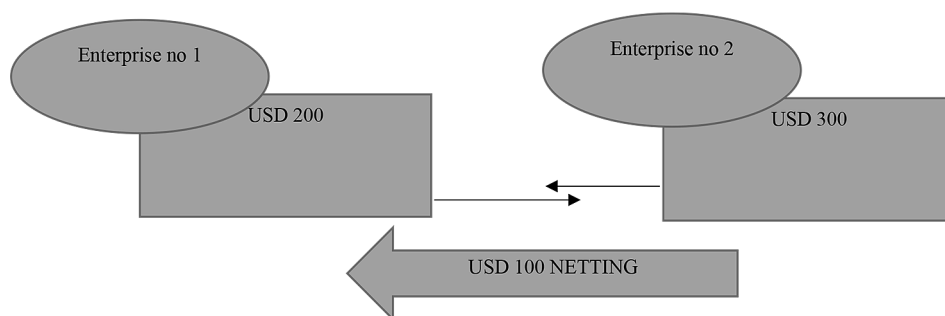


Figure 2: Bilateral netting – the same base currency for both entities

Source: own study

In the above situation (Fig. 3), liabilities between entities are expressed in different currencies. For the purposes of settlement, entities determine the base currency – in this case, PLN.

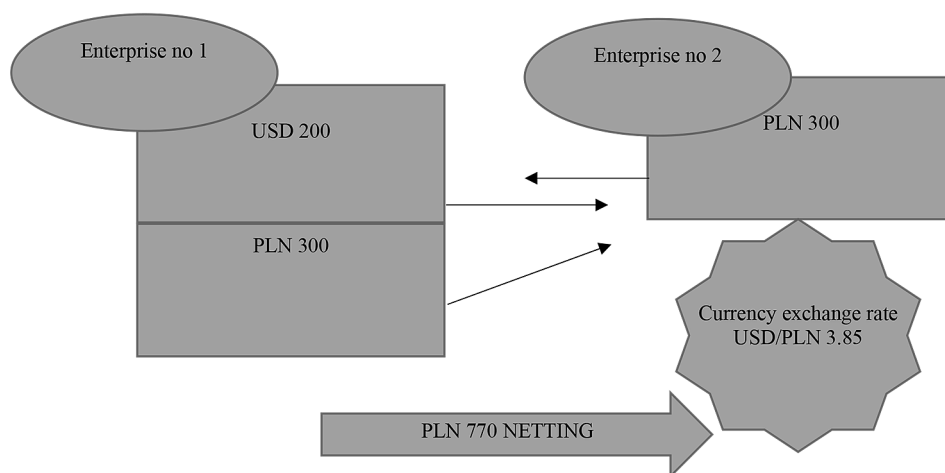


Figure 3: Bilateral netting – the different currencies in enterprises

Source: own study

<sup>5</sup> The nature and types of offsetting trade receivables and liabilities, [http://www.polmoney.pl/tematy\\_glowne/edukacja/kompensaty/kompensaty.html](http://www.polmoney.pl/tematy_glowne/edukacja/kompensaty/kompensaty.html) (accessed on 29 Nov 2019)

To enterprise no 1 will be required to convert USD to PLN at a fixed exchange rate and to settle its liabilities on the basis of offsetting mutual obligations, as in the previous situation<sup>6</sup>.

Multilateral netting is a significantly more advanced tool; nevertheless, it is used on a large scale in the market of international settlements between global enterprises. The development of technology have both allowed us to take full advantage of all benefits of netting, during the last decade. This type of settlement greatly supports international enterprises in reaping numerous financial benefits and significantly simplifies the management of cash assets within and between capital groups<sup>7</sup>.

Multilateral netting consists in managing international payments in such manner so as to determine net positions in the base currency for each entity of the capital group which participates in this process. Any transactions occurring between companies are carried out without external payment systems<sup>8</sup>, and therefore may be performed in one currency; the most common case is, however, when entities, due to the fact that they belong to an international company, use multiple currencies. The maximum number of participants in multilateral netting is not limited in any way<sup>9</sup>.

The concept of multilateral setoff is shown in the figure below, which presents a network of transfers performed by entities of one capital group across the whole world. The figure presents money transfers performed between members of a capital group, arising from mutual obligations resulting from internal economic cooperation. Each entity expects that the liabilities be paid in the local currency thereof or in such currency as is applied in its bank account. Therefore, a Swedish company, which uses Swedish kronas on a daily basis, will have to buy euros, British pounds, and US dollars in order to pay its obligations. Each company presented in the picture will need to follow suit. This generates a great number of transactions and transaction costs. In order to reduce transactions and achieve economies of scale on the currency sale and purchase, the process may be centralized and multilateral netting may be applied.

The below figure presents the same network between units of a capital group, but with the use of multilateral netting. Applied here was the Netting Centre tool, the task of which is to perform settlements between entities.

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<sup>6</sup> Ibidem

<sup>7</sup> Szumielewicz W., *Cash management in capital groups*, Wydawnictwo Difin, Warsaw 2009, p. 89

<sup>8</sup> *Fundamentals of multilateral netting*, The Treasurer, October 2005, p. 50

<sup>9</sup> *The Benefits of Intercompany Netting*, <http://www.coprocess.com/what-is-intercompany-netting.html>, (accessed on 01 Dec 2019)

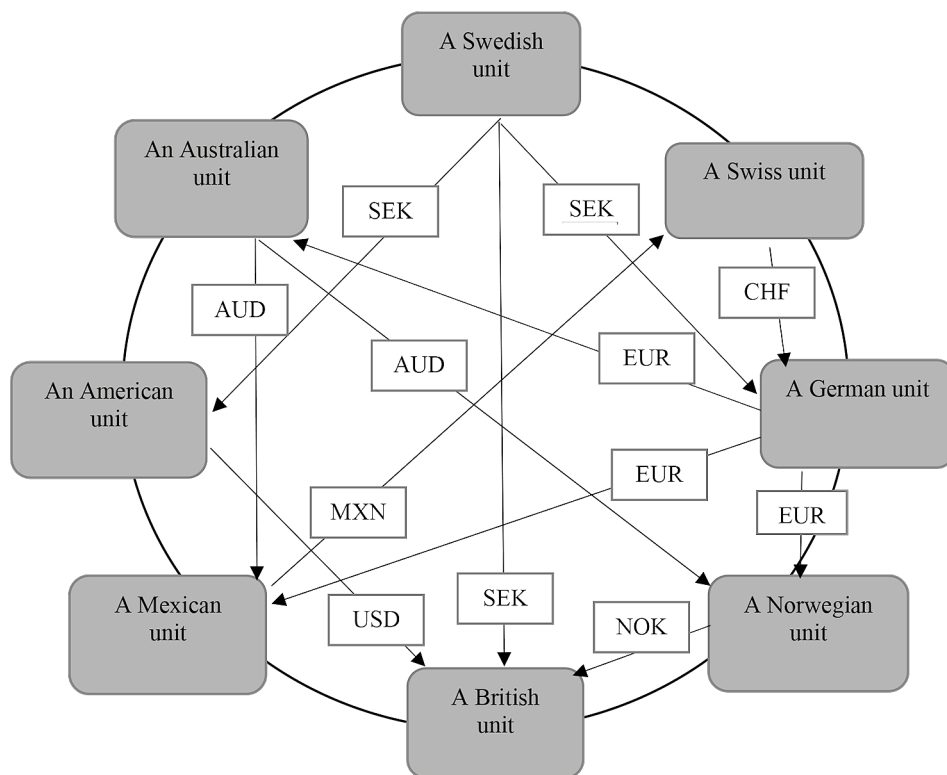


Figure 4: Intra-group financial transfers prior to the use of netting

Source: own study

The tool has a predefined base currency. Thanks to the use of netting, liabilities and receivables are not settled separately, but the net amount of all transactions is settled as an aggregate. In this case, liabilities and receivables of the Swedish company will be added and then converted into the base currency of the netting centre. In this way, the netting centre converts all invoices between units into the base currency in order to charge liabilities to the entities or to transfer funds, calculated according to the equivalent of the national currency<sup>10</sup>.

Currently, the most common tool used in business practice is multilateral netting, as in the case of numerous entities within one capital group it proves to be a much more practical solution, due to transaction costs charged at each transfer.

<sup>10</sup> Ziolkowska E., *Characteristics of selected cash management techniques as part of diversifying business entities – netting and cash pooling*, Management and Finance College, Scientific Journal No 128, SGH Warsaw School of Economics, Oficyna Wydawnicza, Warsaw 2013, p. 135

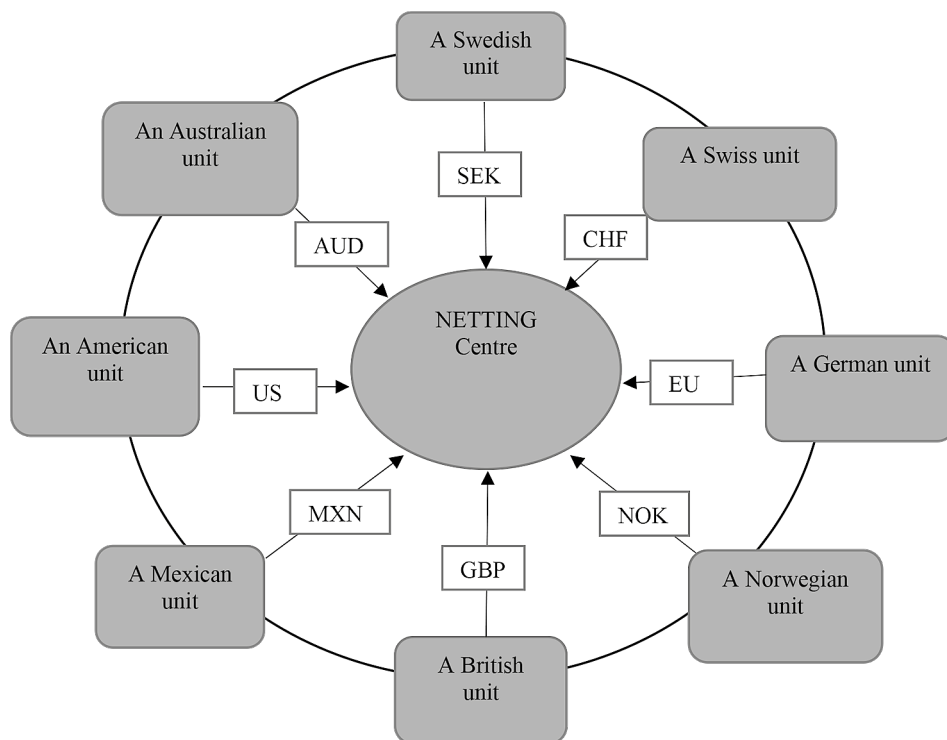


Figure 5: Intra-group financial transfers after the use of netting

Source: own study

### Advantages and disadvantages of multilateral setoff as a tool for international settlements

Capital groups are a special creation of the economy as, on the one hand, they are exposed to global risk on a daily basis while being able to derive huge benefits therefrom. In order to enable free operation of groups on the global market, they must smoothly adapt to dynamic changes and implement tools aimed at reducing global risk. One such solution is the said netting. Multilateral setoff generates numerous benefits for the company, however, similarly to any tool on the market, it also presents some drawbacks.

Present on the market are companies which enable support for all multilateral setoff through special platforms. This greatly facilitates the entire process, with companies adjusting appropriate parameters to the requirements of a capital company. The main advantages of netting include:

- Decrease in volume of the company's transfers
- Decrease in transaction costs of performed transfers

- Concentration of payments and decrease in the number of involved banks, and hence the decrease or elimination of cross-border flows at the company level
- Decrease in the currency risk and costs of currency conversion
- Decrease in additional bank fees
- Structuring the payment system in a company
- Introducing a fixed settlement time frame in a company, which helps to introduce discipline in internal settlement of units
- Simplification of the company's settlement system, thus allowing for easier preparation of financial flow forecasts
- Easy invoice administration
- Improved communication between units
- Decrease in interaction of a unit with banks
- Facilitation for company accountants – easy accounting of netting transactions, streamlining the work of the entire financial department
- Decrease in the number of currency accounts of units; it is enough to create an account for a netting centre<sup>11</sup>.

Additionally, thanks to netting management platforms, the entire process is tailored to the needs of a company. External transactions are processed in a uniform manner, and trade contracts with banks are systematized. Enterprises make their own decision as to the frequency of the netting cycle and any additional tools they may also need<sup>12</sup>.

The key and most significant advantage of netting is savings for the company; the table below presents possible savings.

Table 1: An example of companies' savings obtained through netting

COMPANY	Number of units	Number of currencies	Monthly number of invoices	Monthly gross income	Annual savings
Company A	352	24	43 000	USD 320M	USD 3.7M
Company B	100	22	2 700	USD 60M	USD 1.2M
Company C	40	13	26 000	USD 25M	USD 0.8M
Company D	12	3	800	USD 6M	USD 0.24M

Source: own study on the basis of <http://www.coprocess.com/what-is-intercompany-netting/the-benefits.html> (accessed on 01 Dec 2019)

<sup>11</sup> *What is multilateral netting: and why you can't go another day without it*, <http://www.bellin.com/treasury-matters/what-multilateral-netting>, (accessed on 01 Dec 2019)

<sup>12</sup> *Intercompany netting – who can benefit?* [Http://www.coprocess.com/what-is-itercompany-netting/who-can-benefit.html](http://www.coprocess.com/what-is-itercompany-netting/who-can-benefit.html) (accessed on 01 Dec 2019)

## Conclusion

Globalization and dynamic development of the financial market require enterprises to seek ever newer and more effective solutions. A tool for international settlements such as mutual setoff is gaining popularity among internationalized enterprises since netting is definitely a convenient tool supporting the process of settling international payments. The key advantage of the entire netting process is undoubtedly significant savings and, although the process still presents obstacles and threats, year on year, mutual setoff is increasingly used in international enterprises. An important element of netting implementation is good preparation of a company, as well as the use of expertise of other entities, which have been successfully using netting.

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# INNOVATIVE ACTIVITY OF COMPANIES IN POLAND WITH PARTICULAR EMPHASIS ON THE REAL ESTATE MARKET

## SUMMARY

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The objective of the paper is to analyse the statistical data concerning the innovation of companies in Poland, their innovative activity. The types of innovations and activity of entrepreneurs were characterised depending on the type of innovation introduced or implemented. The article also attempts to describe innovations on the real estate market and characterizes programs supporting pro-ecological activities in building engineering. The paper was drawn up with application of data from the Statistics Poland and the Ministry of Development.

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## Introduction

In the last decade due to the obtained support, numerous public research funding streams and innovation policy conducted by the country and the European Union, it is possible to observe the development of companies in Poland which contributes to their innovative activity. A great number of companies was established and developed due to programmes under the EU cohesion policy, for example such as start-up grants and grants for business development<sup>1</sup>. The state, taking into account the important role played by companies in the economy, pursues the innovation policy creating favourable conditions for the development of innovative companies and puts emphasis on the implementation of new concepts, solutions, actions, ideas, which influence the introduction of innovations to the market.

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<sup>1</sup> *Operational Programme Innovative Economy, 2007-2013, National Strategic Reference Framework 2007-2013, Rural Development Programme 2007-2013, Infrastructure and Environment Operational Programme and regional programmes.*

For the purposes of the paper, the analysis of statistical data and publications of the Statistics Poland and the Ministry of Development was carried out in order to assess the innovative position of companies in Poland and attempt to determine the innovation development level of companies in Poland between 2010 and 2018.

## Innovation of companies in Poland

The innovations are one of the most important factors determining economic success, which contributes to the implementation of technical or technological innovations in the economic sphere. They can be considered as a driving factor of the economy. It is worth noting that innovations among companies can also be of imitative nature, i.e. aimed at introducing innovations to the company through the product, technique, method, already introduced by someone else, but are innovations for this particular company<sup>2</sup>. The main objective of implementation of innovation is the improvement of situation in the scope of the company's operations, including the strengthening of market position and reduction of operating costs<sup>3</sup>.

In the secondary sources, the innovations are perceived very broadly. According to the approach represented, inter alia, by J.A. Allen, Ph. Kotler, P. Drucker and E.M. Rogers, the innovation:<sup>4</sup>

- is the introduction of new products, processes or practices, production methods into wide use,
- is an idea, practice or object that is perceived as new by a given person or company,
- permeates all areas of a company's operations, so it can include changes in product design, price offered, service, marketing methods, or changes in organizations and management methods,
- refers to any good, service or idea that is perceived by someone as new, whereas the idea can exist for a long time but is an innovation for the person or company.

The dominant approach to innovation of the enterprise is to focus on the selected type of innovation, for example: process, technological, product,

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<sup>2</sup> Matusiak K. B., *Innovations and transfer of technologies – dictionary of terms*, PARP, Warsaw 2011, pp. 111-112. Oslo Manual, *Rules of collecting and interpreting data regarding innovations – third issue*, OECD and Eurostat 2005, pp. 19, 48-50.

<sup>3</sup> Pilarczyk B., *Innovations in marketing communication*, Scientific Papers no. 9, Polish Economic Society, Cracow 2011, p. 271.

<sup>4</sup> Jasiński, A., *Innovations and transfer of technology in the transformation process*, Difin sp. z o. o., Warsaw 2006, p. 9, Drucker, P., *Innovation and entrepreneurship. Practice and rules*, PWE, Warsaw 1992, p. 39, Howaniec, H., Okrzesik, O., *Cooperation between science and business*, Bielsko-Biała 2015, Academy of Technology and Humanities Press, p. 70.

marketing and organizational innovation.<sup>5</sup> The main objective of implementing innovation is to achieve an improvement of situation in the scope of the company's functioning.

Taking into account the type of implemented innovations among thriving companies – in total, the product innovations were introduced in 42.2% of companies in 2011-2013 (27.2% of industrial enterprises and 15% in service enterprises), and in 2016 – 37.8% of companies; the process innovations – 52.1% of companies – 2011 – 2013 (30.8% of industrial enterprises and 21.2% of service enterprises), and in 2016 – 32.7% of companies. The organisational innovations were at the level of 36.1 % of companies in 2011-2013 (18% in industrial enterprises and 18.1% in service enterprises), and in 2016 in 8% of companies; while marketing innovations were implemented in 33.8% of companies in 2011 – 2018. (16.3% of service enterprises and in 17.5% of enterprises from service sector), and in 2016 in 15.5% of companies – Figure 1.<sup>6</sup>

According to data, the process innovations were introduced the most frequently in companies in 2011-2013, whereas in 2016 – these were product innovations. Among process innovations of industrial enterprises, the new methods of manufacturing products and services were the most often implemented, followed by new or significantly improved methods supporting processes in the company and modified methods in the field of logistics and distribution, and in service enterprises, the methods supporting processes in the company were the most frequently introduced. In the scope of product innovation the new or significantly improved products or services<sup>7</sup> were introduced in the companies. We observe more effective implementation of development plans among companies, leading to a slow but significant increase in innovation.

The important factor influencing the implementation of innovations in the examined companies in 2016 was customer expectations (73.3%), forcing to changes and adaptations on the market. The approach to the perception of innovation changes and internal regulations in companies (company missions)-46.7%, ideas, inspirations, ideas of the management and employees – 37% are taken into account. A significantly smaller impact on the implementation of innovations is caused by the threat to the company's position on the market –

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<sup>5</sup> *A strategy for responsible development by 2020 (with perspective to 2030)*. Ministry of Development: Warsaw 2017. *Smart Industry Poland 2017. Adaptation of innovations in the activity of micro and small and medium-sized manufacturing enterprises in Poland Research report*, Ministry of Development / Siemens Sp. z o. o. Warsaw 2017, pp. 28- 36.

<sup>6</sup> Statistics Poland, *Statistical Pocketbook...*, op. cit. pp. 302-303; Statistics Poland in Szczecin, *Research activity...*, op. cit. p. 4. *Smart Industry Poland 2017*, op. cit., p. 21.

<sup>7</sup> *Ibidem*, pp. 4-5. Okrześik O., *Innovation of small and medium-sized enterprises in Poland. /In:/ Knowledge management and innovation in organisation*, University of Bielsko-Biala, Bielsko-Biala 2015, pp. 68-69.

21.5% and the possibility to obtain development subsidies – 16.3%.<sup>8</sup> These factors help us to approach the concept of innovation more broadly.

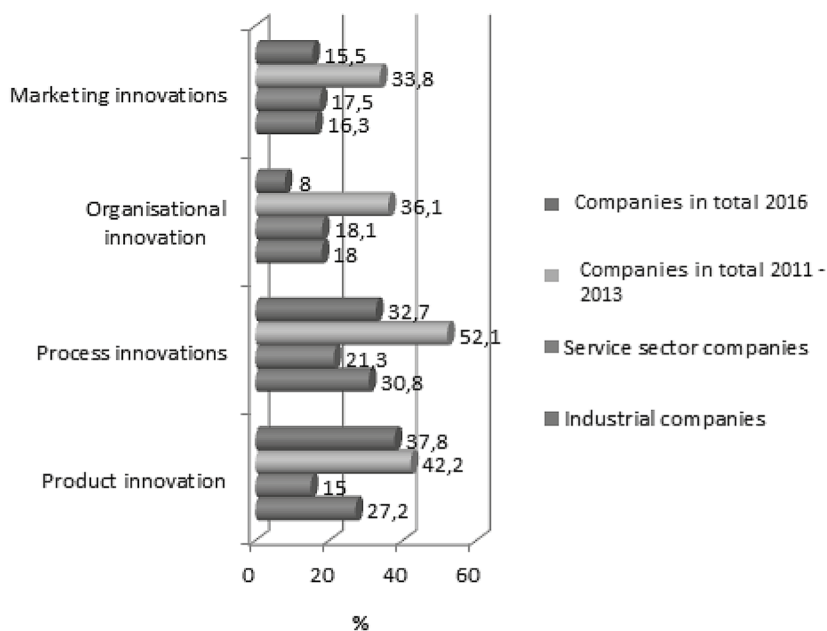


Figure 1: Innovations introduced to the market by companies in 2011-2016

Source: Own elaboration based on: Statistics Poland, *Innovative Activity in Poland*, op. cit., p. 4. Smart Industry Poland 2017, op. cit. p. 28



Figure 2: Factors influencing the implementation of innovations in the company

Source: Own elaboration based on *Smart Industry Poland 2017*, op. cit. p. 28

<sup>8</sup> *Smart Industry Poland 2017*, op. cit., p. 34.

The innovations stimulate the growth of production capacity of companies due to effective and creative use of potential of available resources / products. At the same time they stimulate the development and competitiveness of enterprises. In order to fulfil the customers' expectations, the companies look for solutions to reduce business risks and at the same time improve their market position. Due to the increasing access to and use of modern technologies, the entrepreneurs introduce innovative solutions in various areas of their business activity.<sup>9</sup>

## Innovative activity of companies in Poland

In the industry statements, the innovation in a company is the most often determined by the number of implemented innovations, which affect all sectors of the economy.<sup>10</sup> Meanwhile, innovative activities are all activities of scientific, financial, technical, organisational, and commercial nature that have the intention or lead to the implementation of new or significantly improved products or processes. This activity can be carried out by the company itself within its own area (internal regulations of the company) or can rely on the acquisition of goods, services, including consulting services or knowledge from external sources.<sup>11</sup>

The companies open up to innovations and are more willing to engage in innovative activities. They implement various types of innovations in their concepts, activities, organisational methods, product or production process improvement in order to increase their competitiveness in a given region or country. According to the data prepared by the Statistics Poland in the years 2011-2016 and the Ministry of Development in the period between 2011 and 2013, 31.2% of Polish companies implemented innovative activities (29.5% in the years 2006-2008). In 2016-2018, however, 47.1% of companies have already taken innovative activities (Figure 3).<sup>12</sup>

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<sup>9</sup> *Smart Industry Poland 2017*. op. cit., p. 13.

<sup>10</sup> Camision-Zornoza C., Lapidra-Alcami R., Segarra-Cipres M., Boronat-Nawarro M., *A meta-analysis of innovation and organizational size*, "Organization Studies", 2004, 25(3), pp. 331-360.

<sup>11</sup> Matusiak K. (ed.), *Innovation and technology transfer. Dictionary of Terms*, PARP, Warsaw 2005, pp. 37-38, Okrzesik O., *Barriers of cooperation of Polish enterprises from the SME sector and business environment institutions. /In:/ Management in the process of economic development – economic, financial and environmental issues*, AGH University of Science and Technology, Cracow 2015. Oslo Manual pp. 19, 48-50.

<sup>12</sup> Statistics Poland, *Innovative Activity in Poland*, op. cit., p. 4. *Smart Industry Poland 2017*, op. cit. pp. 28-36.

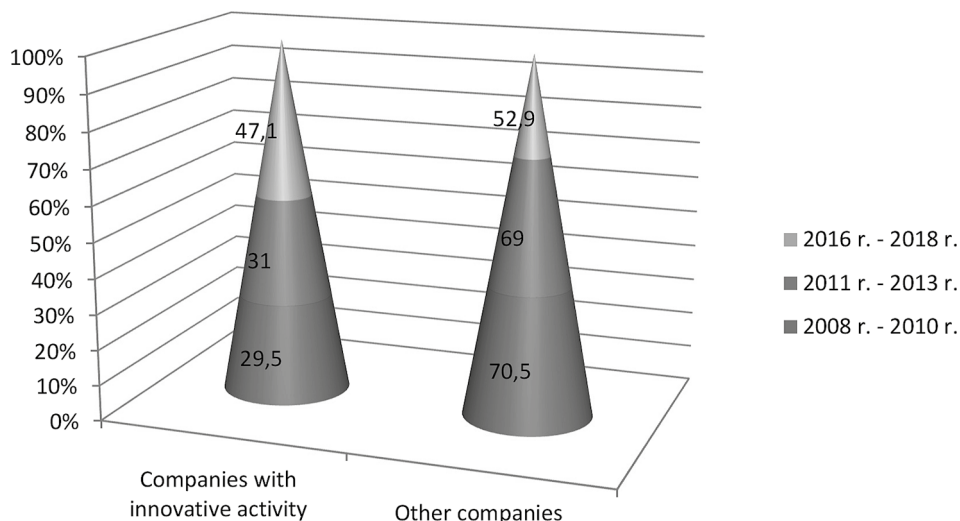


Figure 3: Innovative activity of companies at the national level in the years 2011-2016

Source: Own elaboration based on: *Statistics Poland, Innovative Activity in Poland*, op.cit., p. 4. *Smart Industry Poland 2017*, op. cit. pp. 28 -36.

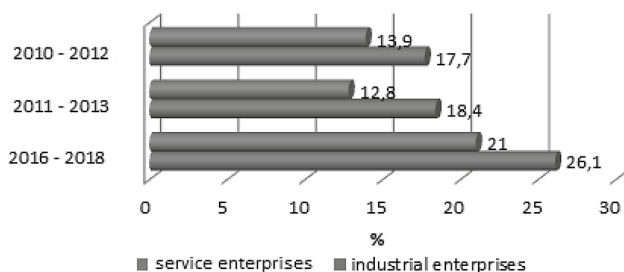


Figure 4: Innovative activity at the national level in the years 2010-2018

Source: Own elaboration based on: *Statistics Poland, Innovative Activity in Poland*, Warsaw 2014, p. 4; *Statistics Poland, Small Statistical Yearbook of Poland 2013*, op. cit., p. 300-302, *Statistics Poland, Innovative Activity of Enterprises in Poland in 2016-2018*, Warsaw 2019, p. 2. *Smart Industry Poland 2017*, op. cit. p. 28-36

The implementation of innovative activity at the national level in the years 2016–2018 was presented by 26.1% of manufacturing enterprises and 21% of service enterprises. In comparison with the data for the years 2011–2013, where the results were as follows: 18.4% of industrial enterprises and 12.8% of service enterprises (compared to 17.7% and 13.9% in the years 2010-2012), we observe an upward trend (Figure 3)<sup>13</sup>. The implementation of innovative activity

<sup>13</sup> *Statistics Poland in Szczecin*, op. cit. pp. 4-5, *Statistics Poland, Statistical Pocketbook*, op. cit., pp. 303-306.

is presented by the increasing number of companies, therefore innovations are gradually introduced in companies with a slight advantage on the part of production companies.

On the basis of the research it can be stated that companies undertaking innovative activity are able to achieve better results than companies that do not undertake such activity. It is also consistent with the assumptions that innovation is a source of competitive advantage of companies<sup>14</sup>. Therefore, innovative activity is important because the companies have the opportunity to achieve broadly understood better results.

### **Innovations on the real estate market**

In Poland, the development of innovation on the real estate market is largely determined by changes in the legislation in the scope of the requirements regarding the standards for modern structures, including the EU subsidies or the subsidies of the National Fund for Environmental Protection and Water Management for investments, energy-efficient financial instruments enabling investment. The programmes and strategies which direct innovative technical and technological solutions used in the building engineering are established as well as environmental and organizational solutions supporting innovative solutions on the real estate market which regenerate cities and increase the comfort of life of citizens. The implementation of innovations on the real estate market contributes, inter alia, to improvement of living conditions and building and development of social community with participation of the society (see: [www.kpk.gov.pl](http://www.kpk.gov.pl)).

According to the definition presented above, the innovations on the real estate market are recognised as solutions the aim of which is to achieve the new quality of product, process or service, as well as the implementation of improvements of existing solutions in relation to the product, organization, service and marketing present on this market.

We can observe, inter alia, the following innovations on the real estate market:

- The innovations focusing on new construction methods and techniques the application of which results in the establishment of new facility (building). An example is the construction of innovative modular residential buildings (school buildings, collective dwellings, hotels, modular offices). Modular construction technology provides the possibility of quick and easy implementation of even a complicated project. In addition, the building made

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<sup>14</sup> Porter P.M., *The Competitive Advantage of Nations*, The Macmillan Press Ltd: London 1990. Hamel G., *The Why, What, and How of Management Innovation*. "Harvard Business Review" 2006. No. 2, p. 75.



of prefabricated units can be easily modified over time by disassembling or adding partition walls as well as extended with further segments in order to create a larger building. The construction of prefabricated modular houses does not take place on the construction site and therefore does not adversely affect the surrounding environment.

- The innovations focusing on new construction methods and techniques that result in new solutions. More and more often we can observe innovative solutions that use solar energy being the most important energy in sustainable buildings (passive and energy-efficient).
- The innovative approach to the extensive green roof technology applied in highly urbanised areas is also extremely important as it brings measurable benefits, both for the environment and for city dwellers. Taking into account the variety of positive aspects of this technology, it is a model technology for the idea of sustainable development.<sup>15</sup> The “Green Roof” technology is an innovative roofing technology consisting of characteristic structural elements which form several layers. The top layer of the green roof profile enables the plant vegetation. The green roof technology can be applied under the surface of the land, at or above the ground level, pursuant to the Building Law the half of the green roof area (not less than 10 m<sup>2</sup>) is classified as biologically active areas.
- The innovations focusing on new methods and goods that result in establishment of a new facility. For example, a building designed, constructed and managed in accordance with the principles of sustainable development. The building with LEED certification is called the “green building” because it is environmentally friendly. It is focused on reducing energy and water consumption, selection of proper materials, improvement of the quality of the natural environment and indoor environment of the building. LEED (Leadership in Energy and Environmental Design), developed in 1998 by the U.S. Green Building Council, is one of the most popular certification systems in the world for the objective assessment of user and environmental friendly buildings. The LEED certificate has several quality levels: certified, silver, gold and platinum. Each building under certification collects points (the maximum number of points is 100) in several basic areas: selection of the proper location, optimisation of energy consumption, reducing water consumption, indoor environmental quality, materials and resources. The ecological buildings with multicriteria BREEAM certification (Building Research Establishment Environmental Assessment Method) were introduced

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<sup>15</sup> Kwiecińska K., Zwoździak J., Green roofs as a model technology for the idea of sustainable development, “Humanities and Social Sciences” vol. XXII, 24 (1/2017), pp. 131-141

- in the UK in 1990 by BRE Global. It is present in 77 countries. In the certification process it is necessary to employ the BREEAM assessor who grants certificates. In Poland, BREEAM certifies buildings with office, commercial, logistic and warehouse as well as residential functions. BREEAM is divided into ten categories: Management, Health and Well-being, Energy, Transport, Water, Materials, Waste, Land Use and Ecology, Pollution and Innovation. This standard is based on points awarded to the assessed building in different categories, such as for example energy efficiency, water and waste management as well as used structural materials or the ability to control lighting, heating and cooling. Additional points can also be earned for access to public transport, bicycle parking lots and places to charge electric cars.<sup>16</sup>
- The innovations focusing on new products, processes and organizations. The innovative solutions are delivered to the market, initiated by technology, science and market demand from consumers. For example, by introducing green infrastructure into urban areas – the green infrastructure improves air quality and urban microclimate, it contributes to combating the urban heat island phenomenon, improves the energy efficiency of buildings and contributes to the support of biodiversity. The “green terraces” developed / established in the private sector are also more and more often visible (the city of Kraków in its investments adopted the construction of a new terminal at the airport in Balice covered with a green roof and the station roof at the airport fast train stop. The new registered office of the Marshal’s Office is to be established, the project of which also includes a green roof. The University of Agriculture Sports Hall was built – a passive building with an interesting visual effect resulting from the use of tall grasses on the green roof.
  - The broadly understood innovations in management methods influencing citizens’ comfort of living or urban development. They facilitate to solve infrastructural and public space development problems, for example, deliberately separated “green zones”. Issuing regulation by the city, for example, the city of Kraków issued the regulation and as of 01.09.2019 there is a total ban on burning coal, wood and other solid fuels in boilers, furnaces and fireplaces. Taking care for the quality of life in the city contributes to investing in innovative methods of home heating. The shaping of new innovation policies within cities is influenced to a large extent by their perception through the prism of a network process involving many different actors as well as their broad definition including social innovation, eco-innovation, service innovation and process innovation.<sup>17</sup>

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<sup>16</sup> <https://plgbc.org.pl/certyfikacja-wielokryterialna/breeam/>

<sup>17</sup> Machnik-Słomka J., *The essence of new innovations – new perspective*, /In:/ *Social innovations in theory and practice*, Ed .by: J. Wyrwa, Polish Economic Publishers, Warsaw 2014.

- The innovative building materials – new building materials created for a specific customer who, on the one hand, is currently often technologically oriented and, on the other hand, is focused on quality and wants to live healthier and safer. Due to this fact it has higher requirements for building materials and services.
- The energy innovation involving the complete or partial conversion of energy sources to renewable energy sources, for example, the photovoltaic system, heat pumps or application of high-efficiency cogeneration. The following heat pumps are installed in buildings: earth (brine-to-water), air (air-to-water), water-to-water, photovoltaic systems, solar kits, solar water heaters, gas condensation technology, energy-efficient multi-pane windows (3, 4), multi-chamber windows, etc.
- The innovation in housing. Materials for which the subsidy from the thermal insulation relief programme can be granted. Namely: materials used for insulation of wall barriers, balcony slabs and foundations included in the insulation systems or used for protection against moisture, materials included in the heating system and electric heating system or hot tap water preparation, materials included in the mechanical ventilation system with heat or cold recovery, window and door joinery including windows, roof slope window with assembly systems, balcony doors, garage doors, non-open transparent surfaces.
- The innovative management of residential, commercial and industrial buildings, the so-called smart home system. The building management system is integrated with all systems: ICT, lighting control, air-conditioning, heating, security, fire protection or remote access control system.

The innovations on the real estate market, mainly in the field of construction and installation technologies improving energy efficiency of residential buildings are implemented with the assistance of EU and government programs granting subsidies for the application of such solutions. The programme of the National Fund for Environmental Protection and Water Management applicable from 2013, which forms a response to the issued Directive 2010/3/EU, imposing an obligation on the Member States to reduce energy consumption (the energy consumption coefficient is to be close to zero by 2021.) This programme involves the co-financing (subsidy) of single-family houses and flats in multi-family buildings built by natural persons or purchased by them from the developer in the NF40 standard, corresponding to the low-energy building engineering (energy-efficient houses), with an average indicator for usable energy demand for heating and ventilation EUco of 40 kWh/m<sup>2</sup> per year, and in the NF15 standard, corresponding to passive building engineering, with an average EUco of 15 kWh/m<sup>2</sup>

per year<sup>18</sup>. Since 2019, a thermal upgrading relief in the form of a tax relief applies, which covers the replacement of solid fuel boilers and insulation of houses. As part of the thermal upgrading relief, even PLN 53 thousand can be deducted. The thermal upgrading relief, such as other measures under the Clean Air programme, is intended to contribute to the improvement of the energy efficiency of our homes (reduction of the building's energy demand)<sup>19</sup>. The government plans to spend more than PLN 100 billion on, inter alia, insulation of single-family buildings and replacement of old furnaces with ecological ones. Under the subsidy, it is possible to purchase such devices as: a heat centre with a temperature programmer; photovoltaic panels with accessories, heat pump with accessories; solar collector with accessories, a gas or oil condensing boiler with control, safety and regulation fittings and air and combustion products supply and discharge systems, a gas or oil tank; a solid fuel boiler fulfilling at least the ecoproject requirements.

The separate programmes are dedicated to entrepreneurs, business environment institutions, scientific and research units and public administration institutions, for example to the Innovative Economy Programme for the implementation of various types of innovative projects, or Regional Programmes, dedicated to innovative activities at the local and regional level.

Supporting the state's innovation policy is very important because the properly functioning instruments provide support and assistance for entrepreneurs, for example through granting subsidies for innovative solutions. The monitoring of provisions by the state in order to improve them guarantees the development of innovative activity. The increase of the importance of innovation in the economy is also visible on the modern real estate market, which makes significant use of innovative solutions for entities and parties to transactions in this sector.<sup>20</sup> The development of innovation on the real estate market is linked to the issues of energy efficiency, ecology, ergonomics and renewable energy sources.

## Conclusion

In today's turbulent environment, the companies are confronted with the need to conduct innovative activity and implement innovations that result from being innovative. Gradually, the percentage of companies innovatively active is growing, what should contribute to the level of their innovation, i.e. the

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<sup>18</sup> Bac M., *In search of innovations on the real estate market* Scientific, "Journals of Malopolska School of Economics in Tarnów", 2014, vol. 24, no. 1. pp. 52-64.

<sup>19</sup> <https://www.podatki.gov.pl/pit/ulgi-odliczenia-i-zwolnienia/ulga-termomodernizacyjna/>

<sup>20</sup> Bac M., op. cit. pp. 52-64.

increasing of the quality of products or services in accordance with expectations of the customers, the improvement of financial condition of the company or the improvement of the competitiveness of the company, the improvement of its position. The companies observe the opportunity offered by the possibility of implementing innovations and systematically increase their expenditure on innovative activities in the perspective of last years. The innovative activities of companies are important for the entire economy. The innovative solutions implemented by them in the scope of production / services influence the economic development of the country. The economy is increasingly moving towards development built on the pillars of innovation.

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# **SOCIAL AND PROFESSIONAL ADAPTATION OF EMPLOYEES IN SMALL ENTERPRISES OF THE LESSER POLAND REGION**

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## **SUMMARY**

The adaptation of employees into the workplace<sup>1</sup> is an important issue in human resource management. The functioning of the human being in the organization, as well as the organization itself, depends on efficient adaptation. Employee adaptation can be considered from many levels. One can speak of adaptation to the requirements of the workplace, formal organization of work, social or physical work environment. The structure of the publication is theoretical and empirical. The theoretical part, based on studies of subject literature, presents the essence of employee adaptation. The empirical part, based on the results of my own research, presents the adaptation of employees to work in selected small enterprises located in the Lesser Poland Region.

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## **Introduction**

The dynamics of changes occurring in the external environment of the organization and penetrating into them causes the need for employees to adapt to changes in the environment, as well as to internal organizational conditions related to a specific organization. Taking into account the interior of the organization, it is necessary to consider the adaptation of employees to certain requirements: their workplace, the formal organization of work, as well as the social and physical work environment. When it comes to a job position, it is extremely important to have relevant knowledge and skills to perform effective and efficient work in a specific job. The formal organization of work is not without significance for employees, where they must comply with applicable regulations, norms, standards

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<sup>1</sup> In the subject literature, adaptation to work is identified with the adaptation of employees to work (e.g. Pocztowski A., *Zarządzanie zasobami ludzkimi. Koncepcje, praktyki, wyzwania*, Polskie Wydawnictwo Ekonomiczne, Warszawa 2018, p. 192).



or established principles. When considering the social work environment, one should take into account the aspect of the employees' adaptation to other people involved in working in the organization. This is more widely associated with the need for teamwork, appropriate behavior in the workplace or respect for values that are respected in the organization. Also, the physical work environment (e.g. lighting, noise) is important in the adaptation of employees.

The aim of the publication is to present the issue of adaptation of employees to work in the organization, taking into account the various levels (dimensions) of socio-professional adaptation. The first part of the publication describes the theoretical issues of adaptation of employees to work. The next part presents a fragment of the results of research related to the topic, carried out in selected small enterprises.

### The essence of socio-professional adaptation

Socio-occupational adaptation is the process of adapting an employee to the position and work environment, the purpose of which is to ensure the efficient functioning of the employee in the social and professional area<sup>2</sup>. In other words, adaptation to work consists in the employee's adaptation to both the environment and the workplace<sup>3</sup>. Adaptation should be seen as a process characterized by complexity and multidimensionality<sup>4</sup>, that commences with the formal decision regarding the newcomer's employment<sup>5</sup>. This process involves the efficient familiarization of a new employee with the workplace and quick implementation to all tasks and activities carried out at the specific workplace. So it is a process of adaptation to the environment and working conditions, whose specificity is well reflected in the English term induction, derived from the Latin word for introducing, showing the way<sup>6</sup>.

Socio-occupational adaptation is somewhat natural and spontaneous<sup>7</sup>, but usually greater intervention of the supervisor in the assignments of newly

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<sup>2</sup> Ludwiczynski A., *Alokacja zasobów ludzkich organizacji. /In:/ Zarządzanie zasobami ludzkimi. Tworzenie kapitału ludzkiego organizacji*, Ed. by: H. Król, A. Ludwiczynski, Wydawnictwo Naukowe PWN, Warszawa 2006, p. 215.

<sup>3</sup> Adamska-Chudzińska M., *Uwarunkowania sprawności zawodowej człowieka w organizacji. Aspekt społeczny*, Uniwersytet Ekonomiczny, Kraków 2012, p. 85.

<sup>4</sup> Jamróz-Ligęza A., *Procesy adaptacji społeczno-zawodowej pracowników*, „Zarządzanie Zasobami ludzkimi”, 2012, no. 2, p. 21.

<sup>5</sup> Jakubiak M., Kondas M., *Employees' Adaptation s a Critical Element of Human Resources Management – a Case Study*, “Organization & Management Quarterly”, 2017, Vol. 4, no. 40, pp. 27-38.

<sup>6</sup> Rosiński J., Długosz-Truszkowska E., *Jak planować rozwój pracownika w procesie adaptacji w organizacji. /In:/ Poszukiwanie tożsamości organizacyjnej w jednoczącej się Europie*, Ed. by: L. Zbiegień-Maciąg, D. Lewicka, Akademia Górniczo-Hutnicza, Kraków 2004, p. 356.

<sup>7</sup> Oleksyn T., *Zarządzanie zasobami ludzkimi w organizacji*, Wolters Kluwer, Warszawa 2017, p. 271.

admitted is necessary at the beginning of the adaptation process<sup>8</sup>. It is advisable to support and guide employees in this process. Then employees will adapt faster to the internal organizational environment and will have the right attitude to work<sup>9</sup>, accept the workplace value system, in which particular importance is attached to customs, attitudes, behaviors or modes of action<sup>10</sup>. The adaptation of employees affects not only their personal effectiveness, but also the functioning of the whole organization<sup>11</sup>. It can be assumed that employees who receive appropriate assistance during adaptation to work, learn about the organization, its culture and organizational structure in a relatively short time, will perform work efficiently and effectively, building proper interpersonal relations. Therefore, employees who start work in a particular organization should receive appropriate support in adapting to the organization in order to get to know their tasks and rules in the workplace.

Adaptation of new employees to work should be such that they can learn about the conditions in the professional environment, the mechanisms of work, as well as the company<sup>12</sup>, and thus achieve the set goals<sup>13</sup>. In the adaptation to work, it is extremely important to provide basic information to a newly recruited person that facilitates starting work, as well as the fastest and least stressful inclusion of a new employee into the structure of the organization<sup>14</sup>. A. Poczowski writes that adaptation to work covers two main areas: social and professional<sup>15</sup>. In the first case, the cited author emphasizes the need to adapt the employee to the norms and customs of the organizational community, regardless of whether the employee has previously worked or if this is his first job. On the other hand, adaptation to work in the professional dimension relates to the adjustment of an employee to the content and working conditions by mastering the scope of

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<sup>8</sup> Załoga W., *Proces rekrutacji pracowników w nowoczesnej organizacji*. /In:/ *Wyzwania i dylematy zarządzania organizacjami publicznymi*. Tom I, Ed. by: W. Kieżun, J. Wolejszo, S. Sirko, Akademia Obrony Narodowej, Warszawa 2013, p. 269.

<sup>9</sup> Nekorane J., Nagyová L., *Adaptation of employees in the organization and its importance in terms of human resource management*, "Revista Academiei Fortelor Terestre", 2014, no. 1, p. 115.

<sup>10</sup> Szalkowski A., *Rekrutacja i redukcja personelu*. /In:/ *Podstawy zarządzania personelem*, Ed. by: A. Szalkowski, Akademia Ekonomiczna, Kraków 2006, p. 106.

<sup>11</sup> Molinsky A., *Cross Cultural Code-Switching: The Psychological Challenges of Adapting Behavior in Foreign Cultural Interactions*, „Academy of Management Review” 2007, vol. 32, no. 2, p.622-640.

<sup>12</sup> Ciekanski Z., *Proces adaptacji społeczno-zawodowej nowego pracownika*, „Zeszyty Naukowe Uniwersytetu Przyrodniczo-Humijnistycznego w Siedlcach. Seria Administracja i Zarządzanie, 2012, no. 94, p. 134.

<sup>13</sup> Prather M., *Importance of Adaptation*, 2017 (<https://penandthepad.com/importance-adaptation-6458209.html>, 18.11.2019).

<sup>14</sup> Syper-Jędrzejak M., *Dobre praktyki w zakresie adaptacji pracowników na przykładzie wybranych firm regionu łódzkiego*, „Zarządzanie i Finanse”, 2013, no. 1, t. 4, p. 506.

<sup>15</sup> Poczowski A., *Zarządzanie zasobami ludzkimi ... op. cit.*, p. 193.

activities, as well as obligations related to the work performed and getting used to the material work environment.

The adaptation process shapes the employee as a team member. According to Z. Jasiński, the size of the employee team is not indifferent to the process of adaptation. The larger the team, the greater its diversity in terms of personality traits, ideological, social, political, moral, sometimes cultural, and beliefs. There is also a risk that the processes of shaping norms, rules of cooperation, building and strengthening relationships, as well as shaping proper relations between participants of teamwork can be much slower in the team. In addition, it should be emphasized that the course of the adaptation process requires giving up part of one's self, individual ambitions, inclinations or habits in favor of new, jointly developed ones<sup>16</sup>. J. Rosiński and E. Długosz-Truszkowska are of opinion that professional adaptation is a difficult art of building proper relations with new employees and a team cooperation. They are convinced that if this process is conducted in isolation from the team, from its other members, it is condemned to failure, because the employee should know and understand his role in the team, in a given place and learn to realize it<sup>17</sup>. However, many organizations increasingly base their structure on employees working in teams that work together to achieve common goals and solve problems<sup>18</sup>. A properly selected team is of great importance to a business, as it can contribute to increasing its efficiency<sup>19</sup>.

The literature on the subject emphasizes that the process of introducing employees to work in the vast majority of enterprises is carried out correctly. There are cases, however, when managers do not pay attention to their subordinates, leaving employees "to themselves"<sup>20</sup>. It should be remembered as well that providing new employees with knowledge about the company, its goals, customers, products, services, etc. emphasizes the importance of a proper adaptation process<sup>21</sup>. A well-organized socio-professional adaptation requires

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<sup>16</sup> Jasiński Z., *Wielkość pracowniczego zespołu produkcyjnego a jego funkcjonowanie*. /In:/ *Innowacje w zarządzaniu i inżynierii produkcji*. Tom I, Ed. by: R. Knosala. Oficyna Wydawnicza Polskiego Towarzystwa Zarządzania Produkcją, Opole, 2014, p. 406.

<sup>17</sup> Rosiński J., Długosz-Truszkowska E., *Jak planować rozwój pracownika ...*, op. cit., p. 360.

<sup>18</sup> Hoch J.E., Dulebohn J.H., *Shared leadership in enterprise resource planning and human resource management system implementation*, "Human Resource Management Review", 2013, no. 23(1), p. 118.

<sup>19</sup> Tomczak-Horyń K., Knosala R., *Kryteria doboru pracowników do kreatywnych zespołów*. /In:/ *Innowacje w zarządzaniu i inżynierii produkcji*. Tom I, Ed. by: R. Knosala. Oficyna Wydawnicza Polskiego Towarzystwa Zarządzania Produkcją, Opole, 2015, p. 329.

<sup>20</sup> Ślósarz M., *Wybrane metody i narzędzia wspomagania zarządzanie zespołami ludzkimi*, „Marketing i Rynek”, 2018, no. 9, p. 920.

<sup>21</sup> Zaleśna A., *Adaptacja nowego pracownika i wzajemne dzielenie się wiedzą na przykładzie przedsiębiorstw sektora MSP*, „Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania Uniwersytetu Szczecińskiego”, 2015, no. 39, t. 3, p. 415.

the use of an appropriately selected set of tools to facilitate the social and professional assimilation of a new employee<sup>22</sup> and the consideration of many factors determining the effectiveness and efficiency of employee adaptation. For example A. Żarczyńska-Dobiesz indicates such factors as: the employee's previous experience, the company's organizational culture, its size, market position or branch of activity<sup>23</sup>.

### Methodical aspects of the study

This part of the publication covers a fragment of my own research more widely conducted and carried out in the personnel area of enterprises. The research was conducted in 2019 in small enterprises. 91 companies took part in the study. The selection of the sample was related to the location of research in enterprises of the Lesser Poland region. The research was used to identify the areas of adaptation of employees. Number of enterprises participating in the study resulted from research assumptions – the author decided to study about 100 business entities from the MSP sector. The measurement tool used in the study was authorial. A survey questionnaire consisting of two modules was applied: the first is the substantive part concerning planes of adaptation of employees to work in the organization, while the other is the record part identifying surveyed enterprises. The survey questionnaire asked about facts and opinions. The questionnaire was used by the author to conduct broader research in the field of personnel. The answers to the questions were given by the owners of the surveyed enterprises located in the following poviats answered: Nowy Sącz (75%), Limanowa (11%), Gorlice (5%), Tarnów (3%), Kraków (2%), Nowy Targ (2%), Brzesko (1%), Myślenice (1%). The entrepreneurs represented the private (86%) and public (1%) sectors. Some companies (13%) did not indicate the sector in which they operated. The type of activity conducted by the surveyed organizations focused on: services (63%), trade (18%) and production (11%). On the other hand, 7% of enterprises were involved in mixed business. 1% of company did not indicate the type of activity. As far as the scope of business activity (i.e. the spatial market) is concerned, the obtained empirical data prove that 33% economic entities operated on the local market, 45% – on the domestic market and 10% enterprises on the international market. At the same time, it should be noted that among all economic entities surveyed, some of them (12%) did not indicate the market for conducting their business activities. The answers

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<sup>22</sup> Ludwiczynski A., *Alokacja zasobów ludzkich organizacji ... op. cit.*, s. 218.

<sup>23</sup> Żarczyńska-Dobiesz A., *Adaptacja nowego pracownika do pracy w przedsiębiorstwie*, Oficyna a Wolters Kluwer business, Kraków 2008, p. 41-42.

obtained from the respondents show that the period (counted in years) in which the surveyed organizations started their activity also varied.

The “oldest” surveyed organization started its business activity in 1982, so for 38 years it has already been operating in the market. In turn, the “youngest” organizations started their business in 2017, so they have been operating in the market for less than 3 years. 40% of companies have been on the market for up to 5 years, 36% over 5-10 years, 10% over 10-15 years, and 11% over 15 years. No data for 3%. As for the very issue of adapting to the requirements of the workplace, in the breaking down of the market, the respondents’ answers varied: national – 46%, local – 31%, and international – 6%. A similar situation occurred in a division by nature of the businesses. Adapting the workplace to the requirements was indicated by: 56% of companies providing services, 15% of companies engaged in trade, 9% of companies dealing with production and 3% of enterprises with mixed activity.

The description of empirical data uses one-dimensional analysis illustrating the scale of activity (and not relations) of the surveyed companies in the field of employee adaptation, where each answer was characterized separately.

## Results of the completed study

Analyzing the obtained research results it should be mentioned that in micro and small enterprises the adaptation of employees to work is not as formalized as it is the case in medium or large enterprises. In micro and small enterprises there is often no separate human resources department, and tasks in this area – of an administrative nature – are carried out by the accountant or assistant of the boss. Based on this assumption, the respondents were not asked about the procedures to be followed during the socio-occupational adaptation of employees, or about the nature of adaptation (which can be formal, organized or informal due to the direct contact of the newly recruited employee with colleagues in this type of enterprise), but they were asked directly to indicate the key breas for the adaptation of employees to work in the organization. Respondents could indicate more than 1 answer (table 1).

Table 1: Key platforms for the adaptation of employees

Specification	Answer in percentage
adaptation to the requirements of the workplace (mastering the necessary knowledge and skills)	77
adaptation to the social work environment (teamwork, observance of values and behaviors)	24
adaptation to the formal organization of work in the company (regulations, norms, standards, principles)	6
adaptation to the physical work environment (lighting, noise)	1

Source: own study based on research results

The summary presented in table 1 shows that the basic platform for the adaptation of employees, according to the respondents, was primarily the adaptation of the requirements of the workplace, associated with mastering the necessary knowledge and skills needed in a specific workplace. 77% of respondents indicated this option. Another level of adaptation of employees to work, indicated by the respondents, was adaptation to the social work environment, in which teamwork is important, observance of values or existing behavior in the workplace. This view was expressed by 24% of respondents. On the other hand, in a rather distant position, as the research has shown, has been placed the answer concerning adaptation to the formal organization of work in a company, related to compliance with regulations, norms, standards or principles in force in the company. Such a position was taken by 6% of respondents. The statistical report also shows that in the social and professional adaptation of the employee process to the physical work environment (which is influenced by lighting or noise, among others) played a marginal role and was generally not desirable by the owners of the surveyed enterprises. Of all respondents, only 1% considered this dimension of adaptation important in the enterprise.

Respondents were also asked to indicate what they thought should be used in innovative solutions in the field of employee adaptation. However, none of the owners of the surveyed enterprises decided to answer this question.

## Conclusion

Social and professional adaptation not only enables the new employee to get to know the environment, but it also has an important task which is to build a sense of belonging, allowing the employee to identify with the organization and the people employed in it in a faster and easier way. With regard to micro and small enterprises, properly applied adaptation of a new employee can improve their results, as a newly employed person can make a significant contribution to the company's development.

The author's professional experience and observation of economic practice allow to point out that the process of adaptation to work is of great importance both for the employee and the organization engaging him to work. Therefore, both parties should be concerned that the process of adaptation goes smoothly and for not too long, just enough for the employee to adapt to his workplace. An important premise for adaptation is not only to minimize any problems or errors related to achieving the required work standards by new employees, but also to learn about the internal environment of the organization that engages the employee at work.

The conducted research showed that the most important factor in adaptation to work was the adaptation of employees to the requirements of the

workplace, which was manifested in mastering the necessary knowledge and skills. However, little attention was paid to adapting employees to the physical work environment.

It is significant that none of the respondents raised the issue of innovative solutions in employee adaptation. The respondents' answers indicate that few of them considered significant adaptation to formal organization at work. Considering the fact that the provision of work process is based on regulations, principles and certain schemes, this aspect of socio-professional adaptation seems to be underestimated and undervalued. The matter of formal and compliant with norms process of providing work seems to be important, protecting both employers and employees. A low importance given to physical adaptation to work in the respondent's answers should also be emphasized. Appropriate actions, as one could argue, and adaptation in this field, would allow for effective work performance and the creation of safe and ergonomic conditions in the enterprises themselves as well as at the workplace.

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**Part III** **RESTRUCTURING AND DEVELOPMENT  
OF ECONOMIES AND ENTERPRISES**



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# THE FOURTH INDUSTRIAL REVOLUTION – CHALLENGES AND DIFFERENT PERSPECTIVES

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### SUMMARY

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In publications and scenarios exploiting the vision of shrinking demand for oil, the focus is therefore not on price but on demand, and with it the factors that lead to its reduction. Of course, electromobility comes to the fore, but in the background a much stronger causative factor is the progressive digital revolution, baptized as the fourth industrial revolution. Its “tentacles” reach far beyond the borders of traditional industry and are strongly influenced by demographic and social changes. The Boston Consulting Group consulting company in one report presents nine leading technological solutions that will revolutionize industrial production. They are e.g.: big data and analytics, augmented reality, use of 3D printers, cloud technology, cyber security, autonomous robots, simulations, horizontal / vertical software integration, industrial use of the internet of all things. All these solutions interpenetrate each other and will come into logical interactions, which in the longer horizon are probably to be controlled not by man but by artificial intelligence. The common denominator of the above-mentioned solutions is “digital”, which it represents the fourth industrial revolution involving integration of digital and physical systems.

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### Introduction

We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global policy, from the public and private sectors to academia and civil society.

The First Industrial Revolution used water and steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production. Now a Fourth Industrial Revolution is building on the Third, the digital revolution

that has been occurring since the middle of the last century. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.<sup>1</sup>

There are three reasons why today's transformations represent not merely a prolongation of the Third Industrial Revolution but rather the arrival of a Fourth and distinct one: velocity, scope, and systems impact. The speed of current breakthroughs has no historical precedent. When compared with previous industrial revolutions, the Fourth is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country. And the breadth and depth of these changes herald the transformation of entire systems of production, management, and governance.<sup>2</sup>

The possibilities of billions of people connected by mobile devices, with unprecedented processing power, storage capacity, and access to knowledge, are unlimited. And these possibilities will be multiplied by emerging technology breakthroughs in fields such as artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3-D printing, nanotechnology, biotechnology, materials science, energy storage, and quantum computing.

Already, artificial intelligence is all around us, from self-driving cars and drones to virtual assistants and software that translate or invest. Impressive progress has been made in Artificial Intelligence (AI) in recent years, driven by exponential increases in computing power and by the availability of vast amounts of data, from software used to discover new drugs to algorithms used to predict our cultural interests. Digital fabrication technologies, meanwhile, are interacting with the biological world on a daily basis. Engineers, designers, and architects are combining computational design, additive manufacturing, materials engineering, and synthetic biology to pioneer a symbiosis between microorganisms, our bodies, the products we consume, and even the buildings we inhabit.

## **Challenges and opportunities of the Fourth Industrial Revolution**

Like the revolutions that preceded it, the Fourth Industrial Revolution has the potential to raise global income levels and improve the quality of life for populations around the world. To date, those who have gained the most from it have been consumers able to afford and access the digital world; technology has

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<sup>1</sup> The Boston Consulting Group, *Przemysł 4.0 PL. Szansa czy zagrożenie dla rozwoju innowacyjnej gospodarki?* [online], w: bcg.com [access: 7.10.2017], <[http://image-src.bcg.com/Images/BCG-Przemysl-4-PL\\_tcm78-123996.pdf](http://image-src.bcg.com/Images/BCG-Przemysl-4-PL_tcm78-123996.pdf)>.

<sup>2</sup> Werbach K., *How to regulate innovation – without killing it* [online], In: Knowledge@Wharton [access: 7.10.2017], <<http://knowledge.wharton.upenn.edu/article/how-to-regulate-innovation-without-killing-it/>>.

made possible new products and services that increase the efficiency and pleasure of our personal lives. Ordering a cab, booking a flight, buying a product, making a payment, listening to music, watching a film, or playing a game – any of these can now be done remotely.

Despite the huge uncertainty about how the future of the energy sector will develop, one thing is certain: the continuation scenarios are forgotten! You cannot escape change, not following change will lead to business catastrophe, and the future belongs to those who designate these changes. We see how powerful social media are, for example – whoever ignores them loses customers, loses elections, lands on the margins of history. Equally powerful is demonstrated by the digital platforms used in services – whoever ignores them loses the competitive struggle. The same is true for industry and the energy sector; the inevitable digitization, and with it the change in business models dictated by the consumer, force us to adapt.

In the era of revolutionary changes, when there is no question of continuation, the future becomes extremely uncertain. This uncertainty is about how the world will change, not whether it will change. There is no definite answer to the question of what the world will look like in 30 years. However, one cannot allow belief to persist, that since we don't know what it will be like, it's better not to do too much and wait for it to be clarified. The upcoming changes are quite a challenge for traditional industry, because at first they run relatively slowly and give the impression of a niche.

Studies already available at company level show that many global giants, such as Boeing or General Electric, are changing their business models to take advantage of the opportunities and avoid the risks posed by so-called industry revolution 4.0. Companies, which become digital, scoop everything and grow dynamically, deepening the distance efficiency and earnings between them and companies still existing in analog reality.

In the future, technological innovation will also lead to a supply-side miracle, with long-term gains in efficiency and productivity. Transportation and communication costs will drop, logistics and global supply chains will become more effective, and the cost of trade will diminish, all of which will open new markets and drive economic growth.

At the same time, as the economists Erik Brynjolfsson and Andrew McAfee have pointed out, the revolution could yield greater inequality, particularly in its potential to disrupt labor markets. As automation substitutes for labor across the entire economy, the net displacement of workers by machines might exacerbate the gap between returns to capital and returns to labor. On the other hand, it is also possible that the displacement of workers by technology will, in aggregate, result in a net increase in safe and rewarding jobs.

We cannot foresee at this point which scenario is likely to emerge, and history suggests that the outcome is likely to be some combination of the two. However, we are convinced of one thing – that in the future, talent, more than capital, will represent the critical factor of production. This will give rise to a job market increasingly segregated into “low-skill/low-pay” and “high-skill/high-pay” segments, which in turn will lead to an increase in social tensions.

In addition to being a key economic concern, inequality represents the greatest societal concern associated with the Fourth Industrial Revolution. The largest beneficiaries of innovation tend to be the providers of intellectual and physical capital – the innovators, shareholders, and investors – which explains the rising gap in wealth between those dependent on capital versus labor. Technology is therefore one of the main reasons why incomes have stagnated, or even decreased, for a majority of the population in high-income countries: the demand for highly skilled workers has increased while the demand for workers with less education and lower skills has decreased. The result is a job market with a strong demand at the high and low ends, but a hollowing out of the middle.

This helps explain why so many workers are disillusioned and fearful that their own real incomes and those of their children will continue to stagnate. It also helps explain why middle classes around the world are increasingly experiencing a pervasive sense of dissatisfaction and unfairness. A winner-takes-all economy that offers only limited access to the middle class is a recipe for democratic malaise and dereliction.

“From the enormity of challenges that the world has to face today, perhaps the most overwhelming is how to carry out the fourth industrial revolution that began at the turn of the century. [...] the fourth industrial revolution can strengthen both individuals and entire communities as a result of creating new economic, social and development opportunities. But it can also lead to the marginalization of some social groups, increase inequalities, contribute to new security threats and disrupt interpersonal relationships. If we are to take advantage of the opportunities offered by the Fourth Industrial Revolution and avoid the pitfalls associated with it, we must carefully consider the issues it addresses.”<sup>3</sup>

Discontent can also be fueled by the pervasiveness of digital technologies and the dynamics of information sharing typified by social media. More than 30 percent of the global population now uses social media platforms to connect, learn, and share information. In an ideal world, these interactions would provide an opportunity for cross-cultural understanding and cohesion. However, they can

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<sup>3</sup> Schwab K., *Dokąd zaprowadzi nas czwarta rewolucja przemysłowa* [online], w: *wszystkoconajwazniejsze.pl* [access: 7.10.2017], <<https://wszystkoconajwazniejsze.pl/klaus-schwab-dokad-zaprowadzi-nas-czwarta-rewolucja-przemyslowa/>>.

also create and propagate unrealistic expectations as to what constitutes success for an individual or a group, as well as offer opportunities for extreme ideas and ideologies to spread.

## **The business perspective**

An underlying theme is that the acceleration of innovation and the velocity of disruption are hard to comprehend or anticipate and that these drivers constitute a source of constant surprise, even for the best connected and most well informed. Indeed, across all industries, there is clear evidence that the technologies that underpin the Fourth Industrial Revolution are having a major impact on businesses.

On the supply side, many industries are seeing the introduction of new technologies that create entirely new ways of serving existing needs and significantly disrupt existing industry value chains. Disruption is also flowing from agile, innovative competitors who, thanks to access to global digital platforms for research, development, marketing, sales, and distribution, can oust well-established incumbents faster than ever by improving the quality, speed, or price at which value is delivered.

Major shifts on the demand side are also occurring, as growing transparency, consumer engagement, and new patterns of consumer behavior (increasingly built upon access to mobile networks and data) force companies to adapt the way they design, market, and deliver products and services.

A key trend is the development of technology-enabled platforms that combine both demand and supply to disrupt existing industry structures, such as those we see within the “sharing” or “on demand” economy. These technology platforms, rendered easy to use by the smartphone, convene people, assets, and data – thus creating entirely new ways of consuming goods and services in the process. In addition, they lower the barriers for businesses and individuals to create wealth, altering the personal and professional environments of workers. These new platform businesses are rapidly multiplying into many new services, ranging from laundry to shopping, from chores to parking, from massages to travel.

On the whole, there are four main effects that the Fourth Industrial Revolution has on business-on customer expectations, on product enhancement, on collaborative innovation, and on organizational forms. Whether consumers or businesses, customers are increasingly at the epicenter of the economy, which is all about improving how customers are served. Physical products and services, moreover, can now be enhanced with digital capabilities that increase their value. New technologies make assets more durable and resilient, while data and analytics



are transforming how they are maintained. A world of customer experiences, data-based services, and asset performance through analytics, meanwhile, requires new forms of collaboration, particularly given the speed at which innovation and disruption are taking place. And the emergence of global platforms and other new business models, finally, means that talent, culture, and organizational forms will have to be rethought.

Overall, the inexorable shift from simple digitization (the Third Industrial Revolution) to innovation based on combinations of technologies (the Fourth Industrial Revolution) is forcing companies to reexamine the way they do business. The bottom line, however, is the same: business leaders and senior executives need to understand their changing environment, challenge the assumptions of their operating teams, and relentlessly and continuously innovate.

“The fourth industrial revolution, also called the digital industrial revolution, changes the business model of companies and entire branches of the economy. The process of transforming the production base assumes that at every stage of the production chain, from the design phase through production and servicing and recycling, it is necessary to apply modern, intelligent information technologies and automation. [...] The implementation of key technologies conducive to this transformation will take place, among others in technological areas such as:

- systems and devices that manage the work of energy operators’ networks and integrate them with the infrastructure of the end-user network,
- systems and equipment for technical infrastructure of energy-saving and passive real estate,
- reliable production systems,
- sensory technologies (sensors collecting data),
- Internet of Things (IoT) enabling communication between objects,
- storage of large data sets,
- cloud computing giving the possibility of free access and processing of data collected in one place,
- telecommunications technologies enabling fast data transfer.”<sup>4</sup>

### **The government perspective**

As the physical, digital, and biological worlds continue to converge, new technologies and platforms will increasingly enable citizens to engage with governments, voice their opinions, coordinate their efforts, and even circumvent

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<sup>4</sup> Ministerstwo Rozwoju, *Czwarta rewolucja przemysłowa* [online], w: [www.mr.gov.pl](http://www.mr.gov.pl) [access: 7.10.2017], <<https://www.mr.gov.pl/strony/zadania/reindustrializacja-gospodarki/czwarta-rewolucja-przemyslowa/>>.

the supervision of public authorities. Simultaneously, governments will gain new technological powers to increase their control over populations, based on pervasive surveillance systems and the ability to control digital infrastructure. On the whole, however, governments will increasingly face pressure to change their current approach to public engagement and policymaking, as their central role of conducting policy diminishes owing to new sources of competition and the redistribution and decentralization of power that new technologies make possible.

Ultimately, the ability of government systems and public authorities to adapt will determine their survival. If they prove capable of embracing a world of disruptive change, subjecting their structures to the levels of transparency and efficiency that will enable them to maintain their competitive edge, they will endure. If they cannot evolve, they will face increasing trouble.

This will be particularly true in the realm of regulation. Current systems of public policy and decision-making evolved alongside the Second Industrial Revolution, when decision-makers had time to study a specific issue and develop the necessary response or appropriate regulatory framework. The whole process was designed to be linear and mechanistic, following a strict “top down” approach.

But such an approach is no longer feasible. Given the Fourth Industrial Revolution’s rapid pace of change and broad impacts, legislators and regulators are being challenged to an unprecedented degree and for the most part are proving unable to cope. How, then, can they preserve the interest of the consumers and the public at large while continuing to support innovation and technological development? By embracing “agile” governance, just as the private sector has increasingly adopted agile responses to software development and business operations more generally. This means regulators must continuously adapt to a new, fast-changing environment, reinventing themselves so they can truly understand what it is they are regulating. To do so, governments and regulatory agencies will need to collaborate closely with business and civil society.

The Fourth Industrial Revolution will also profoundly impact the nature of national and international security, affecting both the probability and the nature of conflict. The history of warfare and international security is the history of technological innovation, and today is no exception. Modern conflicts involving states are increasingly “hybrid” in nature, combining traditional battlefield techniques with elements previously associated with non-state actors. The distinction between war and peace, combatant and noncombatant, and even violence and nonviolence (think cyberwarfare) is becoming uncomfortably blurry.

As this process takes place and new technologies such as autonomous or biological weapons become easier to use, individuals and small groups will increasingly join states in being capable of causing mass harm. This new vulnerability will lead to new fears. But at the same time, advances in technology will create

the potential to reduce the scale or impact of violence, through the development of new modes of protection, for example, or greater precision in targeting.

All emerging technological, business or social innovations at some point arouse the interest of the state. The use of most of them is either in a legal vacuum or is even against the law. Sooner or later, mass market adaptation of most new solutions becomes the reason for lobbying various interest groups that are starting to demand regulation of their use in order to accelerate or slow down their development.

The state can both play a passive role by regulating already evolving phenomena and be active in the process of creating and developing innovation. Carrying out its mission of caring for security – including material – of citizens, it should create conditions for stable and long-term economic growth. And this innovation is the driving force of the most developed economies. The state can be not only a consumer of modern solutions, but also a co-creator of them, and report the need to solve specific problems. By building the right climate, creating an organizational framework, applying economic incentives, providing future customers and creating an outlet – it inspires to creative thinking. An example of a proper state policy focused on achieving the set goals may be the development of the electric car market in Norway. This country is a world leader in terms of the share of electric cars in total sales new cars. In 2016, they accounted for approx. 30% of the market (17.7% fully electric BEV and 13.4% hybrid with rechargeable PHEV batteries), and this share is growing every year. The Norwegian road to electrification of transport, which was based on numerous incentives economic, it began in 1990 with the temporary lifting of customs duties on imported electric cars (in 1996 customs duties were lifted indefinitely). In the second half of the 1990s, registration fees were reduced for their owners and they were exempted from using road fees. In 1999, they were exempted from parking fees in public places and to facilitate the identification of such cars, registration was introduced for them starting with EL (now also EK). In the next of the year, when buying electric cars, they got a 50% tax relief, and a year later the sale of such cars was subject to a zero VAT rate (since 2015, the zero rate has also been used in leasing). Although the cost of producing electric cars is much higher than a similar class of combustion models, their prices are comparable thanks to the tax breaks system in Norway. And if you consider a lower operating price and additional privileges (in addition to free parking, drivers are also exempt from paying for ferries and can run in cities along lanes reserved for buses and taxis), the economic bill clearly indicates the profitability of cars electric. Currently, there are approx. 170 thousand in Norway such cars (including electric hybrids), and in recent months their share in total sales has exceeded 50%.

Importantly, the Norwegian government also took care of infrastructure in its electromobility development plan. When the popularity of “electricians” increased, the government began to invest in the expansion of charging stations. In 2007, EUR 7 million (1.2 thousand euro surcharge for the charger installed) – in line with the assumption that in 4 years the number public chargers will increase to 1900. A construction program has also been launched fast chargers on the main roads in the country. Thanks to government funding, by the end of 2017, two such devices are expected to stand every 50 km.<sup>5</sup>

Much later – with greater impetus – the Germans focused on the development of electromobility. It fits into the framework of their energy transformation program, which aims to include reduction of greenhouse gas emissions by 2020 by 40% compared to 1990 levels (by 80-95% by 2050). In addition to developing alternative energy sources or increasing energy efficiency, it predicts a decrease in carbon dioxide and other harmful gas emissions in transport. The key role in the German “National Plan for the Development of Electromobility” is played by the use of modern information technologies in the creation of an intelligent energy network and energy market, whose key element will also be consumers as its producers. This network of the future is to provide the most efficient way to supply electricity for charging electric vehicles – including diurnal changes in electricity demand and use of home energy storage facilities to balance the market. To start with, initiatives related to vehicle development 500 million euros was allocated to electricity, energy storage installations and infrastructure.

The Germans set up an agency for electromobility to coordinate the implementation of the government’s objectives, and the National Electromobility Platform was created, consisting of representatives of the world of politics, industry, science, local authorities and consumers, whose working groups deal with areas such as propulsion and battery technology, infrastructure charging and network integration, standardization and certification, use of materials and recycling, as well as creating a legal framework. Eight regions were also selected in which pilot projects were implemented (Hamburg, Bremen / Oldenburg, Rhine-Ruhr, Rhine-Main, Saxony, Stuttgart, Munich and Berlin-Potsdam), for which EUR 130 million was allocated. They are to be tested there infrastructure solutions for electric battery cars – in cooperation with car manufacturers and research centers. In 2014, the Bundestag adopted the Electromobility Act providing for a number of incentives to use electric cars. These include: exemption from car tax, tax privileges for companies using electric cars, special parking spaces for

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<sup>5</sup> Giffinger R. (et al.), *Smart Cities. Ranking of European medium-sized cities* [online], w: smart-cities.eu [access: 7.10.2017], <[http://www.smart-cities.eu/download/smart\\_cities\\_final\\_report.pdf](http://www.smart-cities.eu/download/smart_cities_final_report.pdf)>.

electric cars, free access for electric delivery vehicles to places closed to traffic and the possibility of using bus lanes. Separation of special lanes for electric cars on roads is also foreseen. In addition to supporting technologies related to battery electric cars and associated infrastructure the German government has saved EUR 1 billion from the budget for the development of related technologies with hydrogen and fuel cells developed by scientific institutions and industry as part of public-private partnership.

Regulations prepared by governments should become dynamic and not only regulate in the consumer and social interest what is already and works, but also enable through the system of incentives the development of such business models, thanks to which the consumer will receive completely new products and services that meet his needs better and cheaper. Cyber security is a big challenge for regulators in the 4.0 economy.<sup>6</sup>

### **The people perspective**

The Fourth Industrial Revolution, finally, will change not only what we do but also who we are. It will affect our identity and all the issues associated with it: our sense of privacy, our notions of ownership, our consumption patterns, the time we devote to work and leisure, and how we develop our careers, cultivate our skills, meet people, and nurture relationships. It is already changing our health and leading to a “quantified” self, and sooner than we think it may lead to human augmentation. The list is endless because it is bound only by our imagination.

Generally, we are great enthusiasts and early adopter of technology, but sometimes we wonder whether the inexorable integration of technology in our lives could diminish some of our quintessential human capacities, such as compassion and cooperation. Our relationship with our smartphones is a case in point. Constant connection may deprive us of one of life’s most important assets: the time to pause, reflect, and engage in meaningful conversation.

One of the greatest individual challenges posed by new information technologies is privacy. We instinctively understand why it is so essential, yet the tracking and sharing of information about us is a crucial part of the new connectivity. Debates about fundamental issues such as the impact on our inner lives of the loss of control over our data will only intensify in the years ahead. Similarly, the revolutions occurring in biotechnology and AI, which are redefining

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<sup>6</sup> Caylar P.-L., Naik K., Noterdaeme O., *Digital in industry: From buzzword to value creation* [online], In: Digital McKinsey [access: 7.10.2017], <<https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-in-industry-from-buzzword-to-value-creation>>.

what it means to be human by pushing back the current thresholds of life span, health, cognition, and capabilities, will compel us to redefine our moral and ethical boundaries.

The development of the global economy causes that in most regions of the world society get rich. Although the level of wealth is not evenly distributed, and according to some economists, differences in wealth have been growing in recent years, the decreasing phenomenon of poverty and the increase in class size is an unquestionable phenomenon average.<sup>7</sup> According to World Bank data, the percentage of the world's population living in poverty (for less than \$ 1.9 a day) fell from 42% in 1981 to 11% in 2013<sup>8</sup> based on this institution's data, Homi Kharas, deputy director of the Global Economy and Development program at the Brookings Institution, estimates that the middle class has increased from 1 billion people in 1985 to 3 billion people in 2015.<sup>9</sup> From a market point of view this means a huge increase in the number of consumers who, in addition, have more and more financial possibilities to meet their needs. According to the consulting company McKinsey, consumers from developing countries will move from the periphery of the global economy to its center in the next 15 years. The company calls it the greatest growth opportunity in the history of capitalism and predicts that consumption will rise in these countries by 2025 almost twice compared to 2010.<sup>10</sup>

The needs of the modern consumer and ways of satisfying them are changing rapidly, which is most influenced by the progressive digitization that allows customers to have a greater and more accurate selection of goods and services, which – also thanks to the technological revolution – in an ever wider producers and suppliers provide them with an assortment. Currently, the most important demand phenomena are customers' expectations of personalizing the offer, which is forcing adapting to their individual expectations, as well as a thorough change of profile buyers, primarily due to demographic factors – the aging of the population and the entry of a new generation of specific consumers expectations.

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<sup>7</sup> Rifkin J., *The Third Industrial Revolution: How Lateral Power Is Transforming Energy, the Economy, and the World*, St. Martin's Press 2011.

<sup>8</sup> World Bank, *Development Research Group, Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)* [online], In: [worldbank.org](http://worldbank.org) [access: 7.10.2017], <<https://data.worldbank.org/indicator/SI.POV.DDAY?view=chart>>.

<sup>9</sup> Kharas H., *The unprecedented expansion of global middle class. An update* [online], In: [brookings.edu](http://brookings.edu) [access: 7.10.2017], <[https://www.brookings.edu/wp-content/uploads/2017/02/global\\_20170228\\_global-middle-class.pdf](https://www.brookings.edu/wp-content/uploads/2017/02/global_20170228_global-middle-class.pdf)>.

<sup>10</sup> Desai P., Potia A., Salsberg B., *Retail 4.0: The Future of Retail Grocery in a Digital World* [online], In: [sipotra.it](http://sipotra.it) [access: 7.10.2017], <<http://www.sipotra.it/wp-content/uploads/2017/06/The-future-of-retail-grocery-in-a-digital-world.pdf>>.

The era of mass consumption is passing away forever. The same offer in a little different service model and targeted to everyone stops selling. In the sheer volume of information Potential customers are increasingly ignoring mass messages. They search the most corresponding offers and make their own consumption decisions. If they expect hints, it is to be addressed individually to them and meet their needs. There is a departure from profiling customer needs based on regional preferences or domestic.

Modern consumers are less and less spontaneous in their purchasing decisions. Before they decide to spend money, they have been looking for a good product or service on the Internet for a long time, check prices, compare with a competitive offer, read other people's opinions. When they finally decide to buy, even if they want to order goods in the online store, they will often go to a classic outlet, where exactly will watch him. Only a few years ago, customers were looking for information about the offer mainly on websites, now it is increasingly Facebook or another social networking site. Due to the growing popularity of smartphones and mobile applications, the purchasing process in e-commerce looks different. According to the "E-commerce in Poland 2016. Gemius for e-Commerce Polska" survey, over 40% of e-customers use a smartphone in the process of making online shopping.<sup>11</sup>

An analysis of consumer behavior is a preparation for personalizing your needs. Online activity makes it possible to find out who the customer is and what their needs are, and thus – to better match the offer targeted at him. Existing tools already allow this, which often collect a lot of data automatically (IP address, location, cookies), and the acquired knowledge can be used to prepare an individualized offer corresponding to the customer's preferences. Data on clients is relatively easiest to obtain for entities offering goods and services on the Internet, when these entities in various ways encourage to setting up accounts on their pages. In turn, stores operating "in the real world" promote loyalty cards. Collecting purchase history (including complaints), analyzing search phrases and phrases or opinions expressed not only makes it easier to target ads or suggest more products to the basket. The Zalando store, based on the profile of previous purchases, using self-learning algorithms in the analysis, prepares clothes for the new season for individual customers. The company's financial results indicate that the idea came true.

When talking about the changing requirements of customers, we usually think about young consumers who are the fastest and most often using the

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<sup>11</sup> Gemius, *E-commerce w Polsce 2016. Gemius dla e-Commerce Polska* [online], In: [ecommercepolska.pl](https://ecommercepolska.pl) [access: 7.10.2017], <[https://ecommercepolska.pl/files/9414/6718/9485/E-commerce\\_w\\_polsce\\_2016.pdf](https://ecommercepolska.pl/files/9414/6718/9485/E-commerce_w_polsce_2016.pdf)>.

opportunities offered by new technologies. Meanwhile, this group is only one of the market segments, in addition at current demographic trends are unlikely to be expected to increase. On the other hand, older people will increasingly benefit from the inventions of economy 4.0. As a result of the increase in life expectancy and a decrease in the number of births in developed countries, the number of older people will quickly increase in the coming years. In addition, contemporary and future seniors are less and less reminiscent of stereotypical, extremely economical, sick elderly people. A large part of them managed to accumulate significant resources during their professional life, some conduct their professional activity until old age, and the majority – due to the culture of a healthy lifestyle – are active consumers into old age.

In the US, the so-called a generation of “baby boomers”, i.e. people born during the baby boom lasting from the mid-1940s to the mid-1960s, a few years ago began to retire. People over 50 years old already make up half of the adult population, controlling up to 70% of the total disposable income. In 2050, consumers aged 50+ will have as much as 161 million in the United States, which means growth by 63% compared to 2010 (according to Nielsen data). This trend is also visible in other countries; in China, the number of people over 60 will double by 2053, and in Japan the population of 65+ will account for as much as 40% of the population in 2060. The situation is similar in Poland – currently people in post-working age constitute approx. For 19% of the population, and in 2050 their share will increase to 33%.<sup>12</sup> According to GfK data, the share of buyers aged 60 and over is – in the total the value of purchases made by households – 29.9%, and until 2035 will increase to 36.9%. People aged 60 and over have 21% of the total purchasing power Polish population. The annual value of household purchases made by this group of consumers currently amounts to PLN 48.2 billion in total. In this case, can you still talk about “market niche” about seniors? Especially if we consider their resources? According estimates currently the population of Great Britain aged 50+ owns 80% of the national wealth, and in Poland as much as 65% of people above 65 years of age is the property owner. In addition, seniors already control over 2/3 of disposable income the world. Euromonitor analysts presented that the global purchasing power of the 60+ age group in 2010 it was USD 8 trillion, and by the end of the present decade it will increase to USD 15 trillion. Given the size and importance of this group of consumers, it may come as a surprise that, for example, in the US, only 15% of advertising expenditure is allocated to messages targeted at older people.<sup>13</sup>

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<sup>12</sup> Digital/McKinsey, *Cyfrowi Polacy. Konsumenci w czasach e-rewolucji* [online], In: mckinsey.pl [access: 7.10.2017], <<http://mckinsey.pl/wp-content/uploads/2016/09/Raport-Cyfrowi-Polacy.pdf>>.

<sup>13</sup> Boyle M., *Aging Boomers Stump Marketers Eyeing \$15 Trillion Prize* [online], w: „Bloomberg” [access: 7.10.2017], <<https://www.bloomberg.com/news/articles/2013-09-17/aging-boomers-befuddle-marketers-eying-15-trillion-prize>>.



## Conclusion

Neither technology nor the disruption that comes with it is an exogenous force over which humans have no control. All of us are responsible for guiding its evolution, in the decisions we make on a daily basis as citizens, consumers, and investors. We should thus grasp the opportunity and power we have to shape the Fourth Industrial Revolution and direct it toward a future that reflects our common objectives and values.

To do this, however, we must develop a comprehensive and globally shared view of how technology is affecting our lives and reshaping our economic, social, cultural, and human environments. There has never been a time of greater promise, or one of greater potential peril. Today's decision-makers, however, are too often trapped in traditional, linear thinking, or too absorbed by the multiple crises demanding their attention, to think strategically about the forces of disruption and innovation shaping our future.

In the end, it all comes down to people and values. We need to shape a future that works for all of us by putting people first and empowering them. In its most pessimistic, dehumanized form, the Fourth Industrial Revolution may indeed have the potential to "robotize" humanity and thus to deprive us of our heart and soul. But as a complement to the best parts of human nature – creativity, empathy, stewardship – it can also lift humanity into a new collective and moral consciousness based on a shared sense of destiny. It is incumbent on us all to make sure the latter prevails.

Digital security remains a separate issue. Appearing in a relationship with the development of new technologies, new money-making opportunities and new models business often transforms into criminal patterns. Valuable for traders personal data resources are becoming increasingly difficult to control. Cyber attacks are vulnerable even to the largest enterprises, which are stolen valuable information about the development of technology, and as a result of a cyberattack they can even be paralyzed by increasingly better viruses. Certainly the role of the state in this field is to set minimum requirements for digital network security and vigilance over their fulfillment. However, how active should his role in the fight against hacker attacks be? It is known that in many countries there are government entities that analyze virus codes and even create invasive software; and this does not only apply to countries such as North Korea, China or Russia. Media in the world speculated that the virus that caused a serious failure of installations working for the needs of the Iranian nuclear program was created in the laboratories of the USA and Israel. Regulations related to personal data security remain an extremely sensitive issue. The state must impose on their

owners the framework in which they have the right to use it. At the same time, too restrictive regulations may cause difficulties for the development of innovative projects based on the collection and processing of sensitive information provided.

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# IMPACT OF INFORMATION ON NEW ECONOMY: THE CASE OF ITALY

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## SUMMARY

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As it happened at the time with the development of the press, "information" is available today to an increasing number of users and this has been amplified in the last thirty years by the existence of the Internet that represents the infrastructure of Information Society, a new economic model that is increasingly asserting itself in Europe and the world. In light of this, we can ask ourselves how the concept of "information" has evolved and whether the "resource" it represents, although widely spread among the population, is equally distributed among the same. Furthermore, what is the ease of access to information and what are the tools and guarantees that the public authorities put in place to facilitate information flows among the public? Moreover, can the information resource become an instrument of power in the hands of a few? This article evaluates the role of the information, supporting the structure of this new type of society, within the development of the new economy, which is the natural consequence of the process of economic globalization.

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## Introduction

The characteristic of our age is the creation of a global system that embraces all societies on the earth. The process that leads from the most well-known country-system to a single world system has its roots in the industrial capitalism and in the planetary hegemony that Europe exercised throughout the nineteenth century.<sup>1</sup> In *Principles of Political Economy* the author describes what were the first steps taken by the economic and social system towards what would later be called by the name of process globalization.<sup>2</sup> There are two key elements that Mill highlights:

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<sup>1</sup> Adekola A., Sergi B.S., *Global Business Management: A Cross-Cultural Perspective*, Routledge, New York 2016.

<sup>2</sup> Mill J. S., *Principles of Political Economy with some of their Applications to Social Philosophy*, ed. William James Ashley (Longmans, Green and Co., 1909, 7<sup>th</sup> ed., London 1920) 99/10/2019 <<https://oll.libertyfund.org/titles/101>>

- the decrease in transport costs;
- the widespread knowledge about working conditions in remote countries.

These two elements have evolved respectively in the decrease of ICT services costs and in the exponential dissemination of information, thus characterizing that process of globalization in which capitalism is no longer the industrial one, but that of knowledge and technological property, while the planetary hegemony is no longer of Europe but of the United States of America.

In this new type of society, the exchange of information has reached high levels only a decade ago, especially as a result of the evolution of electronic technology at the service, among other things, of intellectual revolution.

Globalization is a challenging, yet very flexible term, whose interpretations are as different as possible. The official definition given by the Organization for Economic Cooperation and Development (OECD) understands this process as that “through which markets and production in different countries become increasingly interdependent, by virtue of the exchange of goods and services and the movement of capital and technology “. This definition can and must be completed by affirming that globalization foresees global competition in a market that only apparently is unique, but that instead presents a dimension of bitter world competition in which the areas of influence of at least three imperialist poles are being defined: USA, EU and Japan or Asian area.<sup>3</sup>

If we do not stop at the simple definition, but we want to understand how and why markets become increasingly interdependent, how and why goods, technology and capital are exchanged today, beyond the borders of individual countries, we need to investigate the real meaning of the term globalization which suggests a qualitative change in our society. Undisputed protagonists of this change, which does not always take on a positive value but rather often has implications that stimulate economic and social inequalities,<sup>4</sup> are what are called electronic resources: programs, texts, web pages, data archives, library catalogs (OPAC), photos, videos, sound documents and all the information that can be made available especially through modern information technology.

### **The new Economy: a new market**

With the advent of an information society, a *new economic reality* has recently been affirmed and it has been defined by many as a *new economy*.

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<sup>3</sup> Vasapollo, L. *Nuove frontiere del capitale intangibile come risorsa strategica per il management aziendale del 2000*, “International Review of Sociology 1994, n.1.

<sup>4</sup> Qerimi, Sergi B. S., *Development and social development in the global context*, “International Journal of Business and Globalisation” 2015, 14(4): 383-407.

The definition of *new economy* was used at Lisbon summit (23-24 March 2000), as a “common European knowledge economy”, thus underlining the importance of information resources (in the broadest meaning of knowledge). This model referring to the US model of consumption-based development – a model that highlights the values of the stock exchange, thus exposing household savings to serious risks – is imposed thanks to the advent of new multimedia technologies that have increased the speed of information dissemination, but also their perishability, creating a sort of virtual marketplace where everyone sells and buys, everyone hopes and believes they can become billionaires, without in most cases, knowing what is produced. The most striking expressions of the role of information in the *new economy* are represented by the use of Internet in the firms and companies: e-commerce, new professionalism associated with the web, online advertising, domain grabbing and so on.<sup>5</sup>

When dealing with the Internet and the problems associated with it, it must be borne in mind that the World Wide Web is much more than just a network. Each of its “components” – technology, consumers, providers of various types of computers, communication, information, human creativity – are constantly evolving. The economy based on these components is as complex as the components themselves. So, trying to use a single model to efficiently explain and allocate this various and dynamic set of elements is not only inappropriate, it is impossible.

The definition of *new economy* is a “conceptual fake”, since any economy is born as “new” and is allocated to become “old”, especially if it does not represent a simple theoretical model but a reality that, in addition to expressing current trends on the markets, also implies social and behavioral patterns that strongly influence daily life. For this reason, therefore, we can speak of an evolution of the *old economy* in which the sector of business services has grown thanks to developments in electronic and ICT technology. The industry thus lives a new era, enriching itself with categories that seem a natural evolution of those already existing, thanks to the growth of the world of knowledge.

It therefore makes little sense to talk about a new economy, separated from everything that preceded and made it possible; instead, it makes sense to talk about an evolved market in which exchanges promote goods with a high technological content and are essentially made possible by information technology.

The *new economy* is the consequence of the establishing society of information that now dominates the economic and social scenarios. What we live is in fact the global information society, that is, the knowledge-based economy

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<sup>5</sup> Sergi B. S., Popkova, Aleksei E.G., Bogoviz V., Litvinova T, N., *Understanding Industry 4.0: AI, the Internet of Things, and the Future of Work*, Emerald Publishing Limited, Bingley, UK 2019.

and all advanced economies are now increasingly subordinate to the ability to process, distribute and use information and knowledge.

In 1996 OECD survey had already shown that more than half of the overall GDP of advanced economies was based on knowledge and, the peculiar characteristic of these economies does not lie so much in the huge quantity of information that they produce for the benefit of consumers, as in the use of knowledge both as input and as output in every sector.

Knowledge has always been the primary source of economic growth in the long term, from the agricultural revolution to the present day, even if there is a fundamental difference: today, thanks to information technology, it is possible to transmit an amount of information at great distances and at relatively modest costs thus, accelerating the motivation towards a knowledge-based economy. In 1997, The European Commission declared that the development of the information society has been boosted by the rapid technological changes that transform industries of information with a speed and characteristics that pose new challenges to policy makers.<sup>6</sup>

We agree upon the fact that the developments of digital electronics and software create the technological potential for an innovative approach to the dissemination and use of information services: we agree less on the extent of these developments and on the times required. Some researchers consider that the specific characteristics of each sector will limit the extent of the convergence of services: economic conditions and content of information services must be regulated separately if they want to guarantee their effectiveness and quality. According to others, the rapid and complete transformation of the current sectors of telecommunications, media and information technologies will be such that areas that are now independent will end up merging into one, canceling out the reciprocal differences. It seems to us that so far this is the most realistic hypothesis, even if not entirely acceptable, given that currently the interdependence between sectors is ever more marked, accelerating the push towards globalization of the economy and towards the achievement of the power of multinational corporations in the ICT and technology fields.

The political basis of these arguments is provided by the same concept of the Information Society which provides a reason that happens at earlier times in the economic development of the industrialized world: the feudal society was based on the labor force, the industrial society on energy, the society of the information, precisely, on information.<sup>7</sup> The development of the information

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<sup>6</sup> Commissione Europea, *Libro Verde sulla convergenza tra i settori delle telecomunicazioni, dell'audiovisivo e delle tecnologie dell'informazione e sulle sue implicazioni normative*, Bruxelles 1997, <http://www.ispo.cec.be/convergencegp>,

<sup>7</sup> Basili C., *La biblioteca in rete*, Editrice Bibliografica, Milano 1999.

society represents that stage of economic evolution characterized by the creation of economic value through the production and use of information, i.e. through the difference between the value in use of the information produced and its cost.<sup>8</sup>

So, while the industrial revolution has been determined by the technical progress of production and transportation systems, the information revolution is fueled by innovations that allow information to be processed, stored and distributed more quickly and less expensive. While the enterprise expressed by the industrial revolution was based on mass production and the development of transport and logistics structures, what is emerging from the current revolution bases its *raison d'être* on the ability to coordinate among them, through technologies information on the various internal and external production factors depending on the market.

The evolution of information has produced an important change in the modern entrepreneurial function:<sup>9</sup> information resources are decisive in the business context since each decision-making unit, or company decision-maker, needs to search, acquire and process information to achieve a balanced economic management.<sup>10</sup> The company that is entering ever more complex markets must conduct and transfer information that is qualitatively increasingly connected in the growth of the environmental complexity in which it is used.<sup>11</sup> The company's ability is therefore not only to find information, but to use it in a competitive manner with respect to the competition.

What innovative technologies make possible is not only the constitution of new industrial sectors, but above all the modification of the structure and activity of existing sectors. And it is precisely the market, understood as a manifestation of the demand of the community of consumers, to be the true protagonist of the scenarios that are taken shape.

It is possible to speak of a market that is based on the concept of information as an economic resource and as part of the heritage of an organization because the information society is a reality characterized by the progressive application to the various fields of economic and social life of processing technologies and the remote transmission of the "information resource". The term resource indicates, for business use, an entity (tangible or intangible) used by the company to

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<sup>8</sup> Mandelli A., *Internet, la conoscenza e la fiducia: prime riflessioni sull'economia delle risorse immateriali nel cyberspazio*, SDA Bocconi, Milano 1997, [http://www.tin.it/osservatorio\\_bocconi/papfidu.htm](http://www.tin.it/osservatorio_bocconi/papfidu.htm)

<sup>9</sup> Martufi R., Vasapollo L., *Profit State, redistribuzione dell'accumulazione e reddito sociale minimo*, La Città del Sole, Napoli 1999.

<sup>10</sup> Goyal S., Kapoor A., Esposito M., Sergi, B.S., *Understanding business model-literature review of concept and trends* "International Journal of Competitiveness" 2017, 1(2): pp. 99-118.

<sup>11</sup> Qerimi, Sergi B. S., *Development and social development in the global context*, "International Journal of Business and Globalisation" 2015, 14(4): 383-407.



achieve its objectives. The intangible resources, even if not reflecting a tangible measure of corporate economic management, are nevertheless decisive for the long-term evolution of the company system: human resources and corporate culture, expressed by professional qualifications, knowledge, training, ideas, creativity, in a single word from “information”, constitute the key resource of intangible capital.<sup>12</sup>

### The resource of information

According to Lynch, the concept of “information resource” is a complex of databases and computer applications that make these databases accessible to a vast community of users.<sup>13</sup>

We have so many different definitions of information:

- 1) Online information: commercial electronic information, distributed by the on-line information industry against payment;
- 2) Network information: electronic information originated and distributed free on the Internet;
- 3) Electronic information: in addition to the first and the second information, it also includes information on optical media;
- 4) Network ICT resource: interactive object or service available in the network in a broad sense that can be expressed as: *files* (texts, images, structured digital archives, digital audio or video, computer programs); *interactive services* (i.e. electronic conference services); *aggregations of information* (databases, electronic archives accessible via FTP, archives of electronic conference messages).

Information is therefore now an important resource as much as capital and labor, so much so that the “production factor of immaterial information” is decisive for the increasing processes of business value and of the entire capitalist system that characterize the current economic scenarios (Martufi, Vasapollo, 2000).<sup>14</sup>

It is the information and therefore consequently the communicational models associated with it, which constitutes the key resource of intangible capital and in this sense, it can be defined as the capital of abstraction. It can even be argued that all the resources that directly or indirectly derive from information are the capital of abstraction, that is to say, a set of invisible resources that are

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<sup>12</sup> Vasapollo, L. *Nuove frontiere del capitale intangibile come risorsa strategica per il management aziendale del 2000*, “International Review of Sociology 1994, n.1.

<sup>13</sup> Lynch C., Preston C.M., *Internet Access to Information Resources*. /In:/ Annual Review of Information Science and Technology 1990, vol. 25.

<sup>14</sup> Martufi R., Vasapollo L., *Profit State, redistribuzione dell'accumulazione e reddito sociale minimo*, La Città del Sole, Napoli 1999.

increasingly able to provide competitive advantages of strategic value. The *capital of information* is strategic to impose the Darwinist dynamics of the savage capitalism for the determination of super-profits, enterprise value increases, for the explosion of forms of flexible accumulation.”<sup>15</sup>

For this reason, it is interesting to note that the dissemination of information is paradoxically accompanied by a profound ignorance about some phenomena in the community: it seems strange, but more widespread are the news, less known are among people. This is because one of the problems underlying the *new economy* is the gap between the potentiality and the use, between users and non-users of modernity. In other words, what can easily occur are false expectations or ideal visions. Technological potentiality, the innovation, often do not find application and this is partly due to the speed with which the innovations themselves follow one another, partly due to the individual's inability to keep up with these changes and therefore to make them culturally their own. On the other hand, in the ICT sector the proliferation of a very wide and diversified typology of equipment and the consequent offer of numerous solutions to various problems make the guidelines and forecasts more difficult in a very fragmented context as far as the standards are concerned: standards that are often imposed by the major companies that dominate the market (www.forumti.it).

In the new economy, “communication is communication for communication”, which reproduces itself and communicates only *culture of profit* and tends to become a deviant, total, global nomadic communication; also a strategic asset that transmits the culture of the empire of capital into a now globalized market, in which the crisis of production is completely replaced by that of the social distribution of goods, income and total and socially realized wealth.”<sup>16</sup>

### The new economy in Italy: e-commerce

How central is the place occupied by information in the context of new economic scenarios is demonstrated by the growth of the Internet phenomenon and the economy linked to it? The Internet economy is the study of the market for Internet-related services.<sup>17</sup> In this market the new network would be the driving force of the economy and of the information society having as its main effect the possibility of compressing time more than space.<sup>18</sup> In fact, no other

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<sup>15</sup> Ibidem.

<sup>16</sup> Ibidem.

<sup>17</sup> McKnight L.W., Bailey J. P., *Internet Economics*. MIT, Cambridge 1997.

<sup>18</sup> Grazzini E., *Piccole imprese crescono on line*, /In:/ “L'Impresa” 1997, n. 9.

successful product or service has evolved as rapidly as the Internet. The changes that the network implies have been and are so fast that those who cannot anticipate the times risk being cut off from the market and from the possible advantages of its evolution.

In this context, the new services and activities made possible by the different technological and market trends can influence all phases of our existence: from family life to work, from the way we carry out business to the way of life. Today, in many cases it is possible to use the computer to connect to your bank, book theater tickets, buy the same computer: to do that, users must feel at ease, use new technologies with ease and safety, and the regulatory framework has an important task to do in order to make users trust the new reality.

Such a scenario profoundly undermines the theory of classical economics, in particular the principle it expresses as scarcity. In the traditional sense, in fact, we cannot talk about the scarcity of knowledge as the more they are used and transmitted the more they proliferate. Unlike traditional goods, knowledge and information, made available through the Web, are characterized by their possibility of „expanding to infinity”, in the sense that their use by a greater number of people does not cause their exhaustion : in the new economy the ability to understand and use knowledge is poor. It is on this scarcity, therefore, that attention must be focused, trying to understand its causes and, if necessary, removing them.

Italian e-commerce is one of the markets with the greatest potential. This is demonstrated by the comparison with foreign markets, which despite continuing to double-digit growth each year in Italy, about 18%, the penetration on the overall market is still far from the other Northern European countries

In recent years, however, companies from abroad have conquered the most interesting sectors and created the online market. Selling online means terribly managing important economies that require investing in the service and in acquisitions. *Booking* and *Expedia* have done so during the years in tourism, *Amazon* in consumer electronics and publishing, *Just Eat* in the delivery of food, *Zalando* in clothing despite the resistance of *YOOX*. Today, new actors are entering sectors that have been protected so far, such as the pharmaceutical sector. To make the difference is accessing to loan in order to transform the company in Italian e-commerce companies that expand internationally.

According the survey carried out by *Osservatorio ecommerce B2C-Consortio Netcom/School of Management of Politecnico* in Milan, in 2019, online purchases by Italians continue to grow and exceed € 31.5 billion for + 15% compared to 2018, when they reached € 27.5 billion. The rise of the amount is linked to the products which show a + 21%, equal to 18.2 billion euros, while services reach 13.3 billion (+7%).

## La domanda eCommerce B2c

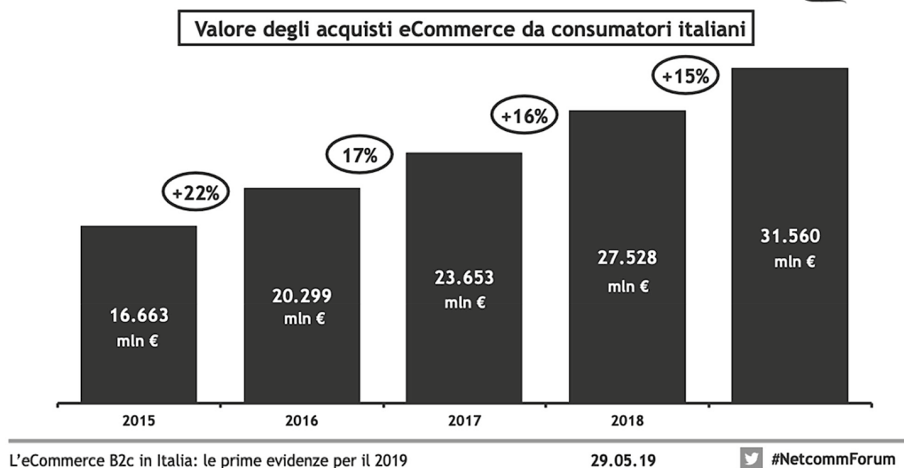


Figure 1: The B2C eCommerce application

Source: #NetcommForum

There are also the ICT and electronics sectors, + 18% and 5 billion in value, and clothing (+ 16% and 3.3 billion). The emerging sectors also include furniture & home living (+ 26%, 1.7 billion), food & grocery (+ 39% and almost 1.6 billion) but a vital role has still tourism with + 8% and 10.8 billion.<sup>19</sup>

Alessandro Perego, the scientific director of the Observatories of digital innovation of the Polytechnic School of Management, comments that ecommerce is increasingly important, also because it is the engine of innovation for the entire retail sector. Although it still represents only 7% of total purchases, it explains over 60% of retail growth, which is expected to be 6.5 billion. It is as if it steals growth spaces to the traditional business. Another essential element is the value of e-commerce sales from Italian sites, which is estimated at € 28.667 billion in 2019 and 4.38 billion are sales made to foreign customers.

The global scenario of online sales presents numbers very different from those of our home: Roberto Liscia, president of *Netcomm*, confirms that only 44% of Italians buy online, compared to 68% of the European population and 86% of the UK but, more alarmingly, is the datum that only 10% of Italian companies sell their products online. The cause is the poor ability to apply the available technologies to expand own business.

<sup>19</sup> Wamboye E., Tochkov K., & Sergi B.S., *Technology Adoption and Growth in sub-Saharan African Countries*, "Comparative Economic Studies" 2015, 57(1): pp. 136-167; Goyal S., Kapoor A., Esposito M., Sergi, B.S., *Understanding business model-literature review of concept and trends.*"International Journal of Competitiveness" 2017, 1(2): pp. 99-118.

World-wide e-commerce is growing and will grow; it will not stop; it has no negative conjuncture. It is a change that captures all the processes from the production to the final consumer. China is the apex of this pyramid and in 2018 had an impressive turnover of 633.9 billion, but the future growth is even more impressive: by 2023 it is estimated that the turnover will be 1095.5 billion. The US will reach 740.4 billion in 4 years and Europe 515 billion (see the figure below).

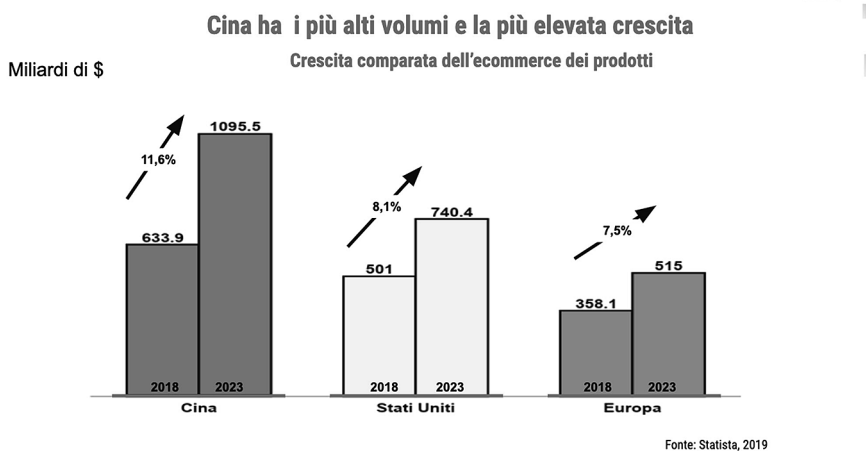


Figure 2: China has the highest volumes and the highest growth

Source: #NetcommForum

So, what has happened in Italy is that everyone has a smartphone, but few are really digitalized, especially in the world of small and medium-sized businesses. The current state of digitalization in Italy is still shaky. From the stage of the Netcomm Forum, Luca Attias, extraordinary commissioner for the implementation of the digital agenda, spoke of a true “Italian digital emergency, which is not perceived. In our country there are behaviors such as nepotism, favoritism, corruption, which could be fought simply by digitization”. The Digital economy and society index which monitors digital connectivity and skills, online activity and the digitalisation of businesses and public services, sees us 25th in Europe and at the bottom of all international rankings, although we have the largest number of citizens who own a smartphone and are users on Facebook.

## Conclusion

Information, more often in digital form, is the raw material of the *new economy*. The energy needed to transform this raw material is not electricity, but electronics, while digital networks constitute the means of transport to bring the information to its destination under all its forms, including sound and image.

Competition becomes universal, particularly on the Internet. The *new economy* is global, privileges intangible objects, such as information, and is strictly interconnected. That the ideology of the *new economy* comes from the United States is not surprising as the United States has been the core and the engine of financial globalization, which, in the American society has caused the weakening of the industrial apparatus and its subordination to the sectors more closely linked to financial processes. The weakening of the industry has led to a drop in well-paid jobs in favor of precarious jobs. Structurally, the *new economy* has existed for a long time, for at least fifty years. Information technology products have been the most dynamic component of investments since the mid-1960s.

Computer science, globalization and flexibility would be at the center of a third industrial revolution: networked systems are capable of producing according to the particular needs of each customer and therefore increase the potential market. In doing so, however, we lose the fact that what is new in information technologies is not digital technology but the transformation into a commodity of a whole part of human activity: communication. The telematics and the increasingly sophisticated means of communication has provoked a decisive evolution in the concept of communication: no longer a simple process of transmitting information of a predominantly commercial nature, but as an organizational capacity to acquire consensus in society capable of finalizing organizational knowledge and behaviors in order to convey the company idea in the whole society.<sup>20</sup>

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<sup>20</sup> Martufi R., Vasapollo L., *Comunicazione deviante. L'impero del capitale sulla comunicazione*. MediaPrint Edizioni 2000.

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# THE MONEY LAUNDERING RISK AND REGULATORY CHALLENGES FOR CRYPTOCURRENCY MARKETS

## SUMMARY

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The rapid growth of cryptocurrencies and the development of crypto infrastructure become the cause of concern for the state authorities responsible for financial safety. More and more regulators are worried about criminals who are increasingly using cryptocurrencies for illegitimate activities like money laundering, terrorist financing, and tax evasion. Users' pseudonymity and the borderless nature of the digital currencies are significantly increasing the money laundering risk. The paper analyses the main vulnerabilities of cryptocurrency markets, namely crypto mixers, shadow money service business, and lightning network transaction, which appeared due to the development of technologies. Typical stages of the money laundering process with cryptocurrency using are defined, as well as the new challenges for financial markets regulators are highlighted. We recommend the mechanism to mitigate the money laundering risk, which includes strengthening of anti-money laundering procedures, more efficient transaction monitoring by financial institutions, development of international standards of cryptocurrency markets and transactions regulation, improving the cryptocurrency exchanges and other market players regulation.

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## Introduction

The rapid development and increasing adoption of new payment products and financial services pose plenty of challenges for financial markets regulators and private sector institutions. One of those challenges is ensuring that new payment technologies and products are not misused for money laundering and terrorism financing purposes.

During the last years, a marked number of cryptocurrencies have emerged and some of them attracted significant investment to build payment infrastructure on the relevant software protocols. Such payment infrastructures and protocols providing a new method for transferring value through the internet of decentralized peer-to-peer networks.



Criminals quickly appreciated that cryptocurrencies have unique properties that could potentially serve their interest in evading law enforcement. Users of cryptocurrency employ pseudonyms, and it can be easily transferred without intermediaries and across international borders. While it is impossible to quantify exactly how much bitcoin is used illicitly, analyzing the laundering of bitcoins gives insight into criminals' methods for hiding their illicit proceeds<sup>1</sup>.

Cryptocurrencies and related payment systems nowadays are often recognized as a future of financial markets, and, in the same time, should provide an even-more powerful new tool for criminals, terrorist financiers and other illegal money transfer makers to move and store illicit funds, out of the reach of law enforcement. This may create unique new challenges in terms of money laundering and terrorism financing risks. Although the global volumes and estimates are relatively low, Europol has reported in 2017 that 3-4% of Europe's crime proceeds were laundered through cryptocurrencies – and this percentage will have upward trend due to the rate of digital currencies adoption by institutional investors and financial institutions<sup>2</sup>.

Taking into account the borderless nature of the digital currencies' phenomenon, majority of international institutions have focused on reports and issued concerning cryptocurrencies and related risks, including money laundering and terrorism financing risks. In instance, Financial Action Task Force (FATF) and European Banking Authority have published recommendations in this issue, concluding that digital currencies exchanges allowing the conversion of digital currencies into fiat money are of particular relevance and must be brought within the scope of the respective national anti-money laundering and counter-financing terrorism (AML/CFT) frameworks.

In June of 2018, the European Parliament and Council published an update to the bloc's anti-money laundering directive. Known as AMLD5, the deadline for its implementation is January 2020. Under the new rules, all crypto exchanges and wallet custodians operating in Europe will have to implement strict know-your-customer (KYC) onboarding procedures and will need to register with local authorities. They will also be required to monitor transactions and to report suspicious activity to the relevant bodies. Furthermore, national authorities, including tax collectors, will be able to obtain crypto user information from the relevant exchanges<sup>3</sup>. At the same time, when we look at the key players in

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<sup>1</sup> Fanusie Y., Robinson T., *Bitcoin laundering: an analysis of illicit flows into digital currency services*, Center on Sanctions and Illicit Finance memorandum, January, 2019.

<sup>2</sup> Europol, *Drugs and the Darknet – Perspectives to Enforcement*, 2017.

<sup>3</sup> Acheson N., *The Hidden Effects of Crypto Money Laundering Rules*. Apr 20, 2019. <https://www.coindesk.com/the-hidden-effects-of-crypto-money-laundering-rules>

cryptocurrency markets, we can see that a number of those are not included in AMLD5, leaving blind spots in the fight against money laundering, terrorist financing and tax evasion. The examples are numerous and include miners, pure cryptocurrency exchanges that are not also custodian wallet providers, hardware and software wallet providers, trading platforms and coin offerors. Persons with malicious intent could look up these blind spots.

The concern about illicit transfers is not just limited to Europe. In December of 2018, leaders from the G20 nations reiterated their pledge to develop comprehensive AML rules for cryptoassets. As a result, FATF published Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers, which intend to help countries and virtual asset service providers understand their anti-money laundering and counter-terrorist financing obligations, and effectively implement the FATF's requirements as they apply to this sector. Countries are now required to assess and mitigate their risks associated with virtual asset financial activities and providers; license or register providers and subject them to supervision or monitoring by competent national authorities. Virtual asset service providers are subject to the same relevant FATF measures that apply to financial institutions<sup>4</sup>.

## Literature review

The cornerstone of existent AML/CFT due diligence requirements is Know Your Customer Policy (KYC). It has to be noted, that KYC requirements were first implemented in the 1970s, therefore they were primarily directed on traceability of assets as long as those remaining in the financial system and allow the identification of money laundering/terrorism financing indicia.

One of the challenges is that KYC and other AML/CFT requirements were designed for a centralized intermediated financial system, in which regulatory requirements and sanctions can be imposed by each jurisdiction at the level of financial intermediaries operating on its territory. In the contrast, cryptocurrencies rely on the set decentralized cross-border virtual protocols and infrastructure elements, neither of which has a sufficient degree of control<sup>5</sup>.

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<sup>4</sup> FATF, *Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers*. <https://www.fatf-gafi.org/publications/fatfrecommendations/documents/guidance-rba-virtual-assets.html> (2019).

<sup>5</sup> Poskriakov F., Chiriaeva M., Cavin C., *Blockchain&Cryptocurrency Regulation 2019. Cryptocurrency compliance and risks: a European KYC/AML perspective*. <https://www.globallegalinsights.com/practice-areas/blockchain-laws-and-regulations/13-cryptocurrency-compliance-and-risks-a-european-kycaml-perspective> (2019).

There are plenty of views that cryptocurrencies used for tax evasion<sup>6</sup>, money laundering<sup>7</sup>, and illegal activity financing, with estimated 46% of Bitcoin transactions occurring in the grey sector of the economy<sup>8</sup>. Furthermore, significant market volatility and bubble-like behavior<sup>9</sup> present risk concerns for individual investors and theoretically pose a systemic risk threat to the financial system as a whole. Cryptocurrency represents an asset class that can be assessed using simple finance tools. At the same time, cryptocurrencies comprise an asset class which is radically different from traditional asset classes<sup>10</sup>.

The lack of the regulatory focus of theoretical and empirical research on cryptocurrencies has been highlighted in the early foundational papers in the field<sup>11</sup>. Recent systematic analyses of cryptocurrency-related academic sources still concede that the existing literature, particularly on regulatory issues, is rather limited, inconclusive and immature<sup>12</sup>.

The participants of the cryptocurrency regulation debate can be classified into two broad categories: “mainstream risk-averse regulation bulls” and “crypto-anarchist regulation bears”. Members of the first broad group generally estimate the expected gains associated with reduced volatility and increased adoption due to the establishment of the regulatory framework to exceed the potential efficiency losses, while the representatives of the second group generally presume the opposite, and tend to claim that government regulation of blockchain technologies and cryptocurrencies, in particular, contradicts the initial idea of decentralisation, blockchain-based payment networks being effectively a “real hedge” against potentially too intrusive government, while some regulatory measures, e.g. know-your-customer procedures, partially compromise essential technological solutions of blockchain such as pseudonymity<sup>13</sup>.

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<sup>6</sup> Slattery T., *Taking a bit out of crime: bitcoin and cross-border tax evasion*, Brooklyn J. Int. Law 39 (2), 2014, pp. 829–873.

<sup>7</sup> Bryans D., *Bitcoin and money laundering: mining for an effective solution*, Indiana Law J. 89 (1), 2014, pp. 441–472.

<sup>8</sup> Foley S., Karlsen J., Putniņš T., *Sex, drugs, and bitcoin: How much illegal activity is financed through cryptocurrencies?* Rev. Financ. Stud. 32 (5), 2019, pp. 1798–1853.

<sup>9</sup> Fry J., *Booms, busts and heavy-tails: The story of Bitcoin and cryptocurrency markets?* Econ. Lett. 171 (4), 2018, pp. 225–229.

<sup>10</sup> Liu Y., Tsivinski A., *Risk and return of cryptocurrency*, NBER Working Paper No. 24877, 2018, <http://www.nber.org/papers/w24877>

<sup>11</sup> Dwyer G., *The economics of Bitcoin and similar private digital currencies*, J. Financ. Stab. 17 (2), 2015, pp. 81–91.

<sup>12</sup> Corbet S., Lucey B., Urquhart A., Yarovaya L., *Cryptocurrencies as a financial asset: a systematic analysis*, Int. Rev. Financ. Anal. 62 (1), 2019, pp. 182–199.

<sup>13</sup> Shanaev S., Sharma S., Ghimire B., Shuraeva A., *Taming the blockchain beast? Regulatory implications for the cryptocurrency Market*, Research in International Business and Finance 51, 2019.

Obviously, to discuss the impact of regulation on cryptocurrency value one should understand to which extent government action can influence the blockchain payment systems in the first place. As cryptocurrencies implement various security solutions to make transaction tracking and the association between physical, legal and digital persons prohibitively hard, the question whether state regulation can, if desired so, effectively restrain blockchain payment systems is a valid and a non-trivial topic to investigate. It is also a relevant issue given the fact that while regulation is a predominantly national matter, cryptocurrencies are necessarily exterritorial<sup>14</sup>.

## Methodology and data

Cryptocurrencies have grown rapidly in popularity and mainstream adoption. Over 2800 cryptocurrencies exist with market capitalization exceeding \$220 billion as at September 2019. Bitcoin, the largest cryptocurrency, accounts for around 68% of the total market capitalization. The numerous online cryptocurrency exchanges and markets have daily dollar volume of around \$50-100 billion.

Researches of cryptocurrency markets show that that approximately one-quarter of bitcoin users are involved in illegal activity, and around \$76 billion of illegal activity per year involves bitcoin (46% of bitcoin transactions), which is close to the scale of the US and European markets for illegal drugs<sup>15</sup>. The problem is significant: even though the full scale of misuse of virtual currencies is unknown, its market value has been reported to exceed EUR 7 billion worldwide<sup>16</sup>.

Bad actors need to launder the \$US 1.7 billion of cryptocurrency stolen and scammed in 2018. Furthermore, they need to get it all done before tough new global anti-money laundering (AML) and counter terror financing (CTF) regulations go into effect over the next year.

Of the \$1.7 billion, hackers stole more than \$950 million from cryptocurrency exchanges and infrastructure during 2018, which is 3.6x higher than in 2017. Cyber crooks also developed ingenious new techniques to

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<sup>14</sup> Auer R., Claessens S., *Regulating cryptocurrencies: assessing market reactions*, BIS Quarterly Review September, 2018.

<sup>15</sup> Foley S., Karlsen J., Putniņš T., *Sex, drugs, and bitcoin: How much illegal activity is financed through cryptocurrencies?* Rev. Financ. Stud. 32 (5), 2019, pp. 1798–1853.

<sup>16</sup> Houben R., Snyers A., *Cryptocurrencies and blockchain. Legal context and implications for financial crime, money laundering and tax evasion*, European Parliament. Policy Department for Economic, Scientific and Quality of Life Policies, 2018, <http://www.europarl.europa.eu/supporting-analyses>

drain millions more from user accounts and wallets. On top of that, ICO exit scams, phony exchange hacks, and Ponzi schemes victimized investors and cryptocurrency users for almost three quarters of a billion dollars (CipherTrace, 2019). The total value of stolen cryptocurrencies had downward trend during the second part of 2018 due to the falling price. In addition, rather than hacks on exchanges and wallets, inside jobs began to dominate the crypto crime landscape. It appears that a new breed of cybercriminals steeped in computer science and FinTech found it easier to commit fraud against unwitting investors and exchange users as opposed to attacking hardened IT systems.

Criminals must launder all of ill-gotten gains before they can spend those funds in the real economy. In addition, global gangs, terrorist groups, and cyber criminals must hide their money trails. These bad actors are clearly flocking to jurisdictions with weak AML and Know Your Customer regimes, because the results of CipherTrace research showing 97% of criminal bitcoin flows into unregulated cryptocurrency exchanges. While recognizing the tremendous potential for innovation provided by blockchain technology, this dark side of the cryptocurrency ecosystem is not lost on regulators. And 2018 saw major moves around the globe to rein in the Wild West aspect of these markets. By 2020 most modern economies will have deployed strict cryptocurrency anti-money laundering regulations.

The analysis of worldwide regulatory events on cryptocurrency markets during 2017-2019<sup>17</sup> has shown significant attention to the anti-money laundering measures (more than 29% of events), as well as to issuance regulation (24%). Thereby the problem of mitigating the money laundering risk in cryptocurrency transaction can be considered as one of the most relevant at the contemporary stage of financial markets development. To solve this problem regulators will need to change the existing approaches with taking into account all the features of cryptocurrencies and their transaction channels.

## Results

While financial institutions have acquired techniques to combat money laundering and terrorism financing over the last 40 years for traditional payment services, cryptocurrencies have existed only since 2008. A lot of financial market players hesitate how to deal with this new financial instrument which provide criminals with a new way of laundering money.

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<sup>17</sup> Shanaev S., Sharma S., Ghimire B., Shuraeva A., *Taming the blockchain beast? Regulatory implications for the cryptocurrency Market*, Research in International Business and Finance 51, 2019.

For financial institutions, it is almost impossible to determine whether an anonymous account correlates to a sanctioned subject as the blockchain underlying the cryptocurrency typically does not store information that can be used to identify the account holder. Even if blockchain were to store such information, there are several options to conceal identity and IP addresses. At best, financial institutions can only identify one side of the transaction: typically, their own client<sup>18</sup>.

Poskriakov et al.<sup>19</sup> highlight three main features why cryptocurrencies are vulnerable to money laundering risks, namely anonymity, traceability, and decentralization. The majority of cryptocurrencies have anonymity or pseudonymity by design. But such anonymity doesn't concern information on transactions – dates, value and the counterparty addresses, which are recorded and available for everyone. So, on the one hand, enforcement authorities are partly able to track transactions by linking the identity to an account or address. On the other hand, a number of solutions increases rapidly that allow a certain enhancement to the anonymity. The traceability risks may not be significant when dealing with single distributed ledger or protocol, but when situation becomes more complicated when cross-currency exchanges are made. To track those authorities may need access to off-chain records of unregulated intermediaries and exchanges from different jurisdictions. The risk of decentralization appears due to the rapid evolving nature of distributed ledger technology and cryptocurrencies protocols business models. The probability of doubtful transactions from cryptocurrencies market to the fiat financial system rises simultaneously with the cryptoinfrastructure's development.

The nowadays topical threats on cryptocurrencies markets are shown below (Table 1).

Some of abovementioned threats may be considered as types of fraud, but crypto mixers, shadow money service business, and lightning network transaction definitely have concern to money laundering schemes. Cryptocurrency mixers blend potentially identifiable cryptocurrency funds with large amounts of other funds, so plenty of people use those to keep their cryptocurrency transactions private. These services typically do not require KYC checks, and they are primarily used to anonymize fund transfers between services. Therefore, the risk

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<sup>18</sup> Sprenger P., Balsinger F., *Anti-money laundering in times of cryptocurrencies*, KPMG. Compliance Matters, 2019.

<sup>19</sup> Poskriakov F., Chiriaeva M., Cavin C., *Blockchain&Cryptocurrency Regulation 2019. Cryptocurrency compliance and risks: a European KYC/AML perspective*. <https://www.globallegalinsights.com/practice-areas/blockchain-laws-and-regulations/13-cryptocurrency-compliance-and-risks-a-european-kycaml-perspective> (2019).

of using crypto mixers as money laundering or hiding profits tool is quite high. At the same time some user may have legitimate privacy or political reasons to cover up their operations.

Table 1: Modern threats on cryptocurrencies markets

SIM Swapping	An identity theft technique that takes over a victim's mobile device to steal credentials and break into wallets or exchange accounts to steal cryptocurrency
Crypto Dusting	A new form of blockchain spam that erodes the recipient's reputation by sending cryptocurrency from known money mixers
Sanction Evasion	Nation states using cryptocurrencies promoted by governments
Next-Generation Crypto Mixers	Money laundering services that promise to exchange tainted tokens for freshly mined crypto, but in reality, cleanse cryptocurrency through exchanges
Shadow Money Service Businesses	Unlicensed Money Service Businesses banking cryptocurrency without the knowledge of host financial institutions, and thus exposing banks to unknown risk.
Datacenter-Scale Crypto Jacking	Takeover attacks that mine for cryptocurrency at a massive scale have been discovered in datacenters.
Lightning Network Transactions	Enable anonymous bitcoin transactions by going „off-chain“
Decentralized Stable Coins	Stabilized tokens that can be designed for use as private coins
Crypto Robbing Ransomware	Cyber-extortionists began distributing new malware that empties cryptocurrency wallets and steals private keys while holding user data hostage

Source: own study

According to the research in the field of high-risk conversion services<sup>20</sup> certain types of conversion services have higher propensities to receive bitcoins and other cryptocurrencies from illicit sources, making them higher AML risks. Mixers and online gambling sites have the biggest money laundering problem – they process far and away the highest proportion of dirty coins. In instance, mixers have consistently processed about a quarter of incoming illicit bitcoins per year, while the proportion laundered through exchanges and gambling combined has been roughly constant (66 to 72 percent). All abovementioned lead to the conclusion that financial authorities in all jurisdictions must increase AML enforcement of mixers and online gambling sites.

The money laundering process in theory often consists of three stages – placement, layering, and integration. Using the cryptocurrency and cryptomarkets tools during those stages can make laundering operations much more easy and rapid (see fig. 1).

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<sup>20</sup> Fanusie Y., Robinson T., *Bitcoin laundering: an analysis of illicit flows into digital currency services*, Center on Sanctions and Illicit Finance memorandum, January, 2019.

Placement	Layering	Integration
<ul style="list-style-type: none"> <li>• ability to open a lot of anonymous or pseudonymous wallets</li> <li>• low cost of wallets opening</li> <li>• low risk of placing proceeds of illicit activity</li> </ul>	<ul style="list-style-type: none"> <li>• easy transfers from wallet to wallet</li> <li>• conversion into different types of cryptocurrencies across borders, or into fiat currencies</li> <li>• unregistered ICOs under control of criminals</li> </ul>	<ul style="list-style-type: none"> <li>• accepting of cryptocurrencies by goods and services sellers</li> <li>• rapid increase of cryptocurrency markets due to institutional players entry, liquidity and large-scale integration of the markets</li> </ul>

Figure 1: Features of using the cryptocurrencies in money laundering process

Source: own study

In general, the money laundering process with cryptocurrency using may include some typical stages (Figure 2).

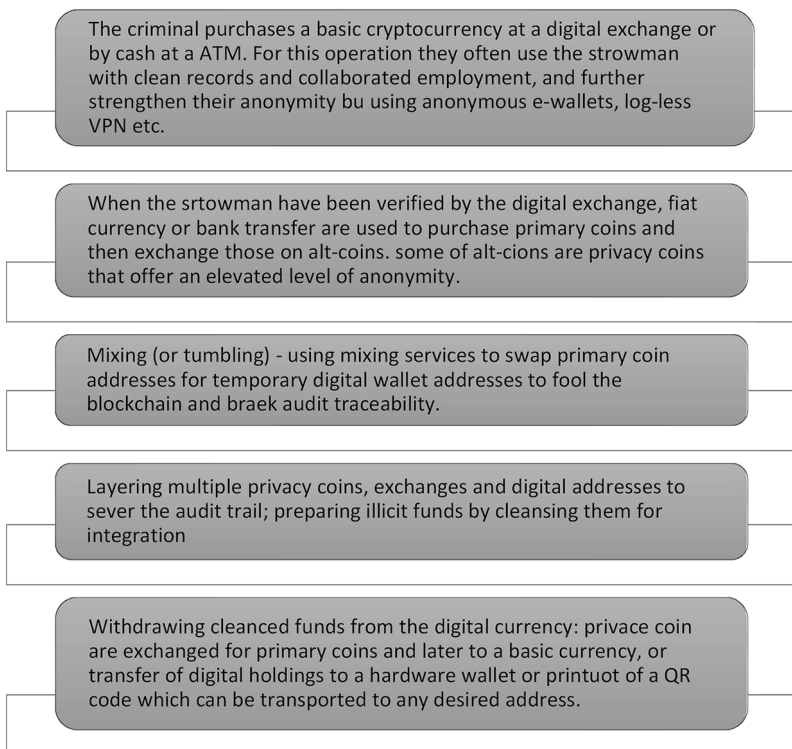


Figure 2: Stages of digital money laundering process

Source: own study



To understand how to mitigate the money laundering and terrorism financing risk of cryptocurrencies it is important to figure out the operations and situations, which are vulnerable to that kind of risk. Higher risks are predominantly found in the following cases:

- Main sources of funds of the customer are cash or equivalent transactions, digital currency exchanges, and third-party payment providers;
- Inflows and outflows of funds that do not correspond to the known sources of customer's income;
- Recurring international wire transfers to digital currency exchanges;
- Legal entities of non-profit organizations transacting on the cryptocurrency markets like private individuals (sign of a shell company);
- Structured and micro-structured transactions;
- Multiple customers send similar values in a similar timeframe to digital currency exchanges;
- Fast outgoing cash and cash-intensive activity at retail banks;
- Rapid flow-through of funds to external financial institutions, where deposit and outflow activity appear similar in aggregate value;
- Large purchases of real estate, cars, boats etc.;
- Connections and transactions to digital money-laundering hubs and those in close proximity to substantial conflicts, organized crime and terrorist activity<sup>21</sup>.

FATF highlights some elements, which should be considered when identifying, assessing, and determining how best to mitigate the risks associated with virtual assets (VA) and virtual assets service providers (VASP), namely:

- The potentially higher risks associated both with VAs that move value into and out of fiat currency and the traditional financial system and with virtual-to-virtual transactions;
- The risks associated with centralised and decentralised VASP business models;
- The specific types of VAs that the VASP offers or plans to offer and any unique features of each VA, that may present higher risks by potentially obfuscating the transactions or undermining a VASP's ability to know its customers and implement effective customer due diligence and other AML/CFT measures;
- The specific business model of the VASP and whether that business model introduces or exacerbates specific risks;

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<sup>21</sup> Sprenger P., Balsinger E., *Anti-money laundering in times of cryptocurrencies*, KPMG. Compliance Matters, 2019.

- Whether the VASP operates entirely online (e.g., platform-based exchanges) or in person (e.g., trading platforms that facilitate peer-to-peer exchanges or kiosk-based exchanges);
- Exposure to Internet Protocol (IP) anonymizers, which may further obfuscate transactions or activities and inhibit a VASP's ability to know its customers and implement effective AML/CFT measures;
- The potential ML/TF risks associated with a VASP's connections and links to several jurisdictions;
- The nature and scope of the VA account, product, or service; as well as the nature and scope of the VA payment channel or system;
- Any parameters or measures in place that may potentially lower the provider's exposure to risk<sup>22</sup>.

In general, The FATF Recommendations require supervisors to allocate and prioritize more supervisory resources to areas of higher ML/TF risk. This means that supervisors should determine the frequency and intensity of periodic assessments based on the level of ML/TF risks to which the sector and individual VASPs are exposed. Supervisors should give priority to the potential areas of higher risk, either within the individual VASP or to VASPs operating in a particular sector. Therefore, supervisors should adjust the type of AML/CFT monitoring; the frequency of AML/CFT examinations in line with the risks identified and combine periodic reviews and ad hoc supervision as issues emerge; or should decide on the appropriate scope or level of assessment in line with the risks identified, with the aim of assessing the adequacy of cryptocurrency markets players' policies and procedures that are designed to prevent their abuse.

The goals of regulating cryptocurrencies can be classified into three categories: combating the use of funds for illicit activities; protecting consumers and investors against fraud and other abuses; and ensuring the integrity of markets and payment systems and overall financial stability<sup>23</sup>. Key challenges for cryptocurrency regulation according to this approach are: authorities will need to clarify cryptocurrency-related activities from legal and securities market perspectives, and to do so according to economic purpose rather than technology used; regulatory events in one jurisdiction may lead activity to migrate to others with more lax approaches, so the role of authorities' coordination become determinative; new types of crypto-products create additional linkages with

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<sup>22</sup> FATF, *Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers*. <https://www.fatf-gafi.org/publications/fatfrecommendations/documents/guidance-rba-virtual-assets.html> (2019).

<sup>23</sup> Auer R., Claessens S., *Regulating cryptocurrencies: assessing market reactions*, BIS Quarterly Review September, 2018.

the financial system, and loss of trust in cryptocurrency may cause similar phenomenon concerning other financial assets.

Among the ways which are often recommended in order to mitigate the money laundering risk on cryptocurrency markets are: to increase AML enforcement of mixers and online gambling sites, which very often hide their location and seek to evade the basic regulations; to improve AML practices of virtual currency exchanges, in particular include “crypto-to-crypto” exchanges under AML Directive; to expose the vulnerabilities of darknet websites not only by shutting down such sites and prosecuting their administrators, but by increasing customer skepticism about sites’ integrity and reducing the perceived security of such platforms by exposing their vulnerabilities publicly; to share the experience and best practices of jurisdictions with established virtual currency AML regulations throughout international bodies; to develop a national blockchain technology innovation strategy etc.<sup>24</sup>.

Possible ways to combat money laundering and terrorist financing activity involving cryptocurrencies have consist of some important steps. Firstly, financial institutions need to strengthen anti-money laundering procedures by focusing those on the interchange between financial institutions and basic crypto exchanges and distinguishing normal customer behavior from possible money laundering. In general, banks should not accept flows from exchanges that do not require identification or KYC information; or proceeds from privacy coins. Secondly, financial institutions have to provide more efficient transaction monitoring. In spite of the anonymity of cryptocurrency transactions, IT systems can use already existing algorithms to identify patterns and behavior that indicate money laundering/terrorist financing schemes. If an account is identified as linked to illegal activity, the flow can be complied to formulate intelligence for law enforcement. Thirdly, the global standards of cryptocurrency markets and transactions regulation should be developed, in particular, worldwide KYC policy has to become more rigorous when issuing digital wallets. Generally, such standards would require consensus between crypto markets players and complementary regulation. Placing third-party ID providers under the state supervision is a necessary step too. Those providers may become key to guaranteeing a degree of anonymity for low-risk categories of customers while allowing authorities to pursue criminal elements. The risk is that personal information stored with crypto market entities is vulnerable to data and identity theft. So, to manage this risk it would make sense to spread state supervision on third-party ID providers and given that enhance their accountability. But the

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<sup>24</sup> Fanusie Y., Robinson T., *Bitcoin laundering: an analysis of illicit flows into digital currency services*, Center on Sanctions and Illicit Finance memorandum, January, 2019.

controversial question in this context is whether regulators need to introduce license requirements for cryptocurrency service providers. One more regulation issue is regulation of cryptocurrency exchanges. Regulating exchanges that offer primary currencies is easier since they often accept fiat currency in exchange for primary cryptocurrencies. Regulation the activity of advanced digital exchanges that offer to exchange primary coins to alt-coins is much more complicated because advanced exchanges do not accept fiat currency and they are often decentralized. Therefore, efficient regulation approaches should be introduced only as a result of the collaboration of international standard-setting bodies. Finally, blockchain technology inherently possesses the potential to reduce anti-money laundering/terrorism financing risk compared to fiat currencies. A blockchain is maintained on an online public ledger, which enabled the supervision, validation, and recording of the complete history of each transaction. Without verification of all transaction phases, the transaction would be immediately stopped without any human interface<sup>25</sup>. Due to this, the digital trail could serve anti-money laundering regulation better than existing fiat paper trails. By using the blockchain technology, further anti-money laundering risk analysis could be integrated into the cryptocurrency system, allowing much more than the control of only entry and exit points. Of course, using the blockchain as an anti-money laundering tool will lead to higher price of transactions and lower level of user's anonymity.

## Conclusion

The development of cryptocurrencies and their markets provides great opportunities for institutions to finding new business models, for governments to build more efficient and secure information systems, and for the financial inclusion of billions of people who lack easy access to the banking services. Cryptocurrency and blockchain technology represent, potentially, a net positive economic and social gain. On the other point of view, using cryptocurrencies as a money laundering tool is a new type of illicit finance methodology. This new technology is going to fulfill its potential, and generate new types of money laundering risks, which have to be managed with approaches implemented to the other payment methods.

The findings concerning the approaches to crypto markets regulation are mixed. It is undoubtedly that regulators should give more attention to the risk appearing in cryptocurrency transactions. This means that regulating authorities should determine the frequency and intensity of periodic assessments based on

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<sup>25</sup> Sprenger P., Balsinger F., *Anti-money laundering in times of cryptocurrencies*, KPMG. Compliance Matters, 2019.

the level of ML/TF risks and give priority to the potential areas of higher risk. At the same time, the important issue of such activity is to separate criminal (or illegal) transactions from legal ones to not interfere the digital currencies development.

New payment instruments like cryptocurrencies bring new money laundering risks when they are introduced to the public, but survive and eventually flourish when safeguards try to eliminate their criminal use. Credit cards, online banking, wire transfers, and cash transactions all have been and continue to be used for crime transactions. Therefore, researchers and analysts should study the history of legacy payment methods, derive lessons learned, and articulate a framework for how financial regulators should approach risk mitigation.

To our mind, cybercrime law enforcement should acquire the technological expertise to combat the illicit use of cryptocurrencies, and regulators should understand the risks posed by this emerging class of more anonymous digital financial assets. Financial institutions need to focus their anti-money laundering procedures on the money flows generated by crypto exchanges, as well as provide efficient transaction monitoring to identify behavior that indicates money laundering/terrorist financing schemes. The findings of the study generally suggest that cryptocurrency transactions and crypto players are not bound by borders. Therefore, it is certain that the national level is not optimal to address money laundering and terrorist financing via cryptocurrencies. Even more appropriate are the European and international levels. Therefore, international collaboration is crucial to successfully impose and enforce rules on combating money laundering and terrorist financing.

Future research in the field of mitigating the money laundering risk of cryptocurrencies might be directed onto investigation the relationship between cryptocurrency regulation, coin prices, and percentage of illegal cryptocurrency transactions. In addition, the ways of Know Your Customer and Customer Due Diligence procedures actualization and fitting those to the cryptocurrency markets characteristic should be prospective subject for academic and empirical researches.

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# MANAGEMENT OF WATER RESOURCES AND THEIR CONSUMPTION WITHIN THE CIRCULAR ECONOMY\*

## SUMMARY

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The chapter starts with the concept of closed circuit economy structured on the idea of circular economy by Kenneth Boulding and First Report of the Roman Club titled "Limits to Growth", subsequently developed by Walter Stahel and Michael Braungart and other authors in the form of practical handbooks and models. Then the authors present the gist of the sustainable development and explain the restrictive character of the principle of preserving natural capital in the light of complementing and substituting that capital by economic capital (anthropogenic). The authors point to the fact that promoting sustainable development within the framework of economic policy fasters its development. In the second part the authors are poised to present the condition of water resources and the trends in the consumption of water as well as the analysis of the investment outlays on water supply and water deficit both globally and in Poland and some other countries. The authors stress that many regions face not so much water deficit as the crisis in water supply resulting from poorly developed infrastructure, improper water policy and low income of population. The chapter presents the following issues: the condition of water resources and their structure, water management, investment outlays and current expenditure on water management, the growing deficit and its consequences, the counter measures, retention and recycling of water in the enterprises and households. In conclusion the authors postulate starting a new research discipline focused on steppe formation and desertification.

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## Introduction

Water resources which represent a specific category of natural resources, are characterized by the fact that they are renewable and globally found in

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relative purity and abundance. For these reasons, they did not raise as many controversies as fossil fuels deposits which are finite, as aptly noted by the 20th Roman Club Report „The Limits to Growth” (LTG) in the 1970s. Insufficiency of water resources and their growing deficit thereof was highlighted by the UN as late as in 2003 in the World Water Development Report, when „The Year of Fresh Water” was announced. The report indicated that, over the past fifty years, water consumption almost doubled as a direct result of both economic and population growth. It was also highlighted that globally, over the next 20 years, the average volume of accessible water resources per capita will drop by one third.

It might be asserted that the difficulties in water supply are to become an even greater impediment to social and economic development than the insufficient supply of power. Unfortunately, Poland also is found within the group of countries with modest water resources and it is experiencing the ongoing drought in the central part of the country, due to an average runoff of surface waters equaling 1,6 thousand m<sup>3</sup>/capita (in some years merely 1,1 to 1,3 thousand m<sup>3</sup>/capita) while in other European countries it amounts to 4–4,6 thousand m<sup>3</sup> p.a.

This paper purpose is to present the importance of water resources to the modern economy by showing the social and economic consequences of water deficit and the ways of reducing water consumption by the industry and households within the selected countries. In particular, the authors highlight the deteriorating water deficit, despite the measures taken to decrease the consumption of water by the industry and municipalities, as well as the process of how the cost of water supply is determined by the privatization processes and trading on the stock exchange. Next, they analyze the issue of closed circulation of water supply in an enterprise and the stages of its implementing in the economy. In conclusion, the authors point to the novel and indispensable areas of research in water resources management.

## **The economy of closed cycle of natural resources**

The concept of circular economy is related to the finite character of natural resources and that in time, they are bound to become exhausted. This became apparent in the second half of the 20<sup>th</sup> century due to the increased mining of mineral resources. By the end of the 20<sup>th</sup> century, the issue of industrial and municipal emissions came to the top of the agenda, as those problems laid grounds for the formulation of resource and ecological barriers to economic development, and then to the necessity to implement the principles of circular economy or loop economy (economy in loops). In turn, similar importance was attributed to performance economy, which is often regarded not merely a synonym, but a higher stage of circular economy.

Circular economy has recently become a slogan, yet its origins date back at least to the onset of the 1960s and are attributed to Kenneth Ewart Boulding, being the first to point out the finite character of Earth resources. Earlier, the economists did not regard Earth in terms of open or circular economy. Yet, in practical terms, economic and social systems were considered open in terms of the input and the outcome such as matter, energy and information. According to Boulding, open economy is defined as a „cowboy economy”; an allegory to cowboys who operated on unlimited areas in ways that were romantic as well as exploratory.

In turn, circular economy represents a spaceship where astronauts in their long journey are confined to limited resources and recycling technologies<sup>1</sup>. Hence, a part of the national product is generated from exhaustible resources, whose degree of use has become more important than the volume of production. K. Boulding presenting the concept of closed economy at the Sixth Resources for the Future Forum in 1966, he formulated new research issues such as whether human well-being is more of a resource or a stream<sup>2</sup>.

The issues of resources exhaustibility were thoroughly discussed within the framework of the First Roman Club Report „Limits to Growth”<sup>3</sup>. The report triggered a lively discussion for two reasons: for the first time, the econometric model of the world economy, constructed by Jay W. Forrester was put to use; next the estimated time of exhaustion of key mineral resources was presented. The report assessed the global volume of resources and their annual extraction, thus showing the resources in some cases will last for other few decades, spelling problems already for the next generation.

Meanwhile, critical comments on the report focused on the weaknesses in forecasting, due to overlooking the important factors of technical progress and substitution. The authors subsequently approved the comments of the critics by implementing after 30 years an improved methodology<sup>4</sup>. However, by simplifying it, they obtained similar results. Neither the new publication nor the ensuing comments attracted a similar attention<sup>5</sup>. It is worth noting the postulate of „zero

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<sup>1</sup> Górka K., Thier A., *Gospodarka obiegu zamkniętego zasobów naturalnych*, „Aura”, 2018, no. 5, pp. 3-6.

<sup>2</sup> Boulding K.E., *The Economics of the Coming Spaceship Earth. /In:/ Environmental Quality in a Growing Economy*, Ed. by H. Jarrett, Resources for the Future, Johns Hopkins University Press, Baltimore 1966, p. 3-14.

<sup>3</sup> Meadows D.H., Meadows D.L., Randers J., Behrens W.W., *Granice wzrostu*, PWE, Warszawa 1973.

<sup>4</sup> Meadows D.H., Meadows D.L., Randers J., *The Limits to Growth. The 30-Year Update*, Chelsea Green Publishing, London 2004.

<sup>5</sup> Turner G.M., *A comparison of the Limits to Growth with 30 years of reality*, „Global Environmental Change”, 2008, no. 18(3), pp. 397-411.

growth” formulated by British Edward E. Mishan in response to the looming exhaustion of natural resources<sup>6</sup>. Nonetheless, the postulate did not find any support among the professionals and was met with a hostile approach from the developing countries. Currently, the „zero waste” technology receives more attention and it has become a crucial element of the circular economy.

In the 1970s, Swiss scientists Walter R. Stahel and Geneviève Reday reverted to the concepts of Boulding, initially in the reports submitted to the European Union, and in other numerous publications, giving circular economy a permanent place. In particular, W. Stahel, a co-founder of Product-Life Institute in 1982 propagated the new concept using the slogans „*Workplace for tomorrow, More with less, Today's goods are tomorrow's resources at yesterday's prices*”. In 2016, he submitted a draft of the EU project “The Circular Economy Package” postulating the products life extension based on their repair or refurbishment as well as recycling the worn off elements to obtain a new feed<sup>7</sup>.

Hence, the exhausted products should be recycled many times which leads to functional service economy. By this token, closed production systems yield zero waste economy. This concept was further developed by various specialists, like the German chemist, Michael Braungart and the American architect, William McDonough who devised a model of a multiple use of industrial goods which were designed in the way to facilitate their future repair and refurbishment<sup>8</sup>. In 2010, they founded *Cradle to Cradle Products Innovation Institute* in San Francisco, with branches in Amsterdam and Venlo, Holland, supported by UNEP and G20 Group initiatives.

As W. Stahel began to propagate the strategy of long product life cycle to decrease waste, the experts termed that creed the producer’s responsibility „from cradle to grave”. Nonetheless, that approach followed the linear model „end of pipe” solution (treat sewage rather than avoid discharging it in the production process). Hence, Stahel suggested biomimetic approach, producing goods „from cradle to cradle” and started propagating that term along with M. Braungart.

Based on these findings, circular economy moves away from the model „*natural resources → extraction and production → consumption → waste*” (in other

<sup>6</sup> Mishan E.J., *The Economics Growth Debate: An Assessment*, George Allen & Unwin, London 1991.

<sup>7</sup> *Limits to Certainty. Facing Risk in the New Service Economy*, Ed. by: W. Stahel, Kluwer Academic Publishers, Dordrecht 1989, 1992; Stahel W., *The Performance Economy*, Palgrave MacMillan, London 2006, 2010; *The Circular Economy. A Wealth of Flows*, Ed. by K. Webster, W. Stahel, Ellen McArthur Foundation, London 2015, 2017; Stahel W., *Circular economy*, „Nature”, 2016, vol. 531, no. 7595.

<sup>8</sup> Braungart M., McDonough W., *Cradle to Cradle. Remarking the Way We Make Things*, North Point Press, New York 2002; Braungart M., McDonough W., Bollinger A., *Cradle – to – cradle design: creating healthy emmissions – a strategy for eco-effective product system design*, „Journal of Cleaner Production”, 2007, no. 15(13), pp. 1337-1348.

words, *take* → *use* → *chuck*). Even though the costs of production have been declining for a long time by economizing the use of resources, application of non-waste technologies and waste utilization as well as recently through integrated investment projects which allow non-waste production, all those attempts are nothing more than mere fine tuning of the linear scheme.

It was as late as the 1980s that a new model of circular economy was elaborated, aptly described as 3R; *reduce, reuse, recycle*. In other words, limit the input, use again, bring back into production and circulation. Some other useful slogans were coined: *use again whatever you can, what cannot be reused should be further recycled. Mend or repair used products, and those that are beyond repair should be readapted.*

The above-mentioned model implies not just ecoefficiency, i.e. the way of making products well is stressed, but also ecoeffectiveness, i.e. the way of making good products free from toxins, good for health, etc. All this leads to making use of all waste perceived as a useful resource, thus making economic growth independent of the consumption as well as giving it some distinct social development traits aimed to raise the standard of living. This already stands for a holistic approach to production and consumption, even though the system of waste segregation and utilization is still far from being efficient (e.g. on the global scale, only 33% of plastic waste are reused) and there is lack of prerequisite technologies such as depolymerization, devulcanization, breaking down the alloys, delamination, breaking down molecules.

Even though **implementation programs of circular economy** are still a novelty, their foundations have been relatively well developed, particularly within urban and local variant, and there are numerous publications on that subject. Some of them have been translated into several languages, like „Cradle to Cradle” by M.Braungart and W.McDonough. Some handbooks were also published, and a 400-page work by a British author Catherine Weetman may serve as a good example<sup>9</sup>.

To function properly, circular economy needs a proper system of organization and management. On the enterprise level, the process is facilitated with the application of environmental management principles compliant with ISO 9000 and 14000 standards, and EMAS. Similarly, *gminas* and *poviats* implement advanced programs of waste management, the use of renewable energy sources, maintaining balance in managing fuels and energy on the local level, and finally providing repair and refurbishment services to facilitate closing local loops of management.

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<sup>9</sup> Weetman C., *The Circular Economy. Handbook for Business and Supply Chains: Repair, Remake, Redesign, Rethink*, Kogan Page Publishers, New York 2011.

At regional level, attempts are being made to close loops in the industrial ecosystems, beginning with Alfred Marshall's concept of industrial complexes and those of Walter Isard (already implemented)<sup>10</sup>, up to the contemporary clusters, i.e. a new framework of cooperation of various economic entities including design offices, production and service stations, individual experts, etc. While at times the foregoing entities are connected via IT networks rather than permanent contracts, they still function as effective and efficient mechanisms. This characterizes one of the features of Fourth Industrial Revolution (Industry 4.0).

The above-mentioned organizations play an important role in the implementation of the principles of circular economy, in line with the work of Institut de l'Économie Circulaire founded in Paris in 2013, and a similar body founded in Montreal, Canada in 2014. In this area, a significant contribution was made by Ellen Mac Arthur Foundation from London promoting practical methods of closing management loops. That subject is also on the agenda of Swedish Foundation for Strategic Environmental Studies MISTRA. In the developed countries, those recommendations are being implemented not just by the managers and engineers, but also by the citizens in their everyday life.

Social movement in support of circular economy found especially fertile ground in Holland, where Martine Postma with her Repair Cafes garnered international recognition. Another person from this country, Marc de Wit, promotes repairing or leasing many products in place of buying them. There are also examples of modeling urban management (with Amsterdam, Brussels and Glasgow as prime examples). In turn, many countries started paying attention to the responsibility of manufacturers for repairing products and extending their life cycle (reverting the built-in obsolescence principle).

Consequently, since 2012 some customers in various states of the USA have been granted Right to Repair Law. In turn, in 2011, the European Union launched „Europe 2020” strategy endorsing a program of effective use of resources, to be followed by „zero waste” program within Circular Economy Package. The European Commission recommended implementing their own circular economy programs by the member states. Parallel to this, business models promote extended life goods and components, their use or leasing. In Poland, the International Team for Circular Economy was set up, which elaborated a road map for transformation towards circular economy. In addition, UNEP/GRID Center, acting under the auspices of the UN, has given those issues more attention.

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<sup>10</sup> Isard W., *Metody analizy regionalnej*, PWN, Warszawa 1965, p. 231; Gajda J., Górka K., *Kompleksy przemysłowe w programowaniu rozwoju przemysłu*, „Zeszyty Naukowe WSE w Krakowie”, 1968, no. 36, pp. 3-26.

## Hydrological cycle in nature and its economic consequences

Water ( $H_2O$ ) is a chemical compound popular in nature, and prerequisite for sustaining life on Earth. In line with the progress of civilization, its importance has been continually growing. Water is found in a continuous and closed circulation due to solar radiation and gravity forces. Solar energy heats up water and consequently causes its evaporation, carried to the upper layer of atmosphere where it is cooled and subject to condensation. On exceeding the critical mass, water particles come down as precipitation. That continuous movement of water is called a hydrological cycle<sup>11</sup>, and it is a natural cycle of water on Earth (Figure 1).

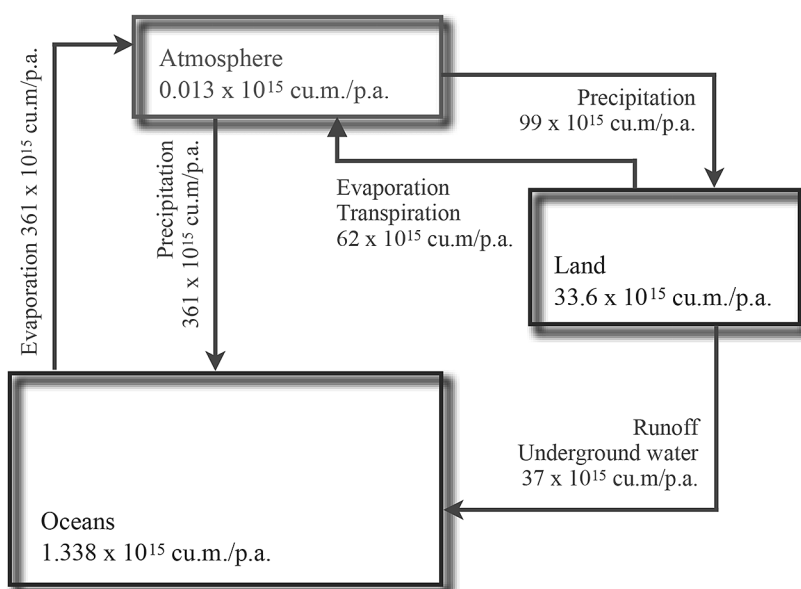


Figure 1: Hydrological cycle of water on Earth.

Source: Authors' own elaboration based on: [www.stronameteo.go-longhorn.net/obrazy](http://www.stronameteo.go-longhorn.net/obrazy).

World water resources are estimated at 1,386 billion  $km^3$  whose about 97% are salty waters in the seas and oceans. Only 3% of water on Earth is fresh water, 2/3 of which is accumulated in glaciers, and the remaining part is groundwater, deep water, rivers and lakes, leaving thus only 0.5% of the Earth's resources at our disposal<sup>12</sup>. However, the Earth can be metaphorically described as a water

<sup>11</sup> Weiner J., *Życie i ewolucja biosfery*, PWN, Warszawa 2003, pp. 47-51.

<sup>12</sup> Craig R., Vaughan D.J., Skinner J., *Zasoby Ziemi*, PWN, Warszawa 2003, pp. 1-22.

planet, because water plays a dominant role on the Earth's landscape as seen from space.

The surface of Earth receives about 100 thousand km<sup>3</sup> of water in precipitation and over a half of that volume is not available since it either evaporates back to the atmosphere or is absorbed by the vegetation. That „green water” cannot be retrieved and it amounts to 61% of precipitation. The remaining part, i.e. 39% runs off to the rivers, the lakes, marshes and ground water. This „blue water” can be subsequently used in the economy before it evaporates or flows to the seas and oceans<sup>13</sup>.

If we look at the issue from another perspective, global precipitation amounts to 710 mm p.a., where 470 mm returns to the atmosphere by evaporation, and 240 mm is the surface and underground runoff. Average time of keeping water in the atmosphere is nine days, in the soil 1–2 months (in the form of humidity), 2–6 months in the rivers, 50–100 years in the lakes, 20–100 years in glaciers (up to 20 thousand years in the Antarctic), 3.2 thousand years in the oceans, 10–100 thousand years in underground reservoirs.

Furthermore, as underground waters and glaciers are the reserve and strategic water resources, each region of the world has its own natural water balance. While it is true that the volume of evaporated water is roughly the same as water falling to the Earth in the form of precipitation, yet that balance is poised differently in various geographic regions. Over the oceans, evaporation exceeds precipitation while it is the other way round over the continents. Mere 10% of the volume of water that evaporates from the oceans comes down to land as precipitation. In Poland, average annual precipitation amounts to 620 mm, and the lowest rainfall is noted in central Poland (from 392 mm), and the highest in the Tatra and the Sudety mountains (up to 1229 mm).

Water is considered an important production factor as it is both a mean and a subject of labor (raw material). It fulfills three basic functions; economic, social and ecological. The economic function translates into water supply to people and economy thus allowing conducting economic activity, sustaining employment and generating Gross Domestic Product (GDP). Social function is related to the utility of waters and their availability, with certain limits dictated by customary charges.

In most general terms, people's access to water is considered a „basic right of man”, as recently declared by the UN. Yet, in many countries, the fulfillment of that right is encumbered with practical problems. Realization of the *social function* in using public water resources is free of charge, even though that under some circumstances the bodies of water and their recreational properties

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<sup>13</sup> Craig J.R., Vaughan D.J., Skinner J., *Zasoby...*, *op. cit.*, pp. 406-408.

may be charged for. In turn, *ecological function* (environmental) is derived from the intrinsic value of water and it is not involved in generating income, but it contributes to biodiversity of the natural environment. On the country scale, these three functions should not contradict one another, but co-exist. The fact is that water resources constitute a public good, and the private sector plays marginal role in their management facilitates that co-existence.

## Growing deficit of water on global scale

The water deficit in various world regions is the consequence of diversified geographic endowment with water and the resultant diversification in precipitation, the abundance of water in rivers, lakes and glaciers. From the management of water supply angle, the supply is diversified in line with the development of hydro-technical, water and sewer networks. For that reason, it is not the *deficit* of water that is on the less developed countries agenda, but the *crisis* in water supply. That issue is particularly acute in the countries of Northern Africa, the Middle East and Central Asia which are characterized by modest water resources and insufficient development of technical infrastructure.

Water resources are measured by the annual average runoff of surface water per capita. Water deficit represents a situation when water scarcity becomes a barrier to human, social and economic development. This means impossibility to satisfy the basic biological need in the form of water consumption, necessary to prepare meals and ensure hygiene. The minimum amount of water for human needs is estimated at approx. 50 l, and the quantities recommended from 50 to 100 l per day, or from 18 to 36 m<sup>3</sup> / person / year.

In Poland, depending on the living conditions, the norm of water consumption ranges from 30 l/24 hours (dwellings without water supply and sewerage) to 160 l/24 hours, which translates into 10.8 to 64.8 m<sup>3</sup>/person/year. In practical terms, there are clear disparities between some countries, e.g. in the USA, average water consumption in households for 1990–2000 amounted to approximately 200 m<sup>3</sup>/person/year, while the consumption of 20 m<sup>3</sup>/person was not available to over one billion people in 55 countries. More recent UNDP statistics show that in Europe, water consumption reaches 200 m<sup>3</sup>, and in the USA over 400 m<sup>3</sup>, while it amounts to 5–20 m<sup>3</sup>/person/year in the underdeveloped countries, and mere 4 m<sup>3</sup>/person/year in Mali<sup>14</sup>.

Most commonly, the water deficit is measured by *water stress index*, which stands for the condition of an organism affected by the environment factor and

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<sup>14</sup> *The Millennium Development Goals Report* [Online] 2015, [https://www.un.org/millenniumgoals/2015\\_MDG\\_Report/pdf/MDG%202015%20rev%20\(July%2015\).pdf](https://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%2015).pdf) [09.01.2020].



it may result in dysfunctions found in plants and animals due to the deficit of water (draft) or excess (flooding). In time, this term began to be applied to human beings as well<sup>15</sup>. The division of water resources including stress condition due to insufficient supply of water is presented in Table 1.

Table 1: Classes of water resources in thousands m<sup>3</sup>/person/year

Class of resources	Characteristics of brackets of water resources	Brackets		
		According to P. Kowalczak	According to M. Falkenmark	According to World Resources Institute
I	Below water bracket	to 0,5	to 0,5	to 1
II	Chronic water deficit	0.5–1.0	0.5–1.0	do 1
III	Water stress	1.001–1.7	1–1.6	1–1.7
IV	Basic problems in using water resources	1.701–5.0	1.6–10 <sup>a)</sup>	1.7–5
V	Trouble-free use of water resources	5.001–10.0	1.6–10	5–15
VI	No basic problems in use of water resources	10,01–100,0	over 10	15–50
VII	Water abundance	over 100	x	over 50

a) The scale elaborated by M. Falkenmark does not provide separate values for class IV and V of water resources.

Source: Thier A., *Gospodarcze i społeczne przyczyny oraz skutki deficytu zasobów wodnych*, Biblioteka Ekonomia i Środowisko, Kraków 2016, p. 36, 57.

Hence, water resources of 0,5 thou.m<sup>3</sup> are a threshold in water management, and below 1,6 thou.m<sup>3</sup> a water stress index, i.e. problems in water management. By this token, resources of 1,5 thou.m<sup>3</sup>/person/year or lower signal water deficit, which was recently the case for Poland in some years.

The countries with water resources under 500 m<sup>3</sup> i.e. below water threshold include Algeria, Saudi Arabia, Djibouti, Jordan, Kenya, Libya, Malta, Mauretania, Oman, Pakistan, Sudan, Syria, Tunisia, Turkmen. The countries with water resources below 100 m<sup>3</sup> include United Arab Emirates, Qatar, Gaza Strip in Palestine, the Bahamas and Kuwait (10 m<sup>3</sup> (sic)). In turn, water resources of 10, or according to other sources, 15 thou. m<sup>3</sup>/person signal the absence of basic problems in water management, while the resources above 50 or 100 thou.m<sup>3</sup> represent abundance of water. In this category, included are Gabon, Guyana, Guinea, Island, Congo.

In its valuation of accessibility of water resources, *International Water Management Institute* takes into consideration the human needs factor and water

<sup>15</sup> Milly P.C.D. et al., *Stationarity is dead: wither water managements*, „Science” 2008, nr 319, pp. 573-574.

infrastructure, i.e. the conditions of water supply<sup>16</sup>. Additionally, in describing water deficit, water poverty index pertains to water supply for a single household and larger communities with reference to the estimated volume of water resource, access to water, the use of water by the economy sectors, state economic policy<sup>17</sup>

In the report *Millennium Development Goals*, the percentage of annual water consumption in the total volume of those resources or *Water Exploitation Index*, was adopted as the **measure of renewable water resources**. Abundance of water is found when its consumption does not exceed 25% of renewable water resources, while 25%–60% index signals water stress, 60%–75% index stands for water deficiency, and the index above 75% denotes acute water deficit. On the global scale, consumption of fresh water accounts merely for 9% its volume. According to the calculations of the authors, in Poland this index reached 15.6–15.8% in 2000 (21.8% in 2012), hence the trend is positive.

The statistics show that during 1998, about 36 countries experienced water stress, rising to 41 in 2011, while 10 countries from Northern Africa, Arab Peninsula and Central Asia consume 100% of renewable fresh water. In practical terms, this volume is even higher, since those countries consume water from deep bore holes, desalination plants and from imports. Another way of measuring the water deficit consists in comparing precipitation to evaporation over an extended period of time. When evaporation is greater than precipitation, it means decreasing water resources. Once such condition persists over a few years, we first experience *atmospheric draft*, and then *hydrological draft* when the rivers dry up. Obviously, such condition translates into the deficit of water resources, and such situation is to be found in Southern Europe and Central Poland (more and more frequently evaporation is greater than precipitation).

**Demographic factors** also make an impact on how water deficit is shaped. Over the past 50 years, the global water consumption almost doubled due to the economic development and population growth, while water resources per capita dropped by 1/3. The UN Report Agenda 21 stated that approximately 1.1 billion people (15% of the world population) suffered from the deficit of water which affected ¼ of land on the Earth<sup>18</sup>. The current estimates show that approximately 40% of world population suffer from water deficit, and in this number 1 billion people have no access to clean water, with 2.6 billion people deprived of sanitary

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<sup>16</sup> *Water Accounting+*, International Water Management Institute [Online] 2019, <https://www.iwmi.cgiar.org/our-work/topics/water> [09.01.2020].

<sup>17</sup> Sullivan C., *Calculating a Water Poverty Index*, „World Development”, 2002, vol. 30/7, pp. 1195-1211.

<sup>18</sup> *The Millennium Development... , op. cit.*, p. 53; *Progress on Sanitation and Drinking Water – 2015 Update and MDG Assessment*. [Online] 2015, [https://www.unicef.org/publications/index\\_82419.html](https://www.unicef.org/publications/index_82419.html) [09.01.2020], pp. 22-25.

facilities. The forecasts envisage further increase in the number of people affected by the chronic water deficit in approximately 50 countries. Despite these statistics, over the past few years, some indices in the area of water management and water supply have improved.

The increase in water consumption attributable to the population growth and economic development (rapid development of new sectors and higher standards of sanitary facilities in households) is found within the group of underdeveloped countries. In Europe and North America water consumption has stabilized and is even declining due to the technical progress facilitating saving water and decreasing water consumption in industry and services.

To give an example, before 1990, a considerable growth in water consumption was noted in Poland due to demographics and social-economic development, only to decline by 25% within 1990–2016, reaching 30% for households. In line with declining consumption of water, the volume of sewage is also dropping. In Poland, over the period of the research, the volume of sewage to be treated dropped by approximately 55%, and the percentage of raw sewage therein declined from 32.5% to 5.1%<sup>19</sup>. As it can be seen, the described tendencies taking place in water and sewage management facilitate recycling water and closing its circulation already at the enterprise level.

Water deficit affects various dimensions of security within all spheres of social life and the economy. Access to water is one of the primary needs, a prerequisite to survival and the feeling of security in biological and psychological meaning of the word, i.e. *hydrological security*. When the use of water resources is restricted and felt by the population, then the psychological threat comes to play. The loss of security attributable to draft and water deficit, combined with migration and conflicts around the border rivers have been experienced for a long time, and recently the situation further aggravated in the countries of North Africa and the Middle East.

Such condition results in the increase in movement of population inside those countries as well as emigration to other countries. Over the period 1860–2000, the number of emigrants leaving their countries rose from 79 to 175 people millions (hence it more than doubled), and the proportion of migrants to the locals was 1 to 35. In the 21<sup>st</sup> century, the emigration to other countries surged with a large number of emigrants causing pressure in economic terms both to the home country as well as to the one that receives them. Recently, a new category of environmental refugee was coined, which describes people migrating due to environmental factors. The category is both political and

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<sup>19</sup> Authors' own calculation based on the *PR Statistical Yearbook*, GUS, Warszawa 2017, p. 105.

economic, and not solely ecological. That is because it difficult to point to one reason for emigration as usually there are a few of them.

National security is another important dimension that emerges due to the deficit of water resources. That is because the volume of water resources, climatic conditions and hydrological/meteorological cycle exert a decisive impact on the economic development of a country. It has been shown that the irrigation in farming consumes 70% of water used globally. In many developing countries, that figure climbs to 90–95%, while it is just 15–30% in the highly developed states. Farm production is hindered within arid and semi-arid zones, which is also attributable to the unfair distribution of water resources as poorer parts of the population are mostly in the losing position. Within the developing countries, the polarization of societies is even greater.

In China and India as many as 65% of poor population live in water deficit areas. In turn, large urban agglomerations have the emerging slums chronically deprived of regular water supply and sanitary facilities. *Health and sanitary safety* is another sphere threatened by water deficit, especially by the restricted access to clean water. Statistics show that a large percentage of the world population has no access to clean water. The absence of water supply and sewerage networks affects the health of residents, as sewage is the source of all kinds of bacteria causing terminal diseases. Statistically, 75% of diseases in the developing countries are water-borne, attributable to the lack of access to clean water or insufficient hygiene.

The UN and other international organizations have launched a series of programs and projects, e.g. Millennium Development Goals which brought tangible results over the past few years. Yet, it is still a long way to reaching all the set objectives. According to Water Development Report, the main obstacles include not just logistic and financial issues, but also cultural factors, and quite frequently cultural and religious premises<sup>20</sup>.

### **Water-intensity of industrial production**

*Water intensity of economy*, especially of industry is a determining factor for water consumption, calculated for a unit of a product or a service. That consumption is heavily dependent not just on water-saving technologies, but also on the economy structure. To give an example, in Poland heat generating sector is an extremely large water consumer (approx. 85% of industrial consumption), then chemical industry with 7%, and metallurgy with 3%. According to Eurostat, the ranking of most water intensive European countries, calculated in m<sup>3</sup>

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<sup>20</sup> *World Water Development Report*, Ośrodek Informacji ONZ, Warszawa 2018, pp. 95-105.

of water/thousand EUR of GDP includes Hungary (200), Bulgaria (180) Estonia (90) Latvia (75), Romania (45), Spain (40), Poland (35). Other countries are contained within the bracket of 10–15 m<sup>3</sup>/1000 EUR.

That is to say, the highest water intensity values are observed in Central-Eastern European countries, with Poland demonstrating here a much better position than in terms of energy-intensity of GDP. Nonetheless, there is still room for considerable improvement by restructuring the economy as a whole, limiting water leaks and curbing stealing water from the network (European estimates show a level of 10%–30–40%, while Georgia ranks even higher). Main Census Office statistics show that over the period 2004–2013, water intensity in Poland dropped from 11 to 6 m<sup>3</sup>/1000PLN, i.e. from 46 to 25 m<sup>3</sup>/1000EUR, which translates into more than 40% reduction<sup>21</sup>.

The authors assessed water intensity in Polish industry with the use of three measures: the share of major sections and departments in the industrial water consumption, water consumption per 1,000 PLN of sold products, and water-intensity coefficient defined as a quotient of the sector's share in water consumption and the value of the sold industrial production. As shown in Table 2, power generation is the most water-intensive sector, followed by paper industry (up to 20 times lower), chemical industry, metallurgy, mining, and food industry. Even though the calculation does not fully include fixed prices, it might be asserted that some positive changes are taking place, as indicated by the declining water-intensity of the industrial production (even by 20–30%) over 2006–2015.

The balance of water management shows direct consumption of water within a year. Recently, that figure has been augmented with the indirect water consumption necessary for the final products. That is *water footprint*, similar to ecological and carbon footprints (CO<sub>2</sub> emissions). In Poland, water footprint for food production amounts almost to 50 billion m<sup>3</sup>, which translates into 1271 m<sup>3</sup>/person/year; within that figure, animal products 57% and cereals 21%<sup>22</sup>.

Indicators of such water consumption may be also be termed as *pull indicators*, representing total water consumption during all production stages, including production abroad brought into the country as imports. The formula reminds of a similar pull outlay indicator applied in enterprises/companies (measured by the time of work, or more often by wages, i.e. personnel expenses) or pull investment outlays. The indicators describe the so-called virtual water within the production full cycle, and they allow assessing the impact made by the structure of consumption on the real consumption of water. To give an example,

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<sup>21</sup> *Wskaźniki zrównoważonego rozwoju Polski*, GUS, Urząd Statystyczny w Katowicach, Katowice 2015, pp. 150-151.

<sup>22</sup> Stępniewska M., *Ile wody naprawdę zużywamy?*, „Gospodarka Wodna”, 2014, no. 9, pp. 321-324.

water consumption to produce 1 kg of beef amounts to 15 m<sup>3</sup>, and only 4 m<sup>3</sup> for 1 kg of chicken. The difference speaks for itself.

Table 2: Water-intensity of the industrial production in Poland for 2006–2015

Chosen sectors and divisions of industry	Water for production and services in %		Sold industrial production in %		Water-intensity coefficient		Consumption of water in m <sup>3</sup> /thou. PLN of production	
	2006	2015	2006	2015	2006	2015	2006	2015
Power and heat generation	83.35	89.90	10.1	10.6	8.25	8.025	104.55	51.2
Paper industry	1.15	1.32	2.1	2.9	0.54	0.46	6.18	2.78
Chemical products	4.54	4.86	10.8	11.8	0.42	0.41	4.52	2.48
Metallurgy	0.67	0.60	4.7	3.5	0.14	0.17	0.93	1.0
Mining	1.20	0.86	4.9	3.9	0.25	0.22	1.80	1.32
Food industry	2.95	1.46	16.1	16.2	0.18	0.09	1.35	0.55
Production of coke and oil refining	0.47	0.58	5.1	4.9	0.09	0.12	0.94	0.71
Construction materials production	0.25	0.19	4.1	3.7	0.06	0.05	0.48	0.30
Transportation machinery production	0.15	0.03	10.7	11.6	0.02	0.003	0.13	0.02
Other industrial sectors	5.27	1.68	31.4	30.9	0.17	0.02	1.84	1.27
Total industry	100	100	100	100	x	x	10.60	6.00

a) 46.78 m<sup>3</sup>/thou. kWh in 2006 and 40.85 m<sup>3</sup>/thou. kWh in 2015; b) 4.71 m<sup>3</sup>/ton of steel in 2006 and 4.90 m<sup>3</sup>/ton of steel in 2015 with closed water circulation (otherwise 200 m<sup>3</sup>).

Source: authors' own calculations based on Main Census Office statistics.

The developed countries demonstrate, as a rule, lower consumption of water indicator and they import the products that are more water intensive to produce. Hence, for Europe, over 40% of water footprint is attributed to the countries beyond that continent. Latin America countries are a good example of that tendency, which both import as well as export water-intensive products. The largest exporters of virtual water include the USA, Canada, Brazil, Argentina, India, Pakistan, and Indonesia. The group of the importing countries includes North Africa, the Middle East, Europe, Japan, South Korea and Mexico. The latter country saves 1 billion m<sup>3</sup> per year by importing corn, even though Mexico has conducive conditions for cultivating that crop.

### The cost of water supply in the context of privatization

In most countries, hydrotechnical companies engaged in water management, responsible for the retention and transfer of water, are state property, while those managing water supply and sewerage networks are municipal/gmina. Combined,

they serve as public utilities, i.e. they satisfy the needs of local communities and are not for profit. However, in the developed countries, the state does not only monitor the prices for water supply and sewage disposal, but it also rationalizes those services from the providers' point of view.

The EU Water Framework Directive instituted Cost Recovery of Water Services Principle, apart from enforcing the principle that the pollution is paid for by the polluter. In addition, there is a tendency to extend the public/private partnership, or even privatize some of the municipal services. This will extend the application of market instruments, and naturally raises much controversy. Due to the weakness of the government, in certain countries with insufficient infrastructure the scope of application of those instruments is much greater. In turn, in line with the development of the economy and rising social awareness, the role of informative and persuasive instruments is increasing. Although those instruments require social consent, yet they prove to be more effective.

Over the past 15 years, charges for water supply and sewage in Poland rose by 150% and 220% respectively, i.e. twice as much than in Western Europe. Consequently, charges for water supply in Poland are close to those in Western Europe, or even higher, even though salaries are 3–4 times lower<sup>23</sup>. In 2015, an average charge for water and sewage (for households) amounted to approx. 11.62 PLN/m<sup>3</sup> (in 2006, 4–7 PLN/m<sup>3</sup>), yet across various provinces of Poland it reached 5.40–51.58 PLN/m<sup>3</sup><sup>24</sup>. That is to say, the economic and social issues are aggravating in Poland also in the realm of water charges.

The European Union recommends setting household charges for water so that they do not exceed 4% of disposable income. Across Poland, that charge is contained within the prescribed figure, nonetheless it is already higher in some *gminas*, meaning that the cost of water has exceeded the acceptable level, which makes it difficult for the less endowed to foot the bill. Consequently, water consumption per capita is on the decline. It is beyond any doubt that the more advanced technologies help pushing that index down, yet the price seems crucial for the volume of consumption. It has been estimated that, in Poland, water consumption should reach 100–120 l/24/person (according to WHO, 80–100

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<sup>23</sup> In 2012, the charge for water supply in Poland amounted to 1.82 EUR/m<sup>3</sup>, i.e. 65 EUR/person/year, in Great Britain that charge was 0,40 and 0,79 respectively, in Holland 1.51 and 71, in Germany 1.94 and 87 (Western countries note higher water consumption). Charge for sewage was 2.93 in Poland, 1.42 in Great Britain, and 2.55 in Holland and 2.80 EUR/m<sup>3</sup> in Germany.

<sup>24</sup> Zwolinski A., *Lany poniedziałek kosztuje nas blisko dwa miliony złotych*. [Online] 2015, <https://www.money.pl/gospodarka/wiadomosci/arttykul/lany-poniedzialek-kosztuje-nas-blisko-dwa.50,0,175288.2.html> [09.01.2020]; *Cena wody i ścieków dla 901 miast i miejscowości w Polsce*, [http://cena-wody.pl/srednie\\_ceny](http://cena-wody.pl/srednie_ceny) [09.01.2020].

liters suffice). In practice, that index has dropped to 100 liters in some cities, and to 70 liters in rural areas.

The EU recommendation stipulating setting the charges for water so they can cover the cost of supply and at the same time not becoming an excessive burden to the household budget, has been complied by most of European countries. In Great Britain, the recommended 4% went down to 3%. Nonetheless, in less developed countries the cost of water supply is much higher, e.g. in Jamaica, Nicaragua, Salvador it reaches 10%. Among other reasons, this is the consequence of the fact that in slums areas, which are not provided with water supply network, the cost of water is 5–10 times higher than in the districts equipped with technical infrastructure.

For that reason, some countries as Chile, Columbia and RSA subsidize poor groups of the population. In turn, in Great Britain the charges depend on the volume of consumption. Using more than 300 l/24hr/person is charged for at a higher rate, encouraging water saving measures. A similar system has been adopted in Singapore where the charge increases when reaching over 40/m<sup>3</sup>/month volume<sup>25</sup>. So far, Poland has not passed any legislation to differentiate the charges, or subsidize the poor water consumers, yet some suggestions are already in place. In turn, some gminas subsidize water treatment plants and sewage treatment plants so to lower the charges borne by the households.

The issue of outlays on water management and the sources of their financing are directly related to water supply charges. In many countries, those outlays amount to less than 0.5% of total investment outlays, while they should reach at least 1% of total outlays (as in Poland). As shown by the UN reports, in many underdeveloped countries the military expenditures are a few times higher than on water management. There are certain opportunities, involving international aid, to extend water intakes and water supply network in those countries. It has been postulated to earmark for that purpose a part of the funds supporting adoption to climatic changes, e.g. GEF. The funds will be raised by allocating 20–50% of the planned financial transaction tax, and it is estimated that 0.005% on tax would bring 40 billion USD, while at 0.05% the amount would rise to staggering 700 billion USD/year.

Another consequence of enforcing the return on the cost of investment in water services and the growing competition on the water market is the suggested floatation of water trade. The concept of trading water on stock exchanges is

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<sup>25</sup> *Raport o rozwoju społecznym*, UNDP 2006, Ośrodek Informacji ONZ, Warszawa 2006; *Raport o rozwoju społecznym. Więcej niż niedobór: władza, ubóstwo i globalny kryzys wodny*, UNDP 2011, Ośrodek Informacji ONZ, Warszawa 2014, pp. 22-32.



supported by the major concerns and investment funds, such as Foundation of Saint Lazare as well as by the politicians who favor market forces. To their minds, going public will resolve the issue of water deficit as it will raise the price of water, thus reflecting its value, and it will curb the corruption. Some practical steps in that area have already been taken by the Alberta province in Canada, separating the title to land from the right to water. That solution will facilitate trading water on the exchange of farmers irrigating farm land as well as by the contractors fracking sand in search of shale gas.

Social issues remain on the agenda as Inter Action Council urged respecting new ethics of management of the natural resources, formulating 21 directives for water management. In their work, the Council highlighted setting the price level of water according to its value, giving preference to irrigating crops used for food (not a biomass for fuels). Trading water on stock exchanges heralds new tendencies in water management as such solutions will find application in other countries<sup>26</sup>. That is why the new situation should be researched in order to prepare relevant economic policies to trigger changes facilitating the implementation of human right to water.

There is another issue on the water market, which is the result of increasing competition on the bottled water market, i.e. mineral, spring and table, and the providers of tap water. The latter has dramatically improved in terms of quality. In western countries, that feud took place some 20 –30 years ago and led to a slump in demand for mineral and spring water (in fact, the underground waters, while water supply networks base on surface waters). In Poland, that process was signaled between 2014–2015 as water supply enterprises started promoting their product as high-quality tap water, offered at a competitive price priced 0.01 PLN/l versus 1.50 PLN/l of bottled water. In response, the producers and bottlers of mineral waters accuse water networks of unfair advertising. In fact, some brands of bottled water do not meet the standards. It is to be expected that the competition will regulate the quality and price of bottled water as well.

Going back to the subject of privatization of water resources, it is worth noting that even though the EU endorsed charges for water, yet Water Directive of 2000 stipulates that „water may not become a commodity as any other product” as it is a common good which should be protected and regarded as heritage. Raising the economic value of water (not necessarily its price) and making it more market driven can be easily accomplished via extended privatization of water resources, or to be more specific, privatization of water supply networks.

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<sup>26</sup> It is worth noting a case reported on the US SE where in five years the stocks of water related partnerships twice outperformed the gold trading ones. Hence, the headline in The Telegraph: „Forget gold, invest in water!”

The consumers are aware of the ecological consequences of the excessive exploitation of water resources, and for that reason the consumption of water in the developed countries is on the decline. By far, this is the consequence of installing water consumption meters and charging appropriate rates. Nonetheless, in India, water used in farming is highly subsidized and the farmers are little concerned about conserving it. This proves that a free, or almost free access to water often leads to its enormous waste.

On the other hand, on the areas with water deficit, that resource is used only by those who can afford it. In certain areas of the world, a bottle of mineral water is priced higher than a bottle of Coke, and in order to survive people living there must put cash into the multinationals' pockets. By this token, privatization of water resources remains a controversial issue, since it usually means raising its price.

In certain countries private access to water is the only access people may have in view of the absence of functional public infrastructure. That is the thesis supporting the engagement of the World Bank in water privatization process which maintains that, without the cooperation with private investors, certain areas would be deprived of water. For that reason, the best solution is to join the efforts of public organs and private equity within public/private partnership framework. That is because a full privatization of water may trigger social unrest, which already happened in Bolivia in 2000 (water privatization was prerequisite to being granted World Bank credit, yet the process was voided). However, bearing in mind the profitability of sales of water and the government problems with its supply and pricing, even greater involvement of the private sector in the water market seems imminent.

As stipulated by all kinds of normative acts and conventions, the right to water is an inalienable human right. Unfortunately, this view is not shared by all. For example, Peter Brabeck-Lethmathe, the president of Nestle, the world largest manufacturer of food products asserted that access to water is neither a common right of man nor a common law. Civic initiatives that emerged in response to such declarations are poised to fight for the right to water for every human.

For example, a European initiative Right 2 Water aims to stop privatization of water resources in Europe (European Citizens' Initiative (ECI)<sup>27</sup>. According to its propagators, privatization will exert a negative impact on the quality of water and its price. Citizens supporting the initiative summoned the European Commission to guarantee access to water and sanitary facilities throughout Europe. They also urged to exclude water supply and water resources management from the legislature of the internal market and liberalization. The European

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<sup>27</sup> *Water and sanitation are a human right!* European Citizens' Initiative [Online] 2019, <https://www.right2water.eu> [09.01.2020].

solutions stipulate paying the costs of water supply, yet upholding common access to water at a fair price, thus highlighting an important role of the state and territorial self-government in water resources management, engaging public/private partnerships and limiting the role of the private sector.

### **Implementation of closed circulation in water management**

Hydrological cycle in nature may be compared to a closed water circulation on the Earth, yet the system is encumbered with an acute shortage or deficit in some regions, triggering certain ways of managing water resources:

- Collecting water in artificial retention reservoirs;
- Saving water by developing more advanced technologies in the industrial and construction sectors as well municipal services, available to individual households;
- Collecting and using rainwater by companies and households,
- Retrieving water from sewage;
- Bringing closed water circulation systems to the industrial enterprises.

In practical terms, fully closed circulation system is not feasible, as nationwide or locally there are sudden rainfalls and floods which prevent retention of water. In turn, earlier retention may not be enough during the time of an extended drought. On lowlands, retention of water is more difficult, and it may involve some adverse conditions. In Poland, water retention reaches 6% of runoff, while 15% are feasible (similarly to Western Europe). In the industrial processes there are water losses in the course of production, cooling and treating circulated water, reaching 3–5% and more (chimney cooling towers in coal fired power plants cause much greater losses). On top of that, there are water losses due to the leaks of the supply network.

In households, just 3% of water is for consumption, 6% for watering plants and gardens, washing cars, and 30% are used for flushing toilets. Hence, 50% of „grey water” can be easily retrieved (Israel and Japan have been long trying to treat it). Rainwater is used for watering lawns and gardens and also for flushing toilets., Grey water drained from washbowls, washing machines and showers may be used for the latter purpose. Such solution calls for a separate infrastructure and inclusion of ecological hydraulic systems in the building law.

Sewage treatment is a costly process, yet more affordable technologies are being implemented. The European Union has envisaged enforcing standards for reusing water, which will accelerate progress in that area. In the first place, enterprises limit open circulation of water where it is drawn at the source and then discharged into the river. Circular, closed circulation systems are being

introduced in which used water is pumped back (after prior treatment) to production or the intake. Consequently, there are three stages observed in the management of sewage in enterprises:

- preliminary treatment of sewage which is then discharged to municipal sewerage system,
- enterprises install their own sewage treatment plants (so called end-of-pipe installations),
- closing circulation of water with the use of integrated devices and waste-free technologies.

The programs defined as green or low-emission economy or sustainable growth have already become the basis for closed circulation systems, especially in the USA and in Europe. The European Union is striving to become the leader in terms of power efficiency growth and power security, and recently it has launched an orchestrated effort within the framework of that concept. In 2015, the European Union published „The EU roadmap for circular economy”, and in June 2016 the EU Environment Council suggested that the member states elaborate their own programs.

The EU directives on circular economy include 12 recommendations which can be briefly characterized as follows:

- 1–3. improvement of energy security, raising energy efficiency, promotion of renewable sources of energy,
4. introducing tradable emission rights,
- 5–7. intensification of waste management,
8. increasing producers' responsibility for the products launched on the market,
9. protection of the water resources against pollution and excessive consumption,
10. better use of sewage and sewage sediment,
11. implementation of the principles of retrieving the cost of water management and better access to water and sanitary facilities,
12. elaboration of commonly accessible water economy efficiency indicators to ensure higher quality of service from water providers (as in France and Great Britain).

Four recommendations pertain to **water management** in the consequence of the fact that the currently binding EU Framework Directive on Water will not ensure a good ecological condition of waters before 2021. That is why European programs highlight the issue of recycling water, bringing up the minimum requirements necessary for sewage recycling hence propagating the best practices in sewage treatment and desalination of sea water.

They recommend intensifying research on climatic changes, steppe formation and desertification (particularly in Southern Europe, even though both processes are currently increasing in Greater Poland and Kujawy regions in Poland). Recommendations include research on the impact made by pharmaceuticals, hygiene products and pesticides on the natural environment, including waters. Setting the minimum standard of water services and subsidizing disadvantaged social groups so that they can afford access to water seem other important points on the agenda. The EU recommends among others the return for the costs of water management in the charges for water. At the same time, it warns against excessive charges to be borne by the population.

The benefits of retrieving raw materials from sewage are clearly exemplified by the production process of phosphate fertilizers. Sewage sediment from those plants has a high content of phosphorus and, with the implementation of a closed circulation, about 20 –30% of phosphate fertilizers could be produced from that source. This is also important having into consideration that 90% of phosphates are imported from the countries outside the EU. A similar situation is in the case of cadmium used to produce those fertilizers (up to 60 mg/kg of sewage).

In Poland, the transformation towards circular economy constitutes a part of the *Responsible development strategy*. The strategy is divided into 4 priority areas; sustainable industrial production, sustainable consumption, Bioeconomy and New Business Models. That plan has also been called reindustrialization in order to ensure higher pace of social and economic development. Overall, the goals of the plans are considered to be ambitious and proper, yet the prerequisites and means for the implementation with 2020, and even 2030 horizon, seem fully insufficient. New Water Law, enacted in 2018, substantially raised ecological charges for the consumption of water. On the positive side, that may prove conducive to the implementation of closed circulation of water systems.

To conclude, we wish to stress that in view of the global deficit of water and the deteriorating climate, the UN and other international agendas should promote water policy on the regional and global level. As we know, the worst conditions persist in North Africa, the Middle East and Central Asia. Water deficit is also a looming perspective for Southern Europe and Poland. That threat has been raised by the geologists and geographers for a long time in many countries. Germany was the first to postulate including steppe formation and desertification in the research and economic studies within the European Union. Another import issue is instituting human right to water.

At the regional and local level, the agenda of particularly important issues includes increasing the retention of water in man-made and natural reservoirs as well as collecting rainwater by the enterprises and households. Those tasks should go hand in hand with the popularization of water saving technologies

and devices as well as providing closed water circulation in the industrial plants. In the latter instance, despite technological advances, domestic and sectorial programs advocating closed circulation supported by the system of economic incentives seem very helpful.

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# INTERNATIONALISATION OF SME SECTOR ENTERPRISES TAKING INTO ACCOUNT THE SPECIFICITIES OF FAMILY ENTITIES

## SUMMARY

Nowadays, the internationalization of enterprises is visible as a peculiar economic tendency. It covers both the economic and social spheres. It can be considered in macroeconomic terms, as the internationalization of the economy and in microeconomic terms, as the process of internationalization of enterprises. As far as the internationalization of enterprises is concerned, the context of this process is quite important in relation to the group of entities defined as family enterprises, whose role should be appreciated both in economic and social terms. The progressive development of international creates both benefits for the development of enterprises and challenges, which make it necessary to change not only on the macroeconomic level, i. e. in relation to economies, but also microeconomic, i. e. within the international itself. The level of internationalization of enterprises in the SME sector is strongly influenced by their size class, as well as the form of ownership associated with the management of these units (family and non-family enterprises).

## Introduction

An important role in the Polish economy is played by the activity of SME's (micro, small and medium enterprises). They constitute a dominant share in the sector of enterprises in general, as well as the main source of generating GDP and employment in this sector.<sup>1</sup> The modern, globalised world offers many opportunities for the development of these entities. However, it also brings with it challenges related to greater competitiveness of the organisation and the necessity to develop skills required for efficient functioning in the international environment.

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<sup>1</sup> Siuta-Tokarska B., Juchniewicz J., *Innovative activity of enterprises in Poland, with particular emphasis on the SME sector – crucial problems.* [In:] *Restructuring management, innovation and competitiveness in the face of change*, Ed. by: A. Jaki, S. Kruk, Organizer's House, Toruń 2019, p. 45.



Internationalisation of enterprises is a manifestation of globalisation, covering both the economic and social spheres. It can be considered both in macroeconomic terms, as the internationalisation of the economy and in microeconomic terms, as the process of internationalisation of the activity of enterprises<sup>2</sup>, which can be considered a dominant trend in the economy of the 20th and 21st centuries. Nowadays, an increasingly important economic aspect is the internationalisation of family enterprises, which in the modern economy are not only an important source of national income, but also an important source of new jobs. Their role should therefore be appreciated both in economic and social terms.<sup>3</sup>

The purpose of the article is to present the influence of internationalization on SME sector companies, including family organizations and the range of functioning of enterprises on international markets. The implementation of such a goal should contribute to the verification of the following research hypotheses:

- operational hypothesis 1 (HO1): with the increase in the size class of an enterprise, the degree of internationalisation of the enterprise increases,
- operational hypothesis 2 (HO2): family businesses in Poland have a lower level of internationalisation than non-family businesses.

## Influence of internationalisation processes on SME sector enterprises

One of the most popular typologies for internationalisation, developed by the OECD<sup>4</sup>, distinguishes four categories of factors influencing the internationalisation of a company. These are: active/pushing factors, reactive/pushing factors, opportunities and entrepreneurial activities—figure 1.

In the case of **active factors**, the entrepreneur, when deciding to expand into foreign markets, is guided by the possibility of achieving a higher profit. **Reactive factors** cause the entrepreneur to operate on foreign markets due to the lack of opportunities on the domestic market. **The chances** are to see the right conditions on foreign markets, to take advantage of random opportunities. In the **entrepreneurial factors** – the entrepreneur strives for growth. This factor is considered to be a primary factor, without the existence of which the others would not have been able to act.<sup>5</sup>

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<sup>2</sup> Duda J., *Internationalisation of Polish micro and small enterprises in the process of European integration and globalisation*, Difin, Warsaw 2017, p.15.

<sup>3</sup> Zalewska A., *Barriers to the development of family businesses* „Economic Studies of the Łódź Region” Vol. 16, Ed. by: M. Matejun, Polish Economic Society, Łódź 2015, p.72.

<sup>4</sup> *Globalisation and Small and Medium Enterprises*, Vol. 1, Vol 2: Synthesis Report, OECD, Paris 1997.

<sup>5</sup> Daszkiewicz N., *Internationalisation of Small and Medium Enterprises in Modern Economy*, Scientific Publishing Group, Gdańsk 2004, p. 51.

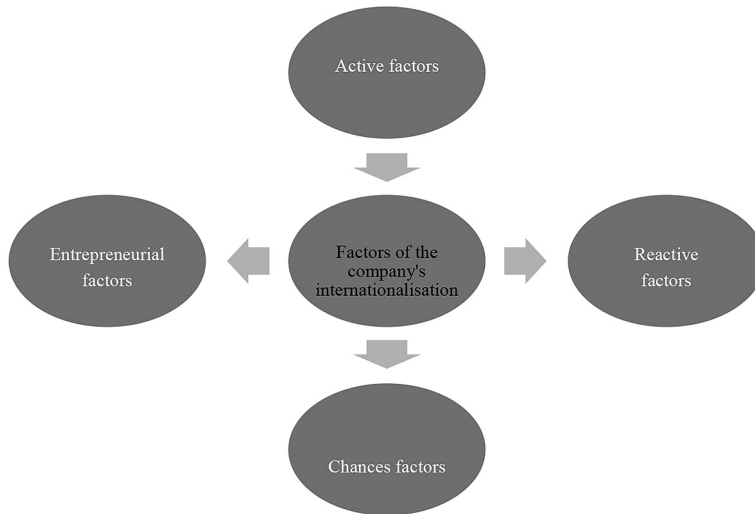


Figure 1: Factors of the company's internationalization

Source: own elaboration based on: Daszkiewicz N., *Internationalisation of Polish family businesses from the perspective of international entrepreneurship*. [In:] *Family Businesses. Modern trends in research and management practices, Entrepreneurship and Management*, Part 1, Volume XV, Notebook 7, Ed. by: B. Piasecki, A. Marjański, Social Academy of Sciences, Łódź 2014, pp. 246-247.

The progressive development of globalisation creates both benefits for the development of enterprises and for the economy and challenges that make it necessary to change not only at the macroeconomic level, i. e. in relation to economies, but also at the microeconomic level, i. e. within the organisation itself.

The processes of globalisation and internationalisation have a very strong impact on the SME sector at the **macro, mezo and micro levels**:<sup>6</sup>

- **macro level** are macroeconomic factors such as monetary policy, interest rates, inflation, conditions for investors or changes in the labour market. These factors are perceived by many entrepreneurs as one of the most important ones that are not affected by them. Therefore, they create significant barriers for this group of actors;
- **the mezo level** refers to changes occurring within the SME sector: includes market competition, technological and cost structure changes and marketing strategies;

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<sup>6</sup> Smallbone D., Cubers A., Leight R., *The Single Market Process and SMEs in the UK: Food Processing Sector*, "International Small Business Journal", 1996, Vol. 14(4) pp. 55-71.

- **the micro-level** refers to the organisation: its size, strategy, level, etc. and the structure of costs, technology, resources and competences of the owners and managers and the qualifications of the employees.

### **Opportunities and risks and motives for the internationalisation of SME sector companies**

Globalisation can be considered in terms of the behaviour of market players, as well as the estimation of expected benefits and potential risks in a company. The balance of benefits and risks associated with the globalisation process is not clear. The basic problem is to maximize the benefits and avoid risks.<sup>7</sup> The most frequently perceived opportunities related to globalisation by Polish entrepreneurs are presented in table 1, while the main threats are presented in table 2.

Table 1: Opportunities perceived by Polish SMEs resulting from globalisation in 2010-2012

Opportunities	Percentage of enterprises
Possibility to sell your products and services on foreign markets on the same principles as on the Polish market	64,0
Possibility to launch business activity on the foreign market on the same principles as on the Polish market	47,9
Easier to find an investor compared to the domestic market	30,9
Possibility to obtain bank loans in other countries	27,8
Possibility of employing qualified staff through access to foreign markets	19,6
Possibility to invest in other companies on the same basis as nationals of the countries in which the investment is made	16,7
Globalisation does not offer additional opportunities	23,2

Source: Duda J., *Internationalisation of Polish micro and small enterprises in the process of European integration and globalisation*, Difin, Warsaw 2017, p. 219.

The most frequently perceived as opportunities for enterprises were: the possibility to sell their products and services on foreign markets on the same principles as on the Polish market, the possibility to launch operations on the foreign market on the same principles as on the Polish market, easier acquisition of an investor compared to the domestic market, the possibility to obtain bank loans in other countries, the possibility to invest in other enterprises on the same principles as the citizens of the countries in which the investment is made.<sup>8</sup>

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<sup>7</sup> Borowiecki R., Siuta-Tokarska B., *Problems of functioning and development of small and medium-sized enterprises in Poland, Synthesis of research and directions of action*, Difin, Warsaw 2008, p.106.

<sup>8</sup> Duda J., *op. cit.*, p. 219.

Table 2: Threats perceived by Polish SMEs resulting from globalisation in 2010-2012

Threats	Percentage of enterprises
Increase in competition on the Polish market	62,2
The need to increase salaries beyond what is necessary it is due to the increase in labour productivity in Poland	52,1
Lack of qualified employees, which is related to the possibility of working in other EU countries	44,5
The need to remunerate employees in the performance of contracts on EU markets at the rates applicable there.	27,4
Other threats	2,4
There are no threats	18,0

Source: Duda J., *Internationalisation of Polish micro and small enterprises in the process of European integration and globalisation*, Difin, Warsaw 2017, p. 218.

The most frequently mentioned threats were: the increase in competition on the Polish market, the necessity to raise salaries to a higher degree than it results from the increase in work efficiency in Poland, the lack of qualified employees, which is related to the possibility of working in other EU countries, or the necessity to remunerate employees while performing contracts on the EU markets at the rates applicable there.<sup>9</sup>

Research conducted among Małopolska entrepreneurs concerning the motives for their internationalisation showed that they lack all kinds of knowledge related to conducting business activity on the international market (48%), as well as knowledge of procedures (over 33%). Moreover, they would appreciate having business contacts (30%), while loans supporting entry into international markets (over 16%) and lower costs of the internationalisation process (12%) would be an incentive. Additionally, entrepreneurs also pointed to the importance of the brand (4. 5%) and access to distribution channels (9. 8%) – figure 2.

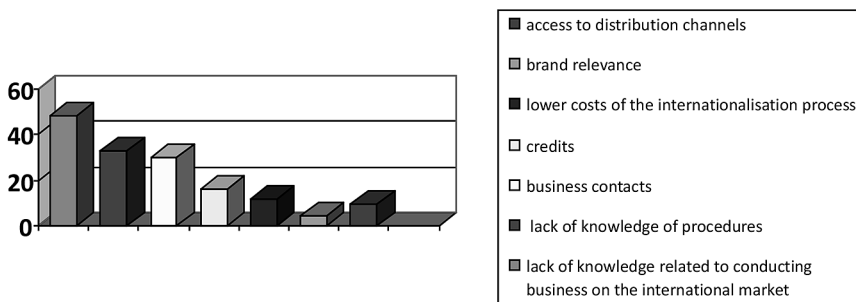


Figure 2: Barriers related to the introduction of internationalisation in enterprises

Source: Duda J., *Internationalisation of Polish micro and small enterprises in the process of European integration and globalisation*, Difin, Warsaw 2017, p. 253.

<sup>9</sup> Duda J., *op. cit.*, p. 218.

## Functioning of SME sector enterprises on international markets

The functioning and development of micro, small and medium enterprises in Poland within the European Union and non-European markets is the subject of many scientific research and research and rationalisation works.<sup>10</sup> Their authors often indicate that the sector of micro, small and medium enterprises in Poland operates mainly on the local, regional or national market. It is also confirmed by the research conducted by the Polish Confederation of Private Employers „Lewiatan”. The results of the research presented in table 3 show that almost 70% of the Polish SME sector operates in the region, less than 25% in Poland, and in the European Union and in the world about 7% of SMEs.

Table 3: Range of activities of Polish SMEs

Specification	Regional market	Domestic market	Foreign markets
	Number of enterprises in %		
SMEs in 2011	68,1	23,4	6,7
SMEs in 2012, of which:	69,5	24,9	7,0
microenterprises	71,6	22,8	5,5
small enterprises	57,7	27,3	15,0
medium-sized enterprises	31,2	34,7	33,8

Source: Duda J., *Internationalisation of Polish micro and small enterprises in the process of European integration and globalisation*, Difin, Warsaw 2017, p.194.

In the group of internationalised SMEs, she conducted research on the scope of internationalisation in 2014. Polish Agency for Enterprise Development (PARP)<sup>11</sup>. The results of these studies show that micro-enterprises internationalise more quickly than large economic entities. This demonstrates the flexibility and adaptability of SMEs to the changes taking place in the global marketplace.

As shown in table 4, companies that have chosen to enter international markets are more likely to be active in the global market than in the cross-border market. Micro-enterprises operate only to a small extent in the markets of the

<sup>10</sup> Borowiecki, R., Siuta-Tokarska B., Thier A., Żmija K., *Development of small and medium-sized enterprises in Poland in the face of challenges of 21st century economy. Economic and Management Context*, Department of Economics and Enterprise Organization, Cracow University of Economics, Cracow 2018; Siuta-Tokarska B., *Similarities and differences in the development of SMEs with national and foreign capital in Poland. Analysis and evaluation of research results*, Difin, Warsaw 2015.

<sup>11</sup> Report on the state of the small and medium-sized enterprise sector in Poland in 2013-2014, PARP, Warsaw 2015, p.80.

neighbouring countries (about 2%). Within the European Union, the percentage of micro-enterprises operating is over 6%, and on the global market 12%. As far as the global scope of activity is concerned, there is a direct proportional relationship between the size class of the company and its activity on the global market. When 12% of micro-enterprises operated on the global market, 27% of medium-sized enterprises operated on the same market.

Table 4: Range of internationalisation of the surveyed enterprises in Poland by size classes (in %)

Activities	Total SMEs	including companies:		
		micro	small	medium
Cross-border – neighbouring countries (Central and Eastern European markets)	3,4	2,0	1,0	0,5
EU – within the European Union (all EU Member States – 28)	15,0	6,5	8,0	5,0
Global – the whole world (both within and outside the EU)	52,0	12,0	13,0	27,0

Source: Duda J., *Internationalisation of Polish micro and small enterprises in the process of European integration and globalisation*, Difin, Warsaw 2017, p. 194.

## Specificity of family businesses

The role of family businesses in Poland has been steadily growing since 1989, when the transformation of the economy from a centrally managed to a market economy began. Family enterprises constitute a significant part of enterprises in the Polish economy, and their number is still growing. According to the IBR report, in 2016 family enterprises accounted for 36% (828 thousand companies) and 18% of GDP (PLN 322 billion)<sup>12</sup>.

Modern family businesses operate in a compound reality. On the one hand, their activity is focused on business development, on the other hand, on ensuring stable functioning of the owner's family.<sup>13</sup> The specific attributes of a family business are directly attributable to from getting involved in a family business. These are the values and norms of the family, the expression of which can be found most often in the mission and vision of the company, penetrate into its interior and decide on its daily functioning.

<sup>12</sup> Report from the survey conducted as part of the project „Family Business Statistics”, family business is a brand, Family Business Institute, Poznań 2016, p. 34.

<sup>13</sup> Lewandowska A., *Strategic decisions of family businesses as an implication of the value of their founders in view of their own research. /In:/ Family Businesses – Management Experience and Perspectives, Entrepreneurship and Management, Part I, Volume XVI, Ed. by: A. Marjański, M. Rebeca, C. Loera, Social Academy of Sciences, Łódź 2013, pp. 101-113.*

In today's highly globalised environment, credibility is important and the reputation of the company. For organizations aspiring to operate in global markets, this means presenting high quality services and products, as well as cooperating with other business entities at the appropriate level. According to Jeżak<sup>14</sup>, the majority of family businesses owe their success to the established value system. It is a set of rules and principles concerning the functioning of the enterprise, as well as the ethical and moral attitude of the family involved in the enterprise – figure 3.

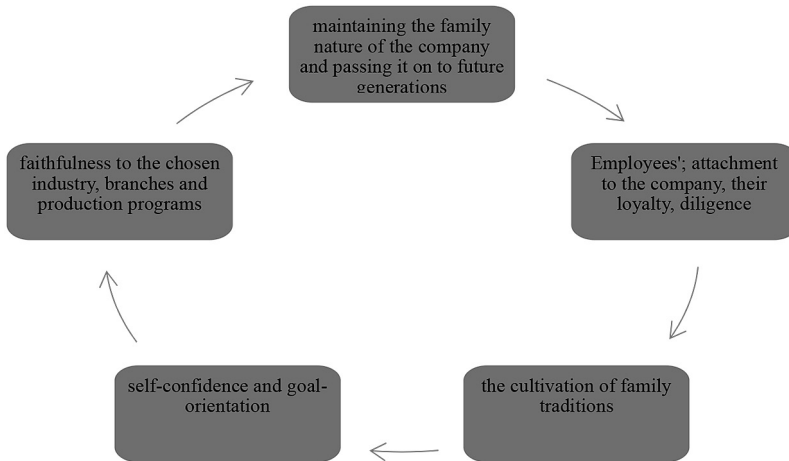


Figure 3: Family business value system

Source: own elaboration based on: Jeżak J., Popczyk W., Winnicka-Popczyk A., *Family business. Functioning and development*, Difin, Warsaw 2004, pp. 24-27.

In family businesses there are two separate subsystems: the family subsystem and the enterprise subsystem. In such entities it is not possible to fully separate the processes taking place in the family and in the enterprise, because economic objectives coexist with the emotions and relationships between family members. Economic justification is not the only objective of such economic operators.<sup>15</sup>

According to R. A. Webber, the family business is primarily aimed at achieving the objectives of the social side of business. It happens, therefore, that its owner resigns from the possibility of expansion and making profit in the event that the implementation of these plans would involve taking out a large

<sup>14</sup> Jeżak J., Popczyk W., Winnicka-Popczyk A., *Family business. Functioning and development*, Difin, Warsaw 2004, pp. 24-27.

<sup>15</sup> Sułkowski Ł., Marjański A., *Family businesses. How to achieve success in the relay of generations*, Poltext, Warsaw 2011, pp. 13-19.

loan, and consequently losing control over company<sup>16</sup>. The research conducted by K. Safijn on 98 family businesses shows (figure 4) that the main business objectives in family businesses are: ensuring the long-term survival of the business, financial independence, financial liquidity. The attributes of a company such as flexibility, creativity and keeping the company in the hands of the family are important. The least attention is paid to business objectives such as market share or consolidation of the company.

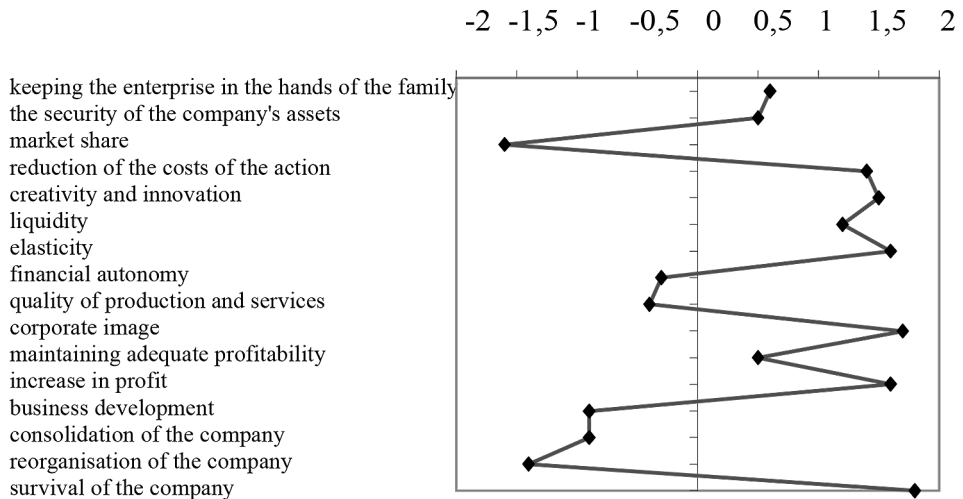


Figure 4: Profile of business objectives of family businesses

Source: Safin K., *Family enterprises – the essence and strategic behaviours*, Publishing House of the Oscar Lange Academy of Economics in Wrocław, Wrocław 2007, p. 209.

## Internationalisation of family businesses

There are a growing numbers of family entities in which the decision to expand into foreign markets is made, which is also a result of the increasingly competitive environment in which these entities operate. However, the internationalisation of family businesses may be different from that of organisations with different ownership structures. There is a view that family businesses have difficulty in building up a portfolio of strategic resources, making their international success more difficult compared to other businesses.<sup>17</sup>

<sup>16</sup> Webber R. A., *Principles of Organization Management*, PWE, Warsaw 1984, p. 339.

<sup>17</sup> Kontinen T., Ojala A., *The internationalization of family businesses: a review of extant research*, "Journal of Family Business Strategy", 2010, Vol. 1, No. 2, pp. 97-107.



The results of many studies show that family entities are less inclined to internationalisation than those that could be described as nonfamily. In addition, they are more likely to choose geographically closer markets. Moreover, traditionally, family organisations are seen mainly as those operating in local markets.<sup>18</sup> The range of internationalisation of family enterprises is shown in figure 5.

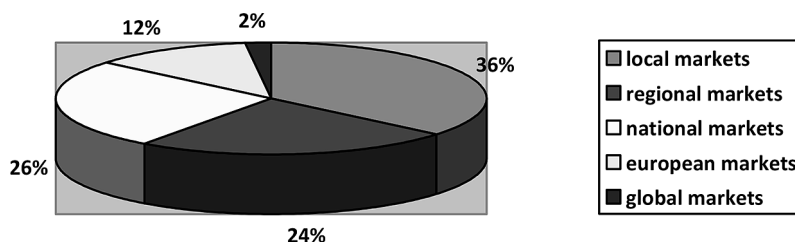


Figure 5: Range of operation of family enterprises in Poland

Source: own elaboration based on: Report from the survey conducted as part of the project „Family Business Statistics”, family business is a brand, Family Business Institute, Poznań 2016.

According to M. A. Gallo, family businesses operate according to the same principles and are similar in terms of their components, processes, barriers and problems they face on a daily basis.<sup>19</sup>

Therefore, family entities do not show a clear national specificity, and the differences between them result primarily from the level of social and economic development of a given country.

The Collegium of Enterprise Sciences of the Warsaw School of Economics conducted research on 63 family enterprises from the Podlaskie Voivodeship. The research revealed that among the most probable directions of activity of family entities, the most frequently indicated were: the need to search for new markets (40%) and the increase in sales on existing markets (32.2%). Fewer operators indicated improvements in existing products and technologies (26.2%) and only one in ten companies intended to focus on reducing unit costs or on a selected market segment.<sup>20</sup>

<sup>18</sup> Zaniewska K., *Internationalisation of family businesses – a review of the research.* /In:/ *Family businesses – contemporary challenges of family entrepreneurship. Development directions and strategies, Entrepreneurship and Management*, Ed. by: Ł. Sulkowski, Volume XIII, Notebook 7, Social Academy of Sciences, Łódź 2012, pp. 52-68.

<sup>19</sup> Jeżak J., Popczyk W., Winnicka-Popczyk A., *Family business. Functioning and development*, Difin, Warsaw 2004, p. 18.

<sup>20</sup> Leszczewska K. *Operating strategies of family companies*, „Quarterly of Enterprise Studies” 2010, Vol. 1(14), p. 72.

## The motives and theories for the activities of family businesses

There are many motives for foreign expansion by family entities, as well as theories that try to explain them. The first study on the internationalisation of family businesses was presented by M. A. Gallo and J. Sven in 1991. The authors pointed out that internationalisation may pose a threat to the family subject, because it forces the organization to change the structure of its goals, strategy and organizational culture. The management of international operations requires skills and competences, the acquisition of which through the employment of qualified specialists may run counter to the desire to keep control of the enterprise in the hands of the family.<sup>21</sup> The S. A., Zahra's undertaking of a more risky strategy of internationalisation by family businesses was explained by their aspiration to develop their business in the long term.<sup>22</sup> Considering various forms of expansion of a foreign family enterprise: export, import, cooperative relations or direct investments, it was found that export activity is the most important in the case of such entities.<sup>23</sup>

The internationalisation of the activities of family businesses is generally analysed in relation to the **resource theory**, **eclectic theory** and the so-called **upsal model**.

In the area of enterprise **resource theory**, identification is most often performed:

- the motives for the expansion of foreign family entities,
- the strategy of organisations operating in the international market,
- the creation of international business networks, and
- entering into strategic alliances and choosing to enter foreign markets.

Family businesses have resources that are difficult to counterfeit, valuable and capable of creating a competitive advantage on an international scale. Especially at the initial stage of the organization's development, the family provides most or even all of the important resources of the enterprise (capital, human resources, knowledge).

**The eclectic theory** of international production assumes, however, that the decision the company's involvement in the foreign market is determined by its development of three interdependent types of advantages, i. e:

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<sup>21</sup> Gallo M.A., Sveen J., *Internationalizing the family business: Facilitating and restraining factors*, "Family Business Review" 1991, Vol. 4(2), pp. 181-187.

<sup>22</sup> S.A. Zahra, *International expansion of U.S. manufacturing family businesses: the effect of ownership and involvement*, "Journal of Business Venturing", 2003, Vol. 18, pp. 495-512.

<sup>23</sup> Rymarczyk J., *Internationalisation and globalisation of enterprises*, PWE, Warsaw 2004, p. 19.

- resulting from the specificity of the company (ownership-specific advantage),
- emissions resulting from the location specific-advantage,
- resulting from internationalisation (internacionlization incentive advantage).

According to J. Dunning, as the competitive advantage of a company increases, the probability of choosing a form of entering the foreign market increases, which will enable strict control over foreign operations (e. g. a fully controlled subsidiary or subsidiary). He concluded that the more specific the resources a company has in a given national market compared to companies in other countries, the greater the incentives to internalise this advantage.<sup>24</sup>

**The uppsala model** assumes that the foreign expansion of the company is a slow and long-term process that is preceded by success on the domestic market. It comprises four main stages of internationalisation:

- irregular export activity,
- export through independent intermediaries,
- establishment of a sales subsidiary,
- establishment of a production subsidiary.

Companies first expand into neighbouring markets.<sup>25</sup>

C. Graves and J. Thomas<sup>26</sup> pointed to three key determinants in the process of internationalisation of family businesses: the level of family involvement in internationalisation, available financial resources and the possibility of using these resources in order to develop the required qualifications in the internationalisation process. On the other hand, the factors that hamper the decision to internationalise come mainly from within the organisation. These include: unwillingness to accept support from external experts, fear of losing control over the organisation, and lack of sufficient financial resources.<sup>27</sup>

Among enterprises in Poland, a survey was conducted on the motives for their internationalisation. In this study, carried out by N. Daszkiewicz N. in the years 2013–2016, a total of 221 enterprises were covered, 90 of which were described as family businesses.

The owners were asked about the main theme of internationalisation.

35.29% of the respondents indicated that there were no opportunities for further development of the company on the domestic market (9.05%) and that

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<sup>24</sup> Dunning J., *The Eclectic Paradigm of International Production: A Restatement and Some Possible Extension*, "Journal of International Business Studies", 1988, Vol. 19(1), pp. 1-31.

<sup>25</sup> Zaniewska K., *Internationalisation of family businesses – a review of the research. /In:/ Family businesses – contemporary challenges of family entrepreneurship. Development directions and strategies, Entrepreneurship and Management*, Ed. by: Ł. Sułkowski, Volume XIII, Notebook 7, Social Academy of Sciences, Łódź 2012, p. 302.

<sup>26</sup> Graves C., Thomas J., *Determinants of the internationalization pathways of family firms: An examination of family influence*, "Family Business Review", 2008, Vol. 21(2), pp. 151-167.

<sup>27</sup> *Ibidem*, pp. 151-167.

12. 67% of entrepreneurs took advantage of unplanned opportunities on foreign markets. On the other hand, seeing the opportunities for further development of the company on foreign markets was the reason for the internationalisation of 42. 99%. Therefore, the decision of the surveyed companies to expand into foreign markets was more often due to their aspirations for growth, and less frequently due to the occurrence of accidental opportunities or exhaustion of opportunities on the domestic market<sup>28</sup> – figure 6.

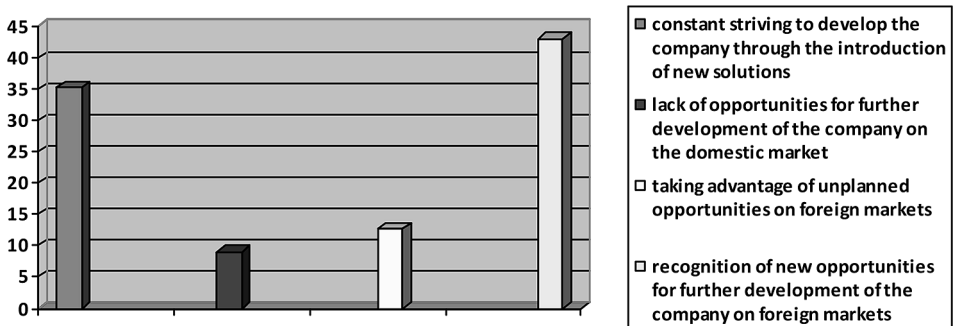


Figure 6: Motives for internationalisation of enterprises in Poland, including enterprises family in the years 2013-2016.

Source: own elaboration based on: Daszkiewicz N., *Internationalisation of Polish family businesses from the perspective of international entrepreneurship*. [In:] *Family Businesses. Modern trends in research and management practices, Entrepreneurship and Management*, Part 1, Volume XV, Notebook 7, Ed. by: B. Piasecki, A. Marjański, Social Academy of Sciences, Łódź 2014, pp. 248-250.

## Conclusion

Nowadays, a dynamic and complicated environment requires flexibility and speed in the actions taken. Growing internationalisation forces companies, including family businesses, to adjust their strategies in response to this trend. Some organisations see it as an opportunity for development, but for others it is a serious threat. There are many motives for foreign expansion, as well as theories that try to explain them. Research on the subject of internationalisation of micro, small and medium enterprises in Poland indicates that the smallest entities operate mostly on the regional market, and with the growth of their size class, the percentage of enterprises operating in the national economy, within the European Union and in the world increases. Research results also show that there

<sup>28</sup> Daszkiewicz N., *Internationalisation of Polish family businesses from the perspective of international entrepreneurship*. [In:] *Family Businesses. Modern trends in research and management practices, Entrepreneurship and Management*, Part 1, Volume XV, Notebook 7, Ed. by: B. Piasecki, A. Marjański, Social Academy of Sciences, Łódź 2014, pp.248-250.

is a direct proportional relationship between the size class of an enterprise and its degree of internationalisation. Also in terms of the global reach of the activity, there is a direct proportional relationship between the size class of the company and its activity on the global market. In the case of family businesses, research results indicate that family businesses are less inclined to internationalisation than nonfamily businesses. In addition, they are more likely to choose geographically closer markets and are mainly active in local markets.

The implementation of the empirical and secondary research allowed for the full implementation of the research goal in this paper, as well as the possibility of verifying the research hypotheses presented in the Introduction:

- operating hypothesis 1 (HO1) with the following wording: with the increase in the size class of an enterprise, the degree of internationalisation of the enterprise increases,
- operating hypothesis 2 (HO2) with the following wording: family businesses in Poland are characterised by a lower level of internationalisation compared to non-family businesses.

It is important to underline that these hypotheses have been verified positively.

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# COMPETITIVE STRATEGIES OF SMEs IN POLAND – AN OUTLINE

## SUMMARY

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Enterprises operating in the 21<sup>st</sup> century have to face unpredictable changes in their immediate and more distant environment, affecting many areas of their business operations. Competition is an inherent feature of market economy, so it is extremely important to recognize and understand what conditions and factors affect the competitiveness of an enterprise. The pursuit of a competitive advantage in environment turmoil requires continuous flexibility of enterprises and quick response to changes – creating the ability to constantly adapt and transform, as well as – depending on the entity's capacities – the implementation of anticipatory processes. This particular ability to adapt to changing market conditions is a characteristic feature of many SMEs, that show evident flexibility and the spirit of initiative, foster entrepreneurial attitudes, and stimulate activity in local or regional environment. In this context, competitiveness of entities in the SME sector is related to presenting their customers with an offer more attractive than that of their competitors. The implementation of this task is associated in particular with the selection of the right strategy, tailored to the specific characteristics and resources of a given entity, as well as emerging opportunities and threats arising in its environment.

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## Introduction

SMEs (micro, small and medium-sized ones) play an important role in the Polish economy, as they have a dominant share in the enterprise sector as a whole and are the main source of GDP generation and employment in this sector<sup>1</sup>. The dynamic globalization process, as well as changes in the conditions of competing in markets have necessitated modification in the approach to enterprise management. Nowadays, enterprises have to face continuous, unpredictable

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<sup>1</sup> Siuta-Tokarska B., Juchniewicz J., *Działalność innowacyjna przedsiębiorstw w Polsce, ze szczególnym uwzględnieniem sektora MŚP – węzłowe problemy. /In:/ Zarządzanie restrukturyzacją, innowacyjność i konkurencyjność w obliczu zmian*, Ed. by: A. Jaki, S. Kruk, Towarzystwo Naukowe Organizacji i Kierowania, Dom Organizatora, Toruń 2019, p. 45.



changes in their immediate and more distant environment, in many areas of business. Entities that want to survive and achieve a competitive advantage should be able to adapt their strategies to the market situation<sup>2</sup>. In the realities of the modern global economy, competitiveness is becoming one of the most important determinants of the assessment of the enterprise's operation in the market, and is also seen as a determinant of development. Competing is an inherent feature of market economy. Therefore, it is crucial to recognize and understand what conditions and factors affect the competitiveness of a given enterprise<sup>3</sup>.

The purpose of the paper is to show the evolution of views and changes in the approach to developing the company's strategy in terms of its competitiveness, and to present the significance and impact of selected market success determinants of SMEs. The accomplishment of the thus formulated goal should contribute to the verification of the following research hypotheses:

- operational hypothesis 1 (OH1): modern enterprises show the need, or even necessity, to formulate strategies to pursue an approach based on knowledge resources, cooperation and the pursuit of sustainable development;
- operational hypothesis 2 (OH2): the key success determinants of Polish SMEs include: resources, processes, relationships, values, company strategies, quality as well as their strategic framework;
- operational hypothesis 3 (OH3): Polish SMEs are not homogeneous, which is due to competitive strategies they pursue.

## The concept and substance of enterprise competitiveness

As the term 'competitiveness' has been defined in various ways, numerous concepts, research approaches, and methods of qualifying and quantifying competitiveness and its processes can be found in the literature. Most often, competitiveness of an enterprise is defined as its ability to compete, i.e. perform operations aimed at accomplishing the same or similar goals as other business entities seek to achieve at the same time and in the same environment<sup>4</sup>. As noted by M. J. Stankiewicz<sup>5</sup>, a company's competitiveness means its ability to efficiently,

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<sup>2</sup> Leszczewska K., *Funkcjonowanie firm rodzinnych w niestabilnym otoczeniu. /In:/ Firmy Rodzinne. Współczesne nurty badań i praktyki zarządzania*, part 1, Ed. by: A. Marjański, M. Rebeca, C. Loera, *Przedsiębiorczość i Zarządzanie* Volume XV, Issue 7, Part I, University of Social Sciences, Łódź 2014, p. 269.

<sup>3</sup> Mitek A., Miciuła I., *Współczesne determinanty rozwoju przedsiębiorstw prywatnych*, „Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania Uniwersytetu Szczecińskiego”, 2012, No. 28, p. 59.

<sup>4</sup> Ibidem, s. 25-26.

<sup>5</sup> Stankiewicz M. J., *Konkurencyjność przedsiębiorstwa. Budowanie konkurencyjności przedsiębiorstwa w warunkach globalizacji*, Towarzystwo Naukowe Organizacji i Kierownictwa, „Dom Organizatora”, Toruń 2002, pp. 36, 89.

i.e. effectively, profitably and economically pursue to achieve its market goals. It is a system whose structural elements include:

- competitive capacity generated by the company's tangible and intangible resources necessary for its operation;
- competition instruments, i.e. means created by the enterprise to win customers for an existing or future offer;
- competitive advantage resulting from such use of the company's capacity that enables efficient generation of an attractive market offer and effective competition instruments;
- competitive position, i.e. the result of the company's competitive efforts in a given sector, relative to the results achieved by its competitors.

In turn, according to A. Kędzierska<sup>6</sup>, the competitiveness of an enterprise means its ability to operate in a given industry in free market economy conditions. The greater the company's competitiveness, the more secure its position in the industry and the less exposure to external stimuli and recession, which is of particular importance in the conditions of open economies. Therefore, according to the OECD<sup>7</sup> "competitiveness reflects the ability of companies [...] to achieve, in conditions of sustainable participation in international competition, relatively high profitability and high involvement of inputs in the long run".

An enterprise's competitiveness can also be understood as its multi-dimensional feature resulting from its internal characteristics, related to the ability to adapt to changes in its environment<sup>8</sup>, or even more – the ability to find out not only current but also future needs. It determines the company's ability to undertake actions ensuring stable and long-lasting development and contributes to building its market value.

Competitiveness is a process that accompanies people in whatever they do. As for business activity based on the market mechanism, competition is an inseparable element of the process regulating resource allocation. For competitive processes to occur, resources must be limited relative to the needs, while in the case of market competitiveness – the main problem is limited demand for goods<sup>9</sup>. The idea of competitiveness boils down to the struggle of numerous individuals

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<sup>6</sup> Kędzierska A., *Wzrost konkurencyjności przedsiębiorstw poprzez fuzje i przejęcia. /In:/ Konkurencyjność przedsiębiorstw w świetle Strategii Lizbońskiej*, Ed. by: J. Bieliński, CeDeWu, Warsaw 2005, p. 98.

<sup>7</sup> *New Directions for Industrial Policy*, OECD, Paris 1997.

<sup>8</sup> Walczak W., *Analiza czynników wpływających na konkurencyjność przedsiębiorstw*, „E-mentor”, 2010, No. 5, p. 1.

<sup>9</sup> Charucka O., *Kluczowe czynniki konkurencyjności MSP i ich wpływ na rozwój gospodarki*, Vistula University, Warsaw 2014, pp. 52-55.

or groups to achieve the same goal, which makes it the main driving force behind the success or failure of national economies, industries and enterprises.

From the very beginning of capitalist management, the substance, features and methods of competition, as well as its impact on the market have been researched by numerous economists<sup>10</sup>. It should be emphasized, however, that the approach to enterprise competitiveness has changed as research into these issues has evolved. Traditional concepts focused primarily on basic market factors such as cost competitiveness, based on economies of scale, specialization, standardization and experience<sup>11</sup>, competition based on the market power of the enterprise, associated with taking the leader position and dominance in the market<sup>12</sup>, marketing concept, competitiveness based on real economy (the product, workforce, etc.), as well as cost leadership and differentiation<sup>13</sup>.

In the last decades of the 20<sup>th</sup> century, a resource-based approach that identifies the primary sources of enterprise competitiveness emerged. In accordance with this approach, competition can be based on time, the company's capabilities, the basic role of developing and creating key competences, the leading role of identification of company-specific capabilities and adapting the business domain to them, as well as on the deconstruction of the traditional vertical value chain<sup>14</sup>.

The history of competitiveness can be divided into three stages during which different types of activity prevailed:

- price competitiveness,
- quality competitiveness,
- competitiveness based on innovation,

and now the next stage is beginning to appear, i.e. green competitiveness based on the concept of sustainable development<sup>15</sup>.

The sources of the idea of sustainable development can be sought in “the awakening of public opinion” to environmental and social threats in the global dimension in the 1960s, which coincided with the development of the media. However, it was not until 1987 that this idea was adopted “somewhat permanently” and its primary definition was included in the report entitled

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<sup>10</sup> Stankiewicz M. J., *Konkurencyjność przedsiębiorstwa, [In:] Budowanie konkurencyjności przedsiębiorstwa w warunkach globalizacji*, Towarzystwo Naukowe Organizacji i Kierowania, Dom Organizatora, Toruń 2005, p. 35.

<sup>11</sup> Kreikebaum H., *Strategiczne planowanie w przedsiębiorstwie*, PWN, Warsaw 1997, pp. 89-100.

<sup>12</sup> Hamrol A., Mantura W., *Zarządzanie jakością: teoria i praktyka*, PWN, Warsaw 1999.

<sup>13</sup> Pierścionek Z., *Strategie konkurencji i rozwoju przedsiębiorstwa*, PWN, Warsaw 2003, p. 200.

<sup>14</sup> Pierścionek Z., op. cit., pp. 202-203.

<sup>15</sup> *Unia wobec procesów integracyjnych – wyzwania dla Polski: materiały z konferencji międzynarodowej zorganizowanej w Warszawie 25 listopada 1999 r.*, Ed. by: E. Latoszek, Dom Wydawniczy Elipsa, Warsaw 2000, p. 95.

*Our Common Future*, that emphasized the need to balance the three capitals: economic, social and ecological<sup>16</sup>. This concept gains its microeconomic dimension also through changes made to enterprises' strategies and operations in response to the transformation of their environment. The strength of the impact of external factors enhances the exposure – regardless of the economic – also the social and ecological dimensions of the competitiveness of entities in the short-term and their development – in the long-term. It is due particularly to the fact that the growing environmental threats and instability in global markets leading to changes in the national and international legal and institutional environment create a new context for the operation of modern enterprises. Attitudes, expectations and behavior of consumers, as well as those of employees, investors, business partners and even competitors are gradually changing, as a result of recognizing the need or even necessity to pursue the assumptions of sustainable development to preserve life on Earth.

In the context of enterprise competitiveness, the foregoing translates into increased importance of non-material aspects of the enterprise's market offer and increased demand for providing not only financial but also non-financial information about its business, as well as emphasis on safe and sustainable technological development, having regard to the entire product life cycle. All these changes increase the recognition of market organizations that operate in a sustainable manner and produce environmentally friendly products<sup>17</sup>.

Enterprises that want to compete and be competitive in the market must be aware of the conditions and factors that are and can be relevant in this process. The key determinants of the competitiveness of contemporary enterprises include external factors present in the entity's market environment, as well as internal factors in the enterprise itself (Figure 1).

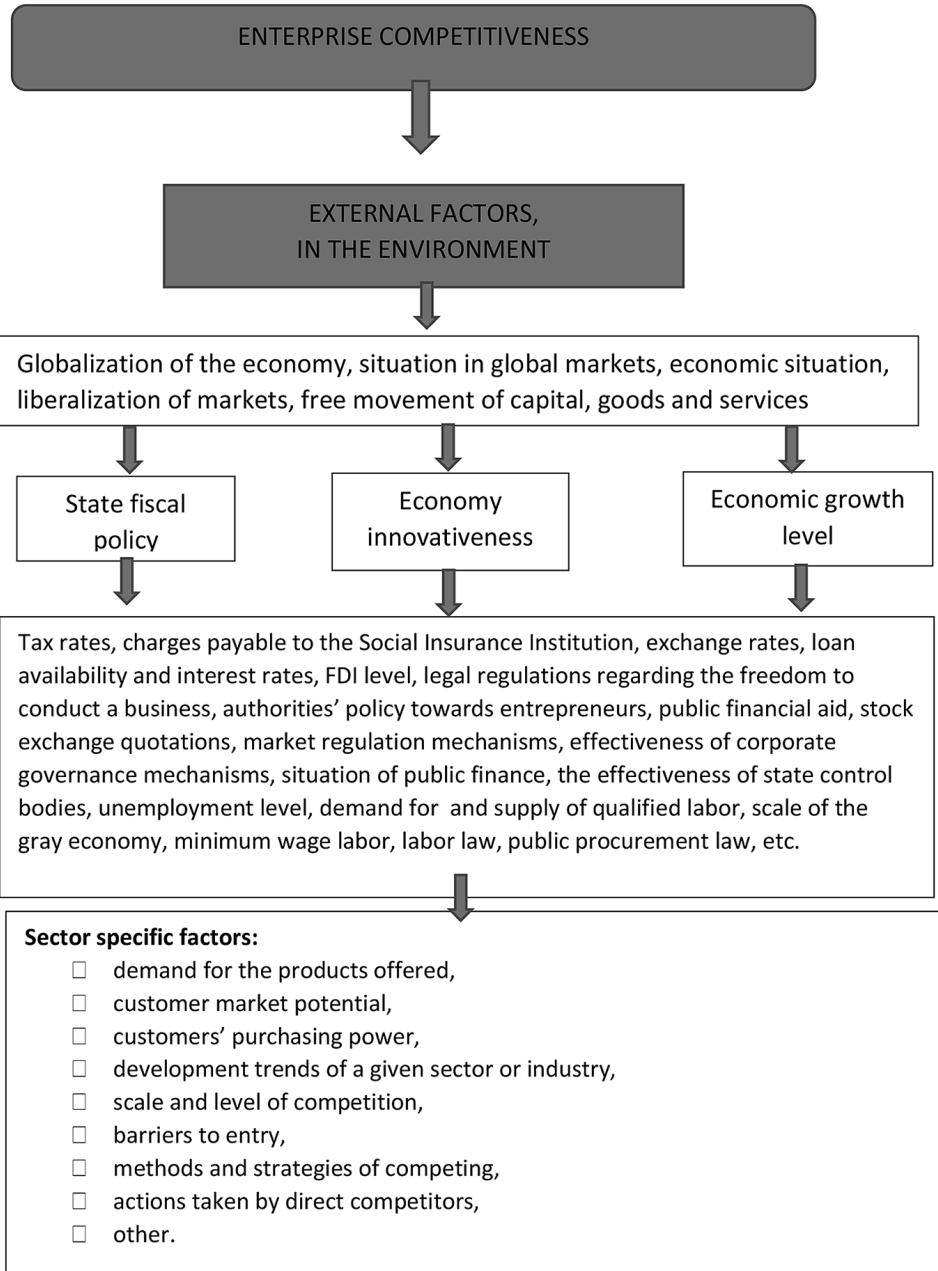
Factors originating in the environment are independent of the enterprise. They are the aftermath of the policy of state and local authorities and market regulation mechanisms, being also influenced by both the general condition and the economic situation in a given country as well as the global economic situation. As for internal factors, they are affected by the company's own operations, and are related to its financial condition, material resources, intellectual capital, organizational structure, adopted development strategy, management methods, entrepreneurship, innovativeness and the quality of its products and services<sup>18</sup>.

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<sup>16</sup> Siuta-Tokarska B., Thier A., Żmija K., *Procesy i problemy w realizacji zrównoważonego i trwałego rozwoju w Polsce. Kontekst mikroekonomiczny*, PWN, Warsaw 2019, p. 12.

<sup>17</sup> Przychodzeń W., *Zrównoważone przedsiębiorstwo. Teoria, praktyka, wycena, nauczanie*, Poltext, Warsaw 2013, pp. 88-89.

<sup>18</sup> Walczak W., op. cit., p. 3.



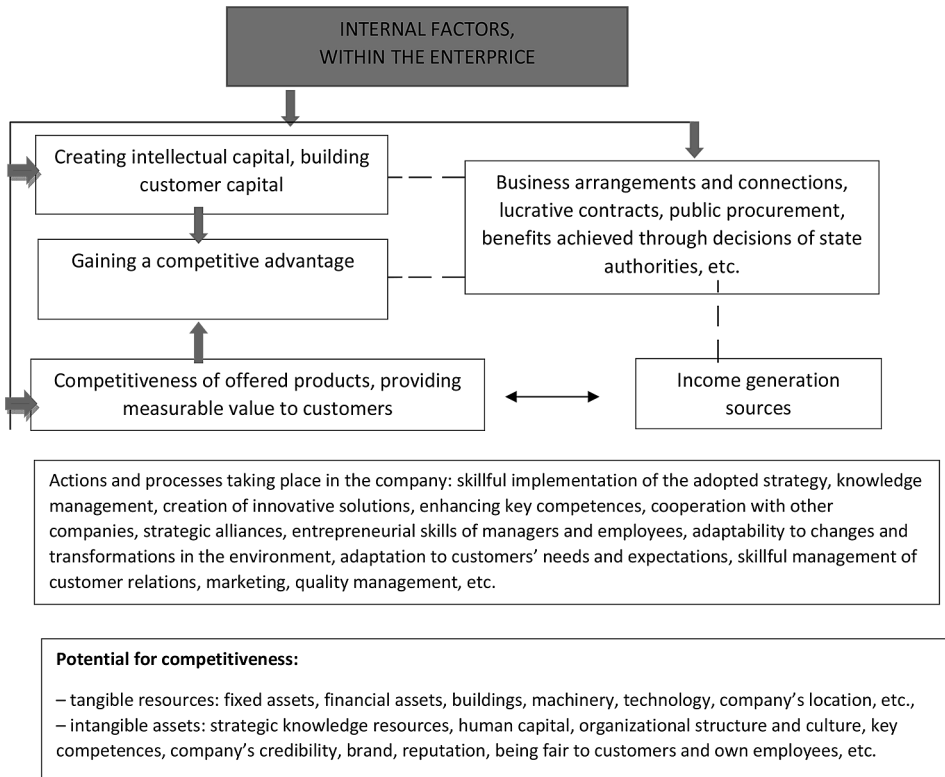


Figure 1: An attempt to comprehensively address determinants of the enterprise's competitiveness

Source: Walczak W., *Analiza czynników wpływających na konkurencyjność przedsiębiorstw*, "E-mentor", No. 5, SGH, Warszawa 2010, p. 3 with the authors' mapping.

## Key determinants of enterprises' success

The concept of success is multidimensional, but also subjective<sup>19</sup>. Therefore, as emphasized by E. Urbanowska-Sojkin, success is very rarely an inherent and permanent feature of an organization<sup>20</sup>, and, at the same time, it is closely related to its environment<sup>21</sup> and the goals that it strives to achieve<sup>21</sup>. As a result, it can

<sup>19</sup> The lack of unequivocal interpretations of success is due to, e.g. selection criteria, variability, multiplicity of success manifestations, difficulty with its measuring and identification and measuring its factors.

<sup>20</sup> Urbanowska-Sojkin E., *Zarządzanie przedsiębiorstwem. Od kryzysu do sukcesu*, Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań 2003, p. 15.

<sup>21</sup> Boguszewicz-Kreft M., Złotowska G., *Niematerialne czynniki sukcesu przedsiębiorstw usługowych. /In:/ Współczesne przedsiębiorstwo. Zasobowe czynniki sukcesu w konkurencyjnym otoczeniu*, Ed. by: J. Fryc, J. Jaworski, „Prace Naukowe Wyższej Szkoły Ekonomicznej w Gdańsku”, 2009, Vol. 4, p. 119.

also be understood as the effective adaptation of the enterprise's systems to its environment, ensuring achievement or maintenance of a competitive advantage, overcoming crises, as well as moving to the next stage of development<sup>22</sup>. It should be emphasized, however, that both one-off success and failure do not necessarily decide about the enterprise's future, thus they should be considered in a longer term<sup>23</sup>.

According to the 80/20 rule, 20% of events generate 80% of effects, while the remaining 80% of events generate only 20% of these effects<sup>24</sup>. Therefore, it can be assumed that there is no need to examine all determinants of the organization's success, but only those 20% that will decide about its success or failure, and analyse them thoroughly<sup>25</sup>.

Key Success Factors (KSF) are understood as, e.g. resources, skills and competences in which the company invests in the market where it operates, and which explain the greater part of differences observed in the obtained value and in the incurred costs<sup>26</sup>. They contribute to the company's success and affect its competitiveness<sup>27</sup>, deciding about its competitive position and success as well as its development opportunities<sup>28</sup>.

According to S. Lachiewicz, the method of approaching the success of SMEs depends on the following factors:

- the character and type of the enterprise's business,
- its size,
- its legal form,
- its economic condition,
- the nature of the market environment,
- as well as other constituents.

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<sup>22</sup> Strużyńska J., Majowska M., Ingram T., *Sukces organizacji z perspektywy teorii ewolucji*. /In:/ *Sukces organizacji. Istota, pomiar, uwarunkowania*, Ed. by: R. Rutka, P. Wróbel, „Prace i Materiały Wydziału Zarządzania Uniwersytetu Gdańskiego”, 2009, No 2/1, p. 91; Janasz K., Janasz W., Koziół K., Szopik K., *Zarządzanie strategiczne. Koncepcje, metody, strategie*, Difin, Warsaw 2008, p. 281.

<sup>23</sup> Haus B., *Zmiana i stabilizacja działalności przedsiębiorstwa*. /In:/ *Zmiana warunkiem sukcesu. Integracja, globalizacja, regionalizacja – wyzwania dla przedsiębiorstw*, Ed. by: J. Skalik, „Prace Naukowe Akademii Ekonomicznej im. O. Langego we Wrocławiu”, 2002, No. 963, p. 133.

<sup>24</sup> Obłój K., *Strategia sukcesu firmy*, PWE, Warsaw 2000, p. 27.

<sup>25</sup> Gierszewska G., Romanowska M., *Analiza strategiczna przedsiębiorstwa*, PWE, Warsaw 2007, p. 169.

<sup>26</sup> Grunert K.G., Ellegard Ch., *The Concept of Key Success Factors: Theory and Method*, “MAPP Working Paper” 1992, No. 4, October, <http://pure.au.dk/ws/files/32299581/wp04.pdf> (online: 21.01.2017).

<sup>27</sup> Sobczak K., *Czynniki sukcesu małych i średnich przedsiębiorstw w kapitalem polskim i zagranicznym – analiza porównawcza*, Poznań University of Economics and Business, Poznań 2014, p. 103.

<sup>28</sup> Lisiński M., *Metody planowania strategicznego*, PWE, Warsaw 2004, p. 179.

According to D. N. Sull, success is understood as a set – unique for a given enterprise – of the following elements<sup>29</sup>:

- strategic framework, as a way of perceiving the competitive environment,
- resources, i.e. means facilitating competitive struggle,
- processes, i.e. methods of performing operations,
- relations, as lasting relationships with external stakeholders and contacts between functional units,
- values, i.e. factors that inspire, unite and shape the organization's identity.

The aforementioned factors relate to contemporary sources of competitive advantage of enterprises, whose proper configuration and allocation foster success. The key determinants of the company's success include also: its strategy, innovativeness, staff (motivating and practice) and the quality of goods and services offered<sup>30</sup>.

Key success determinants can also be found in capital held by the enterprise or external entities. The model of key success determinants developed by E. Skawińska and R. I. Zalewski includes the following four types of capital: intellectual capital (including human, social, structural and relational capital), as well as technological, cultural and financial capital. The aforementioned types of capital enter into feedback relationships that form three dimensions of KSF, i.e. behavioral, structural and institutional ones<sup>31</sup> (Figure 2).

With such features as knowledge, talents, skills, perseverance, courage and ingenuity, human capital affects other types of capital. By improving human capital, new skills are acquired and new norms and values are developed, so are other attributes of social capital, e.g. cooperation, entrepreneurship, loyalty, commitment and participation. The high quality of human capital determines the development of various sources of competitive advantage, such as building relations with the environment, acquiring and using information, as well as increasing innovativeness<sup>32</sup>. Complemented with social values (confidence in standards, mutual understanding), human capital builds social capital.

The following types of capital: technological, financial, cultural and intellectual, are believed to be conducive to development, and their effective use is a key success factor. Relations, as intangible resources, contribute to the

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<sup>29</sup> Sull D.N., *Firma przetrwania. Rekonstrukcja przedsiębiorstwa w obliczu kryzysu*, Helion, Gliwice 2006, p. 90.

<sup>30</sup> Grabowska M., Drygas M., *Determinanty sukcesu przedsiębiorstw*, Konferencja Innowacje w Zarządzaniu i Inżynierii Produkcji, PTZP, Zakopane 2010, p. 517.

<sup>31</sup> Skawińska E., Zalewski R.I., *Konkurencyjność – kluczowe czynniki sukcesu przedsiębiorstw XXI wieku*, "Przegląd Organizacji" 2016, No. 3, p. 22.

<sup>32</sup> Skawińska E., Zalewski R.I., Brzęczek T., *Ocena kapitału społecznego szkolnictwa przez jego reprezentantów w Wielkopolsce*, „Zeszyty Naukowe PTE”, 2011, No. 9, p. 241.



development of relation capital. Combined with technological and financial capital, relation capital enables the implementation of innovative projects in the area of products, technologies and processes. It is worth noting that without proper relations it is difficult to build cultural capital, encompassing, in particular: entrepreneurship, trust, the level of generated information, the attitude to work, acceptance of common goals and changes, tolerance and understanding of future issues<sup>33</sup>.

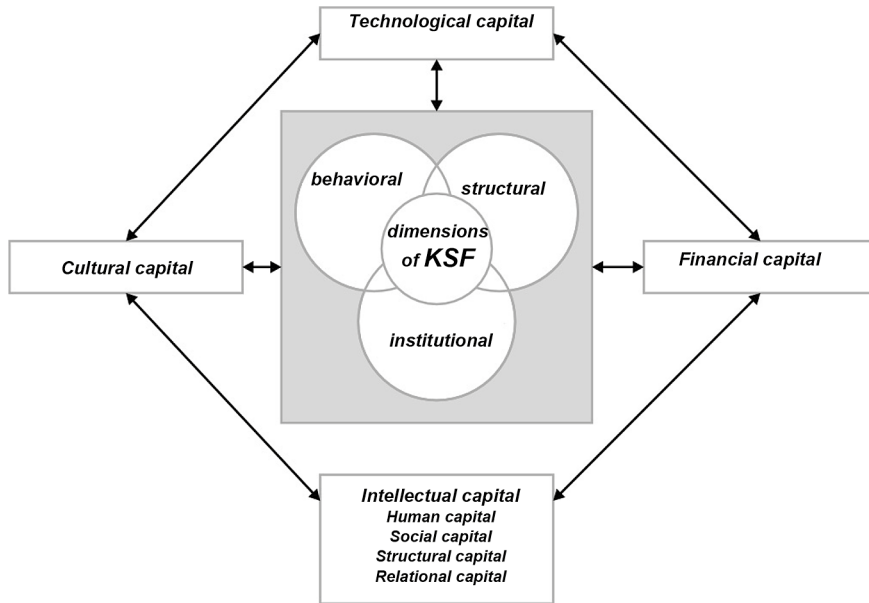


Figure 2: Model of key success factors of „enterprises of the future”

Source: Skawińska E., Zalewski R.I., *Konkurencyjność – kluczowe czynniki sukcesu przedsiębiorstw XXI wieku*, „Przegląd Organizacji” 2016, No. 3, p. 22.

## Enterprise strategies in terms of classical and contemporary approaches to their development

The concept of strategy is derived from the Greek word “strategos” and is a combination of two terms: “stratos” and “agein”, where “stratos” meant an army encamped and “agein” – leadership. Strategic thinking focuses on key long-term decisions, that must be made in a responsible manner, as they have fundamental consequences for every organization<sup>34</sup>.

<sup>33</sup> Skawińska E., Zalewski R.I., Brzęczek T., op. cit., p. 241.

<sup>34</sup> Obłój K., *Strategia organizacji*, PWE, Warsaw 2007, p. 18.

The strategy is one of the basic business abstractions, but the consequences of its implementation are definitely real<sup>35</sup>. Its creation is, therefore, a primary duty of any enterprise. Regardless of the enterprise's size and nature, the strategy is the central axis of its operation, that binds its all the most important links<sup>36</sup>. J. A. F. Stoner and Ch. Wankel point out that active strategy formulation requires strategic planning focused on general and usually long-term issues<sup>37</sup>. From the perspective of time and management schools, there are five categories of approaches to the strategy:<sup>38, 39</sup>

- planning approach to the strategy (1945-1974),
- positioning approach to the strategy (1974-1984),
- resource-based approach to the strategy, including VBM<sup>40</sup> (1983-2008),
- innovation and entrepreneurship approach to the strategy (cir. 2005 – cir. 2013),
- network approach to the strategy (cir. 2010).

The beginnings of strategy development date back to the 1950s. At that time, the strategy took the form of a **long-term** plan (5 years and more), while the process of its development was carried out as part of formal procedures.

The planning approach lost its importance in the 1980s. At that time, strategies began to be developed from the perspective of the **strategic position** (positioning school) as well as competitive advantages achieved by the company.

The resource-based approach was developed in the 1990s when organizations began to be seen primarily as **“a set of assets (resources) and skills, whose configuration in key competences and the manner of their best use became the essence of the strategy”**<sup>41</sup>.

In the resource-based approach, resources, their types, structure and configuration are the key category of organization and strategic management.

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<sup>35</sup> Oblój K., *Strategia sukcesu firmy*, PWE, Warsaw 2000, p. 32.

<sup>36</sup> Klimek J., *Rola zarządzania strategicznego w rozwoju przedsiębiorczości*, Instytut Organizacji i Zarządzania w Przemysle “Orgmasz”, Warsaw 2006, p. 39.

<sup>37</sup> Stoner J.A.F., Wankel Ch., *Kierowanie*, PWE, Warsaw 1994, p. 96.

<sup>38</sup> Niemczyk J., *Logika rozwoju strategii*. /In:/ *Zarządzanie strategiczne. Rozwój koncepcji i metod*, Ed. by: R. Krupski, „Prace Naukowe Wałbrzyskiej Wyższej Szkoły Zarządzania i Przedsiębiorczości”, 2014, Vol. 27, p. 69.

<sup>39</sup> The periods adopted for illustrative purposes include those characterized by clear empirical application of this type of solutions in business practice, which does not mean that previously these issues were not known and/or described in the literature.

<sup>40</sup> VBM – Value Based Management.

<sup>41</sup> Zakrzewska-Bielawska A., *Ewolucja szkół strategii: przegląd głównych podejść i koncepcji*. /In:/ *Zarządzanie strategiczne. Rozwój koncepcji i metod*, Ed. by: R. Krupski, „Prace Naukowe Wałbrzyskiej Wyższej Szkoły Zarządzania i Przedsiębiorczości”, 2014, Vol. 27, p. 14.

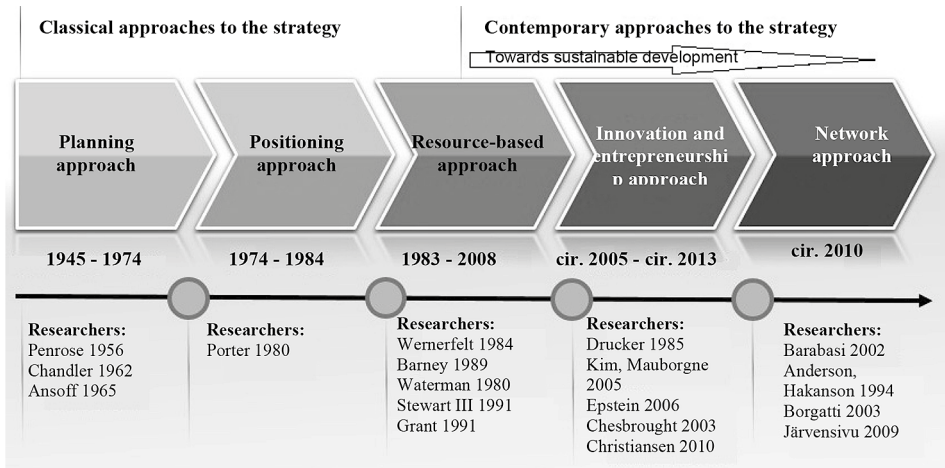


Figure 3: Approaches to strategy development by enterprises

Source: Danielak W., Mierzwa D. Bartzczak K., *Małe i średnie przedsiębiorstwa w Polsce. Szanse i zagrożenia rynkowe*, EXANTE, Wrocław 2017, p. 23, with the authors' own mapping.

The development of entrepreneurship and the increase in the importance of innovation as a result of technical and technological development at the beginning of the 21<sup>st</sup> century, favored the development of an **innovative and entrepreneurial approach**. Innovations are treated as one of the most important determinants of an increase in the company's competitiveness as well as its market position. Pursuing this approach requires relevant knowledge, skills and competences of individuals introducing innovations in a business entity.

Along with the development of research into the development of inter-organizational relations, the **network approach** has become particularly important. It is worth emphasizing that the essence of business networks includes all connections between business partners cooperating in the market<sup>42</sup>.

As part of the contemporary approaches to strategy development, the strategy's combination with the concept of sustainable development in the face of the growing environmental pressure as well as global pressure of social capital, is also gaining particular importance. This is due to the fact that enterprises have been recognized as social, institutional and economic entities operating in specific realities of a given place and time<sup>43</sup>, where the economy is not limited to the local, regional or national market, but in the aspect of various, often highly developed and complicated links and

<sup>42</sup> Hauke-Lopes A., *Kluczowe wyzwania dla lidera strategicznej sieci biznesowej działającej na zagranicznym rynku usług*, „Studia Oeconomica Posnaniensia”, 2014, Vol. 2, No. 1, p. 10.

<sup>43</sup> *Strategie przedsiębiorstw wobec wymogów zrównoważonego rozwoju*, Ed. by: K. Kuciński, SGH (Warsaw School of Economics), Warsaw 2009.

relationships – it is open not only to international, but even global agreements. This in turn changes the space, frequency and quality of modern enterprises. In this approach, sustainable development is one of the most important ideas that has far-reaching repercussions, and at the same time, it should be a determinant of strategic thinking and operation of modern enterprises.

Approaches to the strategy are closely related to the development of the enterprise's competitiveness, being the result of interaction of factors existing **within the enterprise** (resources, key competences, skills and abilities that make it stand out from other companies), in **its environment** and in the **strategy it pursues**<sup>44</sup>.

A properly formulated competitive strategy is indicated as the basic factor guaranteeing the survival and development of the company<sup>45</sup>.

Changes in the approach to competitive strategies are shown in Figure 4. This figure illustrates the transition from classical strategies as approached by Porter (cost leadership, differentiation and concentration) through the strategies proposed by Z. Pięrcionek (lowest prices, product quality, service quality, reputation), as well as those formulated by W. Chan Kim and R. Mauborgne (the "blue ocean strategy"), to strategies by K. Oblój<sup>46</sup>.

Recognizing the company's strategy as one of its development opportunities and sources of building its competitive advantage, it is **important to have regard to innovativeness, entrepreneurship** and a **broader view of the company's environment**<sup>47</sup>. In being competitive, an important role is also attributed to inter-organizational relations, that are the ground for strategic operations of modern enterprises. If properly developed, they can take the form of a **relational strategy**, that accounts for privileged relations established by the company with selected partners from its environment<sup>48</sup>. A. Zakrzewska-Bielawska emphasizes that relational strategies enable access to external resources and can be a source of a competitive advantage through relational competence<sup>49</sup>.

An interesting approach to strategies based on value innovation was presented by W. Chan Kim and R. Mauborgne – the authors of the "blue ocean strategy", being based on an entire system of operations leading to value growth for both the

<sup>44</sup> Moczulska M., Stankiewicz M. J., *Interakcje społeczne sprzyjające zaangażowaniu pracowników w organizacji – założenia w świetle teorii organizacji i zarządzania*, "Management Sciences" 2016, No. 2 (27), p. 122.

<sup>45</sup> Ibidem, p.122.

<sup>46</sup> Danielak W., Mierzwa D., Bartzak K., *Małe i średnie przedsiębiorstwa w Polsce. Szanse i zagrożenia rynkowe* EXANTE, Wrocław 2017, p. 24.

<sup>47</sup> Moczulska M., Stankiewicz M. J., op. cit., p. 121.

<sup>48</sup> Zakrzewska-Bielawska A., op. cit., p. 21.

<sup>49</sup> Ibidem, s. 24.

customer and the whole enterprise. It is important to seek in it a new market area – market space free of competition with unmet demand. The implementation of strategies is favored primarily by: creating free market space in various industries (reconstruction of market boundaries), focusing on building strategies based on a broad vision rather than on figures, reaching beyond the limits of existing demand, and winning completely new customers<sup>50</sup>.

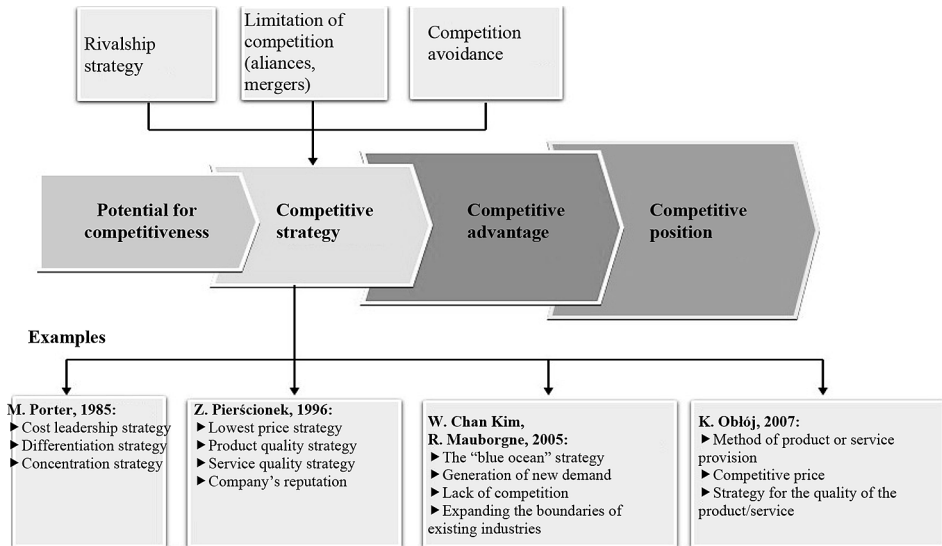


Figure 4: Enterprises' competitive strategies

Source: Danielak W., Mierzwa D., Bartczak K., *Małe i średnie przedsiębiorstwa w Polsce. Szanse i zagrożenia rynkowe*, EXANTE, Wrocław 2017, p. 24, with the authors' own mapping.

Therefore, it can be pointed out that entrepreneurs, on their path of development and implementation of operations aimed at achieving a competitive advantage of their organizations, have the opportunity to follow various competitive strategies, whose implementation should ensure the accomplishment of not only economic goals, but also those that could be conducive to creating added value in terms of social and natural capital.

### Sources of the competitiveness advantage of the enterprise

Sources of competitive advantage are found both **within the company and in its environment**. These are **products and markets, resources and**

<sup>50</sup> Kim Chan W., Mauborgne R., *Strategia błękitnego oceanu. Jak stworzyć własną przestrzeń rynkową, by konkurencja stała się nie istotna*, MT Biznes, Warsaw 2007, pp. 12-33.

**competences as well as relations and values.** Traditional concepts of enterprise competitiveness include<sup>51</sup>:

- cost competitiveness,
- qualitative leadership,
- competing based on the company’s market power (leader position and domination in the market),
- marketing concepts of competitiveness,
- focus on a market niche,
- cost leadership and differentiation.

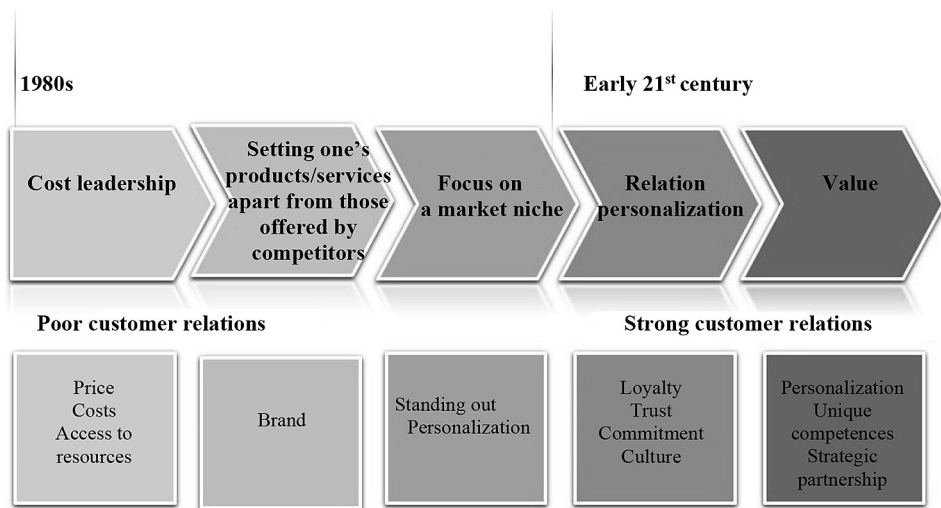


Figure 5: Former and present sources of the competitive advantage of the enterprises

Source: Danielak W., Mierzwa D., Bartczak K., *Małe i średnie przedsiębiorstwa w Polsce. Szanse i zagrożenia rynkowe*, EXANTE, Wrocław 2017, p. 22.

M. E. Porter’s theory is the best known concept of competitive advantage. It includes an advantage in terms of cost leadership, product/service distinction, and focus on a specific market segment. Nowadays, in a changing environment, searching for sources of a competitive advantage based exclusively on traditional approaches proves insufficient.

Modern concepts of competitive advantage have regard to enterprises’ operation in a changing market, technological and competitive environment.

Currently, sources of a competitive advantage are sought in:

- cooperation,

<sup>51</sup> Bednarz J., *Klasyczne a nowe teorie przewagi konkurencyjnej przedsiębiorstw*, <https://ekonom.ug.edu.pl/web/download.php?OpenFile=1051>, p. 113 (online: 12.09.16).

- personalization of customer relations,
- building value based on inter-organizational relations or networks,
- interconnections between market partners based on developed principles and partnership cooperation<sup>52</sup>,
- implemented information resources<sup>53</sup>.

Cooperating enterprises strengthen their competitive advantage also by:

- internalization of the partner's skills and resources,
- learning from partners,
- sharing and creating knowledge,
- growth of the organization and its greater market share,
- sharing R&D risks and costs,
- protection against radical innovations,
- increasing barriers to enter and creating economies of scale<sup>54</sup>

Key competences that are unique, difficult to imitate and give a specific value for customers (brand, patent, location), are of great importance, while **in the case of a dynamic market, intangible resources (knowledge, technology, virtual relations) grow in importance.**

### **Competition instruments used by small and medium-sized enterprises in Poland**

Research into competition instruments used by small and medium-sized enterprises in the Lubuskie Voivodeship shows that the majority of the surveyed entities competed on price – using special prices (69.2% of small enterprises and 67.9% of medium-sized ones) and on the high quality its products/services (66.6% of small and 60.7% of medium-sized ones)<sup>55</sup>.

As many as 56.4% of small companies tailored products/services to customer needs. Half of medium-sized companies took measures to build customer confidence in the company's operations (in the case of small companies, this figure was 38.5%). Enterprises also sought to maintain existing customers and acquire new ones (35.9% of small ones; 17.9% of medium-sized ones). In the group of medium-sized companies, 46.2% modernized their products and services

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<sup>52</sup> Stańczyk-Hugiet E., *Dynamika strategiczna w ujęciu ewolucyjnym*, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław 2013, p. 86.

<sup>53</sup> Stańczyk-Hugiet E., *Niematerialne zasoby sieci międzyorganizacyjnych. /In:/ Współczesne wyzwania dla teorii i praktyki zarządzania, Sieci międzyorganizacyjne*, Ed. by: J. Niemczyk, E. Stańczyk-Hugiet, B. Jasiński, C.H. Beck, Warsaw 2012, p. 78.

<sup>54</sup> Stańczyk-Hugiet E., *Dynamika strategiczna w ujęciu ewolucyjnym*, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław 2013, p. 87.

<sup>55</sup> In order to determine competition instruments used and determinants of competitive advantage, a survey was conducted on a group of 107 small and medium-sized enterprises based in the Lubuskie Voivodeship. The proportion of small enterprises was 58%, and that of medium-sized ones was 42%. The study was conducted in March 2017.

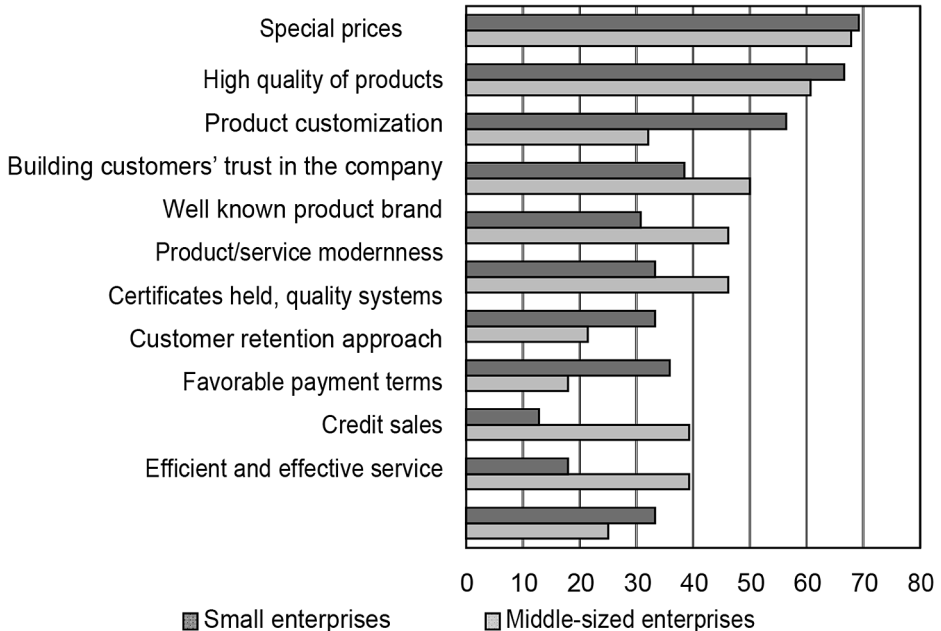


Chart. 1: Competition instruments used by small and medium-sized enterprises in Poland (%)

Source: Danielak W., Mierzwa D., Bartczak K., *Małe i średnie przedsiębiorstwa w Polsce. Szanse i zagrożenia rynkowe*, EXANTE, Wrocław 2017, p. 48.

and strengthened the product brand. Less popular competition instruments were used to make products stand out from those offered by competitors, by demonstrating certificates held, quality assurance systems, convenient payment terms, conditions and the warranty period, diversification of the product/services range and sales promotion, as well as launching new products on the market. Medium-sized enterprises (approx. 40% of the respondents) used favorable forms of payment and credit sales more often than small ones (from 12% to 18% of the respondents)<sup>56</sup>.

### Determinants of competitive advantage among the surveyed SMEs

The key determinants of competitive advantage include more favorable prices – as indicated by 71.8% of small and 53.6% of medium-sized companies (Chart 2). According to more than half of the small enterprises, competitive advantage is determined by maintaining constant contact with customers (51.3%); in the group of medium-sized companies this figure is 35.7%. The customer remains the focus of the surveyed enterprises, that take active steps to

<sup>56</sup> Danielak W., Mierzwa D., Bartczak K., op. cit., p. 48.



acquire new customers, but also to retain existing ones. Small enterprises pursue a personalized approach to meet customer needs. A wide range of products/services is the purchase incentive as indicated by 43.6% of small and 28.6% of medium-sized companies.

Through actions in the area of promotion and marketing, they build positive relations based on trust and loyalty. Relations with customers are favored by partnership relations with suppliers, as indicated by 39.3% of medium-sized enterprises and 28.2% of small ones.

For 60.7% of medium-sized companies and 46.2% of small ones, a positive reputation of the company is a key competitive advantage determinant. Also in the group of medium-sized companies, over half of the respondents (53.6%; 41% of small ones) indicated that in their purchase decisions, customers pay attention to the trademark. Therefore, the reputation, brand, prices and the quality of products are the most important factors conducive to building a competitive advantage.

According to 42.9% of medium-sized companies, a firm market position and a convenient location (42.9%) favor competitive advantage. For over 35% of the surveyed small companies and 21.4% of medium-sized ones, competent staff have a significant impact on gaining a competitive advantage. About 40% of medium-sized and 33% of small ones sell over the Internet. Virtual relations are developed through online purchase and sale transactions, that require customers to acquire knowledge and information on their own and make choices without most often professional support from the seller, as is the case with traditional shopping in points of sale. In face-to-face relations, sales assistants act as advisors, helping the customer to choose the offer that best meets their needs and expectations. When it comes to new products characterized by technical innovations, customers expect the sales assistant to skillfully advise them, suggests ready solutions, as well as prepare an offer tailored to their expectations<sup>57</sup>.

On the other hand, the surveys carried out by K. Sobczak<sup>58</sup> shows that SMEs in Poznań, both those with Polish and foreign capital, report that the factors of their success include primarily the quality of products/services, winning new partners, recipients and building lasting relations with customers, managerial skills of the enterprise's owner, employees' qualifications, their efficiency and loyalty, as well as the company's image and service improvement. This held true for both newly established enterprises and those which had been operating in the market for at least 10 years.

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<sup>57</sup> Danielak W., Mierzwa W.D., Bartczak K., op. cit., pp. 49-50.

<sup>58</sup> The surveys were carried out in 2012-2013 on 160 SMEs located in Poznań.

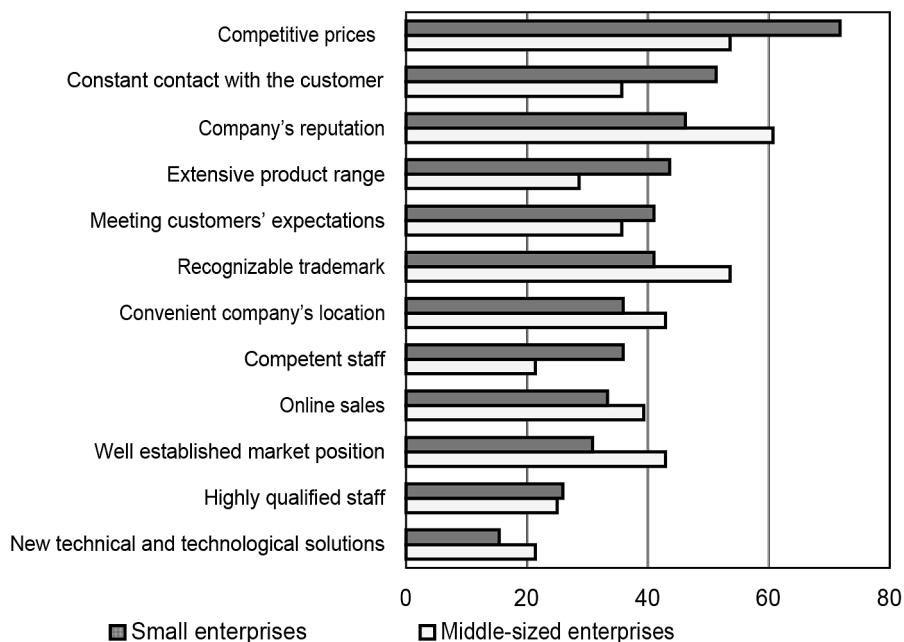


Chart 2: Determinants of the competitive advantage of small and medium-sized enterprises in Poland (%)

Source: Danielak W., Mierzwa D., Bartczak K., *Małe i średnie przedsiębiorstwa w Polsce. Szanse i zagrożenia rynkowe*, EXANTE, Wrocław 2017, p. 49.

Similar conclusions can be drawn from research carried out in 2014 among SMEs from all over Poland with respect to determinants of their competitiveness<sup>59</sup>. Data in this regard are presented in Chart 3.

The data in Chart 3 show that the quality of products/services was reported most often (45.8%), followed by the price of products/services (15.3%), the quality of customer service (15.1%), the ability to customize products to customers' requirements (8.3%), narrow specialization (7.2%), the company's location (1.8%), new, innovative products (1.3%), competent and well-motivated staff (1.3%)<sup>60</sup>.

The above research finding provided by the three research centers show that entrepreneurs in the SME sector are aware that it is the quality of their products and services and that of customer service that is the key determinant of the competitiveness of modern businesses (as confirmed by the vast majority of the respondents). However, as SMEs are not homogeneous<sup>61</sup>, either in terms

<sup>59</sup> The survey covered a total of over 1,100 SMEs, including 42% of micro, 41% of small and 17% of medium-sized ones.

<sup>60</sup> Starczewska-Krzysztofek M., op. cit., p. 14.

<sup>61</sup> Borowiecki R., Siuta-Tokarska B., Thier A., Żmija K., *Rozwój małych i średnich przedsiębiorstw w Polsce wobec wyzwań gospodarki XXI wieku. Kontekst ekonomiczno-zarządczy*,

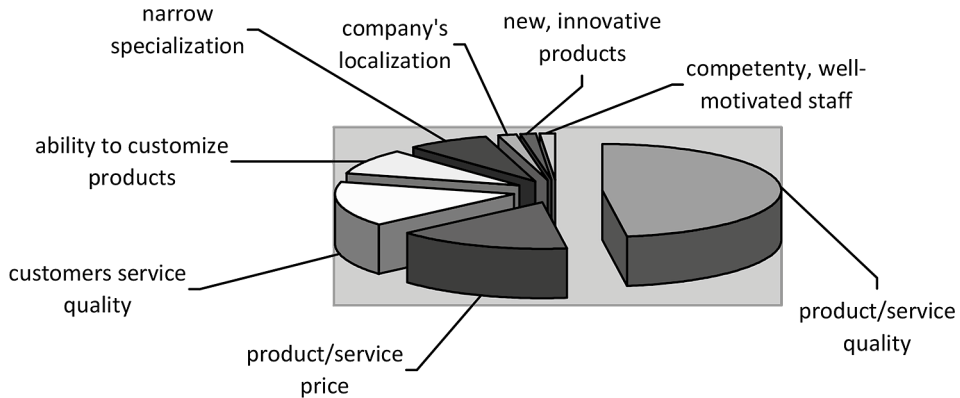


Chart 3: Factors reported by SMEs as decisive for their competitiveness

Source: Starczewska-Krzysztofek M., *Raport Curriculum Vitae małych i średnich przedsiębiorstw 2014 – finansowanie działalności i rozwoju*, Konfederacja Lewiatan, Warsaw 2014, p. 14.

of their size categories or other variables, the competitiveness determinants they report may vary depending on their importance in particular size categories, i.e. micro, small and medium-sized enterprises<sup>62</sup>.

## Conclusion

In the modern world, enterprises, as the basic entities in the market economy, are expected to be able to adapt tasks and functions as well as work organization and management methods to the radically changing conditions of their operation. The ability to adapt to the environment (its complexity, structure and dynamics) and the requirements of market economy determines the effects of operation and development opportunities of each enterprise<sup>63</sup>.

The pursuit of a competitive advantage in environment turmoil requires continuous flexibility of enterprises and quick response to changes – creating the ability to constantly adapt and transform<sup>64</sup>, and even anticipation of changes. Competition may concern not only prices, that are one of the basic competition instruments of SMEs in Poland, but may also be related to qualitative differences regarding the product, e.g. its appearance, functionality, durability, packaging or fashion requirements. Consumer preferences vary and can be more or less

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Wyd. Katedra Ekonomiki i Organizacji Przedsiębiorstw Uniwersytetu Ekonomicznego w Krakowie, Cracow 2018, p. 9.

<sup>62</sup> Siuta-Tokarska B., *Podobieństwa i różnice w rozwoju przedsiębiorstw sektora MŚP z kapitałem krajowym i z udziałem kapitału zagranicznego w Polsce. Analiza i ocena wyników badań*, Difin, Warsaw 2015, p. 376.

<sup>63</sup> Mitek A., Miciuła I., op. cit., p. 54.

<sup>64</sup> Moczulska M., Stankiewicz M.J., op. cit., p. 121.

sophisticated. In this context, each enterprise's task is to present an offer more attractive than that of its competitors, which requires, among others, choosing the right strategy<sup>65</sup>.

The implementation of the undertaken empirical and secondary research enabled the full accomplishment of the research objective adopted in this paper, as well as verification of the research hypotheses set out in the Introduction:

- operational hypothesis 1 (OH1): the operation of modern enterprises shows the need, or even necessity, to formulate a strategy to pursue an approach based on knowledge, cooperation and striving for sustainable development;
- operational hypothesis 2 (OH2): the key success factors of SMEs in Poland include resources, processes, relations, values, enterprise strategies, quality as well as their strategic framework;
- operational hypothesis 3 (OH3): SMEs in Poland are not homogeneous, which is related to competitive strategies they pursue.

The presented research hypotheses have been verified positively.

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# THE DIRECTIONS OF STRUCTURAL CHANGES OF THE POLISH ECONOMY – MODERNITY OR STAGNATION

## SUMMARY

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The chapter presents the results of research on directions of changes in the business structure of enterprises in Poland. An attempt was made to assess the trends and directions of changes in global production, employment and investment outlays from the point of view of achieving the general objectives of structural transformations in the economy. The results of measuring changes in the analyzed measures allowed to indicate directions of changes and determine their intensity. The analysis made it possible to conclude that the trends of changes in the structure of the measures in Poland were consistent with the regularity of structural changes in the process of economic development, but their structure still significantly differs from the structures of highly developed countries. The analysis showed that the economy was modernized by developing types of economic activities that act as carriers of technical, technological and organizational progress.

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## Introduction

Structural changes are considered one of the most important processes that not only contributes to the economic growth of country, including through an increase in the production potential, social product and consumption, but also determines the increase in the overall economic efficiency and the level of national income per capita.<sup>1</sup> It is also a process that leads to quantitative and qualitative changes in the elements of the national economy and changes in the relationship among these elements, as well as among them and the entire

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<sup>1</sup> See also: Franke A., *Zmiany strukturalne w poszczególnych sektorach gospodarki narodowej jako czynnik wzrostu wydajności pracy i wzrostu gospodarczego*, /In:/ Wpływ wydajności pracy na wzrost gospodarczy, Wypych M, (red.), Uniwersytet Łódzki, Łódź 1977; Jaworska M., *Zmiany strukturalne w przemyśle państw OECD w latach 1993-2003*, Wydawnictwo Akademii Ekonomicznej im. Oskara Langego we Wrocławiu, Wrocław 2007.



economic structure.<sup>2</sup> According to the classical theory of economic development, economic growth is associated with changes in the structure of production. There is a perception that high economic growth is associated with major structural changes and vice versa, lower economic growth is due to small changes in structure.<sup>3</sup> We observe such dependence in developing countries where China is the best example<sup>4</sup>, where industrialization causes technological changes that affect GDP growth. There has also been an increase in productivity in the economy, mainly due to the reallocation of workforce from low to high productivity areas.<sup>5</sup> The relationship among structural changes and economic growth is not the same in every country (World Economic and Social Survey 2006).<sup>6</sup>

Structural changes initiated by economic policy are aimed at increasing management efficiency through the implementation of the adopted structural policy, whose task is to create institutional and substantive conditions for innovative competition.<sup>7</sup> It should be emphasized that achieving this goal is extremely difficult, because it should be showed that the process of ownership transformation covers a very wide thematic scope of specific issues that are related to each other, and also applies to a significant number of economic enterprises. At present, it is necessary to modify this approach to disaggregating sectors into more sectors, but taking into account the issue of modern sectors. The structural changes taking place in the economy are so complex that they should be studied in increasingly disaggregated systems.<sup>8</sup> In a market economy, signals from the market regarding changes are quickly read, which means that enterprises are undergoing a continuous adjustment process, which may indicate that the restructuring of the economy is taking place at the level of enterprises

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<sup>2</sup> Ładysz J., *Polityka strukturalna Polski i Unii Europejskiej*, PWN, Warszawa 2008.

<sup>3</sup> Kuznets S., *Modern economic growth: Findings and reflections*. "The American Economic review" 1973, vol. 63, no. 3., Acemoglu D., *Introduction to modern economic growth*, Princeton University Press, 2009

<sup>4</sup> Onufer A., *Kierunki zmian strukturalnych w Chinach, Studia azjatyckie*, Wyd. UE we Wrocławiu, Wrocław 2008.

<sup>5</sup> Kolegowicz K., *Objectives and directions of structural changes /In/: Problemi upravlinnâ ta ekonomiki підприємstv v sučasnih umova h: Materiali HĪV MiŹnarod Problems of Management and Economics of Enterprises in Modern Conditions, XIV International Scientific Conference – KĪiv; Nacional'nij Universitet Harčovih Tehnologij*, 2018, pp. 20-22

<sup>6</sup> See also: *World Economic and Social Survey*, Diverging Growth and Development, Economic & Social Affairs, United Nations Publications 2006, Berglof E., Foray D., Landesmann M., Lin J. Y., Campos M. N., Sanfey P., Radosevic S. & Volchkova N., *Transition economics meets new structural economics*, Journal of Economic Policy Reform, 18 (3), 2015, pp. 191–220. <https://doi.org/10.1080/17487870.2015.1018691>.

<sup>7</sup> Belka M., Hausner J., Jasiński L. J., *Polska transformacja w perspektywie integracji europejskiej*, Friedrich Ebert Stiftung, Warszawa 1996.

<sup>8</sup> Klamut M., *Ewolucja struktury gospodarczej w krajach wysoko rozwiniętych*, Wyd. Akademii Ekonomicznej im. Oskara Langego, Wrocław 1996.

by eliminating inefficient and economically weak enterprises. Structural transformation policy can take various forms, and governments can support the introduction of appropriate changes. Policy adaptation, with an emphasis on the development of new, dynamically developing areas of the economy. They can also slow down the fall of some areas (e.g. for social reasons), limit free international exchange.

## The directions of structural changes

Structural changes have been the subject of economic research for many years and many economists have conducted and continue to conduct research aimed at verifying recognized and discovering new trends and regularities of structural changes, and in the last few years methods for measuring and assessing structural changes have clearly developed. Structural changes in the national economy and in its individual fields are always shaped in specific, existing in a given place and time conditions of development of the mentioned fields of management. Their thorough analysis and assessment of the possibilities of use is necessary to make decisions on structural transformations, the choice of structural policies, the nature and direction of structural changes.

The objectives of structural policy, as well as the objectives of economic policy, vary from country to country and depend on real and regulatory development conditions on their territory. The basic objectives of structural policy, i.e. those that should be implemented in all conditions, include:

- improving the economic efficiency of the economy by moving economic resources from less-efficient to more-efficient sectors of the economy,
- acceleration of economic growth and counteracting unemployment,
- modernizing the economy by developing those areas of its economic activity that play the role of carriers of technical, technological and organizational progress,
- increasing the competitiveness of domestic products on world markets and strengthening the export orientation of the economy,
- using the process of structural changes to reduce the impact of resource, energy, demographic, etc. barriers occurring in the development process.<sup>9</sup>

Structural changes in the Polish economy after 1990 were much faster than in the mature economies of developed countries. This phenomenon is practically unique due to the conditions of economic and social changes taking place in

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<sup>9</sup> See also: *Polityka gospodarcza*, ed. by B. Winiarski, Wydawnictwo Naukowe PWN, Warszawa 2006, s. 285; Lin J. Y., *New structural economics: A framework for rethinking development*. The World Bank Research Observer, 2011, 26 (2), pp. 193–221

Poland after 1990. Therefore, studying structural changes is quite complicated in this case, which requires the use of appropriate methods. This is demonstrated by the discussion in the literature about the tools used and the very method of studying this issue.<sup>10</sup> According to M. Klamut, the economic structure should be associated with the so-called theory of sets, which means that the analysis of economic structure consists in studying mutual quantitative relationships between child and parent elements.<sup>11</sup>

Table 1: Stages of social development and characteristics specific to each of them

No.	stages	features	directions of change
1	Pre-industrial society	dominance of agriculture lack of qualified labor force negligible share of industry	industrial development
2	Industrial society	limiting the role of agriculture dynamic industry development increased importance of qualified engineers and technicians	industrial development
3	Post-industrial society	minimizing the role of agriculture inhibiting the dynamics of industrial development the growing role of the services sector, including services from the hi-tech sector	development of the service sector
4	Information society	knowledge-based economy, high level of workforce domination of hi-tech and industrial sectors	development of the modern services sector (hi-tech)

Source: Kałowski A., Wysocki J., *Zmiany strukturalne w gospodarce polskiej*, Zarządzanie i Finanse, 2012, R. 10, nr 1, cz. 2, p. 282

Structural changes in the economy mean transformations of a quantitative and qualitative nature of all elements of the economy's structure, the consequence of which is the increase in economic structures.<sup>12</sup> The manifestation of quantitative changes, usually is associated with structural changes, which are the change in weights of individual components of the economic system, which are inevitably accompanied by the emergence of new and disappearance of old elements of the structure. The study of quantitative changes mainly refers to changes in the structure of employment and production in individual sectors, which allows the identification of branches and sections of the economy characterized by increasing or decreasing trends of changes in their share in total employment or production,

<sup>10</sup> Kałowski A., Wysocki J., *Zmiany strukturalne w gospodarce polskiej*, Zarządzanie i Finanse, 2012, R. 10, nr 1, cz. 2, pp. 281-292

<sup>11</sup> Klamut M., *Ewolucja struktury gospodarczej w krajach wysoko rozwiniętych*, Wyd. Akademii Ekonomicznej im. Oskara Langego, Wrocław 1996.

<sup>12</sup> Kozłowska A., *Ewolucja struktur gospodarczych w świetle Schumpeterowskiej koncepcji kreatywnej destrukcji*, Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu, Poznań 2010.

as well as stagnant sections. Measurement of quantitative structural changes consists in calculating changes in quantitative relations among the components of economic structures identified from the point of view of specific criteria.<sup>13</sup> Qualitative transformations occur at lower levels of aggregation, in the internal structure of these elements, their components, implemented goals, strategies or undertaken types of activities. Their consequence, at least in theoretical assumptions, is broadly understood progress, manifested in achieving beneficial effects not only in the economic area, but also social and ecological.<sup>14</sup> Changes in the economic structure, both in dynamic and cross-sectional terms, can be noticed by comparing the variability of the share of individual sectors (parts) of the economy in its entirety.<sup>15</sup> Within them, new proportions of the components of the economy and mutual relations among them are shaped. This way of analyzing changes in the sectoral structure in the literature on the subject is considered one of the basic criteria for assessing the socio-economic development of countries.<sup>16</sup>

The structure of the economy is a picture of its division into main elements reflecting the state of the economy and trends in the division of labor. In this approach, the economy is a complex socio-economic system that can be considered on many levels. It is important to analyze the economy from the point of view of the production structure, and in particular the share of modern areas and branches of production in this structure.<sup>17</sup> One of the main components of the development of all types of objects is their structure, and its knowledge and assessment of changes over time allows you to determine the specific structural features of individual objects.

### **The scope and subject of structural analysis and assessments in the economy**

In the economic literature on structural changes, the factors of these changes in the economy, several research trends differ in terms of directions, scope and subject of research. Relatively most are book publications, articles and scientific papers in which the results of analysis and assessments of structural

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<sup>13</sup> Ładysz J., *Polityka strukturalna Polski i Unii Europejskiej*, PWE, Warszawa 2008.

<sup>14</sup> Kwiatkowska W., *Zmiany strukturalne na rynku pracy w Polsce*, Wydawnictwo Uniwersytetu Łódzkiego, Łódź 2007.

<sup>15</sup> Budnikowski T., *Niemiecki rynek pracy w epoce przemian strukturalnych i ustrojowych*, Instytut Zachodni, Poznań 1993.

<sup>16</sup> Strahl D., Panasiewicz V., *Długookresowe wzorce transformacji strukturalnej dla Polski*, Międzynarodowe Studia Porównawcze, IRiSS, Warszawa 1997.

<sup>17</sup> Turowski K., *Unowocześnienie struktury gospodarczej jako czynnik wzrostu produktywności w polskiej gospodarce*, /In:/ Kunasz M. (red.), *Problemy gospodarowania w dobie globalizacji*, Wydawnictwo Katedry Mikroekonomii Uniwersytetu Szczecińskiego, Szczecin 2006, p. 145.

changes, employment, sold production, sales revenues, investments, fixed assets in industry and other departments are presented (their equivalent in PKD are business activity sections) national economy. The current trend includes works in which the impact of changes in the production structure on economic growth, the impact of structural changes on the dynamics of economic development of countries, development trends of national economies has been analyzed, and their results allow for the separation of components of the analyzed and economic structures with growth or a downward trend of change. These trends are the result of diverse dynamics of size being the measures of analyzed and evaluated structures. The size and direction of structural changes subject to analysis and evaluation is measured by indicators of the share of individual components of structures of changes in value over time, indicators of pace and dynamics of change.

The subject of interest of the next research trend of structural analyzes and assessments are methods for measuring the dynamics and intensity of structural changes, similarity and dissimilarity of structures. The application of the mentioned statistical methods of measuring and assessing structural changes makes it possible to isolate the phases and stages of structural changes and economic development of countries and sectors of the economy. Thanks to the methodological proposals presented, it is possible to more accurately and comprehensively measure changes in the analyzed structures, and thus more accurate, more explicit assessment of these changes than assessments based on the results of traditional comparison of structure indicators during the same or many compared structures<sup>18</sup>. Obtained measurement results make it possible to make analyzes and assess the correlation among structural changes and economic quantities characterizing, for example, economic growth, economic development or also to periodize structural changes and look for the correlation among the results of periodization and the state of economic development of the country and the structure of its economy.

The third stream of research on structural changes in the economy contains presentations of the results of analysis and evaluation of structural changes in

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<sup>18</sup> Statistical methods for measuring and assessing the dynamics and intensity of structural changes, similarities and similarities of structures are presented, among others, in the following papers: Tober J., *Niektóre metodologiczne problemy analiz strukturalnych w przemyśle*, Gospodarka Planowa 1970, nr 7; Borysiuk W., *Próba kwantyfikacji zmian struktury polskiego przemysłu w okresie 1950 – 1970*, Gospodarka Planowa 1973, nr 5; Kukuła K., *Pomiar dynamiki struktur ekonomicznych*, Problemy Ekonomiczne 1975, nr 4; Kukuła K., *Propozycje w zakresie pewnych miar dynamiki struktury*, Przegląd Statystyczny 1975, nr 3; Chomątowski S., Sokołowski A., *Taksonomia struktur*, Przegląd Statystyczny 1978, z. 2; Walesiak M., *Metoda oceny podobieństwa struktur (na przykładzie struktury gałęziowej zatrudnienia w przemyśle społecznym województw Polski)*, Wiadomości Statystyczne 1980, nr 10.

selected economic structures of one or several methods of measuring and assessing traditional structural changes (changes in the value of participation indicators) or statistical measures. The main subject of interest of the works included in the research current are the results of measuring and assessing structural changes, not the assessment of the usefulness of accuracy, disadvantages and advantages of the methods used to measure and evaluate structural changes. In some works qualifying for the characterized strand of structural research, attempts are made not only to measure and evaluate structural changes but also to isolate the results of structural changes and the effects of these changes not only measured by changes in the value of participation rates and/or the value of statistical measures used, but also by the change in the economic situation, financial efficiency of the economic structures analyzed and assessed, as well as the effects measured by the degree of implementation of the objectives of structural transformations. The results of structural research conducted in this way, due to their high practical utility and cognitive values, deserve attention and their further development.

The study of structural changes is aimed at determining the absolute and relative differences among the shares of individual components of the structure and the summary effect of such changes at the compared moments of time of the same or many different objects. In addition, it is usually about indicating the directions of structural transformations, calculating the dynamics (intensity) of structural changes, indicating those components of structures that intensify structural changes to the greatest extent. K. Kukuła gave a comprehensive overview of statistical methods for analyzing economic structures<sup>19</sup>, which in his work not only described in detail the statistical methods for measuring and economic evaluation of structural changes but also pointed out their pros and cons and examples of applications.

At present, the determinant of structural changes is primarily the emergence of areas creating innovation and based on modern production factors related to scientific, technical and organizational progress. Additionally, these changes are also affected by a decrease in the competitiveness of products, production efficiency and an increase in unemployment in areas based on the traditional economic structure. As a consequence, the structural change is often taken as the “transition” of economies to more development sectors, which, due to the high level of productivity, dynamize their development, and thus contribute to the modification of existing economic structures.<sup>20</sup>

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<sup>19</sup> Kukuła K., *Statystyczne metody analizy struktur ekonomicznych*, Wydawnictwo Edukacyjne, Kraków 1996.

<sup>20</sup> Karpiński A., *Przemiany strukturalne w procesie transformacji Polski 1989-2003-2025*, Oficyna Wydawnicza SGH, Warszawa 2008, p. 16.

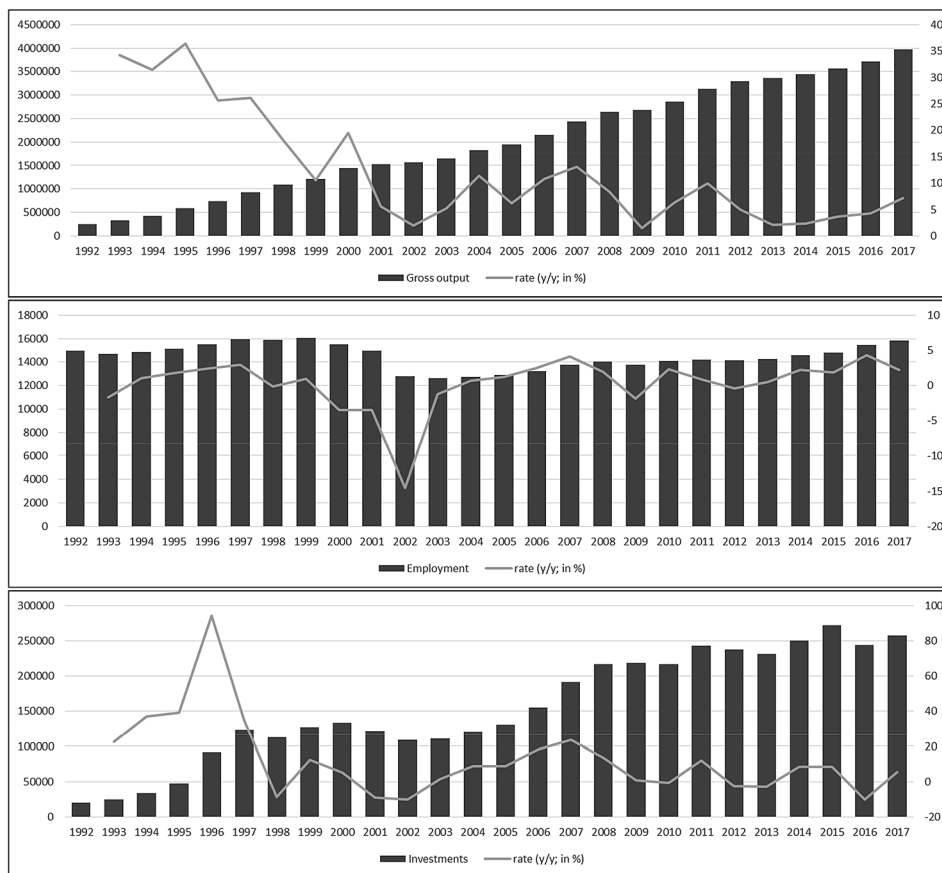
The aim of the article is to present and analyze the structural changes of the three analyzed measures in Poland in terms of the PKD section since 1992. The analysis with its subject area covered the identification of the types of activities with the largest and lowest share of the three measures (gross output, employment and investments), as well as an analysis of the intensity and directions of changes in their structures. The analysis makes it possible to determine the direction of changes in the analyzed structure, analyze the intensity of changes in its individual components, and determine whether the Polish economy has modernized and what direction of changes has occurred in the last 25 years. The effect of the analysis was to isolate the types of economic activity (PKD section) with a significant share in the Polish economy and an above-average rate of change. This assessment allowed the identification of those types of economic activities that have the greatest impact on the changes in the structure of the three measures determining the direction of development of the Polish economy throughout the entire analysis period.

### **Empirical assessment of structural changes in Poland**

The subject of analyzes conducted in the development of the structure is the course of structural changes of three selected measures (gross output, employment and investments) in the Polish economy in terms of the PKD section, i.e. broken down into key types of business activity. The research was based on statistical data made available by the Central Statistical Office in annual Statistical Yearbooks. The analysis was carried out using quantitative and qualitative measurement methods to indicate directions of change and to measure their intensity (intensity). One of the main goals of the analyzes carried out in the area of structural changes working in Poland is an attempt to create a ranking of developing industries that had an impact on the economic growth of the national economy by using the potential of human resources, investment outlays or revenues (gross output). The PKD section rankings built on the basis of criteria drawn up in the Polish economy will provide a source of knowledge about the current structure of the Polish economy and the directions of changes taking place in it.

Empirical analysis of changes in the value of the measures analyzed indicates a strong increase in gross output with a clearly outlined upward trend throughout the entire period of analysis. The pace of changes in gross output throughout the period was positive, but with a weakening growth trend. A similar tendency of changes was observed in the case of the value of investment outlays incurred by enterprises, which were also characterized by a slowdown in the growth rate. Slightly different course of changes was noted in the case of employment, which

was characterized by a decrease in their number since the end of the 90s, which was affected by the fact of economic slowdown in Poland and their re-growth with outlined permanent growth trend since 2003.



1) Employed persons, condition on 31 XII

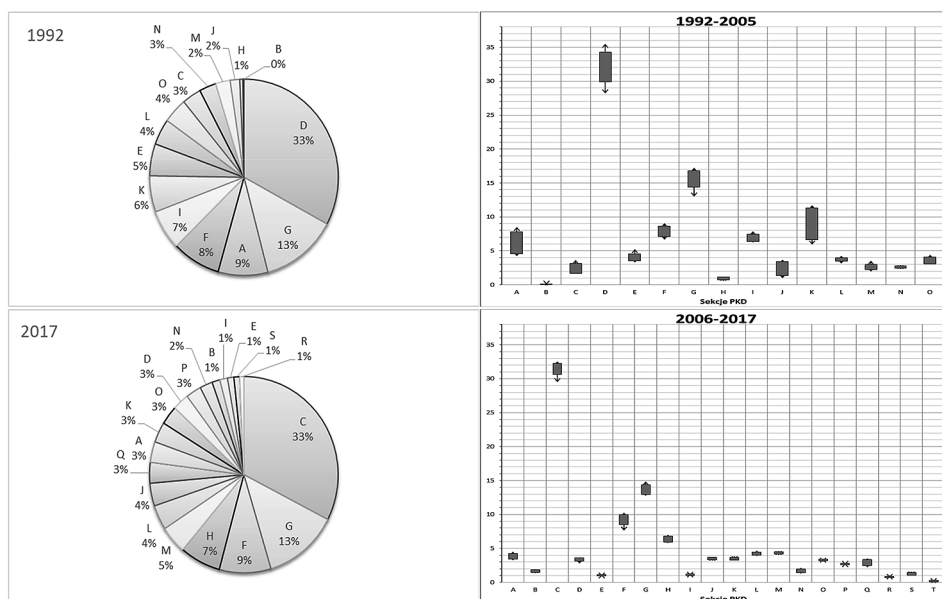
Figure 1: Gross output, employment<sup>1</sup>, investments in the enterprise in Poland and the rate of changes in the years 1992-2017 (in PLN million, in thousand persons, in million PLN; in%)

Source: Own study based on *Statistical Year Books RP*, GUS, Warszawa 1996, 1997, 1998, 2000, 2003, 2005, 2006, 2008 2010, 2012, 2014, 2016, 2018.

A comparative analysis of the changes in the structure of the analyzed measures in the Polish economy was made on the basis of their shares broken down into PKD sections in 1992 (according to the PKD2004 classification) and in 2017 (according to the PKD2007 classification). In assessing the change in the structure of gross output grouped by PKD sections (Fig. 2), it should be noted that both in 1992 and 2017, the dominant type of activity in the structure



of gross output was industrial processing and the value of their share has not changed over 25 years. When further analyzing the CSO (GUS) data, it should be noted that during the system transformation period, however, there were changes in the structure of other components and their highest intensity occurred in the period 1992-2005. In the period from 2006 to 2017, due to the increase in the number of structure components, there was a process of distraction and, consequently, a lower level of variation in structure components was observed. The data shows that the scale of global production in the services and trade sector increased (from 49% to 58%), and this tendency can be assessed positively, because the increase in the importance of the services sector brings the structure of the Polish economy closer to the structural standards existing in the European Union countries.



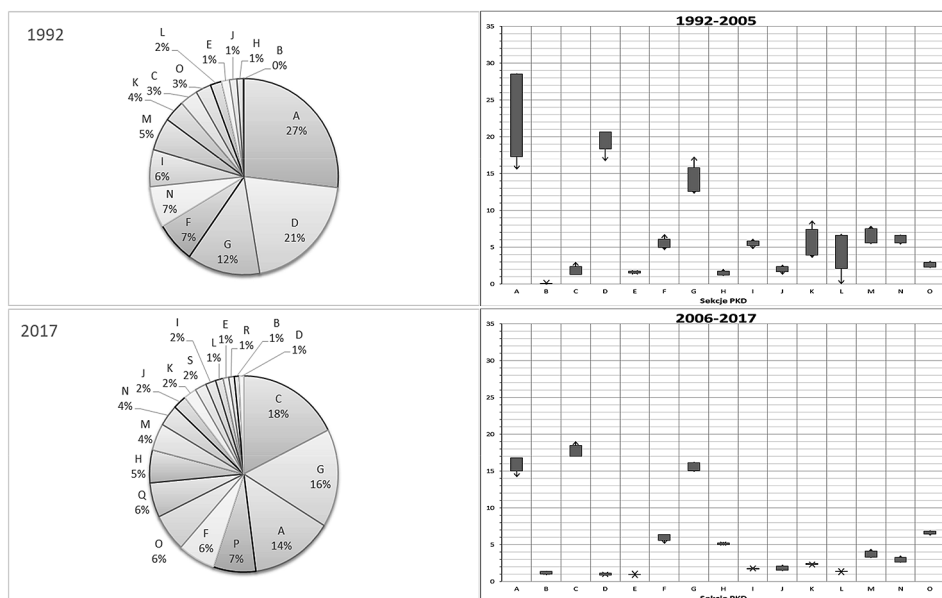
Notes: — standard deviation; average determined by the center of the figure, — minimum and maximum values.

Figure 2: Structure of gross output and descriptive statistics in enterprises in Poland by section PKD2004 in 1992 and by section PKD2007 in 2017 (in%)

Source: as in fig. 1.

An analysis of changes in the employment structure indicates the strong dominance of agriculture, hunting and forestry, industrial processing and trade (59.96%) in 1992, followed by a significant positive change indicating the increase in the importance of the service sector at the expense of reducing the share of agriculture and industry, which can be observed analyzing descriptive statistics especially in the period 1992-2005. The strong change in the structure

of employment is indicated by the fact that in 1992 48% were employed in services and 65% in 2017, which clearly confirms the direction of changes in the nature of modernizing the structure. The analysis of the employment structure indicates higher values of share rates of sections included in services than in the global output structure. This fact indicates the existing development potential and its reallocation to the services sector and the simultaneous clear transition of employees among agriculture and processing and trade and services.



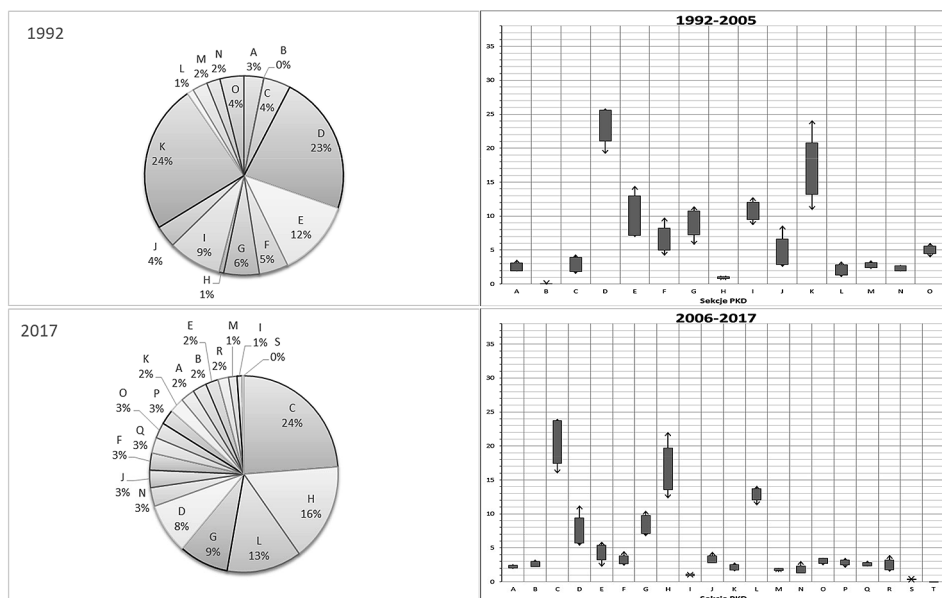
Notes: – standard deviation; average determined by the center of the figure, – minimum and maximum values.

Figure 3: Employment structure and descriptive statistics in enterprises in Poland by section PKD2004 in 1992 and by section PKD2007 in 2017 (in%)

Source: as in fig. 1.

The analysis of the structure of investment outlays incurred by enterprises, as a measure determining the direction of capital investment and at the same time the potential direction of future development, indicates their largest share in agriculture in 1992 (27%) and in 2017 this share was only 2.39%. This direction clearly indicates a strong reallocation of expenditure, which was shown in Figure 4 illustrating the level of variability (descriptive statistics). Observation of the level of volatility allows to state that there has been a strong reallocation of investments towards the service sector (in particular transport and real estate services) and industrial processing. In the structure of investment outlays, over the past 25 years, there has not been such a significant increase in the share of the service sector as was the case with gross output and employment (increase

from 57.22% in 1992 to 60.87% in 2017). A high share and a simultaneous increase in the share in investment outlays incurred by enterprises were recorded in manufacturing. There was also a strong increase in the share of commercial activities, transport activities and activities related to real estate, which clearly indicates the direction of development of the indicated types of activities.



Notes: — standard deviation; average determined by the center of the figure, — minimum and maximum values.

Figure 4: The structure of investment and descriptive statistics in enterprises in Poland by section PKD2004 in 1992 and by section PKD2007 in 2017 (in%)

Source: as in fig. 1.

Summing up the directions of changes in the analyzed structures, it can be stated that in the period 1992–2005 only enterprises included in the manufacturing and construction an above average character of changes characterized industries with a dominant position in the structure of the measures being analyzed. However, after 2006, it indicates that only activities related to transport and storage were a key type of activity and were characterized by above average growth. Position changes indicate a less favorable trend of changes after 2006 indicating a positive direction of changes, but its significant slowdown, especially in the area of service activities. In activities related to construction and professional, scientific and technical activities, despite the key importance in global production and employment, there is no similar direction of changes in the area of investment activities. The lack of a dominant position in the list

of production activities deserves a favorable assessment, indicating continuing favorable changes, especially in the area of investment outlays.

## Conclusion

One of the visible effects of the system transformation process in Poland after 1990 are continuous changes in the structure of the national economy in question, and in particular changes in the area of economic activities (production, trade and services) have been observed that are significantly changed compared to 1992. The positive changes observed in the last 25 years in the Polish economy, however, do not allow for a fully positive assessment, because the analysis of changes taking place in the structure of the Polish economy suggests that it stopped at the stage of post-industrial society. This means that we are still lagging behind the economies of highly developed countries. At the same time, looking at the future of our economy through the prism of the ranking of types of activities (PKD sections) with the largest share in global production, employment and investment outlays, we cannot ignore the importance of the “civilizational leap”. Based on the long-term analysis of structural changes in Poland, it can be stated that the process of reforming the Polish economy has constantly accompanied its development and the direction indicates its positive nature.

It should be noted, however, that in order to become more competitive, the Polish economy is still facing the need for very serious structural changes and this applies to all areas, which were analyzed, which will continue to undergo significant changes. A factor that can accelerate the processes of change in the Polish economy and bridge the gap among highly developed countries is adapting to the recommendations of the structural policy of the European Union. The conducted analysis indicates the persistence of a high share of the analyzed measures in industrial processing and agriculture for many years with a decreasing intensity of changes, especially when we make a comparative analysis against developed countries that achieved much earlier than the Polish economy the advantage of the share of service activity in relation to activity production.

The analysis of changes in the structure allowed to construct the conclusion that the observed trends of changes in the structure of the analyzed measures in Poland by type of business activity were consistent with the regularity of structural changes in the process of economic development, but their structure still significantly differs from the structures of working highly developed countries. Therefore, it can be stated that the stimulation of the growth of the role of service activities in Poland should be continued, as it is strongly correlated with the modern economic structure of highly developed countries (knowledge-based economy) operating in the market economy and building its competitiveness increase.

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# **DYNAMICS AND DIRECTIONS OF GROWTH OF SMALL AND MEDIUM-SIZED ENTERPRISES IN THE ENERGY SECTOR IN POLAND IN THE YEARS 2013–2017<sup>1</sup>**

## **SUMMARY**

The purpose of the study was to examine the state and directions of changes in economic values characterizing the growth of small and medium enterprises of the energy sector in Poland in the years 2013-2017. The conducted research was a continuation and expansion of analyzes conducted so far only for power sector enterprises (class 35.1 section D) and covering the period 2007 – 2013. In this study, the research covered small and medium-sized enterprises (excluding micro-enterprises) belonging to all groups of Section D of Polish Classification of Activities (Electricity, gas, steam and air conditioning supply). An important goal of the study was also to analyze the diversity in economic values in the studied population, broken down by size classes and ownership sector. The examination of the dynamics and structure of the value of investment outlays, fixed assets, the number of employees and revenues from whole activity allowed for the assessment of the growth of the surveyed population and for indicating trends in this area.

## **Introduction**

The energy sector<sup>2</sup> in Poland in recent decades has been subject to significant legal and institutional transformations. At first, the source of these transformations were the processes of restructuring and privatization of state-owned enterprises<sup>3</sup>,

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<sup>1</sup> The publication was financed from funds granted to the Department of Economics and Organization of Enterprises of the Cracow University of Economics from subsidies to maintain the research potential.

<sup>2</sup> The term “energy sector” does not have a homogeneous definition. For the sake of simplicity, the power, heating and gas sectors have been adopted as the „energy sector”, what is broadly equivalent to Section D of The Polish Classification of Activities PKD-2007.

<sup>3</sup> For more see: Szymła W., *Restrukturyzacja sektorów strategicznych na przykładzie sektora elektroenergetycznego, /In:/ Zarządzanie restrukturyzacją przedsiębiorstw i gospodarki.*



followed by horizontal and vertical consolidation<sup>4</sup>, which however, mainly concerned large enterprises. Along with the restructuring processes, the change in current legal order regulating the functioning of energy entities, the gradual liberalization of the energy market or the dissemination of the principle of third party access to the network (TPA) followed. These changes gave impetus to the emergence and development of small and medium energy enterprises mainly on the electricity and gas trading market<sup>5</sup>. Another impetus for the growth of this group of enterprises became legal provisions arising from the need to adapt Polish law to the arrangements of the so-called “Climate and energy package”<sup>6</sup> obliging, among others individual EU countries to increase the share of energy from renewable sources in the energy mix. Following these changes, other countries – including Poland – have started implementing a more or less favorable system of entrepreneurs’ support for RES energy production<sup>7</sup>. This, in turn, gave economic and legal foundations for the development of the yet marginal group of micro and small electricity producers, and the implementation of the idea of distributed generation, which could become the second pillar of electricity generation in Poland in the future<sup>8</sup>.

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*Uwarunkowania, procesy, efekty*, Ed. by: R. Borowiecki, Cracow University of Economics – Foundation of the Cracow University of Economics, Cracow 2014, pp. 89-140; Borowiecki, R., Bartkowiak, P., *Zmiany własnościowe i organizacyjne w przedsiębiorstwach komunalnych sektora energetycznego i ich wpływ na rozwój zrównoważony*, Zeszyty Naukowe Uniwersytetu Ekonomicznego (AE) w Krakowie, 2006, vol. 731, pp. 17-32; Jeżowski P. *Problemy polskiego ciepłownictwa – stan obecny i kierunki zmian*, /In:/ *Zarządzanie w energetyce. Koncepcje, zasoby, strategie, struktury, procesy i technologie energetyki odnawialnej*, Ed. By: A. Chochołowski, F. Krawiec, Difin, Warszawa 2008, pp. 195-218, Makaruk P., *Stan i kierunki postępującej transformacji polskiego sektora elektroenergetycznego*, /In:/ *Zarządzanie w energetyce. Koncepcje, zasoby, strategie, struktury, procesy i technologie energetyki odnawialnej*, Ed. By: A. Chochołowski, F. Krawiec, Difin, Warszawa 2008, pp. 70-118

<sup>4</sup> For more see: Szymła W., *Integracja wewnętrzna w procesie porządkowania struktur korporacyjnych polskich grup elektroenergetycznych*, /In:/ *Dynamika zmian w polskim przemyśle i usługach*, Ed. by J. Pyka, Towarzystwo Naukowe Organizacji i Kierownictwa, Katowice 2011, pp. 110-125.

<sup>5</sup> Research has shown that in the years 2007 – 2013, i.e. since the TPA principle was extended to all recipients, the number of only small power companies doubled, For more see: Szymła W., *The Dynamics and the Directions of Changes in Economic Values Characterizing the Functioning and Development of Enterprises of the Electric Power Industry in Poland in the Years 2007-2013*, /In:/ *Restructuring as the Imperative of Developmental Changes in Economy*, Ed. by R. Borowiecki, B. Siuta-Tokarska, Foundation of the Cracow University of Economics, Kraków 2015, pp. 95-108

<sup>6</sup> The “Package” included six legal acts, two of which were presented by the European Commission in 2007 and the other four in January 2008.

<sup>7</sup> For more see: Michalski M. Ł., *Optymalizacja decyzji inwestycyjnych w elektroenergetyce*, Wydawnictwa AGH, Kraków 2012, pp. 70-81.; Szymła W. *An influence of Climate and Energy Package on the condition of functioning of the power sector enterprises in Poland*, /In:/ *Contemporary Economies in the face of new challenges*. Edited by R. Borowiecki, A. Jaki, T. Rojek, Foundation of Cracow University of Economics, Cracow 2013, pp. 751-761

<sup>8</sup> For more on the scale and importance of distributed generation see: Kućba R., *Wirtualna elektrownia, Wybrane aspekty organizacji zarządzania podmiotami generacji rozproszonej*, TNOiK, Toruń 2011

In the light of the above changes, the development of small and medium energy enterprises may take place on the basis of slightly different conditions and incentives than the large, operating so far, energy enterprises. SMEs development is also directly related to some specific, qualitative features of this group of entities, including unity of ownership and management, greater flexibility in the face of changes in the environment, limited access to financing sources and using mainly own resources in financing development projects<sup>9</sup>. These features are particularly important for private sector enterprises and may decrease in importance as the enterprise grows and moves on to the next stages of development. The potential diversification of the intensity of these features in the SMEs group provides the basis for analyzing the growth of this population when taking into account the enterprise's size and the ownership sector. Of course, it cannot be assumed that the growth of small and medium-sized enterprises will take place at a different pace only because of their size. According to Gibrat's Law of Proportionate Effect<sup>10</sup>, which is now often challenged, the enterprise's growth rate is independent of the initial scale of operations. On the other hand, a number of studies show that although the element of randomness of growth may be significant, most small businesses grow faster than large enterprises<sup>11</sup>. At this point it should be added that the diversification of the growth rate related to the size of the enterprise may be largely conditioned by the type of activity and, for example, the importance of economies of scale for the possibility of staying on the market and developing the enterprise. It seems that this factor is of considerable importance in the studied sector; however, the impulses for the development of small and medium-sized enterprises (described above) significantly changed these conditions.

Therefore, the purpose of this study is, among others, examining whether the new conditions have become sufficient growth factors for small and medium energy enterprises and whether within this group there are indeed differences in the pace of growth depending on the size and ownership sector.

In the studies, small and medium-sized entities (SMEs) were analyzed, taking into account the criterion of the number of employed persons. Under this

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<sup>9</sup> For more see: Borowiecki R., Żmija K., Siuta-Tokarska B., Thier A., *Rozwój małych i średnich przedsiębiorstw w Polsce wobec wyzwań gospodarki XXI wieku*, Uniwersytet Ekonomiczny w Krakowie, Kraków 2018

<sup>10</sup> A detailed analysis confirming and questioning the Gibrat's law were made by: Lotti F., Santarelli E., Vivarelli M., *Defending Gibrat's Law as a long-run regularity*, Small Business Economics, 2009, vol. 32, pp. 31–44; Kurczewska A., *Problemy pomiaru wzrostu małych i średnich przedsiębiorstw*, /In:/ *Ekonomiczne wyzwania XXI wieku, Materiały konferencyjne*, Uniwersytet Szczeciński, Międzyzdroje 2008, pp. 119-126.

<sup>11</sup> Bullock A., Codh A., Fu X., Hughes A., Yang Q., *SME Growth Trajectories. A pilot study of UK SME growth and survival using CBR panel data*, Centre for Business Research, Cambridge University 2004, /cited in:/ Kurczewska A., op. cit. p. 120

criterion, however, only entities employing 10 to 49 persons were considered as small entities<sup>12</sup>. Micro enterprises, i.e. those employing less than 10 persons, not subject to statistical obligation, were not included in the survey. Such a selection of a group of entities allowed the use of real data on enterprises submitted based on the statistical obligation (and not estimated on the basis of a representative sample) of data on enterprises. To illustrate the scale of changes, the research results for small and medium-sized enterprises were compared with those for the entire Section D. The data comes from published sources of the Polish Statistics<sup>13</sup>. The research covered the five-year period of 2013–2017.

The study applied 4 basic economic values referring both to outlays and the factors of production (investment outlays, gross value of fixed assets, number of employed persons) and to the effects of the conducted activities (revenues from the whole activity). The values enable, in a simplified way, to assess the condition and the changes in the scale of the conducted activities and the intensity of growth processes of both the whole population of energy sector enterprises and its individual groups<sup>14</sup>. The study was preceded by an analysis of the dynamics of changes and the structure of the studied population of enterprises with regard to the number of entities.

### **Number of energy enterprises by size classes and sector of ownership**

There were significant changes in the number of energy enterprises during the studied period. These changes also had a moderate impact on structure of the studied Section, broken down by size classes and the sector of ownership. Detailed data on the number, the dynamics of changes and the structure of the energy sector enterprises by size classes and the sector of ownership in the years 2007–2013 are presented in Table 1 and Table 2.

In the years 2013–2017, the number of entities belonging to Section D – Electricity, gas, steam and air conditioning supply increased significantly from 2604 to 4316, i.e. by 66%. Such a decisive increase was primarily due to the growing number of entities employing less than 10 people. The number of micro-enterprises increased from 2072 in 2013 to 3808 in 2017 (i.e. by 84%). In all other

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<sup>12</sup> Therefore, in this study, the term small and medium enterprises and the abbreviation SME will not include entities employing less than 10 people – micro enterprises.

<sup>13</sup> *Statistical Yearbook of Industry*; Statistics Poland, Warsaw 2014–2018,

<sup>14</sup> To analyze the dynamics and the directions of changes in the values and the structure of the sector of enterprises, similar measures are also used by Chomątowski S., Dziura M., Kolegowicz K., Krzemiński K., Siuta-Tokarska B. /In:/ *Dynamika i kierunki zmian wielkości i struktury sektora przedsiębiorstw w Polsce w latach 1990–2005*, Ed. By: S. Chomątowski, Foundation of the Cracow University of Economics, Kraków 2009

groups, the number of entities dropped – in small enterprises from 285 to 284, in medium enterprises from 193 to 173 (i.e. by 10.4%) and in large enterprises from 54 to 51. From the point of view of the population examined in this study, the most important seems to be a decrease in the group of medium-sized enterprises. Interesting information is also provided by the analysis of changes in the number of entities broken down by ownership sector. During the period under review, the huge increase in the number of private enterprises – mainly micro enterprises – was accompanied by a decrease in the number of public sector enterprises from 271 to 246, i.e. by almost 10% in a relatively short, 5-year period.

Table 1: The number and the dynamics of changes (in %) of the energy sector enterprises by size classes and the sector of ownership in the years 2007–2013

Specification	Total	Micro	Small	Medium	Large	Small and Medium	Public sector	Private sector
2013	2604	2072	285	193	54	478	271	2333
2014	2588	2062	296	177	53	473	256	2332
2015	3166	2671	268	174	53	442	250	2916
2016	3702	3186	296	168	52	464	250	3452
2017	4316	3808	284	173	51	457	246	4070
Dynamics (%), 2013 = 100	165,7	183,8	99,6	89,6	94,4	95,6	90,8	174,5

Source: own study and calculations based on *Statistical Yearbook of Industry*; Statistics Poland, Warsaw 2014–2018

Table 2: The structure of the number of the energy sector enterprises by size classes and the sector of ownership in the years 2013–2017 (in %)

Specification	Shares (%) in:								
	Total							SMEs*	
	Micro	Small	Medium	Large	SMEs	Public Sector	Private Sector	Small	Medium
2013	79,6	10,9	7,4	2,1	18,4	10,4	89,6	59,6	40,4
2014	79,7	11,4	6,8	2,0	18,3	9,9	90,1	62,6	37,4
2015	84,4	8,5	5,5	1,7	14,0	7,9	92,1	60,6	39,4
2016	86,1	8,0	4,5	1,4	12,5	6,8	93,2	63,8	36,2
2017	88,2	6,6	4,0	1,2	10,6	5,7	94,3	62,1	37,9

\* excluding micro enterprises

Source: as for Table 1.

Such a serious increase in the number of micro-enterprises with a simultaneous decrease in the number of medium-sized enterprises and small decreases in the group of small enterprises resulted in a significant decrease in

the share of SMEs<sup>15</sup> in the structure of sector entities from 18.4% in 2013 to 10.6% in 2017. The internal structure of SMEs has also changed. The share of medium-sized enterprises in SMEs dropped from 40.4% to 37.9%.

### Basic economic values characterizing the growth of the energy sector SMEs

As it was mentioned before, to illustrate changes in the scale and the directions of the development of the studied group of enterprises, the dynamics and the structure of the basic economic values characterizing the outlays and the effects of activities were analyzed and assessed.

An economic value helpful in measuring the intensity of enterprise growth, indicating the scale and the speed of creating enterprise assets, is the value of investment outlays<sup>16</sup>. The data illustrating the dynamics of changes in the value of investment outlays in the studied group of enterprises are included in Table 3.

Table 3: The dynamics of changes in the value of investment outlays in energy sector SMEs in the years 2014–2017 (in %)

Dynamics (%), previous year = 100										
	Total	SMEs					PUBLIC		PRIVATE	
			SM.	MED.	PUBL.	PRIV.	SM.	MED.	SM.	MED.
2014	113,9	100,4	96,4	104,6	103,0	98,4	137,1	100,2	93,5	124,1
2015	133,2	151,5	196,2	108,7	103,7	189,6	70,2	107,5	209,0	113,1
2016	77,4	44,0	39,9	51,2	38,9	46,2	79,8	35,9	38,5	102,7
2017	91,1	124,0	117,8	132,3	186,6	101,0	144,6	193,5	115,9	60,2
Standard deviation (%)	21,4	39,6	56,1	29,7	52,4	51,5	33,2	56,0	61,5	24,2
Dynamics (%), 2013 = 100										
2014	113,9	100,4	96,4	104,6	103,0	98,4	137,1	100,2	93,5	124,1
2015	151,7	152,1	189,1	113,8	106,8	186,7	96,3	107,7	195,5	140,4
2016	117,4	67,0	75,3	58,3	41,6	86,3	76,8	38,7	75,2	144,1
2017	106,9	83,0	88,8	77,1	77,6	87,2	111,0	74,9	87,2	86,8
Average growth rate (%)	1,7	-4,5	-2,9	-6,3	-6,1	-3,4	2,7	-7,0	-3,4	-3,5

Source: as for Table 1.

<sup>15</sup> Excluding micro enterprises

<sup>16</sup> For more see: Kolegowicz K., *The Changes of the Size of Basic Economic Relations Characterizing the Development of the Largest Production Enterprises in Poland in Years 2005-2014*, /In:/ *Problemy zarządzania we współczesnej gospodarce*, Ed. by: B. Czerniachowicz, K. Szopik-Depczyńska, ZAPOL Sobczyk Spółka Jawna, Szczecin 2016, pp. 40-41; Towarnicka H., *Strategia inwestycyjna przedsiębiorstwa*, Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wrocław 2000, p. 38.

In the years 2013–2017 investment outlays in the entire energy sector were subject to significant fluctuations. They increased in 2014 and 2015 by 13.9% and 33.2% year on year, respectively, and then decreased in subsequent years by 22.6% and 8.9%, respectively. The average annual rate of growth was 1.7%. The value of investment outlays reached the highest value in 2015, when it was more than half higher than that of 2013. In subsequent years, despite declines measured year-on-year, this value still remained at a higher level than that of 2013. Changes in the value of investment outlays in the group of small and medium enterprises had a similar direction. In this group, the value of investment outlays increased in 2014 and 2015. The highest increase was recorded in 2015 (51.5%), however, after this increase, investment outlays fell sharply by 66% in 2016 and constituted only 67% of those in 2013. In the last audited year, the value of SME investment outlays constituted 83% of 2013 outlays. On average, they dropped by 4.5% annually over the whole period considered.

It should be noted that the dynamics of changes in the value of investment outlays was quite differentiated by size classes and the sector of ownership. This diversity is particularly evident in 2015, in which only small enterprises recorded a significant increase – the value almost doubled – however, it is worth noting that only small private enterprises were responsible for this increase (by 109%). In the group of small public sector enterprises studied value dropped by almost 30%. In the same year, investment outlays in the group of medium-sized enterprises increased by 8.7% due to both public sector enterprises (increase by 7.5%) and private sector (increase by 13.1%) In 2017, the value of investment outlays in small and medium-sized enterprises accounted for 88.8% and 77.1% of the value of outlays from 2013, respectively. Over the entire period considered, investment outlays fell faster in medium-sized enterprises than in small enterprises (the average annual decrease was 6.3% and 2.9%, respectively) and faster in public sector than private sector enterprises (average annual decrease by 6.1%, 3.4% respectively).

The correct interpretation of the described changes and their impact on relationships in the examined population requires the presentation of the structure of the value of investment outlays by size classes and ownership sector. The data illustrating the structure of investment outlays in the studied group of enterprises are included in Table 4.

Table 4: The structure of investment outlays, fixed assets, number of employed persons and revenues in energy sector small and medium enterprises by size classes and sector of ownership in the years 2013–2017 (in %)

		Shares (in %)													
		SMEs in Total Energy sector		SMEs			PUBLIC			PRIVATE		SMALL		MEDIUM	
		SMALL	MEDIUM	PUBLIC	PRIVATE	SMALL	MEDIUM	MEDIUM	SMALL	MEDIUM	PUBLIC	PRIVATE	PUBLIC	PRIVATE	
Investment outlays	2013	16,1	51,0	49,0	43,2	56,8	7,6	92,4	84,0	16,0	6,5	93,5	81,4	18,6	
	2014	14,2	48,9	51,1	44,4	55,6	10,2	89,8	79,8	20,2	9,2	90,8	78,0	22,0	
	2015	16,1	63,3	36,7	30,4	69,6	6,9	93,1	87,9	12,1	3,3	96,7	77,1	22,9	
	2016	9,2	57,3	42,7	26,9	73,1	14,1	85,9	73,2	26,8	6,6	93,4	54,1	45,9	
	2017	12,5	54,5	45,5	40,4	59,6	10,9	89,1	84,0	16,0	8,1	91,9	79,1	20,9	
Gross value of fixed assets	2013	12,3	39,7	60,3	32,0	68,0	14,4	85,6	56,2	43,8	14,3	85,7	56,0	44,0	
	2014	12,8	37,2	62,8	40,2	59,8	12,9	87,1	55,9	44,1	15,1	84,9	60,4	39,6	
	2015	12,9	43,9	56,1	40,3	59,7	13,4	86,6	64,8	35,2	12,5	87,5	62,8	37,2	
	2016	14,1	44,4	55,6	39,3	60,7	12,8	87,2	67,0	33,0	12,0	88,0	65,4	34,6	
	2017	13,9	45,8	54,2	41,4	58,6	12,2	87,8	68,5	31,5	10,8	89,2	65,3	34,7	
Revenues from the whole activity	2013	26,4	44,1	55,9	57,5	42,5	35,1	64,9	56,4	43,6	45,7	54,3	66,8	33,2	
	2014	21,7	37,5	62,5	53,1	46,9	21,6	78,4	55,6	44,4	30,6	69,4	66,7	33,3	
	2015	21,8	37,9	62,1	51,6	48,4	20,3	79,7	56,7	43,3	27,6	72,4	66,3	33,7	
	2016	23,0	40,8	59,2	49,3	50,7	21,4	78,6	59,7	40,3	25,9	74,1	65,5	34,5	
	2017	24,6	43,7	56,3	47,0	53,0	20,4	79,6	64,4	35,6	22,0	78,0	66,5	33,5	
Employed persons	2013	18,4	31,4	68,6	21,2	78,8	13,2	86,8	36,3	63,7	8,9	91,1	26,8	73,2	
	2014	11,0	52,0	48,0	24,3	75,7	20,2	79,8	62,2	37,8	9,5	90,5	40,4	59,6	
	2015	11,8	52,9	47,1	21,8	78,2	16,5	83,5	63,0	37,0	6,8	93,2	38,6	61,4	
	2016	12,1	48,0	52,0	26,3	73,7	13,6	86,4	60,3	39,7	7,5	92,5	43,8	56,2	
	2017	13,3	41,2	58,8	24,1	75,9	13,6	86,4	49,9	50,1	7,9	92,1	35,4	64,6	

Source: as for Table 1.

The share of the value of investment outlays incurred by the SME in relation to the entire sector decreased in the analyzed period from 16.1% in 2013 to 12.5% in 2017. In the division by size classes, excluding 2014, small enterprises had the largest share throughout the whole period, their share ranged from 49.1% in 2014 to 63.3% in 2015 (the year of the largest increase in investment in this group enterprises). Compared to 2013, the share of small enterprises increased by 3.5 pp reaching 54.5% in 2017. By ownership sectors, the majority of investment outlays throughout the period considered were in the private sector (on average 63%) with a slight upward trend. In the private sector, most investment outlays were incurred in small enterprises (82% on average) and in the public sector in medium-sized enterprises (90% on average). Generally, it can be stated that there were no significant changes in the structure of the value of investment outlays.

Investment outlays are a direct source of the formation of the basic factor of production, namely fixed assets. The data illustrating the dynamics of changes in the value of gross fixed assets in the studied group of enterprises are included in Table 5.

Table 5: The dynamics of changes in the value of gross fixed assets in energy sector SMEs in the years 2014–2017 (in %)

Dynamics (%), previous year = 100										
	Total	SMEs					PUBLIC		PRIVATE	
			SM.	MED.	PUBL.	PRIV.	SM.	MED.	SM.	MED.
		2014	106,6	111,1	104,1	115,8	122,7	103,6	110,0	124,8
2015	108,6	109,9	129,7	98,2	102,8	115,4	106,8	102,2	133,7	92,2
2016	107,9	117,4	118,8	116,3	120,3	115,5	114,5	121,1	119,4	108,2
2017	106,2	104,4	107,7	101,7	100,8	106,9	96,5	101,5	109,3	102,3
Standard deviation (%)	1,0	4,6	10,0	8,1	9,9	5,2	6,7	10,7	11,6	5,9
Dynamics (%), 2013 = 100										
2014	106,6	111,1	104,1	115,8	122,7	103,6	110,0	124,8	103,1	104,2
2015	115,7	122,2	135,0	113,7	126,1	119,6	117,5	127,5	137,9	96,1
2016	124,9	143,4	160,3	132,3	151,6	138,1	134,5	154,5	164,7	104,0
2017	132,6	149,7	172,7	134,6	152,9	147,7	129,8	156,7	179,9	106,4
Average growth rate (%)	7,3	10,6	14,6	7,7	11,2	10,2	6,7	11,9	15,8	1,6

Source: as for Table 1.



Over the entire period under review, the value of fixed assets in the energy sector increased. The average annual growth rate was 7.3%. At the same time, the value of fixed assets in the SME group grew much faster, where the average annual growth rate was 10.6%. The dynamics of this value in SME was also characterized by larger fluctuations. The highest increase occurred in this group of enterprises in 2016 (an increase of 17.4%) and the lowest in 2017 (an increase of 4.4%). In 2017, the value of fixed assets in SME was almost 50% higher than that of 2013. The increase in this value, however, was quite diverse according to the size classes of enterprises. Small enterprises increased their assets much faster (on average 14.6% a year) than medium enterprises (on average 7.7% a year). In 2017, the value of fixed assets in small and medium-sized enterprises accounted for 172.7% and 134.6% of the value reported at the beginning of the period considered, respectively. A small, though noticeable differentiation was also characteristic of the changes in the studied value, broken down by ownership sector. This value grew slightly faster in the public sector (by 11.2% on average), where it was also much more volatile than in the private sector, where it grew by 10.2% on average. In 2017, the value of fixed assets in public and private enterprises accounted for 152.9% and 147.7% of their value in 2013, respectively. In the public sector, fixed assets increased their value much faster in the group of medium-sized enterprises – by 11.9% on average – compared to 6.7% in small entities. However, the main difference concerned small and medium-sized enterprises in private sector. In the years 2013-2017, the value of fixed assets in small private enterprises increased by almost 80% comparing to a growth by only 6.4% in the group of private medium-sized entities.

In general, it can be stated that in all the examined groups and subgroups of enterprises there was an increase in the value of fixed assets, however the most significant was in small enterprises, especially in those belonging to the private sector.

Thought-provoking information is provided by the analysis of the condition and changes in the structure of fixed assets value (see Table 4). The share of the value of fixed assets of small and medium-sized enterprises in their value for the entire sector in 2013 was 12.3% and increased to 13.9% in 2017. This increase occurred despite the tremendous expansion in the number of micro-entities at the same time (see Table 1). In 2013, the largest share in the value of fixed assets of the SME group were those belonging to medium-sized enterprises (60.3%). However, this share dropped successively and in 2017 it already accounted for 54.2%. A similar trend could be seen in the division by sector of ownership, in which the still prevailing share of fixed assets of private entities decreased from 68% in 2013 to 58.6% in 2017. In the group of public enterprises, medium-sized enterprises were definitely better equipped in fixed assets (87.8 % in 2017), and small among

private ones (68.5% in 2017). However, it should be noted that the structure of fixed assets in private entities changed in favor of small entities (increase in share by 12.3 pp). In the group of small enterprises, the assets of private entities definitely prevailed and it increased further from 85.7% to 89.2% during the period considered. The assets of public entities prevailed in medium-sized enterprises, which increased further from 56% to 65.3% in the period considered.

The second examined production factor was the labor input measured by the number of employed persons. The data illustrating the dynamics of changes in the number of employed persons in the studied group of enterprises are included in Table 6.

Table 6: The dynamics of changes in the number of employed persons in energy sector SMEs in the years 2014–2017 (in %)

Dynamics (%), previous year = 100												
	Total	SMEs					PUBLIC				PRIVATE	
			SM.	MED.	PUBL.	PRIV.	SM.	MED.	SM.	MED.		
2014	95,4	78,5	66,7	87,8	72,5	86,5	44,6	87,6	85,2	88,2		
2015	95,7	96,2	97,2	95,6	93,5	99,3	87,9	95,0	101,3	96,7		
2016	97,2	102,5	110,5	97,7	97,9	107,5	103,4	96,5	113,2	100,0		
2017	99,4	106,3	113,8	101,2	101,4	111,1	96,7	102,7	119,8	98,3		
Standard deviation (%)	1,6	10,7	18,6	4,9	11,2	9,4	22,9	5,4	13,1	4,5		
Dynamics (%), 2013 = 100												
2014	95,4	78,5	66,7	87,8	72,5	86,5	44,6	87,6	85,2	88,2		
2015	91,3	75,5	64,8	83,9	67,8	85,9	39,2	83,2	86,4	85,3		
2016	88,7	77,4	71,6	82,0	66,4	92,3	40,5	80,3	97,7	85,3		
2017	88,2	82,3	81,5	82,9	67,3	102,6	39,2	82,5	117,0	83,8		
Average growth rate (%)	-3,1	-4,8	-5,0	-4,6	-9,4	0,6	-20,9	-4,7	4,0	-4,3		

Source: as for Table 1.

Over the whole period considered, the total number of employed persons in the Section D fell continuously at an average rate of 3.1% per year. At the end of the period under review, it was lower than that of 2013 by almost 12%. In the SME group, the number of employed persons initially dropped in 2014 and 2015 to begin to increase in 2016 and 2017. Despite significant fluctuations in the entire period under analysis, this number dropped by almost 18% in the analyzed population. What is worth emphasizing is the pace of this decline was similar in both examined groups of entities. The average annual decline rate in small and medium-sized entities was -5% and -4.6% respectively. There was, however, a significant differentiation by ownership sector. The number of employed

persons in the public sector dropped in the surveyed group of companies almost continuously at an average rate of -9.4% and in 2017 it constituted only 67.3% of the number from 2013. In the private sector, the number of employed persons, despite numerous fluctuations, increased by 2.6% over the period considered. In the public sector small enterprises were characterized by a much higher rate of decline – on average -20.9% with -4.7% for medium-sized entities. However, it should be noted that the largest, sharp decline occurred in 2014 (-55.4%). It was this decrease that had the greatest impact on the value of dynamics throughout the entire period considered, both in the whole group of small and public enterprises. In the private sector, broken down by size of enterprises, there was also a significant variation in the pace of change. The number of employed persons in small private entities – despite a significant decrease in 2015 – increased by an average of 4% per year. In 2017, their number of employed persons was 17% higher than in 2013. At the same time, the number of employed persons in medium-sized private entities fell by 16.2%.

In 2013, those employed in SMEs accounted for 26.4% of the total number of persons employed in the surveyed section (see Table 4.). This percentage fell to 24.6% over the period considered. Despite significant fluctuations in the number of employees (especially in the group of small enterprises) in the SME sector, medium-sized entities had the largest share throughout the entire period considered. In 2003 it amounted to 55.9% and at the end of the period considered it increased slightly to 56.3%. At first, considering the division by the sector of ownership, SMEs were dominated by public entities, however their share fell steadily from year to year from 57.5% in 2013 to 47% in 2017. In the public sector, medium-sized enterprises had the largest and still growing share in the number of employees. Their share increased from 64.9% in 2013 to 79.6% in 2017. Such a significant change in the structure was the result of the more than twofold decrease in the number of employed in small public sector entities, which took place in 2014. The private sector was dominated by a group of small enterprises whose share in the number of employees increased from 56.4% in 2013 to 64.4% in 2017. In the group of small entities, the majority were those working in private sector, and their share increased significantly from 54.3% in 2013 to 78% in 2017. The structure of the number of employed persons by the sector of ownership in the medium-sized enterprises was characterized by high stability. In the period considered, this group was dominated by the public sector with an average share of 66.3%.

Although the financial result is the most synthetic measure for the measurement of the effects of business activities, yet at the same time the measure does not reflect the scale of the activities. Revenues is the economic value which refers both to the effects of the activities and to its scale. The data illustrating

the dynamics of changes in the value of revenues from the whole activity in the studied group of enterprises are included in Table 7.

Table 7: The dynamics of changes in the value of revenues from the whole activity in energy sector SMEs in the years 2014–2017 (in %)

Dynamics (%), previous year = 100										
	Total	SMEs					PUBLIC		PRIVATE	
			SM.	MED.	PUBL.	PRIV.	SM.	MED.	SM.	MED.
2014	98,8	59,4	98,3	41,6	68,2	57,0	104,6	62,7	97,7	33,8
2015	101,3	108,4	110,3	106,3	97,1	112,0	79,1	101,6	113,5	109,5
2016	96,4	98,8	89,8	109,0	119,5	93,1	98,6	123,7	89,2	99,8
2017	102,3	112,1	96,0	126,9	102,7	115,4	102,3	102,7	95,5	145,7
Standard deviation (%)	2,3	20,9	7,4	32,4	18,5	23,2	10,1	22,0	9,0	40,4
Dynamics (%), 2013 = 100										
2014	98,8	59,4	98,3	41,6	68,2	57,0	104,6	62,7	97,7	33,8
2015	100,1	64,4	108,4	44,2	66,2	63,9	82,7	63,7	110,9	37,1
2016	96,5	63,6	97,4	48,2	79,2	59,4	81,6	78,8	98,9	37,0
2017	98,7	71,3	93,5	61,1	81,3	68,6	83,5	80,9	94,5	53,9
Average growth rate (%)	-0,3	-8,1	-1,7	-11,6	-5,0	-9,0	-4,4	-5,1	-1,4	-14,3

Source: as for Table 1.

In the years 2013–2017, the value of revenues from total activity in the audited section slightly decreased at an average rate of 0.3% per year. Much greater fluctuations and decreases occurred in the examined group of SMEs. The most significant decrease in the examined value took place in this group in 2014, in which revenues decreased by over 60%. Despite the fact that in subsequent years, revenues grew at an average rate of 6.3%, at the end of the period under review they were almost 30% lower than those from 2013. Such a significant decrease in SME revenues was mainly due to a sharp (almost 60%) drop in revenues of medium-sized enterprises observed in 2014. In subsequent years, the revenues of medium-sized enterprises increased continuously at an average rate of 13.7%. In small enterprises, no sharp fluctuations in the value of revenues were observed during the period considered. The largest increase occurred in 2015 – by 10.3% compared to the previous year. The revenues of this group of enterprises fell at an average rate of 1.7% per year and in 2017 were lower than those at the beginning of the period under review by 6.5%. Interesting information is provided by the analysis of dynamics by ownership sector. It can be seen that the significant decrease in revenues recorded in 2014 concerned both public entities (a decrease by 31.8%) and private entities, although in their case the decrease

was larger (-43%). In both sectors, at the end of the audited period, revenues were 18.7% and 31.4% lower, respectively, than in 2013. Interesting observations can also be made in the division for sector of ownership and size classes. The decrease in revenues in 2014 concerned mainly medium-sized private enterprises – a decrease by 76.2%. At the same time, medium-sized public enterprises fell by 37.3%. In subsequent years, the value of revenues was subject to numerous fluctuations. At the end of the audited period, the value of revenues was lower than that of 2013 in all examined groups. The smallest decline occurred in small private entities (by 5.5%) and the largest decrease in medium private entities (by 46.1%). In public entities, this value was lower than the value from 2013 by 16.5% in small entities and 19.1% in medium entities.

The revenues of the SME group in 2013 accounted for 18.4% (see Table 4.) of revenues generated in the energy sector, of which 31.4% was for small enterprises and 68.6% for medium-sized enterprises. However, this share decreased in the following year to just 11%, which can be traced to the already described decline in revenues in the group of medium-sized enterprises. In 2017, SME revenues accounted for only 13.3% of which 41.2% was for small enterprises and 58.8% for medium-sized enterprises. By ownership sectors, there were no significant changes in the structure. Most of the revenues were still generated in private enterprises – 78.8% in 2013 and 75.9% in 2017. Despite significant fluctuations in the group of public enterprises and by size of enterprises, there were no significant changes in the structure. Medium-sized public enterprises generated the majority, i.e. 86.4% of revenues in 2017 compared to 86.8% in 2013. Much more significant changes occurred in the structure of private enterprises. In 2013, 63.7% of revenues were attributable to medium-sized entities, and in the following year this structure was almost completely reversed. In 2014, 62.2% of revenues were attributable to small private entities. Fluctuations in the value of revenues in subsequent years contributed to the equalization of the shares of both groups of private enterprises in 2017. In the last examined division, according to the size of enterprises broken down into ownership sectors, only significant changes occurred in the group of medium-sized enterprises. In this group of enterprises, in 2013 the private sector accounted for 73.2%, but this percentage decreased to 64.6% during the period considered. In the group of small and medium-sized enterprises it was quite stable and at the end of the period under consideration for private entities 92.1% against 91.1% in 2013.

## Conclusion

Although the number of energy enterprises increased significantly during the period under review, such a significant change was mainly due to the huge

growth in the group of micro-enterprises. The number of entities dropped in all other examined groups. In the SME group, the number of entities fell mainly due to a drop in the number of medium enterprises by over 10%<sup>17</sup> with an almost unchanged number of small entities. Still, over half (62.1% in 2017) of SMEs were entities employing 10 – 49 persons.

There were significant changes in the scope of basic economic values analyzed in the study. The value of investment outlays in SME was subject to very significant fluctuations. In 2017, their value was 17% lower than in 2013. Frequent and drastic fluctuations in investment outlays in almost all studied subgroups do not allow to determine a clear trend for the SME sector. However, the booming increase in investment outlays in the group of small private enterprises made in 2015 was noteworthy.

The value of fixed assets increased successively in the entire SME sector (by almost 50% in total), as well as in all the comparative systems studied. Small private enterprises multiplied their fixed assets at the fastest pace (the average of almost 16% a year) and medium-sized private enterprises at the slowest. The situation was different considering the second basic factor of production – labor. The number of employed persons in the period under study fell both in the entire examined section and in the SME group. In 2017 it was lower than the number in 2013 by 12% and 18%, respectively. At first glance, the decline affected equally small and medium-sized enterprises, but there were noticeable differences inside this group. In small-sized enterprises the number of employed dropped significantly in the public sector (by 60%) and increased in the private sector (by 17%).

Considering the effects of the enterprise's activity measured by revenues from the whole activity, a drop in all the analyzed groups and subgroups of energy sector enterprises was observed in the audited period. The decrease in the SME group (by 29%) was, however, noticeably higher than the one calculated for the entire Section D. The largest revenues fell was recorded in medium-sized private enterprises (by 46%) and the smallest (by only 6.5%) in small private enterprises.

Important data was provided by the analysis of changes in the structure of economic values by size class and ownership sector. In the period under study, the majority of investment outlays were incurred by, more numerous, small-sized enterprises (55%). The private sector prevailed in investments (60%). In the group of small enterprises, as much as 92% of all investment outlays was funded by private entities. In the group of medium-sized enterprises only 21%.

When calculating the value of fixed assets and the number of employees, medium-sized enterprises predominated with a share of 54% and 56% respectively.

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<sup>17</sup> Compare to: Szymła W., *The Dynamics ...*, *op. cit.*, pp. 97-98.

In the group of these enterprises, the majority of both the value of fixed assets and the number of employees was located in public sector units (65% and 66%, respectively). Within these economic values, the group of small enterprises was dominated by private entities accounting for 89% of fixed assets and 78% of employed persons. In addition, there was a noticeable tendency to strengthen this advantage. Despite the higher value of fixed assets and the number of employed, public enterprises generated a much lower value of revenues both for the entire examined group (24%) as well as for the group of small (8%) and medium (35%) enterprises. Although the assessment of the effectiveness of fixed assets management cannot be made using only one relation or one indicator<sup>18</sup>, it can be said, in a simplification, about much lower productivity of fixed assets and labor efficiency in the public sector enterprises of the SME group.

To sum up, the SME group is clearly showing signs of stagnation. In the audited period, both investment expenditures attributable to development activities, the number of employees characterizing the scale of operations, and revenues reflecting the effects of activities decreased. The only economic value that increased was the value of fixed assets. The pace of change was often different by size classes and sector of ownership. Small private enterprises as the only ones in the examined period enlarged the number of employed persons and, to the largest extent, the value of fixed assets<sup>19</sup>. It was this group of enterprises that accounted for over half of all investment outlays throughout the entire period considered. It should be noted here that this trend occurred despite the theoretically worse investment financing opportunities for small enterprises.

In order to stimulate the development of the whole group of small and medium energy sector enterprises and help them move to the next stages of development, it seems necessary to provide them with appropriate operating conditions. The most important conditions that may become SME growth factors include, first of all, access to beneficial, external investment financing, legal stability, and finally the abolition of economic, legal, environmental and social barriers to the development of investments in renewable energy sources<sup>20</sup>.

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<sup>18</sup> For more see: Borowiecki R., Czaja J., Jaki A., *Strategia gospodarowania kapitałem w przedsiębiorstwie. Zagadnienia wybrane*, TNOiK, Warszawa 1998, pp. 68-77.

<sup>19</sup> However, much higher growth was observed in the group of small power sector enterprises in the year 2007–2013, for more see: Szymła W., *The Intensity and Conditions of the Development of Small Enterprises of Power Industry in Poland in the Years 2007–2013*, /In:/ *Problemy zarządzania we współczesnej gospodarce*, Ed. by: B. Czerniachowicz, K. Szopik-Depczyńska, ZAPOL Sobczyk Spółka Jawna, Szczecin 2016, pp. 27-38

<sup>20</sup> Koszarek-Cyra A., *Bariery w rozwoju inwestycji z zakresu odnawialnych źródeł energii*, /In:/ *Energetyka prosumencka. Pierwsza próba konsolidacji*, Ed. by: J. Popczyk, R. Kucęba, K. Dębowski, W. Jędrzejczyk, Sekcja Wydawnictw Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa 2014, pp. 105–111.

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**T**he primary aim of this book is the presentation, analysis and exemplification of the conditions of the functioning of contemporary economy, identification of its determinants, as well as the presentation of the concepts, models and tools of managing contemporary economies and organizations in the conditions of the changing economic, social and political environment, with special regard to the role of restructuring, contemporary business models and project, development and change management processes. Partial problems leading to the achievement of this aim are exposed in the form of the following three parts of the presented work:

- ▶ Project Management and Business Models.
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- ▶ Restructuring and Development of Economies and Enterprises.

This book is a theoretical, methodological and empirical study, the aim of which is the presentation and systematics of the scientific and practical output concerning selected thematic areas, the discussion and critical assessment of this output, as well as the presentation of own reflections and proposals with regard to the analyzed issues and problems. The publication is a result of many years' cooperation of the Department of Economics and Organization of Enterprises of the Cracow University of Economics with the representatives of various Polish and foreign scientific centers and individuals representing the economic practice.