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RIPRAN – one of the best project risk analysis methodologies

1. Introduction

Project risk management remains a relatively undeveloped discipline, distinct from the risk management used by operational, financial, and underwriters' risk management. This gulf is due to several factors: risk aversion (especially the public understanding and risk in social activities), confusion in the application of risk management to projects, and the additional sophistication of probability mechanics above those of accounting, finance, and engineering. With the above disciplines of operational, financial, and underwriting risk management, the concepts of risk, risk management, and individual risks are nearly interchangeable (being either personnel or monetary impacts, respectively).

Impacts in project risk management are more diverse, overlapping the monetary, schedule, capability, quality, and engineering disciplines. For this reason, it is necessary to specify the differences in project risk management as they are cited in the *Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs* (2017).

– **Risk management:** The organizational policy for optimizing investments and (individual) risks to minimize the possibility of failure.
– **Risk:** The likelihood that a project will fail to meet its objectives.
– **A risk:** A single action, event, or hardware component that contributes to an effort's overall "risk".

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According to ČSN ISO 31 000:2009 (2009, p. 10), term **risk** is defined as the "effect of uncertainty on objectives. An effect is a deviation from the expected – positive and/or negative. Objectives can have different aspects (such as financial, health and safety, and environmental goals), and can apply at different levels (such as strategic, organization-wide, project, product, or process)." By definition of risk by ISO 31000:2009, it is possible to divide risks into the categories of positive risks (opportunities) and negative risks (threats).

Risk management is then defined by PMBoK (2013, p. 126) as "the systematic process of identifying, analyzing, and responding to project risk. It includes maximizing the probability and consequences of positive events and minimalizing the probability and consequences of adverse events to project objectives." An improvement on the PMBOK definition of risk management is to add a future date to the definition of a risk. Mathematically, this is expressed as a probability multiplied by an impact, with the inclusion of a future impact date and critical dates. This addition of future dates allows for predictive approaches.

Good project risk management depends on supporting organizational factors, having clear roles and responsibilities, and a technical analysis.

Chronologically, project risk management may begin with recognizing a threat or by examining an opportunity. For example, these may be competitor developments or novel products. Due to the lack of a definition, this is frequently performed qualitatively or semi-quantitatively using product or averaging models. This approach is used to prioritize possible solutions where necessary. In some instances, it is possible to begin an analysis of the alternatives, generating cost evaluations and developing estimates for potential solutions.

Once an approach is selected, more-familiar risk management tools and a general project risk management process may be used for the new projects.

- Planning risk management.
- Risk identification and monetary identification.
- Performing a qualitative risk analysis.
- Communicating the risk to stakeholders and the funders of the project.
- Refining or iterating the risk based on research and new information.
- Monitoring and controlling risks.

Finally, risks must be integrated to provide a complete picture, so projects should be integrated into an enterprise-wide risk management framework to seize the opportunities related to the achievement of their objectives.

According to ISO 31 000:2009 (2009, p. 11), it is possible to define a **Risk management framework** as a "set of components that provide the foundations and organizational arrangements for designing, implementing, monitoring, reviewing, and continually improving risk management through the organization."

The five main steps that usually create risk management framework are as follows:

- **Risk identification.** A process of recognizing, finding, and describing risks.
- **Risk analysis**. A very important process. A team must assess the probability and impact of any risks that will be identified in the process of risk identification.
- **Risk evaluation**. In this phase, a manager must compare the results of a risk analysis with the risk criteria that will be established. The manager must determine each risk and find out if its magnitude is acceptable or unacceptable.
- **Risk treatment**. This process is possible to define as the process of modifying risk.
- **Monitoring, review, communication, and control**. Monitoring is continually checking, determining, and observing the status of a risk.
- **Risk management components** allow planners to explicitly address uncertainty by identifying and generating metrics, parameterizing, prioritizing, and developing responses, and tracking risk. These activities may be difficult to track without techniques, documentation, information systems, and various tools.

There are two distinct types of risk tools that are identified by their approach: the capital asset pricing model (CAP-M) and probabilistic risk assessment (PRA). These are the mainstays of project risk management and are classified by the quality and fidelity of the information required for their calculations. Market-level tools use market forces to make risk decisions between securities. System-level tools use project constraints to make risk decisions between projects. Component-level tools use the functions of probability and impact of individual risks to make decisions between resource allocations (Projektová rizika, 2017).

The presented paper presents one of the best risk management analyses in the theoretical and practical viewpoints (RIPRAN – of Czech origin) that can be used not only in the Czech business environment but worldwide.

2. Methodology

The aim of the presented paper is to demonstrate how to use RIPRAN (Czech project for risk analysis) as the main part of a feasibility study of a new product project in a manufacturing company. To fulfill this primary goal, we formulated the following secondary aims:

- To provide a critical analysis of the available information sources dealing with risk management in new product projects in manufacturing companies.
- To study and profoundly understand the RIPRAN project, risk analysis, its history, application, principles, rules, and exceptions.

– To discuss with the author of RIPRAN about the RIPRAN application in new product projects in manufacturing companies of non-Czech origin.
– To compile a feasibility study of the new product project.

All of these highly cited secondary aims were fulfilled. A short overview of the risk management topic as well as RIPRAN's characteristics and definition are part of the presented paper. To process this theoretical part of the paper, we used mostly analysis, synthesis, comparison, and deduction. We studied monographs, journals, and internet links with the impact of each source's topicality. The used sources are cited in the list of references.

During the process of a feasibility study of a new product project provided through the analysis of our own experience, we discussed the application of the RIPRAN method to a new product project with the author of this method. We realized e-mail correspondence, phone discussions, and finally a personal meeting to control the whole RIPRAN analysis document and discuss the method's application in the non-Czech origin business environment.

To fulfill the primary aim of presented paper, we decided to use the case study method.

3. Risk management

As cited in Lacko (2017), the issue of risk management is very current today. This is not only due to the fact that the market economy is risk-based; there are other reasons why there is often a risk today. The current global marketplace presents many threats for each company that must be identified by the company's personnel whichever area they come from (technical, economic, financial, or personnel), and they must prepare the appropriate measures to reduce these risks. The current turbulent environment full of changes resulting mainly from the rapid scientific and technological development (as well as those that are the consequence of solving many of our society's problems and changes in nature) presents a source of many potential threats to the economy of all companies.

Recently, a number of legislative measures have been issued requiring risk analysis at a professional level (e.g., the new labor code – occupational safety risks, a new safety machine approval regulation, the risk of data leakage that is subject to the privacy act, etc.) or in other contexts (e.g., IS risks – theft of a new product's data, etc.). For many Czech companies (especially recently established ones), this issue is new. In addition, the necessary Czech publications on risk engineering and the application of risk engineering in selected areas are lacking that would reflect current progress and demands in this

area. A contribution in this direction is Professor Tichy's publications (Tichý, 2006 or Tichý and Valjentová, 2011), which present a very good overview of the issue of risk management for those who need to get acquainted with this issue in detail.

Project management must necessarily consider the potential threats to a project, so risk analysis is a necessary part of it (as is presented in Mozga and Vítek 2001). Of course, this also applies to the design and management of information technology projects (as highlighted in the university textbook by Krajčík [Krajčík, 2006, p. 82]), because risk management is a part of the project manager's work (see the specification of the project manager's professional knowledge developed by Trávník [Trávník, 2004]).

Other available publications that are relevant to the Czech environment regarding this topic are Korecký and Trkovský (2011), Mareš et al. (2013), or Doležal et al. (2013).

The requirements for quality risk analysis are increasing in such projects as complex engineering and of other complexes (e.g., mechatronic systems, automation systems, robotic systems). Given the high financial budgets of such projects, there is a need to look into ensuring a high probability of the successful completion of such projects (Lacko, 2017).

The underestimation of project risks in some of our firms and projects often comes from the ignorance of risk engineering issues or from overlooking the issue of risk management (as is reported in Weinberger (2005, p. 28–31). Professional risk management requires not only the necessary knowledge of the risks (Tichý, 2006; PMBoK, 2013) but also knowledge of the methods that allow for a qualified risk analysis. A good project risk analysis is part of the quality management of the project (PMBoK, 2013; ISO 31 000:2009; Doležal et al., 2012 or Kreslíková and Kubát, 2003). Therefore, this knowledge should be a part of the required knowledge of a project manager (Marsina, 2009). Only a formal statement of the type ("The project could endanger the lack of awareness of possible educational events, so it is necessary to devote the sufficient publication of courses in the regional press" or "The project could significantly endanger the delayed delivery of program modules by external firms") is necessary to consider as an insufficient output from the project risk analysis (note the generality and absence of any quantified facts!).

The RIPRAN method (which is the subject of the presented paper) complements a set of methods such as the UMRA or risk matrix scoring method, which can be used for high-quality project risk analysis (Tichý, 2006; Podmolík, 2006).

Many Czech projects fail, as confirmed by a number of studies and surveys (e.g., Knapp et al., 2015 or Doležal, 2016). Despite the warnings of many authors (Weinberger, 2005, p. 25–38; Kubiš, 2002, p. 109–116 or Szabo, 2005, p. 1–8),

the attention on risk issues or risk analysis is performed poorly, unprofessional, and is still very low.

RIPRAN enables project teams to carry out risk analyses at a quality and professional level.

4. RIPRAN

The RIPRAN™ method (RIsk PRoject ANalysis) represents an empiric method for project risk analysis. The author of the method is Branislav Lacko.

It issues from the process notion of risk analysis, understanding risk analysis as a process (inputs in a process – outputs from the process – activities transforming inputs to outputs with certain goals).

The method accepts quality philosophy (TQM) and, therefore, covers activities that provide for the quality of the risk analysis as required by the ISO 10 006 standard. The method is designed in order to respect the principles of risk project management (as described in the PMI and IPMA materials).

It especially focuses on the processing of analysis or the project risks that must be done prior to its implementation.

However, this does not mean that we should not be working with threats in other phases. In each phase of a project's life cycle, we should carry out activities (this relates mainly to pre-project phases – opportunity studies and feasibility studies) that lead to the gathering of data for the project risk analysis for the project implementation phase and evaluate the potential risks of success of the particular phases on which we are actually working. The captured risks are then used for the overall analysis of the project risks. The RIPRAN method may be used in all phases of the project.

The whole process of risk analysis following the RIPRAN method consists of the following phases:

– Preparation of the risk analysis.
– Identification of the risk.
– Quantification of the risk.
– Response to the risk.
– General assessment of the risk.

Activities in the individual phases are designed as a consequent series of processes.

The method does not deal with the process of monitoring risks in a project. Whenever some new danger is identified or the situation changes and requires a re-evaluation of a certain risk, it is possible to use the RIPRAN method again (also during the monitoring of the project risks).

5. Case study of project risk management

5.1. Timeline of risk analysis

This documentation of a risk analysis is provided as a main part of a feasibility study of the PRJ 001325 PFC project, which covers the patent of a new product in a manufacturing company. The timeline of this risk analysis is from 08 March 2017 – 16 March 2018. This time frame is sufficient to assess the main risks that can affect the project.

5.2. Creating a team for risk analysis

For this risk analysis, professionals were chosen who already have a lot of skills with similar projects:

– Project manager.
– Electrical design engineer.
– Manager of electrical design department.
– Global project manager.

5.3. Risk management context

The core team that was established for risk assessment chose the following scales of likelihood, impact, and risk level (see Tabs. 1–4).

Table 1

Table of probability scale

Item description	Scale
Very high probability – VVP	more than 0.8
High probability – VP	from 0.6 to 0.8 (included)
Middle probability – SP	from 0.4 to 0.6 (included)
Low probability – NP	from 0.2 to 0.4 (included)
Very low probability – VNP	below 0.02 (included)

Source: RIPRAN 2017, own solution

Table 2

Table of impact scale

Item description	Scale
Very high impact – VVD	more than €3800
High impact – VD	from €2500 to €3800 (included)
Middle impact – SD	from €1500 to €2500 (included)
Low impact – MD	from €750 to €1500 (included)
Very low impact – VMD	below €750 (included)

Source: RIPRAN 2017, own solution

Table 3

Table of risk level

Item description
Very high risk – VVHR
High risk – VHR
Middle risk – SHR
Low risk – NHR
Very low risk – VNHR

Source: RIPRAN 2017, own solution

Table 4

Table of acceptable/unacceptable risk level

	VVD	VD	SD	MD	VMD
VVP	VVHR	VVHR	VHR	VHR	SHR
VP	VVHR	VVHR	VHR	SHR	NHR
SP	VHR	VHR	SHR	NHR	NHR
NP	VHR	SHR	NHR	VNHR	VNHR
VNP	SHR	NHR	NHR	VNHR	VNHR

Source: RIPRAN 2017, own solution

5.4. Risk identification

According to the RIPRAN methodology, the team identifies the greatest threats that may affect the project. The team has to create a scenario for each risk. For the risk identification, the team used the brainstorming method (see Tab. 5).

Table 5

Identification of the risks

Risk no.	Threat	Scenario
R1	Patent is impossible to sell	If the research and development of the product takes a lot of time and the project will be delayed, the product may lose its features and characteristics that are possible to patent.
R2	Timeline, schedule, and budget are not in balance	If the project obtains a timeline, schedule, budget, and manpower characteristics that do not respect each other, it may cause a delay in the project or it can influence other project objectives.
R3	Poorly defined project objectives	Unclearly defined project objectives of a product can cause a project delay or a project stoppage.
R4	Impact of trend and market objectives on the project	The market is very dynamic and market forces influence the market. One of the market forces is the customer's expectation, which is very important and can affect the project's approval.
R5	Government and market restrictions	Government and market restrictions may affect the project if they are changed on the go. For example, a change in an ISO standard, a new law or change in legislation, etc.
R6	Patent infringement	The competitors may be faster in the research and development of a similar product. If they develop their new product earlier, they can patent it sooner; later on, our patent can cause an infringement of patent rights.
R7	Prioritization of human resources	The company regularly researches and develops new products and often uses a similar combination of human resources within various teams. Since each project has a different priority for the company, this can cause issues in the timely delivery of the project.
R8	High buyer power	This type of product has a very characteristic and narrow group of customers. In the sector for which this product is targeted, the differences between the competitors and substitute products are very small. There are also a lot of barriers in the market areas. Specifically, there are very high technology protection parameters for this product.

Table 5 cont.

Risk no.	Threat	Scenario
R9	Threats of substitutive and new entrants	The costs and time for the entry in this sector are very low. Each entrant has to have very good knowledge about the product specifications, product options, and customer expectations.
R10	Insufficient communication	Insufficient communication might have a negative impact on the project, project communication objectives, and communication between the core team and the stakeholders.
R11	Refusal of the project	A project may be refused or stopped because of its overtime or over cost.
R12	Insufficient team knowledge and skills	The product is very new for the organization. Employees have insufficient knowledge and skills for the research and development, manufacture, and sale of the product.
R13	In the past, the team worked together on many other projects.	The group of people that will establish the core team worked efficiently together on other similar projects in the past. This is a positive fact and it is an advantage of this project.
R14	The product does not follow the objectives that must be met to obtain CE certification.	If a company wants to sell a product on the EU market, it needs to have CE certification. The objectives that must be met to obtain this certification are very strict. A product without CE certification is impossible to sell on the EU market.

Source: RIPRAN 2017, own solution

5.5. Risk quantification

In this phase, the team has to assess the risk probability and impact, calculate the risk value, and choose the proper risk level. Risks were quantified by the brainstorming method (see Tab. 6 and Fig. 1).

Table 6

Quantification of risks

Risk no.	Threat	Probability	Impact	Risk value (Level)
R1	Patent is impossible to sell	0.5 – SP	€37000– VVD	VHR – N
R2	Timeline, schedule, and budget are not in balance	0.25 – NP	€1200 – MD	VNHR – A
R3	Poorly defined project objectives	0.2 – NP	€500 – VMD	VNHR – A

Table 6 cont.

R4	Impact of trend and market objectives on the project	0.6 – SP	€20000 –VVD	VHR – N
R5	Government and market restrictions	0.25 – NP	€1300 – MD	VNHR – A
R6	Patent infringement	0.1 – VNP	€3000 – VD	NHR – A
R7	Prioritization of human resources	0.35 – NP	€700 – VMD	VNHR – A
R8	High buyer power	0.3 – NP	€1200 – MD	VNHR – A
R9	Threats of substitutive and new entrants	0.4 – SP	€0850 – MD	NHR – A
R10	Insufficient communication	0.2 – NP	€1200 – MD	VNHR – A
R11	Refusal of the project	0.4 – SP	€1000 – MD	VNHR – A
R12	Insufficient team knowledge and skills	0.3 – NP	€2500 – SD	NHR – A
R13	In the past, the team worked together on many other projects.	0.5 – SP	€500 – VMD	NHR – A
R14	The product doesn't follow objectives that must be met to obtain CE certification.	0.35 – NP	€4000 – VVD	VHR – N
R15	Insufficient support	0.3 – NP	€2000 – SD	NHR – A

Source: RIPRAN 2017, own solution

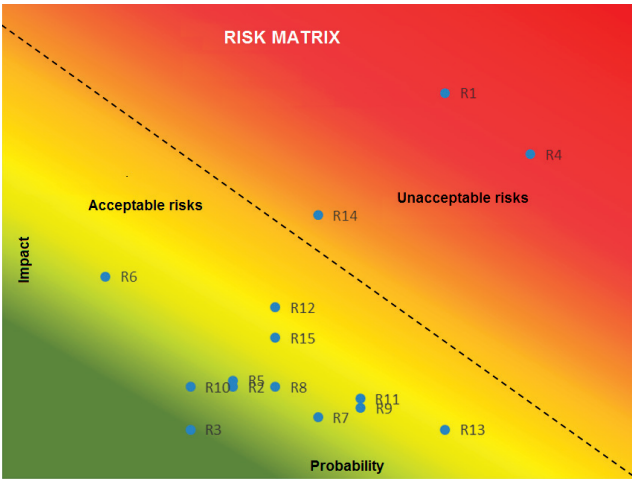

Figure 1. Risk matrix

Source: RIPRAN 2017, own solution

5.6. Response to risks

In this phase, the project team defines their ideas for reducing the risks. For a better description of each risk, we used the Monte Carlo simulation to better describe the risk characteristics.

5.7. Risk: R1 – Patent is impossible to sell

Scenario: The patent may be impossible to sell because of a delay in the phase of the project research and development. The next reason is the fact that the process to obtain a license for the patent takes a lot of time. Usually, the process to obtain a license for a patent takes about 4 years on average. If these delays occur, it may lead to increase in costs, changes in customer expectations, or a change in the conditions on the market (i.e., new entrants, substitutive products, etc.).
Simulation of risk R1 is seen in Figure 2.
Probability: 0.5 SP.
Impact: €36,000 VVD.
Risk value: 17.6 VHR – N.

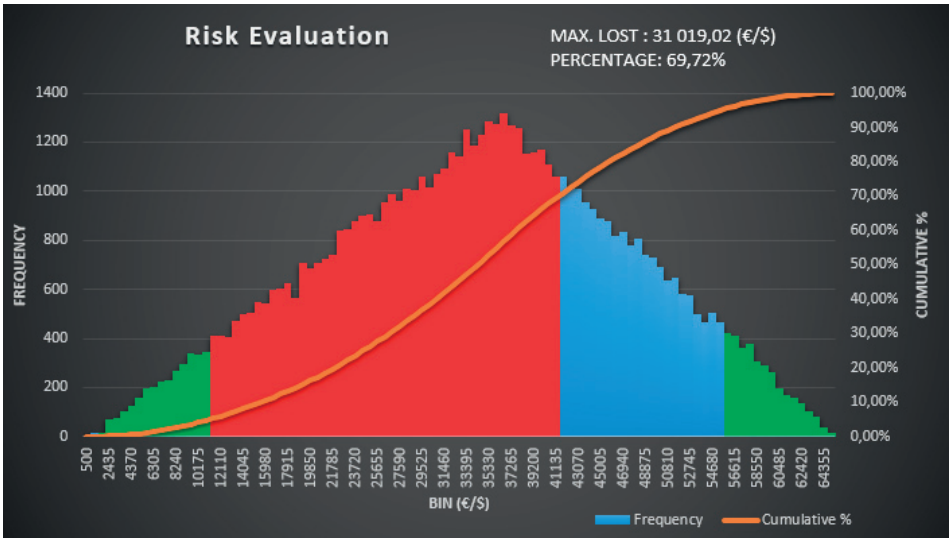

Figure 2. Simulation of risk R1

Source: RIPRAN 2017, own solution

Mitigation plan: patent insurance by Industrial Property Office of the Slovak Republic.
Risk owner: project manager.

Apply mitigation plan on: April 08, 2017.
Costs to realize the mitigation plan: €5500/year × 3 years = €16,500.
New probability: 0.02 VNP.
New impact: €36,000 VVD.
New risk value: 0.8 SHR – A.
Effectiveness of the action: 1.02.

5.8. Risk: R4 – Impact of trend and market objectives on project

Scenario: The market is very dynamic, and the market variables influence the market. One of the market's variables is customer expectation, which is very important and can affect the project's approval.
Simulation of risk R2 is seen in Figure 3.
Probability: 0.6 SP.
Impact: €20,000 VVD.
Risk value: 12 VHR – N.

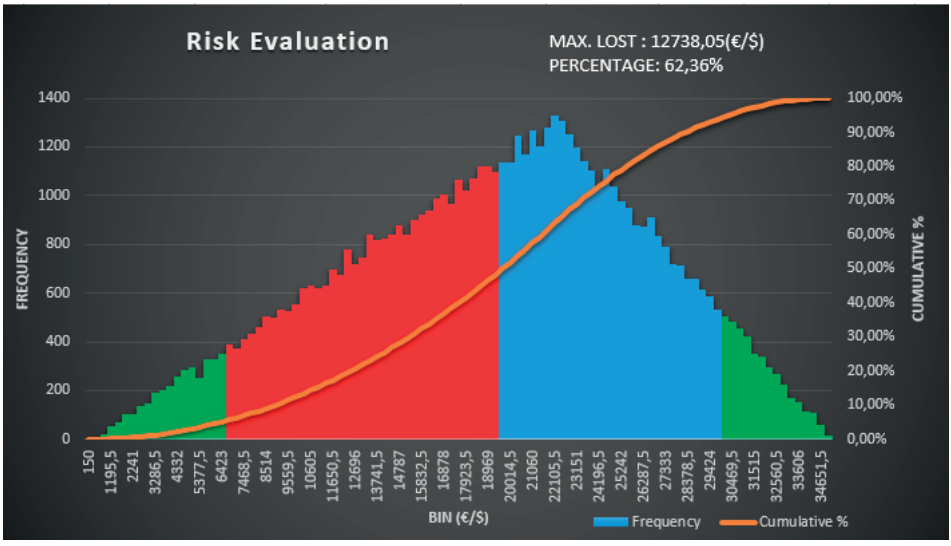

Figure 3. Simulation of Risk R4

Source: RIPRAN 2017, own solution

Mitigation plan: Regular monitoring of various aspects (one market research session per three months), which can influence the market environment and may subsequently affect the project objectives. The marketing department has to analyze new trends in the sector and new regulatory objectives every three months.

Risk owner: project manager, marketing department.
Apply mitigation plan on: May 1, 2017.
Estimated costs to realize the mitigation plan: €5,200.
New probability: 0.02 VNP.
New impact: €20,000 VVD.
New risk value: 0.4 SHR – A
Effectiveness of the action: 0.58

5.9. Risk: R14 – Product does not follow objectives that must be met to obtain CE certification

Scenario: If a company wants to sell a product on the EU market, it needs to have CE certification. The objectives that must be met to obtain the certification are very strict. A product without CE certification is impossible to sell on the EU market. Simulation of risk R3 is seen in Figure 4.
Probability: 0.35 NP.
Impact: €4000 VVD.
Risk value: 1.4 VHR – N.

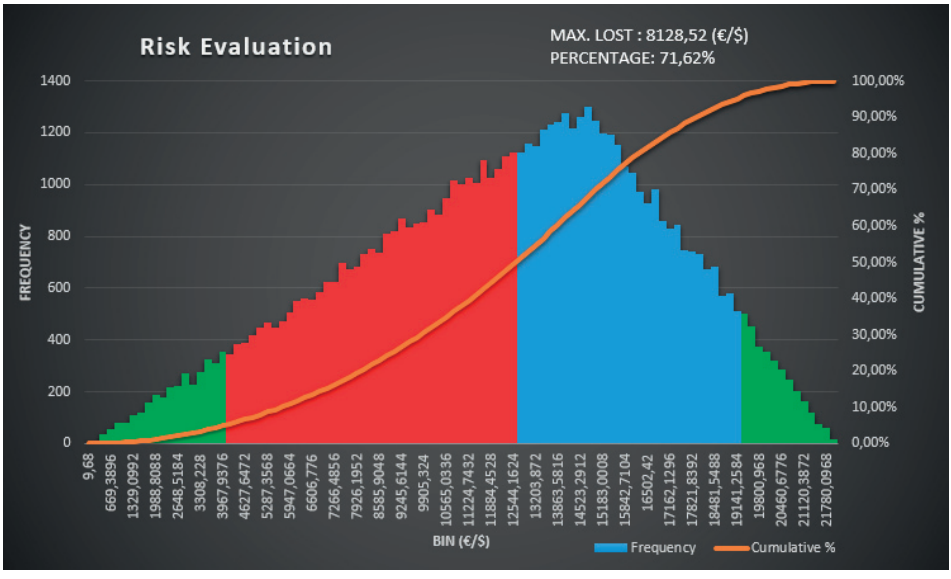

Figure 4. Simulation of Risk R14

Source: RIPRAN 2017, own solution

Mitigation plan: The research and development of the product is in accordance with the standards of CE certification. The changes in the standards are very dynamic. During the research and development phase, it is mandatory to meet the recommended values that are established in the standards of the certification.
Risk owner: project manager, electric design engineer.
Apply mitigation plan on: April 11, 2017.
Estimated costs to realize the mitigation plan: €3000.
Probability: 0.2 NP.
Impact: €2000 VVD.
New risk value: 0.4 SHR – A.
Effectiveness of the action: 0.33.

5.10. General risk assessment

Using the RIPRAN analysis, we can conclude that the project has 15 main risks that were identified and then evaluated by the project risk team. We can also conclude that, except for the three greatest unacceptable risks, all of the other evaluated risks are acceptable.

The team dealt with the three most impactful risks and developed mitigation plans to decrease their impact on the project. We want to regularly monitor and control these analyzed risks on a monthly basis. The project risk team will provide an analysis every two months.

6. Conslusion

Nowadays, project management provides a lot of various high-level project methodologies. Unfortunately, project managers do not always employ the wide range of options offered in the methodologies. In general, project risk assessment in Central Europe is usually performed in very simplified forms. The main goal of this paper was to apply the RIPRAN methodology to a specific case study and to show its advantages and disadvantages.

The used RIPRAN methodology is a very good method that is possible to apply to assess almost all projects. Utilizing the RIPRAN methodology, the core team analyzed 15 main risks that can influence a project. These risks were analyzed by a company without a risk culture. Three out of the 15 analyzed risks were identified as unacceptable risks. To lower the risks and decrease the impact on the project, the project risk team developed mitigation plans. At the end of the RIPRAN methodology process, the team created communication, review, and control objectives as well as a process.

We can state that the used methodology can be applied to almost any type of project and almost every lifecycle phase of a project. It is very easy to understand the methodology process as well as its input and output objectives, and it is also easy to use this methodology in practice. It is possible to use this methodology even if the project team has lower levels of skills and knowledge of risk management characteristics. One of the advantages of this methodology is that it can be extended by other objectives based on the project's nature.

Therefore, we recommend the following risk documentation principles during the usage of the RIPRAN method:

- Each phase should be documented by a separate document that specifies this risk analysis phase that was performed for which project. The document should clearly indicate when the material was elaborated, who approved it, and other similar formalities.
- Suggestions of identification, quantification, and analysis can be done either in the form of a spreadsheet or simply by using a list of all of the facts for each risk.
- A simple form of structured enrollment can be used for the first and last phases.
- Similarly, the final report may be worked in the form of a structured entry.
- If the tables and other materials used are not normally available in the company or do not arise from any other facts (guidelines, methodological guidelines, etc.) where they are important to understand the used process, it is necessary to attach such materials to the documentation as attachments so it is clear which auxiliary materials and sources were used.

At present, it is necessary to prefer the electronic form of all documents, so all output documents should be in electronic form and also archived in electronic form.

A current overview of the risks should be supported by a "risk register" for the appropriate project. This can be solved as a simple table created in MS WORD or, respectively, MS EXCEL, both of which represent simple options to support the work of the project team or, as a database, using a sophisticated database system using SQL principles. The use of a client/server database system is the ideal solution for project risk management within corporate risk management and project management with the application of a corporate project office.

Based on our experience, we claim that the RIPRAN method can be used to support the systematic implementation of risk analysis in a systematic way so that risk analysis is implemented at a high level of quality and is achieved as an effective outcome in project risk management over time, possibly in other business processes.

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Bank policies towards SME sector in Poland and selected countries worldwide

1. Introduction

The sector of small- and medium-sized enterprises is the driving force of economic development globally, owing for instance to the sheer multitude of such businesses their substantial contribution to the GNP and a significant share of employees. Their operations encounter a range of legal, legislative, or financial barriers, however, which slow their development. Financial barriers impede access to funding (including bank credit) to finance innovative activities. Micro-, small-, and medium-sized enterprises face serious problems obtaining bank credit; therefore, the authors aimed to investigate whether the problem of financing SMES (especially microenterprises) is only a Polish problem or if it is a wider problem for other countries as well. Are micro enterprises also facing problems related to obtaining bank loans in other countries? How do banks in other countries solve the problem of the high risk of financing microenterprises?

In order to achieve the goal and answer the questions posed, we conducted literature research and our own research into banks in Poland. It was also supported by research carried out by the Ministry of Economy and research conducted by an organization that promotes and supports the Polish SME sector – the Polish Confederation of Private Employers "Lewiatan." The collected results of the research in Poland served to diagnose the current state in the field of bank policies towards Polish SMEs. Next, we analyzed analogous international surveys, which served as examples of good practices and benchmarks in order to create recommendations for banks operating in Poland.

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2. Literature review

Small- and medium-sized enterprises (SMEs) have a very important influence on the development of a national economy. This is connected with the creation of jobs, growth of the living standard, and maintenance of a balanced regional development (Bhalla and Kaur, 2012; Mwengi et al., 2013, pp. 69–76). SMEs have a significant part of the total employment in many countries, but their contribution to economic growth is lower because of the obstacles they face that large companies simply do not experience (Beck and Demirguc-Kunt, 2006, pp. 2931–2943). One of these is insufficient access to external capital. Although lending and equity-based crowdfunding has emerged as new sources of financing, it is rather aimed at small companies. In connection to this, the problem is the subject of significant research interest to academics. It is also an issue of great importance to policy makers (Berger and Udell, 2006, pp. 2945–2966). Given the above, much research has been conducted. According to Mwagi et al. (2013), most of the SMEs in Kenya could not survive their third years because of the lack of adequate and relevant financing information. Among other things, they need information about available loans. In China, banks may lack the incentive to finance SMEs. There are four main reasons. First of all, not all banks are profit-maximizing financial institutions, so lending to SMEs may not be the main goal of their governors. Moreover, even if local branch managers are able to identify credit-worthy SMEs, they do not have full control over the lending process. Bank managers may also not want to work hard because it does not necessarily provide them a better salary. There are also outside factors; for example, government influence or law enforcement that can discourage financing SMEs. The conclusion of the survey made by Shen et al. (2009, pp. 800–811) reveals that, in China, bank size, lending authority, incentives of loan officers, bank competition, and institutional arrangements all influence the financing of SMEs. As a result, state-owned enterprises have indirect financing advantages; but, there is discrimination towards foreign and private companies (Wang et al., 2014). In Colombia, there are also barriers to financing SMEs by banks: inherent characteristics (informality, availability/reliability of financial statements, management skills, family-owned structures), regulations (particularly the interest rate ceiling on loans), the legal and contractual environment (especially with respect to secured credit), and economic policy that provide conflicting signals to financial markets as to the intentions of the government (Stephanou and Rodriguez, 2008).

T. Beck and A. Demirguc-Kunt (2006, pp. 2931–2943) found that innovative lending technologies could provide market-friendly ways of decreasing the constraints for SMEs. However, A. Berger and G. Udell (2006, pp. 32–53) argue that this framework is oversimplified. In connection to this, it overlooks some

crucial distinctions across national financial institutional structures as well as lending infrastructures. It also regards the way in which the elements influence credit availability for SMEs. Suboptimal financial institutional structures as well as lending infrastructures constrain the technologies available for financing SMEs in many countries. It considerably decreases credit availability for these enterprises, which are the most important source of external financing (Berger and Udell, 2006, pp. 2945–2966; Duda 2013, pp. 7–20; Łuczka 2001; Kyaw 2008). P. Behr and A. Guettler (2007, pp. 194–213) confirm that, in capital market-based financial systems (for example, in the United States), SMEs have better access to loans. In many other countries, however, small- and medium-sized companies have significant problems. In India, there is a conservative approach in commercial banks towards SMEs. Banks were reluctant to grant loans, as they were focused on collateral and securities. SMEs had to face high interest rates as well (Bhalla and Kaur, 2012, pp. 69–76). In Germany, bank lending relies on close and long-term relationships between banks and their clients. As a result, changing a bank is expensive. The solution of this problem could be the model that enables SMEs to self-estimate their expected probability of default. Better knowledge about creditworthiness can open opportunities to accessing alternative sources of external financing (Behr and Guettler, 2007, pp. 194–213).

Most of the studies (including the research already mentioned) concerns only one country and have different methodologies. Given the above, it is difficult to make an international comparison.

The following research questions have been made:

Q1: Does the size of a bank affect financing SMEs in Poland?

Q2: Is the problem of financing SMEs (especially microenterprises) only a Polish problem or is it also a broader issue for other countries?

Q3: Do microenterprises also face problems related to obtaining bank loans in other countries?

Q4: How do banks in other countries solve the problem of the high risk of financing microenterprises?

3. Theories

There are many theses that explain the problems of SMEs accessing bank credit. One of these is the concept of lending discrimination towards small and medium enterprises by J.K. Galbraith (1957, pp. 124–133). It is particularly important for SMEs because of the limitations of other forms of financing their growth. Moreover, these enterprises face the process of declining equity in all developed countries in the long term. Galbraith put the thesis that, in oligopolistic market

conditions and during the restrictive monetary policy implemented by a central bank, SMEs are discriminated towards in their access to bank credit. Large companies are always capable of extra-budgetary funding from different sources and have a much better chance of getting credit through various contacts with banks. Through the use of monetary policy instruments, a central bank tries to control the inflation process. According to Galbraith, this is effective only with respect to SMEs (Galbraith, 1957, pp. 124–133).

The empirical verification of this concept was made by Dawis and Yeomans. They relied on verification of the thesis not on the impact of lending discrimination but on the system of granting credit. The result of a restrictive monetary policy is a decrease in the economic situation of SMEs. Therefore, it also decreases their value of credit, resulting in a rise in their requirements. They proved that the creditworthiness criterion is dependent on the size of the company during the reduction in the supply of credit by the central bank. Further analyses made by other economists also support the thesis about lending discrimination towards SMEs (Łuczka, 2001).

Another thesis regarding the problem of SMEs in accessing foreign capital is credit rationing. This is the concept of the rationalization of credit with asymmetric information formulated by Stigliz and Weiss (1981, pp. 393–410). It can occur in two cases:

– the creditworthiness of the borrowers is the same; however, only some of them could obtain credit while others are rejected (even if they accepted a higher interest rate);
– some borrowers do not receive credit regardless of the interest rate.

Credit risk varies in proportion to the asymmetry of information between the bank and the client. This asymmetry is due to the costs of obtaining relevant information about the investment and creditworthiness as well as the intensity of the information. Banks want to reduce the cost of credit that applies to borrowers with high intensity information (including SMEs). On the other hand, there are customers who have large financial resources and established positions in the market. Credit rationing is applied proportionally to the net assets. Under these circumstances, credit rationing weakens the effectiveness of the monetary policy of a central bank.

Bhalla and Kaur (2012, pp. 69–76) argue that the most important reason for the conservative approach of commercial banks towards SMEs was the information asymmetry between these entities. Moreover, the survey of Mwangi et al. (2013, pp. 16–25) revealed that, besides the reputation effects, information asymmetry has a greater influence on SMEs than other factors. Empirical studies revealed that the most important factor for the differentiation of interest rate bank credit is

the size of the company (Łuczka, 2001). Studies of other economists also confirm this assertion (Woźniak, 2007, pp. 127–135).

There are several explanations for this state of affairs. The first is the relationship between the size and the average cost of the credit. This was confirmed by the results of empirical studies. In connection to this, credit for SMEs has a higher interest rate because of the higher average cost per unit of credit than in the case of larger credit. The second explanation concerns the risk of the loan. The risk of lending to SMEs is high, unlike in the case of a large company. In addition, the cost of a bank account for a large company is lower than for SMEs. This leads to the strong competitive pressure on large customers and stiffening the offer for small- and medium-sized companies. Moreover, SMEs have a lower price flexibility of demand for credit than large enterprises do. Therefore, banks are not willing to lower the interest rate on the credit, and SMEs must accept the rigid conditions of banks or seek credit elsewhere. They are not in a position to exert pressure on the market due to the limited alternative sources of external financing (Cowling and Westhead, 1996, pp. 52–60; Łuczka, 2001; Deakins et al., 2008, pp. 7–20; Cowling, 2010, pp. 36–44).

There is also the distressed-bank barriers hypothesis. Banks in financial distress are less likely to finance SMEs. This is directly linked to the income of the loan manager, because the risks of such financing cannot be easily verified. Moreover, research found that tougher supervisory standards in examining bank portfolios decrease SME lending.

There is a view that small banks are better-suited to finance SMEs. The reason is supposed to be that the soft information gathered through direct contact with small- and medium-sized enterprises mitigates opacity problems. The literature has emphasized that small banks have an advantage in accessing such information. There is an assumption that such banks will fully utilize this. This is reasonable for profit-maximizing financial institutions that provide loan managers enough incentives to collect and use it. Moreover, some research suggests that large banks have a comparative advantage of financing SMEs through lending technologies such as factoring leasing or credit scoring.

Some scientists argue that government-owned banks find that the macroeconomic environment and bank regulations are the most important barriers. Foreign and privately-owned domestic banks rank the degree of competition in the SME sector and the macroeconomic environment as the most important barriers. International research on a sample of 91 banks from 45 countries reveals that access to credit history information is very important for banks in developing countries. This barrier is also more relevant for foreign banks. They rely more on hard verifiable information for lending decisions as well as real estate as collateral. Nevertheless, they do not seem to lend less to SMEs than domestic banks do (Beck et al., 2006, pp. 2931–2943).

4. Research methodology

In order to achieve the goal and answer the research questions posed, the results of our own research and those of our secondary research were used.

In Poland, we surveyed seven banks: six are big international players, and one is a public bank. They include 50% of the banking market in Poland. The research was carried out in 2015 as a questionnaire for competent bankers. While preparing the survey questionnaire for research in Poland, we based it on the research conducted by Augusto de la Torre, María Soledad Martínez Pería, and Sergio L. Schmukler (2010, pp. 2280–2293). The questionnaire consisted of a questionnaire head, 15 closed questions, and specifications. The questions concerned the policies of the banks regards micro-, small-, and medium-sized enterprises. Banks were asked to define this sector and indicate what percentage of their clients are individual-sized classes of enterprises. In addition, they were asked about the type of banking products addressed to SMEs, standardization of the offers, elements of creditworthiness testing, risk assessment, risk management, preferred loan collateral, barriers limiting cooperation with SMEs, incentives to cooperate, and impact of the crisis on SME services. The research was conducted among the managers who deal with loans for Polish SMEs.

In order to show the image of the entire Polish SME sector, the results of the research elaborated and presented by Ministry of Economy, Forecast, and Analysis Department as part of a survey among 6000 enterprises and on research by the Polish Confederation Lewiatan, who surveyed 1650 SMEs.

The benchmarks that were used to refer to the results of the Polish research were used by studies carried out by the World Bank in Argentina, Chile, Columbia, and Serbia.

In Argentina, the World Bank examined 14 banks: 6 foreign, 6 private domestic, and 2 state banks, accounting for 75% of the banking sector and 75% of all bank assets. The survey in Chile covered four foreign banks, three private domestic, and one public bank, which constitutes 79% of the banking assets in that country. The Colombian surveys were conducted with seven private banks and one leasing firm, which manage 60% of the banking assets nationally. Eight banks, including five branches of European banks, one international bank specializing in lending to SMEs, and two large local banks were queried in Serbia – 70% of the entire SME crediting market and 60% of the banking assets.

Comparisons are made more difficult by the fact that each of the countries (and even each bank in Poland) applies classification criteria of their own to the enterprises. The criteria of classifying enterprises as SMEs in the selected countries are shown in Table 1.

Table 1

Criteria of classifying enterprises as SMEs in selected countries

Country	Criteria of classifying enterprises as SMEs
Argentina	average annual turnover between US $300,000 and 30 million
Chile	average annual turnover between US $90,000 and 24 million
Colombia	average annual turnover between US $400,000 and 13 million (small domestic banks apply other criteria: average annual turnover between US $100,000 and 5 million)
Serbia	average annual turnover between €500,000 and 10 million

Source: own compilation on basis of Torre et al., 2010

All businesses with average annual sales below the figures in Table 1 are treated as micro-enterprises. In Poland, the criteria of classifying enterprises as SMEs vary across banks. Each bank has its own criteria in spite of the prevailing Ustawa z dnia 2 lipca 2004 r. o swobodzie działalności gospodarczej (Dz. U. 2004, nr 173, poz. 1807). The criteria are shown below in Table 2. Bank names are not provided due to banking secret considerations.

Table 2

Criteria of classifying enterprises as SMEs by selected banks in Poland

Bank	Criteria
1	Businesses with average annual headcount of below **50** and the following annual turnover: a) self-employed individuals and private partnerships – up to PLN **20 million,** b) commercial companies and other legal entities – up to PLN **10 million**, c) sector – no limitations
2	Businesses with **double-entry books of accounts** and annual sales revenue below €**7 million**
3	Enterprises with annual turnover below PLN **20 million**
4	Small businesses with the so-called **single-entry books of accounts and annual sales revenue below €800,000** Medium-sized companies with **double-entry books of accounts** and annual sales revenue below €**800,000**
5	Enterprises as defined by the **Law on Business Activity**, individual professionals and non-profit entities providing services to households with annual net sales revenues or annual budgets of up to PLN **5 million** in the most recent calendar year

Source: own compilation

In Poland, Chile, Serbia, Colombia, and Argentina, banks with more-developed business models of SME sector service distinguish between small- and medium-sized enterprises. Those without such models apply the same criteria to the SME sector in its entirety.

In this work, the uniform definition of SMEs is omitted and the definitions adopted by each country and by each bank are adopted, which complicates the analysis. However, one definition cannot be established because everyone has their own. Therefore, the results of the international surveys are examples of good practices and show how the problem of financing micro and small enterprises by banks is solved in other countries. However, they are not subject to a comparative analysis.

5. Involvement of banks in financing SMEs in selected countries

The review of international surveys shows that the relationships between banks and the SME sector are significant in almost all countries. Almost all banks (93% in Argentina, 100% in Chile, 88% in Columbia, and 100% in Serbia) have small- and medium-sized enterprises among their active and important clients. The banks recognize SMEs as a strategic sector, especially in Argentina and Chile. In connection to the above, they restructured and hired a person specifically qualified to analyze the situation of the SME sector (Torre et al., 2010, pp. 2280–2293). Similarly, banks in Poland also have special departments that deal with the assessment of the SME sector. This means that not only large enterprises but also micro-, small-, and medium-sized enterprises are becoming more and more important for the banking sector.

Analyzing the available data, it can be noted that banks provide significant numbers of loans to the SME sector. Loans granted to SMEs as related to the entire private sector (including retail sales) reached 37% in Argentina and 14% in Chile in 2006. The granting of loans to SMEs by banks is significant, reaching 62% of all loans granted in Argentina and 28% in Chile. The situation was similar in Columbia, where the number has doubled since 2003 (accounting for 25% of all loans granted in 2006). In contrast, 34% of the loans were granted to the SME sector in Serbia (as related to all loans granted for small-, medium-, and large-sized companies). This indicator was much lower in developing countries (according to research by the IFC – International Finance Corporation, a member of the World Bank); the lending rate for SMEs amounted to just 16%. These results encouraged us to conduct research in Poland and to check whether the policies of banks operating in Poland are similar to those used by banks in other

countries and to obtain answers to the questions that were set out in Section 2 of this article.

The data shows that large or foreign banks usually support the SME sector. This is 100% of the banks in Argentina and Serbia, 88% of the banks in Chile, and 75% in Columbia. Only in Argentina and Chile do medium-sized and national banks support SMEs (56% in Argentina and 16% in Chile).

According to the studies by Torre et al. (2010), there are many factors that cause banks to cooperate with the SME sector.

In some countries (Argentina and Serbia), the most frequently mentioned reason was the increase of profit. In addition, the banks in Argentina also pointed to the relationships of SMEs with large companies as a factor that encouraged cooperation. More than half of the banks in Argentina consider the SME sector as strategic and profitable. In Chile, the most important factor was the possibility of entering other sectors and high competitiveness in other sectors financed by banks. In Serbia and Argentina, the next reasons were the relationships of banks with large clients followed by competitiveness in other sectors financed by banks and the possibility of entering new markets (Tab. 3).

Table 3

Encouraging factors (motivators) for banks to cooperate with SME sector

Factors	Argentina	Chile	Serbia
	percent of banks		
Perceived profitability	92	63	75
Relationships with large clients	69	25	50
Strategic sector	54	25	0
Competitiveness in another sector	31	50	38
Opening to enter other sectors	8	75	38
Social goals	15	25	0

Source: Torre et al., p. 2285

Another factor motivating cooperation with SMEs is the fact that large foreign banks in the world have experienced a decline in revenues from financing the company sector. This was connected with competitiveness on local capital markets (companies acquire other sources of funding) and with the large competitiveness of financial and non-financial institutions such as shopping malls or chain stores that offer installments and loans on the market of individual clients.

When assessing companies from the SME sector, large banks in Argentina, Chile, and Serbia pay attention to the cooperation of SMEs with large companies (their large clients). They choose those SMEs that act as providers or outsourcing companies for larger enterprises. In this way, banks acquire knowledge about SMEs from the large companies that cooperate with small enterprises. This knowledge can help reduce the level of risk and asymmetry of information, which are the biggest problems banks face in handling the SME sector.

Unfortunately, there are also many barriers that discourage banks from cooperating with the SME sector.

In Argentina, the largest obstacle was the high competition among the banks in the sector and the weak demand for loans in the SME sector. In all of the analyzed countries, one can notice that the largest obstacle is the specificity of the SME sector and regulations as well as macroeconomic factors (Tab. 4).

Table 4

Obstacles/barriers of cooperation between banks and SME sector

Obstacle/barrier	Argentina	Chile	Columbia	Serbia
	percent of banks indicating obstacles			
Specificity of the SME sector	46	50	88	69
Competition in sector	69	13	0	63
Macroeconomic factors	46	13	63	63
Regulations	23	50	88	75
Legal and contractual environment	31	38	75	88
Lending techniques for SME sector	23	38	38	63
Lack of adequate demand	46	0	0	38
Characteristic factors for banks	23	13	25	13

Source: Torre et al., p. 2285

Research conducted by the World Bank shows that banks specializing in financing the SME sector have special branches to finance these enterprises (77% in Argentina, 88% in Chile, 100% in Columbia, and 88% in Serbia). In Chile and Argentina, many banks have created branches that are adjusted not only to the size of an enterprise but also to the specific conditions of the sectors

in a given region of a country. This approach is aimed at reducing risk. In order to minimize the risk that always accompanies the financing of these enterprises, banks standardize their offered products. It was noticed that the bigger the company, the more individual (specially tailored) set of products that are offered. The smallest enterprises (especially micro enterprises) tend to get standard products as an offer.

Banks view the standardization as the same products with certain adjustments (such as changing the main credit line) in order to adapt it to the production cycle of a given industry (for instance, selling a specific product or providing financing).

Risk assessment is a natural and even necessary element from the point of view of banks, which is why it always accompanies investment loans. In most banks, risk assessment is separated from the sale of loans. In order to reduce costs, banks do not keep departments for analyzing and assessing risk in each branch but create central branches of risk analysis.

In all banks, the assessment of risks takes place in the head office, not in the regional branches. Specially created risk management departments have clear independence, and their opinion has a very large impact on the decision to grant a loan.

In order to minimize the risk, banks use skimming tools to capture less risky SME clients. They usually specify the size and threshold of this loan through the utility of the skryming tool. They also use tests to determine the efficiency of an automatic scoring system. When assessing larger companies, banks use an individual risk assessment. The automatic system forms the basis for a risk assessment analysis, but it is not the only tool. After granting the loan, the banks apply a monitoring system and apply early warning systems in the event of the risk of non-payment of a loan by an entrepreneur.

Authors Augusto de la Torre, María Soledad Martínez Pería, and Sergio L. Schmukler (2010, pp. 2280–2293), also analyzed the impact of the crisis on changes in bank financing of the SME sector based on research conducted by the World Bank in Argentina (ten banks), Chile (six banks), and Colombia (eight banks). This analysis shows that, as a result of the financial crisis in 2009, the banks did not stop financing the SME sector and did not reduce the amount of financial means allocated to these entities. The reason for these decisions is the fact that the crisis affected not only SMEs but all companies, including large ones and individual clients. As compared to large companies and individual clients, the crisis affected SMEs to a lesser extent.

However, it can be noted that the banks increased its interest rates and shortened its lending time for SME entities. This is a natural behavior during a crisis. The companies also reduced their investment and, therefore, showed less interest in loans and other banking finances (Tab. 5).

Table 5

Changes regarding SME sector. How crisis affected financing of SME sector

Changes regarding SMEs	Argentina	Chile	Columbia
	percent of banks		
Fewer funds to borrow for SME sector	0	0	0
Increase in interest rates for SMEs	40	50	25
Shortening time of crediting	90	33	13
Increased risk due to macroeconomic instability	70	83	88
Increased risk due to macroeconomic instability	0	17	38
Bank prefers to grant loans to other sectors	0	0	0
Fall in demand for loans from SMEs	70	33	63
Fall in demand from SMEs on other services	20	33	13
Increase in demand for loans from SMEs	0	33	0
Increase in demand from SMEs on other services	10	17	0

Source: Torre et al., pp. 2282–2288

6. Involvement of banks in financing SMEs in Poland – results of own research

In Poland (as in other countries such as Argentina, Chile, Serbia, Columbia, and Serbia), banks that provide finances to the SME sector are primarily large banks with an international operating range. Only in Argentina do public and niche banks have a significant share in financing the SME sector. In Poland, 86% of the large banks finance the SME sector with only 14% of public banks doing so (Tab. 6).

The surveyed banks answered that, from their point of view, an important factor encouraging them to finance SMEs is the willingness to improve their own profitability, which was disturbed due to the economic recession on the market and the loss of some large customers. Another important motivating factor for SME financing is cooperation between SMEs and large enterprises. This seems justified because micro and small enterprises are especially not "transparent" to banks because they do not keep full accounts, only simplified ones (or settling

in a lump sum). Therefore, those SMEs that cooperate with large enterprises become more reliable. This was the answer of 100% of the surveyed banks considered. Respondents also indicated that they should expand their activities to the new sector (71%) and that the SME sector is an important element of their strategy (84%). The results are presented in Table 7.

Table 6

Banks financing SME sector in Poland

Type of bank	Percentage of banks
Large banks	86
Public banks	14
Niche banks	0
Other bank brokers	0
Small banks	0

Source: own research

Table 7

Encouraging factors (motivators) for banks to cooperate with SME sector

Factors	Percentage of banks
Perceived profitability	100
Relationships with large clients	100
Strategic sector	84
Competitiveness in another sector	43
Opening to enter other sectors	71
Social goals	0

Source: own research

As presented in the fifth section of this article, barriers limiting the cooperation of banks with SMEs are perceived differently in different countries (Tab. 8). The data presented in Table 13 shows that, for banks in Poland, the specificity of the SME sector is only a small barrier (28%). However, the greatest obstacles

are macroeconomic factors (84%) and regulations (57%). This is due to the fact that most banks have departments prepared to finance SMEs. However, it does not affect the factors independent of them, such as legal provisions and macroeconomic factors.

Table 8

Obstacles/Barriers of cooperation between banks and SME sector

Obstacles/barrier	Percentage of banks
Specificity of the SME sector	28
Competition in sector	43
Macroeconomic factors	84
Regulations	57
Legal and contractual environment	0
Technologies lent to SME sector	28
Lack of adequate demand	14
Characteristic factors for banks	28

Source: own research

In most of the surveyed countries mentioned in the fifth section, banks offer standard products to SMEs in order to minimize risk. For large enterprises (which are less risky from the point of view of banks), they offer dedicated products. Studies conducted in Poland show that only 28% of the banks offer standard products to SMEs; this may be one of the reasons for the low rate of bank loans for micro and small enterprises (Tab. 9).

Table 9

Standardization of banking products offered to SME sector in Poland

Mainly standardized products	Similar proportion of standardized and individually customized products	Mainly individually tailored products
percent of banks offering these products		
28	57	14

Source: own research

The low financing level of SMEs by banks in Poland is confirmed by the results of the research published by the Polish Confederation of Private Employers (PKPP) "Lewiatan." They show that the majority of SMEs do not use bank loans (more than 65%) due to the difficulties obtaining them. The loans are least often used by microenterprises and most often by medium enterprises. This is due to the fact that the banks in Poland do not have credit offers adjusted to microenterprises as are available in Argentina, Chile, Columbia, and Serbia. They consider this sector to be very risky and, therefore, do not finance these enterprises (Tab. 10).

Table 10

Percentage of SMEs using/not using bank loans

Size of enterprise	Percentage of enterprises using/not using bank loans	
	yes	no
SMEs	35	65
medium	78	22
small	51	49
micro	30	70

Source: study based on report: *Report: Development trends...*, 2017

The correlation analysis shows that the demand of large companies for loans is actually independent of the criteria for granting. The reason for this is that they also have access to other forms of financing. The situation is different in the case of SMEs, particularly for long-term loans (Tab. 11).

Table 11

Correlations between criteria for granting loans and demand for loans in Poland during years of 2004–2017

	SMEs	LEs
Short-term loans	0.223192	−0.01048
Long-term loans	0.562627	0.284342

Note: $p < 0.05$

Source: own calculation based on www.nbp.pl, January 12, 2018

Due to the non-adaptation of banking offers to the specifics of SMEs, microenterprises tend to suffer worse credit conditions. This is confirmed by the data contained in Table 12 (which was intentionally shown for a longer time horizon in order to show the trends).

Table 12

Average interest rates on loans to SME sector during years of 2008 to 2016

Year	Interest rate of loans						
	micro	small	micro/ small difference	micro/ medium difference	average	small/ medium difference	Total interest rate
2008	10.5	10	0.5	2.0	8.5	1.5	9.0
2009	12	8.5	3.5	4.0	7.0	1.5	10.0
2010	10	8.0	2.0	3.5	6.5	1.5	10.5
2011	11.5	7.0	4.0	3.0	8.0	1.0	9.0
2012	10	7.0	3.0	3.0	8.0	2.0	8.5
2013	9.0	7.5	1.5	3 0	6.0	1.5	8.0
2014	9.0	7.0	2.0	4.5	4.5	2.5	7.5
2015	8.0	6.0	2.0	4.0	4.0	2.0	7.1
2016	6.5	5.0	1.5	2.5	4.0	1.0	6.4

Source: own compilation based on report: *Report: Development trends...*, 2017

The data contained in Table 13 above shows that, due to their higher credit risk, microenterprises have higher-interest bank loans – approximately 2% more than the average interest rate for the entire SME sector. This varied from 0.5% to 4% as compared to small enterprises and from 2% to 4% as compared to medium-sized enterprises. In general, it can be seen that the smaller the enterprise, the higher the interest rate. In addition, the data presented in Table 21 shows that only 20% of bank beneficiaries in Poland are microenterprises. The results presented in Tables 20 and 21 confirm that microenterprises in Poland are discriminated towards by banks and, thus, confirm the theory of information asymmetry by J. Stieglitz and A. Weiss (1981, pp. 393–410).

Table 13

Beneficiaries of bank loans in Poland

Size of enterprise	Percent of banks granting loans
micro	20
small	60
medium	100

Source: own research

One of the reasons for the discrimination towards microenterprises by banks in Poland may be the lack of an individual approach to risk management. If we refer the results of the research presented in Table 14 to the international surveys (Table 10), one can notice very significant differences. Only in Poland is the risk assessment automated, which can have a significant impact on the fact that so few micro and small enterprises acquire bank loans. The reason is because the smallest entities are inherently riskier and require an individual assessment approach.

Table 14

Is risk management at banks largely automated?

Percent of banks that have automated risk management	
Yes	**No**
84	28

Source: own research

However, there are no significant differences in the approach to the location of the risk assessment. In banks operating in Poland, the risk assessment is separated from the sale of loans and takes place at the head office (Tab. 15). However, in the case of Poland (which is a phenomenon), more than half of the submitted loan applications by SMEs are rejected. The explanation is that the head office of a bank does not always understand the specificity of the region.

Table 15

Is risk assessment separate from sale of loans in banks in Poland?

Percent of banks that have separate risk assessment process	
Yes	**No**
84	16

Source: own research

However, risk management is always conducted at the banks operating in Poland. There were no other individual cases where risk management would take place in the bank branches. This is a significant distinction between Poland and the other countries (Tab. 16), and this also shows the lack of an individual approach to risk management in the case of SMEs.

Table 16

Is risk assessment held at headquarters (head office) in banks in Poland?

Percent of banks in which risk management takes place at head office	
Yes	**No**
100	0

Source: own research

The next questions in the survey concerned the impact of the crisis on the financing of the SME sector by banks.

The research shows that the banks in Poland hardly felt the financial crisis in 2007. They have applied and continue to apply very restrictive policies towards the SME sector. They practically do not support microenterprises because they are very often required to keep full accounts. This requirement eliminates almost all Polish microenterprises. The characteristic feature in Poland is that 91% of these are single proprietors (EUROSTAT data, 2014), leading to simplified accounting. In contrast to banks in Argentina, Chile, and Columbia, the banks in Poland were not hit by a declining demand for loans from SMEs since, both before and after the crisis, more than half of the enterprises from the SME sector did not apply for bank loans. They considered them to be unavailable (Tab. 17).

Table 17

Did crisis affect financing of SME sector in Poland?

Changes regarding SMEs	**Percentage of banks**
Fewer funds to borrow for SME sector	0
Increase in interest rates for SMEs	43
Shortening time of crediting	14
Increased risk due to macroeconomic instability	84
Increased risk due to beyond macroeconomic instability	43
Banks prefer to grant loans to other sectors	14
Fall in demand for loans from SMEs	28
Fall in demand from SMEs on other finances	43
Increase in demand for loans from SMEs	43
Increase in demand from SMEs on other finances	0

Source: own research

7. Conclusions and recommendations

The results of our own research and literature studies enabled us to answer the research questions posed in the introduction of the article.

Q1: Does the size of a bank affect the financing of SMEs in Poland?

We have shown that the size of the bank affected the financing of SMEs in Poland. The SME sector is financed mainly by large banks and rarely by small or niche banks. The presented data confirmed that banks in Poland support the SME sector; however, the criteria for including enterprises in the SME sector eliminate most microenterprises. Banks finance those entities that keep full accounts. On the other hand, the specificity of the Polish sector is such that 70% of SMEs are microenterprises, and 91% of this group are sole proprietors (whose accounts are settled according to simplified accounting). According to the presented data, the majority of banks in Poland do not support microenterprises. Only 20% of the banks grant loans to microenterprises. 100% of the surveyed banks provide investment loans to medium-sized enterprises, and 60% of them lend to small enterprises.

Q2: Is the problem of financing SMEs (especially microenterprises) only a Polish problem or is it also a wider problem for other countries?

We showed that the problem of financing SMEs (especially microenterprises) is not only a Polish problem but also regards other countries. This issue has been widely studied and discussed. However, in the analyzed countries, banks have developed solutions tailored to the specifics of these entities. These solutions served as benchmarks for the recommendations for banks that finance Polish SMEs.

Q3: Do microenterprises also face problems related to obtaining bank loans in other countries?

In the selected countries (Argentina, Columbia, Chile, and Serbia), microenterprises do not face such big problems related to obtaining bank loans (contrary to Poland). For Polish microenterprises, bank loans are difficult to access. The analysis shows that only 30% of the microenterprises used bank loans as compared to 51% of the small enterprises and more than 78% of the medium-sized enterprises. In addition, the cost of obtaining a bank loan is inversely proportional to the size of the enterprise. The smaller the company, the higher the interest rate for loans. It can therefore be noted that, in reference to the information asymmetry theory of J.E. Stigliz and A. Weiss (1981, pp. 393–410), Polish microenterprises, are discriminated against by banks due to their increased risk.

However, the research conducted by Augusto de la Torre, María Soledad Martínez Pería, and Sergio L. Schmukler (2010) does not confirm the theory of information asymmetry in Argentina, Chile, Columbia, or Serbia.

Q 4: How do banks in other countries solve the problem of the high risk of financing microenterprises?

In order to reduce the risk of financing the SME sector, banks in the analyzed countries have specifically adapted their policies to this group of enterprises. This adjustment is based on the fact that smaller companies receive more standard products while the offers for larger companies are individually adapted. The research conducted in Poland shows that banks very rarely offer standard products at the same time as indicating a high degree of risk for financing microenterprises.

The banks in the analyzed countries have learned to minimize the risk resulting from the incomplete information regarding microenterprises. They pay attention to the cooperation of SMEs with large companies. They believe that large companies do not cooperate with risky entities and verify information about the insolvency of their business partners.

Polish banks do not pay any attention to this aspect when assessing the risk of SMEs. They do not pay attention to the specificity of the SME sector (as opposed to banks in the analyzed countries).

The banks in the chosen countries do not use an automatic risk management system because the SME sector requires an individual risk analysis in each case. This is exactly the opposite in Poland. Eighty-four percent of Polish banks use automatic risk management systems to assess the creditworthiness of SMEs, which results in the fact that only 30% of the micro-enterprises acquire bank loans.

Banks in the analyzed countries have changed their policies for SMEs in recent years, recognizing this sector as strategic and important from their point of view.

Banks in Poland are only at the beginning of this path; nowadays, their policies are focused on the least-riskiest groups of enterprises in this sector – only small- and medium-sized companies (excluding micro enterprises).

Based on the results of our own research and the analysis of international research, we propose the following recommendations for Polish banks:

- Standardization of products for microenterprises and individual offers for large enterprises.
- Offering the so-called relational loans. This means that, apart from loans, banks should offer a set of other banking products (for example, account financing, factoring, leasing, etc.) that allow them to gain better knowledge about their clients and increase the "transparency" of the entities applying for loans.
- An individual approach to the risk assessment of microenterprises instead of automated systems.
- Adaptation of offers not only considering the size of the company but also the type of business (industry).

8. Limitations on directions of future research

The conducted research of banks in Poland allowed us to initially diagnose the policies of the banks for Polish SMEs. The analysis of international surveys has shown that the policies of the banks in the selected countries of the world for SMEs is significantly different than the policies of the banks operating in Poland. This different approach may be one of the important reasons for the large percentage of refusals by banks to grant loans to microenterprises. Our research only allowed for preliminary recommendations for the banks. However, the differences encouraged us to conduct further research in the future using both qualitative and quantitative methods, which will allow for analysis.

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Impact of ATM location on its profitability in Malopolskie and Podkarpackie provinces**

1. Introduction

Automated Teller Machines (ATMs) were introduced in Poland in 1990. The first ATM was installed in 1991 in Warsaw at Polish Bank PKO. The most intensive expansion of ATMs since 1999 achieved a rate of growth of about 12% per year. In 2007, the number of ATMs reached more than 10,000; by the end of 2013, the number of ATMs had reached 18,903; in September 2016, there were 22,504 ATMs in Poland; and in March 2017, this number exceeded 23,000. The number of ATMs was growing constantly except for the second quarter of 2010 and first quarter of 2013, when declines were observed. Since 2010, one can observe a slowdown of the increase of ATMs. The rate of growth in this time span was about 1% as compared to the time period from the beginning of 2007 until the beginning of 2010, when the rate of growth was close to 4%. The described changes in the number of ATMs are illustrated in Figure 1.

The dynamic growth of ATMs was a result of bank policy. They tried to find alternative and cheaper ways to distribute cash (withdrawals from ATMs are cheaper than from bank branches). Moreover, the banks were confronted with a growing demand for cash. Some banks were not interested in investing in ATM networks; therefore, they started to cooperate with independent deployers.

The rise in ATM withdrawals and profits from interchange fees (3.50 PLN per withdrawal) seemed to guarantee that this business would be promising and profitable.

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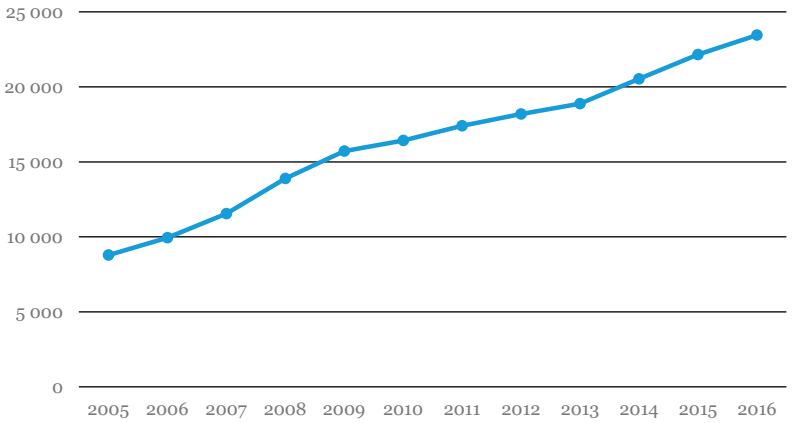

Figure 1. Trend of number of ATMs in Poland from 2005 through 2016

Source: own elaboration on basis of data from National Bank of Poland

Figure 2 demonstrates the scheme of the interaction of different subjects with respect to the charges, service, and functioning of ATM networks. In the scheme, basic charges that are typical for the part of the banking system related to ATMs are presented. **Interchange** charges for withdrawal from foreign ATMs as well as **surcharges** are paid on the basis of transactions. For each withdrawal from an ATM, the owner receives an issued debit card interchange from the bank. However, the bank that issued the charge card can charge a commission in the case of withdrawals from foreign ATMs. It is not common to charge a commission on transactions from one's own ATMs. In some countries (e.g., the U.S.), surcharges demanded by owners of ATMs (banks or independent deployers) from customers withdrawing cash are common.

As just mentioned, the main profits of independent ATM deployers are due to interchange commissions. This depends on the number of withdrawals from the ATMs. However, at the end of the first decade of the 21st century, the positive trend in the development of ATM networks stopped.

First of all, in the beginning of 2010, MasterCard and Visa reduced their interchange commissions by 60%; i.e., the reduced interchange amounted to 1.3 PLN. The profits of the owners of ATM networks essentially declined. During this time, cashless payments started to become popular. More and more shops were offering cashless payments. In 2009, cashless transactions exceeded 50% of the total number of transactions for the first time. These were mostly small transactions. Small transactions (withdrawals) from ATMs are relatively the most profitable.

The reduction of profits due to the interchange and development of terminal payments forced owners of ATMs (mostly independent deployers) to undertake

measures to increase the competitiveness of their ATMs. First of all, they removed ATMs from locations where the number of withdrawals was low and installed them in more profitable places. The negative consequence was lower ATM availability for customers.

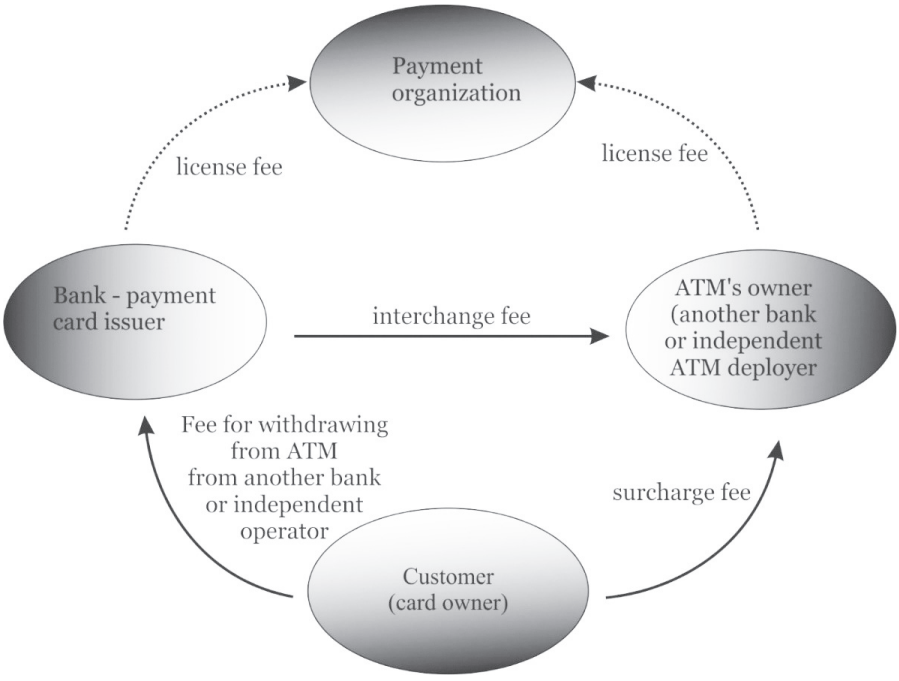

Figure 2. Model of charges in ATM system
Source: Górka (2011)

Another way to increase the profitability of ATMs was the attempt to encourage customers to take out small withdrawals due to promotions or restrictions of a maximal withdrawn sum of money. Some independent deployers issue advertisements during withdrawals from ATMs. This is an additional way to gain extra profits with their ATMs.

As one can see from Figure 1, the development of ATM networks slowed down at the beginning of the second decade of the 21st century. This is also reflected in the number of withdrawals during this period. As is visible in Figure 3 (which illustrates the number of withdrawals during the period of 2005–2016), the number of withdrawals did not increase in 2010 as compared to 2009. This situation occurred for the first time since the installation of the very first ATM in Poland.

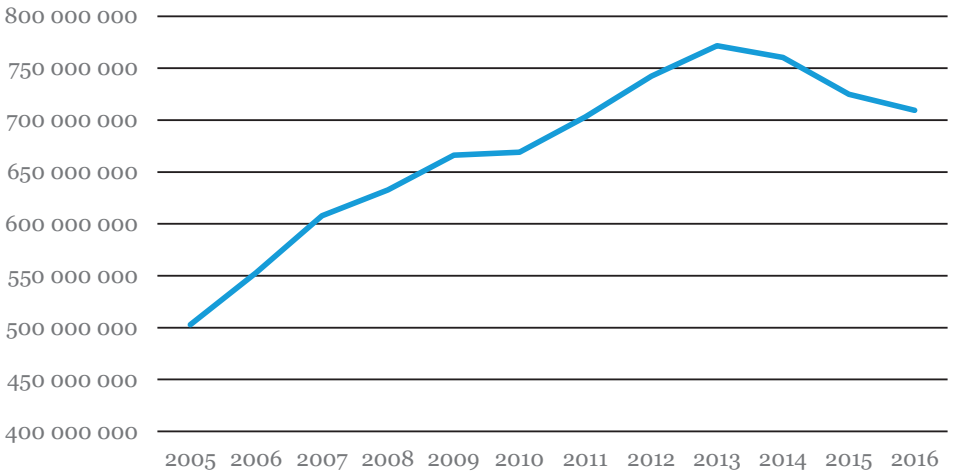

Figure 3. Number of withdrawals from all ATMs during 2005–2016

Source: wwn elaboration on basis of data from National Bank of Poland

However, this negative tendency did not continue with respect to the number of installed ATMs in Poland. The number of ATMs is not the only factor reflected in the development of ATM networks. International comparisons of the development of ATM networks are possible by taking into account the population of an analyzed country. In 2013, there were 5.4 transactions per capita in Poland. An important observation is that we not only saw a growth in ATM numbers through 2013 but also in the number of transactions; e.g., in 2013, the number of transactions per inhabitant of Poland showed a tendency to rise. The number of transactions through 2013 not only tended to rise but also exhibited seasonality. The lowest numbers of transactions were usually in the first quarters of each year.

However, the number of transactions was lower in 2014 than one year earlier (comp. Figure 3). This situation occurred for the first time since the ascendance of ATMs in Poland. This took place in spite of the growing number of ATMs (comp. Fig. 1). The reason for this was the growing number of cashless terminals and cashless payments. The growing availability of cashless terminals in shop service points followed from the considerable reduction of interchange commissions for shops owner and service points in 2014–2015.

The decline in the number of withdrawals from ATMs and growth of the number of ATMs resulted in a decrease in the average number of withdrawals per ATM. During the year 2016, this number amounted to 2500 withdrawals from each ATM monthly.

As follows from a report from June 2014 by the National Bank of Poland, each ATM requires 3000–3500 withdrawals monthly to be considered profitable. One can see that the average ATM is not profitable in Poland.

The problem of the loss of profitability of ATMs in recent years is seldom considered in research publications. The only thorough analyses of this problem are due to Górka (2011), who demonstrates that an analysis of Polish market data shows that reductions in the interchange fees collected from ATM cash withdrawal transactions have directly led to a sharp decline in the profitability of the ATM business for banks and independent ATM deployers. The independent deployers have recently been the main driving force behind the development of the ATM network in Poland. In the case of Poland, the possibility of charging special ATM transaction convenience fees does not necessarily mean that such fees will be charged to consumers. However, they would help stimulate the market. In 2011, interchange fees were low. Górka stressed that this discouraged both banks and independent ATM deployers from investing in the development of the ATM network despite consumer needs.

In Górka and Chodnicka (2012), a method is described to forecast the number of ATMs in Poland in the near future. They forecasted the further dynamic growth of the number of ATM networks in Poland in the future. In addition, Górka (2013) published an extensive contribution concerning an efficiency analysis of payment instruments in Poland. In this contribution, the management of cash and non-cash transactions in Poland and approximation of the costs of particular payment instruments are also considered.

One of the first contributions with respect to the management of ATM networks in Poland is the PhD thesis by Zajączkowski (2013). The author attempted to build a complex model of the functioning of ATM networks, both at bank branches and those owned by independent deployers.

Bjørndal et al. (2004) discussed the cost allocation of ATMs from a mathematical point of view. They considered a situation in which a group of banks would connect their ATMs in a network. The banks' customers may use the ATMs of any bank in the network. The problem studied is that of allocating the total transaction costs arising in the network among the participating banks. The situation is modeled as a cooperative game with transferable utility. The authors proposed two allocations and discussed their relationship to the core and other well-known solution concepts as well as to population monotonicity.

We did not find any contributions concerning the number of withdrawals from particular ATMs from the selected ATM network. To the best of our knowledge, the contribution by Gurgul and Suder (2016) is the only work based on original data of this type. It is concerned with the seasonal and calendar effects for time series of the number of withdrawals in selected ATMs in the Malopolskie and Podkarpackie provinces (comp. Gurgul and Suder, 2016).

The general tendency on the bank market changes (both cash and cashless) is not comfortable for independent ATM deployers. The main reason is the declining number of withdrawals from ATMs and increasing number of cashless transactions. One way to manage this problem is replacing ATMs at non-profitable localizations (where the number of withdrawals is below the level of profitability) to places where the number of withdrawals is greater than 3500 monthly.

In our paper, we try to indicate the types of localizations that may occur to be profitable for owners as well as those that bring losses. An analysis of the deployers who know the number of withdrawals is not difficult; however, scientists' knowledge of these problems with respect to the functioning ATM market is important. A lack of publicly available data about withdrawals does not allow us to conduct a respective analysis. To the best knowledge of the authors, they are not available contributions to this subject.

2. Structure of location of selected ATMs

In our paper, we analyze the number of withdrawals from ATMs managed by one of the largest networks of ATMs in Poland. This data is from ATMs installed in the Malopolskie and Podkarpackie provinces. We analyze the daily number of withdrawals from selected ATMs during the time period of January 2011 to December 2012. The total number of ATMs whose volume of withdrawals was analyzed amounts to 254.

Although the presented data is from the period of 2011–2012, we can draw the conclusion (based on Figure 3) that the overall number of withdrawals from ATMs in Poland during this period does not differ significantly from the number of withdrawals from ATMs in 2016. Assuming that the distribution of withdrawals for the particular locations remained approximately the same as in 2011–2012, we can consider the used data to be representative of the present data.

The goal of this paper is to find the impact of ATM location on the profitability of its functioning. In order to establish whether a certain type of localization has an effect on its profitability, we introduce some categories of locations.

Since our data comes from two provinces, one location criterion is the province in which a given ATM is located. A further type of location introduced by the network of ATMs refers to the type of surrounding where the ATM is placed. The network defined some types of locations. In Table 1 are the defined locations and numbers of ATMs in both provinces in these locations. The only criterion for a given location to be considered in the table are that there are at least two ATMs at this place.

Table 1

Number of ATMs in given types of locations in both provinces

Location type	Malopolskie		Podkarpackie		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Bakery/Patisserie	6	3.03	0	0	6	2.36
Bank branch	49	24.75	26	46.43	75	29.53
Factory	2	1.01	0	0	2	0.79
Hypermarket	25	12.63	8	14.29	33	12.99
Hotel	3	1.52	0	0	3	1.18
Office building	3	1.52	0	0	3	1.18
On Street	4	2.02	1	1.79	5	1.97
Other	2	1.01	1	1.79	3	1.18
Petrol station	24	12.12	2	3.57	26	10.24
Pharmacy	2	1.01	1	1.79	3	1.18
Residential	2	1.01	0	0	2	0.79
Restaurant	2	1.01	0	0	2	0.79
Service point	3	1.52	0	0	3	1.18
Shop	33	16.67	6	10.71	39	15.35
Shopping center	33	16.67	11	19.64	44	17.32
Transport	3	1.52	0	0	3	1.18
University	2	1.01	0	0	2	0.79
Total	198	77.95	56	22.05	254	100

Source: own elaboration

From Table 1, it is visible that more than 75% of the ATMs under study are located in the Malopolskie province. Taking into account the types of locations, approximately 29% are in bank branches. The next most popular locations are those connected with shopping: shopping centers (17.32%), shops (15.35%), and hypermarkets (12.99%).

The listed types of locations are the main criterion for the clustering of ATMs. However, in the present study, we introduced two additional criteria of the clustering of ATMs.

The first refers to the number of inhabitants in a given locale.
We introduced five categories of place sizes:

– Class I – populations of up to 20,000 (i.e., villages and small towns);
– Class II – populations from 20,001 to 50,000 (i.e., moderately sized towns);
– Class III – populations from 50,001 to 100,000 (i.e., large towns);
– Class IV – populations from 100,001 to 200,000, (i.e., large cities, such as Rzeszow and Tarnow);
– Class V – populations of 200,001 or more (i.e., Krakow).

In Table 2 is the information that 57% of the ATMs were located in Krakow (Class V). The smallest percentage of ATMs (below 4%) was found in places with populations below 20,000.

Table 2

Number of ATMs in given places in both provinces in classes

City-size class	Malopolskie		Podkarpackie		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
I	10	3.94	1	0.39	11	4.33
II	23	9.06	15	5.91	38	14.96
III	9	3.54	14	5.51	23	9.06
IV	9	3.54	26	10.24	35	13.78
V	147	57.87	0	0	147	57.87
Total	198	77.95	56	22.05	254	100

Source: own elaboration

The last clustering of location is based on accessibility to ATMs in the given places. The places were clustered on the basis of the number of inhabitants per one ATM[1].

We introduced four classes of places:

– Class A – fewer than 1000 people per ATM;
– Class B – from 1000 to 1199 people per ATM;
– Class C – from 1200 to 1499 people per ATM;
– Class D – 1500 people or more per ATM.

[1] On the basis of data by the end of 2012.

In Table 3 is the data about the number of ATMs in the different classes of accessibility for both provinces. One can note that more than 61% of the analyzed ATMs were located in places with Accessibility B (i.e., places where there were 1000–1199 inhabitants per ATM). The smallest percentage of ATMs (below 8%) were found in places with the greatest accessibility. In addition, one can see in Table 1 that the deployers whose data was used do not install ATMs in places with the broadest accessibility.

Table 3

Number of ATMs in selected classes of accessibility in both provinces

Availability of ATMs class	Malopolskie		Podkarpackie		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
A	20	7.87	0	0	20	7.87
B	156	61.42	26	10.24	182	71.65
C	10	3.94	19	7.48	29	11.42
D	12	4.72	11	4.33	23	9.06
Total	198	77.95	56	22.05	254	100

Source: own elaboration

The clustering of ATMs according to type of location and size of the place where they are located enables us to test a hypothesis on whether the location of an ATM and the kind of place determines the pattern and number of withdrawals from a given ATM.

3. Impact of location on volume of withdrawals

One of the main problems of ATM network deployers is the selection of the proper locations of its ATMs. The location of an ATM should guarantee a high volume of withdrawals; i.e., more than 3500 withdrawals per month. In order to check whether the selected types of locations have a significant impact on the number of withdrawals from the ATMs located in these places, we calculated descriptive statistics of the average withdrawals from ATMs in selected clusters of locations. In order to better describe the structure of withdrawals, we conducted a more detailed analysis for four ATMs selected from different types of locations.

3.1. Analysis of four selected ATMs

In Table 4, the four locations of the four selected ATMs are described. In Figure 4, the monthly withdrawals from the given ATMs during the period of 2011–2012 are shown.

Table 4

Location of selected ATMs

ATM type	ATM 1	ATM 2	ATM 3	ATM 4
District	Malopolskie	Podkarpackie	Malopolskie	Malopolskie
City	Krakow	Rzeszow	Zakopane	Oswiecim
Location type	shopping center	bank branch	petrol station	restaurant

Source: own elaboration

Analyzing Figure 4, one can notice that the selected ATMs represent different types with respect to the profitability of their functioning. During the whole period at ATM 1 (i.e., 24 months), the volume of withdrawals was considerably greater than 3500. A quite different observation follows from a visual inspection of ATM 2. Here, in all of the months of 2011 and 2012, the number of withdrawals was approximately 2500 (i.e., lower than the level of profitability). In the case of ATM 3, the number of withdrawals was below the line of profitability in only in two of the months. This is the probable result of a smaller number of tourists in Zakopane during the months of March–April and October–November. At ATM 4, a number of withdrawals lower than 3500 occurred 9 times out of the 24 months taken into account. One can notice that the largest monthly fluctuations were at this ATM as well as at ATM 3.

From the perspective of a manager of an ATM network, the size of withdrawal during the selected months is not important; very important, however, is the average number of withdrawals per month during a given period. The number of withdrawals is directly reflected in the level of profitability of the functioning of the ATM under study. In Table 5, the basic statistics regarding the monthly withdrawals for the four selected ATMs are given.

The data from Table 5 indicates that, during the period under study (i.e., the period of 2011–2012), the deployers of ATMs 1 and 3 made a profit because the average number of withdrawals from these ATMs was more than 3500 monthly. In the case of ATM 4, the average number of withdrawals was about 3500, so the

functioning of this ATM was on the boundary of profitability. The functioning of ATM 2 (with an average number of withdrawals of 1100) was not profitable for the deployer.

Table 5

Basic statistics of monthly withdrawals for four selected ATMs

Descriptive statistics	ATM 1	ATM 2	ATM 3	ATM 4
Average	7902.8	1099.3	5185.9	3495.0
Minimum	6515	953	3302	2741
Maximum	9650	1248	9327	4047
Standard deviation	664.0	87.9	1511.4	325.0
Coefficient of variation [%]	8.4	8.0	29.1	9.3

Source: own elaboration

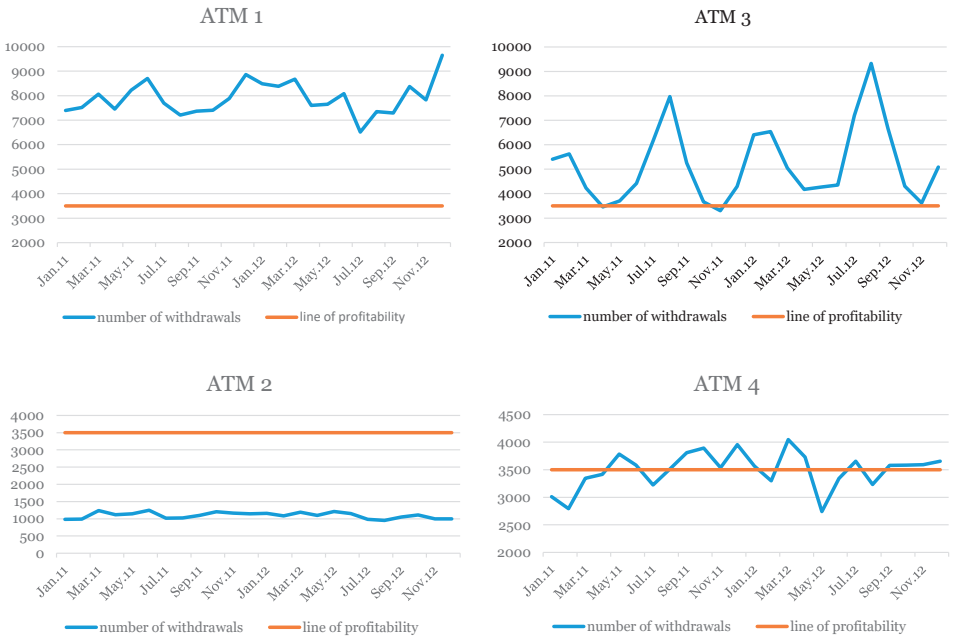

Figure 4. Number of withdrawals from four ATMs

3.2. Analysis of all ATMs in location clusters

The analysis of the number of withdrawals from the four selected ATMs showed that the profitability of the functioning of these ATMs depends strongly on their type of location. In order to verify this hypothesis, all 254 ATMs were analyzed; the results were presented for all ATMs originating from the same types of locations. For three location categories (i.e., type of location, size of place, and availability of ATM), the results for both provinces were presented together and separately. The analysis was based on the monthly averages of withdrawals from the ATMs.

Category "type of location"

In Table 6, the results of the analysis of the number of ATMs in particular types of locations are presented where the average number of withdrawals exceeded 3500. One can notice that all ATMs located in pharmacies, residential areas, and universities in Malopolskie exhibit average numbers of withdrawals above the boundary of profitability. Considerable percentages of ATMs in shopping centers (93.9%), hypermarkets (88%), and bakeries (83.3%) also exhibit withdrawals numbering over 3500 monthly. Profitable locations are also at shops and service points. In these locations, the percentage of profitable ATMs amounts to 70%. In the case of the remaining locations, the number of ATMs with more than 3500 withdrawals was not more than 50%.

The least profitability of the functioning of the exhibited ATMs were located in the "transport" (0%) and bank branch (22.5%) types of location. In Malopolskie, more than 60% of the installed ATMs exhibit an average number of withdrawals of more than 3500. In Podkarpackie, only two location types are profitable: "on the street" (100%) and in hypermarkets (75%). In the first case, it is difficult to draw general conclusions because observations were made on only one ATM. In Podkarpackie, only 17 out of 56 ATMs exhibited average monthly withdrawals of over 3500. Because a considerable number of the ATMs are located in Malopolskie, the total results for both provinces are similar to those of Malopolskie.

Information about the percentage of ATMs that make a profit in a given location can be one of the determinants of "profitability" at a planned location. However, this information may not give the full picture if the average number of withdrawals from ATMs exceeds 3500 (criterion of profitability) or not. Therefore, in Table 7, the main descriptive statistics for ATM withdrawals for all types of locations are presented.

In 13 out of the 17 types of locations in Malopolskie, the average number of withdrawals amounted to 3500 or more. The largest averages (more than 6000 withdrawals monthly) were for residential and shopping center locations. The four locations in Malopolskie with an average number of withdrawals below the level of profitability were bank branches, factories, hotels, and transport.

Table 6

Number of ATMs and percentage for which average number of withdrawals in selected locations is greater than 3500 in dependence of type of location

Location type	Malopolskie			Podkarpackie			Total		
	Number of ATMs	Number of ATMs with averages over 3500	Percentage of ATMs with averages over 3500	Number of ATMs	Number of ATMs with averages over 3500	Percentage of ATMs with averages over 3500	Number of ATMs	Number of ATMs with averages over 3500	Percentage of ATMs with averages over 3500
Bakery/patisserie	6	5	83.3	0	×	×	6	5	83.3
Bank branch	49	11	22.5	26	3	11.5	75	14	18.7
Factory	2	1	50.0	0	×	×	2	1	50.0
Hypermarket	25	22	88.0	8	6	75.0	33	28	84.9
Hotel	3	1	33.3	0	×	×	3	1	33.3
Office building	3	1	33.3	0	×	×	3	1	33.3
On street	4	2	50.0	1	1	100.0	5	3	60.0
Other	2	1	50.0	1	0	0.0	3	1	33.3
Petrol station	24	11	45.8	2	0	0.0	26	11	42.3
Pharmacy	2	2	100.0	1	0	0.0	3	2	66.7
Residential	2	2	100.0	0	×	×	2	2	100.0
Restaurant	2	1	50.0	0	×	×	2	1	50.0
Service point	3	2	66.7	0	×	×	3	2	66.7
Shop	33	24	72.7	6	2	33.3	39	26	66.7
Shopping center	33	31	93.9	11	5	45.5	44	36	81.8
Transport	3	0	0.0	0	×	×	3	0	0.0
University	2	2	100.0	0	×	×	2	2	100.0
Total	198	119	60.1	56	17	30.4	254	136	53.5

Source: own elaboration

Table 7

Basic statistics for averages of number of withdrawals from ATMs in the same type of location

Location type	Malopolskie				Podkarpackie				Total			
	average	coefficient of variation [%]	Min.	Max.	average	coefficient of variation [%]	Min.	Max.	average	coefficient of variation [%]	Min.	Max.
Bakery/patisserie	4478.1	23.5	3189.1	6032.5	×	×	×	×	4478.1	23.5	3189.1	6032.5
Bank branch	2451.3	54.6	372.2	6394.9	1874.7	59.6	482.1	4915.8	2251.4	57.2	372.2	6394.9
Factory	3002.4	41.4	2124.3	3880.6	×	×	×	×	3002.4	41.4	2124.3	3880.6
Hypermarket	5516.1	36.2	2778.8	11531.1	4343.0	37.3	1642.9	6955.6	5231.7	37.4	1642.9	11531.1
Hotel	3293.9	89.2	622.5	6440.9	×	×	×	×	3293.9	89.2	622.5	6440.9
Office building	3732.8	34.6	2781.8	5201.6	×	×	×	×	3732.8	34.6	2781.8	5201.6
On street	4559.2	32.3	2798.7	6076.4	6621.0	×	6621.0	6621.0	4971.6	31.6	2798.7	6621.0
Other	4656.5	48.4	3064.5	6248.5	3322.3	×	3322.3	3322.3	4211.8	42.0	3064.5	6248.5
Petrol station	4089.9	47.3	2159.1	9539.7	2902.1	9.7	2703.5	3100.6	3998.6	47.1	2159.1	9539.7
Pharmacy	5573.8	41.9	3921.8	7225.7	2614.2	×	2614.2	2614.2	4587.2	51.8	2614.2	7225.7
Residential	6319.8	5.0	6096.7	6542.9	×	×	×	×	6319.8	5.0	6096.7	6542.9
Restaurant	3938.7	15.9	3495.0	4382.3	×	×	×	×	3938.7	15.9	3495.0	4382.3
Service point	4595.4	48.9	2987.5	7163.5	×	×	×	×	4595.4	48.9	2987.5	7163.5
Shop	4645.6	31.4	2601.2	7779.1	3461.1	26.8	2334.1	4744.7	4463.4	32.4	2334.1	7779.1
Shopping center	6144.7	38.1	2655.2	13224.0	4529.2	44.7	2262.3	8171.2	5740.8	41.0	2262.3	13224.0
Transport	3317.1	8.5	2993.3	3494.6	×	×	×	×	3317.1	8.5	2993.3	3494.6
University	3961.2	15.3	3534.0	4388.4	×	×	×	×	3961.2	15.3	3534.0	4388.4
Total	4328.7	49.7	372.2	13224.0	3079.2	59.1	482.1	8171.2	4053.2	52.9	372.2	13224.0

Source: own elaboration

In most cases, we observe moderate values of the coefficient of variability; i.e., for the majority of locations, the differentiation of mean withdrawals is not very high. Therefore, we can assume that the calculated averages can represent all ATMs in a given location. In general, the results from Table 7 for Malopolskie confirm the conclusions from an analysis of the results from Table 6.

Solely for ATMs located in petrol stations, the first analysis indicated that fewer than half of the ATMs in these locations make a profit. Therefore, this location seemed to be not very good. However, the average for the total number of ATMs is considerably greater than 3500. This indicates that the installation of ATMs at petrol stations makes sense (it is profitable). On the basis of the total results for Malopolskie, we draw the conclusion that the installation of ATMs in Malopolskie is profitable, with an average monthly volume (number of withdrawals) of more than 4300.

The results in the analysis of averages for Podkarpackie confirm the results from Table 6. There is only one exception – shopping centers. In this type of location, the number of ATMs that bring profits is below 50%; however, the average number of withdrawals at this location is considerably greater than 3500.

The level of differentiation of the averages for all location is low or moderate. This means that, at a given location, we cannot observe considerable deviations from the average.

To summarize this part of the analysis, one can say that, taking into account all locations with five or more ATMs, only the ATMs at bank branches exhibited volumes below the expected volume (necessary to assure the profitability of ATMs). This is true for both provinces under study.

The most profitable locations (high average of monthly withdrawals) are hypermarkets. For locations with five or fewer ATMs, they were not profitable in factories, hotels, nor transport. However, because of the small sample size, these results cannot be considered as a general rule.

Category "size of place"

Taking into account Table 8, we see that, for Malopolskie in this category of location, the most-profitable location is Krakow (Class V). Nearly two-thirds of the ATMs in Krakow exhibit average monthly numbers of withdrawals over 3500. The results of the profitability assessment of ATMs in small or very small places are similar; the percentage of profitable ATMs is approximately 50%. The lowest percentage of profitable ATMs can be found in large and very large towns. (Categories III and IV). For the Podkarpackie province, the only profitable locations are in very small places; however, this conclusion is made regarding only one ATM, so this conclusion cannot be generalized. The same conclusions can be made from Table 8, taking into account both provinces jointly: most profitable locations are in Krakow and the smallest places.

The conclusions drawn from Table 8 are confirmed by the results in Table 9. The mean number of withdrawals from ATMs in Krakow is over 4600. The deviation from the average is not high; therefore, this number is representative for Krakow. However, one should take into account that there are also ATMs whose functioning is not profitable in Krakow (the minimum of the monthly averages in Krakow amounts to 372.2). Also, for the ATMs in Categories I and II, the average is greater than 3500. In the rest of the cases, none of the averages were greater than the value of profitability (at least 3500 withdrawals monthly). The results in Table 9 for both provinces under study are analogous to Table 8 (the profitability of ATMs installed in Krakow and the smallest places). The profitability of ATMs in small places is close to the boundary of profitability.

Table 8

Number of ATMs and percentage for which average number of withdrawals in selected locations is greater than 3500 in dependence of type of size of place

City-size class	Malopolskie			Podkarpackie			Total		
	Number of ATMs	Number of ATMs with averages over 3500	Percentage of ATMs with averages over 3500	Number of ATMs	Number of ATMs with averages over 3500	Percentage of ATMs with averages over 3500	Number of ATMs	Number of ATMs with averages over 3500	Percentage of ATMs with averages over 3500
I	10	5	50.0	1	1	100.0	11	6	54.5
II	23	12	52.2	15	3	20.0	38	15	39.5
III	9	3	33.3	14	4	28.6	23	7	30.4
IV	9	2	22.2	26	9	34.6	35	11	31.4
V	147	97	66.0	0	x	x	147	97	66.0
Total	198	119	60.1	56	17	30.4	254	136	53.5

Source: own elaboration

Table 9

Basic statistics for average number of withdrawals from ATMs installed in places of same size

City-size class	Malopolskie				Podkarpackie				Total			
	average	coefficient of variation [%]	Min.	Max.	average	coefficient of variation [%]	Min.	Max.	average	coefficient of variation [%]	Min.	Max.
I	3583.9	36.6	1281.1	5201.6	5885.04	×	5885.04	5885.04	3793.1	37.5	1281.1	5885.0
II	4015.8	44.7	1240.3	8409.8	2643.31	62.02	792.75	6471.17	3474.0	53.1	792.8	8409.8
III	2888.6	65.4	1012.7	7019.2	2709.56	47.81	1053.71	4867.96	2779.6	54.5	1012.7	7019.2
IV	2957.3	54.7	623.3	6243.9	3421.82	60.53	482.083	8171.17	3302.4	59.1	482.1	8171.2
V	4600.4	48.3	372.2	13,224.0	×	×	×	×	4600.4	48.3	372.2	13,224.0
Total	4328.7	49.7	372.2	13,224.0	3079.21	59.14	482.083	8171.17	4053.2	52.9	372.2	13,224.0

Source: own elaboration

Category "ATM availability"

An analysis of Table 10 convinces the reader that, among ATMs from the category of Availability B for Malopolskie (i.e., 1000–1200 people per ATM), these are the highest number of ATMs making a profit for ATM network deployers. This observation can follow from the fact that Krakow belongs in this category. In the case of Malopolskie, the least "profitable" ATMs are located in the classes with the highest availability. For the Podkarpackie province in all categories of availability, the percentage of the number of ATMs with an average number of withdrawals of more than 3500 is less than 50%. An analysis of the results for both provinces jointly suggests that ATMs are profitable only in the "very small" and "small place" availabilities.

These conclusions are in line with the data in Table 11. For Malopolskie, ATMs are profitable in Classes A, B, and C. For Podkarpackie, none of the averages were greater than 3500. For all ATMs jointly, we received averages above the level of profitability in the places belonging to Classes A and B.

Recapitulation of analysis for given types of locations

During the analyzed period, only 53.5% of ATMs managed by the ATM network and installed in the given regions made a profit during the period of 2011–2012. The average monthly number of withdrawals was more than 4000; i.e., at least 500 more than the break-even mark. In general, the ATMs installed in Malopolskie are more profitable than those in Podkarpackie.

Summarizing the results of analysis for the remaining location criteria, we can draw a general conclusion that the source of the greatest profits are ATMs located in hypermarkets and shopping centers in Krakow. The sources of deficits are ATMs installed at bank branches in moderate and large places with large and very large availabilities. In order to make the conclusions more precise, the average numbers of withdrawals in the selected types of locations with respect to the size of place and availability of ATMs at a given place are inserted in Tables 12 and 13.

The results in Table 12 confirmed our earlier hypotheses. The installation of ATMs in hypermarkets is profitable regardless of the size of the place. This is the only location in all of the types of places in which the installation of ATMs is always profitable. In the case of shopping centers, the functioning of ATMs in average places is not profitable. In petrol stations, one can expect profits in ATMs installed in the smallest places and in Krakow. For a number of ATMs greater than or equal to five, good results are exhibited by ATMs installed close to bakeries/patisseries in Krakow and ATMs from the "on the street" category. In the last category independent of place, the average number of withdrawals is more than 3500. Not profitable ATMs are due to our criterion functioning at bank branches; this is true independent of size of place.

Table 10

Number of ATMs and percentage for which average number of withdrawals in selected locations is greater than 3500 in dependence of class of availability of ATMs in given place

Availability of ATMs class	Malopolskie			Podkarpackie			Total		
	Number of ATMs	Number of ATMs with averages over 3500	Percentage of ATMs with averages over 3500	Number of ATMs	Number of ATMs with averages over 3500	Percentage of ATMs with averages over 3500	Number of ATMs	Number of ATMs with averages over 3500	Percentage of ATMs with averages over 3500
A	20	10	50.0	0	×	×	20	10	50.0
B	156	100	64.1	26	9	34.6	182	109	59.9
C	10	5	50.0	19	3	15.8	29	8	27.6
D	12	4	33.3	11	5	45.5	23	9	39.1
Total	198	119	60.1	56	17	30.4	254	136	53.5

Source: own elaboration

Table 11

Basic statistics for average number of withdrawals from ATMs installed in place from same class of availability

Availability of ATMs class	Malopolskie				Podkarpackie				Total			
	average	coefficient of variation [%]	Min.	Max.	average	coefficient of variation [%]	Min.	Max.	average	coefficient of variation [%]	Min.	Max.
A	3680.8	35.3	1281.1	5762.0	×	×	×	×	3680.8	35.3	1281.1	5762.0
B	4501.7	49.7	372.2	13,224.0	3421.8	60.5	482.1	8171.1	4347.4	51.5	372.2	13,224.0
C	4136.5	57.5	1240.3	8409.8	2568.2	55.9	792.7	6471.1	3109.0	62.0	792.8	8409.8
D	3319.9	48.3	623.3	6243.9	3152.0	54.8	1113.5	5885.0	3239.6	50.3	623.3	6243.9
Total	4328.7	49.7	372.2	13,224.0	3079.2	59.1	482.1	8171.1	4053.2	52.9	372.2	13,224.0

Source: own elaboration

We cannot draw reliable conclusions for the other types of locations because the samples were too small. However, one can say that, taking into account the classes of sizes of places, the most profitable functioning of ATMs is in Krakow.

Table 12

Average number of withdrawals from ATMs installed in place of same size in dependence of type of location

Location type	City size class				
	I	II	III	IV	V
Bakery/patisserie	×	×	×	×	4478.1
Bank branch	1686.27	2041.47	2049.37	1631.27	2698.66
Factory	×	2124.25	×	×	3880.63
Hypermarket	5885.04	4870.69	4210.47	4289.32	5726.05
Hotel	×	×	×	×	3293.89
Office building	4208.31	×	×	×	2781.75
On street	×	5408.83	×	6621	4276.03
Other	×	×	×	3322.33	4656.5
Petrol station	3651.23	3342.22	3100.63	2703.54	4304.84
Pharmacy	×	×	×	2614.17	5573.75
Residential	×	×	×	×	6319.77
Restaurant	×	3495.04	×	×	4382.29
Services point	×	×	×	×	4595.44
Shop	3928.65	4465.22	×	3271.13	4669.99
Shopping center	4961.79	5018.22	3200.9	4984.7	6522.35
Transport	×	3463.21	×	2993.33	3494.63
University	×	×	3534.04	×	4388.42
Total	3793.13	3474.03	2779.63	3302.38	4600.44

Source: own elaboration

Good profits are brought by ATMs installed in the smallest places. The ATMs in small and large places obtained results close to the boundary of profitability. The analysis demonstrated that the installation of ATMs in average places is not profitable.

In Table 13, the results of clusters with respect to the classes of availability of ATMs are inserted. Also, the previous results are confirmed here. For ATMs from Class A, the functioning of ATMs is only unprofitable at bank branches. Quite similar is in the case of places from Class B; here, the relatively low average monthly number of withdrawals was shown at the office building location. For the remaining types of places, one can find "profitable" locations. However, in places with the greatest availability of ATMs, the average number of monthly withdrawals from ATMs is considerably lower as compared to the two other classes.

Table 13

Average number of withdrawals from ATMs installed in place of same size of ATM availability in dependence of type of location

Location type	Availability of ATMs class			
	A	B	C	D
Bakery/patisserie	×	4478.1	×	×
Bank branch	1695.79	2349.5	1991.87	2346.53
Factory	×	3880.63	2124.25	×
Hypermarket	4870.69	5681.92	4102.19	3666.93
Hotel	×	3293.89	×	×
Office building	3215.04	2781.75	×	5201.58
On street	5408.83	4862.27	×	×
Other	×	4211.78	×	×
Petrol station	3514.23	4220.56	×	3100.4
Pharmacy	×	4587.22	×	×
Residential	×	6319.77	×	×
Restaurant	3495.04	4382.29	×	×
Services point	×	4595.44	×	×
Shop	4174.74	4520.11	4311.08	4626.67
Shopping center	4467.13	6064.69	4733.19	4531
Transport	3463.21	3494.63	×	2993.33
University	×	3961.23	×	×
Total	3680.76	4347.42	3109.01	3239.61

Source: own elaboration

4. Conclusions

The main goal of the research was to determine the location factors that impacted the profitability of ATMs installed in the Malopolskie and Podkarpackie provinces during the period of 2011–2012.

The conducted analysis showed that the functioning of the ATM network is much more profitable in Malopolskie than in Podkarpackie. For the category "type of location," the authors found those locations where the installation of ATMs was statistically profitable. For places with a large number of ATMs (only in this case can the analysis be assumed to be reliable), the functioning of ATMs in hypermarkets, shopping centers, and bakeries is definitely profitable. ATMs in bank branches appeared to be unprofitable; however, it is worth noting that this location is specific and the installation of many ATMs at this location can be justified in spite of the lower number of withdrawals. This assumption may follow from the fact that the costs of an ATM functioning at a bank branch may be lower than those outside the bank. Taking into account the types of places where ATMs are located, the most profitable ATMs are in Krakow as well as the small and smallest places. These are places with very low and low availabilities of ATMs.

The results of the profitability analysis for the particular locations of ATMs and the declining number of withdrawals from ATMs in recent years allow for the conclusion that activity on the market of ATM networks can be less and less profitable in the upcoming years. The decline of profitability mostly concerns main independent network deployers. They cannot introduce additional charges to their customers like bank deployers can. Although the number of ATMs grew from year to year through the end of 2016, the first information by the end of 2017 (comp. Sadowski, 2017) indicated that the number of ATMs in 2017 could decline as compared to 2016.

Most of the measures by independent deployers against further declines of profitability are not advantageous for customers; as a consequence, this may bring forth a negative reputation for the ATM network.

The first measure in the case of non-profitable ATMs is their relocation. However, relocation of ATMs from places with lower profitability to places of higher profitability where there are many withdrawals implies a lower availability of ATMs (the distances to the nearest ATM will be further). A second way is limiting the size of particular withdrawals. Large withdrawals are a source of higher costs and do not generate considerably higher profits. Also, this measure is not welcome by customers and can be a source of the loss of a firm's reputation. The next measure may be the establishment of additional fees for customers of banks with whom they cooperate. However, this decision may also be a source of decline for customers of ATMs and may be bad for business relationships with banks.

The next way of attaining additional profits may be the emission of advertisements during withdrawals from ATMs. It seems that this way of seeking additional profits may not be so harmful to deployers' relationships with customers as described above. However, according to empirical investigations, customers are not happy with the advertisements because the withdrawals take longer to complete (comp. Molga, 2015)

There is one method of increasing profits that is accepted by the customers of ATMs. This is an increase in the functionality of ATMs. Many ATMs allow withdrawals in foreign currency, top-ups of handy money transfers, and even the ability to apply for credit. More and more popular are the so-called dual-device cash recyclers. A cash recycler is a complex machine that handles a couple of simple but important tasks – accepting and dispensing cash.

It is not easy to assess the effectiveness of the deployers' measures in order to preserve the profitability of ATMs. This will be more visible in the upcoming years.

The obtained results are important for ATM deployers who are planning locations for their ATMs. In addition, our results may inspire a discussion about the future of ATM markets. Moreover, these results may help to find a way to avoid uninstalling ATMs in our country.

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Managing volunteer engagement in reference to empirical research

1. Introduction

In Human Resources Management (HRM), we can observe the growing popularity of work engagement issues and its expansion into other areas of application. The interest in work engagement is also reflected in scientific discourse, which explores this issue from various perspectives – psychological, social (relational), and organizational ones (Kirsch, 2010).

The social context supports the increasing importance of work engagement and indicates new areas of its use. Thus, increasing economic prosperity highlights social inequalities that on one hand show a great need for pro-social activities and on the other provides opportunities to engage at both the individual (e.g., volunteerism) and organizational levels (e.g., corporate social responsibility – CSR activities). This is a great challenge for today's management, especially in third-sector organizations. Moreover, there are relatively few studies and publications concerning these issues, particularly in Poland; therefore, their examination can be very useful for leaders of non-profit organizations.

The aim of this paper is to identify and explain the terminology and concepts existing in the literature concerning engagement, as it is often confused by the interchangeable use of the terms engagement, commitment, and involvement (Hallberg and Schaufeli, 2006), and to study this phenomenon among a group of volunteers involved in the organization of World Youth Days in 2016 in Poland (WYD). During the organization of this huge event, numerous signs of a strong organizational commitment were observed; but above all, individual

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engagement was evident, which manifested in great enthusiasm and zeal of action, the will to go beyond the minimum social requirements, and to do something for a group (a particular organization, community, church, homeland, humanity, etc.) (Mrówka, 2010). This event revealed an enormous potential of energy, creativity, and teamwork, which are invaluable resources of all kinds of social groups and organizations.

2. Engagement, commitment, and involvement – the same or different?

In the literature, the concept of engagement is understood differently depending on the considered context and conditions of its application. In many cases, it is limited to purely intuitive recognition. Another popular practice is to define the concept for specific research or activities. In the literature, terms such as commitment, involvement, and engagement can be identified. Although they seem similar, each of them is used in a different context (Hallberg and Schaufeli, 2006).

Thus, the term "commitment" is used in relation to the mutual relationship of an employee and an organization. It expresses the commitment in terms of a sense of duty and emotional attachment, mostly to the organization (Robinson et al., 2004). Therefore, it is often cited as an organizational commitment occurring in three basic varieties – affective commitment, continuance commitment, and normative commitment (Łochnicka, 2015).

Then, the term "involvement" focuses on the participation of the organization's members in the process of forming a structure and the functioning of the organization (Łochnicka, 2015). In the literature, it is often used as job involvement. In this regard, this construct characterizes an individual; however, the level of this involvement is mostly determined by the organization.

In contrast, the concept of engagement refers to the emotional relationship that occurs between an individual and a group, although the emphasis is on shared goals and values in this perspective (Vance, 2006). Therefore, it is mostly recalled as work engagement. The literature identifies three dimensions of engagement: intellectual engagement, affective engagement, and social engagement (The Insights Group Ltd., 2014).

Commitment and engagement are very similar, and this is why they are distinguished in some publications whereas some authors consider them to be identical (Ferrer, 2005).

When analyzing engagement from the organizational approach, there are two fundamental perspectives: from the employer's and the employee's points of view. For managers, it is important to create employee engagement, as it is

connected with employee loyalty and the higher quality of work and efficiency, which turns into increased profits. In addition, it releases the potential of knowledge, experience, and creativity, which leads to increased innovation and a competitive advantage (MacLeod and Clarke, 2009). Moreover, research indicates that work engagement is also related to greater efficiency and better economic results (Łochnicka, 2015) as well as higher customer satisfaction, which is crucial for building a competitive advantage (Corporate Leadership Council, 2004). Finally, when increasing work engagement, employees can achieve a higher level of satisfaction with their efforts, developing their competencies – gaining new experience and skills as well as achieving a sense of fulfillment and validity in their work (Łochnicka, 2015). In both cases, engagement goes beyond a purely financial and formalized kind of relationship.

3. Engagement of volunteers

Findings show that a company where sustainability and corporate social responsibility is a central part of the managerial culture may be more attractive to potential employees (Jones and Willness, 2013; Albinger and Freeman, 2000). Recent research shows that 76% of employees (mostly millennials) consider a company's social and environmental commitments when deciding where to work, and 64% will not take a job if a potential employer does not have a strong corporate social responsibility (WorldatWork, 2016). And among the most popular social responsible activities within a company, employees are often motivated to do voluntary work for the local community.

In this context, volunteerism becomes an extremely important phenomenon from the engagement point of view, as it goes beyond the financial incentives in practice. In socially responsible (SR) organizations, employees share similar values and goals with the organization, and by the strong engagement in volunteer work for the local community, they are proud of what they do (Jones and Willness, 2013). Therefore, volunteers are by definition involved individuals who are ready to invest their personal resources (strength, time, knowledge, experience, etc.) to do "something more" for the community or organization (Mrówka, 2010).

The economic and political transformation that took place in the '90s in Poland supported the development of formal volunteerism. The Act on Public Benefit Activity and Volunteerism of 2003 introduced the official definition of a volunteer and sanctioned the legal side of volunteerism. At the beginning of the 20th century, volunteerism in Poland was characterized by dynamic growth reflected by the steadily increasing number of volunteers (Gumkowska et al., 2004). The growing popularity of volunteerism in Poland also contributed to a greater

public awareness, which meant that people began to recognize their community involvement (broadly defined) in terms of volunteer work.

Therefore, the way voluntary work is perceived has been transformed. What is more, the increase in the amount of work is not necessarily directly proportional to the increase in the quantity of volunteers; in fact, this number may even be smaller. This is why it should be assessed by both the number of volunteers as well as the action that took place as well as their results when assessing voluntary work. The period of the dynamic increase in volunteerism (expressed in the number of volunteers) has led to the real development of these pro-social activities. In 2012, voluntary activities were declared by every fifth Pole; since that time, the percentage of volunteers in Poland has remained stable (at around 20%). Another dimension of the development of volunteerism shows the constantly increasing number of businesses that appreciate and use the work of volunteers (Fig. 1). In 2006, around 40% of organizations benefited from the work of volunteers; in 2015, this percentage reached 61% of all organizations (75% of foundations and 59% of associations) (Adamiak et al., 2015). It can be assumed that volunteerism in Poland is growing and is becoming very popular; therefore, there is a need for research covering this stream.

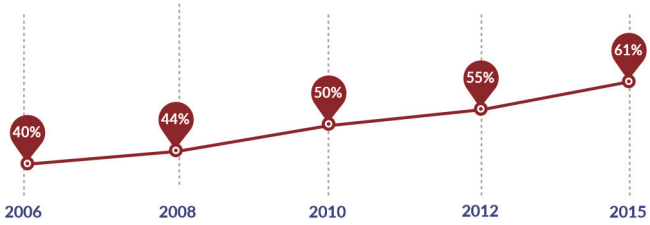

Figure 1. Percentage of organizations using volunteer work

Source: Adamiak et al, 2015.

4. Research methods

World Youth Days was an important event in the Church and in the society, and its organization in Krakow was a huge logistical and organizational challenge. It was financed by the voluntary offerings of the faithful of the Catholic Church in Poland and the contributions of pilgrims as well as sponsors. In terms of the proper administration, state authorities, transport and municipal organizations, and medical services were all involved to ensure security, proper logistics, and health. In the preparation and course of World Youth Days, many uniformed services were

involved; e.g., more than 20,000 police officers, nearly 20,000 firefighters and rescuers (PSP and TSO, respectively), nearly 1000 officers (BOR), nearly 12,000 border guard officers, and 5000 soldiers (Zasadzińska-Baraniewska et al., 2016).

World Youth Days was also a media event, as large media firms were involved in the organization and transmission of this event – Catholic Information Agency Sp. z o.o., Polish Press Agency SA, Polish Radio SA, Polish Television SA, and other smaller firms on a local scale. The WYD organization was supported by many sponsors and partners – the organizing committee of the WYD distinguished 27 different types of organizations and businesses and 13 supporting businesses and agencies of the public administration when sending a formal thanksgiving.

The nearly three-year period of preparation required a large amount of work performed mostly by volunteers. Therefore, a study of the volunteers who actively participated in the organization of World Youth Days can be a source of valuable information for the leaders guiding the work of volunteers for similar events (particularly because there is a research gap on this subject in Poland in the literature). This is why the research focused on an analysis of the engagement of volunteers in the context of their basic socio-demographic characteristics.

The research tool was a questionnaire survey consisting of main sections related to the engagement and future recommendations for managing and organizing similar events. The questionnaire contained 13 closed and 2 open questions. The sample was comprised of WYD volunteers from the area of Malopolska Province. Questionnaires were sent electronically via the coordinators and district offices, creating the organizational structure of WYD. In total, 220 returned questionnaires were obtained.

5. Empirical results

In the survey, three quarters of the respondents were women, which shows that, in the analyzed sample, volunteering women are more often engaged as compared to men. Almost half of the respondents were volunteers aged 19 to 25 years (45.2%), every fourth volunteer (24.7%) was in high school (16–18 years of age), and every fifth (19.6%) was more than 25 years old. The least numerous category of volunteers were high school students (10.5%) (Fig. 2). Middle school students were a very large group of supporting volunteers; however, they could not obtain volunteer status of WYD in its full meaning due to regulations[1].

[1] Adulthood was the condition of becoming a full volunteer.

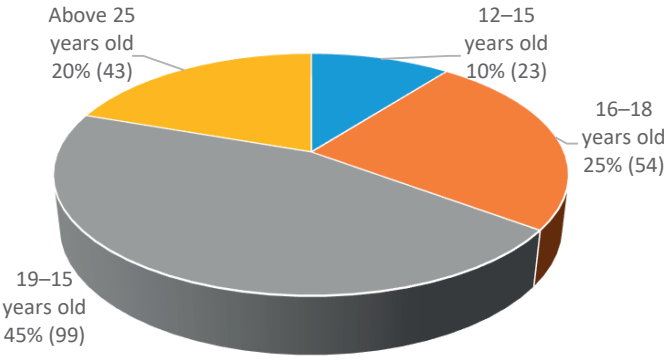

Figure 2. Age of WYD volunteers

Source: authors' own research

When it comes to family status, most volunteers came from families with two (33.9%) or three (28.9%) children. Of all the respondents, 14.7% had three siblings and 11.9% had four or more. Every tenth volunteer was the only child (10.6%). This family structure corresponds with the models adopted by Polish families.

The largest group of respondents was volunteers came from urban areas with more than 20,000 residents (41.9%), and the smallest group came from rural areas and small towns with 500 inhabitants and fewer (1.8%). In the other categories, the percentages of volunteers were at similar levels (11–17%) (Fig. 3).

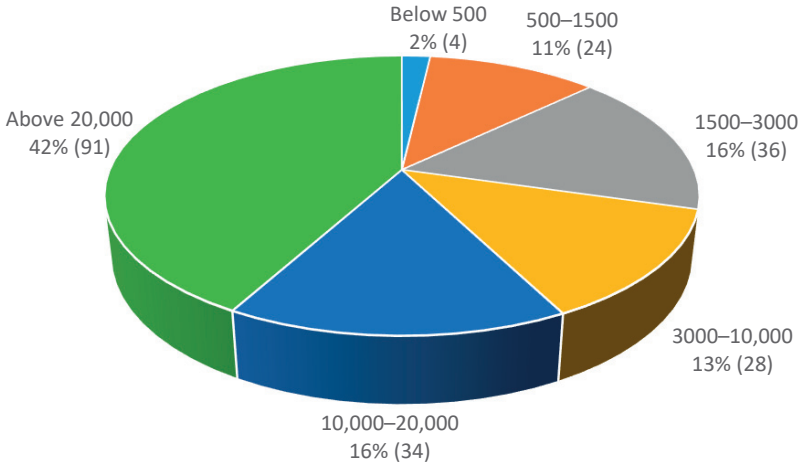

Figure 3. Number of inhabitants in places of residence of WYD volunteers

Source: authors' own research

An analysis of the research sample shows that the WYD volunteers were often those who have been already engaged in voluntary work in parish life. More than half of the respondents (52.8%) had taken an active part in various forms of voluntary activities for more than four years before WYD, and only 13% were not previously involved (Fig. 4).

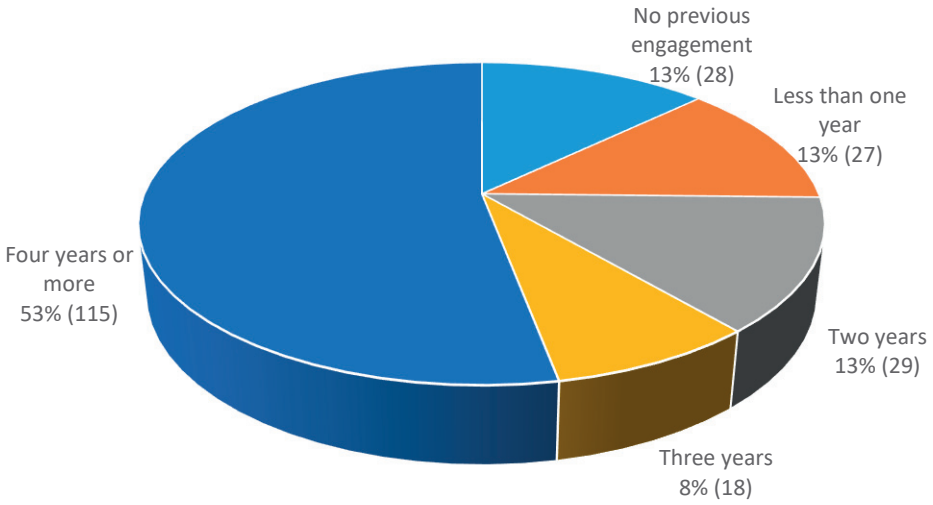

Figure 4. Period of previous engagement in voluntary work in parish life

Source: authors' own research

Moreover, this engagement was active rather than formal, because the vast majority (71.9%) always or almost always participated in regular meetings of their groups. The high degree of engagement evidenced by inclusion in most of the events organized by this group declared by 69.6% of the respondents (55.1% of them are often involved in the organization of these events, and 14.5% are involved as participants).

The WYD volunteer group was formed mainly by individuals who usually include a variety of additional activities in their daily routines. A lack of involvement to any initiative was declared by only 7.4% of the respondents. The most often undertaken activities by volunteers were those that aimed to develop their interests, such as playing, singing, art, sport, etc. (62.7%). Other forms of additional involvement were charities (36.4%), additional lessons (28.1%), activities of local government (25.3%), teaching support of younger colleagues (22.1%), and persistent volunteerism (16.6%) (Fig. 5).

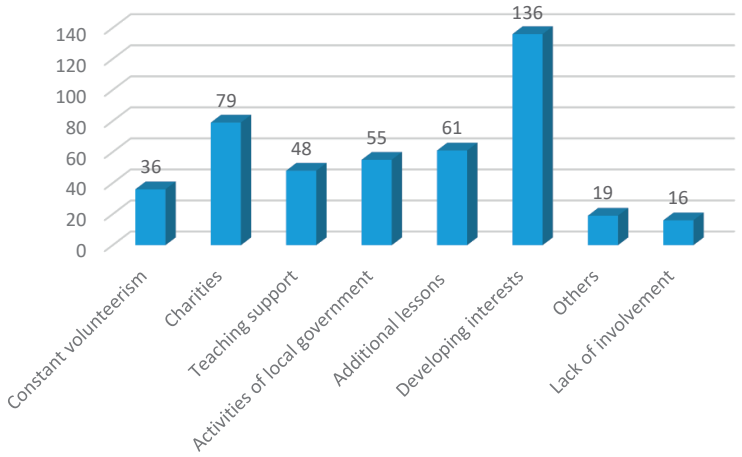

Figure 5. Other additional activities in daily routines

Source: authors' own research

When recruiting volunteers, among the most often mentioned reasons for voluntary activities was the desire to help (two-thirds of the respondents) and to participate in an historic event (59.4%). Many volunteers wanted to take the opportunity to do something important for the Church (55.7%) or for the country (24.7%). Some of the volunteers became engaged because of the influence of others (a priest or guardian – 20.5%, a relative or close friend – 16.4%, or a group of friends – 7.3%). Finally, some volunteers were looking for adventure (39.7%) or simply access to single events of WYD (25.1%), while others were guided by curiosity (26.9%) and even by boredom (0.9%) (Fig. 6).

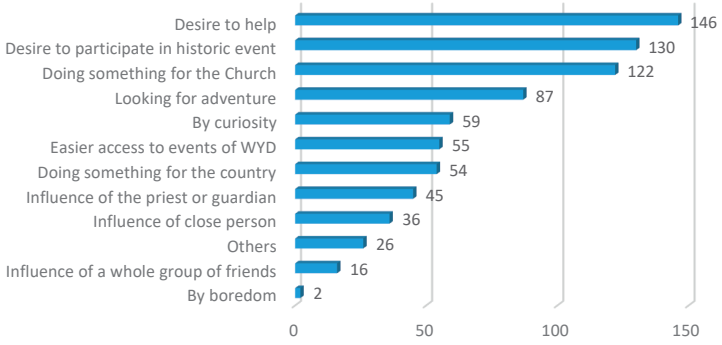

Figure 6. Reasons for WYD voluntary activities

Source: authors' own research

When analyzing the relationships between the different aspects of engagement, four gradable variables were included: the period of activity within the group, the frequency of participation in the meetings of this group, the degree of involvement in the events organized by this group, and the level of engagement in the organization of WYD. The strength of the links between them was analyzed on the basis of rank correlation coefficients (Spearman's rho, Kendall's tau, Goodman and Kruskal's gamma).

The tests did not show strong correlations between the levels of the different activity forms. The specific levels of significance between the particular indicators are shown in Table 1.

Table 1

Relationship between different aspects of engagement

Relationship	Spearman's rho	Kendall's tau	Goodman and Kruskal's gamma
The period of activity within the group – The frequency of participation in the meetings	0.371240***	0.321722***	0.448558***
The period of activity within the group – The degree of involvement in group events	0.427695***	0.374009***	0.528329***
The period of activity within the group – The level of engagement in WYD	0.034137	0.029630	0.046341
The frequency of participation in the meetings – The degree of involvement in group events	0.472506***	0.422172***	0.579024***
The frequency of participation in the meetings – The level of engagement in WYD	0.038625	0.033267	0.050899
The degree of involvement in group events – The level of engagement in WYD	0.174654**	0.157067***	0.240837***

Source: authors' calculations (*** $p = 0.01$ **$p = 0.05$)

The strongest positive correlation was observed between the variables relating to the ordinary activities of the group – participation in regular meetings and the degree that volunteers engage in events organized by this group. Based on this relationship, the gradation of the engagement phenomenon can be confirmed – as there are individuals more and less engaged in their work. Individuals characterized by a higher level of engagement (commitment) are willing to engage

in various possible activities, as the engagement in the activity seems to be itself important. On the other hand, individuals who are characterized by lower levels of engagement are more likely to select those activities and engage only in those activities that suit them (and only to the extent that it is convenient to them).

A slightly weaker relationship occurred between the period of membership in a group and participating in the events and between the period of membership in a group and attendance at meetings. This correlation indicated that, at least to some extent, the time of membership in a group is reflected in the level of commitment. This may be associated with a greater commitment to the group and a growing sense of responsibility for the group and its activity.

This level of dependence could be also affected by the maturity of the individuals. However, the independent variables in our sample (age and period of involvement in the activities of the group) did not show a correlation (coefficient of rank correlation: −0.006354 [Spearman's rho], 0.002513 [Goodman and Kruskal's gamma], 0.001765 [Kendall's tau]). However, we can distinguish two kinds of maturity in this case: the first one is connected with age and personal experience (personal maturity), and the second is connected with membership within a particular group (membership maturity).

More attention, however, should be paid to the statement of variables (which did not show any relationship). In any case, this refers to the variable characterizing the level of engagement in the organization of WYD, which was independent from the prior level of commitment (involvement) in a group (as shown by the results obtained).

The dependence coefficients between the engagement period in a group and the level of involvement in the WYD as well as between the frequency of participation in group meetings and the level of involvement in the WYD were statistically insignificant. This observed regularity (a very low correlation or its lack concerned with the involvement in the WYD organization) is worth emphasizing and suggests an interesting direction for future research. However, it does not entail binding conclusions.

WYD was an important event that mobilized people with different levels of prior engagement – including those who were previously uninvolved. On the other hand, there were also people whose strong engagement to the current activities of their groups did not translate into a high proportion of their involvement in the organization of WYD. In practice, this means that the recruitment should not be narrowed to only the existing activists when looking for co-workers in the organization of a major event.

A series of independence χ^2 tests were also carried out, testing the relationships between the engagement dependent variable and the socio-demographic variables. Although the criteria of fulfilling of assumptions has yet to be met

(required minimum multiplicity of individual cells) and the size of the empirical abundance tables was large, the χ^2 test was used with the Williams correction in the analysis. An interesting regularity was observed – all of the variables determining the level of engagement proved to be independent of gender, numbers of siblings, and sizes of the places of residence. However, each of them showed a dependence on the age variable at the same time.

6. Discussion and conclusions

Volunteer work seems extremely important for the younger generation and can sometimes even determine their acceptance of a job (WorldatWork, 2016). Therefore, many business organizations and non-profit organizations are incorporating volunteer programs for their employees. The growing popularity of volunteerism indicates that this kind of work can provide multi-dimensional benefits for all stakeholders (leaders, volunteers, and local communities) as well as for the organization itself. However, to make this possible, it seems necessary to study this phenomenon to discover the profile of the volunteers and most suitable management tools to effectively manage their engagement at work. This is especially true since there is a lack of similar research in Poland in the literature. This is why the event of World Youth Days that was organized in Krakow was a great opportunity to study voluntary work, as it showed the great potential of young people when engaging in volunteering work.

The results of the research showed that women, people aged 19–25, and those with one or two siblings were most often engaged in volunteerism for the WYD. Most volunteers came from larger towns and had already been a member of a particular group for a long time while also taking on a variety of other activities. The most commonly reported reasons for inclusion in the organization of WYD were the desires to help, to participate in an important historical event, and to do something for the Church. It can be assumed that the growing environment supports the strong pro-social attitudes and involvement in volunteers, as sensitivity to the needs of others is something obvious and natural for those respondents with siblings. In addition, the larger the town, the greater the recruitment environment for volunteerism.

Analysis of the research results allowed us to formulate the following recommendations useful for leaders of teams of volunteers. Research has shown that, within the volunteers' groups, it is possible to use professional and modern management methods; in fact, volunteers are looking for professional management methods. The level of a volunteer's engagement is determined by various factors. Some of those factors refer to the volunteer's personality and abilities, but most

are centered on the functioning of the team (the proper organization of the team) as well as around the leader of the team (his or her attitudes and actions). When looking at the first dimension of the group of factors that determine whether a volunteer join a group, the respondents indicated good work organization of the team (without excessive bureaucracy), a favorable atmosphere, and the strong cooperation of all members in achieving clearly defined objectives. Then, in the second dimension, respondents emphasized that a leader must above all be involved in the same work (functioning group). He or she must show a high level of responsibility, motivation, and enthusiasm in leadership that inspires others. A good leader should be proactive, take the initiative, and lead the way to achieve the goals while at the same time not imposing these goals and not forcing the method of its implementation. Moreover, the respondents indicated that a leader must be a determined and decisive person (capable of making decisions) and at the same time should be open to the voices of other volunteers (bottom-up ideas and initiatives). When creating volunteer engagement, it is crucial to show the importance of volunteer work by the leader; therefore, a personal invitation to cooperate and thanking each individual is essential when managing a team of volunteers.

This article showed that the phenomenon of engagement among volunteers should be explored, as there is a niche in the Polish literature in this area. Developing a leader's skills in managing a team is much easier than creating a real leader's engagement. Therefore, research in leadership skills and the management of teams of volunteers could be valuable. However, limiting the research only to these aspects would distance the volunteers' studies from the significant area of development of the management. A professional approach to leading a team of volunteers can influence volunteer engagement, translating into the better effectiveness of the whole team or organization.

7. Research limitations and implications

This research whose results are presented in this paper was a pilot study and is subject to certain restrictions. It should be noted that the survey method assumed entirely the voluntary and anonymous filling-out of questionnaires. Therefore, when interpreting the results, it is important to take into account the possibility of some kind of selectivity that might have accrued in the responses, which will help avoid overly general and categorical conclusions. Although the questionnaires were sent to all of the volunteers from the districts covered by the study (thus, their availability was the same for all), it can be expected that

the respondents were those who were strongly involved volunteers – more active than those involved only formally.

Moreover, the engagement of volunteers from NGOs and business organizations (employee volunteerism) is not necessarily comparable. The potential to volunteer in an activity may be satisfied in various way; e.g., in charity organizations, NGOs, religious organizations, or employee volunteerism. This research does not directly apply to employee volunteerism, although exploration of volunteer management in general will help to understand the processes and issues and will also be helpful in further research.

Due to the small sample size (220 responses), the reliability of the results obtained and the degree of fulfillment of the test assumptions are low. Therefore, in the future, the results can be verified based on a larger sample.

It would be desirable to continue similar studies – however, from a wider research perspective – taking into account not only individual events such as World Youth Days but also the ongoing management process that uses volunteer labor (in particular, organizations in the third sector). Results of such studies would provide more guidance for the strong engagement of volunteers and effective management and will lead to increased benefits for all stakeholders.

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Descriptive representation about transformation of company by using current technologies and tools for analytical processing and evaluation of diverse data

1. Introduction

Rapid development in the field of information and communication technology currently allows for the production of a number of various technologies that are beneficial for the support of managing employees in a company. This especially includes technologies (IoT, Industry 4.0, Big Data) that allow companies to obtain data as part of their performed processes. It was very difficult to obtain such data in the past and to react based on its information value to situations occurring in real time. As these technologies are also available for common consumers (i.e., customers), there comes a new era of production of data about customers whose data is available for a company (especially in the unstructured form). The information obtained from readily available, truthful, and relevant data represents a key source or input into the process of the decision-making of company managers in the present global economic environment, where managers must make correct and quick decisions (and not only on the local market). As the requirements of customers are constantly changing, obtaining information about the situation on the market is very important for a company, and such information influences the flexibility of the whole production process of a company. The problem comes when the companies do not realize the importance of the data available and the possibility of obtaining the data (e.g., the deployment of new technology to areas

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and processes of a company that currently do not generate data, etc.), decision support, and the associated need for the deployment of new technologies for their collection processing and analysis. Therefore, it is necessary to point out the possible available trends in the technological field and a model to illustrate the possibility of using them to obtain relevant information from the internal and external environment for decision support decision-making problem solvers. The Big Data technology was developed to capture and utilize large amounts of diverse data. The prosperity and flexibility of production companies do not depend solely on the satisfaction of customer needs and requirements, but the production process, optimization of company resources, and support processes must also be taken into account. Companies should therefore intervene in the field of the Internet of Things (IoT) and Industry 4.0. Information value received by means of the Big Data solution from data from IoT and Industry 4.0 interventions in combination with customer and market data of various natures can significantly affect the decision-making processes in favor of achieving strategic objectives of a company (increased profit, turnover, customer satisfaction, partner satisfaction, reduction of costs, etc.). In the current business environment, it is therefore necessary to clarify the importance of the available data and technologies generated for the support of decision-making in a company. Benefit article is a model representation of the use of technology trends to support the decision-making by managers of enterprises today in an environment where the business gain some competitive or other benefits depending on the ability to quickly and efficiently generate, capture, process and obtain relevant data in a short time value for a company's managers. The contribution of the article is also a statement that opens up space for discussion and further exploration of modern technologies (Big Data, Industry 4.0, IoT) as related to the effective strategy creation and strategic management of a company.

2. Main theoretical approaches

The development in the field of information and communication technologies and, at the same time, their availability for both companies and customers (end users) have caused a year-to-year growth in data volume by 40 to 50% in recent years, whereas companies are able to utilize only around 20% of this data. It is assumed that the volume of annually generated data will reach 35 zettabytes by 2020 (Datalan, 2013). Data can be generally divided into structured, semi-structured, and unstructured information. The pre-processing of unstructured data, its modification to be structured, and its subsequent storage is very important for its further exploitation (Wu et al., 2018).

Structured data is data stored in a typical relational database; i.e., data that has a clearly defined length and format. Of the total volume of the available data, this data represents approximately 20%. This data includes the following (Nemschoff, 2014; Meer, 2013):

– data from CRM and SRM company information systems,
– data entered by person (e.g., into a company information or database system), such as name, surname, and age,
– data from performed surveys, loyalty programs, and customer user accounts,
– user or customer ratings of products, services, employees, purchase process,
– all data a company collects as related to the performed transactions, online purchases, and purchases in brick and mortar shops,
– data compiled by third parties; i.e., the state, marketing agencies.

Semi-structured data does not have a clearly defined structure or form, but it reaches a certain level of arrangement (although it is not stored in a relational database). This data can, for instance, include the following (Rouse, 2014): identifiers of certain elements of text or parts thereof; tags in HTML (HyperText Markup Language) pages; logs in a computer network (logins and logouts).

Unstructured data represents the most significantly growing type of data. This data does not have a clearly defined structure or format. This means that its processing and utilization within company managing processes represents a demanding activity that cannot be performed by means of traditional company information systems with regard to time and financial costs. Unstructured data especially includes the following (Nemschoff, 2014): satellite and atmospheric images; current weather images; seismological images; sensory data; photographs and videos; radar and sonar data; data generated by social network users; various website content generated by users (such as blogs, videos, website content); text and voice messages, emails, etc.

It is apparent with regard to the nature of information that it can be assumed that the volume of especially unstructured data will continue to grow thanks to the development and availability of technology. This data can contain a significant information value for managing workers in the process of decision-making in a company. The findings of other authors also point to the essential significance of information for the support of decision-making in a company. Kubina et al. (2015) emphasize that information plays a key role for a company in its decision-making processes. Similarly, Chander et al. (2001) claim that information is required by the ubiquitous need for decision-making.

The basis for company success is currently satisfying the needs and requirements of the customer sooner and better than the competition under an optimal level of costs. As the requirements of customers constantly change, the processes

of a company need to be adapted to such changes. This is the reason why it is necessary to make relevant decisions that are to a large extent affected by the information obtained from the available data of a diverse nature. This means that data currently represents a basic component for the support of achieving the objectives of a company; they help it optimize processes as well as increase the efficiency and purposefulness of individual activities. A lot of diverse data has started to be generated, especially through the intervention of large global corporations such as Google and Facebook (Garlasu et al., 2013). Problems with their capture, processing, and real time utilization stimulated the development of the Big Data technology. This concept must also be developed for other large companies. A single information system that uses current technological tools for processing data into the form of utilizable information in real time is the objective of every organization (Štofková et al., 2016).

The basis for defining Big Data was introduced in 2001 by analyst Doug Laney, who described the amount of constantly increasing data by the term "3V," which means volume, variety, and velocity (Meer, 2014; Bezweek and Egbu, 2010). Characteristics of Big Data can be seen on the Figure 1.

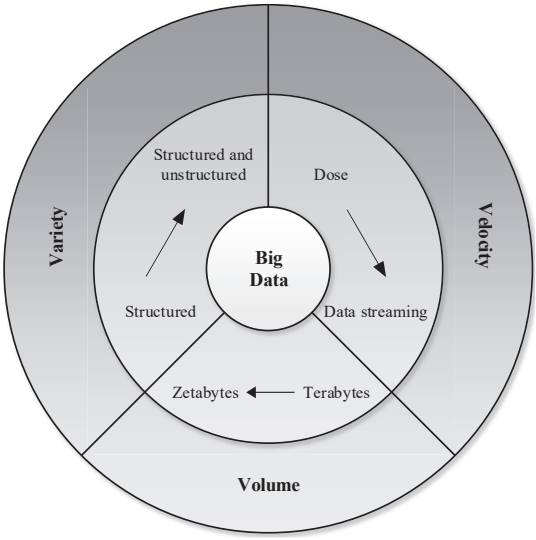

Figure 1. Characteristics of Big Data (Zikopoulos et al., 2011, Understanding Big Data)

Scientific research activity in the field of Big Data shows the diversity of opinions of various authors about this issue.

The term "Big Data" is characterized by a set of hardware and software tools that simultaneously process multiple data files that are voluminous, diverse, and

complicated to manage them using traditional techniques of data management (Romero et al., 2017). Big Data applies to data sets of sizes that are outside the abilities of current database systems to capture, store, process, and analyze them (Manyika et al., 2011). The term "Big Data" relates to the large volume of information coming from various sources such as transaction records, boot files, social media, sensors, third parties, web applications, etc. However, Big Data does not mean only large amounts of data but also exceptionally diverse data types distributed at various speeds and frequencies (Stanimirović and Mišković, 2014). Big Data is data requiring excessive amounts of time/space for storage, transfer, processing, and utilization from available sources (Yildirim et al. 2014). According to the IBM company, Big Data is defined by the following features (Collett, 2012):

– 1V: Volume represents a very large amount of collected data for analytical processing (e.g., Airbus aircraft generate 40 TB of data each half-hour; Twitter generates 12 TB of data daily; Facebook – 25 TB, etc.) (Drobný, 2012), which represents an opportunity for companies to summarily process voluminous data within one single database structure.
– 2V: Variety means that data is in both the structured and unstructured forms; i.e., data has the form of messages, images, GPS signals, and other data types generated by means of internet and telecommunication devices.
– 3V: Velocity means that data needs to be obtained and processed quickly (i.e., in real or almost real time), which allows companies to react flexibly to changes in the market or gain a competitive advantage.

The Big Data 3V concept was completed on the grounds of research by the IBM company by two more characteristics (Marr, 2014; Jain, 2016):

– 4V: Variability means the possibility of obtaining distorted outputs, as the processing of large amounts of varied data also includes the processing of much data containing noise or distortion (e.g., data from social networks).
– 5V: Value represents the value and accuracy of a large amount of diverse data that must be ensured in the whole system (in the interpretation of accumulated data) before the building of infrastructure and implementation of the Big Data solution for the achievement of improvement that can be measured every day.

The Big Data solution also contains various methods, techniques, and services by means of which it is possible to obtain, process, and transform much diverse data to information necessary to support decision-making. Currently, there are several providers of complex Big Data solutions. They are especially large companies focused on the creation of information systems for the support of company processes such as SAP, Oracle, or IBM. Big Data solutions therefore differ with regard to the

provided software equipment, available services, and functionalities. With large data volumes, the whole process from obtaining to the storing and handling of data must be sufficiently secured (Ma and Di, 2014). Security issues are solved by means of various supplementary products and services, which vary according to the solution supplier. Any company implementing a Big Data solution should therefore know which data it obtains and, according to its nature, implement such a Big Data solution that will also include the products and services necessary for securing the data. In general, the basic functionalities and supporting services of a Big Data solution include the following (according to Platform IBM Big Data 2015): Hadoop Analysis; Stream Computing; Data Storage; Information Integration and Control; Visualization and Exploring Data Values; Support of Application Development for Processing Voluminous Data; Administration and Monitoring of the whole Big Data System; and others. The companies are interested in acquiring valuable knowledge from Big Data technologies. The result of investing in business intelligence and using Big Data analysis is to understand the broader context (Muntean, 2018).

On the grounds of the findings of several authors, the Big Data issue can be understood as a complex set of methods, techniques, human resources, procedures, modern hardware and software equipment, analytical tools, and many supporting services that enable the capturing, storing, processing, and obtaining of the information necessary to support decision-making. Working with the quantities of diverse data in the Big Data solution is especially characterized by the speed of its processing or speed of obtaining relevant and true information for the need of decision-making by managers of a company. Such processing and utilization of data in support of decision-making can positively affect the finding of business opportunities and making the activities in all processes in a company more effective.

The significance of Big Data solutions for the support of the decision-making of managing workers in a company was verified in practice by several companies such as Walmart, Bank of America, Tesco, etc. The deployment and utilization of the Big Data solution resulted in the following (Plant 2014; Savvas, 2014; Davenport and Dyché, 2013):

– the possibility to analyze millions of terabytes of new information;
– taking into account information from unstructured data in the creation of product sales offers;
– more accurate mapping of the buying behavior of consumers;
– improvement of the margin and streamlining of operations in all company sections;
– almost immediate increase in sales;
– predicting the departure of clients and providing services to satisfy and keep them;
– saving approximately 100 million dollars on stock;

– acceleration of the identification of suitable localities for the placement of products, services, and equipment to hours (previously taking weeks);
– possibility to analyze approximately 200,000 variants for each car route in real time and selection of the most beneficial route;
– saving costs in the form of 10 million gallons of natural gas and reduction of carbon emissions by 100,000 tons;
– increase of profit and positive environmental impact.

Based on the previous assumptions, it can be assumed that the significance of utilizing quantities of diverse data by means of a Big Data solution is crucial for the support of company decision-making in almost all areas of company processes. The significance of Big Data solutions will grow in direct proportion to the growing volume of generated data. In addition to the said assumption that the volume of generated data will grow, this assumption can also be confirmed by the arrival of new technological trends in the forms of the Internet of Things and Industry 4.0. These trends aim at interconnecting the individual machines and equipment that generate data at the global (IoT) or industrial and local (Industry 4.0) levels. The aim of this interconnection is to obtain data from all of the equipment for the need of its analysis and transformation to the information necessary for decision-making.

3. Discussion and proposal for effective use of new technology in management

It can be assumed with regard to the development of technologies and trends in the field of IoT and Industry 4.0 that Big Data solutions will be utilizable as basic analytical platforms for capturing, storing, processing, analyzing, and distributing the transformed, truthful, and relevant information to the right places and at the right (real) time for the needs of performing the activities of automated machines or decisions of managers or other managing workers in a company. Links between Big Data solutions, IoT, and Industry 4.0 are shown in the following Figure 2.

Such arranged smart systems represent a new view of processes and performance in a company. Decision-making in a company is more and more interconnected with new data-processing technologies; managers make decisions on the grounds of outputs from such technologies. We face the transformation of a company where the value of the current technologies and tools has a significant impact on the management. Also, according to authors Kabir and Carayannis (2013), organizations should consider the knowledge hidden in Big Data as tacit knowledge and should take advantage of the cumulative experience garnered by the companies and studies.

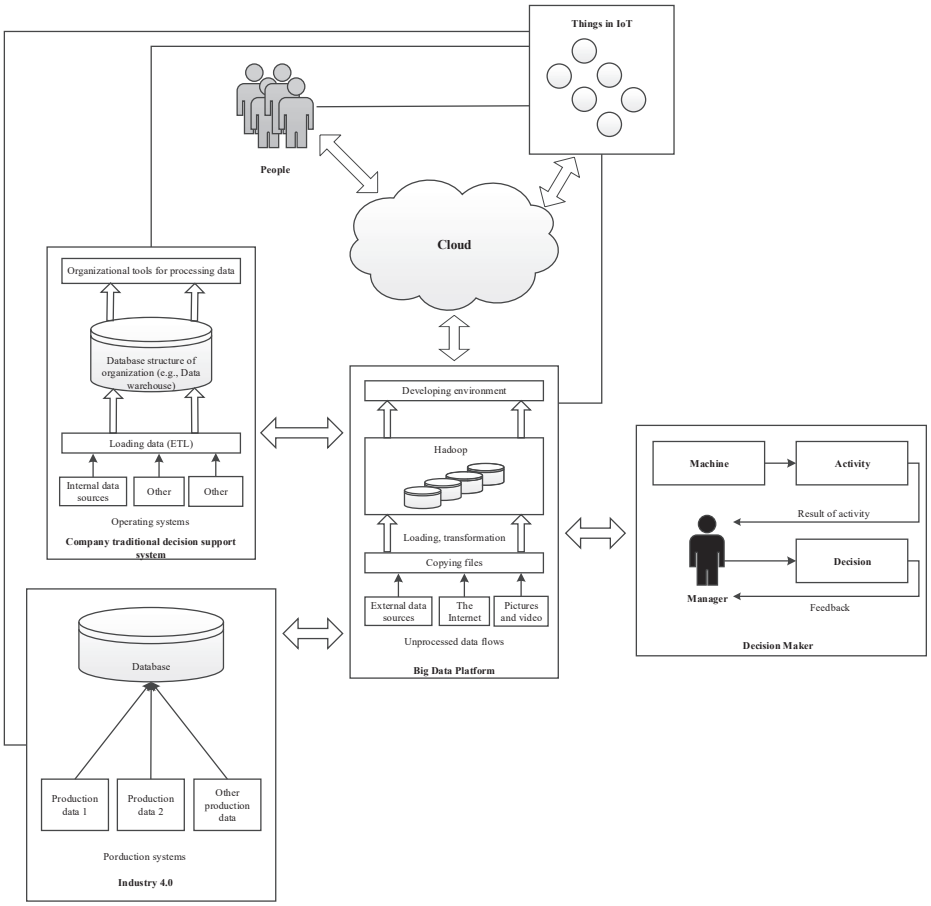

Figure 2. Emplacement of Big Data in IoT and Industry 4.0

Management should be currently directed more towards new technologies such as Big Data, Industry 4.0, IoT, and others. The influence of the globalization aspects moves the development of information and communication technology (Big Data) forward, which allows the processing of variety of data from the global environment, therefore providing the possibility of using them as decision support for the creation of cooperation (Koman et al., 2016). The data contains large amounts of knowledge. Knowledge about technologies as well as their hardware and software components must be managed. Zhuge (2002) points out the importance of executing, controlling, storing, and maintaining knowledge flow management in the development process. The increase of data in companies must be handled; the information value of such data affects the managing and decision-making processes

in a company; therefore, it is necessary (c) "to integrate data through a single system". A single integrated system for obtaining the necessary information for the support of decision-making leads to the "achievement of higher efficiency of an organizations' management". An important aspect in the mentioned integration is cooperation. "Cooperation among companies should in the present be based on a software model", interconnected with current ICT systems and Big Data technology, especially for the efficiency and purposefulness in management, task performance, and in decision-making. Data represents a huge potential for the creation of new useful business models (Štofková et al., 2016). Cooperation as part of a software model of companies helps to "define the relationship between technology and a manager". A manager not only manages people, plans, organizes, and performs managing processes (including control in an organization), but the manager especially makes decisions based on data ("hard decision-making") and his/her own experience ("intuitive decision-making"). New technology brings new information inputs into these processes. These new inputs must be interconnected with the processes in an organization from a technological perspective. Employees and managers (i.e., the human potential of a company) must be taught how to use these technologies. And "the most important activity is to know how to (a) capture and process this data". Data contains large amounts of knowledge; therefore, if it is correctly used in the provision of company processes (in company functioning; e.g., fluency of production, getting feedback from customers, and others), synergy can be achieved. Such a synergy represents added value – not only for information flow management but also for cooperative relationships between the internal and external processes of a company. The **synergy** that can be achieved in a company can represent the following aspects (further verification in practice is required):

- Economic aspects – common interactions captured as part of various economic indicators.
- Interaction and cooperative actions between company departments and processes (this can include both internal and external relationships).
- Concordance between the strategy and performance-controlled processes – setting of quantifiable criteria.
- Creation and support of new innovations.
- Improvement of human work conditions (automation of administrative activities).
- Utilization of modern advanced technologies that bring savings in energy, costs, and increases in quality.
- Larger production volume.
- Optimization of source recombination.
- Creation of new studies, new procedures, and new methods of using software products and technologies.

The utilization of diverse data and achievement of synergies has a significant impact on the field of **strategic management,** whereas the strategic approach should be perceived as a wide range of possibilities for solutions of certain problems and objectives. The current business environment is formed by companies that attempt to create such strategic moves that will strengthen competitiveness. Kim (2012) summarized previous ideas concerning the red and blue oceans of competitive fights as a strategic tool for evaluating unique values; i.e., strategic moves in certain areas for the strategy policy applied outside the framework of competition. A new key value in blue oceans should be identified here; namely, (b) **to implement new technologies and analytical tools into strategic decisions.** The strategic management of a company needs information on which the evaluation and decision-making in the activities of a company or group of companies is based. Strategic objectives, criteria, and initiatives help establish a better picture of the strategies and activities within cooperative organization forms. The strategic management of cooperative organization forms needs to reach the full potential of cooperation.

4. Conclusion

We can assume that a company that lacks an effective and purposefully functioning strategy and strategic management cannot win in the present competitive fight. It is important to use new tools and techniques for information processing in the strategy (Big Data, Industry 4.0, IoT) as active factors of influencing the strategic management of a company. The orthodox setting of strategic management can have unfavorable consequences for a company's results. It is necessary for current management to focus their attention on the necessity of innovation in the managerial decision-making and management of a company. Modern technologies in managing and decision-making in a company must be continuously developed and moved closer to available trends; therefore, the following statements should be directed for further examination of this issue:

The principal element for the provision of achieving measurable results from the decision-making processes in the strategic management of a company is the integration of all information sources into a single integrated analytical system for work with information from the available data (Big Data). A condition is the intervention of a company in the field of current modern technological trends of the future (IoT or Industry 4.0).

The strategic management of large companies and cooperation between their individual concerned subjects is significantly affected by data. This data is produced in the external environment and modern technological sets such as IoT or Industry 4.0.

The production of the said data in technologies is prompted by interconnections: people to people, machine to machine, and machine to people. Modern technologies generating data strengthen mutual communication. The obtaining and advanced processing of such data positively affects the effectiveness of cooperation of all concerned company subjects and causes the formation of synergies.
Strategic management by means of suitable data can produce better decisions.
The strategic management of companies needs information on which evaluation and decision-making in the cooperation and formation of synergy (synergy between the technology, technology and man, men) depends.

A further examination of the said claims can bring significant changes in the management as related to data-driven organization (data-flow management).

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Universal basic income. Theory and practice

1. Introduction

During the past few years, the world economy has accelerated technological progress, resulting in the widespread replacement of human labor with modern machinery and equipment. Researchers from the University of Oxford (Frey and Osborne) point out that about 47% of the jobs in the United States are exposed to high-risk computerization. Similarly, an Australian study published by the Committee of Economic Development of Australia (CEDA) indicates that around 40% of Australia's jobs are at high risk of computerization or automatization over the next 10–15 years (Don, 2016).

However, Arntz et al. (2016) argue that the mentioned share should be close to 9%. It is certain that computerization and automatization will undoubtedly replace many of the jobs currently being done by people, who would need to find other occupations in order to provide for themselves and their families (Arntz et al., 2016).

The possible inflow of computerization and automatization on employment varies by the occupation and sector. Activities most exposed to computerization and automatization concern physical work; in particular, operating machinery and preparing fast food. Collecting and processing data are two classes of activities that more and more can be prepared better and faster thanks to machines. This could displace large amounts of work. However, despite being automated, some occupations may not decline at all; employees may rather perform new tasks (Manyika et al., 2017).

As a result, there are growing fears about the future of employment, social welfare, and the financial stability of social security systems. In addition, tax systems that rely on income from work may be subjected to severe pressure because the

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machines replacing human labor do not pay taxes nor pay contributions to social security systems. Finally, technological changes can lead to increases in income inequality in society and the stronger polarization between the owners of capital and the labor force, especially for lower-skilled workers.

The Universal Declaration of Human Rights states that "everyone has the right to life, liberty, and security" and "the right to a standard of living that guarantees the health and well-being of him and his family." In response to this statement, the concept of a "basic income" was introduced, which should be a universal income offered to all persons in all countries.

The purpose of the article is to analyze the theoretical and empirical aspects of a universal basic income, with a particular emphasis on the origins and consequences of introducing this instrument. In the text, a research method based on literature studies in macroeconomics and economic policy as well as statistical and descriptive methods based on data provided by the Organization for Economic Co-operation and Development and the World Bank are used.

2. Core of universal basic income

A universal basic income (UBI), also called "citizen income," is a universal income granted to all members of the community without the need for work. First, the right to income and level of income are independent of the size and structure of the household. Second, a universal income is paid regardless of the income of citizens from other sources. Third, this income is granted without the need to do any work by the beneficiary of that income.

A universal basic income is a cash benefit paid by the government on a regular basis (on a monthly, quarterly, or annual basis). If a basic income reaches a level satisfactory to meet one's basic needs, the basic income is said to be full; if it is lower, it is a partial income (Fumagalli, 2014).

The fundamental idea of introducing a basic income is that all citizens regardless of their individual income receive a uniform amount of money from the state each month to meet their basic needs. As a result, all other state-provided social benefits such as unemployment benefits or child benefits are withdrawn. Such a basic income would be largely financed by the abolition of costs, which in some cases has highly complex social benefits (including related administrative expenses).

In addition to the direct payment of money to beneficiaries of a universal basic income, this instrument may take the form of a negative income tax (NIT). A negative income tax occurs in conjunction with the existing income tax system of a progressive nature. A negative income tax leverages the mechanism by

which tax revenue from people with incomes above the minimum is collected to provide financial assistance to people with incomes below that level. Hence, the taxable income of individual households is deducted from the basic income of their members. If the difference is positive, then the tax should be paid; if the difference is negative, the state pays the household.

In practice, the distribution of household incomes achieved with a universal basic income and a negative income tax is the same. Despite the obvious similarity of the above-mentioned mechanisms, a negative income tax may be less costly. This situation is due to the fact that, in the case of a universal basic income, there are two-way cash flows; one resulting from the payment of the basic income, and the other related to the payment of income tax. Moreover, in the case of a negative income tax, there is one household payment. On the other hand, a universal basic income is characterized by a certain advantage over a negative income tax, which results from the fact that each variant of a negative income tax needs to be supplemented by an installment system before the final tax settlement is reached at the end of the fiscal year. Additionally, despite the same distribution of income between households, the distribution of income within the household itself is more equal in the case of a universal basic income than in the case of a negative income tax. Finally, in the case of a universal basic income, beneficiaries receive a fixed income regardless of whether they earn additional income (e.g., from employment) or do not earn any income. Conversely, a negative income tax is dependent on the income earned by household members (Van Parijs, 2000).

Another type of basic income is wage supplements; that is, salary supplements designed to offer additional income so that no worker earns less than a certain level of income. In this case, the government guarantees to cover the difference between what the individual has earned and the minimum set by the state (Tanner, 2015).

Both the concept of income fundamentally as well as the ways in which it is distributed among citizens differ substantially depending on the economic doctrine that we deal with. Namely, according to the classic (liberal) approach, proponents of a basic income postulate the idea of a "negative income tax." According to this doctrine, the functions of the state should be limited to the minimum necessary by setting a negative progressive tax. Citizens below the poverty line would then not pay income taxes, and the government would pay the necessary funds to meet each person's threshold. In this case, public services (education, healthcare, etc.) would be paid; the exceptions would be national justice and defense.

In turn, according to the doctrine of the Social Democrats, it is necessary to ensure the continuity of income for the unemployed or those whose income from work is too low. In this case, the guaranteed income should only be for those who are without a suitable source of income. Such a redistribution of income

is independent of the activity undertaken and continues until the beneficiary of the benefit falls below the poverty line. So, this concept coincides with the idea of guaranteed pay.

Finally, according to the third doctrine presented by the radicals, the basic income should be universal, unconditional, and indefinite. Such a benefit would not be discriminatory and would represent a continuous benefit, independent of actual professional activity and providing a standard of living for every citizen of a given country or region.

3. Origins of universal basic income

The idea of a universal basic income dates back to 1796, when English radical Spence put forward the first coherent and elaborate proposal to grant equal treatment to all residents without any precondition. These amounts were to be granted to all citizens equally and paid quarterly. These funds were to come from a part of the income earned by the whole population from the land lease.

In the 19th century, the demand for introducing a basic income was adopted by radical and socialist movements. The supporters of this concept included Fourier and Charlier. Increasing popularity and recognition of the idea of a basic income was obtained in the first half of the 20th century. The main merit is attributed to the activities of Russell and Milner, who put forward the proposal of a universal income to help tackle poverty.

At the end of the 1960s and early 1970s, interest in the concept of a universal basic income appeared again. In the 1972 presidential election in the United States, Nobel laureate Tobin called on Democratic candidate McGovern to propose the idea of a universal basic income, while another Nobel Prize winner (Friedman) proposed that Republican candidate Nixon implement the concept of a negative tax income (Fumagalli, 2014).

As proposed by Tobin, a universal basic income can be expressed in arithmetic form, presented as follows:

$$t = x + 25 \tag{1}$$

where:

t – the average tax rate in percentage of GDP necessary to finance the basic income;

x – the basic income expressed as a percentage of GDP per capita.

The justification for this expression is that the basic income payments must be financed in the long run, and 25% is the approximate share of the expenditure

required to finance non-social public expenditure (health, education, public administration, public debt, military spending, etc.) (Kay, 2017).

In 1986, when the Basic Income European Network (BIEN) was created, the aim was to popularize the idea of a basic income. In 2004, the organization changed its name to the Basic Income Earth Network, transforming itself from a European network into a global organization. In 1988, the first issue of the Basic Income Studies Journal, devoted entirely to a detailed analysis of the basic income concept, was published.

In recent decades, many countries and regions in the world have implemented the idea of a basic income in full form or in pilot form.

In 1976, Alaska formed a standing fund in order to invest its revenue from the sale of crude oil in recognition that the mineral resources belonged to Alaskan residents. Since 1982, dividends have been paid on a per-capita basis to all inhabitants of the state. The only condition for receiving financial support was the requirement for residential status for at least one year, with the intention of remaining a resident of Alaska. Dividends were calculated on a yearly basis based on the fund's five-year average investment performance. The largest dividend of $3269 was paid in 2008 and included a one-time $1,200 bonus to compensate residents for high fuel prices. In 2012, the dividend was $878 per person, or $3512 for a family of four. Currently, the dividend is $2,000 per capita per year and shows an upward trend every year.

The paid dividends played an important role in making Alaska one of the states with the lowest poverty in the United States (as well as one of the lowest income inequalities). Although the individual dividend was relatively small, the overall impact on the economy was significant, as in 2009, the purchasing power of Alaskan residents increased by $900 million. These results were comparable to the creation of a new branch in the economy or the creation of 10,000 new jobs. At the same time, there was no apparent impact of the paid dividend on the labor market.

Between 1968 and 1978, four guaranteed income experiments were conducted for citizens in selected areas of the United States (New Jersey, Seattle, Denver, North Carolina, Iowa, and Gary, Indiana). Although the tested system was in the form of a negative income tax and not a guaranteed basic income, the effects were similar due to the similarity of the two systems. The results of the experiment revealed that men receiving income reduced their working time by an average of 7% and women by 17%. This was mainly due to the decrease in the number of hours worked rather than the total absence of work. The monthly expenditures of the citizens increased moderately with increasing incomes, but the structure of these expenditures did not change significantly (Munnell, 1986).

In 2008, a non-governmental organization called ReCivitas launched a pilot project to pay a basic income in the small town of Quatinga Velho located near

Sao Paulo, Brazil. The project was financed by private donations and provided a monthly universal income for 27 people for $13.6 per capita. Over the next three years, the number of people receiving payments increased to 100. The monthly payment of a universal income was well below the poverty line, but even the villagers who received the basic income showed an improvement in their ability to meet their basic needs. Researchers have noted an improvement in the quality of nutrition among the residents, with 25% of the basic income being spent on food. There was also an improvement in their health and living conditions (Pasma, 2014).

In January 2013, an annual signature collection procedure was launched under the European Citizens' Initiative for Basic Income. The aim of the initiative was to obligate the European Commission to encourage its member states to cooperate in undertaking research on a basic income as an instrument to repair their social security systems. However, it did not succeed, as they were only able to collect 285,000 signatures (well short of the required one million). Only six countries (Bulgaria, Slovenia, Croatia, Belgium, Estonia, and the Netherlands) managed to gather the minimum number of signatures required, and the previously set target was reached only in Bulgaria. Proponents of the basic income concept decided that the associated social movement should be institutionally formed and set up in 2014 with an organization called Universal Basic Income Europe.

In 2016, a national referendum was held in Switzerland that aimed to introduce a basic income. The results of the referendum showed that nearly 77% of the Swiss population opposed such a plan, while only 23% supported it. The basic income proposal was addressed for both adults and children. They were to receive a universal monthly income irrespective of their social and professional status. The monthly income paid by the state would amount to 2500 Swiss francs for adults and 625 Swiss francs for children. These figures reflected the high cost of living in Switzerland. Thus, Switzerland is the first country in the world to reject a proposal to introduce a universal basic income.

The most advanced experience with a basic income can be attributed to Finland, where nearly 2000 citizens were paid unemployment benefits of €560 per month in 2017 (the equivalent of a quarter of the average household income in Finland). In this case, the basic income did not eliminate additional benefits for citizens (e.g., housing benefits) and did not lead to changes in taxes for people receiving the basic income.

4. Results of introduction of universal basic income

The economics literature points to the measurable benefits of introducing a universal basic income. First of all, a universal basic income allows citizens the

freedom to spend the money any way they want. In other words, a basic income strengthens economic freedom at the individual level. This income provides residents the freedom to choose a particular type of work instead of forcing them to take low-productivity jobs to meet their daily needs. Second, a basic income is a kind of unemployment insurance and, thus, can contribute to reducing poverty. Third, a basic income leads to the fair distribution of wealth. Fourth, the increase in income improves the bargaining power of citizens, as they no longer must accept the offered working conditions. Fifth, a universal basic income is easy to implement. Due to its universal character, there is no need to identify the beneficiaries. It therefore excludes errors in the identification of planned beneficiaries, which is a common problem in targeted social programs. Sixth, due to the fact that each individual receives a basic income, it promotes efficiency and reduces losses in governmental transfers. Moreover, the direct transfer of a universal income to citizens can contribute to decreased corruption in a country. Additionally, the benefits may result from the reduction of costs and time as a result of substituting a basic income for many social programs. Finally, transfers of a basic income directly to the receiving bank accounts can raise the demand for financial services, which promotes the development of the financial market in the country.

On the other hand, opponents of the universal basic income idea point to the following disadvantages of this system. First of all, it poses a risk of a moral hazard. The result of this is a reduction in the motivation to work and the consequential drop in the labor supply in a country. In addition, it is about fiscal costs and the risk of declining purchasing power of the transfers received by the citizens. Namely, the opponents of the universal basic income concept will find that, after raising a universal income, taxes will rise in a country to finance the growing governmental spending. Moreover, an increase in the money supply of a country may cause an increase in inflation and a decrease in purchasing power in the country.

It is obvious that the impact of the basic income on the whole market cannot be unequivocally defined, since the income affects the individual areas of economic life; it is positive in some cases and negative in others (Sattelberger, 2016).

The impact on employers of introducing a universal basic income can be positive for those jobs that stimulate the competitiveness of the workers. Without working to ensure a specific level of living, individuals can develop and seek work that will offer them satisfaction and the ability to feel fulfilled. Rising competition will attract more qualified people to the labor market who are more willing to learn and develop and, thus, will result in strong human resource development. In addition, continued social protection and increased labor supply on the market will allow employers to lower their wages. However, there is a high risk for

employers to offer jobs to people with lower qualifications. In this case, the employer will have to pay a higher salary to fill vacancies. The increase in the wage fund will lead to higher prices, and the increase in prices will entail the need to increase the universal basic income.

Also, the impact on employees of introducing a universal basic income is positive. By receiving a universal income, they are able to pursue their own continuous development by engaging in programs that will help them get the desired positions by being able to invest a portion of their basic income to education without affecting the family budget.

The progressive income tax that is currently applied in most countries around the world seems to be the best available source of funding for social policies that seek to ensure an adequate standard of living for citizens by introducing a universal basic income. The introduction of a basic income must be accompanied by an organic or even complete elimination of other forms of social assistance such as unemployment benefits, pensions, and social allowances, leaving only funds available for people with disabilities. In addition, the introduction of a universal basic income may contribute to a reduction in state budget expenditures as a result of declining employment in the public sector. On the other hand, the elimination of unemployment insurance premiums and social security contributions may lead to a reduction in fiscal pressure on the economy (Cercelaru, 2016).

A universal basic income can be easy to apply, but the costs will be much higher than in the current social systems. However, a negative income tax can be cheaper, but it will potentially discourage work. On the other hand, a wage supplement system can encourage work, but it will not be common; hence, it is not able to completely replace the current social systems (Deutscher Bundestag, 2016).

5. Universal basic income in light of empirical studies

In its published report, the Organization for Economic Co-operation and Development (OECD) stated that, for most high-income countries, a universal basic income can actually increase poverty. The proposed proposal is based on a scenario analysis in which all existing cash and tax benefits for people under 65 are replaced by a universal basic income in the 35 OECD member countries. The analysis conducted by this organization argues that governments in most member states implement social support programs for the poor, while a universal basic income will make it less precise. The OECD has conducted a detailed analysis of the impact of a universal basic income on four member states: Finland, France, Italy, and Great Britain. Three out of the four analyzed countries stated that their hypothetical universal income would actually increase poverty by at least 1%.

Jessen et al. (2015) conducted empirical research on the potential effects of introducing a universal basic income in Germany at €800 per month for adults and €380 per month for people under 18 years of age. These figures are close to the current level of existence guaranteed by unemployment benefits and social assistance in Germany. The study assumes that the mechanism would be financed from a 68.9% linear tax. Researchers have found that the introduced reform would increase the labor supply in Germany in the first decile of income distribution. This effect would be significant and would increase the supply of this group by 6.1%. On the other hand, the introduction of a universal basic income in Germany would reduce the supply of labor in most of the remaining income decisions. In general, the introduction of a universal basic income would reduce the total labor supply by 5.2%. Utilizing the utilitarian social welfare function, the authors of the study have confirmed that the overall social benefits to be achieved would be higher compared to the present situation. The result of the analysis has thus confirmed that the introduction of a universal basic income in Germany would be economically justified, increase motivation to work in poorer households, and bring social benefits as compared to the current system (Jessen et al., 2015).

On the other hand, a commission of the German parliament analyzed a basic income in 2013 and concluded that it would cause a significant decrease in the motivation to work among the citizens, with unpredictable results for the national economy. The system would need a total restructuring of the taxation, social insurance, and pension systems, which can be very expensive. They also argued the current system of social facilitate in Germany is more effective because it is more personalized. Finally, the German parliament concluded that there are no viable ways of financing a basic income in Germany (Davala et al., 2015).

The United Nations Educational, Scientific, and Cultural Organization (UNICEF) ended a few years ago with a pilot project in partnership with the SEWA in India to analyze the effectiveness of a universal basic income among thousands of people living in Madhya Pradesh. The results of the study confirmed the increase in local economic activity that led to the emergence of micro-businesses, creation of new jobs, and increasing purchases of technical equipment and livestock for the local community. In addition, people receiving the universal basic income made significant improvements in respect to child nutrition, school enrollment of children, health care, and accommodation. It should also be noted that the increase in benefits for women was higher than for men (increasing financial autonomy for women), greater in the case of people with disabilities (compared to healthy people), and greater among the poorest (compared to wealthy people) (Lehmann, 2003).

Relatively few economists claim that all citizens can benefit from the introduction of a basic income (Chéron 2002). According to Lehmann, the final effect

of introducing a basic income depends on the level of education in a country. He argues that more-qualified people are much less likely to benefit from a basic income than less-qualified people (Chéron, 2002).

Referring to experiments in the 1970s in Manitoba, Canada, Hum and Simpson acknowledged that employment reduction was relatively small after introducing a universal basic income (about 1% for men, 3% for men married women, and 5% for unmarried women). In addition, the researchers noted that the introduction of the universal basic income had a significant impact on the structure of the households (Hum and Simpson, 2001).

On the basis of empirical research on the concept of a universal basic income, two main conclusions can be drawn. First, a basic income is generally positive only when it is not too high or is slightly below the threshold of relative poverty. Second, a basic income should replace unemployment benefits.

The Family 500+ program introduced in Poland in 2016 could be described as a quasi-guaranteed income if paid for each child regardless of the income earned by the household. The Family 500+ program is 500 PLN per month paid by the state for each second child and all subsequent children regardless of household income. Low-income families also receive support for the first (or only) child if they meet the criterion of an average monthly net income of 800 PLN (or 1200 PLN in the case of raising a disabled child in the family). By the end of 2016, 3.8 million children were eligible for support, representing 55% of all children under the age of 18. The program has raised the standard of living for those families receiving benefits. The program has dramatically improved the material conditions of the families, resulting in a reduction in the number of people benefiting from social assistance and nutritional support. With the program, total poverty has decreased by 48% and extreme poverty by 98% (https://www.mpips.gov.pl, 2017).

Goraus and Inchauste (2016) estimated that the poverty and inequality in Poland will fall as a result of the introduction of the Family 500+ program. Indirect taxes were also expected to increase, but the net effect on disposable income was estimated to be positive, relative to the situation in 2014 (Goraus and Inchauste, 2016).

The cost of the program is about 25.7 million PLN per year (1.5% of the GDP). To compare the efficiency of the new program relative to the other existing programs mentioned in Figure 1, researchers calculated the change in poverty and extreme poverty per zloty (PLN) spent for each program. They found that the changes in poverty and inequality were lower for the Family 500+ program as compared to social subsidies, social assistance, nursing allowances, and housing benefits, because these were more targeted; however, it was more efficient than the spending on the nursing and family benefits (Fig. 2) (Goraus and Inchauste, 2016).

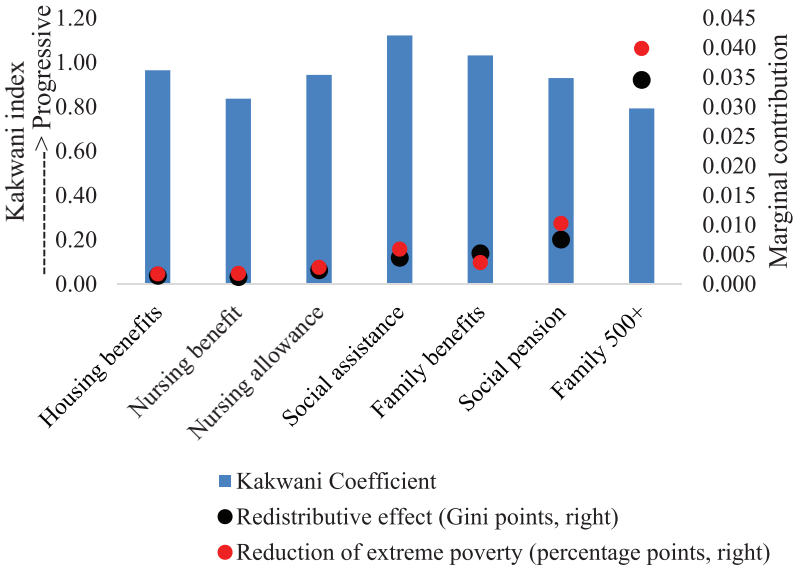

Figure 1. Progressivity and marginal contribution of Family 500+ program

Source: Goraus and Inchauste, 2016.

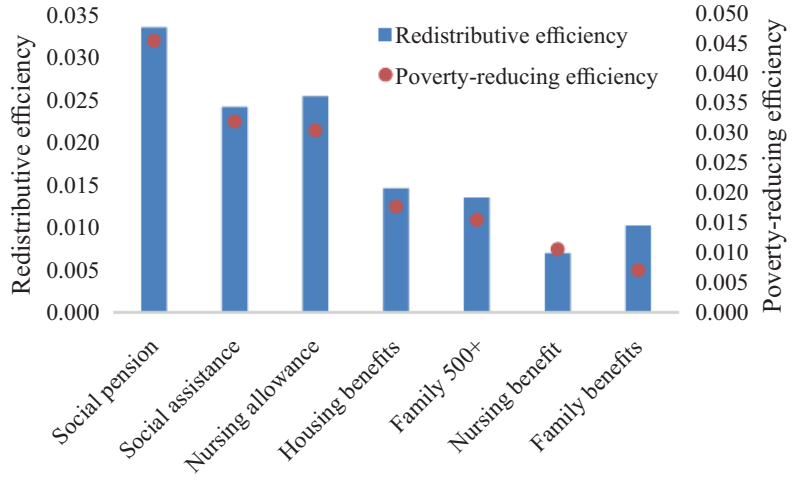

Figure 2. Efficiency of social spending

Source: Goraus and Inchauste, 2016.

When the authors took into account the likely increase in the value-added tax (VAT) and excise tax, the net cost of the program was expected to be 22.2 million PLN per year (1.3% of the GDP). To compare the efficiency of the new program relative to other existing programs, Goraus and Inchauste (2016) calculated the changes in poverty and extreme poverty per zloty spent for each program. They found that the changes in poverty and inequality were lower for the Family 500+ program as compared to social support, social assistance, nursing allowances, and housing benefits (as these were more targeted), but it was more efficient than the spending on the nursing and family benefits (Goraus and Inchauste, 2016).

Supporters of a universal basic income would like to introduce a full universal system in Poland, amounting to approximately 1000 PLN per month. However, opponents argue that the reasons for introducing such a benefit are weak, because we have seen a marked increase in private employment accompanied by drops in inequality and the risk of poverty in Poland over the past 15 years. They also claim that the introduction of an unconditional basic income would entail a tax increase of about one-third in Poland. Such an increase in taxation would lead to a breakdown in economic development and a decline in professional activity. They believe that social policy can be carried out from the bottom up, without the coercion of state and tax redistribution (Goraus and Inchauste, 2016).

6. Conclusions

Supporters of the introduction of a universal basic income argue that it will help reduce the potential for abuse in the system. The universal transfer of a basic income is a very simple and transparent transfer system that drastically reduces the possibility of abuse as compared to other systems commonly used today. In addition, the introduction of a basic income reduces the stigmatization of the applicants. At the same time, supporters say that it creates a more egalitarian society and opens up possibilities for individual self-realization. Moreover, basic income supporters argue that technological development in the world of work is causing manual labor to be constantly replaced by technical solutions. This means that a small group of people with high wages will face a growing number of unemployed. A universal basic income will then ensure the necessary social balance.

On the other hand, opponents of a universal basic income claim that the belief in an equal distribution of a basic income is only wishful thinking and that it can never become a reality. In addition, a universal income raises the risk of abuse (moral hazard) because the basic income would significantly reduce the willingness to take up employment and, thus, lead to a decrease in employment.

This would reduce the driving forces of the market economy. In addition, the introduction of a basic income would result in the loss of other social benefits and, thus, the need for self-financing social needs.

A universal basic income is, in fact, a radical change from the current social system and is equitable, liberal, and treats all citizens equally. People with higher incomes pay higher taxes than people with lower incomes in absolute and relative terms. The minimum living guarantee is guaranteed to everyone, and people without incomes receive net transfers. Although the concept of a universal guaranteed income is neither perfect nor cheap to implement, it seems reasonable to at least consider a radical change in the current social assistance system. At times, it turns out that the risk of radical change is less than the risk of continuation of an existing system, as the current social system can exacerbate social and political pressure as a result of increasing polarization in society (Benedyk, 2018).

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Reasons full-time students of economics in Poland undertake jobs

1. Introduction

Observations of the behavior of full-time students at economics universities in Poland reveals that a significant percentage of these students combine studying with working in gainful employment (Jarecki, 2010; Ostoj, 2015). The determinants related to the supply of labor for a typical worker is relatively well researched, both in terms of the significance of the compensation levels and the role of other factors that are sources of utility to a worker (Marshall, 1961; Pigou, 1933; Ehrenberg and Smith, 2012; Bartel, 1980; Herzberg, 1987; Mathios, 1989; Ophem, 1991). However, there is a lack of research and theorization concerning the decision-making mechanisms of full-time students choosing to combine studying with work.

This article aims to investigate the determinants and motivations behind full-time students of economics in Poland deciding to take a job. The assumption proposed in this article is that an employment-seeking student may see work primarily as a source of income, or he/she may alternatively wish to gain professional experience that would make it easier for him/her to enter the labor market in the future. A combination of these two motivations is also possible. This article presents verification of the research hypothesis that, in the current conditions in Poland, students tend to manifest attitudes similar to a typical worker, while they are less likely to behave like individuals investing in human capital. The author conducted an in-depth study into the reasons for taking up work and the criteria that were of greatest importance to students when accepting a specific job offer. Particular emphasis was placed on the role of financial incentives as opposed to professional development-related motivations. This article presents and discusses

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the results of the survey created by the author and conducted among full-time students enrolled in a master's program of economics at the University of Economics in Katowice during the years of 2014–2016.

The article comprises four parts. The first part discusses the theoretical considerations of the micro-economic determinants of the individual labor supply decision (both the financial and non-financial incentives) relevant to the interpretation of the students' behavior. The second part presents the Polish socio-economic reality conducive to combining studying and working. The third part characterizes the survey, and the fourth part presents the results of the survey.

2. Determinants of individual labor supply decision – literature review

The drivers of the individual supply of labor of typical worker are well-researched in the literature. In micro-economic terms, the classic income-leisure choice model (Marshall, 1961; Pigou, 1933; Ehrenberg and Smith, 2012) proposes that the level of real remuneration (as the source of utility from consumption) is the primary determinant of an individual's decision to supply labor. According to this approach, the number of working hours grows proportionally with an increasing hourly rate. As a result, we can observe a positively sloped labor supply curve. Another model is a bending individual labor supply curve, implying that the number of hours the worker is prepared to work decreases beyond a certain hourly rate. This hourly rate is determined as the point when the marginal utility of the goods acquired with each extra hour of work meets the marginal utility of a leisure hour. A variety of other factors determining the individual labor supply decision include the level of fixed costs involved in taking up employment (e.g., commuting costs or household costs), the amount of income from non-wage sources, or changes in leisure-time preferences. Taking into account the level of remuneration for the analysis of individual labor supply decisions, one may refer to the reservation wage model within the framework of the job search theory (new microeconomics). According to this model, a job searcher defines his or her lowest acceptable level of income and, among the offers that satisfy this condition, compares the expected marginal benefits with the marginal costs of the job search (Mortensen, 1986).

This theory is usually applied to the unemployed, who are entitled to unemployment benefits or have no income at all. When applied to students, the assumptions are different, as they tend to remain financially dependent on their parents, obtain scholarships, or get student loans[1]. Therefore, as they have a certain

[1] Student loans in Poland are rarely taken out, so the reference in the paper is purely theoretical.

level of income already and a limited amount of time to search, students will set a lower preference level of minimum income, which raises the employers' interest in employing them.

Ehrenberg and Smith (2012, p. 504) describe a model of a choice of a reservation wage, which is applicable when we assume that students' qualifications rise after each year of studies, which may increase the reservation wage as an additional source of income. Prasad (2003) provides the results of research that exhibits a negative relationship between the reservation-offer wage ratio and skill level. This phenomenon was explained as a pursuit to prevent human capital depreciation among highly-qualified people who cannot find jobs.

Apart from the neoclassical model or reservation wage model, there are alternative approaches accounting for other benefits from employment; for example, professional development and the opportunity to gain relevant experience, which constitutes a form of human capital investment. In principle, they indicate the need to take a more comprehensive view of the utility of work, which cannot be reduced to the utility from the consumption of goods (Bartel, 1980; Kunze and Suppa, 2013).

One of the models that takes a comprehensive view of the utility of work is Herzberg's (1987) two-factor theory, identifying hygiene factors that, when realized at certain levels, reduce the dissatisfaction of work (e.g., job security, salary, interpersonal relationships) and motivators – contributing directly to job satisfaction (e.g., challenging work, development and promotion opportunities). The model was developed based on a study conducted among white-collar workers (which attracted criticism due to its limited scope); however, for the purpose of describing the potential utility that students may derive from their work, it may be considered adequate.

Mathios (1989) argued that the pay differences among people pursuing education for a longer period of time (more than 16 years) were greater, but the role of non-financial incentives was more significant. This is connected with a generally higher level of remuneration and job security in this group, which leads to a greater role of non-financial incentives. A good example of the concept of the determinants of the labor supply decision is also the extended theory of job search proposed by Ophem (1991), who pointed out that it was not only the unemployed who searched for jobs but also those in employment seeking new positions.

These conditions correspond with the characteristics of the researched group better because they usually have some source of income. According to Ophem, both the current and anticipated levels of remuneration accompanied by non-financial incentives have an impact on the decisions made by the employed to seek a new job.

Irrespective of the attraction of the approaches underlining a variety of dimensions of the utility of work, research is still being conducted into the influence of hourly rate maximization on labor supply. This is confirmed by empirical studies (Blau, 1991).

All of these reasons also undoubtedly play a role in the case of labor supplied by students; however, the models discussed above are insufficient for an in-depth analysis of the supply of labor of full-time students because they assume that an individual's labor-related activity is a natural phenomenon, indispensable in the process of need fulfillment. This may also apply to students; but at the same time, they are supported by their parents (at least in part) and have access to student grants and loans, so their motivations are more complex. A student intending to start a job has to plan his/her day to allocate time for classes at the university, class preparation at home, doing paid work, as well as rest and leisure. The problem is the absence of relevant studies into this phenomenon.

The number of hours spent at a university is linked with each specific degree program and the extent to which student attendance is required by a teacher. The amount of time devoted to home study in preparation for classes was researched by McMullen (2011), but he examined American students. He discovered, for example, that the number of hours spent on home study went up in line with a growing minimum wage, higher unemployment rates, and increased education intensity of the local industries (measured with an average education level among workers in a particular industry), whereas it fell when tuition fees increased.

These results were valid across the entire respondent population, although they manifested some diversification due to family background and the US state. These results, however, are of little value when it comes to the analysis of the behavior of Polish students, because full-time students pursuing education in public universities in Poland do not pay for tuition.

A minimum wage may affect them as prospective pay only, since they do not have a regular employment contract when they are employed as students; therefore, it does not apply to them (this was the case until the end of 2016, which is covered later in the article). The situation in the labor market in terms of the unemployment rate may have an impact when the rate is high among graduates and young people, especially if lack of experience is a barrier to finding employment. Then, a growing unemployment rate may encourage students to seek employment during their studies.

The identification of the motivations behind students' decisions to seek employment will reveal similarities and differences concerning the determinants of taking up gainful employment for students and regular workers. The analysis, however, should take into account specific socio-economic conditions under which such decisions are made.

3. Conditions conducive to combining full-time studies with employment by students in Poland

It can be argued that the phenomenon of combining studies with employment is observed in many countries (Eurostudent V, 2012–2015, p. 99). It usually concerns students from poorer families who are unable to finance their children's higher education, irrespective of whether education is free or paid. This problem normally affects a small percentage of students, and the work cannot interfere with studying and is performed at the cost of a student's leisure time (Schultz, 2014, p. 117; Jarecki, 2010; Marszałek, 2012). The phenomenon analyzed in this article, however, has a much wider scope. As the published research results indicate, it may even concern the majority of students (especially those in master's degree programs), and the income from employment may constitute as much as 70% of the total income of this group during their final year at the university (Jarecki, 2011, pp. 179–182). Moreover, in most countries, students who work do not tend to live with their relatives. In Poland, this factor is of minor significance and concerns all students to some extent (Eurostudent V, 2012–2015, p. 104).

The determinants of this phenomenon should be studied both in terms of supply and demand in the labor market. For students to be able to find employment, the economy must need workers to meet particular criteria. It might seem that students who are less flexible in terms of the time they have available for work will have difficulty finding employment. In Poland, however, job adverts run by employers in newspapers often explicitly require students for specific positions. This is caused by the lower costs involved in employing a student rather than a regular worker. Although in the case of employing a student based on a regular employment contract, the employer incurs the same costs as with a regular employee because all of the types of social insurance and health insurance apply to students as well. However, an employer can enter a different kind of agreement with a student; for example, a contract work agreement (or agency contract, contract on service provision), which generates much lower costs provided the students has not yet turned 26 (Ustawa z dnia 13 października 1998... Art. 6.1, Item 4). In such cases, the employer does not have to pay social insurance contributions for the students that they employ, and they do not have to be registered with the social insurance institution. Until the end of 2016, regulations concerning remuneration for workers employed based on such contracts did not exist. On January 1, 2017, a minimum pre-tax hourly rate for contract work was established at PLN 13, which will change employment arrangements in the future. In fact, it is related to the minimum wage under a regular employment contract (Ustawa z dnia 22 lipca 2016... Art. 1). Employers can also use a range of flexible working time arrangements, which is an extra incentive for students.

The supply of the labor of students is shaped by actual opportunities to combine studying and work. This depends on the kind of degree program and its time intensity. This article focuses on a specific field of study; this being economics, which is relatively less time-intensive and requires few laboratory classes/tutorials. Additionally, a university may often arrange the timetable in such a way so as to allow students to save time and money on commuting; thus, classes are scheduled for 3–4 days a week.

Another factor is the demographic low. During the years of 2005/2006, Poland had 1,953,800 students, whereas during 2016/2017, there were only 1,405,100 (28% fewer). This is despite a high percentage of secondary school students pursuing tertiary education, amounting to 53% in the 19–24 age group during the academic year of 2015/2016 (GUS, 2016, pp. 341, 343). At that time, universities did not reduce their potential, operating also as scientific research institutions. As a consequence, they had to compete for students, especially in light of the tertiary education financing system that linked the amount of the subsidy for teaching purposes with the number of students. This caused universities to aim at keeping the number of students high. In 2017, these regulations were changed, but the period of time under analysis in this article concerns the conditions prior to this change.

Students' decisions may also have been affected by the general situation in the labor market, including the unemployment rate in the entire population and (especially) among university graduates. According to the Labor Force Survey, the unemployment rate reached 9.8% over the entire population and 23.8% among university graduates aged up to 30 in the third quarter of 2013, whereas in the corresponding period of 2016, the general unemployment rate was 5.9% and 17.7% for the group of university graduates aged up to 30 (GUS, 2014, p. 85; 2016, p. 125). The situation in the labor market improved within this period, but the situation of university graduates remained relatively worse when compared to other demographic groups. This might have been another incentive for students to seek employment while still at a university.

The phenomena discussed above created a combination of circumstances conducive to students' decisions to seek employment during the course of their studies.

4. Description of survey

The scale of the phenomenon of combing studies with work observed in Poland became the inspiration for conducting a survey among the students of the University of Economics in Katowice. The survey was developed and carried out by the author of this article. It did not have any financial backing. It can be viewed as

a pioneer project in this field, and the presentation of a part of its results aims to achieve the goals of this article. The study made an attempt to, inter alia, identify the motivations behind seeking gainful employment while attending a university. The factors taken into account were both financial and non-financial, referring to the theory of individual labor supply decision; however, they were adapted to the conditions that affect Polish students' decision on their employment.

The survey included all of the first-year students in the full-time master's degree program in economics at the Faculty of Economics of the University of Economics in Katowice. Accordingly, they were all bachelor degree holders pursuing further education in master's degree programs. The survey was conducted in three consecutive years – in January and March of 2014, in January of 2015, and in January and February of 2016. The survey was carried out with the use of an anonymous paper-based questionnaire. The use of this technique ensured a 100% collection rate. The questionnaire contained 17 questions; however, due to the issue under discussion in the article, only some of them will be included in the analysis. These comprise two multiple-choice questions targeting all of the respondents and two questions addressed to working respondents only, including one multiple-choice question and one ranking question.

In 2014, the survey was taken by 129 respondents, and 124 correctly completed questionnaires were returned. In 2015, there were 194 respondents who completed 192 questionnaires correctly, while in 2016, the survey had 116 respondents with 115 returning correctly completed questionnaires. The survey was comprised of all of the students who were present on the day of the survey (which was chosen in a manner ensuring maximum turnout). In Poland, full-time programs at public universities are free, so all of the respondents were pursuing a free education. The sample was homogenous in terms of age (about 23 years of age) but was diverse in terms of gender. In 2014, among the respondents who correctly completed the questionnaire, there were 89 women (71%) and 35 men (29%). In 2015, the respective figures were 129 (67%) and 63 (33%), while in 2016 – 86 (75%) and 29 (25%). There was a distinct majority of women in each year – the highest was in 2016. The author chose not to break the results down by gender due to such a significant disproportion between women and men, since the subpopulation of working men would be too small. However, it does not seem to have an impact on the results of the research. For instance, in the part of the Eurostudent research regarding the students' employment, distinction by gender is not applied.

A critical element of the study was the identification of the group of students who worked at the time of the survey or had had a paying job prior to the survey. Table 1 presents the breakdown of the researched population by status based on the supply of labor.

Table 1

Breakdown of respondents by job status

Job status	2014		2015		2016	
	No.	[%]	No.	[%]	No.	[%]
I do not work and have never worked before	42	34	53	28	18	16
I used to work	17	14	44	23	34	30
I work	31	25	51	26	36	31
I run a business	0	0	6	3	0	0
I work part-time (weekends, summer break)	34	27	38	20	27	24
Total	124	100	192	100	115	100

Source: Author's survey

At the time of the survey in 2014, 52% of the respondents worked. In 2015, 49% of the respondents worked or ran their own businesses, while 54% of the students worked in paying jobs in 2016. The percentage of working students was similar to the figure that was the result of a survey conducted at the Faculty of Economic Sciences and Management at the University of Szczecin in 2008/2009, which revealed that 48% of economics students earned income from employment during the course of the academic year (Jarecki, 2010). On the other hand, this is higher than in the survey among university graduates conducted by the Institute of Labor and Social Studies (IPiSS) in 2012, which put the figure at 44% (IPiSS, e-Dialog, 2012, pp. 10–12) and in the nationwide study carried out by the Polish Agency for Enterprise Development (PARP) in 2013, treating economics and administration students as one group and putting the percentage of working students at 45% (Jelonek et al., 2014, p. 40).

It is also worth noting the percentage of the respondents who had any experience of working in a paying job (at the time of or prior to the survey). In 2014, this number was 66%. In 2015, it was 72%, while in 2016 – 85%. This clearly indicates that the vast majority of the respondents had already experienced their first job.

5. Results of survey

All of the respondents in the sample were asked for their opinions about the reasons why full-time students took up gainful employment. Their answers referred both to financial motivation and professional experience (Tab. 2). The respondent was to choose one of the proposed answers or formulate their own reply.

Table 2

Breakdown of responses to following question: What do you think is the most important reason full-time students find employment?

Reason	2014		2015		2016	
	No.	[%]	No.	[%]	No.	[%]
Financial motivation	78	63	112	58	80	70
Awareness of the need to gain professional experience	40	32	69	36	28	24
Little chance of being awarded scholarship	–	–	3	2	2	2
Following the example of older friends	–	–	2	1	–	–
Pressure from the media and environment on developing practical skills	3	2.5	6	3	5	4
Other, what?.....	3	2.5	–	–	–	–
Very low scholarship	1		–	–	–	–
Low grants that are insufficient for a student to support him/herself without parental assistance	1		–	–	–	–
Depends on the kind of job	1		–	–	–	–
Total	124	100	192	100	115	100

Source: Author's survey

Based on the opinions expressed by the entire sample, the survey results clearly confirm the dominance of financial motivation behind full-time students seeking employment. This dominance was highest in 2016. Even when you examine other reasons (2014), income-related causes were given; for example, low grants and scholarships. Another important factor was the awareness of the need to gain professional experience. This was indicated by almost a third of the respondents in 2014 and 36% in 2015 but by less than a quarter in 2016, which shows that this motivation lost importance according to the respondents. In the opinion of only a few students in 2015 and 2016, another reason was pressure from the media on developing practical skills. Additionally, the percentage of the respondents sharing

this opinion grew from year to year. It should also be added that the results of this part of the survey did not differ greatly from the above based on job status. In 2016, financial motivation as the main reason behind finding employment was chosen by nearly 73% of the respondents who worked at the time of the survey or prior to it and by 63% of the respondents who had never worked; in 2015, these figures were 56% and 62%, respectively, and in 2016 – 63 and 62%, respectively (the data comes from the survey and was not included in the table).

The breakdown of the answers to the above question gives a general picture of the students' opinions, which were shaped by observation and experience. The most important motivations, however, were those declared by the working students.

The students who worked or ran their own businesses at the time of the survey were asked about the real motivations behind their decision to seek employment. Each respondent was able to reflect on their own situation and motivation behind their choices. The breakdown of the responses is presented in Table 3 (93 out of 95 respondents working in 2015 correctly completed the relevant part of the questionnaire, while in 2016 – 62 out of 63).

Table 3

Breakdown of responses to following question:
What was the main motivation behind your decision to seek employment?

Motivation	2014		2015		2016	
	No.	[%]	No.	[%]	No.	[%]
Financial motivation	31	48	45	48	32	52
Willingness to gain professional experience	3	5	10	11	8	13
Financial motivation combined with gaining professional experience	29	45	33	35	20	32
Finding a job that would be continued after graduation	1	1.5	1	2	1	1.5
Following the example of friends and acquaintances	–	–	–	–	1	1.5
Other, what?	1	1.5	4	4	–	–
Pursuing interests	1	1.5	–	–	–	–
Helping out in a family business	–	–	1	1	–	–
Need to manage leisure time	–	–	1	1	–	–
Passion and financial independence	–	–	2	2	–	–
Total	65	100	93	100	62	100

Source: Author's survey

In the group of working students participating in the survey, nearly half in 2014 and 2015 and more than a half in 2016 chose financial motivation as the main reason for seeking employment. This was definitely the dominant motivation. Only 5% of the working students in 2014 and a little more – 11% in 2015 and 13% in 2016 – were driven by the willingness to gain professional experience. If considered through the prism of graduation within the next one and a half years, this figure is really small. On the other hand, a positive sign is the fact that this percentage grew from year to year. A significant percentage of the respondents chose a combination of the need to earn some income with the need to gain professional experience (as many as 45% in 2014, 35% in 2015, and 32% in 2016). Other responses were given by one respondent only, including the decision to seek employment that might continue after graduation.

It should be assumed that the students made a thorough assessment involving the consideration of all of the information about the available positions prior to the decision to accept a particular job. Hence, the respondents were asked to rank seven criteria according to their importance in the next part of the survey. The most important criterion was to be ranked as first. Table 4 shows how the students ranked specific criteria.

Table 4

Percentage of respondents who ranked specific criterion in particular manner

Motivation	Year	Rank						
		1	2	3	4	5	6	7
Remuneration level	2014	48	18	15	11	5	3	0
	2015	38	22	17	9	7	3	2
	2016	42	15	22	18	0	0	3
The opportunity to apply the knowledge acquired during the course of their studies in practical situations	2014	9	12	5	18	14	19	23
	2015	3	13	17	17	12	18	20
	2016	2	6	11	19	24	21	17
The opportunity to build a relationship with an attractive employer with the intention of maintaining it after graduation	2014	11	12	25	8	11	18	15
	2015	19	18	11	18	12	8	14
	2016	5	23	16	21	7	9	19
The opportunity to develop new skills and competences	2014	22	23	17	22	7	9	0
	2015	34	19	17	12	10	5	3
	2016	41	16	17	10	10	2	3
Convenient transport connection	2014	2	20	15	14	14	17	18
	2015	2	12	15	7	20	25	19
	2016	5	12	19	14	19	24	7

Table 4 cont.

Motivation	Year	Rank						
		1	2	3	4	5	6	7
Distance from their place of residence	2014	9	9	16	9	18	18	21
	2015	7	6	13	16	13	26	19
	2016	8	25	5	13	12	17	20
Good opinion about a company as an employer	2014	0	5	8	18	31	15	23
	2015	4	9	13	16	23	11	24
	2016	2	5	14	12	22	19	26

Source: own elaboration based on survey results

The largest percentage of the respondents ranked the remuneration level as the most important criterion for accepting a job offer (although there were significant differences among the years). The significance of this criterion is also confirmed by the fact that 82% of the respondents in 2014, 77% in 2015, and 79% in 2016 ranked it as first, second, or third. The second criterion that was ranked most frequently was the opportunity to develop new skills and competences, and it gained in popularity from year to year to come close to the compensation level as the criterion most frequently ranked as first. In total, this criterion was ranked as first, second, or third by 62% of the respondents in 2014, 79% in 2015, and 74% in 2016. In light of the above, it comes as a surprise that the opportunity to apply the knowledge acquired over the course of their studies in practical situations was of relatively little importance to the students, which may imply that the job they accepted was not intended to give them experience in the profession they were training for but rather to allow them to develop skills and competencies in new fields. In 2014, 42% ranked the criterion related to the practical application of the knowledge acquired during the course of their studies as the next-to-last and last places; in 2015 and 2016, this number was 38%. This may also signal a certain discrepancy between the university curriculum (or the chosen degree program) and the demand created by employers in the labor market.

One should expect that the labor supplied by students one and a half years prior to the completion of a master's degree program would be an effective way to establish a relationship with a prospective employer who might wish to continue employing the student after graduation. Even if this was not the main motivation for seeking employment (which was shown in the breakdown of the responses presented in Table 3), it might be one of the most important criteria for accepting a job offer. In 2014 and 2015, 48% of the respondents and 44% in 2016 ranked it as first, second, or third; however, only 11% ranked it as first in 2014, 19% in 2015, and a mere 5% in 2016. The low importance of this motivation may be surprising, especially due to the lower costs involved in employing a student. Employers are

often more willing to hire a person without professional experience, train them, and continue to employ that person later on after graduation. This way, a student can find a position requiring higher qualifications more easily, whereas graduates tend to face higher expectations from an employer.

A criterion of relatively low importance was convenient transport connection. In 2014, 49% of the respondents, 64% in 2015, and 50% in 2016 ranked it from fifth to seventh, 35% in 2014, 27% in 2015, and 31% in 2016 – second or third. The distance from one's place of residence also ranked low, but 9% of the respondents in 2014, 7% in 2015, and 8% in 2016 chose it as the most decisive factor.

A good opinion about an employer was usually ranked as fifth or seventh, and none of the respondents ranked it as first in 2014. This criterion grew in importance in 2015; 4% of the respondents saw it as the primary decisive factor, while about a quarter ranked it as first, second, or third (with only a fifth of them in 2016). This may be due to the fact that, effectively, the students did not see their current employer as a prospective employer, which was also the conclusion drawn from the analysis of the previously discussed criteria. Additionally, this problem was addressed in more detail by another question (not presented in this article), which asked the students whether they would like to continue working for the same employer after graduation. In 2014, 69% said "no" or "rather not." In 2015, the same answer was given by 53%, and in 2016 – 69%, which confirms that the decision to seek employment during their studies was not dictated by the prospect of staying in the job after graduation despite the relatively high unemployment among university graduates (as mentioned earlier in this article).

The other criteria (not shown in the table) such as combining work and studies or pursuing a passion attracted only one respondent. Their small number seems to confirm that the criteria listed in the questionnaire generally matched those followed by students in practice.

6. Conclusion

The study revealed new unresearched phenomena concerning the motivations behind seeking and accepting employment by full-time students of economics, which may be analyzed through the prism of the concepts of the individual labor supply of regular workers discussed in the articles. It was shown that, at the moment of conducting the survey, more than half of the respondents worked. All of the students (both working and not working) underlined the significance of financial motivations behind their decision to seek employment, which would indicate that the motivations manifested by regular workers were also relevant to the choices made by the students. In more-detailed questions addressed towards

working students, the dominance of financial incentive was very clear (although a large albeit decreasing percentage of the respondents also pointed to combining a paying job with gaining professional experience). Among the criteria that was decisive for the choice of a job, remuneration ranked first, closely followed by the opportunity to develop new skills and competences. This sheds new light on the decisions made by young people who start to see such employment as a chance for development. The relatively lower importance of such determinants as the distance between the place of work and place of residence or convenient transport connection (in other words, the fixed costs of employment) also points to the differences between students and regular workers, who often wish to minimize commuting time and costs. The finding that young people are not concerned with the opinion about an employer is likely to indicate that they do not intend to stay with the same employer in the long term. The investigation of the sources of these attitudes would require a separate study.

In conclusion, the significance of remuneration among other reasons behind the decisions to seek employment and accept a particular job by students is beyond question. However, the in-depth research also reveals the importance of developing new skills and competencies as pro-growth factors relating to investment in human capital. They may play the role of motivators for young people. These conclusions are consistent with the concepts pointing to the growing significance of non-financial incentives for people pursuing a relatively long education, which is grounded in the theories presented by Herzberg, Mathios, and Ophem. It might be worth supporting these kinds of motivations behind students' decisions to find employment, which would enhance their future employability through a better match with employers' expectations.

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Cooperation among SMEs in Poland on the path to their development

1. Introduction

The turbulence and permanence of the undergoing changes in the environment of contemporary enterprises, accompanied by the high dynamics of globalization processes, are creating a new reality of their functioning (Żmija, 2011), with development still unalterably being the constitutive goal of their activities on the market. As a result, enterprises undergo a constant change, transforming their functions, partial goals, tasks, and methods of organization and management due to the collapse of the hitherto prevailing paradigms of their functioning (Borowiecki and Siuta-Tokarska, 2016). The noted changes in the principles of the functioning of enterprises, information systems, and organizational structures used in them should favor flexible, more "intelligent" solutions that are applied in the models of enterprise of the future (Kubik, 2012). Quite often, the formation and implementation of these types of changes require the proper "reprogramming" and a different view of the inside and environment of an entity. The existing and newly occurring forms of cooperation of enterprises with other enterprises and other market entities (e.g., with local government units, research and development units, institutions of higher education, etc.) are to some extent a response to the occurring market challenges, among which we can indicate for (example) the growing and changing requirements of customers, shortening of product lifecycles, or growth of competition in the era of a digital economy (hence, the phenomenon of coopetition; namely, collaboration between competitors to achieve the goals set by them) (Małys, 2011). After N. Göler von Ravensburg,

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one can indicate that cooperation is an indispensable element for numerous micro-, small-, and medium-sized enterprises, which arises from the fact of the progressing processes of globalization and liberalization of economies, consequently intensifying the need for collaboration among these entities (Göler von Ravensburg, 2009).

The aim of this publication is to present the level and forms of the implementation of cooperation among SMEs in Poland, with their basic division by the type of the origin of the owner's capital (Polish and foreign capital). To achieve the goal formulated in this way, the first part of this paper indicates the significance of cooperation among enterprises on the path to their development. Then, the next part presents the findings of the author's own empirical research conducted among SMEs with Polish and foreign capital, pertaining to the undertaken forms of collaboration, size classes of the cooperating entities, and the benefits related to it.

The following questions for the research goal adopted in this way were formulated as follows:

- Do SMEs in Poland collaborate with enterprises and with other market entities, and what is the level of this collaboration (low, medium, or high)?
- With which enterprises do SMEs collaborate, taking into consideration the size classes of these entities and origin of the capital (Polish or foreign capital)?
- Which forms of cooperation are implemented most often and least often by SMEs, and are there are any differences between enterprises with Polish or foreign capital in this respect?

With the research questions defined in this way, the following three hypotheses were adopted:

H1: Enterprises of the SME sector in Poland cooperate both with enterprises and other entities on the market, but the share of SMEs cooperating with other enterprises is greater than with other market entities.

H2: When differentiating SMEs by their size classes, the percentage of cooperating enterprises increases with the growth of the size class of the entity (the smallest – among micro-enterprises, and the biggest – among medium-sized enterprises).

H3: Among the enterprises of the SME sector in Poland, cooperative firms of their collaboration prevail, whereas considering the differentiation of enterprises by the origin of their capital the author made – SMEs with foreign capital use concentrated forms of cooperation to a greater extent than SMEs with Polish capital.

2. Cooperation among enterprises as factor of their development

Development being a manifestation of all forms of life is the object of interest of, among others, philosophy as well as the natural and social sciences (Siuta-Tokarska, 2015).

In general, development is treated as a long-term process of purposeful changes in which successive stages of transformations can be distinguished (Brózda, 2002).

According to W. Gabrusewicz, the development of enterprises is understood as an evolutionary and long-term process of purposeful quantitative and qualitative changes leading from simpler, relatively not very diverse forms or states to more-complex and more-diverse forms or states significantly transforming the inner structure of an enterprise and its operating methods (Siuta-Tokarska, 2015). It is assessed and adopted as a justified assertion that, just like the changeability of matter, is the driver of any development, the essence of the development of an enterprise are changes made in it, and the development of an enterprise is mostly affected by those changes that identify the occurring problems and show the ways and possibilities of solving them (Siuta-Tokarska, 2015). Moreover, it is assumed that, in the assessment of the development of social and economic phenomena, one should apply the category of progress understood as changes that aim to enrich the entity and consist of passing from the lower to higher stages of the entity's development, and the enriching refers to the individual components and relationships among them. While discussing the development of an individual economic entity, one must bear in mind that, in spite of a general similarity in the progression of the process of these entities' development, their development differs in terms of the type, subject, and scope of the changes (Siuta-Tokarska, 2015), which is particularly visible with regard to SMEs (among which, we can distinguish micro-, small-, and medium-sized business entities).

The dynamics and structure of the developmental processes are primarily determined by the factors of development; the basic division of which grasps the external and internal factors of enterprise development. All of the factors may have a stimulating or destimulating influence on the development of the enterprises; therefore, they may positively influence its development or be its restraint, and their effects may cancel each other out in some cases (Siuta-Tokarska, 2015). As a result, the factors of development cause or contribute to the occurrence of a change in an enterprise, a consequence of which new challenges for an enterprise occur, which may then change the character, dynamics, and mutual penetration of the processes undergoing in it (Walas-Trębacz, 2004).

Thus, enterprises in which the strive for (Walas-Trębacz, 2004):

– a fast reaction to changes undergoing on the economic market;
– adaptation to multidirectional changes in the environment;
– the manufacturing of products meeting the expectations of the recipients and/or the creation of needs for a specific product;
– the proper forecasting of changes in the environment and identification of those factors whose impact will be decisive (determinants) for the competitive potential of the entity and coping with the occurring power of competition (advantage) and, as a consequence, achieving an adequate position on the market;
– the creation of new ideas as well as the creation of new values;
– the development of an individual

is visible, more and more often use opportunities related to the implementation of ventures with support from an external partner in the form of cooperation (Rundo and Ziółkowska, 2013; Karwacka, 2016). As M. Strzyżewska points out, studies on alliance capitalism and new forms of the organization of enterprises confirm that, over the last few decades, cooperation among Polish enterprises and among enterprises from different countries has created a powerful leveraging of the development of enterprises and their internationalization (Strzyżewska, 2001). The area of research within this scope also concerns SMEs, and the issue of cooperation is regarded as important and significant for their development (Adamik, 2012; Borowiecki and Siuta-Tokarska, 2008).

The notion of the cooperation among enterprises can be understood as a type of collaboration characterized by the coordination of activities within the established relationships, with identical or complementary goals undertaken by entities in order to achieve the results desired by all of the interested parties (Małys, 2011). The occurrence of the categorization of goals (interests) of the cooperating parties is indicated into the following (Małys, 2011):

– individual goals that motivate the entrance into relationships based on cooperation;
– strategic goals that the parties try to defend (e.g., arising from other relationships within the cooperation;
– common goals arising from the commonness of the goals of all parties to the collaboration process.

Among the numerous motives of undertaking cooperation by entrepreneurs as indicated in the literature of the subject, the following are particularly worth paying attention to (Ratajczak-Mrozek, 2011; Barczak, 2016):

– the better use of market opportunities;
– increasing the bargaining power towards suppliers and recipients and strengthening the position in comparison with the competitors;

– the possibility to raise funds and increased speed of the implementation of investment ventures;
– the growth of added value;
– an increase in the access to information;
– achieving access to complementary resources of partners (raw materials and materials, products and technical solutions, human capital) as well as their knowledge and experience with regards to the organization and management or research and development;
– the implementation of the process of learning "within created and developed interorganizational bonds";
– an opportunity to improve employee qualifications by using good practices of cooperation;
– the access to customers and business partners;
– extending the range and improvement of the quality of the products;
– the facilitation of the distribution of products, developing a distribution network;
– reducing the risk of activity;
– the possibility to reduce the costs of activity;
– the possibility to achieve economies of scale;
– the possibility of the faster internationalization of the enterprise activity.

The relationships that will be established based on cooperation should contribute to an increase in the effectiveness of an organization (Olesiński, 2010) as well as to an increase in its developmental potential and the implementation of development itself as a consequence. Thus, the subject matter of cooperation among organizations concerns various research areas with a broad spectrum of significance for their development, as the following (for example) (The Oxford Handbook..., 2008):

– organizational issues, including cooperation between enterprises by industries, size classes, the time of an enterprise's activity ("the age of the enterprise"), the stage of development, the country of origin, the dissimilarity of organizational cultures, the number of business partners, the consequences concerning the spatial arrangement of an organization in the established regional clusters or industrial areas, and the diversification of activities and types of cooperation between partners;
– the issues of connections and bonds linking the studied entities, such as interactional and non-interactional relationships, the way of formulating cooperation, prevailing ways of managing cooperation, the relationships and the significance of power in the cooperation process;

– the issues of the dimensions and attributes of the context of the implementation of cooperation, such as the influence of the cultural and institutional environment on cooperation, access to material and immaterial resources, access to explicit and tacit knowledge, intensity and frequency of the flow of resources and information among the entities, issue of the "closeness" of the relationships, and impact of other factors on the collaboration; e.g., the geographical location, availability of infrastructure, or influence of external entities;
– issues of a constitutive character: sources of cooperation and trajectory of related processes (phases of the cooperation process, evolution of coordination structures in the context of time, reasons for ending cooperation).

An analysis of the literature of the subject also inclines to the reflection that making a decision about cooperating with another entity is preceded by an adequate entrepreneur's calculation of both the opportunities and threats that may be related to it. Therefore, the factors that determine cooperation are multidimensional and varied (Tab. 1).

Table 1

Factors determining cooperation among enterprises

Criterion	Types of factors	Authors
Form of cooperation (traditional or contemporary)	Peripheral or native areas, lack or existence of competition between partners, lesser or greater significance of capital control, local or global character of cooperation, types of key resources, single agreements or networks of agreement, regionalization or its lack, forced agreements (e.g., related to legislation) or voluntary ones.	A. Sulejewicz
External and internal forces	Globalization of markets, fast dissemination and shortening of lifecycle of new technologies and products, development of opportunities to achieve economies of scale, growing turbulence and uncertainty in economy, liquidation of barriers in international trade, scope of activities and experience, sense of inadequacy of resources or qualities of enterprise competitiveness.	D. Faulkner, C. Bowman

Types of effects possible to be achieved	Reduction of uncertainty, increasing flexibility, possibility to acquire new developmental abilities, possibility to access deficit resources and skills, acquiring information, possibility to operate faster.	J. Child, D. Faulkner
Function of implemented cooperation	Stabilizing, specializing, directing, integrating, inspiring.	M.E. Porter
Organizational factors	Attributes of enterprise such as age and size of enterprise, business strategies, organizational structure and management system, specific resources of enterprise, dynamic ability.	B. Siuta-Tokarska
Personality and cultural factors	Individual factors concerning entrepreneur (e.g., traits of character, taking risk, individual competences, ability to establish contacts), cultural traditions concerning (e.g., a given region or country).	S. Slatter, D. Lovett
Labor resources	Skills of employees and managers, resource management, and entrepreneurship of the staff.	W. Danielak
Social factors	Level of mutual trust, two-sidedness, speed, and peaceableness of information flow.	W. Czakon
"Proximity" dimension of cooperating entities	Social (relational), cognitive (technological), organizational, institutional (cultural) proximity.	J. Bryant

Source: own study based on: (Bryant, 2003; Child and Faulkner, 2005; Czakon, 2007; Danielak, 1999; Faulkner and Bowman, 1999; Porter, 2001; Siuta-Tokarska, 2015; Slatter and Lovett, 2001; Sulejewicz, 1997).

As was indicated in this section of the article, the issue of the cooperation among enterprises is an important and characteristic element that determines their development. Therefore, this research area requires particular attention, and the empirical research findings in this respect are the significant part of this area.

3. Criteria and selection of research objects

To assess the level of cooperation among enterprises, entities being non-financial SMEs were examined, among which were distinguished **micro-, small-, and medium-sized enterprises**. Within the research, the enterprises were separated

into **enterprises with Polish capital** (which should be understood as enterprises with Polish private ownership and mixed ownership, with the dominance of the capital of entities of Polish private ownership controlled by Polish private entities, as well as all the entities that are included in the sector of non-financial enterprises and were not classified as entities with foreign capital) and **enterprises with foreign capital** (namely, private entities with foreign capital and of mixed ownership with the dominance of the capital of foreign entities controlled by non-residents, which are included in the sector of non-financial enterprises).

Based on the sections of Polish Classification of Activity (PKD) 2007, the following are distinguished: **industrial, construction, transport, commercial, and service enterprises**.

In the process of selecting a research sample upon the stratification of the studied enterprises into specific groups, a stratified random sampling was chosen. In the work on the research into cooperation among enterprises, the method of triangulation of research techniques was used: structured interviews in the form of mail surveys; direct interviews conducted via the Internet (the so-called CAWI); and direct computer-assisted phone interviews (the so-called CATI). In total, from January to July 2013 (considering the research period of 2007–2012, which is the period of the global economic crisis[1], 501 enterprises were examined, including 251 with Polish

[1] During the years 2013–2016, the activities of SMEs were influenced by the general improvement of the economic situation in Poland as compared to the aforementioned research period. This can be indicated, among others, by the results achieved by all enterprises during the years 2013–2015, including the activities of the SME sector (Działalność..., 2014; Działalność..., 2015; Działalność..., 2016). It is worth emphasizing that the findings of the research of other authors concerning the cooperation among enterprises and conduced after 2013 confirm an increasing share of SMEs in Poland cooperating with other enterprises; moreover, they indicate cooperation of some of these enterprises with research and development units and institutions of higher education, which was also the subject of the research of the author of this publication. What results from the research conducted among 148 SMEs from Łódz and Masovian Voivodeships from May to July 2014 is that 68.3% of the entities cooperated with other enterprises in the same industry (including 68.3% of micro-, 65.9% of small-, and 73.7% of medium-sized enterprises), and 34.5% cooperated with research and development units and institutions of higher education (including 28% of micro-, 34.1% of small-, and 63.2% of medium-sized enterprises). The dominating percentage of entities was indicated in respect to cooperation with distributors/recipients (90.3%), with suppliers (86.2% of the studied SMEs), but it was also significant with regard to cooperation with producer groups, holdings, or capital groups (36.6%). On the other hand, a low percentage of enterprises was indicated with regard to cooperation with business environment institutions (15.9%), local government units (15.2%), non-profit organizations (7.6%), and clusters (4.1%) (Lisowska, 2015). Also, based on the research considering SMEs characterized by the growth potential, an increase in the share of entities cooperating with other entities was proven. What results from the research presented in the "Polish Startups" report is that the share of SME startups in which cooperation with the scientific and research sector was indicated increased from 25% in 2015 to 42% in 2016 (Polskie startupy..., 2015; Polskie startupy..., 2016). In the European Commission publication, an increase in the share of innovative SMEs in Poland cooperating with other entities in their total number is pointed out, from 4.2% in 2013 to 6.8% in 2015 (Innovation..., 2014; European..., 2016).

capital and 250 with foreign capital from three regions of Poland differing in terms of socio-economic development; namely, the central, southern, and eastern regions. Among the studied enterprises, considering the size classes of the entities, 43% were micro-enterprises, 37% were small enterprises and 20% were medium-sized enterprises, and taking into consideration their types of activity, 20% were industrial enterprises, 15% were construction enterprises, 8% were transport enterprises, 38% were commercial enterprises, and 19% were service enterprises.

In the paper, in order to compare enterprises distinguished in terms of capital, the structure similarity measure was used, which is described with the following formula:

$$PS = \sum_{i=1}^{n} \min\left(pi_1, pi_2\right) \tag{1}$$

where[2]:

i – number of structure component,
n – number of structure components,
pi_1 – share of the i-nth component in the first structure,
pi_1 – share of the i-nth component in the second structure,
min – minimum value of the structure component.

The use of the taxonomic method will enable to show similarities and differences in respect of the implemented cooperation among the studied enterprises with Polish and foreign capital.

4. Findings of author's own research into cooperation among SMEs in Poland

Considering the specificity of the SME sector, we can indicate that cooperation within the enterprises of this sector and with other entities on the market should be an integral part of this development.

[2] With regard to the studied and analysed similarity of the structures of SMEs with Polish and foreign capital, considering their size classes and types of activities, the following measures of their similarity were adopted:
<0.8;1.0> – two structures are similar to a great extent; and for the value of "1.0", full similarity of the studied structures is indicated,
<0.6; 0.8) – two structures are similar to a moderate extent,
<0.4;0.6) – two structures are similar to a low extent,
<0.2; 0.4) – two structures are similar to a very low extent,
<0; 0.2) – two structures are different; and for the value of "0", full dissimilarity of the studied structures is indicated.

As K. Poznańska shows, under the conditions of globalization, one of the concepts that provides the opportunity to achieve permanent competitive advantages is the stimulation of various forms of cooperation among enterprises (Poznańska, 2010), and cooperation among enterprises and institutions of the business environment also influences the growth of their competitiveness[3]. As M. Romanowska observes, the ideal is an enterprise in which collaboration and not competition is searched for, in which numerous agreements with suppliers and purchasers as well as alliances with competitors are concluded for the needs of building a full offer (Romanowska, 2001).

The findings of the research into the cooperation among small- and medium-sized enterprises in Poland show that a special place in these enterprises is taken by cooperation within the supply chain (suppliers – subcontractors – customers) and to a lesser extent with other entities within horizontal connections (competitors, industry organizations, local governments, and others) (Małys, 2011). As a result, the links of the enterprises have a more vertical than horizontal character (Górzyński, et al., 2006). When comparing the intensity (the number of entities with which the entity cooperates), conditions (formal and informal cooperation), and level of the implemented forms of cooperation (from simple to complex) of SMEs in Poland with enterprises of this sector in Western European countries, a substantial insufficiency in the case of Polish entities of this type becomes evident (Olesiński, 2010; Siuta-Tokarska, 2015).

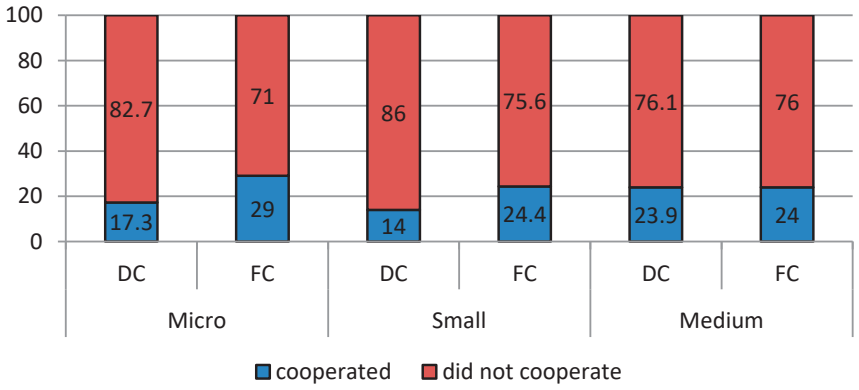
The research into cooperation among SMEs with Polish and foreign capital with other entities (apart from enterprises) such as research units, institutions of higher education, local government units, and others showed a relatively low share of SMEs implementing such cooperation.

Considering the size classes of the enterprises (Fig. 1), one can notice an insignificant difference between the enterprises with Polish and foreign capital, whereas the similarity of their structures is high.

Among the SMEs with Polish capital, the biggest share of cooperating enterprises concerned medium-sized enterprises (23.9%), then micro-enterprises (17.3%), and the smallest was noted among small enterprises (14%). For enterprises with foreign capital, the biggest share was noted among micro-enterprises (29%) and was similar among small and medium-sized enterprises (about 24%).

Some differences between the SMEs with Polish and foreign capital are visible depending on the type of the activity of the enterprises (Fig. 2).

[3] E. Wojnicka's study proved that, among the specific group of enterprises conducting industrial activities, there was a positive influence of the greater intensity of agreements for innovations, causing a greater share of innovative activity revenues in the total revenues of this group. Moreover, an indirect impact of cooperation with institutions of higher education and knowledge-intensive business support services on high profitability and an increase in the market share of these enterprises was proven (Wojnicka, 2004).

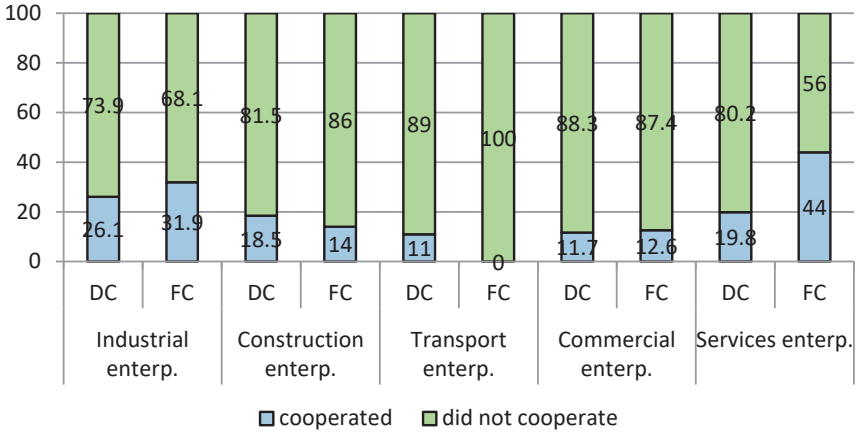


PS	Micro-enterprises	Small enterprises	Medium-sized enterprises
	0.88	0.90	0.99

Notations: DC – enterprises with domestic (Polish) capital; FC – enterprises with foreign capital

Figure 1. Structure of SMEs with Polish and foreign capital in Poland cooperating with other entities on economic market by their size classes and similarity of their structures (PS)

Source: own study



PS	Industrial	Construction	Transport	Commercial	Service
	0.94	0.96	0.89	0.99	0.76

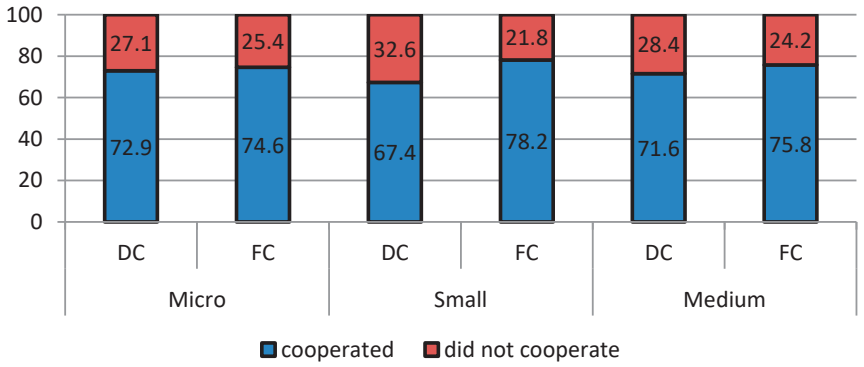
Notations: DC – enterprises with domestic (Polish) capital; FC – enterprises with foreign capital

Figure 2. Structure of SMEs with Polish and foreign capital in Poland cooperating with other entities on economic market by types of their activity and similarity of their structures (PS)

Source: own study

Among the enterprises with Polish capital, the biggest share of enterprises cooperating with other entities was noted among industrial enterprises (26.1%), then service enterprises (19.8%), construction enterprises (18.5%), and the lowest among transport and commercial ones (about 11%). In enterprises with foreign capital, the biggest share was observed among service enterprises (44%), then industrial ones (31.9%), and this was considerably smaller among construction (14%) and commercial enterprises (12.6%), whereas no cooperation was proven among transport firms. To generalize the obtained results, one can notice that the similarity of the studied structures of enterprises with Polish and foreign capital by their types of activity is high (PS ≥ 0.8), with the exclusion of service firms (PS < 0.8).

In the research part concerning cooperation among the SMEs with Polish capital and with foreign capital with enterprises, it was proven that the majority of the studied enterprises (more than 67%) implemented cooperation on the economic market, whereas in the smaller part of them, the lack of such cooperation was indicated (Fig. 3)[4].



PS	Micro-enterprises	Small enterprises	Medium-sized enterprises
	0.98	0.89	0.96

Notations: DC – enterprises with domestic (Polish) capital; FC – enterprises with foreign capital

Figure 3. Structure of SMEs with Polish and foreign capital in Poland cooperating with other enterprises by their size classes and similarity of their structures (PS)

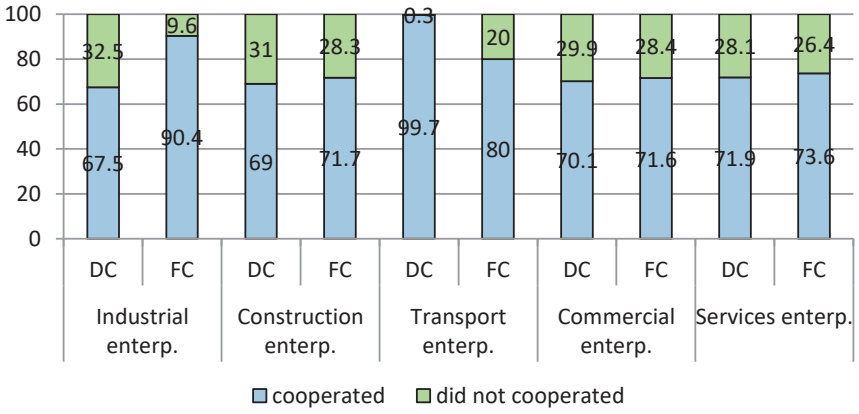
Source: own study.

As a result, the similarity of the structures of enterprises with Polish and foreign capital was high; the highest was for micro-enterprises (PS = 0.98), then for medium-sized (PS = 0.96), and the lowest was for small enterprises (PS = 0.89).

[4] This concerns contractual, non-contractual, and other cooperative forms.

In the paper, a research period of a few years was adopted – six years altogether, which undoubtedly was of great significance for the obtained research findings.

Taking into consideration the individual types of activities of SMEs (Fig. 4), the similarity of the structures of enterprises with Polish and foreign capital was high for commercial enterprises (PS = 0.99), service (PS = 0.98), construction (PS = 0.97), and transport enterprises (PS = 0.80); it was medium for industrial enterprises (PS = 0.77). As for industrial enterprises with Polish capital, the highest percentage of enterprises that did not cooperate with other enterprises was indicated when compared to the other four types of activity, opposite to that in the case of enterprises with foreign capital.



PS	Industrial	Construction	Transport	Commercial	Service
	0.77	0.97	0.80	0.99	0.98

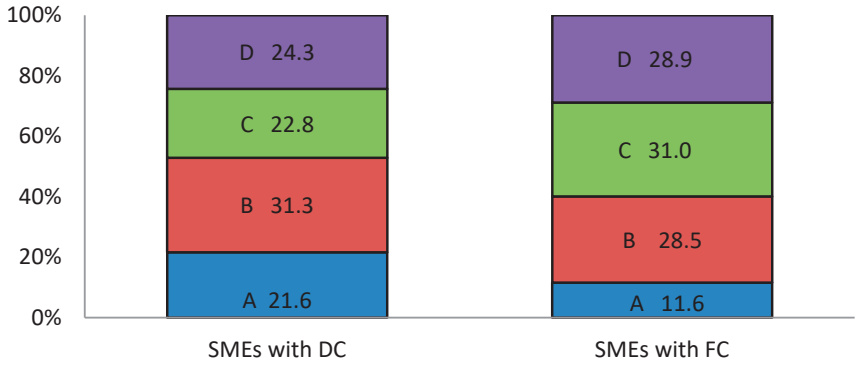
Notations: DC – enterprises with domestic (Polish) capital; FC – enterprises with foreign capital

Figure 4. Structure of SMEs with Polish and foreign capital in Poland cooperating with other enterprises by types of their activities and similarity of their structures (PS)

Source: own study

Within the author's own research, the level of cooperation among SMEs[5] with Polish and foreign capital was also assessed, considering the size classes of the enterprises with which the studied SMEs cooperated (Fig. 5).

[5] The notion "level of cooperation" should be understood here as the share of cooperating enterprises among the total number of enterprises. Cooperation with enterprises is understood both as cooperation among enterprises inside the SME sector (e.g., cooperation of some micro-enterprises with other micro-enterprises) as well as with small and medium-sized enterprises; also, with enterprises from the outside the SME sector, it concerns the large enterprise sector.



PS = 0.87

Notations: A – micro-enterprises; B – small enterprises; C – medium-sized enterprises; D – large enterprises; DC – domestic capital; FC – foreign capital.

Figure 5. Structure of SMEs with Polish and foreign capital in Poland cooperating with enterprises by their size classes and similarity of their structures (PS)

Source: own study

Both among SMEs with Polish and foreign capital, the dominating share was depicted for the SMEs cooperating with other enterprises of the SME sector (about 76% of the enterprises with Polish capital and more than 71% with foreign capital), whereas enterprises cooperating with large business entities had a minority share (more than 24% and about 29%, respectively).

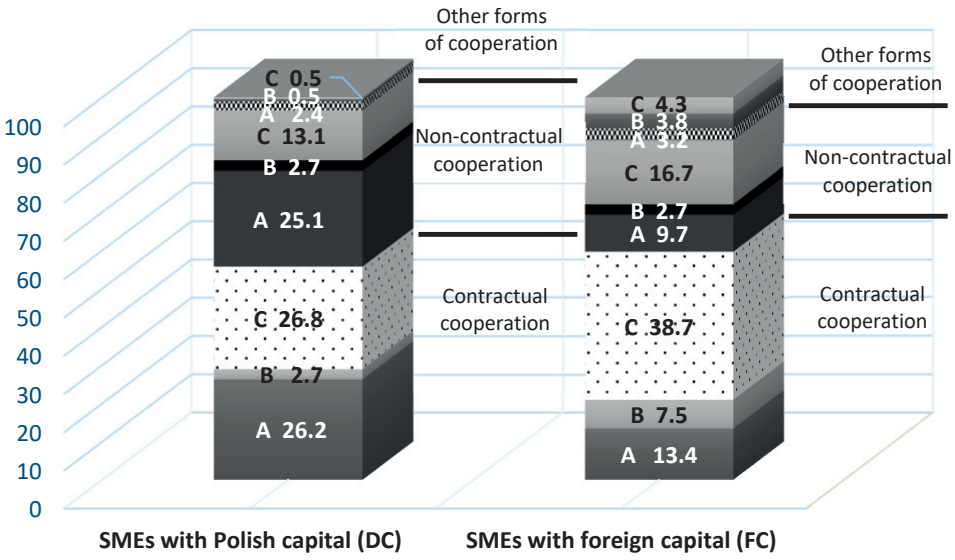
The differences between the studied enterprises with Polish and foreign capital in respect to cooperation inside the SME sector are related to the following:

- minority share of enterprises with foreign capital with regard to cooperation with enterprises in lower classes of their size, that is the lowest share for micro-enterprises, higher for small enterprises, and highest for medium-sized enterprises;
- the highest share of the enterprises with Polish capital with regard to cooperation with small enterprises, and smaller but similar shares with regard to cooperation with medium-sized enterprises and micro-enterprises.

Considering the type of capital (Polish and foreign enterprises) with which the studied SMEs cooperated, one may notice the following (Fig. 6):

- SMEs with Polish capital cooperated in particular with Polish enterprises (53.7%), then with both Polish and foreign ones (40.4%), and the smallest number of them cooperated only with enterprises with foreign capital (5.9%);

– SMEs with foreign capital cooperated mostly with enterprises with Polish and foreign capital (59.7%), then a smaller number of them cooperated only with enterprises with Polish capital (26.3%), and the smallest number (14%) only with entities with foreign capital.



PS=0.73

Notations: A – cooperation among studied SMEs with enterprises with Polish capital; B – cooperation among studied SMEs with enterprises with foreign capital; C – cooperation among studied SMEs with enterprises with Polish capital and with enterprises with foreign capital; DC – domestic capital; FC – foreign capital.

Figure 6. Structure of SMEs with Polish and foreign capital by type of implemented cooperation and type of capital of cooperating enterprises

Source: own study

Within the research conducted by the author, among the SMEs with Polish and foreign capital, the following forms of their cooperation with other enterprises were proven:

– contractual cooperation – as the basic form (most often indicated in the enterprises);
– non-contractual cooperation;
– other forms of cooperation (including the so-called loose and dense concentration forms), which were used by the studied enterprises to the least extent.

The similarity of the structures of SMEs with Polish and foreign capital can be defined as moderate (PS = 0.73). The fundamental differences concern the use of other forms of cooperation because, for SMEs with Polish capital, this form of cooperation was used by only 3.4% of the studied enterprises, whereas for SMEs with foreign capital, the share was 11.3%, as well as non-contractual cooperation: among SMEs with Polish capital, this form of cooperation concerned 40.9% of the studied enterprises and 29.1% of entities with foreign capital.

It is also worth paying attention to the benefits related to this cooperation as indicated by entrepreneurs. To make an appropriate division of the benefits the studied enterprises could achieve from the undertaken cooperation with other enterprises, we can distinguish the following:

– qualitative benefits:
  • improvement in the quality of products/services,
  • access to specialist knowledge,
  • possibility to implement innovative solutions,
  • growth of the prestige of the enterprise,
  • establishing business contacts;
– **quantitative benefits**:
  • gaining new customers,
  • winning new markets,
  • greater export opportunities,
  • reduction of business costs;

  quantitative and qualitative benefits:
  • growth of competitiveness of the enterprise,
  • other benefits.

Among the studied SMEs, the following were indicated most often: benefits related to winning new customers (23.8% of SMEs with Polish capital and 23.5% of SMEs with foreign capital), and then to the growth of competitiveness (13.2% and 14.5%, respectively), as well as the growth of prestige (11.1% and 15%), whereas least frequently, the access to specialist knowledge was indicated (4% and 3.3%), the possibility to implement innovative solutions (10% and 3.8%), and other benefits (3% and 2.5%). The similarity of the structures of the studied SMEs with Polish and foreign capital was high (PS = 0.92).

5. Conclusions and recommendations

Based on the analysis of the literature of the subject concerning the problem of cooperation among enterprises, one can clearly indicate that such cooperation is an important element of the growth of their competitiveness in the short

term, whereas in the long run, it is an integral factor of their development. The results of the research into SMEs in Poland as compared to Western European countries prove that these enterprises have a considerable potential that is used insufficiently. This can be proven (among others) by the findings of the author's own research with the capital differentiation of these enterprises. Among the SMEs with foreign capital in Poland as compared to those with Polish capital, a substantially higher percentage of the entities implementing cooperation with other market entities was observed, both by their size classes and their types of activities (construction and transport enterprises were the exceptions), just like in respect to the cooperation with other enterprises (transport enterprises were the exception). Some differences among the studied SMEs with Polish and foreign capital were manifested in respect to the different forms of cooperation used by them (the enterprises with foreign capital more willingly implement other forms of cooperation with enterprises, including concentration forms of cooperation – loose and dense ones), whereas the differences concerning the size classes of the enterprises with which they cooperated were insignificant; thus, the similarity of their structures was high.

In addition to the presented empirical and cognitive conclusions, the implementation of the author's own research also enabled the verification of the adopted research hypotheses (Tab. 2).

Table 2

Collation of results of verification of research hypotheses

No.	Content of adopted hypothesis	Result of verification
H.1	SMEs in Poland cooperate with both enterprises and other entities on the market, and the share of SMEs cooperating with enterprises is greater than with other market entities.	+
H.2	Differentiation of SMEs by their size classes, the percentage of cooperating enterprises increases with the growth of the size class of the entity (the smallest – among micro-enterprises; the largest – among medium-sized enterprises).	–
H.3	Among SMEs in Poland, cooperative forms of their cooperation prevail, whereas with the differentiation of enterprises by the origin of their capital – SMEs with foreign capital use concentration forms of cooperation to a greater extent than SMEs with Polish capital.	+

Explanation: the "+" sign indicates that the hypothesis was proven; 0 – no grounds for the acceptance nor the rejection of the hypothesis; the "–" sign indicates that the hypothesis was verified negatively (the hypothesis was not confirmed).

Source: own study

To sum up the above conclusions arising from the conducted literature analysis and the author's own research, one can claim that the cooperation among SMEs in Poland is implemented, both with enterprises inside their sector and with large enterprises; however, the extent of this cooperation is insufficient. Polish enterprises basically use the so-called concentration forms to a lesser extent as compared to foreign enterprises, whereas the basic form of the cooperation implemented by them is cooperation (contractual and non-contractual). What is visible is the potential of these enterprises and the possibilities to increase their activities in the area of cooperation with other enterprises and other market entities, such as local government units, research and development units, or institutions of higher education in order to improve their competitiveness and implement their development.

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Summaries

Kateřina Bočková, Daniel Lajčin: **RIPRAN – one of the best project risk analysis methodologies** ▪ Managerial Economics 2018, vol. 19, No. 1

JEL Classification: C02, O22

Keywords: *project management, project risk management, RIPRAN*

Project risk management is an important aspect of project management. According to the PMBoK, risk management is one of the ten knowledge areas in which a project manager must be competent. Project risk management remains a relatively undeveloped discipline, distinct from the risk management used by operational, financial, and underwriters' risk management. This gulf is due to several factors: risk aversion (especially public understanding and risk in social activities), confusion in the application of risk management to projects, and the additional sophistication of probability mechanics above those of accounting, finance, and engineering. The aim of the presented paper is to demonstrate how to use RIPRAN (the Czech project for risk analysis) as a main part of a feasibility study of a new product project in a manufacturing company. To fulfill this primary aim, we formulated these secondary aims:

– To provide a critical analysis of the available information sources dealing with risk management in new product projects in manufacturing companies.
– To study and profoundly understand RIPRAN, project risk analysis, its history, application, principles, rules, and exceptions.
– To discuss with the author of RIPRAN about the RIPRAN application in new product projects in manufacturing companies of non-Czech origin.
– To compile a feasibility study of the new product project.

All of these highly cited secondary aims were fulfilled. A short overview of the risk management topic as well as RIPRAN's characteristics and definition are part of the presented paper. To process this theoretical part of the paper, we used mostly analysis, synthesis, comparison, and deduction. We studied monographs, journals, and internet links with the impact of a source's topicality. The used sources are cited in the list of references. During the process of a feasibility study of a new product project provided through the analysis of our own experience, we discussed the application of the RIPRAN method to the new product project with the author of this method. We realized e-mail correspondence, phone discussions, and finally a personal meeting to control the whole RIPRAN analysis document and discuss the method's application in the non-Czech origin business environment. To fulfill the primary aim of the presented paper, we decided to use the case study method.

Joanna Duda, Maciej Woźniak: **Bank policies towards SME sector in Poland and selected countries worldwide** ▪ Managerial Economics 2018, vol. 19, No. 1

JEL Classification: G2, G21, G23, L29, M21

Keywords: *SMEs, policy of banks, bank credit*

Small- and medium-sized enterprises (SMEs) are very significant for the economy. However, they face many problems when trying to finance their development. In connection to the above, the

authors set four research questions that are connected with bank policies towards SMEs. Then, they make an analysis in order to answer the questions. The conclusions, recommendations. and limitations are presented at the end of the paper.

Henryk Gurgul, Marcin Suder: **Impact of ATM location on its profitability in Malopolskie and Podkarpackie provinces** ▪ Managerial Economics 2018, vol. 19, No. 1

JEL Classification: C32

Keywords: *ATMs, number of withdrawals from ATM, location*

The first decade of the 21st century saw a dynamic development in ATM networks. This was reflected in the growth of the number of ATMs and number of withdrawals. However, in the beginning of the second decade, a slowdown in the dynamic development of this part of the banking system has been observed in Poland. The significant reduction of interchange (which is the main source of revenue for ATM network deployers) and growing availability of cashless payments tempered a further intensive development of these networks. Over the next 3 years, this regression was reflected in the declining number of withdrawals from ATMs and the insignificant growth of the number of ATMs. Therefore, ATM owners are forced to search for new solutions that could guarantee more profits. One way is the suitable choice of locations for new ATMs and removal of ATMs from non-profitable locations. In this paper, the authors have attempted to indicate the locations with the largest number of withdrawals on the basis of the number of withdrawals from the ATMs of the one of the largest ATM network deployers. The ATMs with the largest number of withdrawals are sources of the largest profits due to interchange. The authors have also indicated those locations where ATMs can be a source of losses.

Tomasz Janik, Ewa Beck-Krala: **Managing volunteer engagement in reference to empirical research** ▪ Managerial Economics 2018, vol. 19, No. 1

JEL Classification: D64

Keywords: *engagement, commitment, involvement, voluntary work, non-profit organizations, leading a team of volunteers*

Engagement and volunteerism are important issues in the area of Human Resource Management. Organized in Krakow in 2016, World Youth Days (WYD) exposed many phenomena related to these areas, creating an interesting research field. This paper identifies and explains the terminology and concepts existing in the literature that concern engagement and characterizes the volunteering issue in the context of Polish social reality. The article also contains selected findings of a survey conducted among World Youth Days volunteers. Based on it, this paper shows the characteristics of selected relationships and the social and demographic conditions of volunteerism in that specific research perspective. Research has shown that, within the volunteers' groups, it is possible to use professional and modern management methods. Our findings lead to a set of suggestions for team leaders that have the potential of creating a higher level of engagement among participants and may enable better organizational management.

Gabriel Koman, Martin Holubčík, Milan Kubina: **Descriptive representation about transformation of company by using current technologies and tools for analytical processing and evaluation of diverse data** ▪ Managerial Economics 2018, vol. 19, No. 1

JEL Classification: M15, O32, L25

Keywords: *big data technology, data and information, decision-making, Industry 4.0, IoT, management, synergy*

Companies are currently producing and processing larger and larger amounts of data that they were not able to effectively process and subsequently use in the management of company processes in the past. There are several technologies and tools for the analytical processing and evaluation of diverse data, such as the Big Data technology. The Industry 4.0 concept (which is closely linked with the IoT) will bring an enormous growth of produced data into the company sphere. The information value of such data can significantly affect managing and decision-making processes in a company. Here, we can see a synergy between man and technology where each influences the other. The purpose of this paper is to support the following statement: in the present business environment, we are facing the transformation of a company that, for efficient management and decision-making, needs: a) to capture and process all available data; b) to implement new tools into strategic decisions; and c) to integrate data through a single system. This article describes the possibilities of deploying the efficient use of new technologies (Big Data, Industry 4.0, and IoT) in management.

Piotr Misztal: **Universal basic income. Theory and practice** ▪ Managerial Economics 2018, vol. 19, No. 1

JEL Classification: D31, H53, I30.

Keywords: *universal income, income inequality, economic policy*

A universal basic income is financial income agreed to all members of society without the need to provide work. The right to this income and its level are universal and independent of the size and structure of the household. In addition, a universal income is paid regardless of the income of the citizens from other sources. The purpose of the article is to provide a theoretical and empirical analysis of a universal basic income, with a particular emphasis on the origin and results of introducing this instrument. In the text, research methods are used based on literature studies in macroeconomics and economic policies as well as statistical and descriptive methods based on the data published by international economic institutions (Organization for Economic Co-operation and Development and the World Bank).

Izabela Ostoj: **Reasons full-time students of economics in Poland undertake jobs** ▪ Managerial Economics 2018, vol. 19, No. 1

JEL Classification: J220

Keywords: *supply of labor, students, Poland*

Observation of the behavior of full-time students at economics universities in Poland reveals that a significant percentage of these students combine studying with gainful employment. In

the literature there is a lack of research results and theorization concerning the decision-making mechanisms of full-time students choosing to combine studying with work. The assumption proposed in the article is that an employment-seeking student may perceive work primarily as a source of income or, alternatively, he/she may wish to gain professional experience that would make it easier for him/her to enter the labour market in the future. This article aims to investigate the motivations behind the decision to seek employment taken by full-time students of Economics in Poland. In particular, it attempts to identify the reasons behind starting a job and the criteria that played the most important role upon accepting a job offer. Focus is placed on the comparison between financial motivations and reasons relating to professional development. This article uses the results of a survey created and conducted by the author. The conclusions based on these results indicate that the main source of motivation for engaging in gainful employment was financial in nature and the primary criterion for choosing a particular employer was the level of compensation.

Barbara Siuta-Tokarska: **Cooperation among SMEs in Poland on path to their development** ▪ Managerial Economics 2018, vol. 19, No. 1

JEL Classification: D22, L25

Keywords: *cooperation, SME sector, development*

On the basis of the overview of the literature of the subject, the significance of the problem of cooperation among SMEs in the context of the factors influencing their development is presented. The author's own empirical research conducted among the enterprises of the sector with and without foreign capital in Poland presents the engagement of these enterprises in cooperation with other enterprises as well as with other market entities such as local government units, research and development units, or institutions of higher education. The results of the research concerning various forms of cooperation among SMEs with other enterprises as well as the size classes of the cooperating enterprises are also graphically presented. Moreover, the assessment of the similarity of the structures of the SME sector enterprises with Polish and foreign capital is made, which in turn made it possible to define their similarities and differences by taking into consideration their capital (Polish or foreign).

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All illustrations, figures, and tables are placed within the text at the appropriate points, rather than at the end.

Title page should include a footnote, giving the author(s) affiliation(s) (including postal and e-mail addresses of all authors).

Figures must be prepared in a form suitable for direct reproduction. Digital artwork at least 300 dpi resolution is accepted. Photographs, on glossy paper (9 by 13 cm or larger), should display sharp contrast. Figures, tables and photographs should be numbered according to their reference in text.

Illustrations should be edited in CorelDraw (*.CDR), DrawPerfect (*.WPG) or in any other vector graphics form e.g. HPGL, Encapsulated PostScript (*.EPS), Computer Graphics Metafile *.CGM) or bitmaps (*.TIF, *.PCX).

Mathematical equations within the text should be written in separate lines, numbered consecutively (numbers within round brackets) on the right-hand side. Greek characters must be written out clearly.

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Book with two authors

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Book with three or more authors

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Book – second or later edition

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Book by same author in the same year

Napier, A. (1993a) Fatal storm, Sydney: Allen and Unwin.
Napier, A. (1993b) Survival at sea, Sydney: Allen and Unwin.

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Danaher, P. (ed.) (1998) Beyond the ferris wheel, Rockhampton: CQU Press.

A chapter in a book

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Hart, G., Albrecht, M., Bull, R. and Marshall, L. (1992) 'Peer consultation: A professional development opportunity for nurses employed in rural settings', Infront Outback – Conference Proceedings, Australian Rural Health Conference, Toowoomba, pp. 143–148.

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