

Game Changers in Management

edited by
Monika Hajdas



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Preface

A “game changer” is a metaphor (Avelino et al., 2017) commonly used to describe a broad range of events and phenomena in different fields and domains, from natural disasters (Gober, 2018), through economic crises (Loorbach et al., 2016), emerging stories and narratives (Van Ruler, 2021), technological or social innovations (Avelino et al., 2019) to conflicts and political or military interventions (Geller & Guedes, 2017). Although precise definitions of a “game changer” vary and its conceptual boundaries remain blurred (Avelino et al., 2017), scholars agree that its main quality is the ability to change the *status quo*.

Management scholars have long been interested in increasing the relevance and impact of their studies (Banks et al., 2016; Brammer et al., 2019; Wickert et al., 2021) by addressing a diverse range of global issues. This aspiration to offer significant and meaningful theoretical, practical and societal contributions has led to the advent of strand of management research related to “grand challenges” (Brammer et al., 2019; Buckley et al., 2017; Ferraro et al., 2015; George et al., 2016). Solving any of these challenges could be a game changer, not only from management studies perspective but also from a wider social standpoint.

The present monograph on *Game Changers in Management* includes eight chapters that draw inspiration from a diverse set of theories – such as technology adoption, service-dominant logic or information systems (IS) success model, and industrial contexts – from military, through board games to higher education. Authors discuss current challenges in management research and practice and offer their valuable insights into advancing the knowledge on how to tackle those challenges.

The opening chapter in this monograph falls into a broad category of power, influence and public trust (Enriques, 2022) and how those who possess them may act towards a better future framed by the Sustainable Development Goals (SDGs). In their chapter entitled *Does Our Future Rest in Corporate Hands? Study of Krakow Top Ten Corporate Employers’ Commitment to UN Sustainable Development Goals* Piotr Buła, Anna Thompson and Agnieszka Żak highlight a private sector’s potential as the key agent of change when facing global game changers and wicked problems.

As emerging technologies usually bring significant social or economic change (Sossa et al., 2020), several authors in this monograph have focused their attention on technological game changers. In the chapter *Artificial Intelligence Adoption in Human Resources Management*, grounded in the context of Industry 4.0, Joanna Tabor-Błażewicz investigates the state of AI adoption in HR departments, including technology’s advantages and disadvantages perceived by HR professionals. As adopting novel technologies rarely

comes without challenges (Bai et al., 2023), the chapter *The Industry 5.0 Concept as a “Game Changer” for the Fourth Industrial Revolution* by Sebastian Saniuk and Sandra Grabowska highlights the limitations of digital technologies of the fourth industrial revolution. The authors of this chapter focus particularly on the dehumanization of an industry and show how these limitations hinder achieving the main goals of Industry 5.0, i.e., human orientation, sustainable development and resistance to all kinds of interference and disruptions caused by various geopolitical changes. In the chapter *The Idea of Organizational Resilience in the Face of Cybercrime* Dorota Walentek and Dorota Jelonek pay attention to numerous cyberthreats resulting from digital transformations, focusing particularly on employees’ knowledge and ability to prevent them. The chapter *The Evaluation of IT Systems in Enterprises* by Marcin Szplit focuses on the connection between strategy of the enterprise and introduction of IT systems.

Financial crises force many firms and organizations to search for more flexible methods of financing (Baber & Fanea-Ivanovici, 2022). In the chapter *Crowdfunding in the Board Games Industry – ‘Gamechanger’ or a Temporary Curiosity?* Michał Nowicki discusses how economic crises challenge firms in terms of maintaining financial liquidity and a skilful fundraising. Based on a study of a board games industry the author depicts crowdfunding as an alternative to traditional financing mechanisms and highlights its additional benefits such as fostering creativity, organizational openness, innovation and entrepreneurship.

As Russia’s war on Ukraine has staggered the European security order (Fiott, 2023), the topics of military safety and the effectiveness of a military sector are gaining additional importance and attention. The chapter *Evolution of Development Centres in the Military Sector – from Beginnings to Game Changers* by Katarzyna Czainska, Dorota Balcerzyk and Robert Balcerzyk deals with the issue of identifying competencies, methods of diagnosis and their effectiveness using assessment and development centres which in armies focus on the officer cadre and their leadership. The findings of the study can facilitate predicting and forecasting the behaviour of soldiers in stressful situations, during operations under pressure, in a dynamic, uncertain environment.

As Nelson Mandela’s famous quote puts it – “Education is the most powerful weapon which you can use to change the world”, the monograph’s final chapter refers to the topic of higher education. In the chapter on *Using the Experience of Students in Improving the Quality of Services at Universities* Anna Ludwiczak shows how supplying universities’ quality management systems with a knowledge on students’ experiences may broaden the repertoire of measuring the quality of education.

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CHAPTER 1

Does Our Future Rest in Corporate Hands? Study of Krakow Top Ten Corporate Employers' Commitment to UN Sustainable Development Goals

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Abstract: Increasingly, and to a greater extent than in the past, the private sector is taking responsibility to confront global game changers and wicked problems, and act on the UN Sustainable Development Goals (SDGs). This approach offers a huge opportunity to build alliances and work with different sectors, which is one of the key approaches to meeting the challenges of VUCA and realising CSR 4.0. In order to find an answer to the question of whether our future rests in corporate hands, the authors analysed the activities of the 10 largest multinational corporations operating in Krakow in terms of selected CSR 4.0 principles with a particular focus on the implementation of the SDGs. For this purpose, the following research methods were used: literature analysis, content analysis of sustainability reports and comparative analysis. Even within the limited scope of the presented literature review and comparative analysis, this article highlights the enormous potential of the private sector in driving the positive change we need globally, as laid out in the UN Sustainable Development Goals. The private sector has greater resources, is better able to handle risk and innovate, it stands to be not just a key partner, but potentially the key agent of change, in particular in the face of mounting global game changers and wicked problems.

Keywords: CSR 4.0, Sustainable Development Goals (SDGs), cross-sector partnerships, game changers, change management

1.1. Introduction

The times we live in are very uncertain. There is a growing awareness of a globally connected business world. The status quo seems to change every day, making existing models for dealing with complexity and uncertainty obsolete (Mack et al., 2015). The turbulence that the technological, political, economic, environmental or socio-cultural processes are now creating is often referred to by the acronym VUCA (Volatility, Uncertainty, Complexity, Ambiguity). The unpredictable movements in the VUCA may severely hamper the ability of corporations, organisations, and people to make decisions, plan, manage risk and support change; this is further exacerbated in the longer-term perspective of most societal challenges (Van Tulder, 2018).

Game changers were broadly conceptualized as macro-trends that are perceived to change the rules of the game, i.e., to change how society is organised and defined by today's common norms, values, institutions, and social relationships (Avelino et al., 2017; Haxeltine et al., 2013). Game changers are events and developments that shape the course of history (Avelino et al., 2017); they include global changes, e.g., climate change, resource depletion, geopolitical instability, economic crises, growing inequality, ageing and health, migration and social cohesion (Avelino et al., 2017). Nowadays, we can add to this list further crises, such as the COVID-19 pandemic, the war in Ukraine or rampant inflation, and their associated socio-economic challenges.

The VUCA reality not only raises challenges and pitfalls for leaders, but also creates opportunities for those who can manage its dynamics (Bennett & Lemoine, 2014; Muff, 2018). Some refer to them as strategic "leadership paradoxes" (Bolden, 2016) or as "grand challenges" (George et al., 2017) that require concerted and coordinated efforts. It is conceivable that their scale, scope and complexity will be such that no single sector – government, business, civil society or academia – will be able to tackle them alone. There will be a need for alliances that bring together different sectors (Albrechtsen, 2017). Dealing with rapidly increasing complexity and uncertainty also requires innovations in business models, new forms of decision-making that can deal with various levels of problems or quite different mentalities (Van Tulder, 2018). Despite efforts, progress is still too slow and, in addition, COVID-19 has turned the clock back on many fronts (Van Tulder & Van Mil, 2022).

The remedy to these problems may be a change in the way organisations operate and do business within the framework of the CSR 4.0 concept and concerted efforts to achieve the Sustainable Development Goals (SDGs), which, according to Van Tulder (2018), provide a framework for classifying the most pressing social, economic and environmental challenges. The SDGs provide the most relevant positive agenda and counteract the negative consequences of VUCA (Van Tulder & Van Mil, 2022).

The aim of this article is to analyse the activities of the 10 largest multinational corporations operating in Krakow in terms of CSR 4.0 principles with a particular focus on achieving SDGs. Munro's (2020) concept emphasises a global perspective, but also focuses

on social and intrapersonal entrepreneurship, innovation, shared value, social impact, stakeholder engagement and achieving sustainable development goals. In this article, the authors undertake a consideration of selected elements of the CSR 4.0 idea, using the following research methods: literature analysis, content analysis of sustainability reports, and comparative analysis.

This article is structured as follows: The introduction provides a brief explanation of the concepts of VUCA and change makers and an overview of today's global challenges. Section 2 (literature review) describes the contemporary view of corporate social responsibility, the new CSR 4.0 concept by Munro and the UN Sustainable Development Goals. Section 3 presents the methodology of our research. Section 4 discusses the results of the content analysis of the sustainability reports of the ten largest corporations operating in Krakow. The conclusions are presented in Section 5.

1.2. Literature Review

Contemporary View of Corporate Social Responsibility

The events of the last few years (i.e., COVID-19 pandemic, Russia's aggression against Ukraine) have shown that any forward perspective on the direction of CSR must account for uncertainty now and in the future, and recognise that priorities may change. The dominant approach to CSR is increasingly proactive, systematic and long term (D'Cruz et al., 2022). CSR has moved from the periphery to the core of business and has become an integral part of business strategy and a source of competitive advantage (Porter & Kramer, 2011).

In the CSR 2.0 era, companies engaged in corporate social responsibility actions not only because of a moral imperative but also for business value: business and social interests were no longer seen as a zero-sum game, but as interdependent and complementary (D'Cruz et al., 2022). As the next step, the CSR 3.0 perspective encompassed what forward-looking companies are doing and how they are updating their CSR strategies to match global changes in the way they do business. CSR moved towards a more integrated, networked and partnership-oriented concept (Crespin, 2013; Dumont, 2012; Munro, 2020). It focused on social innovation (Buła & Žak, 2017; Munro 2020; Osburg & Schmidpeter, 2013), the commonality of goals and values of all stakeholders in the company (Dumont, 2012; Sánchez-Bayón & García-Ramos Lucero, 2020), the networking aspect and social media presence (Crespin, 2013; Dumont, 2012), up to the challenges of artificial intelligence (D'Cruz et al., 2022). In the third wave of CSR, organisations are oriented towards stakeholders and their needs and driven by the Sustainable Development Goals (SDGs). In this case, CSR is local, easily measurable and verifiable, as it is based on activities that concern the company's social and environmental setting (Sánchez-Bayón & García-Ramos Lucero, 2020).

Initiatives and movements that have the potential to significantly influence global change in organisational performance and stakeholder (especially youth) attitudes are also

currently being widely discussed in academic literature, in the business community and on social media. Munro (2020) and Carroll (2021) point to conscious capitalism, the Be the Change movement, business-for-purpose or B-corp, among others. Equally important is the Business Roundtable's 2019 initiative on a more ethical way of doing business, which argues for a shift away from shareholder primacy to engagement with all stakeholders (Harrison et al., 2020).

Munro's Concept of CSR 4.0

In considering the evolution of corporate social responsibility, the Australian researcher Munro (2020) proposed the concept of CSR 4.0. According to her, CSR has now become a new type of responsibility – with innovation and partnership as key themes, which has an important role to play in the era of the fourth industrial revolution and the new era of Globalisation 4.0. In the proposed CSR 4.0 framework, Munro (2020) emphasises that the relationship between business and society is close and inseparable. The author advocates a change in the way organisations and companies operate and do business within an evolving CSR framework and a collaborative and integrated environment (Carroll, 2021).

The key principles and themes of CSR 4.0 are: "purpose" as a core priority; innovation, integration and collaboration with all partners; identification, engagement and co-creation with all stakeholders; shared and integrated value at a deeper level; deep transformation and networking in a new ecosystem; measurable Sustainable Development Goals (SDGs) with continuous evaluation and renewal; a systems orientation that includes both managers and employees; and circular social missions with environmental loops (Munro, 2020).

Increasingly more companies are realising that their efforts do not have to focus solely on maximising profits and expanding their business. "Purpose-driven businesses" not only generate revenue, but also focus on social needs (Carroll & Brown, 2018; Kanter, 2011; Munro, 2020) and incorporate the idea of "doing good for the greater good" into their corporate DNA (Friedman, 2022). Doing good and being profitable are not mutually exclusive. In fact, they can be complementary and even a competitive advantage. This approach has a positive impact in the following areas: improving business performance; attracting young, talented employees who care about social issues; retaining employees; boosting employee morale; inspiring employees; attracting potential investors; and connecting with socially conscious customers (Friedman, 2022; Lueneburger, 2014).

As Munro (2020) argues, with public trust shifting from governments to businesses (Edelman, 2020) joining together to solve difficult problems requires partnerships between key organisations. Business leaders should work together to solve the most wicked social and environmental challenges. Wicked problems are large-scale societal challenges (e.g., extreme poverty, pandemics, and climate change), entangled in networks of causal, interrelated variables that cross-national boundaries, complicating both their prediction and diagnosis (Conklin, 2005; Reinecke & Ansari, 2016). The scale and transnational reach of wicked problems in a globalising world has led to calls for a multi-stakeholder approach to governance, with a particular focus on firms and other private actors (Scherer et al., 2013).

The novelty of Munro's (2020) model lies in its focus on both executives (*C-suite*) and employees and "preneurs". It encompasses top-down bottom-up systemic approaches with initiatives that can be taken at scale, towards a purpose-driven economy within a circular ecosystem – which must be "authentic" and therefore also measurable and accountable.

It is worth emphasising that partnerships are the element that permeates all the principles of CSR 4.0. Of particular importance is a model of partnerships that are long-lasting, scalable, and transformative and that create shared value (Albrechtsen, 2017). With traditional boundaries between sectors blurring and the role of governments less relevant, business and civil society have a more important role in governance. Global instability, economic transformation, the fourth industrial revolution and armed conflicts are opening not only new responsibilities and opportunities for each sector, but also a shared desire to achieve the idea of a world envisaged in the global Sustainable Development Goals.

Sustainable Development Goals (SDG)

One of the most critical areas of CSR discussion over the past 20 years is the concept of sustainable development (Carroll, 2021). In 2015, all UN member states adopted the resolution "Transforming our World: the 2030 Agenda for Sustainable Development" (United Nations [UN], 2015). The new vision for world development sets out in the 2030 Agenda focuses on five great transformational changes (known as the 5Ps principle): People, Planet, Prosperity, Peace, Partnership. It includes the Sustainable Development Goals (SDGs) – 17 overarching objectives (see Figure 1.1), associated 169 specific, interdependent, and indivisible tasks to be achieved by a wide range of stakeholders, and 232 indicators to measure their achievement. Sustainable development in Agenda 2030 terms is inclusive development, based on multi-sectoral partnerships.

The Sustainable Development Goals (SDGs) are aimed at all actors in society. Since the private sector comprises the largest part of the economy it is considered an important stakeholder in Agenda 2030 to drive progress towards the SDGs (Mio et al., 2020; Rashed & Shah, 2021; Scheyvens et al., 2016; Topple et al., 2017). Many authors argue that the private sector has a unique role to play in the pursuit of the Sustainable Development Goals (Berrone et al., 2019) and particular strengths (Scheyvens et al., 2016) that it can leverage to achieve them. These include innovation, responsiveness, efficiency, technology, financial resources, expertise, sector-specific knowledge, management capabilities and a greater willingness to take risks (Berrone et al., 2019; Buhmann et al., 2019; Frey & Sabbatino, 2018; Porter & Kramer, 2011; Scheyvens et al., 2016). The private sector contributes resources, knowledge and expertise, also by hiring employees with specific skills that can help achieve the SDGs (Marx, 2019; Pedersen, 2018; Scheyvens et al., 2016).

Following the introduction of the Sustainable Development Goals, there have been a number of publications that have analysed their application at different levels and in different contexts (Chankseliani & McCowan, 2021; Fuso Nerini et al., 2019; Gupta & Vegelin, 2016; Hák et al., 2016; Holden et al., 2017; Morton et al., 2017; Naidoo & Fisher, 2020; Olabi et al., 2022; Sachs et al., 2019; Sadiq et al., 2023; Vinuesa et al., 2020; Zinkernagel et al., 2018).


















5 P principles	Sectors	Sustainable Development Goals (SDGs)
People	Social	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>1 NO POVERTY</p>  </div> <div style="text-align: center;"> <p>2 ZERO HUNGER</p>  </div> <div style="text-align: center;"> <p>3 GOOD HEALTH AND WELL-BEING</p>  </div> <div style="text-align: center;"> <p>4 QUALITY EDUCATION</p>  </div> <div style="text-align: center;"> <p>5 GENDER EQUALITY</p>  </div> <div style="text-align: center;"> <p>6 CLEAN WATER AND SANITATION</p>  </div> </div>
Prosperity	Economic	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>7 AFFORDABLE AND CLEAN ENERGY</p>  </div> <div style="text-align: center;"> <p>8 DECENT WORK AND ECONOMIC GROWTH</p>  </div> <div style="text-align: center;"> <p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>  </div> <div style="text-align: center;"> <p>10 REDUCED INEQUALITIES</p>  </div> </div>
Planet	Environment	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>  </div> <div style="text-align: center;"> <p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p>  </div> <div style="text-align: center;"> <p>13 CLIMATE ACTION</p>  </div> <div style="text-align: center;"> <p>14 LIFE BELOW WATER</p>  </div> <div style="text-align: center;"> <p>15 LIFE ON LAND</p>  </div> </div>
Peace		<div style="text-align: center;"> <p>16 PEACE, JUSTICE AND STRONG INSTITUTIONS</p>  </div>
Partnership		<div style="text-align: center;"> <p>17 PARTNERSHIPS FOR THE GOALS</p>  </div>

Figure 1.1. Interlinks between 17 SDGs and the 5P principles

Source: own preparation. SDGs’ icons from <https://www.un.org/sustainabledevelopment/news/communications-material/>.

Pizzi et al. (2020) analysed 266 articles published in leading business and management journals between 2012 and 2019. The results of their analysis indicate the four most common research themes: technological innovation, the contribution of companies in developing countries, non-financial reporting and education for the Sustainable Development Goals. In contrast, Mio et al. (2020) analysed 101 articles published between 2015 and 2020 in the context of the Sustainable Development Goals and the strategic role of business. Their analysis shows that publications from the discipline of business management and accounting, and in particular the topics of strategy and management, play a key role. Research on the role of the enterprise in the implementation of the SDGs falls into two streams. The first analyses it from a strategic and management perspective (Calabrese et al., 2018; Pohlmann et al., 2019; Sharma & Soederberg, 2019; Sullivan et al., 2018). The second strand, on the other hand, examines the role of companies through the lens of governance (see, e.g., Goralski & Tan, 2020; Ike et al., 2019; Naciti, 2019; Toppo et al., 2017).

In contrast, the analysis by Mio et al. (2020) shows that in terms of research context of journal headquarters, authors’ affiliation in business-related research and the SDGs, Europe dominates. This is probably due to the EU’s environmental sustainability efforts (e.g., *The European Green Deal* or *Fit for 55*). Research on companies and the Sustainable

Development Goals focuses on industries such as extractive industries, banking, fishing and tourism. The publications are dominated by issues in strategy implementation, including the implementation of the SDGs, the roles of companies and industries in achieving the SDGs, the essence of entrepreneurship in the implementation of the SDGs, and the relationship between CSR and the SDGs. In contrast, the two strands of strategic management and accounting are almost absent: one related to SDG performance measurement and the other to SDG disclosure (Mio et al., 2020).

An attempt to contrast academic research on the SDGs with business practice (see, e.g., Mio et al., 2020; Sullivan et al., 2018 versus PwC, 2019) found slight differences in how businesses approach the SDGs. Considering the specific SDGs most discussed in the publications, these were found to be (Mio et al., 2020): Goal 9 (*Industry, Innovation and Infrastructure* – 57% of articles in the sample), Goal 3 (*Good Health and Well-being* – 43%) and Goal 6, Goal 12 and Goal 13, each mentioned in 36% of the studies.

In contrast, PwC's (2019) findings show that the top three SDGs mentioned in the companies they surveyed were (in order): SDG 8 (*Decent Work and Economic Growth*), SDG 13 and SDG 12. This is partly confirmed by another study, conducted on a sample of 8,500 companies from the Refinitiv ESG Global database. Its authors (Krasodomska et al., 2022) note that the three SDGs referred to by the most companies are Goal 8, Goal 13 and Goal 3. The fewest companies surveyed included Goal 14 in their reports (PwC, 2019). This finding is consistent with the research by KPMG (2020) which found that the two SDGs focusing on addressing the global biodiversity challenge (Goal 14 and Goal 15) are the least relevant of all 17 SDGs for companies worldwide. It is noteworthy that, according to 61% of the companies surveyed, no SDGs are reported, and only 3% of the sample provide information on all 17 Sustainable Development Goals in their reports (Krasodomska et al., 2022).

Thorlakson et al. (2018) emphasise that the private sector mainly pays attention to workers' rights and compliance with local laws; and argue for the need to also integrate social and environmental issues into actions. The strategic role of companies, particularly multinational corporations, in pursuing the SDGs is highlighted by both academic and practical analyses (Garnett et al., 2016; Haffar & Searcy, 2018; Krasodomska et al., 2022; Mio et al., 2020; Sullivan et al., 2018; Wicki & Hansen, 2019).

Reporting

Sustainability reporting has been on the rise globally in recent years and will expand and become more sophisticated over time (Carroll, 2021; Shabana et al., 2017). There are steadily increasing expectations for companies to provide consistent, comparable and transparent climate and other environmental, social and governance (ESG) information. These are driven not only by investor decisions and stakeholder pressures, but increasingly by the actions of regulators (Carroll, 2021). The increased importance of planetary and social impact in the investment process is contributing to a better understanding of companies' business models and a more accurate measurement of risk. Companies are ready to support and actively

engage in efforts to enable investors and other stakeholders to direct their resources and attention to the most sustainable ideas and companies (Jagd, 2022).

According to the latest KPMG (2020) report, the highest reporting rate was recorded in the USA (90% of analysed companies), while in Poland nearly 8 out of 10 largest companies already report on such issues. More than 69% of the analysed companies now link their activities to the Sustainable Development Goals in their corporate reporting. However, only 14% of these companies disclose both positive and negative impacts on the SDGs. The significant increase in corporate engagement is primarily the result of higher investor expectations. A report by Morgan Stanley (2021) indicates that, in the sample surveyed, 79% of all individual investors and as many as 99% of millennials were interested in this topic.

Regulatory change is accelerating, increasing both the number of regulations and the complexity of requirements to be fulfilled on the part of the organisation (Baid & Jayaraman, 2022; Brühl, 2021; Sancak, 2023). There will be an intensification of activities in this area in the near future. This has to do with the CSRD (*Corporate Sustainability Reporting Directive*) which gradually introduces reporting obligations for more and smaller companies (Baumüller & Grbenic, 2021; Xu & Woo, 2022). Reporting will take place according to certain standards – the ESRS (*European Sustainability Reporting Standards*) – which, on the one hand, standardise the reporting system and, on the other hand, impose more comprehensive collection and disclosure of non-financial data.

Shabana et al. (2017) argue that sustainability reporting follows several stages from defensive reporting through proactive reporting to imitative diffusion. In the last-mentioned stage of reporting, managers will tend to model their organisations on others and reporting practices will be widely adopted across industries and companies. Greater transparency in the presentation of financial and non-financial data (*double materiality*), as well as the inclusion of non-financial criteria in investors' financial decision-making, will also be key.

The achievement of sustainability goals can be measured by specific indicators in different sectors (Siew, 2015). To report non-financial data, public and private organisations use recognised methodologies and guidelines (Henriques et al., 2022; Lykkesfeldt & Kjaergaard, 2022; O'Dwyer & Unerman, 2020; Siew, 2015; Stewart & Niero, 2018). These include: GRI (Global Reporting Initiative), CDP (Carbon Disclosure Project), IIRC (International Integrated Reporting Council), TCFD (Task Force on Climate-related Financial Disclosures), CDSB (Climate Disclosure Standards Board) and SASB (Sustainability Accounting Standards Board).

1.3. Research Methodology

The private sector, especially large multinational corporations, is considered key in achieving the Sustainable Development Goals due to its resources and scope of operations (UN, 2015). Sachs (2012) highlights this when he argues that multinational companies have unique strengths. They provide global reach, cutting-edge technology, and a tremendous capability

to successfully drive the necessary large-scale solutions. Many other business entities also play a key role in dealing with sustainability goals (Kolk et al., 2017). As Szennay et al. (2019) point out, the size of these actors' activities mean they "have a significant impact on the entire planetary ecosystem".

In line with the idea of "think globally, act locally", it can be assumed that the actions of multinational corporations in achieving the SDGs will have a significant impact on all stakeholders, including local communities, to "leave no one behind". Hence, this article analyses the 10 largest multinationals operating in Krakow (Table 1.1). There are close to 100,000 people working in all of Krakow's corporate centres (operating, for example, in the financial services and software and information technology sectors). This is a significant number of employees at the scale of the city, given that from among over 800,000 people who live in Krakow (Główny Urząd Statystyczny [GUS], 2022) approximately 470,000 are of working age (Business in Małopolska, 2020).

Table 1.1. The 10 largest corporations in Krakow

No.	Company Name	Industry	Number of employees in Krakow	Country of origin	Krakow office setup year
1	HSBC	Banking	5200	United Kingdom	2007
2	Shell	Energy	4400	United Kingdom	2006
3	UBS	Banking	3600	Switzerland	2007
4	Comarch	Software/Hi Tech	3480	Poland	1993
5	State Street	Financial services	3200	United States	2007
6	IBM	Hi Tech	3000	United States	2005
7	Aptiv	Automotive	3000	United States	2000
8	Capgemini	IT/Consulting	2640	France	2003
9	Motorola Solutions	Telecommunications	2500	United States	1998
10	Cisco	Hi Tech	2200	United States	2012
			33 220		

Source: own preparation based on (Motife, 2022).

In this article, the authors seek answers to the questions of whether the largest multinational corporations operating in Krakow are acting to achieve the SDGs, which SDGs are most and least popular, and whether these actions are implemented with partners. To this end, the authors considered and analysed selected elements of the CSR 4.0 principles, with a particular focus on the realisation of the Sustainable Development Goals. The following research methods were used: analysis of the subject literature, analysis of the content of sustainability reports of individual corporations operating in Krakow and a comparative analysis.

1.4. Results and Discussion

The authors analysed only publicly available information, from the official websites of the above companies, in order to gather information on the organisations’ performance against Munro’s 8 CSR 4.0 categories.

All of the ten corporations take actions which correspond to Munro’s 8 CSR 4.0 categories. In order to formulate an impartial view of their engagement in CSR 4.0., the authors turned to Munro’s objective 7 (Measurable SDGs ongoing assessment and renewal), to compare the ten companies on their commitment to the UN Sustainable Development Goals. Importantly, the disclosure by companies of their commitment to Goal 17 (Partnership to achieve the goal) can be recognised as corporate commitment to engaging in CSR action in partnership with other entities as well as their workforce.

All ten companies under analysis made explicit declarations of which SDGs they actively support. A summary of the corporate overall commitment to the UN Sustainable Development Goals can be found below (Table 1.2).

Table 1.2. Top ten corporate employers in Krakow: Commitment to individual UN SDGs (by company)

Company name (# commitment SDGs)	UN Sustainable Development Goals																
	1	2	3	4	5	7	10	11	6	13	14	15	8	9	12	16	17
HSBC (7)																	
UBS (9)																	
State Street (9)																	
Shell (13)																	
Aptiv (11)																	
Capgemini (11)																	
Motorola Solutions (10)																	
Comarch (8)																	
IBM (17)																	
Cisco (17)																	
Total	3	3	8	9	9	7	7	6	5	9	3	4	9	8	7	7	5

Explanations:
 In orange, people goals: 1, 2, 3, 4, 5, 7, 10, 11; in green, planet goals: 6, 13, 14, 15; in blue, prosperity goals: 8, 9, 12; in purple, peace and partnership goals: 16, 17.

Source: own preparation based on publicly available information disclosed on websites of the above corporations.

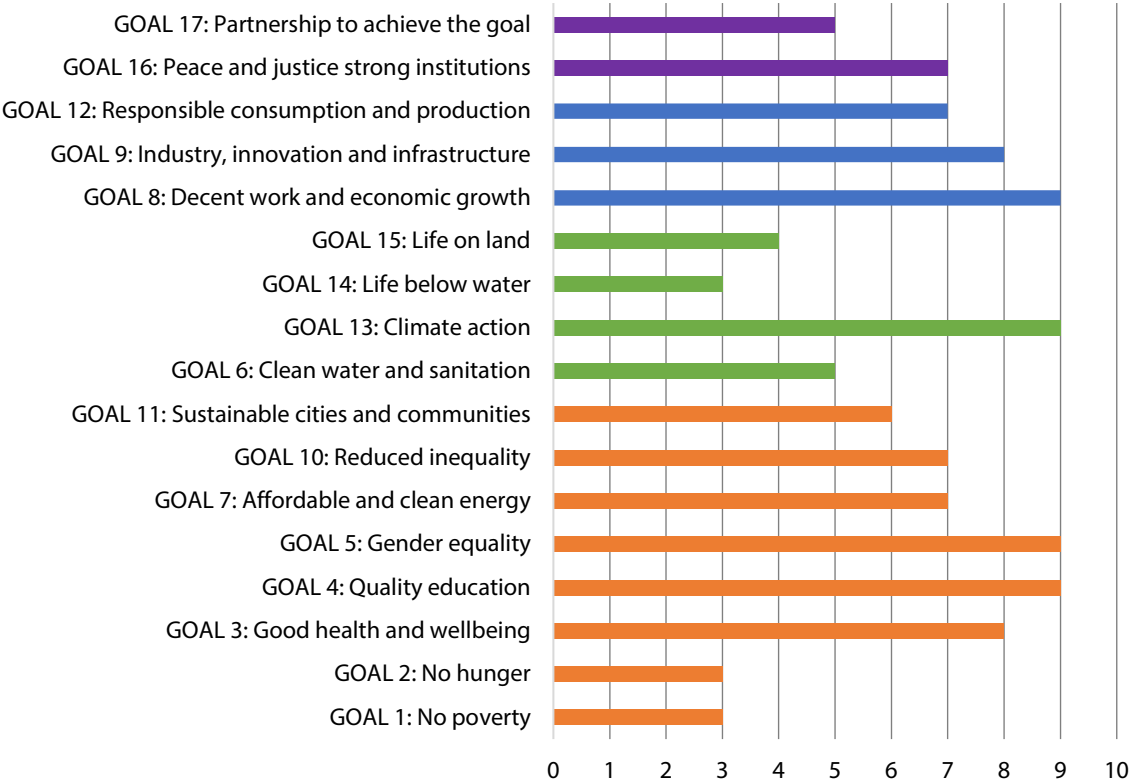
Noteworthy is the fact that US-based hi-tech companies, IBM and Cisco, declare commitment and work towards all 17 SDGs. No other of the ten show such thorough commitment. The core business of both IBM and Cisco spans production and operations across the globe they are thus uniquely positioned to be able to commit to all 17 goals. IBM’s webpages reflect this:

IBM is uniquely positioned to contribute towards the achievement of the 17 SDGs through the proactive management of the company’s internal operations and supply chain, corporate social responsibility programs, diversity and inclusion practices, and most importantly, the IBM products, solutions, and services that IBM offers to clients. (3BL Media, 2019)

Cisco’s webpages disclose their reporting against their commitment to all the SDGs, and state “Cisco contributes to the SDGs while working to fulfil our purpose to Power an Inclusive Future for All” (Cisco, 2022).

Delving deeper into an analysis of the selection of individual goals which the corporations choose to commit to (Figure 1.2), the survey of the top ten corporate employers in Krakow, shows that the “most popular” among the SDGs are:

- Goal 8: Decent work and economic growth,
- Goal 13: Climate action,
- Goal 5: Gender equality,
- Goal 4: Quality education.



Explanations as in Table 1.2.

Figure 1.2. Top ten corporate employers in Krakow: Commitment to individual UN SDGs (in aggregate)

Source: own preparation based on publicly available information disclosed on websites of the above corporations.

Meanwhile the least popular among the 17 SDGs are:

- Goal 1: No poverty,
- Goal 2: No hunger,
- Goal 14: Life below water.

In order to assess how the above findings compare with analysis of SDG performance by companies beyond the top ten corporate employers in Krakow, the authors looked at two sources of analysis of corporate engagement with realisation and reporting of the UN SDGs, one which would compare the ten companies to other employers in Poland, and one which would help to show how they rate against companies worldwide (Table 1.3).

Table 1.3. Comparison of most and least popular SDGs across three surveys

	Top 10 corporate employers in Krakow	RBF Good Practices (1,677 firms in Poland)	PwC SDG Challenge (1,000 firms globally)
Most popular SDGs	SDG8	SDG3	SDG8
	SDG13	SDG4	SDG13
	SDG5	SDG12	SDG12
	SDG4	SDG13	SDG3
Least popular SDGs	SDG1	SDG14	SDG2
	SDG2	SDG2	SDG14
	SDG14	SDG6	SDG1

Source: own preparation on the based on publicly available information disclosed on the websites by the above corporations (PwC, 2019; Responsible Business Forum [RBF], 2021).

The *Responsible Business in Poland. Good Practices*, an annual report published by the Responsible Business Forum, is Poland’s largest overview of CSR & sustainability initiatives, and groups good practices in terms of the implementation of the respective UN SDGs. The 20th edition presented 1,677 actions taken by 283 organisations. According to RBF findings, most initiatives address: Goal 3 – Good health and well-being (519 practices), Goal 4 – Quality education (410 practices), Goal 12 – Responsible consumption and production (368 practices), and fourth Goal 13 (328 practices). The least represented SDGs were: Goal 14 – Life below water (20 practices), Goal 2 – Zero hunger (25 practices), and Goal 6 – Clean water and sanitation (32) (RBF, 2022).

As already mentioned, PwC conducts an annual survey of 1,000 companies globally on their realisation and reporting of the UN SDGs. According to PwC SDG Challenge (2019), 72% of companies mentioned SDGs in their reporting and 14% mentioned specific SDG targets. From this perspective, the surveyed firms fared much better. Every one of them mentioned SDGs, including statements made explicitly by their CEOs or embedded in their business mission or vision, in addition to the fact that every single one reported performance against all or a selected list of SDGs. As in the case of the 1,000 companies surveyed across the

globe, decent work and economic growth (SDG 8) was the most popular goal identified by the analysed companies. This goal is followed by Climate action (SDG 13) and Responsible consumption and production (SDG 12). According to the PwC study, the SDGs least popular with business across the globe are: Zero hunger (SDG 2), Life below water (SDG 14), and No poverty (SDG 1).

It appears that the top ten corporate employers in Krakow more closely resemble the average of the global business than that of Polish business milieu. This is not surprising as only one of the analysed companies is headquartered in Poland (Comarch), the rest are global corporations founded and headquartered elsewhere.

While among the least popular SDGs, the top ten are completely in sync with the global trends, noteworthy is the fact that while the global and local survey have among the top four SDGs Goal 12 (Responsible consumption and production) and Goal 3 (good health and wellbeing), the surveyed companies did not select these. Conversely, while our top ten sees SDG 5 (gender equality) as a top goal, the average Polish and global employer does not. The lack of popularity of Goal 12 is not surprising as most of the brands listed among the top ten are not production companies, thus their ability to embody responsible consumption and production is limited. This is highlighted by the fact that those that do not report against this SDG are HSBC, UBS and State Street, all financial and banking institutions.

As discussed earlier in the chapter, Mio et al. (2020) noted in an analysis of corporate publications on the Sustainable Development Goals that these corporate documents are dominated by the topics of implementation of the SDGs, the roles of companies and industries in achieving the SDGs, the essence of entrepreneurship in the implementation of the SDGs, and the relationship between CSR and the SDGs. This also holds for the ten analysed companies. Only a few, in particular the banking and production companies (HSBC, Shell, IBM, Cisco) provided reporting and accounting insight on the impact of their CSR activities in relationship to their SDG realisation. A good example is of the HSBC UN Sustainable Development Goals Bond and Sukuk Report (HSBC, 2021), in which the institution disclosed amount disbursed to financing projects or business ventures by SDG category. Of relevant note here is the fact that, as first in its industry, in 2017 HSBC released bonds in support of the UN Global Sustainability Development Goals (HSBC, 2017). The USD 1bn raised through bonds was used to finance projects that benefit communities and the environment. The UK-based bank has continued to release these bonds, and many other financial institutions have followed its lead.

Financial institutions, and in particular banks which can release bonds and lend funds via various mechanisms, are uniquely positioned to support and endorse implementation of the UN Sustainable Development Goals. This approach is a huge opportunity to build alliances and work with different sectors, which is one of the key approaches for tackling the challenges of VUCA (Albrechtsen, 2017) and realising the concept of CSR 4.0 (Munro, 2020).

As mentioned earlier, dealing with rapidly increasing complexity and uncertainty also requires innovations in business models (Van Tulder, 2018). IBM, as one of the two of the ten corporations we analysed, that works towards supporting all 17 SDGs, has a robust program

of partnerships. Noteworthy is the success it has had in furthering two of the least popular SDGs, i.e., No poverty (Goal 1) as well as Life below water (Goal 14). In 2019, IBM leveraged its proprietary IBM Blockchain technology and partnered with Plastic Bank, a for-profit social enterprise that builds recycling ecosystems in under-developed countries in an effort to fight both plastic pollution in oceans and poverty in developing countries to receive the UN SDG Action Award in the Connector category from the UN SDG Action Campaign (IBM, 2019).

Shell exemplifies what several from among the analysed corporations are also working towards, i.e., partnerships across sectors, to further multiple SDGs. Shell has established sustainability partnerships as part of its focus on SDG17, this includes environmental partners (The International Union for the Conservation of Nature, The Nature Conservancy, and Earthwatch), social partners (Mercy Corps, Global Road Safety Partnership, Clean Cooking Alliance and RESOLVE). Shell is the lead partner in the Global Road Safety Partnership (GRSP) in which it works with government, non-governmental organisations and businesses to improve road safety in cities and communities, including an initiative in South Africa to help children travel safely to schools (“Safe to School, Safe to Home”).

The analysis presented in this article, clearly shows that the SDGs, as well as CSR 4.0 have become an integral part of doing business in Krakow today. While not all companies disclose the financial impact of their CSR efforts, including those to further the UN Sustainable Development Goals, all diligently disclose the impact of their activities against the UN Sustainable Development Goals. While there is variance in the goals that individual companies choose to support, and some are less popular than others, the exceptional examples of corporate support of goals that are difficult to support show that corporations have the means and drive to support meaningfully and significantly any of the Sustainable Development Goals.

1.5. Conclusions

The SDGs are neutral, non-political and provide an internationally recognised benchmark for gaining assurance that all actions taken by organisations, research, education and community engagement – are relevant, meaningful and have a real social impact (Van Tulder, 2018). Importantly, achieving the SDGs is beyond the reach of a single company and requires collaboration across sectors, supply chains and economic systems, as well as innovative partnerships with governments and civil society. This is strongly emphasised in the CSR 4.0 principles, where each principle refers to collaboration and partnership.

With the new reporting directives, the number of companies that will have to publish their non-financial data will increase year on year. Stakeholder favour and competitive advantage will be gained by those that put real action first, rather than paper (or online) reports.

Agents of change (change makers) are needed to meet the emerging game changers. Already in the year of the announcement of the Sustainable Development Goals, this need

was highlighted by, among others, Hajer et al. (2015). The authors warned against a situation in which the SDGs and targets, fail to live up to expectations, due to “cockpit-ism”. This term implies the illusion that top-down leadership by governments and intergovernmental organisations can solve global problems on their own. To prevent this, new agents of change are needed, such as businesses, civil society and cities. To mobilize them, in turn, a variety of sustainability perspectives are needed that respond to the different motives and logic for change of these actors.

Munro (2020) highlights that change makers can be individual stakeholder groups. Millennials and Generation Z in particular are encouraged to be change makers in everything they do in life, but also to create social projects and social enterprises as their primary workplace, for the betterment of society. These generations are particularly focused on “business for purpose” and setting up social enterprises, and are part of the “Be the Change” movement. According to the author, this movement is part of the ongoing social revolution or evolution of CSR. Munro’s slogan “Be the Change” is seen very broadly, as a change towards anyone becoming an agent of change (change maker). Companies, corporations, MNEs or SMEs are also part of the “Be the Change” movement through their CSR programmes, product and employee innovation and determination to allocate resources to selected key or relevant SDGs.

In contrast, this article’s analysis of sustainability reports, based on the principles of CSR 4.0, shows that cross-sector partnerships can also be change makers. “In the future, cross-sector partnerships will be at the heart of all CSR approaches” (Visser, 2012). Through them, social and environmental initiatives are undertaken and wicked challenges are solved. Cross-sector partnerships are essential to achieving economies of scale and sustainable impact. By sharing information, resources, activities and capabilities, organisations can collectively secure results that could not be realised individually.

One might also be tempted to conclude that companies mainly focus on objectives close to their business activities, which are top-down regulated by laws or regulations (e.g., labour law or the labour code), so the implementation of these objectives is easier. This theme has already been addressed, for example, by Scheyvens et al. (2016), who surmise that many large business actors are only interested in the economic justification of responsible practices. Even when private sector actors talk about increasingly supporting business (for example in emerging economies), they actually do so because it is good for business, providing new markets and a source of inputs (Scheyvens et al., 2016).

The authors recognise that their analysis does not represent an exhaustive view of the issues and challenges that the private sector may face today and in the future in achieving the SDGs. The analysis process only included global corporations which are in many ways very different from other organisations. In order to understand well the role of companies in achieving the SDGs by 2030 the conducted research needs to be extended. Although some believe that companies consider the achievement of the SDGs to be part of their sustainability plans and strategies (Pineda-Escobar, 2019), there is still not enough understanding of what specific actions companies are taking or should be taking (PwC,

2019). In light of the new directives, it may also be of interest to see what is the capacity of small and medium-sized companies to implement actions to achieve individual SDGs, as well as their motives and degree of preparedness for reporting. Future research could also explore the role of stakeholders (employees, investors, consumers and members of civil society, with a particular focus on generations recently in or just entering the labour market) in stimulating activity to achieve individual SDGs. Also relevant is the question of cross-sectoral partnerships in which configurations they are undertaken, in support of which goals, and what are the key success factors for such partnerships.

Even within the limited scope of the presented literature review and comparative analysis, the authors have shown that all of the ten analysed largest corporate employers in Krakow are committed to corporate actions in support of the UN Sustainable Development Goals. This article highlights the enormous potential of the private sector in driving the positive change we need globally, as laid out in the UN Sustainable Development Goals. The evidence is not anecdotal but systematically disclosed, showing sustained progress, and long-term positive impact. Given the fact that the private sector undeniably has greater resources, is better able to handle risk and innovate, it stands to be not just a key partner, but potentially the key agent of change, in particular in the face of mounting global game changers and wicked problems.

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Czy nasza przyszłość spoczywa w rękach korporacji? Badanie zaangażowania dziesięciu najlepszych pracodawców korporacyjnych w Krakowie w realizację Celów Zrównoważonego Rozwoju ONZ

Streszczenie: Coraz częściej i w coraz większym stopniu niż w przeszłości sektor prywatny bierze na siebie odpowiedzialność za konfrontację z globalnymi zmianami gry i zawiłymi problemami oraz podejmuje działania w ramach Celów Zrównoważonego Rozwoju ONZ. Takie podejście daje ogromną możliwość budowania sojuszy i współpracy z różnymi sektorami, co jest jednym z kluczowych podejść do sprostania wyzwaniom VUCA i realizacji CSR 4.0. W celu znalezienia odpowiedzi na pytanie, czy nasza przyszłość spoczywa w rękach korporacji, autorzy analizują działalność 10 największych międzynarodowych korporacji działających w Krakowie pod kątem wybranych zasad CSR 4.0 ze szczególnym uwzględnieniem realizacji Celów Zrównoważonego Rozwoju. W tym celu wykorzystano następujące metody badawcze: analizę literatury, analizę treści raportów zrównoważonego rozwoju oraz analizę porównawczą. Nawet w ograniczonym zakresie przedstawionego przeglądu literatury i analizy porównawczej artykuł ten podkreśla ogromny potencjał sektora prywatnego w napędzaniu pozytywnych zmian, których potrzebujemy globalnie, zgodnie z Celami Zrównoważonego Rozwoju ONZ. Sektor prywatny dysponuje większymi zasobami, jest w stanie lepiej radzić sobie z ryzykiem i wprowadzać innowacje, może być nie tylko kluczowym partnerem, ale kluczowym czynnikiem przemian, w szczególności w obliczu narastających globalnych zmian i zawiłych problemów.

Słowa kluczowe: CSR 4.0, Cele Zrównoważonego Rozwoju (SDGs), partnerstwa międzysektorowe, *game changers*, zarządzanie zmianą

CHAPTER 2

Artificial Intelligence Adoption in Human Resources Management

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Abstract: In recent years, dynamic changes have been observed in organizations stemming from usage of novel technologies. Among others, artificial intelligence application to Human Resources Management is a developing field of study which shows constant growth. The aim of this paper is to recognize the state of AI adoption in HR departments with a special concern on advantages and disadvantages, attitudes and state of knowledge of HR professionals basing on the results of the literature review as well as empirical research. A systematic review of world literature was carried out using the following databases: Proquest, EBSCO, Emerald, JSTOR, Science Direct and BAZEKON. The results were supplemented with conclusions from quantitative research conducted on the sample of 50 HR professionals. The most visible application of AI can be observed in recruitment and selection although other HR processes may also benefit from it. AI can improve the work of HR departments. The most often mentioned advantage was a possibility to automate routine tasks, while the lack of empathy and “human” approach prevailed among disadvantages. Few companies have implemented or plan to implement AI in HRM in the near future which is confirmed by other studies stating that the application of AI has not advanced as expected.

Keywords: artificial intelligence, HR department, HR professionals, HR processes

2.1. Introduction

In recent years, dynamic changes have been observed in organisations based on technologies of the Internet of Things, Big Data, blockchain, artificial intelligence (AI), Industry 4.0 (Urba et al., 2022). The changes concern also HR departments as AI has enormous implications for human skills in organizations (Poba-Nzaou et al., 2021). In fact, a new concept is also evolving as part of 4th Industrial Revolution called Smart Human Resources 4.0 (SHR 4.0) which concerns using innovations, e.g., artificial intelligence, Internet of Things or Big Data Analytics for the effective management of new generations of employees (Sivathanu & Pillai,

2018). In particular, artificial intelligence application to Human Resources Management is a developing field of study which shows constant growth (Palos-Sánchez et al., 2022). AI may support three areas of business functioning, namely: enhance business process automation, provide cognitive insights that facilitate decision-making and support cognitive engagement through intelligent agents and chatbots (Johnson et al., 2020).

The novelty of the topic, as well as the ever-developing possibilities of improvement, cause the existence of research gaps regarding the implementation of artificial intelligence to the HRM process. Thus, the aim of this paper is to recognize the state of AI adoption in HR departments with a special concern on advantages and disadvantages, attitudes and state of knowledge of HR professionals basing on the results of the literature review as well as empirical research. The following research questions were formulated.

1. What are the attitudes and state of knowledge of HR professionals in the field of artificial intelligence?
2. What are the advantages and disadvantages of the use of artificial intelligence in HR departments stated by HR professionals?
3. What is the current state of AI implementation in HRM and what are the plans for the future?

2.2. Literature Review

Artificial intelligence was at first defined by McCarthy in 1956 as “the science and engineering of making intelligent machines” (Mukherjee, 2022). It is a system created by a human being that can think and behave rationally, in a manner similar to a human. This technology is still developing and has many applications in the economy. In the management of organizations, and in particular in human resources management, it is also possible to obtain benefits from the use of artificial intelligence. Already in 1994 introduction of expert systems was observed, followed by fuzzy logic in 2000, artificial neural network in 2001, then data mining in 2006, genetic algorithm in 2008 and machine learning 2011 (Qamar et al., 2021). Likewise, sensory and tracking technologies as well as metabolism monitors have been introduced as AI-based decision making technologies (Arslan et al., 2022).

The implementation of AI may take a number of different forms: robotics automation, machine learning, natural language processing, recommendation engines, using robots to address common staff queries, manage vast and diverse datasets, support decision-making and make predictions for the future (Sakka et al., 2022; Votto et al., 2021). This is usually done for tasks that are routine, repetitive, while people are better suited to tasks that require creativity, judgment, or flexibility (Kambur et al., 2022; Tian et al., 2022). There are three main components which differ AI from conventional software: high-speed computing, large quantities of high-quality data and advanced algorithms (Vorzhakova & Boiarynova, 2020).

Nowadays, the most visible application of artificial intelligence can be observed in recruitment and selection processes (Palos-Sánchez et al., 2022). It is pointed out that AI can be used in three steps of the recruitment process, namely: sourcing, screening of resumes and candidate matching (Garg et al., 2021; Tian et al., 2022). Chatbots (virtual assistants) are able to provide 24/7 support and communication with candidates, responding with a positive or rejection message within 24 h from receiving the application (Kambur et al., 2022) and a sharp increase is observable in interest in social chatbots in recent times (Kusý & Varečková, 2021). AI may not only use psychometric tools, or integrate multiple data, but also synchronize behavioral competency of candidates, analyse their rate of success, and study the rate of attrition of the organization (Mukherjee, 2022). Androgynous robots may be effectively used for interviewing candidates: to provide information on the interview, to ask competence-related questions and to record and transcribe candidates' responses (Trocin et al., 2021). Unbiased, objective machine learning software may detect facial expressions of candidates to evaluate their motivation levels (Kappen & Naber, 2021). Subjective criteria such as nepotism and favouritism are less likely to be observed and the whole process of recruitment is more effective (Bailao et al., 2022; Kshetri, 2021).

As for other HR processes AI may be used in:

- onboarding through identifying individual needs tailored to specific role,
- employee development for tailored trainings delivered just in time,
- performance management for preparation of a holistic picture of performance evaluated in comparison to other employees,
- compensations through automatic tracking across many data sources (Johnson et al., 2022) or to design salary forecast algorithms (Gong et al., 2022);
- engaging employees through intellectual surveys, real-time feedback platforms, awards and recognition, personalized messaging and communication (Vorzhakova & Boiarynova, 2020);
- talent management processes, decisions require access to and analysis of a lot of data about the current needs of talents we want to keep in the organization (Claus, 2019);
- machine learning techniques are also used for employee attrition – to understand what are the key indicators and probability of employee leaving the company (Fallucchi et al., 2020).

Research confirm that adoption of artificial intelligence may also significantly influence the employer reputation (Kot et al., 2021).

Nevertheless, the use of artificial intelligence raises many doubts and challenges. There are concerns among employees whether they would be replaced by artificial intelligence and questions about further development of their career (Kong et al., 2021). Fear and distrust concern also perceived limitations in the accuracy and reliability of AI decisions (Ore & Sposato, 2021). What is more, algorithm-based HR decision-making may evoke blind trust in the process which can marginalize human sense-making or moral imagination (Leicht-Deobald et al., 2019). Humans may also be harsher for others, following an algorithm which

suggests more strict disciplinary actions (Bartosiak & Modlinski, 2022). Ethical issues are also raised, namely designing and developing ethical HRM systems to eliminate AI design bias (Rodgers et al., 2023). Moreover, due to the protection of personal data, an organization may not know that AI discriminates against candidates (Van Bekkum & Zuiderveen Borgesius, 2023), algorithms can also produce discriminatory results, even when seem to be neutral (Gay & Kagan, 2018). It is also raised that there is a tension between extensive use of Big Data and AI and the demand to use data ethically and socially responsibly (Mantelero, 2018).

The process of AI implementation may be affected by no clear vision and limited understanding as well as shortage of employee data and managers' attitudes to bypass AI decisions (Tuffaha et al., 2022). Complexity of HR phenomena, data challenges from HR operations and employee reactions to AI management result in slow progress in AI adaptation (Tambe et al., 2019). Last, but not least, development of AI requires transformation of HRM processes and training of the personnel (Tian et al., 2022; Urba et al., 2022) as well as qualified personnel to serve and maintain AI (Vorzhakova & Boiarynova, 2020).

2.3. Methods

For the purpose of this paper two types of research have been conducted: review of the literature and empirical quantitative analysis with the use of own questionnaire.

The first stage of research involved a systematic review of world literature in the subject of artificial intelligence usage in HR processes. In the first phase, the purpose of the research was defined, namely to obtain knowledge on the state of and ways of AI usage in HR processes. The scope of literature was selected using a review of the following databases: Proquest, EBSCO, Emerald, JSTOR, Science Direct and BAZEKON. It was decided to choose the databases to which the author had access at least in part full-text. Then, the selection of publications was made by searching for the following keywords in abstracts: "artificial intelligence", "Human Resources", "HR department" in a group of scientific articles published since 2018 in Polish and English. It was decided to narrow down to the last five years to obtain the latest research results, showing the impact of technological changes in HR departments. In this phase of the study, the research was restricted to 168 articles.

Search results were developed by checking possible repetitions of articles or non-scientific articles and verification of the content of abstracts. As many as 11 articles were removed at this stage. The next phase involved an analysis of the full content of the articles and on this ground it was decided to remove further 116 articles with content inadequate to the area of research. It should be mentioned that search engines pointed to articles with very little concern for artificial intelligence, e.g., the word was only mentioned among other technology-related novelties. As a result, 41 papers were obtained. The selection of publications was carried out in January 2023. In the next phase, a content analysis was carried out. Subsequently, the conclusions of the research were developed.

Table 2.1. Research methodology

Stage number	Description					
Stage 1	Defining the purpose of the research					
Stage 2	Selection of databases: PROQUEST, EBSCO, EMERALD and BAZEKON					
Stage 3	Selection of articles with criteria as follows: a scientific article, published since 2018 in English or Polish. Keywords: artificial intelligence, Human Resources, HR department					
Stage 4	Selection of 168 articles:					
	<table border="1"> <tr> <td>Proquest 16 art.</td> <td>Bazekon 1 art.</td> <td>EBSCO 17 art.</td> <td>Emerald 49 art.</td> <td>JSTOR 16 art.</td> <td>Science Direct 69 art.</td> </tr> </table>	Proquest 16 art.	Bazekon 1 art.	EBSCO 17 art.	Emerald 49 art.	JSTOR 16 art.
Proquest 16 art.	Bazekon 1 art.	EBSCO 17 art.	Emerald 49 art.	JSTOR 16 art.	Science Direct 69 art.	
Stage 5	Removal of 127 articles (including 6 repetitive, 116 inadequate, 5 unscientific)					
Stage 6	Analysis of the remaining 41 articles' content					
Stage 7	Conclusions, summary of research					

Source: own study.

The second step of the research involved quantitative analysis with the use of own questionnaire conducted by the author in January-February 2023 on the sample of 50 HR professionals. The research sample was deliberately selected through direct contacts using social networks LinkedIn and Facebook. The profile of a potential respondent and belonging to thematic groups related to the HR industry were analysed, and then a message inviting to participate in the study was sent.

The respondents were mostly HR senior specialists (30%) or HR managers (30%). Half of respondents had up to 5 years of experience in HR industry, 24% had from 6 to 10 years of experience and 22% even over 16 years of experience. They represented organizations from many sectors with a predominance of IT (28%) and services (20%). These were mainly very large organizations, employing more than 500 people (50% of the sample), with 16% employing from 250 to 499 people, and 20% from 50 to 249 people. Details of the research sample have been presented in Table 2.2.

Table 2.2. Details on research sample

Representatives' profile	
Position in the structure	director/manager of HR department – 30% HR senior specialist – 30% HR junior specialist – 14% HR intern – 4% other – 22%
Experience in a HR industry	1–5 years of experience – 50% 6–10 years of experience – 24% 11–15 years of experience – 4% over 16 years of experience – 22%

Organisations' profile	
Industry	banking – 4% construction – 2% finance and insurance – 4% industry – 10% pharmaceuticals and health care – 4% public administration – 2% sales – 10% services – 20% IT sector – 28% other – 16%
Employment	up to 10 employees – 8% 10–49 employees – 6% 50–249 employees – 20% 250–499 employees – 16% over 500 employees – 50%

Source: own study.

2.4. Results of Empirical Research

Knowledge and Attitudes towards Artificial Intelligence among HR Professionals

In the first part of the study the attitude of HR professionals to the implementation of artificial intelligence in HR departments was analysed. Four statements were presented to respondents with a request to determine the extent to which they agreed or disagreed with each statement. They have been analysed below.

Artificial intelligence can improve the work of HR departments. The vast majority of respondents say that AI can improve the work of HR departments (strongly agree – 54%, rather agree – 30%). Only 6% rather disagree with the sentence and 10% hesitate.

Artificial intelligence is a threat to occupational safety in HR departments. Almost half of the respondents have no concerns about occupational safety risks in HR departments although the answers were less decisive (8% strongly disagree with the safety threat, 38% rather disagree). At the same time, as many as 28% of respondents notice such threats (rather agree – 22%, strongly agree – 6%), and 26% are not sure whether such threats exist.

I am a supporter of the implementation of artificial intelligence to work in HR. The research shows that more than half of respondents define themselves as supporters of the implementation of AI in personnel processes (24% strongly agree, 36% rather agree). 28% of respondents is not sure whether they support such implementation and only 12% said they rather disagree.

I have too little knowledge about artificial intelligence in HR work. Similar number of respondents admit that they have too little knowledge about AI at HR (strongly agree – 22%,

rather agree – 32%). At the same time 26% say that they have enough AI knowledge and 20% hesitates.

The use of artificial intelligence in HR work, according to respondents, mainly means the use of chatbots and virtual assistants (84%) and data management analytics (78%). Process automation (76%) and smart search engines (70%) are also treated as part of artificial intelligence for HR professionals. Algorithms, HR data management systems and AR for trainings gained less indications (Figure 2.1).

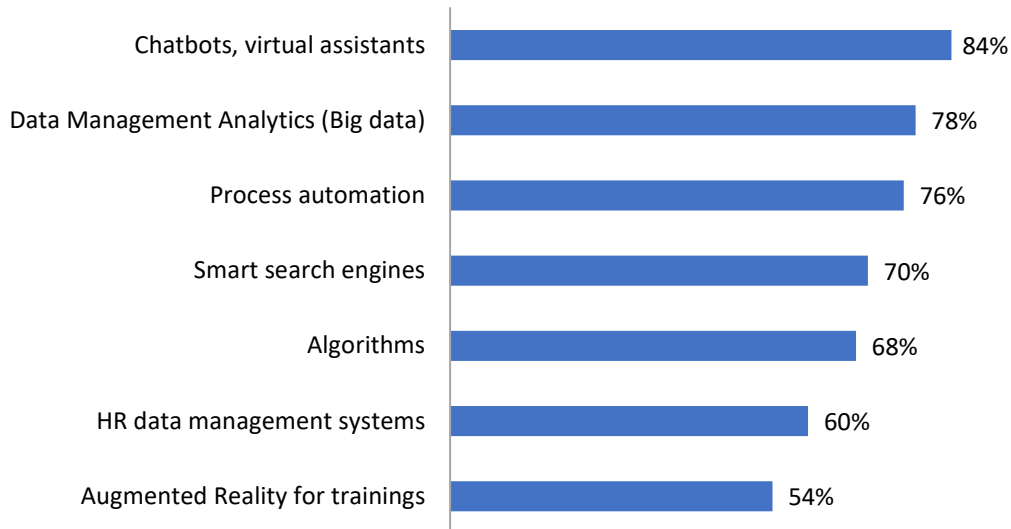


Figure 2.1. The use of Artificial Intelligence in HR departments' work

Source: own study.

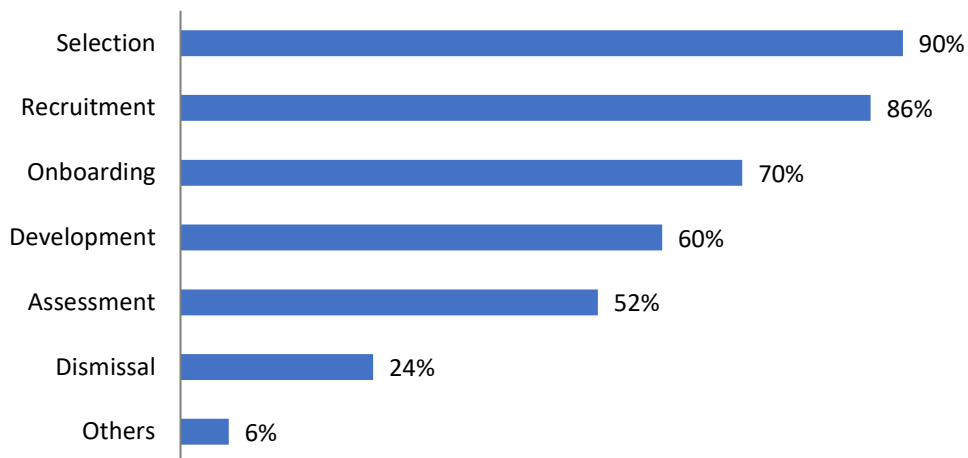


Figure 2.2. HR processes in which AI can be used

Source: own study.

Respondents see the possibility of using artificial intelligence mainly in the recruitment process (86%) and selection (90%) of employees. This may be related to the previous answer regarding chatbots and virtual assistants, used to a large extent in processes related to communication with job candidates. More than half of the respondents also see the possibility of using AI in the onboarding of new employees (70%) and their development (60%). It seems less desirable for respondents to use AI to evaluate employees, although 52% still consider it possible. AI is definitely inadequate for dismissal of employees (only 24%) (Figure 2.2).

Advantages and Disadvantages of the Use of Artificial Intelligence in HR Departments

HR professionals mention many advantages associated with possible implementation of artificial intelligence in the workplace. The main one is the possibility to automate routine tasks, mentioned by almost all respondents (94%). This can be, for example, working on the same documents many times, answering the same questions, filling in the same tables, etc. Another advantage is the AI ability to analyse big data (90%). Management of employee data related to recruitment, career tracking, development, potential, assessments, etc. is difficult and requires analytical skills and excellent organization. In this case, respondents appreciate the possibility of using AI for analysis. The third most frequently mentioned advantage is the speed of work (72%) which may especially concern different calculations.

When it comes to the main disadvantages that respondents pointed out, the lack of empathy and “human” approach appeared in the first place (82%). It is often mentioned that soft skills, communication, understanding of other people and empathy constitute the advantage of HR professionals. In second place was lack of understanding of complicated issues or statements by virtual assistants (72%). This is a generally highlighted drawback of chatbots, especially for languages with a high degree of difficulty and complexity of variations. In these cases, virtual assistants may not be taken seriously when they are unable to understand the employee during the conversation. The third most frequently mentioned disadvantage is the lack of creativity, yet only 48% agreed on that. More advantages and disadvantages may be found in Table 2.3.

Table 2.3. Advantages and disadvantages of using AI in HR processes

Advantages	Disadvantages
Possibility to automate routine tasks – 94%	Lack of empathy and “human” approach – 82%
Ability to analyse big data – 90%	Lack of understanding of complicated issues, statements by virtual assistants – 72%
Speed of operation – 72%	Lack of creativity – 48%
Elimination of so-called “human” errors – 66%	Difficulty in understanding and implementing software or algorithm – 32%

Ability to work 24 h a day – 56%	Machines taking people’s jobs – 28%
Lack of emotion in decision-making – 48%	Others – 8% decreasing quality and quantity of relations between HR and employees availability, price
Others – 4% simplifying decision process, improving communication	

Source: own study.

Present and Future Use of Artificial Intelligence in HR Departments

Despite the above-mentioned statements about being supporters of the use of artificial intelligence in HR processes, respondents indicate that in almost none of the surveyed organizations AI is implemented in HR processes. 44% of respondents said that they do not use AI at all in HR departments, while 48% use it to a small extent. Only 6% use AI in several HR processes, and 2% in many processes. These are extremely small amounts, indicating that at the moment the level of use of artificial intelligence in the HR departments of Polish enterprises is dramatically low (Figure 2.3).

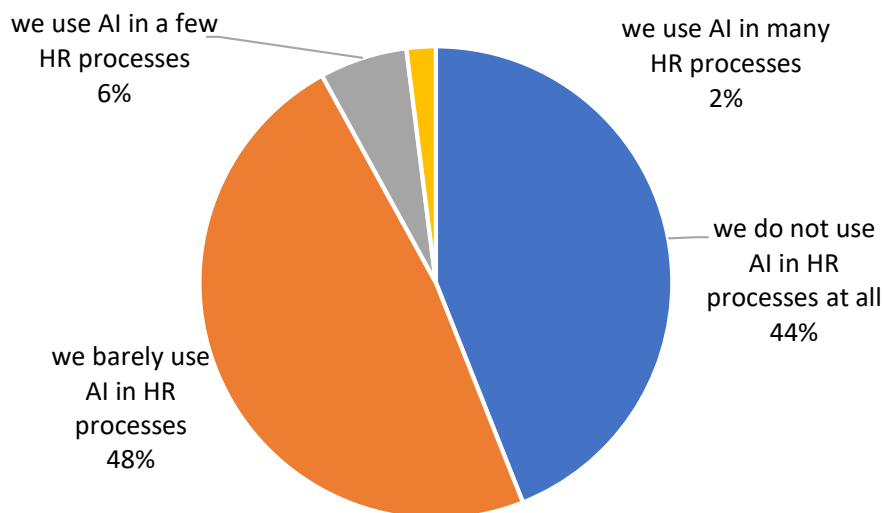


Figure 2.3. Present AI implementation in HR processes in researched companies

Source: own study.

The research indicates that in the near future, reaching up to 5 years, the situation will not change. 44% of organisations do not plan to implement Ai in HR processes at all. 14% plan to implement it in 1–2 years, and 8% plan to do it in 3–5 years. However, as much as 34% is still hesitating and have not decided yet on implementation (Figure 2.4).

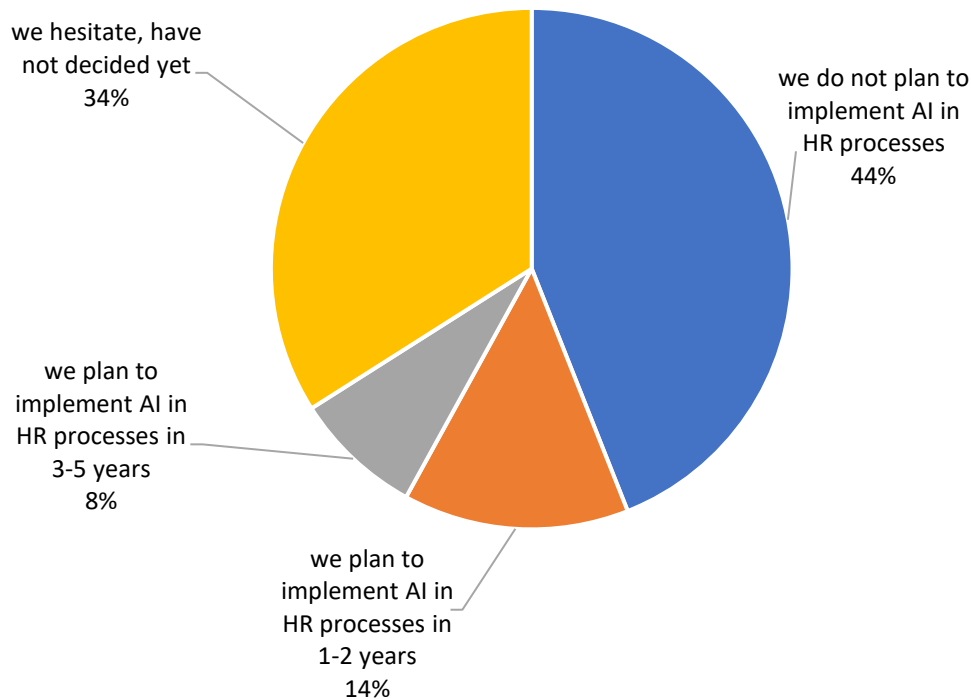


Figure 2.4. Future plans on AI implementation in HR processes in researched companies

Source: own study.

2.5. Discussion

Answering the first research question “What are the attitudes and state of knowledge of HR professionals in the field of artificial intelligence?” it can be stated that respondents were mostly supportive towards the idea. This coincides with research, e.g., on a group of HR professionals from Hungary, who were mostly supportive towards AI. In the same group, the absence of widespread fear of losing their job due to the use of robots was also confirmed (Karacsony, 2022). Other research state that possible hurdles in human workers and AI interactions may involve: resistance in accepting robots as team members, fear of losing the job, inability to communicate properly, problems with proper estimation of AI possibilities, differences connected with performance evaluation: humans are tired, need breaks (Arslan et al., 2022).

A large proportion of respondents believe that they have too little knowledge about artificial intelligence, which may cause resistance in their implementation. Research on other groups suggests that about half of employees are interested in implementing innovations in HR (Mubarakshina et al., 2022).

Considering the second research question “What are the advantages and disadvantages of the use of artificial intelligence in HR departments stated by HR professionals?” concerns about the lack of emotional, human approach to employees presented by respondents are also confirmed in other research groups (Meduri & Yadav, 2021; Palos-Sánchez et al., 2022). At the same time, respondents mentioned many benefits of using AI, which is confirmed also by other research (Karacsony, 2022).

The research has shown that few companies have implemented or plan to implement AI in HRM in the near future which is an answer to the third research question “What is the current state of AI implementation in HRM and what are the plans for the future?”. This is confirmed by other studies stating that the application of AI has not advanced as expected in spite of growing number of publications and overall interest (Nankervis et al., 2021; Palos-Sánchez et al., 2022). Possible reasons are among others: concerns with data, lack of understanding how to use analytics, unclear governance, competing priorities (Bekken, 2019). What also remain is the necessity to comply with current and evolving legal authority (Gay & Kagan, 2018), which e.g. concern analysing employees’ data or monitor their health and efficiency.

2.6. Conclusions

The research contributes to filling the research gap considering the state of adoption of artificial intelligence in HR departments as well as perceived advantages and disadvantages of such implementations. Generally supportive attitudes of HR employees may be a sign of future changes in this area.

In practical business terms, research contributes to a better understanding by companies what benefits and challenges are connected with AI adoption in HRM. The necessity for trainings for HR personnel and clear vision of managers should be underlined as practical recommendation from the research.

There are research limitations caused by:

- the deliberately selected and small sample which makes it impossible to make inferences about the entire population,
- predominance in the research sample very large organisations and organisations representing IT sector and services,
- a rapidly changing economic environment which requires innovation, which in turn may influence companies’ decisions regarding faster HR transformation then shown in the research.

Further research is needed to recognize transformation of HR departments, ways of cooperation between robots and human beings and needs of new generations entering job market with their digital competence and expectations.

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Wykorzystanie sztucznej inteligencji w procesach personalnych

Streszczenie: W ostatnich latach w organizacjach zaobserwowano dynamiczne zmiany wynikające z wykorzystania nowatorskich technologii. Zastosowanie sztucznej inteligencji do zarządzania zasobami ludzkimi to jeden z obszarów, który wzbudza wiele zainteresowania. Celem artykułu jest rozpoznanie stanu adaptacji AI w działach HR ze szczególnym uwzględnieniem zalet i wad, postaw i stanu wiedzy specjalistów HR w oparciu o wyniki przeglądu literatury oraz badań empirycznych. Przeprowadzono systematyczny przegląd literatury światowej z wykorzystaniem baz danych: Proquest, EBSCO, Emerald, JSTOR, Science Direct i BAZEKON. Wyniki zostały uzupełnione wnioskami z badań ilościowych przeprowadzonych na próbie 50 specjalistów HR. Najbardziej widoczne zastosowanie AI można zaobserwować w rekrutacji i selekcji, chociaż inne procesy HR również korzystają z zalet sztucznej inteligencji. AI może usprawnić pracę działów HR. Najczęściej wymienianą zaletą była możliwość automatyzacji rutynowych zadań, natomiast wśród wad przeważał brak empatii i „ludzkiego” podejścia. Niewiele firm wdrożyło lub planuje wdrożyć AI w ZZL w najbliższej przyszłości, co potwierdzają inne badania stwierdzające, że zastosowanie AI nie postępuje zgodnie z oczekiwaniami.

Słowa kluczowe: sztuczna inteligencja, dział HR, specjaliści HR, procesy HR

CHAPTER 3

The Industry 5.0 Concept as a Game Changer for the Fourth Industry Revolution

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Abstract: The concept of Industry 5.0 is a game changer for the fourth industrial revolution. It extends the ideas of Industry 4.0 with values related to sustainable development, human focus and resilience of the industry. The purpose of the chapter is to identify the critical areas of digital technologies used during the fourth industrial revolution and to identify their impact on achieving the main goals of Industry 5.0, i.e., human orientation, sustainable development and resistance to all kinds of interference. The authors used the method of critical analysis of the literature and conducted an expert survey of selected experts representing the business and academic communities. In addition, the chapter draws attention to the increase in competency requirements of employees related to the implementation of Industry 5.0 technology areas.

Keywords: Industry 5.0, human-centric, resilience, sustainability, competencies

3.1. Introduction

Today, industries that are changing as part of the Fourth Industrial Revolution are having a transformative impact not only on the economy, but also on society. The dynamic development of automation and digitization of processes, which characterizes the concept of Industry 4.0, may undermine the social role of industry as an employer and engine of prosperity (Bai et al., 2020; Ghobakhloo, 2020; Xu et al., 2021). The emergence of these

changes and problems, which are closely linked to purely technological innovations, requires industry to rethink its place and role in society. This is what we call a kind of game changer.

The dehumanization of industry by focusing solely on the implementation of Industry 4.0 technologies has led to many concerns among workers, governments and the public about new working conditions and the role of people in industry and the economy (Olsen & Tomlin, 2020). Thus, a new concept of industrial transformation called Industry 5.0 has emerged, which is currently being supported by the European Commission (European Commission [EC], 2021). Many scientific studies point to the need to include the important role of humans in the assumptions of future industrial development. The humanization of the technological environment built for Industry 4.0 is one of the first factors in the evolution from Industry 4.0 to Industry 5.0. Industry 5.0 is a synergy between humans and machines that significantly changes the playing field in manufacturing enterprises (Grabowska et al., 2022).

In addition to the important factors in the development of cooperation between human capital and intelligent machines, very important environmental aspects related to sustainability and aspects of the lack of resilience of processes and even entire business models were included. The aspect of lack of resilience was particularly noticeable during the COVID-19 pandemic or the start of the war in Ukraine (Javaid et al., 2020). Recognizing the validity and importance of the goals of Industry 5.0, there is a need for research in the field of implementation of digital technologies simultaneously conducive to the development of the Industry 5.0 concept (Ivanov, 2022).

The aim of the chapter is to identify key areas of digital technologies currently used in industry that will strengthen the implementation process of the Industry 5.0 concept. Achieving the aim of the paper requires answering the following research questions: Which Industry 5.0 technologies have the most impact on the Industry 5.0 pillars? The research uses a critical analysis of the literature and the results of an expert study.

3.2. Review of the Subject Literature

Industry 4.0 Towards Industry 5.0

The concept of Industry 4.0 was introduced more than a decade ago in 2011, while research on Industry 5.0 has only gained momentum in the last few years. Academic research on Industry 5.0 has begun sporadically around the world over the past five years. In February 2023, there were 315 articles indexed in the WoS database that include the phrase "Industry 5.0" in their titles, abstracts or keywords. The main research areas covered in these publications relate to the concept of Industry 5.0 focus on man, his cooperation in the human-technology and man-machine system. In technological aspects, research is related to the application and future of the Internet of Things, virtual and augmented reality, Autonomous Vehicles, blockchain and Collaborative Robots. Human-centred research mainly included studies on predicting future working conditions and education of industrial workers, integrated human

and technological aspects, i.e., human-centred manufacturing technology and the quality of human-robot collaboration in the future. Overall, the concept of Industry 5.0 extends the ideas of Industry 4.0 in a broader and more human- and society-friendly way.

Industry 5.0 is based on three essential pillars (EC, 2021).

- Sustainability which implies the use of cyber-physical production systems using renewable energy sources. The European Commission indicates in its report that reducing carbon emissions by 55% by 2030 requires a sustainable industry and an orientation toward sustainable production and consumption. Hence, there is a need for greater orientation toward applying the principles of the digital closed economy and reducing the negative impact of industry on the environment (Maddikunta et al., 2022).
- Human-centric, based on the use of human potential in machine learning or close cooperation between humans and collaborative robots (cobots). The use of digital technologies must not infringe on workers' basic rights, such as the right to respect for privacy, independence and human dignity. Combining the best of two worlds – the speed and accuracy guaranteed by automation – with the cognitive skills and critical thinking of humans is expected to ensure the success of Industry 5.0 (Adel, 2022; Wan & Leirimo, 2023).
- Resilience which stems from the recent experience of the industry, which, through the overdevelopment of global supply chains, has become irrisilient to disruptions caused by geopolitical changes, crises in the form of, for example, the COVID-19 pandemic, armed conflicts, restrictions, etc. (Rožanec et al., 2022; Van Oudenhoven et al., 2022).

In 2020, the European Commission distinguished six basic categories of technological solutions relevant to Industry 5.0, which combine the use of existing Industry 4.0 technologies to realize the goals of the Industry 5.0 concept (EC, 2020) (Figure 3.1).

1. Human-centred solutions and human-machine interaction technologies that combine the strengths of humans and machines. The scope of this area should include, among others, technologies for speech and gesture recognition and predicting human intentions, technologies for tracking the mental and physical workload and stress of employees.
2. Biologically inspired technologies and smart materials that enable the use of materials with embedded sensors and enhanced functions, while being recyclable.
3. Digital twins and real-time simulations to model entire cyber-physical systems. These technologies optimize production, test products and processes, and detect possible detrimental effects on the safe operation and maintenance of production systems.
4. Cybersecure technologies for data transmission, storage and analysis can handle data and system interoperability. This technology area can include networked sensors, and scalable, multi-level cybersecurity (secure IT infrastructure in the cloud).
5. Artificial intelligence, for example, detects causes in complex, dynamic systems, leading to practical information. Currently, the greatest hopes for the development of artificial intelligence are related to the development of technology based on causality, not just correlation.

6. Technologies for energy efficiency targeting the development of renewable energy integration, support for hydrogen and Power-to-X technologies, and development of low-energy data transmission and data analytics technologies.

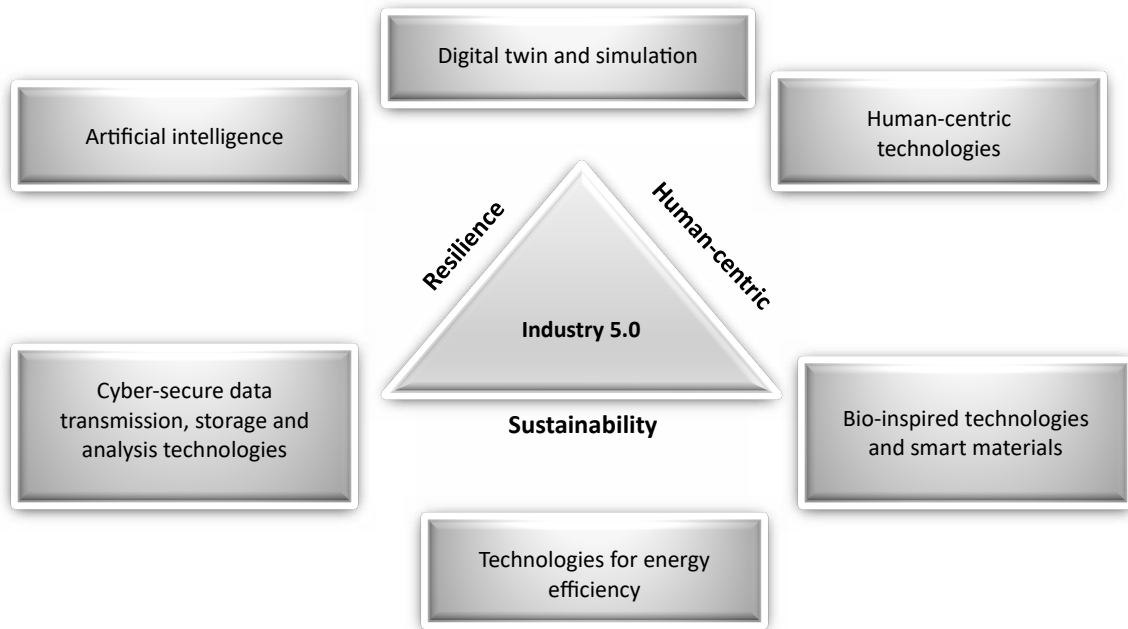


Figure 3.1. Technology categories of relevance to Industry 5.0

Source: own elaboration.

Competency Requirements for Industry 5.0

The case of Industry 5.0 appears to be a special case of a general change in the demand for skills due to the combination of digitization and employee intelligence. In this context, the level of highly-skilled workforce, the ability to transfer knowledge, teamwork and openness to unrestricted communication through the aforementioned digital areas of technology become important (Leng et al., 2022). The skills needed to implement the Industry 5.0 concept are mainly related to digitizing the production environment, collecting and analysing large data sets, ensuring data security, and effectively creating cyber-physical networks of intelligent resources of cooperating enterprises and people. This means changes in education, which should move towards developing professions such as mechatronics, automation, IT, and data analytics, among others, and new skills in place of existing ones, whose share will steadily decrease. Machines are replacing traditional skills, and the emergence of new expected skills requires adaptation to new technologies. An industry transformation focused on creating cyber-physical systems will require new knowledge and competencies from Industry 4.0 engineers and Industry 5.0 managers (Lu et al., 2022).

There is also a need to train next-generation leaders and young talent in Performance Augmentation for Industry 5.0 and Additive Manufacturing, which allows for shorter production runs, the ability to produce parts with geometries not possible with current methods, generating unique features for the design changes that need to be achieved from customer expectations (Orso et al., 2022).

Based on the literature on the knowledge and skills of human resources to implement the Industry 5.0 concept, the following problems can be identified in the area under study (Broo et al., 2022; Cillo et al., 2022):

- employees need knowledge and a new paradigm of skills resulting from the digitization of systems and the cooperation of humans with intelligent cobot machines, which should lead to an increase in the overall efficiency of production systems, the efficiency of operational management and the efficiency of production and support processes;
- there is a need to recruit highly skilled personnel who are characterized by openness to change, ability to transfer knowledge and teamwork in cyber-physical systems;
- it is important to be able to combine knowledge in the area of information and production technologies in the Industry 4.0 and Industry 5.0 environment with management science, especially in the areas of strategy development and case analysis, planning and implementation, collaboration and networking, business models, human resources, change and leadership;
- there is definitely a growing importance of lifelong learning in the Industry 4.0 and 5.0 environment, which requires: promoting a climate of innovation and learning, changing the ways of learning (e.g., remote learning), new approaches to developing human resources talent.

The success of any enterprise highly depends on its employees, who possess the necessary skills, knowledge, and competence to play a crucial role in the growth and development of the organization. With advancements in digital technologies and innovation, employers face new challenges in personnel development, motivation, and management, especially for those employees with above-average abilities (Ustundag et al., 2018). Talent management will be crucial to human resources management in Industry 5.0. With increasing competition in the market, the organization's success will depend on its employees' unique competencies and talents.

3.3. Materials and Methods

A literature synthesis – research studies and expert studies – was used to achieve the paper's aim and answers to research questions. The chapter proposes an expert method involving interviews with experts with experience in implementing Industry 4.0 technologies. The study used an individual in-depth interview (IDI) with selected experts using a structured questionnaire supported by a Computer-Assisted Web Interview data collection technique.

The selection of experts was purposeful based on the adopted criterion, which meant participation in implementing at least three Industry 4.0 technologies in practice. Three representatives of the scientific community (professors) and eleven managers representing companies that have implemented Industry 4.0 technologies were invited to participate in the study. The companies mainly represent the automotive, food and mechanical processing industries. The study is a pilot study and constitutes a basis for further in-depth research. Data for analysis were collected from December 2022 to February 2023.

The experts were tasked with assessing the impact of the six technology areas proposed by the European Commission on the three pillars of Industry 5.0: human orientation, sustainability and resilience. Impact was assessed using a 5-point Likert scale of 1 – no impact, to 5 – very high impact.

3.4. Results and Discussion

Noteworthy in the Industry 5.0 concept is the comprehensive approach to implementing individual technologies. That is the need to combine different technologies to achieve all the goals associated with the Industry 5.0 concept, namely sustainable economic development, orientation to human well-being in production systems, and achieving a high level of resilience to all kinds of disruptions (Huang et al., 2022). Figure 3.2 illustrates experts' responses regarding the impact of implementing the various areas of Industry 5.0 technology on the role of humans in cyber-physical systems. Experts unequivocally indicated a significant impact of human-oriented technologies and human-machine interaction technologies. They also highlighted the relatively high impact of digital twin and simulation technologies. The lowest impact on human orientation in the Industry 5.0 environment was shown by the experts in relation to technologies for energy efficiency.

Figure 3.3 shows respondents' answers regarding the impact of Industry 5.0 technology areas on sustainability. In this case, experts singled out energy efficiency techniques, bio-inspired technologies, and smart materials. High importance was also given to the implementation of digital twin and simulation technologies. Similarly, human-oriented solutions and human-machine interaction technologies significantly impact sustainability. Other technologies are of medium importance, according to experts. No area was indicated as having no impact on sustainability.

Figure 3.4 shows the experts' opinions on the impact of the proposed technology areas on the resilience of Industry 5.0 systems. Experts see a significant role in achieving greater resilience to all kinds of disruptions in implementing technologies for energy efficiency, technologies related to cyber security and technologies for transmission, data storage and analysis, digital twins and simulation, and the use of artificial intelligence in production systems. According to experts, the medium impact on resilience comes from human-centred solutions, biology-inspired technologies, and smart materials.

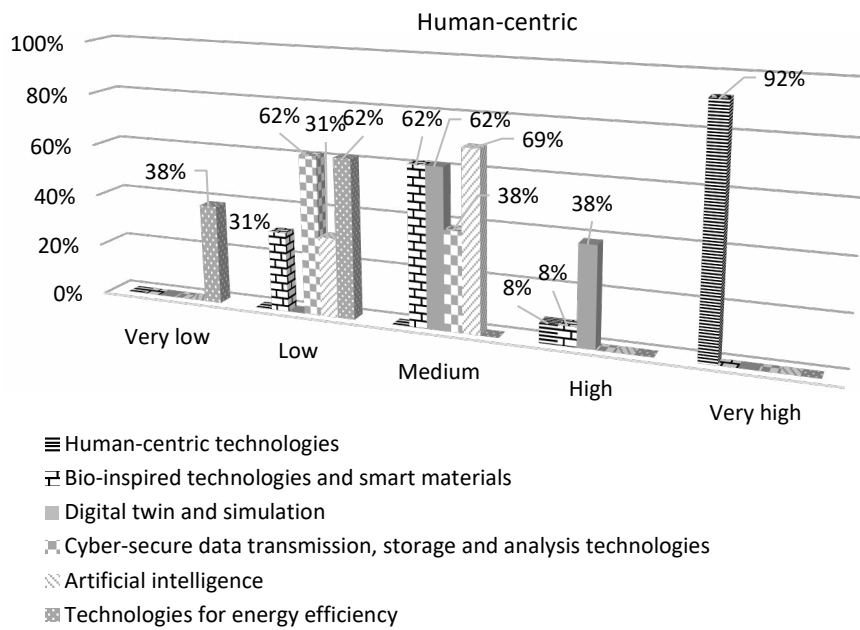


Figure 3.2. The impact of Industry 5.0 technology areas on the human-centric pillar

Source: own elaboration.

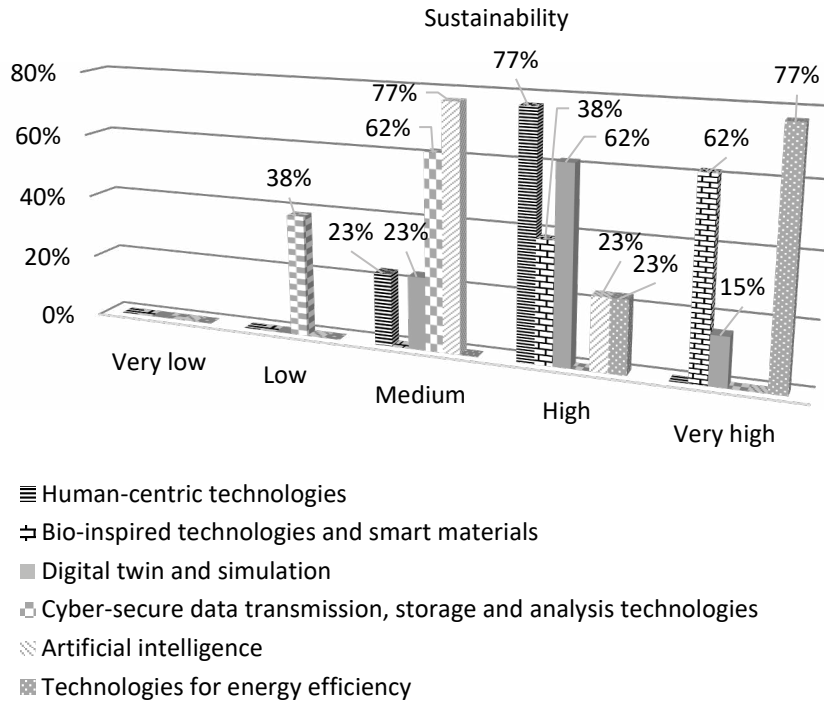


Figure 3.3. The impact of Industry 5.0 technology areas on the sustainable development pillar

Source: own elaboration.

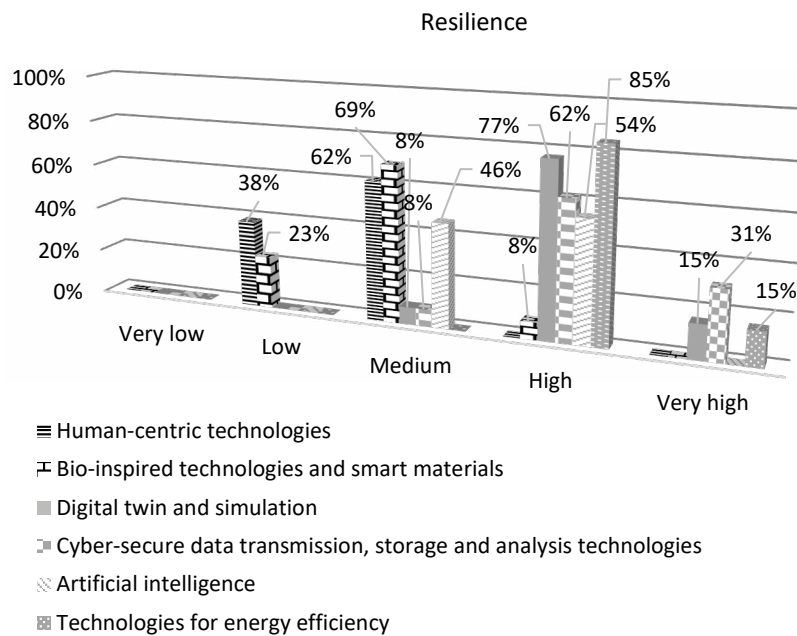


Figure 3.4. The impact of Industry 5.0 technology areas on the pillar of systems resilience

Source: own elaboration.

3.5. Conclusions

The Industry 5.0 concept is not a new revolution, but rather an evolution of the trends seen in the Industry 4.0 concept. Today, companies face the challenge of adopting technological innovations that take into account the social and environmental priorities of the European Union. Supporters of the Industry 5.0 concept predict significant changes in the approach to implementing fourth industrial revolution technologies, leading to additional benefits for European economies, value creation chains, and improved working and environmental conditions. The highest priority areas for the development and implementation of Industry 5.0 technologies are human-centred solutions, energy efficiency technologies, digital twin and simulation, cyber security and data analytics, and artificial intelligence. It is clear that the most effective way to achieve the goals of the Industry 5.0 concept is through a systemic approach that combines different technologies that interact in different ways with the various pillars of Industry 5.0.

The transformation of the Industry 4.0 concept into the Industry 5.0 concept does not mean moving away from an orientation towards achieving high productivity systems and flexibility but instead paying more attention to the critical role of humans in the economic process, quality of life and environmental protection. Hence, the ever-present challenge of the fourth industrial revolution should also be the circular economy, sustainable production

and consumption, which is reflected in, among other things, a higher level of orientation to personalized production and a higher level of servitisation of enterprises.

In this context, the level of a highly-skilled workforce, the ability to transfer knowledge, teamwork and openness to unrestricted communication through technologies such as the Internet of Things, Big Data, Cloud Computing, Blockchain, etc., becomes essential. Industry 5.0 is a challenge in diversifying the competence of employees, especially engineers. However, it should not be forgotten that the essence of the functioning of the enterprises of the future is the employees. Their competencies, knowledge and skills will allow the company to grow. Employers are increasingly being forced to take on new challenges in enterprise social capital management, development, motivation, and talent management.

The presented research results were based on a small group of experts, which limits the generalization of the presented results. However, the obtained results may inspire further, more in-depth empirical analyses based on research on enterprises implementing Industry 4.0 and 5.0 technologies.

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Koncepcja Przemysłu 5.0 jako game changer dla czwartej rewolucji przemysłowej

Streszczenie: Koncepcja Przemysłu 5.0 to zmiana gry dla czwartej rewolucji przemysłowej. Rozszerza ona idee Przemysłu 4.0 o wartości związane ze zrównoważonym rozwojem, skoncentrowaniem na człowieku i odpornością branży. Celem rozdziału jest identyfikacja kluczowych obszarów technologii cyfrowych wykorzystywanych w czwartej rewolucji przemysłowej oraz identyfikacja ich wpływu na osiągnięcie głównych celów Przemysłu 5.0, czyli orientacji na człowieka, zrównoważonym rozwoju i odporności na wszelkiego rodzaju zakłócenia. Autorzy wykorzystali metodę krytycznej analizy literatury oraz przeprowadzili badanie eksperckie wśród wybranych ekspertów reprezentujących środowisko biznesowe i naukowe. Ponadto w rozdziale zwrócono uwagę na wzrost wymagań kompetencyjnych pracowników związany z wdrożeniem obszarów technologicznych Przemysłu 5.0.

Słowa kluczowe: Przemysł 5.0, orientacja na człowieka, odporność, zrównoważony rozwój, kompetencje

CHAPTER 4

The Idea of Organizational Resilience in the Face of Cybercrime

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Abstract: The digital transformation process, deepened by the outbreak of the COVID-19 pandemic, completely changes the current reality of the organization in global terms. Using digital solutions has a number of advantages, but it is also associated with numerous cyber threats. In the face of these threats, digital resilience has become a kind of business imperative. The aim of the article is to determine the level of knowledge of the organization's employees about cyber threats and the degree of their preparation for potential threats of this type. The study showed an insufficient level of recognition of cyber threats by employees of the organization. It was found that employees were not adequately prepared for potential threats by the employer, which consisted, among others, in the fact that training on digital threats was conducted too rarely. Many employees do not apply appropriate forms of data and document protection. The above conclusions should encourage managers to ensure a higher level of employee education on cybercrime, and thus to build a more digitally resilient organization.

Keywords: organisational resilience, cybercrime, cyber security

4.1. Introduction

Digital transformation, intensified by the outbreak of the COVID-19 pandemic, is a process that completely changes the current reality of the organization in global terms. It is a big challenge for those responsible for building a safe and resilient organization. The reason is the constant exposure of enterprises to a number of dangerous incidents lowering the

level of cybersecurity. Adware, logic bomb, BEC, likejacking, trojans, tabnabbing, phishing, spoofing, all are just some of the threats that can be faced by employees of the organization every day. And it is often on their awareness of digital dangers and attitudes that the security of the organization depends. This aspect has been touched upon rightly by Mitnick in *The Art of Deception: I have been breaking people, not slogans* (Mitnick & Simon 2003).

The aim of the article was to determine the level of knowledge of the organization's employees about cyber threats and the degree of their preparation for potential threats of this type. As a part of the research process, an attempt was made to answer the questions about the level of recognition of cyber threats by employees of the organization, whether organizations prepare employees for potential digital threats, and what are the most common methods of securing against cyber threats in organizations.

For an organization to be able to effectively counteract cyber threats, it should be resilient. Resilience in management has been studied on many levels since the beginning of the 21st century. However, in the face of ever-increasing cybercrime, the number of publications dedicated directly to the resilience of enterprises to digital threats is definitely insufficient. The number of articles describing the aspect of cybercrime from the point of view of organization management is also low. The present study will contribute to increasing knowledge about the resilience of organizations to digital threats by checking what is the level of awareness of employees in the field of cybercrime and the possibilities of protection against it. The study is also important from the point of view of managerial practice: it can provide an indication for managers whether their subordinates are prepared for preventive actions related to digital incidents threatening the organization.

4.2. The Idea of Organizational Resilience

The term *resilience* is interdisciplinary and occurs, among others, in psychology, management, or natural sciences (Masten et al., 2021, p. 524). Most often, resilience is defined as a relatively permanent property of an individual, enabling it to adapt to adversity, tragedy or threat (Rutkowska, 2015, pp. 29, 30). It is also referred to as flexibility, resilience and resilience of the individual.

Table 4.1 presents the selected definitions of resilience, referring to different scientific disciplines.

Summarizing the analysis in Table 4.1, resilience can be treated as a kind of individual trait (Acosta, 2017; Masten et al., 2021; Rutkowska, 2015; Tagde & Fredrickson, 2004) or as a process (Cicchetti, 2010; Van Breda, 2018). Regardless of the presented alternative, the key element of the definition of resilience is the individual's ability to cope with a crisis situation. In the above interpretations, the words *flexibility*, *dynamic*, *adaptation*, *threat* are repeated. Therefore, a resilient economic unit should be flexible enough to dynamically adapt to a situation that threatens its existing existence.

Table 4.1. Selected definitions of resilience

Resilience...	Authors
"...has been characterized by the ability to bounce back from negative emotional experiences and by flexible adaptation to the changing demands of stressful experiences."	Tugade & Fredrickson (2004, p. 1)
"...has been conceptualized as a dynamic developmental process encompassing the attainment of positive adaptation within the context of significant threat, severe adversity, or trauma."	Cicchetti (2010, p. 145)
"...is a relatively permanent property of an individual that enables them to adapt to adversity, tragedy, or threat."	Rutkowska (2015, p. 29)
"...can be defined as the capacity of a dynamic system, such as a community, to anticipate and adapt successfully to challenges."	Acosta et al. (2017, p. ii)
"...is the multilevel processes that systems engage in to obtain better-than-expected outcomes in the face or wake of adversity."	Van Breda (2018, p. 4)
"...it is defined for scalability and integrative purposes as the capacity of a dynamic system to adapt successfully through multisystem processes to challenges that threaten system function, survival, or development."	Masten et al. (2021, p. 521)

Source: own study based on the indicated bibliographic items.

In management, resilience is usually treated as a feature of the system and a measure of the organization's excellence, resulting from effective management in the face of a crisis. At the level of managerial competencies, resilience is interpreted as a mechanism for surviving crisis situations, a personality trait, and aggregate competency (Bugaj & Witek, 2022, p. 11).

Analysing data from the Web of Science (WoS) database, we notice that the first articles dealing with the issue of resilience were written in 1913 and referred to the elasticity of metal alloys. In turn, the publications concerning *management* and containing *resilience* among the keywords began to appear since 2000. The number of articles devoted to resilience in individual time periods is shown in Figure 4.1.

In the period from 2000 to 2009, the term *resilience* rarely appeared in the keywords of publications from the WoS database in the *Management* category: total number of publications = 54 (Figure 4.1). During this period, resilience was mainly represented by the following keywords: *management*, *performance*, *reliability*, *coordination*, *technology*, *crisis management* and *model*. Since 2010, researchers have increasingly addressed the problem of resilience in management. The number of articles falling within the *Management* category and having *resilience* among the keywords increased from 13 in 2010 to as many as 373 in 2022. A particularly large increase in the number of studies can be seen after the outbreak of the COVID-19 pandemic: 185 publications in 2002 vs. 373 publications in 2022. These figures confirm the growing need for research on the resilience of enterprises to crisis situations.

Currently, resilience in management is being studied on many levels. Figure 4.2 presents the bibliometric mapping of keywords found in the WoS database, including the term *resilience* in the *Management* category in 2020–2022.

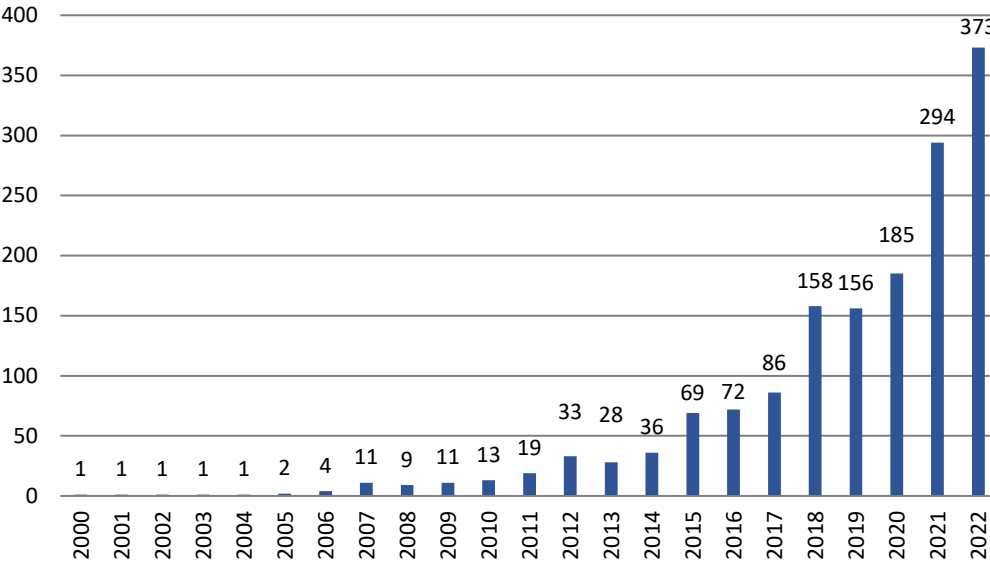


Figure 4.1. Number of publications in WoS concerning resilience and falling within the Management category
 Source: own implementation based on WoS.

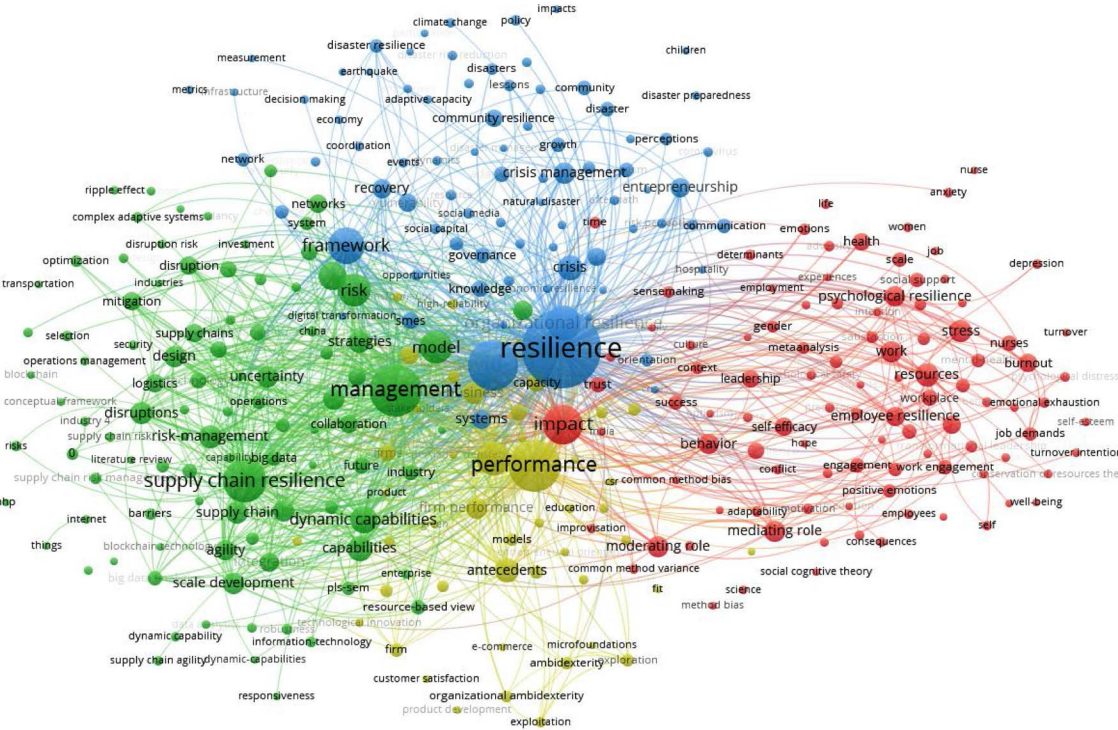


Figure 4.2. The mapping of keywords occurring in the WoS in the Management category, including the key word resilience in the years 2020–2022
 Source: own implementation based on WoS.

The mapping in Figure 4.2 was performed in VOSviewer. Five was assumed as the minimum number of occurrences of the key word. A total of 326 items have been obtained, divided into four clusters. The total number of connections was 9909. For comparison, similar data for the period from 2010 to 2019 showed 218 items, five clusters and 4740 connections, and for the period from 2000 to 2009 only four items, two clusters and 17 connections. From 2020, the term resilience most often occurs in combination with the words: *performance, management, covid-19, supply chain resilience, impact, framework, organizational resilience, innovation, risk, capabilities, risk-management, crisis*.

Along with the development of interest in the organization's resistance to potential threats in literature, the concept of *organizational resilience* appeared. According to DesJardine et al. (2019, p. 28), it consists in the ability of an organization to create a resilience strategy and introduce appropriate practices at the strategic, tactical and operational level in the face of subsequent crises.

Importantly, the above-mentioned crises do not have to be solely economic in nature. The role of ecological or social factors is increasingly emphasized in the literature. The crisis caused by the COVID-19 pandemic was extremely important for the increased interest in organizational resilience (Finstad, 2021; Pinzaru et al., 2020; Žitek & Klímová, 2020). Enterprises had to completely change the previously used channels of contact with the environment in a very short time. In order to stay on the market, companies have expanded their scope of activities in the digital world. And here we come to the paradox of digital transformation: the more organizations transfer their activities online, the more they are at risk of a cyberattack. Previously, the paradox of IT productivity from the perspective of managers was studied (Jelonek, 2016). However, there is no turning back from information technology, let alone from digital transformation: it is a reality to which organizations must adapt. Currently, more and more researchers describe the risks associated with digital transformation (Casey & Souvignet, 2020; Hacıoglu & Sevgilioglu, 2019) and digital resilience as a necessity for organizations functioning in the 21st century (Garcia-Perez et al., 2021; Paulus et al., 2022; Tran, 2020).

4.3. Cybercrime as the Everyday Life of 21st Century Organizations

The concept of *cybercrime* has emerged with the rapid development of digital tools and the rapid spread of the Internet. The first total publications on cybercrime date back to 1995 (source: WoS database). However, the first publications in the *Management* category appeared only in 2006. Despite the ever-increasing threat of cybercrime, the list of publications until 2022 is only 78 (source: WoS, criteria: topic = cybercrime, category = *Management*).

The term "cybercrime" refers to all crimes in which the use of information technology and telecommunications networks plays an important role (Petrishcheva et al., 2019, p. 4411). A big problem of this type of crime is the fact that they are usually carried out

completely remotely and do not require as much financial outlay from the criminal as an attack in the physical world (Hui et al., 2017, p. 3). In addition, cyberattacks often remain hidden or detected with a long delay (Petrishcheva et al., 2019, p. 4411). It happens that cyber-savers illegally acquire secret data of organizations for a long time in order to sell it or achieve their own goals. These purposes may include, inter alia, increasing one's own assets by stealing company funds or destroying them.

Cybercrime can be of different scale. Some of them directly concern a person, others a specific organization, and still others – large territorial or economic areas. Countering digital attacks, especially large-scale ones, requires close international cooperation. The first international law dealing with the fight against cyberattacks was the Convention on Cybercrime developed by the Council of Europe in 2001 (Konwencja Rady Europy, 2001). However, despite the creation of international treaties, the fight against digital attacks is not easy. As emphasized by Hui and Kim (2017, p. 4), the reason for the difficult fight against cybercriminals is their very specific profile. They are often minors and are subject to significantly lower penalties than those imposed on adults. These people engage in illegal activities, believing that their knowledge and IT skills will help them avoid punishment. An additional problem may be the remote mode of digital attack and the geographical dispersion of people attempting this type of attack together. International agreements have been written about, among others, Kshetri (2013) and Hui and Kim (2017), however, even these agreements are valid in specific geographical areas, where not all members of a given group are necessarily present.

The threat of cyberattacks has increased particularly sharply during the COVID-19 pandemic. Quarantines imposed by the governments of many countries have increased the number and volume of online payments and accelerated the pace of digitalization of the economy (Afonasova et al., 2019). Thus, there is an additional space for the development of cybercrime (Kuzmenko et al., 2021). Selected digital threats are shown in Table 4.2.

The digital threats presented in Table 4.2 are divided into two types: technical and sociotechnical threats. It is an original division proposal, according to which programs and algorithms affecting data acquisition mainly at the *technical level are included in the category of technical threats*. In turn, in the category of *sociotechnical threats*, those phenomena that relate first to a specific behaviour of people are placed: their decisions, clicks, moods, etc. Cybercriminals launching an attack using a socio-technical threat count on a person's specific behaviour, e.g., clicking on a fake QR code to redirect to a fake website. It is worth noting that as a result of the user's reaction in accordance with the expectations of the criminal (in the example cited: clicking on the QR code), a technical threat may occur (e.g., downloading malware). The table also lists some of the threats that most often occur outside the structure of the organization (e.g., grooming or oversharing), but which may affect this organization by reducing the involvement of employees in the company. For example, if an employee has a ZUI team, he or she may be less effective in performing non-internet work tasks.

Due to the large number of presented threats, it was decided not to explain all the entries. Only those definitions that were used during the survey were given. These terms are

underlined and the definition is in parentheses. It is worth noting that many more digital threats are social engineering in origin. For this reason, it is crucial to constantly educate employees as individuals subject to social engineering activities about possible undesirable online activities.

Tabela 4.2. Selected cyberthreats

Technical assumptions	Sociotechnical risks	
<ul style="list-style-type: none"> ■ <u>adware</u> (malware) ■ backdoor ■ information bubble ■ <u>logic bomb</u> (explodes suddenly after meeting certain conditions by the system/user) ■ botnet ■ <u>browser hijacker</u> (modification of web browser settings by a third party without the user's knowledge) ■ DDoS ■ exploit ■ <u>fake domains</u> ■ flooding ■ jamming ■ keylogger ■ kruegerapps ■ <u>password spraying</u> (the use of popular passwords by an attacker to access several accounts at the same time) ■ <u>spyware</u> ■ stealware 	<ul style="list-style-type: none"> ■ <u>Business Email Compromise</u> (impersonation of a person with whom you had business contacts) ■ <u>clickbait</u> (an article with a catchy title causing misinformation) ■ cybercrime ■ cyberstalking ■ digital kidnapping ■ deepfake ■ disinformation ■ doomsurfing ■ doxing ■ fake news ■ FOMO ■ flaming ■ phonoholism ■ grooming ■ happy slapping ■ hate ■ <u>likejacking</u> (overestimating the number of likes on social media so that the user clicks and downloads malware) ■ hate speech ■ illegal content ■ nomophobia ■ <u>oversharing</u> (excessive overflow in the network) ■ patocontent ■ <u>phishing</u> (redirecting the user to fake pages, most often via e-mail) 	<ul style="list-style-type: none"> ■ <u>pharming</u> (a more dangerous form of phishing; redirecting the user to fake bank websites, extorting passwords and money from them) ■ <u>vishing</u> (impersonation of bank employees and other trusted employees) ■ <u>spoofing</u> (impersonating other devices or other users) ■ phubbing ■ <u>quishing</u> (redirecting a user to fake pages via a QR code) ■ <u>scam</u> (an attempt to extort our data by promising high earnings or rewards) ■ sexting ■ sextortion ■ shareting ■ <u>smishing</u> (redirecting a user to fake pages via SMS) ■ making people smombies ■ <u>tabnabbing</u> (a form of phishing, replacing a website when a user browses another tab) ■ conspiracy theories ■ troll parenting ■ trolling ■ Internet Addiction Syndrome (IAS)

Due to the large number of presented threats, it was decided not to explain all the entries. Only those definitions that were used during the survey were given. These terms are underlined and the definition is in parentheses.

Source: own study based on OSE (2022) and Varga (2021).

The digital threats presented in Table 4.2 are divided into two types: technical and sociotechnical threats. It is an original division proposal, according to which programs and

logarithms affecting data acquisition mainly at the *technical level* are included in the category of *technical threats*. In turn, in the category of *sociotechnical threats*, those phenomena that relate first to a specific behaviour of people are placed: their decisions, clicks, moods, etc. Cybercriminals launching an attack using a socio-technical threat count on a person's specific behaviour, e.g., clicking on a fake QR code to redirect to a fake website. It is worth noting that as a result of the user's reaction in accordance with the expectations of the criminal (in the example cited: clicking on the QR code), a technical threat may occur (e.g., downloading malware). The table also lists some of the threats that most often occur outside the structure of the organization (e.g., grooming or oversharing), but which may affect this organization by reducing the involvement of employees in the company. For example, if an employee has a ZUI team, he or she may be less effective in performing non-internet work tasks.

Due to the large number of presented threats, it was decided not to explain all the entries. Only those definitions that were used during the survey were given. These terms are underlined and the definition is in parentheses. It is worth noting that many more digital threats are social engineering in origin. For this reason, it is crucial to constantly educate employees as individuals subject to social engineering activities about possible undesirable online activities.

From the point of view of the organization, cybercrime is a very important problem (Kshetri, 2013). Organizations should have constantly updated data and information security policies and make them known to their employees (Jelonek, 2003). The actions of digital fraudsters, including theft of funds, phishing, or deliberate destruction of IT infrastructure, can prevent business activities, lead to a decline in the reputation of the organization, and even its bankruptcy. During the research conducted by the LogRhythm institution, as many as 67% of employees confirm that their company has lost a client due to his lack of trust in the company's security strategy (LogRhythm 2022, p. 7). At the same time, the same report confirms that nearly half of companies are prepared for the growing complexity of cybercrime (48%), an increasing number of them (43%) and the evolution of threat types (42%).

An increasing number of organizations are aware of the need to protect their systems and sensitive data against cybercriminals. The main form of this type of protection is technical security, such as advanced antivirus programs, or the use of appropriate encryption programs. In enterprises, special security units are created, whose role in the proper functioning of the organization increases with the development of ICT tools and the emergence of new methods of cyberattacks. According to the report *The State of the Security Team 2022*, in 2020, only 43% of security department employees stated that they had received sufficient management support in terms of commitment, strategy and budget. In 2022, this percentage was as high as 83% (LogRhythm, 2022, p. 4).

However, even if the company spends large amounts of money to secure access to its data, it is exposed to the undesirable effects of third parties. One of the most common ways to reach the company's protected data are its employees, who do not always behave in accordance with good cybercrime practices (Abazi & Kő, 2019). This can be seen both in their work and in their private lives. According to the report *Attitudes of Poles towards*

cybersecurity (Związek Banków Polskich & Warszawski Instytut Bankowości [ZBP & WIB], 2021, p. 3), only 33% of respondents declare that they use different passwords for different electronic accounts, and 9% do not use any methods of password protection.

In order to determine the areas most exposed to cybercriminal attacks, specialists from Seon have created a ranking of countries with the highest and the weakest digital protection. According to this ranking, the best protected countries against online attacks in 2020 are Denmark, Germany, USA, Norway, Great Britain, Canada, Sweden, Australia, Japan, and the Netherlands. The least protected against cyberattacks are: Myanmar, Cambodia, Honduras, Bolivia, Mongolia, Algeria, Zimbabwe, Nicaragua, Bosnia and Herzegovina, and El Salvador (Varga, 2021). Poland was not included in the quoted list.

4.4. Research Methodology

The aim of the article was to determine the level of knowledge of the organization's employees about cyber threats and the degree of their preparation for potential threats of this type. In relation to the objective, an attempt was made to answer three research questions:

Q1: What is the level of cyber threat recognition by the organization's employees?

Q2: Are organizations preparing employees for a potential digital threat?

Q3: What are the most commonly used methods of protecting against cyber threats in organizations?

The study has been divided into two main stages: analysis of existing documents and a survey. In the first stage, the publication of *ABC Cyber Security*, created by specialists from the Scientific and Academic Computer Network – the State Research Institute (OSE IT-Szkoła, 2022), was analysed. The analysis focused on selecting the most important passwords related to cybercrime and cybersecurity in organizations. Of the nearly 100 terms found in the analysed publication, 30 were selected for the next stage: 20 meaning cyber threats (including *phishing*, *oversharing*, *tabnabbing*) and 10 ways of protecting against these threats (including *updating*, *fact-checking*, *firewall*). Only passwords that may occur in the employee's professional life were selected for the study. The assessment of concepts referring mainly to the personal sphere (e.g., *troll parenting*, *grooming*) has been abandoned.

Then the second stage, i.e., the survey, was started. The questionnaire has been prepared in electronic form and was published on www.swpanel.pl and submitted for completion to registered users of the portals: www.swpanel.pl and www.ankieteo.pl. Table 4.3 summarises the questions contained in the questionnaire.

The questions collected in Table 4.3 are divided into three distinct groups. The first group consists of questions relating to the characteristics of the respondents, i.e., their gender, age and size of the company in which they work. The next group consists of introductory questions, thanks to which it was possible to determine whether the respondent uses digital technologies at work, whether he has had experience with digital threats and whether

Table 4.3. The questions included in the questionnaire

	Question	Responses
Specification	Gender:	<input type="checkbox"/> Female <input type="checkbox"/> Male
	Age:	<input type="checkbox"/> Under 26 <input type="checkbox"/> 26–45 <input type="checkbox"/> 46–65 <input type="checkbox"/> Over 65
	How many employees are employed by the company you work for?	<input type="checkbox"/> Less than 10 <input type="checkbox"/> 10–49 <input type="checkbox"/> 50–249 <input type="checkbox"/> Over 249
Introductory	Do you use digital technologies in your work?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I've never worked before
	Have you encountered any digital threats so far?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know <input type="checkbox"/> I've never worked before
	Has there been a cyber-attack at the company you work for?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I don't know <input type="checkbox"/> I've never worked before
Main	Assess whether the following processes/ phenomena/tools related to the digital world threaten the security of the organization, or are they a protection against cyberattacks? In other words: are they positive or negative from the point of view of the security of the organization/company?	Evaluation passwords: <i>update, biometric security, netiquette, adware, logic bomb, browser hijacker, business e-mail compromise BEC, backup, captcha, cracker, clickbait, fake domains, malware, likejacking, oversharing, fact-checking, firewall, password generators, antivirus software, two-factor authentication, password spraying, pharming, phishing, vishing, spoofing, quishing, scam, smishing, spyware, tabnabbing</i> Evaluation options: 1 – <i>definitely a digital threat</i> , 2 – <i>rather a digital threat</i> , 3 – <i>neither a threat nor a security</i> , 4 – <i>rather a protection against a digital threat</i> , 5 – <i>definitely a protection against a digital threat</i> , 6 – <i>I do not know this term</i>
	Think about your current employer and assess the degree to which they have prepared you for particular digital threats. If you're not currently working, think about your previous employer.	Evaluation passwords: <i>adware, logic bomb, browser hijacker, business e-mail compromise BEC, cracker, clickbait, fake domains, malware, likejacking, oversharing, password spraying, pharming, phishing, vishing, spoofing, quishing, scam, smishing, spyware, tabnabbing</i> Responses to the choice: <i>The employer has not prepared, The employer has prepared to a small extent, The employer has prepared to a sufficient extent, The employer has prepared very well, I have never worked or do not know</i>
	How often does your employer train you or send you cybersecurity material?	<input type="checkbox"/> Once a year or less <input type="checkbox"/> Several times a year <input type="checkbox"/> Several times a month <input type="checkbox"/> I've never worked before
	What forms of protection against a digital threat and what reasons do you use?	Evaluation passwords: <i>update, backup, captcha, fact-checking, firewall, password generators, antivirus software, two-factor authentication, biometric security, netiquette</i> Available replies: <i>I do not use, I use – due to the requirement of the employer, I use – due to my own views</i>

Source: own work.

there has ever been a cyberattack at his workplace. The third group consists of main questions concerning the respondents' assessment of individual passwords related to cybersecurity (type A passwords) and cybercrime (type B passwords) and the process of preparing an employee by his employer to deal with a threat on the web. In question 8, all the threats that the respondents were asked about (type B passwords) were collected. In question 10, you can find a list of selected security measures/good practices for using digital devices (type A passwords). Question 7 intentionally mixes these terms. The aim was to find out the respondents' opinions on whether a given term defines a phenomenon/tool that is safe or dangerous from the point of view of an organization.

4.5. Results of the Study

The study was conducted from 09.01.2023 to 16.01.2023. The sample consisted of 239 people: 57% women and 43% men. The most numerous age group were representatives of generation Y, i.e., people from 26 to 45 years (43%). The number of other age groups was as follows: 29% of the respondents were 46 to 65 years old, 16% less than 26 years old, and 12% more than 65 years old. Most respondents worked in a microenterprise (less than 10 employees): 28%. In a small enterprise (from 10 to 49 employees) 23% of respondents were employed, in the average one (from 50 to 249 employees) – 15%, in a large (over 249 employees) – 14%. 20% had no professional experience.

In the group of people with professional experience, 60% used digital technologies in their work, 36% have personally encountered any digital threat, 41% of respondents declared that they did not have this type of experience. The answer *I don't know* was chosen by 23% of people. The respondents were also asked whether there was a cyberattack in their company. 19% answered *Yes*, 50% – *No*, and 31% – *I don't know*.

In order to answer the first research question (Q1: What is the level of recognition of cyber threats by employees of the organization?), the slogans assessed in question no. 7 were ranked in accordance with the previously assigned type: A for phenomena positively affecting the security of the organization (of a protective nature) and B for cyber threats. Then, we checked how respondents perceived individual concepts. The results have been demonstrated in Figure 4.3.

Drawing the average from individual categories, it was found that A-type passwords (of a security nature) were appropriately assigned by 35% of respondents. The correct mapping in the case of type A was considered to be answers: *rather collateral* and *definitely collateral*. The situation is much worse in the case of type B passwords (cyber threats). They were properly identified by only 18% of the respondents. *Rather, the threat* and *definitely the threat* were considered to be correct identification. This means that on average, 82% of employees of an organization either admitted that they did not know the concepts that mean cyber threats, or mistakenly described them as neutral or even positive for the security

of the organization. In view of the above, it can be concluded that the level of recognition of digital threats by employees of the organization is insufficient.

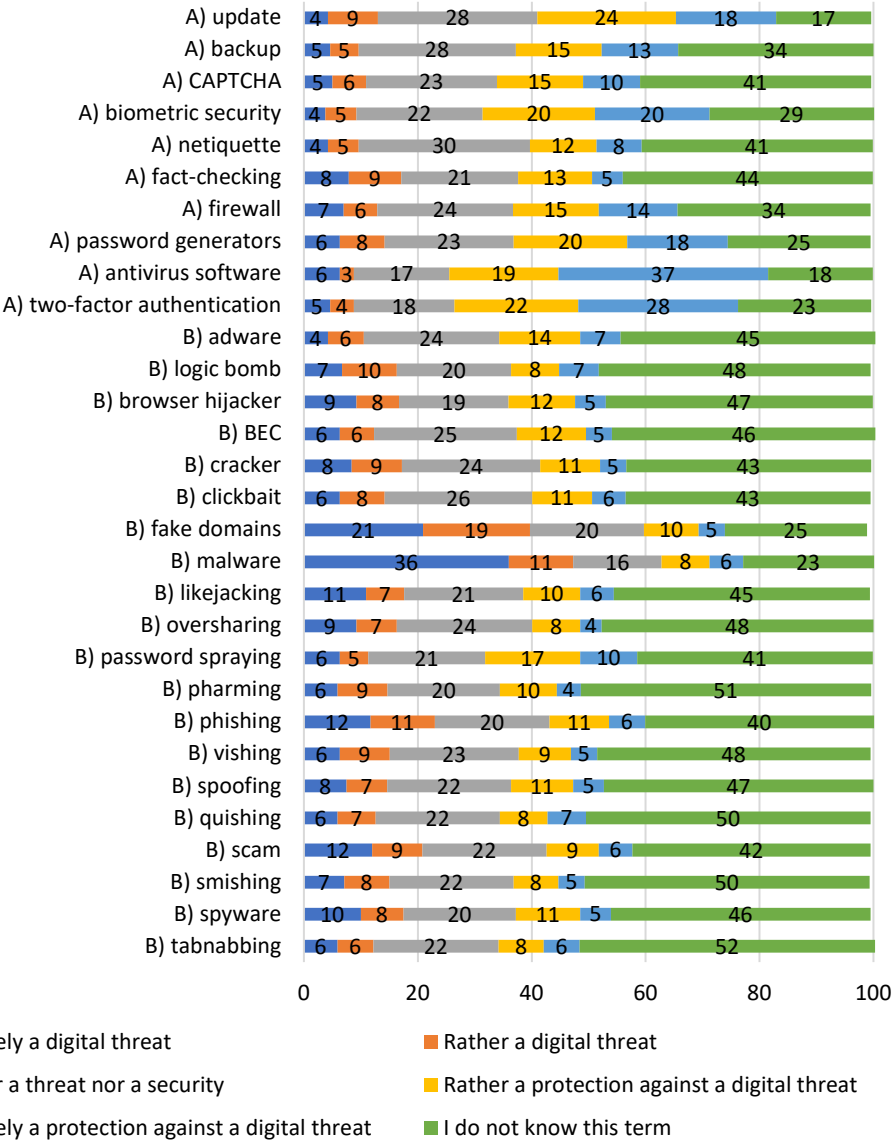


Figure 4.3. The percentage of employees assigning individual concepts to a given category
 Source: own work.

It was then checked whether the accuracy of assigning threats and safeguards (or concepts that positively affect the security of an organization, such as a *netiquette*) to the appropriate category depends on the age, gender, size of the enterprise and the fact that it has faced a digital threat in the past. The χ^2 test was used. For each evaluated concept, the value of the correct mapping is given according to the evaluation description given in the case

of drawing the average. Correct mapping in the case of the accuracy of password mapping is statistically significantly ($p > 0.05$) correlated with gender in only three cases: *captcha*, *netiquette* and *fact-checking*. In these cases, men gave a much more accurate assessment. Age is correlated with the assignment of terms: *clickbait*, *fake domains*, *likejacking*, *password generators*, *antivirus software* and *scam*. The most accurate assignment can be noted among the group of people aged 26–45, then under 26, 46–65 and over 65 years of age. The size of the enterprise is statistically significantly correlated with the assignment of concepts: *backup* (the larger the enterprise, the more accurate the assignment), *antivirus software* (most accurately employees of small, then large, medium and micro enterprises) and *two-factor* credit (most accurately employees of small, then medium, large and micro enterprises). Respondents without professional experience assigned passwords the worst.

The highest number of statistically significant correlations was found between the employee's experience with the digital threat in the past and the accuracy of the assignment. In the case of the following terms: *update*, *backup*, *captcha*, *netiquette*, *likejacking*, *oversharing*, *fact-checking*, *firewall*, *two-factor authentication*, *password spraying*, *pharming*, *phishing*, *spoofing*, *scam* and *tabnabbing*, the most accurate assignment was presented by people who encountered a digital threat in the future (answer *Yes* to question No. 5), then by people giving answers *No* and *I do not know*, and the weakest people without professional experience.

Employees were also asked if their employer was preparing them for a potential digital threat (P2). The answers are presented in Figure 4.4.

The self-assessment of the degree of employee preparation for the digital threat presented in Figure 4.4 consisted in determining by the respondents whether the employer prepared them for the threat very well, to a sufficient extent, to a small extent, or did not prepare at all. The values indicated in the figure refer to the percentage of employees who assigned a given concept to a specific category. As we can see, the total percentage of respondents who admit that their organization has prepared them for a given threat to a sufficient or very good degree ranges from 36% (*BEC*, *tabnabbing*) to 42% (*trojan*). The average assessment of all risks was 39% (refers to the answer: *The employer prepared sufficiently* and *The employer prepared very well*). That is, far less than half of respondents say that the employer prepared them for cyber threats, which is hardly a sufficient result from the point of view of business security. The situation is further exacerbated by the fact that on average 33% of employees declare that they do not have sufficient preparation in the event of encountering a digital threat (the assessment ranges from 31% in the case of *quishing*, *phishing* and *pharming* to 36% in the case of *tabnabbing* and *BEC*).

These results are not surprising in the face of a very negative assessment of the frequency of employee training in the field of digital security. In the group of people with any professional experience, as many as 55% of respondents state that the employer trains them or submits materials with digital threats once a year or less often. The answer *A few times a year* was chosen by 25% of the respondents, *several times a month* – by 13%, and the answer *daily* was chosen by only 7%.

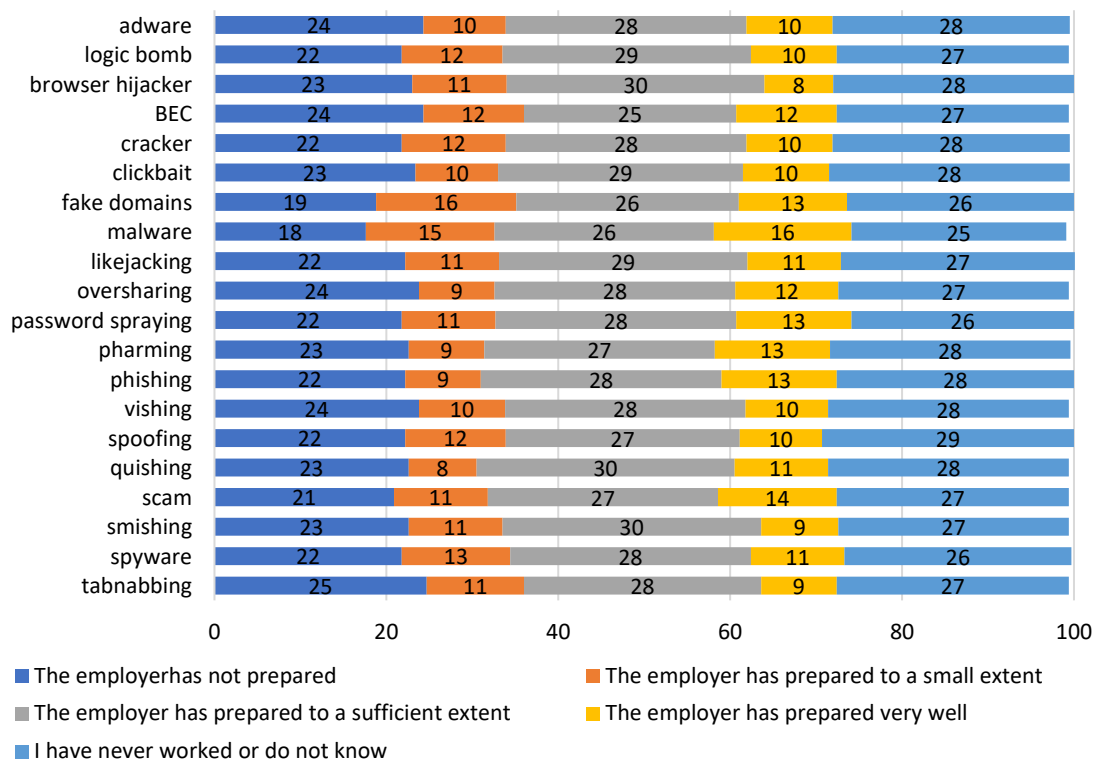


Figure 4.4. Self-assessment of the degree of employee preparation by the employer for digital threats

Source: own work.

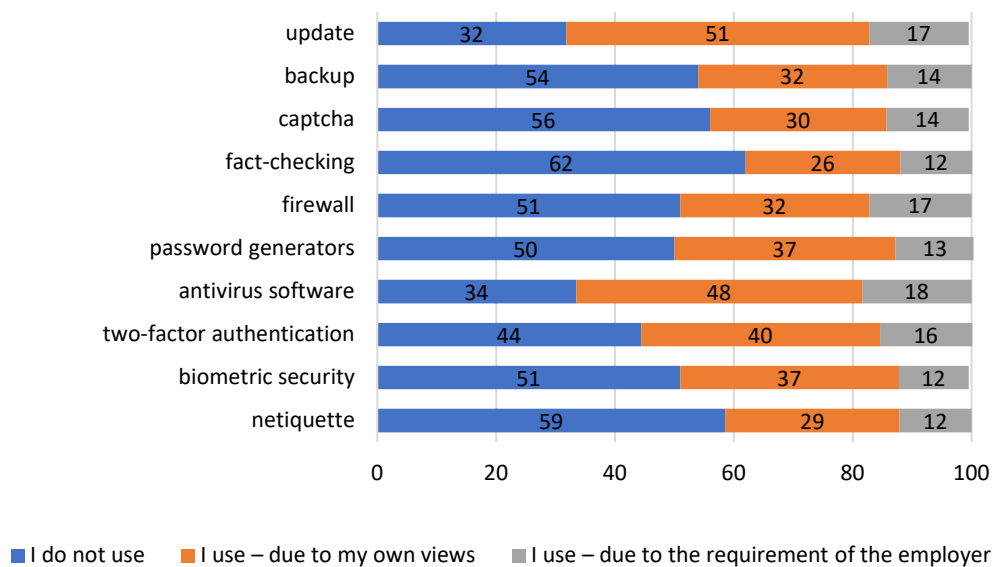


Figure 4.5. Security methods used by employees of the organization

Source: own work.

The last research area was the most commonly used methods of protection against cyber threats in organizations (P3). Employee responses in percentage terms are collected in Figure 4.5.

As shown in Figure 4.5, on average, 36% of employees use security due to their own views, and 15% due to the employer's requirement. The percentage of people not using the above forms of security ranges from 32% in the case of *updates* to as much as 62% in the case of *fact-checking*. Therefore, it can be assumed that on average 49% of employees do not use any of the analysed forms of security.

The results of the study confirm the general conclusions of the LogRhythm report (2022): at the beginning of the third decade of the 21st century companies are not prepared for threats existing in the digital environment. The conclusions of the presented study are also in line with the opinion of Abazi and Kó (2019), according to which employees are not adequately prepared for potential threats, are not able to recognize the threat and do not use sufficient forms of security. Finally: the results of this study confirm the conclusions contained in the report of the Związek Banków Polskich (Association of Polish Banks) and Warszawski Instytut Bankowości (Warsaw Institute of Banking) (2021) regarding the insufficient degree of application of safeguards against digital threats of the organization's processors.

4.6. Conclusions

Crisis situations can have a very strong impact on the structure of modern organizations. This was visible, for example, during the COVID-19 coronavirus pandemic which forced most companies to temporarily start remote work. In extreme versions, crisis situations can lead to the collapse of the organization. In order for a company to survive in times of danger, it should develop the ability to be resilient. However, it is crucial to take care of resilience before the crisis situation reveals itself. Thanks to preventive building of resilience, the organization has a chance to develop an effective immune system, especially necessary in the era of constant digital threat.

The presented research results showed an insufficient level of recognition of cyber threats by the organization's employees. The reasons for this can be found, among others, in the employer's lack of adequate preparation of employees for potential threats. Employees too rarely participate in training on how to deal with digital threats, which means that many employees do not apply appropriate forms of security.

Organizations should place greater emphasis on systematic education of employees about digital threats and methods of data and document protection. The first step may be, for example, to provide employees with more information about hazards. It is logical that the employer will not have the possibility of daily training of the employee, but every day he can send the employee, for example, an e-mail with a short information about one selected digital threat. This type of practice can significantly increase the vigilance of subordinates.

The limitation of the study is certainly the lack of division of respondents into specific industries. Cybersecurity is an important topic for every type of industry, however, it can be assumed that the level of knowledge about cybernetic threats is higher among IT industry employees than among employees from other industries.

According to the authors, further research is needed related to building organizational resilience, especially in industries that are crucial for the functioning of societies, such as the energy or medical industries. In the face of the increasing activity of cybercriminals, it is important to develop methods to prepare employees of individual organizations for attempts at cyberattacks and to educate employees in the habit of immediately responding to a potential technological threat. It is worth often and clearly emphasizing the role of digital resilience, because in the era of widespread automation of processes, it is cyber-attacks that can lead to the annihilation of an organization extremely quickly.

Organizational resilience, and in particular digital resilience, is crucial both for companies that have already started the transformation process and for those that are just starting it. In both cases, an overview of the company's practices and habits, which is the starting point for eliminating undesirable behaviours among employees and strengthening positive attitudes in terms of digital security, is extremely important to ensure the continuity of processes occurring in a given organization. Failure to take care of the preventive attitude of employees in the field of digital security may result in damage to the system by third parties, interruption of processes within the organization, and in extreme cases – the bankruptcy of the company.

Parallel to the technical security measures in place, organizations should therefore ensure continuous education of employees in the field of cyber threats. Systematic adherence to good cybersecurity practices by employees can significantly reduce or even eliminate the negative effects of digital attacks. These practices primarily concern the protection of the user's personal data, the mandatory use of up-to-date anti-virus software, setting strong passwords, logging out of transactional services after completion of activities, increased vigilance when using secured systems (e.g. electronic banking systems), not entering suspicious websites, verifying all received links, creating backup copies and habitual analysis of information read on the web in order to recognize fake news (Związek Banków Polskich [ZBP], 2022, p. 22).

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Idea rezyliencji organizacyjnej w obliczu cyberprzestępczości

Streszczenie: Proces cyfrowej transformacji, pogłębiony wybuchem pandemii COVID-19, całkowicie zmienia dotychczasową rzeczywistość organizacji w ujęciu globalnym. Korzystanie z rozwiązań cyfrowych ma wiele zalet, ale wiąże się także z licznymi cyberzagrożeniami. W obliczu tych zagrożeń swoistym imperatywem biznesowym stała się cyfrowa rezyliencja. Celem rozdziału było określenie poziomu wiedzy pracowników organizacji na temat cyberzagrożeń oraz stopnia ich przygotowania na potencjalne zagrożenia tego typu. Badanie wykazało niewystarczający poziom rozpoznawalności cyberzagrożeń przez pracowników organizacji. Stwierdzono brak odpowiedniego przygotowania pracowników na potencjalne zagrożenia przez pracodawcę, polegający m.in. na zbyt rzadkim przeprowadzaniu szkoleń z zakresu zagrożeń cyfrowych. Wielu pracowników nie stosuje odpowiednich form zabezpieczeń. Wnioski te powinny skłonić menedżerów do zadbania o wyższy poziom edukacji pracowników w kwestii cyberprzestępczości, a tym samym do budowania bardziej rezyliენტnej cyfrowo organizacji.

Słowa kluczowe: rezyliencja organizacyjna, cyberprzemoc, cyberbezpieczeństwo

CHAPTER 5

The Evaluation of IT Systems in the Enterprises

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Abstract: IT systems have become essential for businesses of all sizes, providing a centralized database of customer, product, and service information that can be used to generate reports and improve efficiency. IT systems also include features such as document management, automated correspondence, data protection, and process tracking and optimization. This study aimed to investigate the relationship between corporate strategy and IT system implementation. The authors observed that IT is becoming increasingly critical to business success. The authors developed a group of variables to quantify the dimensions of various potential situational and organizational conditions that could impact the effective implementation of IT systems supported by business process management (BPM). They then derived the actual conditions that have an impact on effective IT implementation from the group of potential conditions. The results of the statistical analysis confirmed a relationship between the occurrence of changes in the company's general strategy and the implementation of IT. Companies that made changes to their general strategy in response to the challenges presented by IT were more likely to be satisfied with the accomplished objectives of the implementation. The study's findings suggest that corporate strategy is an important factor in the success of IT system implementation. Companies that align their IT strategy with their overall business strategy are more likely to achieve their desired outcomes.

Keywords: IT system, strategy, success factors, business process management, ERP

5.1. Introduction

An efficient evaluation system and method for enterprise informatization is essential for guiding the implementation and development of Enterprise Information Systems (EIS). Information technology has become an important part of businesses, helping to integrate business processes and data across various companies. Companies use EIS to collect, process, and produce valuable information.

5.2. Information Systems Success Model (ISSM)

The ISSM developed by William H. DeLone and Ephraim R. McLean is a widely used evaluation theory for EIS. It consists of six interrelated variables:

- System quality: The desired characteristics of an EIS, such as usability, reliability, and flexibility.
- Information quality: The relevance, accuracy, and completeness of the information produced by an EIS.
- Service quality: The quality of support provided to EIS users by the IT department.
- User satisfaction: The level of satisfaction of EIS users.
- System use and intention to use: The degree to which EIS users use the system and their intention to continue using it.
- Net benefits: The overall benefits that an EIS provides to the organization.

The ISSM is one of the most influential models for assessing the success of EIS. Other models include the Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DOI), Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Model of PC Utilization (MPCU), and Unified Theory of Acceptance and Use of Technology (UTAUT).

The ISSM is a comprehensive and well-established model for evaluating the success of EIS. It considers a wide range of factors, including system quality, information quality, service quality, user satisfaction, system use and intention to use, and net benefits. The ISSM can be used to guide the implementation and development of EIS, as well as to measure the success of existing EIS.

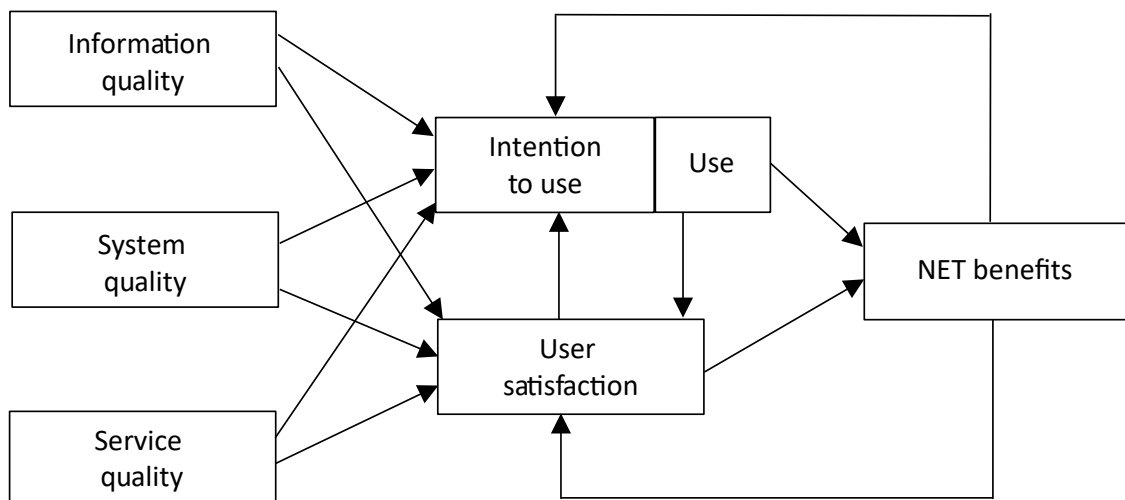


Figure 5.1. Information systems success model

Source: (William & Tjhin, 2021).

5.3. Review of the Literature

Melville et al. (2004) propose an integrative model of IT business value, which considers the organizational performance impacts of IT. This model encompasses various measures of performance, such as productivity enhancement, profitability improvement, cost reduction, competitive advantage, and inventory reduction. By using this model, enterprises can assess the value and impact of their IT systems on overall performance. Tsai (2001) discusses the effects of network position and absorptive capacity on business unit innovation and performance. This study highlights the importance of adjusting innovation and performance data to evaluate each unit, considering their specialization in different industries and strategic priorities. This approach can be applied to evaluate the performance of IT systems within different business units of an enterprise. Lu et al. (2016) propose a capacity evaluation model for enterprise technological innovation complex systems. This model can be applied to evaluate the technologically innovative ability of enterprises. By using an optimization model, the authors demonstrate the effectiveness of the evaluation model in providing accurate innovation ability values for different enterprises. This model can serve as a useful decision-making reference for optimizing the technological innovation system in enterprises. Liu (2014) focuses on the evaluation of enterprise tacit knowledge, which is crucial for IT system evaluation as it directly impacts the effectiveness and efficiency of knowledge transfer within an organization. The author builds an evaluation index system for enterprise tacit knowledge and introduces the Fuzzy AHP method to determine index weights. This provides a theoretical basis for effectively evaluating and managing enterprise tacit knowledge, which is essential for evaluating IT systems. In addition to these references, other relevant topics include performance appraisal (Lin, 2021; Peng, 2022), sustainability (Dergachova et al., 2019; Zhang et al., 2021), and low carbon development (Zhao et al., 2015). These topics provide insights into evaluating the performance and impact of IT systems in relation to employee performance, sustainability goals, and environmental considerations. By considering the insights from these references, enterprises can develop a comprehensive evaluation framework for their IT systems. This framework should consider the organizational performance impacts, network position, absorptive capacity, technological innovation ability, tacit knowledge, and other relevant factors. By using appropriate evaluation models and methods, enterprises can assess the effectiveness, efficiency, and value of their IT systems, leading to informed decision-making and continuous improvement.

The success variable of net benefits is the extent to which IS contributes to the success of individuals, groups, organizations, or various stakeholders. This variable summarizes the separate dimensions of individual impact, and organizational impact and additional IS impact measures from other researchers such as workgroup impact and social impact into a single success dimension. The choice of what impact to measure depends on the system being evaluated, the study's objectives, and the level of analysis.

5.4. Data Collection, Analysis, and Pilot Research Results

Primary data for own research was collected in the period at the end of 2019. The research concerned enterprises operating in The Kielce Technology Park and are involved in FutureHub cluster. The population was defined as people responsible for the implementation of IT systems in enterprises. The chosen method of sampling is random. The sample size is a group of 11 enterprises. The selected sample unit included the persons responsible for the IT projects, company managers, heads of IT departments or other persons appointed by managers. The applied random selection method resulted in responses from 11 entities. This result raises concerns about the representativeness of the research. The error of the lack of the representatives resulted both from the limited size of the surveyed population and from the reluctant cooperation of a large group of surveyed companies. Due to the limitations resulting from the adopted sampling method, it was not possible to apply the subjective estimation and extrapolation method. Among the available secondary sources, there were no data useful to analyse the issues constituting the essence of the described research, those related to the corporate strategy. The research was carried out in 11 companies involved in IT system implementation. Due to the nature of the research, it should be defined as exploratory. The overall goal of exploratory research is to identify the problem. In this type of research, the individual conducting it is usually guided by the initial hypothesis.

- Implementation of the ERP is depending on the company's strategy.
- The implemented ERP are used at a level, which is seen by management as unsatisfactory. One of the first questions concerned the extent, in which the management of the company implementing the IT system was involved in the implementation process.

The success of an information system (IS) can be measured using the following variables:

- System quality: The desired characteristics of an IS, such as usability, reliability, and flexibility.
- Information quality: The relevance, accuracy, and completeness of the information produced by an IS.
- Service quality: The quality of support provided to IS users by the IT department.
- User satisfaction: The level of satisfaction of IS users.
- System use and intention to use: The degree to which IS users use the system and their intention to continue using it.
- Net benefits: The overall benefits that an IS provides to the organization.

These variables are interrelated and have a dependence on measuring the success of information systems.

In addition to the above variables, the pilot research results also suggest that the following factors are important for the success of IT system implementation:

- Management involvement: Companies with greater management involvement in the implementation process reported higher levels of system quality, information quality, service quality, user satisfaction, and net benefits.
- User training: Companies with more extensive user training reported higher levels of system use and intention to use.

It is important to note that the pilot research was conducted in a small sample of companies, and further research is needed to confirm these findings and to identify other factors that may be important.

The Mann-Whitney *U* test was used to test the relationship between management commitment and satisfaction level. The results showed that companies with management involved in the ERP project had significantly higher satisfaction levels ($p < 0.01$).

Research shows that in the surveyed enterprises, responsibility for the CRM project lies with employees of the marketing and IT departments and the company’s management, with other departments of the enterprises being involved to a much lesser extent. Since management’s involvement in the project is widely considered to be one of the key success factors, it was necessary to check whether there is a relationship between this fact and the degree of satisfaction with the functioning of the CRM system. This relationship is shown in Table 5.1.

Table 5.1. Relation between commitment of the company’s management and evaluation of the process management

Management commitment \ Satisfaction level	Yes	No
	1	0
2	0	1
3	0	2
4	1	0
5	4	0
Average	4.1	2.5
Standard deviation	0.6	1.4

Source: own preparation.

Table 5.2 shows the relationship between developing a written process management strategy and satisfaction with implementation and the achieved objectives of the ERP. The measurement is qualitative and shows no significant differences between companies that developed a written ERP strategy and those that did not. However, there is a slight improvement in satisfaction with the achieved results in companies that modified their

general strategy in response to the challenges presented by the ERP. This is especially significant because organizational changes can disrupt the balance of power within an organization and lead to competency conflicts.

Table 5.2. Strategic factors and level of satisfaction with the IT project

	Written ERP strategy		Changes in the company's strategy resulting from ERP implementation	
	Yes	No	Yes	No
Satisfaction with implementation	2.9	2.7	3.5	2.4
Satisfaction with accomplished objectives	3.4	2.4	4.2	2.5

Source: own preparation.

The results of the study suggest that management commitment is an important factor in the success of ERP implementation. Companies with management involved in the implementation process are more likely to have satisfied users. However, developing a written process management strategy does not seem to have a significant impact on satisfaction levels. Companies that modify their general strategy in response to the challenges presented by the ERP are more likely to be satisfied with the results of the implementation.

It is important to note that the study was conducted with a small sample size, so further research is needed to confirm these findings. It is also important to consider the context of the study, as the results may not be generalizable to all companies.

In order to compare the obtained results, the Student *t*-test was used for significance of two means for 7 degrees of freedom and the level $\alpha = 0.05$. The obtained calculation results are presented in Table 5.3.

Table 5.3. Significance of mean differences

Satisfaction				Grade average	T statistic value	Critical value
Satisfaction with implementation	Equal variance assumption	Written strategy	Yes	2.9	0.364	2.3646
			No	2.7		
		Changes to strategy	Yes	3.5	1.350	
			No	2.4		
	Unequal variance assumption	Written strategy	Yes	2.9	0.345	2.3646
			No	2.7		
		Changes to strategy	Yes	3.5	1.354	
			No	2.4		

Satisfaction from achieved goals	Equal variance assumption	Written strategy	Yes	3.4	2.001	2.3646
			No	2.4		
		Changes to strategy	Yes	4.2	2.930	2.3646
			No	2.5		
	Unequal variance assumption	Written strategy	Yes	3.4	1.922	2.3646
			No	2.4		
		Changes to strategy	Yes	4.2	4.129	2.3646
			No	2.5		

Source: own preparation.

The *t*-test showed that the only statistically significant difference in satisfaction levels was between companies that made changes to their general strategy in response to the challenges presented by the ERP and companies that did not make such changes. Companies that made changes to their general strategy were more likely to be satisfied with the accomplished objectives of the ERP implementation.

The remaining differences in satisfaction levels between companies were not statistically significant. This includes differences between companies that developed a written ERP strategy and those that did not, and differences between companies that modified their general strategy and those that did not.

5.5. Conclusions

The results of the study suggest that the most important factor in the success of ERP implementation is making changes to the company’s general strategy in response to the challenges presented by the ERP. Companies that make these changes are more likely to be satisfied with the accomplished objectives of the ERP implementation.

Developing a written ERP strategy and modifying the company’s general strategy were not found to be statistically significant factors in the success of ERP implementation. However, it is important to note that these factors may still play a role in the success of ERP implementation, even if they are not statistically significant.

Overall, the study provides some valuable insights into the factors that contribute to the success of ERP implementation. Companies that are considering implementing an ERP should carefully consider the need to make changes to their general strategy in response to the challenges presented by the ERP.

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Ocena wdrożenia i funkcjonowania systemu IT w przedsiębiorstwach

Streszczenie: Systemy informatyczne stały się niezbędne dla firm każdej wielkości, zapewniając scentralizowaną bazę danych zawierającą informacje o klientach, produktach i usługach, które można wykorzystać do generowania raportów i poprawy wydajności. Obejmują one również takie funkcje, jak zarządzanie dokumentami, zautomatyzowana korespondencja, ochrona danych oraz śledzenie i optymalizacja procesów. Celem badania było zbadanie związku między strategią przedsiębiorstwa a wdrażaniem systemów informatycznych. Autor zaobserwował, że informatyka staje się coraz ważniejsza dla osiągnięcia sukcesu w biznesie. Opracował grupę zmiennych pozwalających ilościowo określić wymiary różnych potencjalnych warunków sytuacyjnych i organizacyjnych, które mogą mieć wpływ na efektywne wdrażanie systemów informatycznych wspieranych przez zarządzanie procesami biznesowymi (BPM). Następnie z grupy potencjalnych uwarunkowań wyprowadził warunki rzeczywiste mające wpływ na efektywne wdrożenie IT. Wyniki analizy statystycznej potwierdziły związek między występowaniem zmian w ogólnej strategii firmy a wdrażaniem IT. Firmy, które dokonały zmian w swojej ogólnej strategii w odpowiedzi na wyzwania stawiane przez IT, były bardziej usatysfakcjonowane osiągniętymi celami wdrożenia. Wyniki badania sugerują, że strategia przedsiębiorstwa jest istotnym czynnikiem powodzenia wdrożeń systemów informatycznych. Firmy, które dostosowują swoją strategię IT do ogólnej strategii biznesowej, mają większe szanse na osiągnięcie pożądaných wyników.

Słowa kluczowe: system informatyczny, strategia, czynniki sukcesu, zarządzanie procesami biznesowymi, ERP

CHAPTER 6

Crowdfunding in the Board Games Industry – Game Changer or a Temporary Curiosity?

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Abstract: The objective of the article is providing some arguments and proving that, in the case of the board game industry, crowdfunding should be not only seen as an alternative to “traditional” sources of financing, but also should be commonly perceived as a kind of game changer. Bibliometric analyses prove that crowdfunding as a topic is cognitively attractive, and suggest that importance of crowdfunding will grow in the future. The author uses both quantitative and qualitative research methods, techniques and tools. Quantitative research is primarily an in-depth bibliometric and graphical analysis based on WoS CC database resources using VOSViewer and MS Excel software. Qualitative research is a synthetic presentation and analysis of several, intentionally selected, case studies, i.e., hugely successful “crowdfunding campaigns” conducted on kickstarter.com – the most recognizable crowdfunding platform. After reading the content of the article reader should feel encouraged to independently follow issues related to the topic of crowdfunding, as it is “trendy” topic importance of which will grow in the nearest future. Literature analysis shows crowdfunding not only as a source (mechanism) of financing. Crowdfunding is also a phenomenon stimulating, among others, innovation, entrepreneurship, organizational openness, creativity, readiness to co-create. Crowdfunding is a topic that everyone should be interested in – both business practitioners and representatives of the world of science.

Keywords: crowdfunding, gamechanger, Kickstarter, board games industry

6.1. Introduction

Organizations need to seek new ways and possibilities for development in order to build a strong and stable competitive position. This requirement is difficult to meet even in “times of prosperity”. The outbreak of the SARS-CoV-2 coronavirus pandemic has caused an economic crisis of global scope. Supply chains have been broken and/or significantly deteriorated, inflation has increased sharply, market conditions have deteriorated and become very difficult. Financial situation of many companies has deteriorated significantly... As a result, one may

indicate that the times of the modern crisis have again shown the importance of the ability to maintain financial liquidity and skilfully raise funds for the purposes of conducting business activities, carrying out various initiatives and business projects. “Small” businesses and individual creators face additional difficulties in this context. They often have limited access to traditional sources and funding mechanisms. They must therefore look for possibilities and opportunities in other, less obvious places, and use unconventional solutions, often of an innovative nature. One such seems to be crowdfunding. This observation indicates the subject of interest of this article:

- What is the level of popularity and interest in crowdfunding, taking into account the division into the “world of science”, “world of business” and “world of the internet community”?
- Whether using crowdfunding is a temporary fashion, or perhaps crowdfunding should be perceived as an innovative mechanism and source of financing entrepreneurial initiatives, of constantly growing popularity?
- Whether crowdfunding is a revolution, a so called game changer among mechanisms and sources of financing?

Looking for answers to the above questions, the author, firstly, analyses and systematises the current state of knowledge in the field of crowdfunding topic (bibliometric analysis of the resources of the Web of Science Core Collection database and the use of InCites and VOSViewer & Google Trends software), and secondly, presents and synthetically discusses intentionally selected case studies – hugely successful crowdfunding campaigns conducted on kickstarter.com, the most recognizable crowdfunding platform.

6.2. Crowdfunding – the Perspective of Perception by the “World of Science”

In order to start the scientific knowledge journey on the topic of crowdfunding one is encouraged to get familiar with the works of Vismara (Block et al., 2018; Vismara, 2016; Audretsch et al., 2016; Vismara & Signori, 2018) who concentrates on topics related to crowdfunding and entrepreneurial finance or Moritz and Block (2014) focusing on strengths and significance of crowdfunding for financing perspective of the SME sector. The recognized authors of publications on crowdfunding are also Vanacker and his co-authors (2013, 2014, 2017, 2018a, 2018b) who focus on issues related to equity crowdfunding and VC, and Belleflamme et al. (2013, 2014, 2015) who specialize at development of knowledge about crowdfunding practices and platforms. Taking into consideration Polish authors, Król (2011) should be mentioned, who deals with the issue of crowdfunding as a source of financing for projects in Poland, and Dziuba (2012, 2014a, 2014b, 2015, 2017) – author specializing in identifying models of crowdfunding and presenting the issues of the economics of crowdfunding.

Having read the works and views of the above-mentioned authors, the reader should come to the conviction that the “world of science” is interested in the phenomenon of crowdfunding, as a multi-faceted and complex phenomenon, attractive in cognitive terms, and above all, having a huge development potential. Crowdfunding is considered to be one of the fastest-growing mechanisms and forms of obtaining financial resources in the 21st century, based on the continuous development of the Internet, electronic payment systems and social networking sites (Dziuba, 2012). According to Król (2011) crowdfunding is most often defined as

a type of accumulation and allocation of capital transferred to the development of a specific enterprise in exchange for a specific return service, which involves a wide group of capital providers, is characterized by the use of ICT technologies, as well as a lower entry barrier and better transaction conditions than those generally available on the market.

Cuesta et al. (2015) add that “crowdfunding is an example of collective cooperation of individuals collecting small amounts to achieve the assumed goal, while a significant number of participants in the project as a whole is huge”. In simple words, crowdfunding can be seen as an innovative and effective way of raising capital, in which a request for financial aid for the implementation of a project is directed to Internet users, using specially designed online platforms for this purpose (Malinowski, 2017; Rossi & Vismara, 2018). But crowdfunding is not only about money. In addition to its main role crowdfunding also helps to stimulate, among others: innovation/open-innovation (Mollick, 2016), entrepreneurship and social entrepreneurship (Davis et al., 2017; Rey-Marti et al., 2019), creativity and readiness to co-create (Bock & Dilmetz, 2022; Lipusch et al., 2020; Quero & Ventura, 2014), sustainability (Horisch, 2018; Tenner, 2021), customer relations (Shneor et al., 2022; Wiscicka-Fernando, 2021). The proof of the authenticity of the above position is provided by, carried out using the VOSViewer software, the “co-occurrence” type analysis of the keyword “crowdfunding” (Figure 6.1).

In order to assess the level of popularity and interest of researchers in the topic of crowdfunding, a bibliometric analysis of the resources of the Web of Science Core Collection database and the use of InCites was conducted. Two sets of data were prepared for the purposes of the analysis:

- 1) “broad” data set containing $n = 1006$ items – “crowdfunding” searched in the WoS CC database as “topic”, applying the following restrictions:
 - a) Web of Science Categories: Business, Management, Economics, Business Finance,
 - b) Document Types: Article, Proceeding Paper, Early Access,
 - c) Publication Years: 2012–2023;
- 2) “narrow” data set containing $n = 153$ articles – the same constraints were applied, but the term “crowdfunding” was an element searched in the title section and additionally the term “innovation” (professional form of the term “game changer”) was added as an element searched in “topic” section.

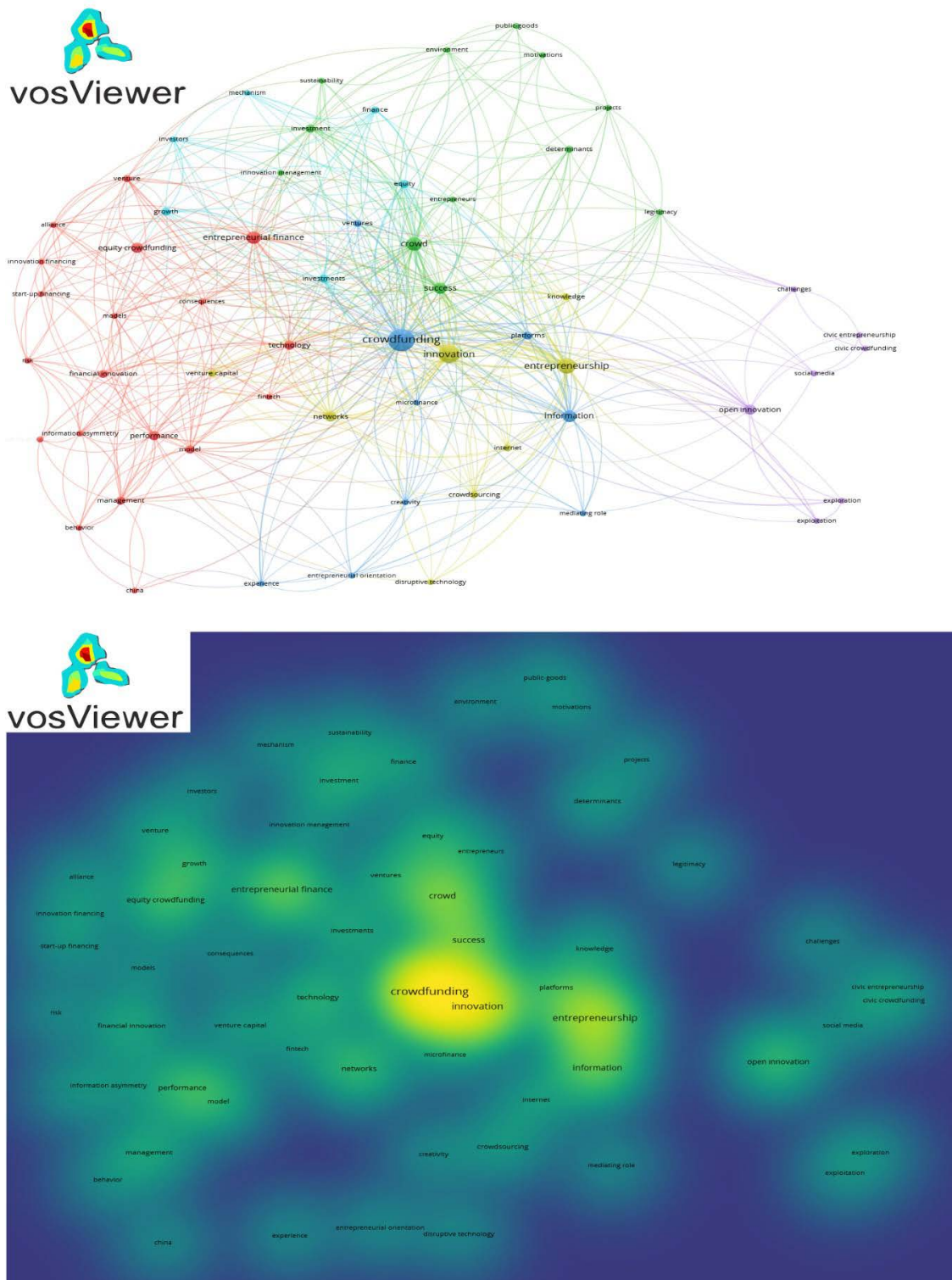


Figure 6.1. “Crowdfunding” – co-occurrence VOSViewer map

Source: own elaboration (high resolution RGB co-occurrence map available at: <https://tiny.pl/wklcf>).

The obtained results should be considered satisfactory. A search in the WoS CC database revealed 1,006 publications focusing on crowdfunding, including 153 studies presenting it as “something” innovative, as a game changer (Figure 6.2). Taking into account the “Web of Science Categories” criterion, the distribution is as follows: 514 (89) businesses, 390 (76) management, 243 (20) economics, 220 (28) business finance (results from “broad”/“narrow” data sets). In both cases, there is a clear increase in interest in the issues discussed year-on-year.

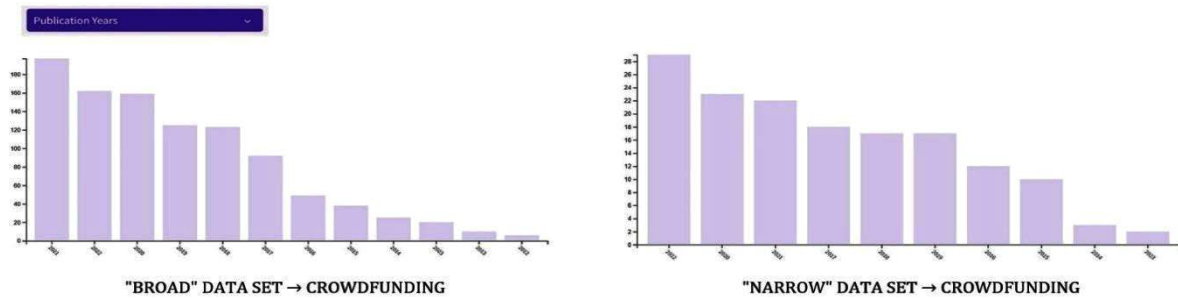
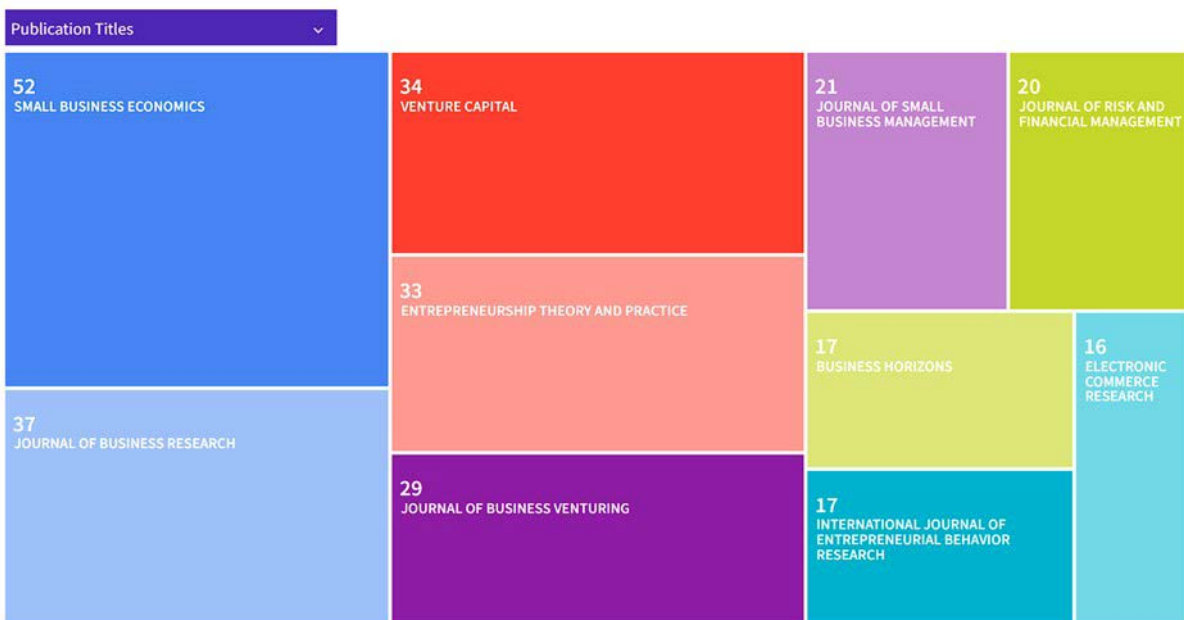


Figure 6.2. Number of publications dealing with crowdfunding issues

Source: own elaboration.

Analysing the “country of origin” of the publication, basically in both approaches, the data indicate the dominance of: USA (243/34), Italy (119/40), Germany (109/14), England (104/20), France (84/16), and China (84/7). Articles focused on “general” crowdfunding issues are published by leading publishers (184 by Elsevier, 138 by Emerald Group Publishing, 125 by Springer Nature, 80 by Wiley, 73 by Sage) in renowned journals such as: *Journal of Business Venturing*, *Business Horizons*, *Entrepreneurship Theory and Practice*, *Journal of Business Research*, *Small Business Economics* (Figure 6.3).





Source title	Articles	5-Year IF	CiteScore	Highest percentile	SNIP	SJR	Publisher
<i>Journal of Business Venturing</i>	25	13.139	14,6	98.0% 5/271 Management of Technology and Innovation	4,534	5,829	Elsevier
<i>Business Horizons</i>	16	10.562	14	97.0% 10/423 Business and International Management	2,937	2,382	Elsevier
<i>Entrepreneurship Theory and Practice</i>	30	14.105	13,7	98.0% 11/696 Economics and Econometrics	3,353	3,353	Wiley-Blackwell
<i>Journal of Business Research</i>	30	10.969	11,2	94.0% 12/195 Marketing	3,089	2,316	Elsevier
<i>Small Business Economics</i>	49	8.081	10,7	96.0% 7/216 General Business, Management and Accounting	3,101	2,63	Springer Nature

Figure 6.3. Publications dealing with crowdfunding issues – publishers and journals

Source: own elaboration.

A query in WoS CC for the 3 most cited articles (search “crowdfunding” as a keyword in title, “innovation” as a keyword in article topic section) returns the following results:

- 741 citations of the article by Ahlers et al. (2015), “Signaling in Equity Crowdfunding”, published in *Entrepreneurship Theory and Practice* (IF = 9.993) – article in which authors “present a first-ever empirical examination of the effectiveness of signals that entrepreneurs use to induce (small) investors to commit financial resources in an equity crowdfunding context”.
- 371 citations of the article by Gerber and Hui (2013), “Crowdfunding: Motivations and Deterrents for Participation”, published in *ACM Transactions on Computer-Human Interaction* (IF = 4.106) – article in which authors “present a grounded theory of motivation informed by the first cross-platform qualitative study of the crowdfunding community [...] uncover creator motivations, which include the desire to raise funds, expand awareness of work, connect with others, gain approval, maintain control, and learn; and supporter motivations, which include the desire to collect rewards, help others, support causes, and be part of a community”.
- 144 citations of the article by Stanko and Henard (2017), “Toward a better understanding of crowdfunding, openness and the consequences for innovation”, published in *Research Policy* (IF = 9.473) – article in which authors indicate that “Crowdfunding backers can be thought of as the earliest possible adopters, who may be even more valuable than traditional early adopting consumers” and “Results indicate that the amount of funding raised during a crowdfunding campaign does not significantly impact the later market performance of the crowdfunded product, while the number of backers attracted to the campaign does”.

Let us move on to the most publishing authors. Figure 6.4 presents a parametric list of 10 “best” authors publishing in the context of crowdsourcing issues.

LP	Name	Country	WoS CC Documents	H-Index	Times Cited	IRtW	CNCI	JNCI
1	Cumming, Douglas	USA	17	14	1589	4,342	8,280	3,975
2	Vismara, Silvio	BELGIUM	17	12	1278	3,492	7,450	3,909
3	Schwienbacher, Armin	FRANCE	15	13	1909	5,911	8,771	3,447
4	Short, Jeremy C.	USA	9	6	845	4,361	6,008	1,513
5	Hornuf, Lars	GERMANY	8	8	567	3,292	6,512	2,968
6	Stevenson, Regan	USA	8	4	311	1,806	3,159	0,993
7	Cicchiello, Antonella Francesca	ITALY	8	4	35	0,203	0,890	1,679
8	Thas Thaker, Mohamed Asmy bin Mohd	MALAYSIA	7	4	54	0,358	0,959	1,406
9	Allison, Thomas	USA	7	7	814	5,401	7,373	1,907
10	Johan, Sofia	USA	7	6	293	1,944	4,029	2,081

Figure 6.4. Crowdfunding – most publishing authors

Source: own elaboration.

Considering the results of the above bibliometric analysis of the resources of the Web of Science CC database, it seems justified to state that although crowdfunding is a “young”

phenomenon (concept), present in the world of science only recently, it constitutes an attractive research “niche”. The multifaceted nature of crowdsourcing determines its scientific cognitive attractiveness. Analysing the current state of knowledge about crowdfunding, one can get the impression that this topic is still accompanied by many knowledge gaps, and therefore one should expect a continuation of the growing trend of interest in this topic on the part of representatives of science. This observation is a partial answer to the first of the questions posed. In order to give a complete answer, it is also necessary to analyse the level of crowdfunding popularity among representatives of the “world of business” (business practitioners and independent artists) and “world of the internet community” – probably the most important “element” co-creating crowdfunding.

6.3. Crowdfunding. The Perspective of Perception by the “World of Business Practitioners” and “World of the Internet Community”

For the purpose of estimating the level of interest and popularity of the subject of crowdfunding “in the world of the Internet community”, it was considered that the best tools for this purpose would be the analysis of the frequency of queries for this term asked by the search engine google.com (Google Trends).

The analysis carried out with the help of Google Trends clearly indicates that in the query for keywords commonly associated with the search for financial capital to start or maintain a business, queries about “crowdfunding” constituted the vast majority over queries about keywords representing alternative sources of financing, excluding “typical” forms of financial support – bank loan, venture capital funds or leasing (Figure 6.5).

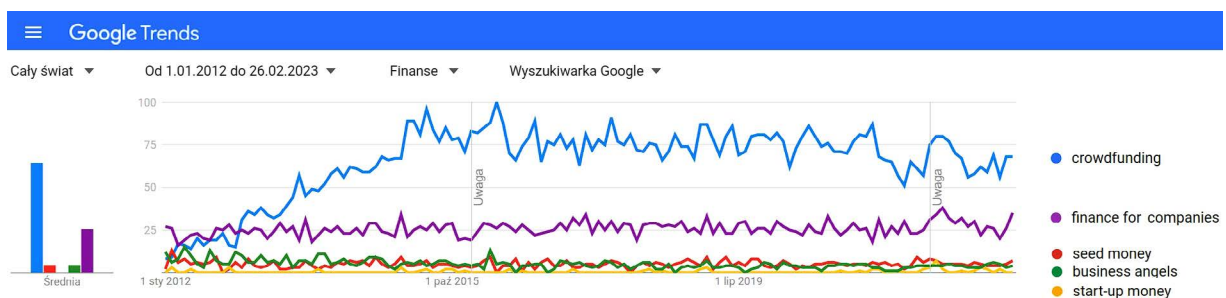


Figure 6.5. Google Trends analysis – “crowdfunding” vs other keywords representing alternative sources of financing

Source: own elaboration.

In the case of the “business world/practitioners”, in order to estimate the level of interest and popularity of the “crowdfunding”, it was decided to base the analysis on the statistics

published on the website <https://www.statista.com>, conclusions from several selected professional reports, and, finally, by checking the number of company profiles that are operating in the “crowdfunding business arena” and are present at LinkedIn.

The search for the keyword “crowdfunding” on the LinkedIn.com platform, applying the criterion limiting the results to “company profiles” and the industry criterion “financial services, specialized services, capital markets”, revealed the number of 4,200 profiles of companies in total, including 1,100 operating in the EU. However, the business attractiveness of crowdfunding is better evidenced by statistics published in specialized reports and <https://www.statista.com>.

Statista points out that:

- As of 2020, the transaction value of real estate crowdfunding was the highest among European crowdfunding platforms (alternative finance market segments). The volume of equity-based crowdfunding reached a total transaction value of \$280 million, while reward-based crowdfunding deals were valued at \$262 million.
- The total value of alternative finance transactions across Europe in 2020 came to over 22 billion euro. The United Kingdom was by far the largest alternative finance market in Europe, accounting for almost 60% of all transactions in 2020. The UK might be the big fish compared to other European countries for alternative finance, but compared to the North American markets they were small fry. The alternative finance market for in the U.S. and Canada combined was almost six times larger than the U.K.

The report *Crowdfunding Market Size...* (2022) prepared by Grand View Research indicates that:

The global crowdfunding market size was estimated at USD 1.67 billion in 2022 and is expected to reach USD 1.88 billion in 2023. The global crowdfunding market is expected to grow at a compound annual growth rate of 16.7% from 2023 to 2030 to reach USD 5.53 billion by 2030. North America dominated the crowdfunding market with a share of 29.31% in 2022.

The above conclusions are confirmed in another study. The report *Crowdfunding Market Deployment...* (2022) elaborated by TechNavio informs that “the global crowdfunding market is estimated to decline at a CAGR (Compound Annual Growth Rate) of 15.86% between 2022 and 2027 [...] use of crowdfunding campaigns as a platform for crowdsourcing will positively impact market growth during the forecast period”.

The above-mentioned content seems to indicate quite clearly the importance and high level of popularity of crowdfunding among business practitioners and the Internet Community. At the same time, it can be concluded that this level is many times greater than that in the case of the “world of science/researchers”. Taking into account the “size and value of the market” of crowdfunding and the prospects for its growth, statement that crowdfunding should be considered as game changer seems to be safe and indeed true. But the final evidence will be provided by an analysis of the activity of the kickstarter.com crowdsourcing platform – in general, and more importantly, in the case of the board games industry.

6.4. Crowdfunding on Kickstarter – Game Changer for the Board Games Industry

Kickstarter is an American public benefit corporation based in Brooklyn, New York, that maintains a global crowdfunding platform focused on supporting the creativity by gathering money for interesting projects and business initiatives. The company's stated mission is to "help bring creative projects to life" (Gannes, 2013). Kickstarter is one of a number of web-based crowdfunding platforms for gathering money from the public, which circumvents traditional avenues of investment. Project creators choose a deadline and a minimum funding goal → amount of money they want/hope to collect. Fundraising campaigns on Kickstarter are bounded by few simple principles (Kickstarter, 2023c):

- projects must create something to share with others;
- projects and backer statistics must be honest and clearly presented;
- projects can't fundraise for charity;
- projects can't offer equity;
- projects can't involve prohibited items.

What is also important and somehow characteristic for Kickstarter is that it is a "reward based" and "all or nothing" crowdfunding platform. "Reward based" because people who back Kickstarter projects are offered tangible rewards or experiences in exchange for their pledges, usually the higher value of the financial pledge = the higher value of the reward obtained in return, however – projects cannot offer incentives like equity, revenue sharing, or investment opportunities. "All or nothing" because if the campaign goal is not met by the deadline, no funds are collected (this can be seen as a kind of assurance contract), but when goal is reached Project creators receive full amount of the pledged funds (even when the amount excess original goal). The business model of Kickstarter is surprisingly simple, for promoting projects Kickstarter applies a 5% fee on the total amount of the funds raised, and their payments processor applies an additional 3–5% fee. This model traces its roots to subscription model of arts patronage, where artists would go directly to their audiences to fund their work unlike many forums for fundraising or investment. Worth mentioning is the fact that Kickstarter claims no ownership over the projects and the results they bring. The web pages of projects launched on the site are permanently archived and accessible to the public. After funding is completed, projects and uploaded media cannot be edited or removed from the site. On the other hand, there is no guarantee that people who post projects on Kickstarter will deliver on their projects, use the money to implement their projects, or that the completed projects will meet backers' expectations. Kickstarter advises backers to use their judgment on supporting a project.

But what makes Kickstarter a game changer? The answer is simple. Those are the scale and scope of the conducted activity and the amount of financial resources that have been generated so far and passed on to the creators of the crowdfunding campaigns successfully completed. Collected in real-time data is impressive.

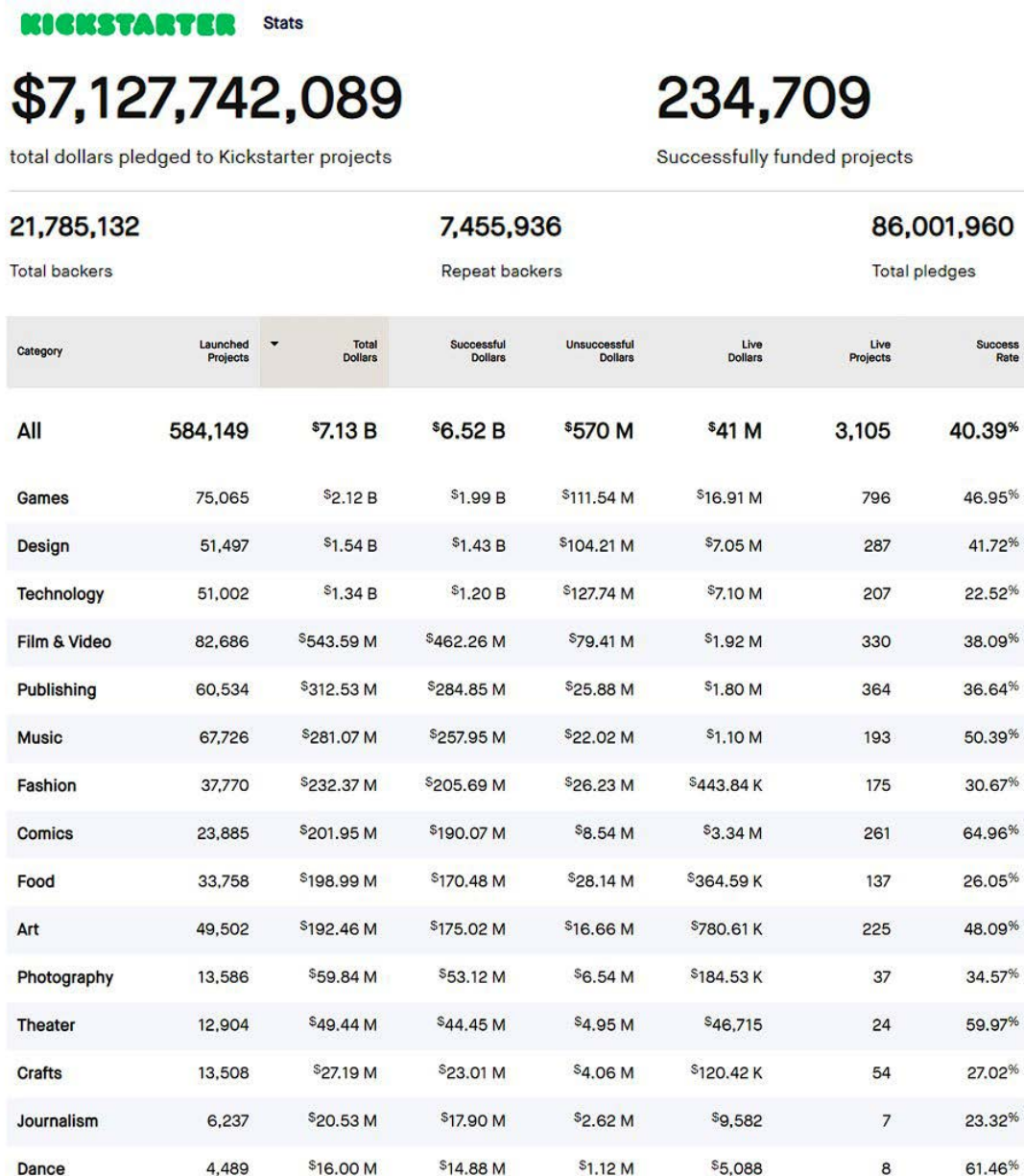


Figure 6.6. Kickstarter stats – how much funds the platform obtained to support projects?

Source: own elaboration based on media from kickstarter.com.

When analysing the above data, an observation that is particularly important from the point of view of this article can be made that the category “games” (aggregating both board games and “computer games”) ranks first in terms of the value of collected funds by successful crowdfunding campaigns, and second in terms of the number of projects promoted through the platform, and also that the percentage of successful campaigns is higher than the average (46.95 vs 40.49%).

Aggregated data seem to be a strong indication that crowdfunding on Kickstarter is actually a “gamechanger” – many of the projects would not have been created if not for this form of fundraising.

The final proof of the veracity of the statement that crowdfunding = gamechanger (for the purposes of this article for the developers of board games, although it should be quite easy to find the appropriate examples for projects from other categories) is provided by a synthetic analysis of two case studies, Kickstarter campaigns for the:

- board game “Exploding Kittens”,
- board adaptation of the computer version of the game – “Heroes of Might & Magic III – the Board Game”.

In the first case, as the authors of crowdfunding campaign write:

Exploding Kittens is a highly strategic kitty-powered version of Russian Roulette. Players take turns drawing cards until someone draws an exploding kitten and loses the game. The deck is made up of cards that let you avoid exploding by peeking at cards before you draw, forcing your opponent to draw multiple cards, or shuffling the deck. The game gets more and more intense with each card you draw because fewer cards left in the deck means a greater chance of drawing the kitten and exploding in a fiery ball of feline hyperbole. [...] We think this game combines all the things we’re best at creating, and put together this Kickstarter campaign because we can’t build this without you. So if you’re into card games or laser beams or weaponized enchiladas, please help us make this game a reality. [...] We think you’ll love it as much as we do (Kickstarter, 2023a).

This project was created by three people, and what caused the interest of the Kickstarter Community is probably extremely absurd humour, direct form of contact creator-community and simplicity. The authors of the project planned to collect \$10,000. They set 4 different levels of support thresholds: \$20/35/100/500. Each level of support meant that a copy of the game would be obtained if it was launched on the market.

In conclusion, one can get the impression that this project is basically a “micro-project”, perhaps created for a joke. The reality brought a huge surprise, and the internet literally “ignited” – the counter stopped at the amount of \$8,782,571, as 219,382 people supported the project.

According to Kickstarter rules, the authors of the project were paid the collected amount minus the commission and operating costs. Assuming the highest levels (5 + 5%) authors received \$7,904,313, that is 7,790 times more than they expected. According to Kickstarter rules, funds collected during the campaign exceeding the “minimum target” can be used by the authors of the collection in various ways.

Sometimes when a project is overfunded, it lets the creator put that money back into the project to create something better for the backers and themselves. More songs on an album, additional game elements, better materials, etc. [...] Creators may also choose to offer add-ons, allowing backers to select additional rewards, and ultimately get more out of the

project. Any funds raised beyond the goal will help the creator to cover any manufacturing or shipping costs related to their add-ons. [...] In other cases, overfunding leads to better margins and the creator may even profit from the project (Kickstarter, 2023d).

“Exploding Kittens” game was released in 2015. To date, there are 3 extensions (additional sets of cards).

Exploding Kittens



Figure 6.7. “Exploding Kittens” Kickstarter crowdfunding campaign success

Source: own elaboration based on media from kickstarter.com project crowdfunding campaign site (Kickstarter, 2023a).

Certainly, the result of this crowdfunding campaign is an example of a huge game changer, not only for the authors of the project (Elan Lee, Matthew Inman and Shane Small), but also for the entire board games industry. This campaign opened the door to more ambitious and complex projects. An example of this is the successful Kickstarter crowdfunding campaign for the project “Heroes of Might & Magic III – the Board Game”.

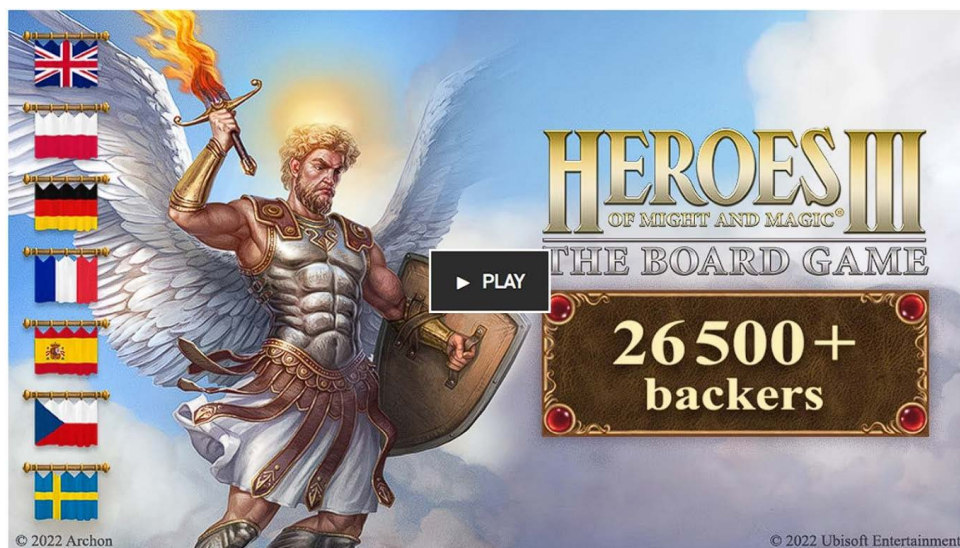
Campaign was conducted in fall of 2022 (funding period: from November 15, 2022 till November 29, 2022 = 14 days) by Archon Studios – a company from Poland, located in Piła, employing about 50 people. As in the case of “exploding Kittens”, it was a success, in a similarly spectacular way exceeding the expectations of the creators of the project. The minimum financial expectations for establishing the project to life were set at €50,000. The project received support from almost 27,000 patrons, thanks to which €3,834,885 were collected. However, three differences from the first example, which are important from the point of view of the issues discussed in the article, should be pointed out.

Firstly, the project was submitted by the company, not by a group of independent developers. According to company BIO (Archon Studio, 2023):

Archon has established itself as a prominent player in the board game, wargaming, and RPG terrain market. With such passion, we began creating our own board games, and now we're recognized for our commitment to innovation and producing exceptional miniatures. We've loved miniatures ever since we were kids. We grew up with tabletop games, and we have since decided to make our own. Archon Studio is dedicated to creating amazing games and miniatures, challenging ourselves with more complex and detailed designs with every project. Our community is Archon's lifeblood – we share our passion with you and fulfill our dreams together. Project after project, we create models in the highest-quality plastic, making them worth painting and assembling.

Secondly, the project and the product to be created as part of its implementation is much more complicated, containing many components (including high-quality graphic materials, figurines made by 3D printing, and many other elements).

And thirdly (the most important difference) – at the start of the campaign its creators provided for the possibility of exceeding the minimum amount of funds the hope to collect. They established the so-called "Stretch Goals". Since the success of "exploding Kittens", it has basically become the standard in the case of the campaign on Kickstarter. "Stretch Goals" is actually a promise of preparing additional content that will be created in the future, assuming reaching additional levels of funding. It is a kind of promise of a plan to develop and maintain the project "alive" over a longer period of time.



Heroes of Might & Magic III The Board Game

Project We Love Pifa, Poland Tabletop Games

€3,834,885

pledged of €50,000 goal

26,993

backers

Figure 6.8. "HoM&M III – TBG" Kickstarter crowdfunding campaign success

Source: own elaboration based on media from kickstarter.com project crowdfunding campaign site (Kickstarter, 2023b).

When reviewing the content of the description of the campaign, one can get the impression that due to the number of achieved “Stretch Goals”, the development of the project is planned for years. Importantly, thanks to the collection on Kickstarter, Archon Studios solved one of the biggest problems of maintaining the development of the project. Naturally, it is about providing funding in the long term. As a reminder, the project was able to acquire €3,834,885 – beautiful “gamechanger” and solid “financial cushion” ensuring the ability to run company’s activity in a way free from business disruptions for a very long time.

6.5. Conclusions, Further Research Directions and Limitations of the Study

Crowdfunding is definitely a topic more popular among the Internet community and business practitioners than a topic undertaken for scientific purposes. Crowdfunding is a phenomenon stimulating, among others, innovation, entrepreneurship, organizational openness, creativity, readiness to co-create. Attention should be paid to the constantly growing interest of the scientific world aimed at crowdfunding issues.

The above conclusions appear to be appropriate and justified even taking into account the obvious research limitations. Firstly, the article uses bibliometric analysis only of the resources of the WoS CC database using certain filters limiting (for example filter aggregating articles classified into Web of Science Categories – Business, Management, Economics, Business Finance). Increase/extension in the number of categories, or extension of research to include articles indexed in other knowledge databases (i.e., Scopus) would probably increase the evidence potential confirming the conclusions of the article. Secondly, intentional selection of two specific (“handpicked”) case studies can also be considered a certain disability. Selection of Kickstarter campaigns for the board game “Exploding Kittens” and board adaptation of the computer version of the game – “Heroes of Might & Magic III – the Board Game” was made on purpose, because during the article’s creation these were very high-profile cases of crowdfunding campaigns completed with great success. The author does not point out various negative cases, i.e., campaigns that were unsuccessful, or those in which the collection of finances was successful, but the implementation of the project was not. Indication of such cases would certainly give a more complete picture of the crowdfunding reality. This fact can be seen as a kind of “disability” of the article, although on the other hand, it can be seen as a guide regarding directions of interesting and worth pursuing directions of future research works. In addition, due to the topic scope of the article and editing requirements (specifically imposed article length limit), the study do not analyse the causes and factors that increase or reduce the likelihood of success of a given crowdfunding campaign. This may be another interesting direction for future research – for example, whether “place” of the campaign is important (e.g., an analysis of success rate of crowdfunding projects placed on less recognizable crowdfunding platforms), whether and how important it is to use the

reward system for supporters (some platforms do not provide awards for financing a given project) and how the level of interest in a given collection is affected by the expected level of support (specified, required levels of foundation payments set by campaign organizer) and the offered prize – what supporters receive as a token of gratitude (its overall attractiveness and “financial value”). It could also be interesting to look for an answer to the question about the importance of the level of preparation and quality of promotional materials included in the information message of a given crowdfunding campaign, and how the crowdfunding campaign organizers try to fuel the level of interest among the crowdfunding community. The multitude of the above questions clearly proves that the phenomenon of crowdfunding should be considered interesting, up to date, and worth further analysis.

Returning to the questions raised in this article, the level of popularity and interest in crowdfunding is high, crowdfunding should be perceived as an innovative mechanism and source of financing entrepreneurial initiatives (campaigns often allow for obtaining financial resources that exceed the expectations and real needs of the organizers of such events), crowdfunding is a revolution, the so called “gamechanger”, at least for the board games industry, as it often ensures the ability to run company’s activity in a way free from business disruptions for a very long time.

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Finansowanie społecznościowe w branży gier planszowych – *game changer* czy tymczasowa ciekawostka?

Streszczenie: Celem artykułu jest przedstawienie argumentów i udowodnienie, że w przypadku branży gier planszowych finansowanie społecznościowe powinno być postrzegane nie tylko jako alternatywa dla „tradycyjnych” źródeł finansowania, ale także jako swoisty *game changer*. Analizy bibliometryczne dowodzą, że crowdfunding jako temat jest atrakcyjny poznawczo i sugerują, że jego znaczenie będzie się zwiększać w przyszłości. W artykule wykorzystano metody, techniki i narzędzia badań ilościowych i jakościowych. Badania ilościowe to przede wszystkim dogłębna analiza bibliometryczna i graficzna oparta na zasobach bazy danych WoS CC przy użyciu oprogramowania VOSViewer i MS Excel. Badania jakościowe to syntetyczna prezentacja i analiza dwóch celowo wybranych *case studies*, czyli niezwykle udanych kampanii crowdfundingowych prowadzonych na kickstarter.com – najbardziej rozpoznawalnej platformie crowdfundingowej. Po przeczytaniu artykułu czytelnik powinien czuć się zachęcany do samodzielnego śledzenia zagadnień związanych z tematyką crowdfundingu, ponieważ jest to temat „modny”, którego znaczenie w najbliższej przyszłości wzrośnie. Analiza literatury pokazuje crowdfunding nie tylko jako źródło (mechanizm) finansowania. Crowdfunding to także zjawisko stymulujące m.in. innowacje, przedsiębiorczość, otwartość organizacyjną, kreatywność, gotowość do współtworzenia. Crowdfunding to temat, którym każdy powinien być zainteresowany – zarówno praktycy biznesu, jak i przedstawiciele świata nauki.

Słowa kluczowe: crowdfunding, *game changer*, Kickstarter, branża gier planszowych

CHAPTER 7

Evolution of Development Centres in the Military Sector – from Beginnings to Game Changers

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Abstract: The article presents the results of the review of literature and source materials (military and civilian), the purpose of which was to determine: diagnosed competencies, applied methods of diagnosis and their effectiveness using Assessment/Development Centres. The study covered materials from 1920 to 1974, including declassified documents from experiments carried out in the German, British, Danish and American armies. The obtained results were confronted with selected methods of officer development currently used in the Polish army. It was found out that the centre are mainly used in working with officers, and the subject of the diagnosis is primarily leadership competencies (defined by the performance dimension). Since the 70s of the 20th century the basic principles of the organization of the centres have not changed, namely the multidimensionality of the research, the complexity of the tools used and the collectivism of the assessment. Game changers in this field are the tools and forms of carrying out individual elements of assessment; solutions related to computerization, virtualization and neurodiversity are being implemented, examples of which are described in this study.

Keywords: Assessment Centres, Development Centres, military training

7.1. Introduction

The use of development centres is still very popular among specialists in human capital management, both in the civil and military sectors. Although this method is time-consuming and cost-intensive, it has an advantage over other diagnostic methods due to the comprehensiveness and accuracy of the assessment (Cumberland et al., 2016). Of course, this happens when certain procedures for organizing this research are met (Juchnowicz, 2014). In the literature on the subject, it is often emphasized that the methods and tools of assessment centres and development centres come from the army, especially in diagnosing leadership competencies that are crucial for the indicated sector. However, the question arises whether the conclusions from the research that was conducted among soldiers actually became the foundation of AC/DC used in business? In addition, it is worth analysing whether AC/DC tools currently used in the military sector can still be an inspiration for business entities.

The article presents the results of the study of source materials (military and civilian), the purpose of which was to determine: diagnosed competences, used methods of diagnosis and their effectiveness. The study covered materials from 1920 to 1974, including declassified documents from experiments carried out in the German, British, Danish and American armies. The obtained results were confronted with selected methods of officer development currently used in the Polish army. Recommendations for the implementation of game changers (modern training solutions with the use of simulators and devices enabling training) in Extended and Augmented Reality were also formulated.

7.2. Theoretical Foundations – Current State

Currently, assessment and development centres are defined as multidimensional processes of assessing the competences of selected people by independent and objective assessors, where assessment centres support the selection of optimal candidates for positions (recruitment and selection function), and development centres initiate employee development processes (Juchnowicz, 2014, p. 378). Therefore, it is a diagnostic method that, performed on the basis of defined competence criteria, allows for the assessment of specific behaviours in situations similar to real ones. Based on the guidelines of the International Assessment Centre Task Force, it should also be assumed that an assessment centre consists of a standardized evaluation of behaviour based on multiple inputs; any single assessment centre consists of multiple components, which include behavioural simulation exercises, within which multiple trained assessors observe and record behaviours, classify them according to the behavioural constructs of interest, and (either individually or collectively) rate (either individual or pooled) behaviours. Moreover, using either a consensus meeting among assessors or statistical aggregation, assessment scores are derived that represent an

assessee's standing on the behavioural constructs and/or an aggregated overall assessment rating (OAR) (Guidelines..., 2015). The key elements of AC/DC include: 1) Systematic Analysis to Determine Job-Relevant Behavioural Constructs; 2) Behavioral Classification; 3) Multiple Assessment Centre Components; 4) Linkages Between Behavioural Constructs and Assessment Centre Components; 5) Simulation Exercises; 6) Assessors; 7) Assessor Training; 8) Recording and Scoring of Behaviours; 9) Data Integration; 10) Standardization (Guidelines..., 2015).

The most common AC/DC tasks include:

- a) in-basket/in-tray – through which analytical skills, prioritization, task delegation, work organization, decision-making, stress resistance, time management are diagnosed;
- b) group discussion – through which competences in the field of interpersonal communication, persuasion and cooperation skills, decision-making, negotiation and leadership skills, and emotional control are diagnosed;
- c) role-playing – through which competences in the field of interpersonal communication, persuasion and cooperation skills, decision-making, negotiation skills and team management are diagnosed;
- d) case study – through which analytical skills, decision making, persuasion skills, creativity and expert knowledge are diagnosed;
- e) presentations – through which competences in the field of communication, search, synthesis and graphic presentation of information, the ability to convince and engage recipients are diagnosed (Trochim, 2019).

An important issue undertaken by researchers is the approach to testing the validity of the method itself, which is the centres. For this purpose, various criteria are used, such as: objectivity, standardization, normalization and reliability. One of the examples of the conducted analysis is, e.g., a statistical measure of the predictive value using the Pearson correlation coefficient; for AC/DC, the researchers obtained a score in the range of 0.41–0.65, which is the highest for all selection methods covered by the study (Kawka & Listwan, 2010).

7.3. Research Methodology

To compare the current state with the original assumptions of AC/DC developed in the military sector, a qualitative study of source materials was carried out. The study covered the literature on the subject and declassified, selected documentation of experiments carried out in the German, British, Danish and American armies. The following research questions were formulated: 1) what competencies were tested within DC; 2) what methods were used within DC; 3) what was the accuracy of the techniques and tools used; 4) which techniques and tools can be used in modern DC in the military sector? The article presents a selected fragment of the study, in which the key results of the analyses were indicated.

7.4. Research Results – Identification of Key Stages of AC/DC Development in the Military Sector

In 1920, Johann Baptist Rieffert founded, on behalf of the Reichswehr Ministry, a centre for psychological research at the University of Berlin. The main task of the centre was to improve the methods of selecting candidates for officers of the German army. In the years 1922–1931, Rieffert headed the Department of Military Psychology, during which time he not only developed the procedure with entrance tests for the AC, but also built the psychological service of the Reichswehr. The theoretical foundations of Rieffert's method should be sought in the mainstream of holistic psychologists, Gestalt theory and the works of Kurt Lewin, including those on test research, group dynamics and sensitivity training. In 1926, Rieffert introduced the "Round Table" as part of the officer selection process, which to this day is one of the standard building blocks of the AC (under the term "group discussion"). In 1927, participation in this first form of AC was compulsory for all officer candidates. The following procedures that were used as part of the Wehrmacht selection process are also mentioned:

- biography analysis (the aim of the measurement was biographical data that could have an impact on mental and spiritual development, for example travels);
- expression analysis (the aim of the measurement was forms of "mental expression without a conscious order of purpose and without the participation of consciousness"; the following methods were used: analysis of facial expressions, pantomime, forms of speech and language, written analysis);
- mental analysis (e.g., arithmetic tasks, tests and essays on technical videos, followed by exploration);
- performance analysis (testing reactions on apparatus, sports tasks and "series of commands", i.e., the examinee had to follow instructions, but the manner of execution was largely his invention);
- leader test (solving tasks together with subordinate soldiers, and thus analysing expression, mind and action);
- final test (the aim of the measurement was: behaviour in a familiar community; the method of controversial discussion among the examinees was used) (Simoneit, 1933, pp. 46–57).

The course of the above Wehrmacht selection procedure was such that two examination groups with four participants were assessed by observers. The selection committee consisted of permanent members of the examination centre, the commander of the examination centre as a chairman, several psychologists, two officers from the armed forces and a medical officer (psychiatrist). The selection process took three days. During this time, branch officers were tasked with supervising participants also outside of exams. Together with the test procedure, a comprehensive picture of the test person could be created and evaluated. After the observation was completed, the candidates were informed of the result by the

Army Personnel Office. At its peak in 1936, approximately 40,000 candidates were screened at 15 military psychological centres (Obermann Consulting, 2022).

Another representative of German precursors was Max Simoneit. He started his work with Rieffert. He believed that the psychological diagnosis of candidates for officers and specialists should be the main focus of military psychology. He used qualitative assessments more often than quantitative, and subjective rather than objective (Burt, 1942). Simoneit (1933) believed that an officer candidate must be observed in action to judge his complete character. The key trait he studied was the candidate's willpower. He developed, among others, tests such as obstacle courses that could not be completed; candidates repeatedly climbed inclines until they were exhausted (Harrell & Churchill, 1941). These tests were accompanied by diagnoses of facial expressions, handwriting, and leadership roles. Simoneit's methods were seen as innovative, and the use of multiple and unconventional assessment methods inspired officer selection practices in Australia, the United Kingdom, and the United States (Highhouse, 2002).

The representative of the British AC school was, e.g., Wilfred Ruprecht Bion. He specialized in group dynamics (Bion, 1959). The British War Officer Selection Board used a procedure in which psychiatrists interviewed officer candidates and psychologists conducted a series of tests. This procedure has raised many questions about the weight to be given to psychiatric and psychological conclusions. Bion replaced this process with a series of leaderless group situations to explore the interplay of individual personalities in a social situation. Bion believed that creating leaderless situations for candidates (e.g., a group carrying a heavy load through a series of obstacles) was an indicator of their capacity for mature social relationships (Sutherland & Fitzpatrick, 1945). He changed priority from individual action to collaboration to complete tasks. The challenge for the candidate was to demonstrate his skills through others (Murray, 1990). Candidates underwent a series of tests and exercises over a period of 2.5 days. Psychiatrists and psychologists worked together as a team of observers to share observations and develop a common impression of each candidate's personality (Highhouse & Kostek, 2013).

At the same time, work was carried out in the United States. The most important person to be named was Henry Murray. He is credited with coining the term AC. In accordance with the holistic approach, Murray developed a theory of personality, also called personology (Murray, 1938). The basis of the theory was the conviction of the need for in-depth, systematic research of individuals. Murray's contributions to the development of AC were multiple; he has introduced methods such as: the idea of task simulation, a structured approach to assessing candidates, and the approach based on the principle of "multi-eyes". Because of his medical background, he was used to discussing patient cases with others in collegiate counselling (Obermann Consulting, 2022). This is how he also educated students in the field of AC. One student (Robert D. Stolorow) recalled that the AC course in Harvard's graduate program in clinical psychology in the late 1960s involved an entire class studying one person for an entire semester using biographical material, clinical interviews, and psychological tests; then the whole class wrote down a common case report (Kovary, 2018). After leaving

Harvard, Murray joined the Office of Strategic Services (OSS), which was established in 1942 and was the predecessor of the Central Intelligence Agency (CIA). The main task of the AC in the OSS was to develop a methodology for selecting people to conduct special operations aimed at destroying the morale of enemy troops, organizing and training resistance groups, and gathering information behind enemy lines. Murray and his team constructed a series of situational tests and "task samples" that required candidates to deal with stresses, conflicts, and problems of the same general nature as in the situations they would later face. The assessment program took three days, during which not only was the candidate's test performance determined, but also his personality as a whole (N., Sam M.S., 2018). One of the main evaluation methods was the so-called intelligence test. The process began by giving each candidate a fictitious name to prevent test colleagues from identifying their service status or civilian background. Afterwards, almost everything he did was recorded, i.e., the way he greeted staff, walked around, behaviour at informal meetings, conversations on topics that revealed his attitudes, goals, prejudices and religious beliefs. Over the course of 3 days, each candidate took a number of written tests, including aptitude tests and projective tests, and completed questionnaires designed to gain information about his life and personality. After analysing, this material was the basis for guiding the course of questions conducted by the examiner during the clinical interview. This part of the process turned out to be one of the most innovative of all procedures. The next stage was a series of "stress interviews", the purpose of which was to determine the extreme level of intellectual and emotional stress that a given person can withstand. The candidate was asked, for example, to come up with a story and then defend it sitting fully upright with a bright light shining in his eyes, fending off a crossfire of questions. To add to the tension, the examiners asked questions and accusations with increasing speed, to the point of constant harassment from all sides. During this task, observers also assessed the candidate's physiological responses, such as blushing, swearing, swallowing, stuttering, and other signs of tension. The next step was to continue the conversation, but under calm conditions, trying to reduce the candidate's vigilance and make him not defend his story. The described interview test allowed the examiners to assess the intellectual resourcefulness, emotional stability and safety awareness of the subjects. The characteristics identified in the interview test were then tested in situational stress tests. An example task ("Test of Walls") was that several candidates had to carry a heavy log of about 2.5 m and themselves through 2 walls (about 2.75 m) separated by a deep, imaginary canyon, also about 2 m wide, 5 m long. No leader was assigned to the group; observers recorded which men took over as leaders and whether leadership changed among the participants. The observations allowed the identification of "natural" leaders and insights into how men interacted with each other. In addition, observers recorded energy levels, initiative and ideas, as well as candidates' reactions when their suggestions were rejected by others. The most frustrating stress test was the construction task which required a human to build an approximately 1.5.m cube from a set of large bricks (the Giant TinketToy) within a given time. The portions were so large that the candidate was given two assistants to assist him, who were actually psychologists secretly trained to annoy him and prevent him

from completing the task. Based on their observations, psychologists made a report on how the candidate handled the situation. After a 3-day assessment session, the examiners exchanged observations, interview and test results to obtain a final score for the candidate (N., Sam M.S., 2018). According to data disclosed by the OSS, a total of 5,391 candidates were examined, of whom 1,187 were assigned to operational activities (OSS Assessment Staff, 1948). At the same time, the book *Assessment of Men: Selection of Personnel for the Office of Strategic Services* (OSS Assessment Staff, 1948) is considered the first work on AC, although the term “centre” is not used in it.

The next stage in the development of the AC/DC methodology can be considered the research conducted in the Danish army in the years 1953–1963. Analysing the report prepared by Meincke (1999), it can be seen that the AC/DC process used in this army is methodologically similar to the method used today. First of all, the basis for the selection of techniques and tools is the competency profile of candidates for officers. The profile distinguishes: undesirable mental disorders, desirable mental health, cognitive abilities and leadership potential. Undesirable mental disorders included: mental distress, adaptation difficulties, irrational/incomprehensible behaviour, unpredictable behaviour, tendency to lose self-control, inappropriate originality and unconventionality, disgusting appearance, and reluctance to comply with rules and standards of behaviour. The recommended mental characteristics were: positive and realistic self-image, goal-oriented behaviour, independence, realistic perception and interpretation, personal development and self-fulfilment, social competence and energy. In the group named “specific personality traits in the officer’s profile”, 2 subgroups were distinguished, namely:

- a) cognitive abilities which include: intellectual ability, knowledge/proficiency, motivation to learn;
- b) leadership potential, i.e.: analytical skills, judgment/discernment, wide field of view, initiative, energy, perseverance, flexibility, personal strength, decisiveness, willingness to lead, ability to cooperate, sensitivity to other people/empathy, situational awareness/attention directed at social environment. ability to communicate, self-confidence, assertiveness, sense of humour, resistance to stress, potential for further personal development.

The AC process was also not accidental; candidates were assessed according to the following procedure: tests of intelligence, skills and knowledge, group exercise without a leader, short psychological interview (30 minutes), long psychological interview (60 minutes), summary meeting at which psychologists come to an agreement on the assessment of candidates, physical fitness, interview with an officer of the military academy, competition committee. Candidates who failed the tests in accordance with the standard (except for the personality test) were excluded from further proceedings. The remaining candidates went to the next stage which was a group exercise without a leader (90 minutes). Each group of 6 candidates was supervised by 3 psychologists. In a group exercise, candidates were assessed on their ability to cooperate, social skills, sensitivity to other people, energy

and initiative. The next stage was psychological interviews: short (30 minutes) – focusing on military experiences, and longer (60 minutes) concerning upbringing, learning, professional experiences, interests, social relations, motivation and professional intentions. Each candidate spoke to 2 psychologists (one in a short interview and the other in a longer interview). The psychologists had access to all test results and information about the candidate. After the interviews, the psychologists discussed each candidate's case among themselves, until a consensus was reached, i.e., whether they fit the officer's profile. The end product of the psychological selection process was a personality description and adequacy assessment, as well as quantitative assessments. The specific goals of the psychological assessment were twofold: a) predict success in academic training (training prediction); b) an estimate of how well the candidate will be able to function as an officer after graduation from the academy (career prediction). The results of the psychological assessment were presented to the selection committee; together with the results of the physical fitness tests and marks from the military service of the candidates, the selection committee will use the psychological report as the basis for the final evaluation. The chairman of the commission could reject the psychological report, but this was most often the case when the assessments of the candidate's military superiors conflicted with the psychological assessment. To check the reliability of the career prognosis based on the described AC procedure, further research was conducted on all military officers trained in 1953–1963. The criterion used was whether an individual officer, 25 years after completing officer training, was promoted beyond the rank of major. It was found that, on average, 32% of these officers were promoted to the rank of lieutenant colonel (Meincke, 1999).

In the years 1973–1974, a study was conducted in the U.S. Army Infantry School (USAIS) at Fort Benning. 408 officers and non-commissioned officers were tested in leadership courses. Field leadership performance ratings were obtained from supervisors, colleagues, and subordinates assessed at 6- and 18-month intervals after completion of the assessment and assignment to a new unit. The candidates were participants of the following education levels: Infantry Officer Advanced Course (IOAC), Infantry Officer Basic Course (IOBC), Branch Immaterial Officer Candidate Course (BIOCC) and Advanced NCO Educational System (ANCOES). The following were appointed to the team of assessors: 6 majors, 7 captains, 2 lieutenants, 3 senior sergeants, 2 first class sergeants and 1 staff sergeant. The assessors were selected by the District Attorney based on the following criteria:

- each man had to represent a different combat specialty;
- every captain and senior had to have command experience;
- every major, captain and sergeant had to serve in combat;
- officers had to have a higher degree in one of the behavioural sciences.

Before starting their duties, the assessors received four months of training in the principles and techniques of assessment, interviewing and counselling. The training included multiple trials of assessment exercises. The aim of the study was to diagnose and assess the following competencies: adaptability, administrative skills, communication skills, decision-

-making, strength, mental skills, motivation, leadership effectiveness in the organization, social skills and supervisory skills.

The following sequence of exercises was adopted:

1. Entry Interview: A background interview to elicit information related to motivation, experience and the assessee's self-knowledge of his strengths and weaknesses (time: 65 minutes).
2. Appraisal Interview: An applied exercise in which each assessee interviewed 2 others to select one for a position within a battalion. This interview elicited behaviours related to communication skills, social interaction and organization of thought (time: 105 minutes).
3. Leaderless Group Discussion: This exercise was a combined individual and group task in which 6 IOAC assessees were assigned a mission to distribute year-end funds among the represented directorates while attempting to acquire a maximum amount for his own directorate. IOBC, BIOCC, and ANCOES assessees were assigned a mission to get a soldier from their unit selected as the Brigade Soldier of the Month and providing a rank order of merit list of the available candidates. This exercise elicited behaviours associated with forcefulness, persuasiveness, organizational ability and group interaction (time: 140 minutes).
4. In-Basket Exercise (Three versions: IOAC – assessee was placed in the role of a battalion commander; IOBC/BIOCC – assessee was placed in the role of a company commander; ANCOES – assessee was placed in the role of a 1st Sergeant). An in-basket containing many items typical of the appropriate position was presented to the assessee who had 3 hours to address each item in the in-basket. This exercise elicited behaviours relating to problem solving, decision making, work organization and leadership. It was followed by an interview to discuss reasons for action taken and the relationship perceived to exist among some of the actions (Exercise 180'; Interview 80').
5. War Came (IOAC assessees only): This was an assigned-role rotating leader exercise conducted in two 160-minute sessions. Teams of 6 players engaged in cost effectiveness analysis in a military force planning environment. This exercise elicited organizational and leadership behaviour (Exercise 320'; Orientation 90').
6. Radio Simulate (Three versions: IOAC assessees were placed in company commander role; IOBC/BIOCC assessees were placed in a platoon leader role during a civilian emergency situation to assure that lack of military experience did not preclude them from participation in the exercises; ANCOFS assessees were placed in the role of acting platoon leaders). It was a 5-hour exercise using radios as the only means of communication. It elicited organizational and leadership behaviours (Exercise 300'; Orientation 90').
7. Assigned Leader Group Exercise (Field Exercise): This was a 5-hour rotating leader designated exercise involving a team of 6 assessees. There were 6 lanes with a different obstacle provided for each lane. It elicited emergent leadership, planning and organizational behaviours (300').

8. Management Exercise ("Conglomerate"): This was a 2-hour exercise divided into 2 planning and 2 trading periods. The 18-man assessment group was organized into three 6-man groups who competed against each other. This exercise elicited behaviours relating to emergent leadership, aggressiveness and social interaction (120').
9. Writing Exercise: This was an exercise designed to measure accuracy of information provided, grammar, spelling and completeness. The IOAC – 4 assessees responded to a Staff Action Paper and other assessment groups to a discharge action (60 minutes) (Dyer & Hilligoss, 1979).

In addition to these exercises, a number of psychometric tests were used in the study. The primary criterion for selecting specific tests was relevance of the variables to be tested to the leadership dimensions of administrative skills, communication skills, supervisory skills, forcefulness, adaptability, decision making, and mental ability. Additional criteria used in the selection of tests were: non-offensiveness of test items, suitability of content and format for use with mature adults, adequacy of normative data and theoretical discussions, timeliness of publication or revision, and effectiveness in administering the test. As a consequence, the following tests were used: Leadership Opinion Questionnaire, Watson-Glaser Critical Thinking Appraisal, Nelson-Denny Reading Test, Henmon-Nelson Test of Mental Ability, Leadership Q-Sort Test, Social Insight Test – Chapin, Work Environment Preference Schedule – Gordon, Strong Vocational Interest Blank, Edwards Personal Preference Schedule, Person Description Blank. Additional questionnaires were also developed to help improve the research process and gather suggestions for improving the techniques and administration of the AC/DC.

American researchers verified the obtained results using the analysis of correlation coefficients. In summary, they found that the largest proportion of criteria predictors were obtained from self-report instruments (with the least involvement of the evaluator's time and the evaluator); on the other hand, the most intense formal assessment exercises actually perform worst at predicting the field leadership criterion. Intermediate between these extremes was the Interview which provided a large number of predictors with only a moderate involvement of the time of the evaluator and the evaluator.

The obtained results were confronted with selected methods of officer development currently used in the Polish and American armies. In general, it was noted that the AC/DC officers still use the set of tools developed in the 1970s. A summary of the evolution of the development of AC/DC methods is presented in Table 7.1.

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Table 7.1. Overview of AC/DC tools used in the years 1926–1973

Year	Author	Method / tool	Competence	AC/DC Personnel
Since 1926	Johann Baptist Rieffert	“Round Table” / “Group Discussion”	communication leadership submission groupthink	selection committee: <ul style="list-style-type: none"> ■ permanent members of the examination centre, ■ commander of the examination centre (chairman), ■ several psychologists, ■ 2 officers from the armed forces, ■ medical officer (psychiatrist)
	Max Simoneit	biography analysis mental analysis	mental and spiritual development	
		expression analysis	forms of expression	
		performance analysis	execution of commands	
		leader test	cooperation with the team	
controversial discussion among the examinees	behaviour in a familiar community			
Since 1933	Max Simoneit	<ul style="list-style-type: none"> ■ obstacle courses that could not be completed ■ diagnosis of facial expressions ■ graphology ■ playing leadership roles 	willpower mode of action	no data
Since 1940	Wilfred Ruprecht Bion	A series of leaderless group situations	group dynamics	psychiatrists and psychologists
Since 1927	Henry Murray	<ul style="list-style-type: none"> ■ task simulation ■ biographical material ■ clinical interviews ■ psychological tests 	personality	psychiatrists and psychologists
Since 1942		<ul style="list-style-type: none"> ■ situational tests ■ samples of tasks ■ intelligence test ■ stress interviews ■ stress tests 	resistance to stress solving the conflict troubleshooting identifying natural leaders	psychiatrists and psychologists
1953–1963	Danish army	intelligence tests	logical-abstract reasoning, verbal skills, numerical skills and spatial reasoning	mixed commission: officers and psychologists
		math test	undergraduate arithmetic and math skills	
		technical comprehension test /mechanical	understanding technical and mechanical matters	
		technical comprehension test /mechanical	understanding technical and mechanical matters	
		general knowledge test	cultural, political, historical and scientific knowledge	
		personality test	psychological profile of competence	

		group exercise without a leader	cooperation skills, social skills, sensitivity to other people, energy and initiative	
1973–1974	USAIS	entry interview	motivation, experience, the assessee’s self-knowledge of his strengths and weaknesses	6 majors, 7 captains, 2 lieutenants, 3 master sergeants, 2 first class sergeants, and 1 staff sergeant
		appraisal interview	communication skills, social interaction and organization of thought	
		leaderless group discussion	forcefulness, persuasiveness, organizational ability and group interaction	
		in-basket exercise	problem solving, decision making, work organization and leadership	
		war game	organizational and leadership behaviour	
		radio simulate	organizational and leadership behaviours	
		assigned leader group exercise	emergent leadership, planning and organizational behaviours	
		management exercise (“conglomerate”)	emergent leadership, aggressiveness and social interaction	
		writing exercise	accuracy of information provided, grammar, spelling and completeness	

Source: own study.

An example of a comprehensive AC/DC solution is the Leaders Reaction Course (LRS) launched at the University of Land Forces in Wrocław (AWL). The track was constructed on the basis of benchmarking solutions used in the armies of other countries (e.g., Great Britain, Germany or the United States). The main objectives of using this type of track are: to improve leadership skills by creating opportunities for learning during practical operation as a commander, to assess the participant by observing his character traits and behaviour, to provide feedback to the participant regarding his leadership skills and competences, to enable the participant to observe strengths and weaknesses of team members while performing tasks, enabling development as a leader (Zielichowski & Kaliciak, 2020). It is therefore a kind of developed Development Centre implemented for the needs of the army.

The second important direction of game changes in the development of soldiers' human capital is the use of electronic solutions in the training of professional competences. This applies in particular to the use of trainers, simulators and computer games that very realistically reproduce the conditions of the modern battlefield. Simulation consists in recreating the properties of given objects or phenomena using a specific model. With regard to IT tools, we distinguish computer simulation which, properly programmed, allows you to study the behaviour of real objects based on observation of the operation of a computer program that simulates this behaviour, an example can be both a computer game and a professional simulator, e.g., flight. The use of IT systems to recreate the reality that surrounds us is commonly used by the US Army, where research and development work related to battlefield simulation is carried out on an ongoing basis. Progress resulting from the growing needs and challenges generated by the modern battlefield requires training of both individual soldiers and entire vehicle crews. The interactive intervention of the above-mentioned entities is created thanks to properly coordinated simulation tool, the so-called "distributed simulation", which allows for connecting and exchanging relevant information using a computer network in a war game. According to Salamon, an important element of such a simulation is the need to use computer simulation models that describe the behaviour of individual objects on the virtual battlefield. A computer generator of the behaviour of objects involved in the battlefield simulation increases the realism of the exercises. It enables a realistic simulation of combat operations without the need to connect many expensive real military simulators, intended for training crews of military vehicles and individual soldiers. New types of simulators developed in the last few years make it possible to combine constructive and visual simulation (Salamon, 2001). Visualization and programming of processes that take place during military operations faithfully reproduce, for example, the Virtual Battle Space (VBS) program. It is a platform that allows you to transfer military exercises to the monitor screen. The VBS includes IT tools used at all stages of the exercise (i.e., data preparation, scenario development, exercise implementation and analysis of the exercise course and evaluation of the results obtained) supported by a battlefield simulator (trainer). The trainer can design any scenario describing the simulation on the battlefield. A very important and useful component of VBS is a library of ready-made objects (a man in various configurations, a group of people, vehicles of various categories, buildings, roads, vegetation and other objects) along with their properties. The use of this type of IT tools can satisfy a certain part of the diagnostic and training deficit under AC/DC. Most of the world's leading armies, based on current experience and future actions resulting from them, strive to develop simulation and training systems in the direction that should lead to: a) combining them into a single-level and multi-level simulation network (with the possibility of using constructive, virtual and real at the same time); b) "supervising" the simulation network, e.g., through the "communication and integration bus", the task of which is to create an environment that enables the exchange of data between heterogeneous components of the simulation system, ensuring the transfer of data between the systems connected to it and enabling

further development of the simulation system by modernizing or switching it on newer simulators or trainers for the training process (Stopniak & Chmieliński, 2015).

It should be noted that the online, computer-administered test of the required competencies for junior non-commissioned officers throughout the army, has been tested since 2002 by the U.S. Army as a part of the technological solutions used in AC/DC. The use of the above tool to diagnose the competence profile of soldiers in the following categories was analysed: a) Basic Soldiering (Common Tasks – e.g., weapons, navigation, first aid); b) NCO and Army History, Customs, and the Seven Army Values; c) Leadership; d) Training (Campbell et al., 2014). The preliminary results of the AC/DC organization research were as follows:

- 1) work analysis is a key requirement of the operational test; this is particularly important where areas such as leadership must be defined in terms of work efficiency;
- 2) in the case of an army-wide test, the plan must be a flexible document that has a certain durability and usefulness over the years; an annual full revision of the plan is neither practical nor desirable; one way to achieve the desired level of flexibility is to define broader performance categories; much more work is also needed on the definition and description of categories, especially in doctrinally weak areas such as history/customs, values, leadership and training;
- 3) tracking the movements of the evaluated person creates many problems; it is primarily useful in settings where (a) a test is used as a criterion and (b) tracking can be by individual; if assessees are allowed to choose which path to take (especially in operational evaluation), this has implications for the equivalence and comparability of tests and whether there are benefits to taking one path or the other; the matter is complicated by the fact that not all soldiers will have a similar level of experience with the weapons and equipment they use and which may be affected by the decision situation;
- 4) because the guidelines from the army command were that the promotion test should include elements of the situational assessment test, the following performance dimensions were analysed in the leadership study: problem-solving and decision-making skills, motivating, leading and supporting subordinates, directing, monitoring and supervising work, training others, relating to peers and supporting them, team leadership, concern for the soldier's quality of life, cultural tolerance;
- 5) failed to configure the point scale for tasks/questions with the ranking technique;
- 6) the requirement of prior notification and preparation of the soldier for AC/DC is an important part of the assessment program;
- 7) the pilot test was configured to be administered via the Army's Digital Training Facilities (DTF) to serve as a portal to the military distance learning programme; despite limitations in availability, DTFs are still the most promising place for an operational assessment test;
- 8) more technical problems than expected were encountered during the pilot tests; problems are divided into three broad categories: login problems, computer-specific problems, and system problems; soldiers must have confidence in the testing system,

career-critical tests are sufficiently stressful without distracting technical issues; before the solution is used for real AC/DC, technical problems must be solved and interference removed;

- 9) the army must establish a process of selection, training and certification of persons supervising tests implemented as part of IT solutions;
- 10) the ethical aspect is important, namely the need to implement a culture of intolerance towards fraud.

The third key game changer implemented in AC/DC is the discovery of neurology. As a part of the experiments, neurodiversity is tested by assuming that people experience and interact with the world around them in many different ways, and one of the reasons for this is, e.g., neurological deficits and/or neurotransmitter levels (Johannessen, 2020). The study of neurodiversity is currently treated only at the level of a complementary tool under AC/DC; correlations with the results of other tools, e.g., psychological tests, are analysed.

7.5. Conclusions – Key Results, Findings, Limitations and Future Research

Development centres used in armies focus primarily: subjectively – on the officer cadre, objectively – on leadership. A direction of assessment was developed, in which the efficiency and effectiveness of the commander in operational activities was taken as the main criterion. At the same time, it is important that these measures do not concern the individual results of a given officer, but the collective results. This means that the measure of the performance of a given leader (officer) is the ability to carry out the tasks of the team he leads.

It was noticed that since the 70s of the 20th century, the foundation of AC/DC has been unchanged, namely the multidimensionality of the study, the complexity of the tools used and the collectivism of the assessment. Due to the development of technological solutions, psychology, sociology, neurology, etc., the tools and forms of conducting individual elements of the assessment are modified.

Researchers point out that when designing AC/DC in the military environment, special attention should be paid to the selection of assessors, the construction of a competency profile based on the analysis of operational activities performed by the assessed person, the selection of competencies that can be observed and thus assessed. Moreover, the results of the assessment should be understandable for army commanders to translate the observations and conclusions of psychologists into the language of military development practice. As indicated in the final part of the article, participation in AC/DC is a very stressful situation for a soldier, as it affects his further career, therefore, every effort should be made to ensure maximum comfort for participants, providing comprehensive information about the purpose of the entire process, its next steps and about the results; this process must not be interrupted by, for example, technical problems.

The use of AC/DC in a military environment, as well as in a business environment, is time-consuming and cost-intensive. However, on the other hand, it is the best method of observing and assessing people in action, which, due to the specificity of the soldier's profession (officer, commander), is a key argument for its use. The standardization of the methods and techniques used also speaks in favour of AC/DC. The data obtained as part of the study can be used as a valuable source of predictors for predicting and forecasting the behaviour of soldiers in stressful situations, during operations under pressure, in a dynamic, uncertain environment. In addition, the results of AC/DC should be the basis for planning the training process of officers, profiling the officer's profile and designing trajectories of officers' career paths. It is suggested to divide the officers into two groups: in the command and staff divisions. Careers of officers after being qualified to a specific group should run in a strictly defined group of positions (command or staff positions). It should be remembered that serving in staff positions implies the need to have different competences than in command positions, which does not determine the validity of any of the indicated positions.

In the opinion of the researchers, it is justified to create an AC/DC model that would support the recruitment of candidates for officers and the development of officers in active service. The data obtained from the conducted research and observations in conjunction with the profile of the candidate for an officer would help to select candidates with optimal predispositions. It is also important that the AC/DC toolkit incorporates the latest scientific developments, such as virtualization and neurotransmitter research. Table 7.2 presents the author's proposal of the AC/DC toolkit that can be used in the examination of officers in the field of leadership competences.

Table 7.2. An exemplary set of AC/DC tools that can be used in the examination of officers in the field of leadership competencies

Method/tool	Competence	AC/DC Personnel
Psychological tests	psychological profile of competence, personality	Selection committee: <ul style="list-style-type: none"> ■ commander of the examination centre – chairman – senior officer with experience, ■ two psychologists, ■ three officers from the armed forces representing various specialties with experience in a line unit
Interview	communication skills, information related to motivation, experience, self-awareness	
Situational tests: <ul style="list-style-type: none"> ■ competitive exercises ■ exercise under pressure 	resistance to stress troubleshooting willpower aggressiveness social interactions	
Obstacle course	methods of operation and efficiency	
Leader test	cooperation with the team persuasion inner strength leadership behaviour	

Group exercise without a leader	identifying natural leaders cooperation skills social skills sensitivity to other people empathy energy and initiative	
Virtual Battlefield Systems (VBS)	decision making process the ability to make independent decisions knowledge of command theory/procedures goal-oriented attitude towards people (soldiers) tendency to make unethical/unlawful decisions inclination to unethical and illegal behaviour resistance to the impact of external stimuli in the decision-making process (noise, confusion, chaos, barriers and information noise)	
Testing the level of selected neurotransmitters (dopamine, acetylcholine, serotonin, GABA)	tendency to certain behaviours (hyperactivity, analytical mindset, tendency to take risks, etc.)	

Source: own study.

Undoubtedly, the conclusions from the research that was conducted among soldiers became the foundation of AC/DC used in business. It should be concluded that the solutions currently used in the army, especially those related to the implementation of new technologies and scientific achievements, are universal and can be used in other sectors of the economy. In addition, it can be seen that the army also draws from solutions provided by business and the world of science.

It is also worth mentioning that the results of research, especially in the literature, may not be complete due to often confidential nature of research conducted in the military sector. This constitutes a fundamental limitation in the current transfer of knowledge between the military and economic sectors. The confidentiality clause covers primarily the results of tests conducted on soldiers, as they would provide information about the soldiers' strengths and weaknesses in the mental sphere. This poses a significant threat, especially in the context of hybrid warfare.

However, the main directions of research in the field of AC/DC can be indicated. These are undoubtedly: problems of using artificial intelligence in the assessment process, determining the limits of neurobiological interference in human capabilities, and ethical issues related to the above-average development of human capabilities in the context of their military use.

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Ewolucja ośrodków rozwoju w sektorze wojskowym – od początków do *game changers*

Streszczenie: W artykule zaprezentowano wyniki przeglądu literatury i materiałów źródłowych (wojskowych i cywilnych), którego celem było określenie: diagnozowanych kompetencji, stosowanych metod diagnozy oraz ich skuteczności przy zastosowaniu Assessment/Development Centres. Badaniem objęto materiały z lat 1920–1974, w tym odtajnione dokumenty z eksperymentów przeprowadzanych w armiach niemieckiej, brytyjskiej, duńskiej i amerykańskiej. Otrzymane rezultaty skonfrontowano z wybranymi metodami rozwoju oficerów stosowanymi współcześnie w armii polskiej. Stwierdzono, że centra wykorzystuje się głównie w pracy z oficerami, a przedmiotem diagnozy są przede wszystkim kompetencje przywódcze (definiowane wymiarem wydajności). Od lat 70. XX w. nie zmieniły się podstawowe zasady organizacji centrów, mianowicie wielowymiarowość badania, złożoność zastosowanych narzędzi i kolektywizm oceny. *Game changers* w tej dziedzinie stanowią natomiast narzędzia i formy przeprowadzania poszczególnych elementów oceny; wdrażane są rozwiązania związane z informatyzacją, wirtualizacją i neuroróżnorodnością, których przykłady opisano w niniejszym opracowaniu.

Słowa kluczowe: centra oceny, centra rozwoju, szkolenie wojskowe

CHAPTER 8

Using the Experience of Students in Improving the Quality of Services at Universities

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Abstract: The article fits into the subject of quality management systems in Polish universities. The aim was to identify opportunities to use student experience to improve quality in these organizations. A critical review of the literature on the main trends and research methods and tools that are used to identify experiences in university practice was conducted. The analysis showed that it is possible to identify students' experiences in relation to various aspects of their functioning at the university, which may translate into a better understanding of their needs and expectations. The choice of methods and tools depends on what areas of the organization will be evaluated and what purposes the study is to serve.

Keywords: student experience, quality management systems, quality measurement, universities

8.1. Introduction

Since the late 1990s, higher education institutions in Poland have been participating in the process of constant changes resulting from the need to improve the quality of education. Initiated in 1999 by Poland's signing of the Bologna Declaration, the professionalization of activities in the area of quality management at universities was to ensure that they meet educational standards, both within the European Higher Education Area and national legal requirements. As indicated by Brdulak (2016), activities of universities related to quality management often focus mainly on meeting the requirements of the legislator, i.e., only on ensuring the quality of education. From the point of view of management theory, the quality system at a university in dynamic terms should be open to make it possible to easily introduce improvement changes and to respond to the challenges of the external environment, including: requirements of employers, expectations and capabilities of students, and the

impact of competition from other higher education institutions (Barnett, 2010, as cited in Bugaj, 2016). To effectively implement these goals, quality systems in universities must be equipped with appropriate mechanisms that will ensure quick and accurate identification of problems, which will be the basis for developing improvement solutions. For this reason, one of the key areas of functioning of the discussed system is monitoring, measuring and improving the quality of services provided.

Universities, when building internal quality management systems, can use many solutions that have been successfully implemented in enterprises before. The quality management systems compliant with ISO 9001, TQM and *kaizen* (Tutko, 2022, p. 120) are among the most frequently used in practice by Polish universities, in which customers are the focus. It is therefore essential that organizations measure, analyse and improve processes to fully meet their needs and expectations. Today, this idea is still being developed. According to the concept of service dominance logic, the customer should not only be the entity evaluating the service but also co-create its value (Vargo & Lusch, 2004, 2008). Such an approach may be particularly important in the case of educational services provided to students. They are the key “customers” of universities for which they provide teaching and administrative services. On the other hand, students are participants in academic life who specially contribute to the value at the university, and their satisfaction largely depends on their experiences related to their interactions with the university. Therefore, designing or improving services at the university, without knowing how they are perceived by students and in which places in the process there are significant problems affecting their overall satisfaction with the service, may reduce the value created in the process. It is therefore necessary to search for methods and tools supporting this aspect of process identification and analysis.

The most common form of student satisfaction research in the practice of Polish universities is a survey related to the evaluation of didactic classes carried out in an electronic form. Only some Polish universities conduct wider satisfaction surveys (Hall, 2022, p. 137). In the literature, in addition to the above-mentioned ones, there are many other methods and techniques for examining the quality of services that are used in universities. Among the most popular are: the SERVQUAL method, the Importance-Performance Analysis (IPA) technique, the A-E technique with the student satisfaction survey tool used within it, and less frequently: the SERVPERF method, and Expectation-Perception Analysis (EPA) techniques (Hall, 2011). This type of research, such as the above-mentioned SERVQUAL method, usually focuses on the overall assessment of the service assessed by the customer in the context of various categories. This allows for an overall assessment of the quality of the services provided, often without the possibility of identifying specific moments or real causes of problems. In addition, they do not provide the possibility of obtaining complete information to understand the customer in the context of his individual experiences acquired during the interaction with the service provider.

In recent years, there has been an increase in interest in the topic of student experiences. Matus, Rusu and Cano (2021) indicate that this issue has received a lot of attention from

universities, especially in the last decade (2010s), but very little research has focused on holistic student experiences. The concept was often used in universities for promotional purposes to increase interest in the university. In addition, the authors point to the trend of using the term “student experience” as an indicator of quality and/or satisfaction. The literature on the subject in the field of experience marketing indicates a relationship between satisfaction with the service and the customer’s experience related to his interactions with the service provider. Therefore, to provide students with services that meet their needs and expectations, it is necessary to improve them in such a way as to shape positive student experiences. Therefore, the question arises whether there are methods and tools for measuring student experience that can be used in the process of improving services at universities. The article aims to analyse the possibilities of using methods and tools measuring students’ experience in improving quality in universities. To achieve this goal, a critical review of the literature related to the subject of student experiences in the context of methods and tools for their measurement was carried out. To identify methods and tools for measuring student experiences, a literature review was carried out, covering the bases: WoS and Google Scholar. The review was limited to scientific articles that in the title, abstract or keywords refer directly to the terms: Identifying or measuring student experiences at universities. The analysis focused on finding research confirming the use of methods and tools for identifying student experiences at universities.

8.2. The Concept and Essence of the Student’s Experience in the Context of Value Creation

The student experience is related to the term “customer experience” which is widely described in the literature. The first mention of this issue appeared in the 1950s when Abbot (in 1955) and Alderson (in 1957) argued that consumers do not really want products, but experiences that will satisfy them. In the following years, these views were developed by experimental theorists. According to their opinion, a broad view of consumer behaviour is necessary, which will include the emotional aspects of experience and decision-making (Lemon & Verhoef, 2016, p. 70). In addition, with the development of the concept, emphasis began to be placed on the aspects of creating company and customer value (Kamaladevi, 2010).

The literature on the subject does not provide a clear definition of how to understand the customer experience. Some authors indicate that this is a reaction to the company’s offer, others say that customer experience is related to the assessment of the quality of the offer. This means that in some studies customer experience overlaps with outcome variables, such as satisfaction or value, while in others it is an independent variable leading to satisfaction, for example. In addition, some studies see experience as a feature of the product, which is contrary to the interpretative tradition that always sees experience as a subjective

perception of the customer, even as a synonym of value in use (Becker & Jaakkola, 2020). Nevertheless, customer experience can be considered as an internal and subjective reaction of the customer to direct or indirect contact with the organization (Meyer & Schwager, 2007, p. 117). Direct contact is usually initiated by the customer and takes place when purchasing a product or using a service. Indirect contact refers to unplanned contact with a brand, product or service (e.g., through advertising in the media, or recommendations of friends) (Meyer & Schwager, 2007). As indicated by De Keyser et al. (2015, p. 117), customer experience can be considered as the fourth form of offer in the economy. They are inherently multidimensional and include both cognitive and emotional aspects. The student experience can be thought of as a special case of customer experience. Students, as key customers of universities, constantly interact with the products and teaching and administrative services offered to them by universities. As noted by Matus, Rusu and Cano (2021), by understanding the dynamics of these interactions and their impact on students, it is possible to improve the quality of experiences, satisfaction and well-being. To achieve this, it is necessary to identify the elements/dimensions/factors that make up the student experience and to conduct a systematic analysis and evaluation of experiences in the context of improving universities.

Understanding what customer experience is and how it affects buyers' perception of service quality is not easy. In the literature, this issue is widely described both in general terms (Becker & Jaakkola, 2020; Hwang & Seo, 2016; Johnston & Kong, 2011; Palmer, 2010) and in relation to universities (Ciobanu, 2013; Sabri, 2011; Yap et al., 2022). Cano et al. (2021) note that research on this issue shows an increasing trend. In turn, Matus, Rusu and Cano (2021) argue that knowledge on how to research student experiences and use them in the process of improving services in universities is still dispersed. This is partly because different approaches and methods of measuring experience are used in university practice, depending on the needs. Their choice often depends on the purpose of the analysis, the subject of research and the organizational capabilities of the institution.

8.3. Methods and Tools for Studying Students' Experiences in the Practice of Universities

Universities in Poland, striving to improve the quality of functioning, mostly focus on the functional and utilitarian aspects of services. As a result, it is common practice in these organizations to measure and analyse student satisfaction after the service has been completed (e.g., after completing a course). As a result, the identification and analysis of student experiences in an inclusive approach is omitted, i.e., those that cover all life experiences of students, including, for example, affective aspects (i.e., feelings and emotions) or student involvement. Table 8.1 presents the results of the analysis of research trends relating to the study of student experiences, which dominate in the literature on the subject.

Table 8.1. Trends in the area of student experience research

The subject of research	Characteristics of the conducted research
Inclusive view of the student experience	Research focused on conceptualizing what constitutes a high-quality student experience. An attempt at a comprehensive study of the experiences of students who use the services of the university.
Experience in the field of education	Teaching experience related to basic services in the area of education, which is provided at the university and the impact of the student experience on learning results are identified. Discussions within this group of studies concerned, among others: teaching methods, learning support and establishing academic relationships.
Equal opportunities	Group of studies on differences in the assessment of student experience depending on gender. This category refers to the important problem of ensuring an equal learning environment for everyone.
Improving the quality of experiences	Identify how higher education institutions can improve the quality of the student experience. Within this category, three approaches to improvement are proposed: <ul style="list-style-type: none"> <li data-bbox="481 752 1383 846">■ focus on students – higher education institutions engage with students continuously to understand their expectations and aspirations and align them with institutional expectations, <li data-bbox="481 846 1383 911">■ focus on managing the learning environment – improving pedagogical approaches, <li data-bbox="481 911 1383 1005">■ focus on ensuring synergy between physical infrastructure and educational and operational strategies of the institution – a holistic approach to shaping the student experience.
Satisfaction in the field of education	Identifying and measuring determinants of higher education experience that affect student satisfaction.

Source: own study based on (Tan et al., 2016).

Different methods and tools are used to study students' experiences in higher education. Based on an analysis of the literature, Zeng, Freyer and Zhayo (2021) identified three main approaches to measuring student experience: the student engagement survey, the course experience survey, and the SET student survey. In addition, the literature increasingly points to the benefits of studying the student journey in the context of improving the services offered by learning (Rains, 2017). Table 8.2 presents and characterizes the main tools used in higher education institutions to study student experience.

One of the most widespread in academic practice is the study of students' experiences in the context of their involvement in studies. It is carried out at the institutional level and implemented using a questionnaire. Student engagement research began in 1979 when the C. R. Pace College Student Experiences Questionnaire (CSEQ) was introduced in the USA (Zeng et al., 2021). The aim of the CSEQ is to identify how students perceive the general learning environment that should be provided by the academic and administrative staff at the university. The study focuses on assessing the amount of time and effort that students put into the educational process. It also verifies how universities use their resources and organize their curriculum and other learning opportunities to encourage student participation

Table 8.2. Selected methods of identifying student experiences

Type of conducted research	Tools	Example places of implementation	Dimensions of the research
Study of students' experiences in the context of involvement in studies	College Student Experiences Questionnaire – CSEQ	USA, Australia & New Zealand, South Africa, UK, China, South Korea, Ireland	The questionnaire measures institutional commitment across five dimensions: level of academic challenge, active and collaborative learning, student-faculty interaction, enriching learning experience, and supportive campus environment.
Study of students' experience related to participation in the course	Course Experience Questionnaire – CEQ	UK, Australia, Canada, China, Japan, Netherlands	The original version of the questionnaire contained 30 items on five scales reflecting the different dimensions of effective teaching: good teaching, clear goals and standards, adequate workload, adequate assessment, emphasis on autonomy.
Opinion survey on the course	Student Evaluation of Teaching – SET	USA, Canada, UK and others	In its original version, the questionnaire included six main dimensions: course planning, communication skills, teacher-student interaction, course difficulty, student assessment and self-assessment of learning. Subsequent versions covered: subject knowledge, course organization, usefulness, enthusiasm, feedback and interaction with students.
Customer experience research by identifying the journey	Student Journey Mapping – SJM	USA, UK, Germany	It consists in identifying in the course of in-depth qualitative research (e.g., in the form of an interview) all emotions, opportunities and problems that the student experiences before, during and after the service.

Source: own study based on (Andrews & Eade, 2013; Chakrabarty et al., 2016; Fargo & Mastrangelo, 2021; Mandernach, 2015; Schuhbauer et al., 2020; Talukdar et al., 2013; Zeng et al., 2021).

(Mandernach, 2015). The student engagement survey allows for systematic observation of the university's institutional progress in supporting student engagement in learning. It can be the basis for formulating quality objectives at both the strategic and tactical levels. The results of research using the questionnaire can also be used in the process of benchmarking universities.

Another, commonly used in the university environment, is the study of students' experiences related to their participation in a course in which the Course Experience Questionnaire (CEQ) is used. The CEQ, based on the course perception questionnaire, was developed at Lancaster University in the 1980s and is used as a measure of perceived teaching quality in national and annual study programs in Australia. In 2005, the UK launched the National Student Survey (NSS) based on the CEQ as part of its quality assurance framework (Zeng et al., 2021). The use of the questionnaire makes it possible to identify the educational

experiences of students, which allows for generating information on the effectiveness of teaching, provides information for making decisions regarding teaching and allows for obtaining data for research on teaching processes. It is therefore a useful tool that can be used in the process of ensuring and improving the quality of education.

Student Evaluation of Teaching (SET) methods are widely used practically all over the world. The sets usually consist of a standard questionnaire that is provided to students at the end of the course. They are asked to give their opinion on topics such as the quality of the course, the quality of teaching and many aspects of it. The results of these assessments are typically used to evaluate faculty performance and often serve as the primary basis for promotion and hiring decisions (Royal, 2017). The literature on the subject often emphasizes their usefulness in striving to ensure the quality of education and activities in the area of teaching and learning quality in higher education (Galbraith et al., 2012; Spooren et al., 2013). As pointed out by Zeng et al. (2021), SET provides a cost-effective and standardized tool that allows universities to collect comparable information within colleges for different courses. Nevertheless, this tool is criticized due to the lack of consensus on the definition of effective teaching, the lack of theoretical basis for the construction of the tool and the bias of the assessment.

Another, slightly less frequently used in the practice of university, experience research tool is Customer Journey Mapping (CJM). It differs significantly from the previously discussed ones because it is based on qualitative research and identifies students' experiences in a process approach. According to Rains (2017), student journey mapping enables university administrators to draw unique insights from the perspective of their key audiences. This method consists of a visual presentation of the sequence of events during which students interact with the organization (for example, during the recruitment process for studies). In general terms, the journey map is therefore a visual illustration of the process, which illustrates the needs and perception of students' relations with the university (Temkin, 2010). According to Rosenbaum, Otalora and Ramírez (2017), the main objective of mapping is to improve interactions with service providers, which is expected to lead to an improved customer experience related to contact points. Usually, these points are presented horizontally on visual maps according to the process schedule.

In the literature on the subject, the effectiveness of CJM in the context of improving student service in academic libraries is indicated by Andrews and Eade (2013), and Samson, Granath and Alger (2017). The possibilities of using CJM to increase student engagement in the context of library services are described by Fargo and Mastrangelo (2021). In turn, the method of journey mapping in the context of the analysis of the entire life cycle of a student was used by Schuhbauer, Brockmann and Mustafayev (2020).

It is worth noting that the first of the tools mentioned above focuses on a relatively wide range of students' academic experiences. It contains an extensive set of questions relating to student characteristics and a description of students' experiences under three main categories: university activities, university environment and estimated benefits (Gonyea et al., 2003, p. 3). In turn, the other two tools, i.e., CEQ and SET, are aimed at evaluating

courses and teaching. Student journey mapping identifies experiences related to student-university interactions and can be the basis for improving student administration processes.

8.4. Conclusions

In the era of dynamic changes taking place in the socio-economic environment of universities, focusing solely on meeting the mandatory requirements limits their development opportunities. Universities, wishing to develop and improve their competitive position, should strive to maximize the value provided to eternal stakeholders, including primarily students, by providing them with services that meet their needs and expectations. This is connected with the need to constantly strive to expand systemic mechanisms focused on the idea of continuous improvement and development of a quality culture.

The conducted analysis of methods and tools for analysing student experience indicates the possibility and benefits of their use in the practice of Polish universities, as part of university quality management systems. Analysing students' experiences in the context of involvement in studies using the CSEQ student experience questionnaire allows for looking at experiences holistically, which can be a good basis for verifying and formulating quality goals in the medium and long term. Researching students' experiences related to participation in a course with the use of CEQ and surveying opinions on the course with the use of SET may extend the forms of measuring the quality of education already existing at universities. It is worth highlighting the first of the above-mentioned methods in particular due to its strong foundation in theory and the benefits of its application in practice indicated in the literature. In turn, the study of student experiences using travel mapping (SJM) can effectively support the improvement of administrative processes at a university and complement the previously described methods and tools for identifying experiences.

To summarize, it can be said that measuring students' experiences can provide valuable information about their satisfaction with the services provided by universities. Therefore, it can support the decision-making process related to designing solutions that improve the functioning of universities. The review was limited to the analysis of documents that use the term "research or measurement of student experiences" in their titles, abstracts, and keywords. Therefore, articles in which measurement of student experiences is not the main subject of research may have been omitted. Despite these limitations, the results were sufficient to identify the main methods and tools for measuring student experiences. In the context of directions for further research, it is worth focusing on the problem of integrating the discussed methods and tools for measuring student experience with other tools used within quality management systems at universities.

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Wykorzystanie doświadczeń studentów w doskonaleniu jakości usług w szkołach wyższych

Streszczenie: Artykuł wpisuje się w tematykę systemowego zarządzania jakością w polskich szkołach wyższych. Jego celem jest identyfikacja możliwości wykorzystania doświadczeń studentów w doskonaleniu jakości w tych organizacjach. Dokonano krytycznego przeglądu literatury w obszarze głównych trendów oraz metod i narzędzi badawczych, które wykorzystuje się do identyfikacji doświadczeń w praktyce szkół wyższych. Analiza wykazała, że możliwa jest identyfikacja doświadczeń studentów w odniesieniu do różnych aspektów ich funkcjonowania na uczelni, co może się przełożyć na lepsze zrozumienie ich potrzeb i oczekiwań. Wybór metod i narzędzi jest uzależniony od tego, jakie obszary organizacji będą poddane ewaluacji i jakim celom ma służyć badanie.

Słowa kluczowe: doświadczenia studenta, systemy zarządzania jakością, pomiar jakości, szkoły wyższe

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A “game changer” is a metaphor commonly used to describe a broad range of events and phenomena in different fields and domains, from natural disasters, through economic crises, emerging narratives, technological or social innovations to conflicts and political or military interventions. Although precise definitions of a “game changer” vary and its conceptual boundaries remain blurred scholars agree that its main quality is the ability to change the *status quo*.

Management scholars have long been interested in increasing the relevance and impact of their studies by addressing a diverse range of global issues. This aspiration to offer significant and meaningful theoretical, practical and societal contributions has led to the advent of strand of management research related to “grand challenges”. Solving any of these challenges could be a game changer, not only from management studies perspective but also from a wider social standpoint.

The monograph on *Game Changers in Management* includes eight chapters that draw inspiration from a diverse set of theories – such as technology adoption, service-dominant logic or information systems (IS) success model, and industrial contexts – from military, through board games to higher education. In the monograph authors discuss current challenges in management research and practice and offer their valuable insights into advancing the knowledge on how to tackle those challenges.

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