Krakow
University
of Economics

Krakow Review of Economics and Management

Zeszyty Naukowe

No 4 (1010) / 2025

ISSN 1898-6447
e-ISSN 2545-3238

Krakow
University
of Economics

Krakow Review of Economics and Management

Zeszyty Naukowe

No 4 (1010) / 2025

ISSN 1898-6447
e-ISSN 2545-3238

The journal is indexed by:
BazEkon (bazekon.uek.krakow.pl), CEEOL (www.ceeol.com), CEJSH (cejsh.icm.edu.pl), DOAJ (doaj.org), EBSCO (www.ebsco.com), ERIH PLUS (kanalregister.hkdir.no/publiseringskanaler/erihplus/) and ICI World of Journals (journals.indexcopernicus.com)

ISSN 1898-6447
e-ISSN 2545-3238

Until 2023: Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie / Cracow Review of Economics and Management

The online journal is both the primary and reference version
The articles are available on the journal's website: krem.uek.krakow.pl

Krakow University of Economics Press, Rakowicka 27, 31-510 Kraków, Poland,
phone +48 12 293 57 42, e-mail: wydaw@uek.krakow.pl, krem@uek.krakow.pl
Printing Center, Krakow University of Economics, Rakowicka 27, 31-510 Kraków, Poland

Krakow Review of Economics and Management 4 (1010)
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie 2025

KREM, 2025, 4(1010)
ISSN 1898-6447
e-ISSN 2545-3238

Table of Contents

Krakow Review of Economics and Management
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie
4 (1010)
2025

KREM, 2025, 4(1010): 5–23
ISSN 1898-6447
e-ISSN 2545-3238
https://doi.org/10.15678/krem.18723

Labour Market Diversification through Digital and Sustainable Work

Marzena Fryczyńska[1], **Małgorzata Skrzek-Lubasińska**[2]

[1] SGH Warsaw School of Economics, Collegium of Business Administration, Niepodległości 162, 02-554 Warszawa, Poland, e-mail: mfrycz@sgh.waw.pl, ORCID: https://orcid.org/0000-0001-5882-7017

[2] SGH Warsaw School of Economics, Collegium of Business Administration, Niepodległości 162, 02-554 Warszawa, Poland, e-mail: mskrze@sgh.waw.pl, ORCID: https://orcid.org/0000-0003-0162-1311

Suggested citation: Fryczyńska, M., & Skrzek-Lubasińska, M. (2025). Labour Market Diversification through Digital and Sustainable Work. *Krakow Review of Economics and Management / Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 4(1010), 5–23. https://doi.org/10.15678/krem.18723

ABSTRACT

Objective: The aim of this article is to examine the diversification of the labour market in Poland based on sustainability and digitalisation of work in the context of remote jobs.

Research Design & Methods: The study employs a quantitative methodology, to analyse data from 1,035 workers whose jobs can be performed remotely (outside the company's premises, using modern technologies) with ICT support.

Findings: The study identified four distinct cohorts representing varying levels of digital and sustainable work. Results show significant differences in demographic and employment characteristics, with income, sector, and working hours influencing digitalisation and sustainability. The findings highlight the uneven distribution of digital and sustainable work across the labour market, emphasising the need for targeted strategies to bridge these gaps.

Implications/Recommendations: The study concludes with recommendations for expanding digitalisation opportunities and implementing tailored practices to boost work sustainability. This research underscores the need for strategic considerations and further research in this evolving field.

Contribution: This research contributes to the understanding of the complex relationship between digitalisation and work sustainability. It provides valuable insights into labour market diversification and offers practical recommendations for enhancing work sustainability in the digital age. The findings of this study have implications for policymakers, employers, and workers navigating the evolving digital landscape.

Article type: original article.

Keywords: digital work, sustainable work, digitalisation, sustainability, self-employment, labour market.

JEL Classification: F66, J2, J8, O15, O3, Q01.

1. Introduction

The labour market is presently confronting novel challenges that have the potential to fundamentally reshape its dynamics. These changes are not evolutionary; rather, they are of an unprecedented magnitude in world history and transpire over a remarkably brief period.

New technologies are expected to reduce the demand for labour (Roubini, 2023). Machines, robots, and artificial intelligence contribute to unprecedented productivity surges across various sectors. Historically confined to manufacturing, this trend has recently accelerated to encompass service industries, including those within the creative domain previously reserved exclusively for human involvement. Banerjee and Duflo (2019) or Srnicek and Williams (2015) predict that the displacement of jobs in traditional sectors, even with the creation of new roles in innovative sectors, necessitates a continuous adaptation of workers' skills to evolving conditions, changes to work processes, and at workplaces. This protracted process engenders labour market frictions attributable to structural mismatches between the workforce and available positions.

Compounding this issue is the imperative for change associated with the climate crisis and the necessity for sustainable development – one that forestalls both ecological and social degradation of the global environment and its resources. In EU countries, including Poland, the proportion of older people is increasing while the birth rate is decreasing, resulting in a shrinking group of economically active individuals. Hence, solutions are sought to maintain a large and qualitatively high reservoir of workforce by promoting sustainable work, i.e., work that, by being performed, does not deplete the resources required for future work. Sustainable work requires long--term and lifelong perspectives (Ehnert & Harry, 2012; Van der Heijden *et al.*, 2020), which, at the same time, necessitate urgent, specific, common, and persistent action at workplaces. Digitalisation aims to streamline organisational processes and work processes; however, according to Rózsa *et al.* (2023), a recent study suggests that new technologies often lead to reduced sustainability of work performance.

The aim is to examine the degree of co-occurrence of work sustainability and work digitalisation for labour market diversification. We want to elaborate on it, referring to work and the labour market in Poland. A deeper analysis is performed based on a quantitative study including only those workers whose jobs can be performed remotely (outside the company's premises, using modern technologies) with ICT support.

In the first part of the article, we define the scope of the research field, focusing on digital and sustainable work, based on a critical analysis of the literature. After formulating the prepositions, we verified them based on quantitative data collected in survey-based empirical research among 1,035 workers in Poland. Finally, we draw conclusions, limitations and recommendations.

2. The Concepts and Definitions of Sustainable Work and Digital Work

Sustainable work has featured in Agenda 2030 *Transforming Our World: The 2030 Agenda for Sustainable Development* (United Nations, 2016) in UN Sustainable Development Goals to be accomplished by 2030 (Goal 8 – Decent work and economic growth) (United Nations, 2024). It is also one of the pillars of The Human-centred Agenda by the ILO Global Commission on the Future of Work (Silva, 2022) and in the European Commission's (2019) Annual Sustainable Growth Strategy. It is also a reference to profound transformations in the world of work in the ILO's (2019) Centenary Declaration for the Future of Work. Based on that, Eurofound (2015) defined sustainable work over the life course as working and living conditions that support people in engaging and remaining in work throughout an extended working life. These conditions enable a fit between work and the characteristics or circumstances of the individual throughout their changing life, and must be developed through policies and practices at work and outside of work.

The notion of sustainable work came to prominence in the late 20th century within the literature, framing it as work that is effective while concurrently protecting the long-term health and fostering the development of employees (Joss, 1995; van Eijnatten, 1999). Abrahamsson and Ennals (2022) enumerated the key factors contributing to sustainable work, encompassing elements such as: healthy and inclusive workplaces, good work in a lifelong perspective, employee-driven innovation, workers' co-determination. As mentioned by Fostervold, Koren and Nilsen (2018), the concept of sustainable work can be defined from different perspectives: company/organisation/group (as a production and work system), employees (individual level) or society (social level – as sustainable development). Subsequently, sustainable work has become the focal point of examination in numerous scholarly investigations. Through decades of research, diverse definitions of the concept have been formulated, as exemplified by Khallash and Kruse (2012), Peters *et al*. (2015), Littig (2018), and Pawłowska (2019). Despite the aforementioned scientific concepts we follow the meaning and the definitions of sustainable work proposed by Eurofound (2015).

The concept of digital work is expansive, marked by a notable absence of a universally accepted definition (Messenger & Gschwind, 2016; Wibowo, Deng & Duan, 2022). The term "digital work" has become a focal point of extensive discourse at both the European Union and individual Member State level. Although no EU-level legislation precisely delineating and addressing digital work exists, there are legislative provisions explicitly pertinent to digital working conditions. Various terms have been employed to characterise this multifaceted phenomenon, encompassing digital workplace, teleworking, telecommuting, e-working, remote working, and agile working. In a comprehensive literature review, Wibowo, Deng and Duan (2022) provided an exhaustive examination of diverse definitions of digital work found in scholarly discourse. Within these definitions, certain elements consistently emerge as prerequisites for categorising work as digital, typically encompassing the utilisation of digital technologies, a remote operational setting, flexibility in working hours, and, somewhat less frequently, consideration of contractual arrangements. Our article fits into remote working, as an exemplification of digital work.

The advent of digitalisation and the ensuing digital revolution carries profound implications for the labour market. In a recent study by Rózsa *et al*. (2023), they contend that there are grounds to believe that new technologies frequently contribute to diminished sustainability of work performance:

1) increased risk of job loss (in the digital world the workers are hired mainly on a short-term basis (Fornino & Manera, 2022),

2) deepening of inequalities (dualisation of the labour market, earlier deactivation of 50+ employees) (Greve, 2019; ten Berge *et al*., 2020; Bonacini, Gallo & Scicchitano, 2021; Pensiero, 2022),

3) significant changes in job roles and responsibilities (Industry 4.0 reduces room for employees' autonomy and increases forms of management control) (Cirillo *et al*., 2021),

4) the need to acquire new skills (Acemoglu, 2002),

5) changes in management procedures (Lau & Höyng, 2023).

The escalating prominence of digital work underscores the imperative for a more nuanced understanding and examination of the concept of sustainable work. As digitalisation becomes increasingly integral to the labour market, the confluence of these dynamics accentuates the pressing need for further research and strategic consideration to ensure the sustainability of work amidst the evolving ICT technological landscape.

The labour market should strive to create sustainable work by leveraging trends, phenomena, and tools that increase the level of work digitalisation. Despite the recommended direction of changes into digital and sustainable work in one, the labour market also encompasses labour forces for which sustainable work remains a goal, as well as growing digitisation of work is an unrealistic characteristic. Therefore, we formulate a thesis about two directions of change in the labour market: towards increasing sustainability and digitalisation of work. This is illustrated by the four internally differentiated cohorts of the labour market presented in Figure 1.

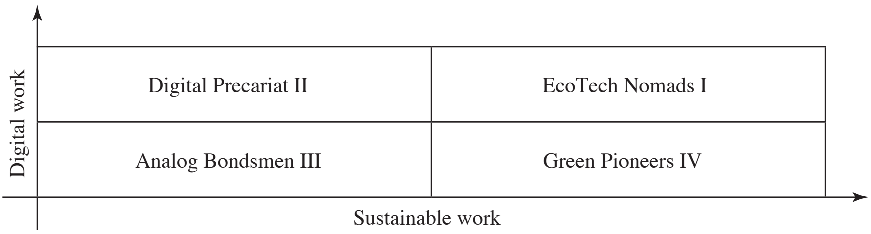


Fig. 1. Cohorts of the Labour Market in Relation to the Sustainability and Digitalisation of Work
Source: the authors.

Four cohorts of workers were identified based on results obtained in the dimensions of sustainable work and digital work. The EcoTech Nomads cohort (I) consists of individuals with the highest scores on both scales. The Digital Precariat cohort (II) includes workers with the highest level of digitalised work but lower scores in sustainable work. Among the Analog Bondsmen cohort (III), low levels of both work digitalisation and sustainability are observed. Meanwhile, the Green Pioneers cohort (IV) represents individuals with lower levels of work digitalisation but higher levels of work sustainability.

3. Research Analysis

3.1. Research Method and Sample Characteristics

A quantitative study was conducted in August 2023 using the computer-assisted web interviewing (CAWI) technique, on a randomly stratified sample of residents of Poland. Respondents were acquired through the controlled survey panel of Opinia 24. A total of 1,035 respondents were surveyed. The study group consisted of individuals who were professionally active and declared that the work they currently perform could be done outside the company's premises using new technologies. Among them, 43% represented organisations where work could be entirely performed remotely, while 57% could be partially performed remotely. Respondents were employees capable of and engaged in remote work utilising a digitised work environment. Thus, the study examined individuals for whom work digitalisation is an organisational possibility.

The study involved 523 men and 512 women (N = 1,035), among whom 159 were aged 16–29; 579 were aged 30–49 – more than half of the sample (55.4%); and 304 were aged 50+. They represented various industries, with the most represented respondents being from IT and technology (9.0%), finance (6.9%), education (10.4%), trade and sales (12.8%), and manufacturing (11.9%). Among the participants, single employment status stated 94.7%. Among them 69.4% were employed under employment contracts, 7.7% under civil-law contracts, and 17% operated as individual entrepreneurs. One-fourth (26.2%) declared holding managerial positions, and one-third (33%) worked in public institutions. The study included participants from organisations of various sizes: 74.4% were from the micro, small, and medium-sized enterprise (MSME) sector, while the rest were from large and very large enterprises.

3.2. The Variables of Sustainable Work and Digital Work

To achieve the research aim, a proprietary measurement tool for sustainable work was developed, drawing on the concept advocated by Eurofound (2015). Using a seven-point scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”), participants evaluated 14 statements encompassing the variable. Assessing the level of work sustainability included considerations of social relationships, the meaningfulness, and significance of the work performed, the utilisation and development of competencies, work productivity and profitability, appreciation and satisfaction at work, social security, balancing private and professional roles, and physical and mental well-being at work. For example, statements included “Work is a place where others value my input,” “Work is rewarded in a way that ensures appreciation,” or “Work provides me with social security.” The variable was derived as the aggregated mean of all statements, with its reliability measured using Cronbach’s standardised alpha, yielding a value of 0.933.

The level of work digitalisation was assessed for those who work remotely or in a hybrid manner. Among the important aspects of work digitalisation, participants evaluated the ability to work remotely, the extent of the employer’s use of information technology systems, remote supervision, organisation and control of work, processing of official administrative matters, participation in developmental activities, and the use of information technology tools for maintaining internal and external relationships. For example, statements included “Remote monitoring of work intensity,” “Work exclusively through an information technology system (application, software) required by the company, the employer,” or “Utilisation of information technology tools for establishing or maintaining relationships outside the organisation." Using a continuous scale (slider in the CAWI application) ranging from 1 to 100, participants evaluated 8 statements. For the present analyses, an aggregated indicator was calculated as the mean. All 8 statements in these studies constitute a measurement scale that achieved high reliability (Cronbach's alpha = 0.917).

3.3. Analysis

A statistical analysis of the collected quantitative data was conducted using IBM SPSS 29. In the first step, the sample of $N = 1{,}035$ was divided into four cohorts based on levels of sustainable work ($M = 4.9$, $SD = 1.04$) and digital work ($M =$ $= 46.8$, $SD = 25.95$). The mean values were included in the cohorts where the results were higher, considering the observed skewness of –0.378 and 0.128, respectively. As a result, cohort I included $n = 307$ workers (29.7%), cohort II included $n = 215$ (20.8%), cohort III included $n = 286$ (27.6%), and cohort IV included $n = 227$ (21.9%) workers (see Fig. 2).

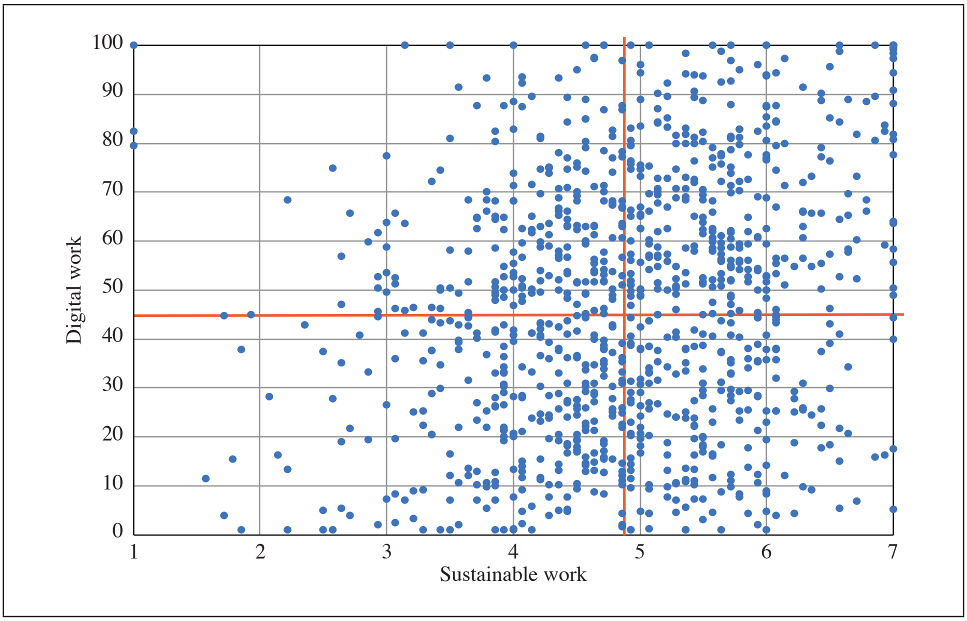


Fig. 2. Dispersion of Workers Based on the Extent of Sustainable and Digital Work
Source: the authors, based on gathered empirical data.

To assess cohort segmentation, two analyses were conducted. First, the diversity of the cohorts in terms of demographic and employment characteristics was examined. Second, the demographic and employment characteristics that differentiate sustainable work and digital work levels within each cohort were analysed, offering insights into the distribution of workers within each cohort. The differentiating variables included gender, age, educational attainment, income level, weekly working hours, managerial or non-managerial position, work contract, company size, and sector.

The demographic-employment diversity analysis within cohorts revealed no significant variation in terms of gender – $\chi^2(3) = 0.207$, $p = 0.976$; education – $\chi^2(6) = 11.882$, $p = 0.065$; weekly working hours – $\chi^2(9) = 12.716$, $p = 0.176$; and company size – $\chi^2(12) = 18.419$, $p = 0.104$. For the remaining variables, the distribution across cohorts was significantly different, with $p < 0.001$. Over- and under-representation within certain variable categories are presented below.

In response to the second question – how the examined variables differentiated sustainable work and digital work outcomes in each cohort – variance analyses were conducted. The results of the Shapiro-Wilk test for sustainable work and digital work in each cohort were statistically significant, indicating that their distributions significantly deviated from normality. However, it should be noted that the skewness of all variables did not exceed the threshold of 2, as suggested by George and Mallery (2016), indicating relatively symmetrical distributions. Details are provided in Table 1. Additionally, Welch's correction was applied when assumption of equal variances was violated (assessed with statistically significant Levene's test) and reported in tables. Consequently, parametric tests (ANOVA or *t*-tests) were used to analyse mean differences. The results of the analysis for significantly differentiating variables and categories are presented for each cohort.

Table 1. Exploration Results of Sustainable and Digital Work in Four Cohorts

Descriptive Statistics	Cohort I		Cohort II		Cohort III		Cohort IV	
	Sustainable work	Digital work	Sustainable work	Digital work	Sustainable work	Digital work	Sustainable work	Digital work
Mean	5.75	70.21	4.14	65.88	3.98	24.63	5.62	25.15
Skewness	0.569	0.364	–1.968	0.739	–1.111	–0.097	0.586	–0.153
Shapiro-Wilk	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$

Source: the authors, based on gathered empirical data.

Cohort I: EcoTech Nomads

Among the examined variables in the cohort I, the most notable differences were observed in work income and job position. A significantly higher percentage of individuals earn a net income of 8,000 or more (26.8%) compared to 16.4% for the entire population. Another significant difference is the overrepresentation of managerial positions (59.7%) compared to 30.9% for the whole sample, with a corresponding underrepresentation of non-managerial roles.

The mean level of sustainable work in this cohort was 5.75, while the mean level of digitalised work was 70.2. Age ($F(2, 304) = 4.95$; $p = 0.008$; $\eta^2 = 0.03$), weekly working hours ($F(3, 303) = 3.02$; $p = 0.03$; $\eta^2 = 0.03$), and work income ($F(3, 272) = 3.11$; $p = 0.027$; $\eta^2 = 0.08$) significantly differentiated the level of digitalised work in this cohort. These results highlight how demographic and employment factors, particularly age, working hours, and income, influence the extent of digitalised work in the first cohort, with older workers being less employed in digitalised work tasks than younger cohorts.

Workers aged 50 and older performed the least digitalised work, with a mean score of $M = 65.07$, which was significantly lower than their counterparts aged 16–29 years (by 7.41) and 30–49 years (by 6.29) (see Table 2).

Table 2. Mean-variance of Digital Work by Age Groups (Cohort I)

Dependent Variable	Group	*n*	*M*	*SD*	*F*	*df*	*p*	η^2
Digital work	16–29 years	55	72.48	14.49	4.95	2, 304	0.008	0.03
	30–49 years	186	71.36	15.87				
	50 years and more	66	65.07	13.50				

Dependent Variable	Compared Groups	*M*1–*M*2	*SE*	*p*	95% *CI*	
					LL	*UL*
Digital work	50 years and more – 16–29 years	–7.41	2.77	0.023	–14.07	–0.75
	50 years and more – 30–49 years	–6.29	2.17	0.012	–11.52	–1.06

Notes: The Bonferroni *post-hoc* test was applied.

Source: the authors, based on gathered empirical data.

Interestingly, the highest level of work digitalisation is reported by those working up to 30 hours per week ($M = 76.39$), while the lowest level is observed among those working 51 hours or more per week ($M = 65.56$). This between-group difference (+/– 10.83) is statistically significant ($p = 0.041$), as shown in Table 3. This suggests that jobs with higher levels of digitalisation tend to correspond with reduced working hours.

A strong and significant effect of mean comparisons ($\eta^2 = 0.08$, $p = 0.013$) for work digitalisation was also noted for the variable of net income from work. Interestingly, those EcoTech Nomads earning between 2,001–4,000 PLN report the highest level of digitalised work ($M = 70.29$), while those earning between

6,001–8,000 PLN report the lowest levels of digitalised work (see Table 4). This finding is particularly important given the overrepresentation of high-income earners within this category.

Table 3. Mean-variance of Digital Work by Weekly Working Hours (Cohort I)

Dependent Variable	Group	*n*	*M*	*SD*	*F*	*df*	*p*	η^2
Digital work	up to 30h	36	76.39	18.12	3.02[a]	3, 303	0.003	0.03
	31–40h	171	70.28	14.58				
	41–50h	76	68.59	16.12				
	51h and more	24	65.56	11.14				
Dependent Variable	**Compared Groups**		*M*1–*M*2		*SE*	*p*	95% *CI*	
							LL	*UL*
Digital work	up to 30h – 51h and more		10.83		4.01	0.044	0.19	21.46

[a] The Levene test result was statistically significant – the result was reported with Welch's correction.

Notes: The Bonferroni *post-hoc* test was applied.

Source: the authors, based on gathered empirical data.

Table 4. Mean-variance of Digital Work by Work Income (Cohort I)

Dependent Variable	Group	*n*	*M*	*SD*	*F*	*df*	*p*	η^2
Digital work	2,001–4,000 PLN	63	74.74	16.03	3.11[a]	3, 272	0.027	0.08
	4,001–6,000 PLN	94	68.81	15.84				
	6,001–8,000 PLN	45	66.44	10.04				
	8,001 PLN and more	74	70.29	15.73				
Dependent Variable	**Compared Groups**		*M*1–*M*2		*SE*	*p*	95% *CI*	
							LL	*UL*
Digital work	2,001–4,000 PLN – 6,001–8,000 PLN		8.3		2.31	0.031	0.49	16.12

[a] The Levene test result was statistically significant – the result was reported with Welch's correction.

Notes: The Bonferroni *post-hoc* test was applied.

Source: the authors, based on gathered empirical data.

Workers in this cohort rate the sustainability of their work highly. Among them, the individuals who appear at the top of the digitalisation scale are younger, work fewer hours, and earn lower net incomes from their work. These results highlight the nuanced relationship between work digitalisation and various demographic and employment factors, particularly income, age, and working hours.

Cohort II: Digital Precariat

Cohort II, characterised by high levels of digital work and lower levels of sustainable work, includes a significantly higher proportion of workers in the private sector (74.4%, compared to 67% for the entire sample). There are notably fewer individuals employed under labour code employment contracts (62.3% compared to 69% for the whole group) and nearly twice as many working under civil contracts (14% versus 7%).

In this cohort, the average level of sustainable work ($M = 4.14$) varies significantly across sectors ($t(213) = 2.96$; $p = 0.003$; $d = 0.65$). The average level of digitalised work ($M = 65.88$) also shows significant differences in terms of gender ($t(213) = -2.72$; $p = 0.007$; $d = 0.37$) and income ($F(3, 180) = 4.07$; $p = 0.008$; $\eta^2 = 0.06$).

Workers in the private sector report higher levels of sustainable work ($M = 4.22$; $n = 160$) than those in the public sector ($M = 3.92$; $n = 55$). This indicates that private sector employees are closer to the average value of sustainable work, while public sector employees fall towards the lower end of the spectrum. In terms of digitalised work, women report significantly higher levels ($M = 68.52$; $n = 106$) compared to men ($M = 65$; $n = 109$) (details in Table 5). A similar trend is observed in income comparisons, with the highest earners (8,001 PLN and above) reporting the highest levels of digitalised work ($M = 73.35$). This level is significantly higher ($p = 0.006$) than that reported by the lowest earners ($M = 62.20$), as Table 6 shows.

In summary, workers in the private sector within cohort II are closer to the mean in terms of sustainable work levels. Meanwhile, women and high-income earners are positioned at the higher end of the digitalisation spectrum due to their higher scope of digitalised work.

Table 5. Mean-variances of Sustainable Work by Sector and Digital Work by Gender (Cohort II)

Dependent Variable	Independent Variable	*M*	*SD*	*M*	*SD*	*t*	*p*	95% *CI*		Cohen's *d*
								LL	*UL*	
Sustainable work	sector	public ($n = 55$) 3.92	0.82	private ($n = 160$) 4.22	0.59	–2.96	0.003	–0.5	–0.1	0.65
Digital work	gender	man ($n = 109$) 63.32	13.14	woman ($n = 106$) 68.52	14.77	–2.72	0.007	–8.95	–1.44	0.37

Source: the authors, based on gathered empirical data.

Table 6. Mean-variance of Digital Work by Work Income (Cohort II)

Dependent Variable	Group	*n*	*M*	*SD*	*F*	*df*	*p*	η^2
Digital work	2,001–4,000 PLN	60	62.2	11.73	4.07	3, 180	0.008	0.06
	4,001–6,000 PLN	66	67.51	14.98				
	6,001–8,000 PLN	33	65.36	13.95				
	8,001 PLN and more	25	73.35	15.91				

Dependent Variable	Compared Groups	*M*1–*M*2	*SE*	*p*	95% *CI*	
					LL	*UL*
Digital work	2,001–4,000 PLN – 8,001 PLN and more	–11.15	3.32	0.006	–20.01	–2.29

Notes: The Bonferroni *post-hoc* test was applied.

Source: the authors, based on gathered empirical data.

Cohort III: Analog Bondsmen

In the cohort characterised by the lowest levels of sustainable work ($M = 3.98$) and digital work ($M = 24.63$), there is a significantly higher proportion of individuals employed in the public sector (43% compared to 33% for the overall sample). Additionally, this cohort includes more individuals earning a net income of 2,001–4,000 PLN (around minimal wage), holding non-managerial positions (78.5% compared to 69.1% for the entire sample), and those aged 50 and above (44.1% compared to 29.3% for the total population).

Table 7. Mean-variance of Sustainable Work by Weekly Working Hours (Cohort III)

Dependent Variable	Group	*n*	*M*	*SD*	*F*	*df*	*p*	η^2
Digital work	up to 30h	38	4.01	0.70	3,021	3, 282	0.030	0.03
	31–40h	134	4.06	0.69				
	41–50h	81	3.99	0.74				
	51h and more	33	3.64	0.79				

Dependent Variable	Compared Groups	*M*1–*M*2	*SE*	*p*	95% *CI*	
					LL	*UL*
Digital work	31–40h – 51h and more	0.42	0.14	0.018	0.047	0.79

Notes: The Bonferroni *post-hoc* test was applied.

Source: the authors, based on gathered empirical data.

Internal variation within this cohort is observed in sustainable work based on weekly working hours ($F(3, 282) = 3.021$; $p = 0.030$; $\eta^2 = 0.03$). The highest levels of sustainable work among Analog Bondsmen are reported by individuals working 31–40 hours per week ($M = 4.06$). These results are significantly higher ($p = 0.018$) than those for individuals working the longest hours (over 51 hours per week), with a difference of approximately 0.42. These findings suggest that working moderate hours in this cohort is associated with a relatively higher level of sustainable work, which may indicate a more favourable work-life balance compared to those working excessive hours.

Cohort IV: Green Pioneers

In cohort IV, there is a significantly higher proportion of self-employed workers (23.3% compared to 17.6% for the total sample) and older workers (44.1% compared to 29.3% for the total population). The levels of sustainable work ($M = 5.62$) and digital work ($M = 25.15$) within this cohort do not show significant variation across any of the analysed variables.

These findings indicate that this cohort has a distinctive demographic profile, particularly in terms of self-employment and age. This suggests a certain uniformity in work conditions within this group, despite demographic differences.

4. Discussion

Our analysis focused on the aim of examining the degree of co-occurrence of work sustainability and work digitalisation for labour market diversification, bringing conclusions, limitations, and recommendations.

1. The study's identification of four cohorts mirrors previous findings on labour market stratification driven by digitalisation. Roubini (2023) and Srnicek and Williams (2015) emphasised that new technologies reshape job roles and responsibilities, often leading to segmentation. The EcoTech Nomads and Digital Precariat cohorts reflect these divisions, wherein digitalisation creates both high-tech job opportunities and precarious employment with limited sustainability. Rózsa *et al*. (2023) suggest that digitalisation does not uniformly enhance sustainable job quality, which is supported by this study's finding that sustainable work shows more variation across cohorts. These results align with earlier assertions that digitalisation alone does not guarantee improvements in work sustainability and can exacerbate inequalities, especially in less regulated labour markets (Greve, 2019; Bonacini, Gallo & Scicchitano, 2021).

2. The study's findings that income and occupational status differentiate cohorts, with higher income and managerial roles clustered in the EcoTech Nomads, are consistent with theories on the dualisation of the labour market (Bonacini, Gallo & Scicchitano, 2021). As digital and sustainable work intertwine, economically privileged workers can access better working conditions, while the Analog Bondsmen experience stagnant conditions in low-skilled, low-paid jobs. This duality is also

highlighted in the report of Eurofound (2023), which notes that older and lower--income workers often face barriers to upskilling and adapting to new technological demands, thereby remaining in roles with lower digitalisation and sustainability. The present findings suggest a need to address the uneven distribution of digital resources and training opportunities, as suggested by Acemoglu (2002) in the context of labour market adaptation.

3. The study's finding that public sector workers are overrepresented in the Analog Bondsmen cohort resonates with previous research showing that public sector jobs often lag in digital transformation and sustainable work practices (Haug, Dan & Mergel, 2024). The private sector is more inclined toward implementing advanced digital solutions and flexible work arrangements, which corresponds with the overrepresentation of private sector workers in the Digital Precariat and EcoTech Nomads cohorts. This sectoral discrepancy suggests that while private enterprises may be at the forefront of digital innovation, they may also contribute to precarious employment conditions due to short-term contracts and project-based work (Fornino & Manera, 2022).

4. The overrepresentation of older workers in the Analog Bondsmen and Green Pioneers cohorts points to age-related disparities in accessing digital work (Greve, 2019; Komp-Leukkunen *et al*., 2022). This finding is consistent with Bonacini, Gallo and Scicchitano (2021), who argue that the digital divide is exacerbated for workers aged 50 and above, especially in contexts where lifelong learning and continuous professional development are not systematically supported. The results suggest that older workers either lack digital skills or are employed in roles that have not yet undergone digital transformation, which aligns with Abrahamsson and Ennals' (2022) call for more inclusive workplace innovations that cater to the aging population, thereby mitigating the risk of workforce withdrawal among older workers (Yamashita *et al*., 2024).

5. The study's observation that women in the Digital Precariat cohort engage in more digitalised work than men may initially appear contrary to conventional assumptions about gender inequality in digital fields (Kamberidou & Pascall, 2020). However, Messenger and Gschwind (2016) argue that while digital work may offer flexibility, it often coincides with lower sustainability due to less job security and increased remote monitoring. This finding aligns with Cirillo *et al*. (2021), who contend that digitalisation can reinforce managerial control and limit worker autonomy, disproportionately affecting women who may seek flexible work arrangements to balance caregiving responsibilities. While digitalisation offers a variety of opportunities for female empowerment and for enhancing women's participation in labour markets, financial systems, and entrepreneurship (Krieger-Boden & Sorgner, 2018), it is essential to ensure that these advancements do not push women into unsustainable or precarious forms of work.

6. The study finds that shorter weekly working hours correlate with higher levels of sustainable work, especially in the EcoTech Nomads cohort. This aligns with the Eurofound's (2015) definition of sustainable work, which emphasises work-life balance and manageable workloads as key components. The association of higher digitalisation levels with shorter working hours suggests that digital tools may enable more efficient work processes, reducing the need for extended working hours (van Eijnatten, 1999). However, this potential benefit may not extend to all workers, as shown by the lower levels of both digital and sustainable work among those in the Analog Bondsmen cohort, who often work longer hours without corresponding improvements in work conditions.

Implications

The study contributes to the academic discourse by providing empirical evidence on the coexistence of digitalisation and sustainable work. It challenges existing assumptions that increased digitalisation inherently leads to more sustainable work (Rózsa *et al*., 2023). The results suggest that while digitalisation can facilitate certain efficiencies, it does not automatically enhance job quality or sustainability across all worker segments. This finding calls for a more nuanced understanding of the conditions under which digitalisation can support or hinder sustainable work, expanding current theoretical frameworks (Eurofound, 2015).

The identification of four distinct cohorts (EcoTech Nomads, Digital Precariat, Analog Bondsmen, and Green Pioneers) adds to the labour market segmentation literature. It illustrates that the digital divide and sustainable work are not evenly distributed, which aligns with dual labour market theories (Bonacini, Gallo & Scicchitano, 2021). Future research can build on this framework to explore the specific mechanisms driving these disparities, such as the role of organisational practices, sectoral differences, and individual employee characteristics (Greve, 2019).

The study highlights the variability in the experiences of digital work, suggesting that the concept of digital work lacks a universally applicable definition (Messenger & Gschwind, 2016). The findings support the call for a more context-specific understanding of digital work, where factors like employment type, sector, and age influence how digitalisation is experienced in practice. This can guide future research in developing more refined, context-sensitive measures of digital work.

Companies should not view digitalisation solely as a means to increase productivity but as an opportunity to foster sustainable work practices. Employers should adopt strategies that combine digital solutions with policies promoting work-life balance, fair compensation, and employee development (van Eijnatten, 1999). For instance, offering shorter workweeks and flexible hours could help workers in more digitally intensive roles achieve higher levels of sustainable work. The segmentation observed in the study implies that policy interventions are needed to reduce inequalities in access to sustainable and digital work. Policies should promote digital skills training, particularly for older workers and those in lower-income or public sector roles, to ensure they are not left behind in the digital economy (Bonacini, Gallo & Scicchitano, 2021). Additionally, regulatory frameworks should support sustainable work conditions, such as limiting excessive remote monitoring and ensuring fair work contracts in highly digitalised roles. The study's findings suggest that public sector organisations lag in digital adoption and sustainable work practices, as evidenced by the overrepresentation of public employees in the Analog Bondsmen cohort. The public sector should prioritise digital transformation initiatives while also investing in sustainable work policies, such as job security measures, continuous training, and inclusive workplace practices to close the gap with the private sector (Haug, Dan & Mergel, 2024).

Limitations

The study is not free of limitations. Firstly, the study focuses on workers in Poland who can perform their jobs remotely with ICT support. While this provides valuable insights, the findings may not be generalisable to all labour market segments, especially those in roles that cannot be digitalised, such as certain manufacturing or service jobs. Future research could expand the scope to include more diverse worker groups to improve generalisability. Secondly, although the study used reliable scales to measure digitalisation and sustainable work, there may still be limitations in capturing the validity of these constructs. For instance, the reliance on self-reported measures may introduce bias, and future research could benefit from incorporating more objective indicators gathered in companies. Thirdly, since the study is conducted in Poland, the findings may be influenced by the specific economic, cultural, and regulatory context of the country. The relationship between digitalisation and sustainable work might differ in other regions with different labour market structures and policies. Comparative studies across countries would help validate the results and provide a more global perspective.

Authors' Contribution

The authors' individual contribution is as follows: Marzena Fryczyńska 60%, Małgorzata Skrzek-Lubasińska 40%.

Conflict of Interest

The authors declare no conflict of interest.

References

Abrahamsson, K. F., & Ennals, R. (Eds). (2022). *Sustainable Work in Europe: Concepts, Conditions, Challenges*. Peter Lang. https://doi.org/10.3726/b19658

Acemoglu, D. (2002). Technical Change, Inequality, and the Labor Market. *Journal of Economic Literature*, *40*(1), 7–72.

Banerjee, A. V., & Duflo, E. (2019). *Good Economics for Hard Times: Better Answers to Our Biggest Problems*. Allen Lane.

Bonacini, L., Gallo, G., & Scicchitano, S. (2021). Working from Home and Income Inequality: Risks of a 'New Normal' with COVID-19. *Journal of Population Economics*, *34*(1), 303–360. https://doi.org/10.1007/s00148-020-00800-7

Cirillo, V., Rinaldini, M., Staccioli, J., & Virgillito, M. E. (2021). Technology vs. Workers: The Case of Italy's Industry 4.0 Factories. *Structural Change and Economic Dynamics*, *56*, 166–183. https://doi.org/10.1016/j.strueco.2020.09.007

Ehnert, I., & Harry, W. (2012). Recent Developments and Future Prospects on Sustainable Human Resource Management: Introduction to the Special Issue. *Management Revue*, *23*(3), 221–238. https://doi.org/10.5771/0935-9915-2012-3-22

Eurofound. (2015). *Sustainable Work over the Life Course: Concept Paper*. Publications Office of the European Union. https://doi.org/10.2806/281708

Eurofound. (2023). *Living and Working in Europe 2022*. Publications Office of the European Union.

European Commission. (2019). Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee, the Committee of fhe Regions and the European Investment Bank. Annual Sustainable Growth Strategy 2020. COM(2019) 650 final. Retrieved from: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019DC0650&from=EN (accessed: 30.01.2024).

Fornino, M., & Manera, A. (2022). Automation and the Future of Work: Assessing the Role of Labor Flexibility. *Review of Economic Dynamics*, *45*, 282–321. https://doi.org/10.1016/j.red.2021.07.002

Fostervold, K. I., Koren, P. C., & Nilsen, O. V. (2018). Defining Sustainable and "Decent" Work for Human Factors and Ergonomics. In: A. Thatcher, P. Yeow (Eds), *Ergonomics and Human Factors for a Sustainable Future: Current Research and Future Possibilities* (pp. 47–76). Palgrave Macmillan. https://doi.org/10.1007/978-981-10-8072-2_3

George, D., & Mallery, P. (2016). *IBM SPSS Statistics 23 Step by Step: A Simple Guide and Reference*. Routledge. https://doi.org/10.4324/9781315545899

Greve, B. (2019). The Digital Economy and the Future of European Welfare States. *International Social Security Review*, *72*(3), 79–94. https://doi.org/10.1111/issr.12214

Haug, N., Dan, S., & Mergel, I. (2024). Digitally-induced Change in the Public Sector: A Systematic Review and Research Agenda. *Public Management Review*, *26*(7), 1963–1987. https://doi.org/10.1080/14719037.2023.2234917

ILO. (2019). *ILO Centenary Declaration for the Future of Work*. Retrieved from: https://www.ilo.org/wcmsp5/groups/public/@ed_norm/@relconf/documents/meetingdocument/wcms_711674.pdf (accessed: 20.01.2024).

Joss, J. E. (1995). *Sustainable Work: Managing for Long-term Health and Effectiveness*. Stanford University.

Kamberidou, I., & Pascall, N. (2020). The Digital Skills Crisis: Engendering Technology – Empowering Women in Cyberspace. *European Journal of Social Sciences Studies*, *4*(6), 1–33. https://doi.org/10.5281/zenodo.3558799

Khallash, S., & Kruse, M. (2012). The Future of Work and Work-life Balance 2025. *Futures*, *44*(7), 678–686. https://doi.org/10.1016/j.futures.2012.04.007

Komp-Leukkunen, K., Poli, A., Hellevik, T., Herlofson, K., Heuer, A., Norum, R., Solem, P. E., Khan, J., Rantanen, V., & Motel-Klingebiel, A. (2022). Older Workers in Digitalizing Workplaces: A Systematic Literature Review. *The Journal of Aging and Social Change*, *12*(2), 37–59. https://doi.org/10.18848/2576-5310/CGP/v12i02/37-59

Krieger-Boden, C., & Sorgner, A. (2018). Labor Market Opportunities for Women in the Digital Age. *Economics*, *12*(1), 1–14. https://doi.org/10.5018/economics-ejournal.ja.2018-28

Lau, A., & Höyng, M. (2023). Digitalization? A Matter of Trust: A Double-mediation Model Investigating Employee Trust in Management Regarding Digitalization. *Review of Managerial Science*, *17*(6), 2165–2183. https://doi.org/10.1007/s11846-022-00598-6

Littig, B. (2018). Good Work? Sustainable Work and Sustainable Development: A Critical Gender Perspective from the Global North. *Globalizations*, *15*(4), 565–579. https://doi.org/10.1080/14747731.2018.1454676

Messenger, J. C., & Gschwind, L. (2016). Three Generations of Telework: New ICTs and the (R)evolution from Home Office to Virtual Office. *New Technology, Work and Employment*, *31*(3), 195–208. https://doi.org/10.1111/ntwe.12073

Pawłowska, Z. (2019). Podstawowe wskaźniki zrównoważenia pracy w krajach UE w świetle badań Europejskiej Fundacji na Rzecz Poprawy Warunków Życia i Pracy. *Bezpieczeństwo Pracy: Nauka i Praktyka*, *6*, 21–23. https://doi.org/10.5604/01.3001.0013.2412

Pensiero, N. (2022). The Effect of Computerisation on the Wage Share in United Kingdom Workplaces. *Economic and Labour Relations Review*, *33*(1), 158–177. https://doi.org/10.1177/10353046211048750

Peters, V., Engels, J. A., de Rijk, A. E., & Nijhuis, F. J. N. (2015). Sustainable Employability in Shiftwork: Related to Types of Work Schedule Rather than Age. *International Archives of Occupational and Environmental Health*, *88*(7), 881–893. https://doi.org/10.1007/s00420-014-1015-9

Roubini, N. (2023). *Megazagrożenia: 10 trendów niebezpiecznych dla naszej przyszłości*. Poltext.

Rózsa, Z., Folvarčná, A., Holúbek, J., & Veselá, Z. (2023). Job Crafting and Sustainable Work Performance: A Systematic Literature Review. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *18*(3), 717–750. https://doi.org/10.24136/eq.2023.023

Silva, V. (2022). The ILO and the Future of Work: The Politics of Global Labour Policy. *Global Social Policy*, *22*(2), 341–358. https://doi.org/10.1177/14680181211004853

Srnicek, N., & Williams, A. (2015). *Inventing the Future: Postcapitalism and a World without Work*. Verso Books.

ten Berge, J., Lippényi, Z., van der Lippe, T., & Goos, M. (2020). Technology Implementation within Enterprises and Job Ending among Employees. *Research in Social Stratification and Mobility*, *69*, 100548. https://doi.org/10.1016/j.rssm.2020.100548

United Nations. (2016). *Transforming Our World: The 2030 Agenda for Sustainable Development*.

United Nations. (2024). *Sustainable Development Goals*. Retrieved from: https://sdgs.un.org/goals (accessed: 25.01.2024).

Van der Heijden, B. I. J. M., De Vos, A., Akkermans, J., Spurk, D., Semeijn, J., Van der Velde, M., & Fugate, M. (2020). Sustainable Careers across the Lifespan: Moving the Field forward. *Journal of Vocational Behavior*, *117*, 103344. https://doi.org/10.1016/j.jvb.2019.103344

van Eijnatten, F. M. (1999). Sustainable Work Systems (SWS): The Need for a European Approach. In: T. Chase (Ed.), *Readings Monterey* (pp. M69–M79). The STS.

Wibowo, S., Deng, H., & Duan, S. (2022). Understanding Digital Work and Its Use in Organizations from a Literature Review. *Pacific Asia Journal of the Association for Information Systems*, *14*(3), 2. https://doi.org/10.17705/1pais.14302

Yamashita, T., Narine, D., Chidebe, R. C. W., Kramer, J., Karam, R., & Cummins, P. A., & Smith, T. J. (2024). Digital Skills, STEM Occupation, and Job Automation Risks among the Older Workers in the United States. *The Gerontologist*, *64*(8), gnae069. https://doi.org/10.1093/geront/gnae069

Krakow Review of Economics and Management
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie

4 (1010)
2025

KREM, 2025, 4(1010): 25–45
ISSN 1898-6447
e-ISSN 2545-3238
https://doi.org/10.15678/krem.18685

Valuation of Assets and Liabilities in Marshal's Offices: Current Status and Prospects by the Integrated Reporting

Dorota Adamek-Hyska[1], **Aneta Wszelaki**[2]

[1] University of Economics in Katowice, Department of Accounting, 1 Maja 50, 40-287 Katowice, Poland, e-mail: dorota.adamek-hyska@ue.katowice.pl, ORCID: https://orcid.org/0000-0001-7134-6947

[2] University of Economics in Katowice, Department of Accounting, 1 Maja 50, 40-287 Katowice, Poland, e-mail: aneta.wszelaki@ue.katowice.pl, ORCID: https://orcid.org/0000-0002-3790-6311

Suggested citation: Adamek-Hyska, D., & Wszelaki, A. (2025). Valuation of Assets and Liabilities in Marshal's Offices: Current Status and Prospects by the Integrated Reporting. *Krakow Review of Economics and Management / Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 4(1010), 25–45. https://doi.org/10.15678/krem.18685

ABSTRACT

Objective: The article aims to analyse and evaluate the parameters of asset and liability valuation used in the marshal's offices of local government units and evaluate how they are reported in terms of the developing idea of integrated reporting. In the empirical research, the authors drew attention to the orders of the voivodeship marshals on accounting policies and additional information from the marshal's offices for the years 2020–2022. Directions for further research were also indicated.

Research Design & Methods: A systematic literature review was used as the methodology. Literature studies were used to identify the current state of knowledge in the context of the problems studied. The Scopus and Web of Science databases were selected as data sources. The regulatory sphere concerning asset and liability valuation methods and reporting by local government budgetary units was analysed. In addition, a comparative and descriptive analysis of the collected empirical materials was carried out. A synthesis of the analysed results was created.

Findings: The article presents the results of the analysis of accounting policies and additional information on Polish marshal's offices in asset and liability valuation and assessment of their reporting in light of the developing idea of integrated reporting. This area is very sensitive because it should be disclosed every year in the first part of the additional information and thus published on the Public Information Bulletin (BIP) pages of these offices. Polish accounting law specifies the principles and methods of asset and liability valuation, leaving managers of accounting entities, including offices serving provincial and local government units, with many areas containing different possibilities for selecting valuation parameters.

Implications/Recommendations: The considerations presented in the article indicate that the discretion allowed by the Polish accounting law directly shapes the property and financial image of the entity and its financial results, impacting the presentation of the entity's performance. However, these entities' selected models and methods of asset and liability valuation do not determine the direction of sustainable reporting because the accounting of typical public finance sector entities is mainly oriented toward fulfilling legal obligations for control and statistical purposes.

Contribution: The issues that have been undertaken bridge the research and methodological gap in the studies on the possibility of sustainable reporting by marshal's offices in Poland.

Article type: original article.

Keywords: assets, liabilities, valuation, local government budgetary units, local government units, integrated reporting.

JEL Classification: M40, M41, M48, H70, K20.

---

1. Introduction

Public sector accounting is becoming increasingly important, especially in times of globalisation and an unstable institutional environment. Therefore, the current shape of the budget accounting model is determined by many internal and external factors. Users of financial statements of public finance sector entities, including local government budgetary units, expect reliable and valuable financial and other information from these entities, enabling them to assess how efficient the management of these entities is. As a result, legal regulations evolve, causing changes in the public finance sector entities' principles and financial reporting models. However, a significant step toward the harmonisation of accounting in the Polish public finance sector was taken by introducing changes to specific accounting principles in 2006, requiring local government budgetary units to extend the scope of financial statements prepared to include a profit and loss account, a statement of changes in the entity's fund and additional information (Adamek-Hyska, 2011, pp. 83–84). This resulted in these entities' financial reporting resembling financial reporting in the private sector. The accounting of public finance sector entities still focuses mainly on fulfilling legal obligations, fully satisfying only the needs of other government agencies for control and statistical purposes. It is also worth adding that foreign scientific research into the accounting of public sector entities is currently primarily focused on the harmonisation of accounting principles of these entities on an international scale, i.e., IPSAS and EPSAS projects (Al-Zubi, 2015; Grossi & Steccolini, 2015; Laswad & Redmayne, 2015; Legenkova, 2016).

Correct valuation in accounting should provide a true and fair view of the reporting entity, which, through data from the financial statements and other reports, provides financial information to various users of this information. In the accounting of local government organisational units, there are different legal regulations regarding general-purpose financial statements and individual budget reports, which means, among others, that the reporting system of local government units and local government organisational units (i.e., local government budgetary units and local government budgetary establishments) is internally inconsistent. Its various components provide diversified, yet systematised, data on these entities' financial and property situation, budget implementation, and the condition of the property, considering all possible property relations with other entities (Adamek-Hyska, 2015, p. 210).

Local government budgetary units report data mainly of a financial nature, considering the applied valuation principles reflected in their accounting policies. However, they are not required to report non-financial data, e.g., in the context of corporate social responsibility. As a member of the EU, Poland is obliged, among other things, to achieve the EU sustainable development goals, including environmental goals, of which climate and energy goals are priority ones. Therefore, local government units' interest in reporting these issues is also gaining importance.

The article aims to review and evaluate the parameters of asset and liability valuation used in selected provincial offices of local government units and evaluate their mandatory reporting in light of the developing idea of integrated reporting. The empirical research focused on 16 marshal's offices in Poland because they constitute a closed group of units of significant regional importance.

We employed appropriate research methods to achieve the study objective and verify the adopted theses. These included literature studies to preliminarily identify the current knowledge on the problems under study. The regulatory domain regarding the valuation methods of assets and liabilities and reporting by local government budget units was analysed. Subsequently, a comparative and descriptive analysis of the collected empirical materials was conducted. The study ends with synthetic conclusions drawn against the adopted research theses.

2. Valuation Parameters of Assets and Liabilities in Local Government Budgetary Units – Theoretical and Legal Aspects

Valuation of assets and liabilities is a process aimed at determining the monetary amounts in which all assets and their sources of financing are to be recognised in the accounting books and disclosed in the financial statements. This value is determined by the adopted valuation models and methods (Buk, 2013, p. 52).

The determining valuation factor is the moment at which it is made. Valuation of assets and liabilities means determining their value primarily at the moment of (Walińska, 2014, p. 75):

– initial recording in the accounting books (so-called initial valuation),

– ending of the financial year, i.e., as of the balance sheet date (so-called balance sheet valuation).

The choice of the appropriate parameter for the initial valuation of assets and liabilities directly depends on how the accounting entity obtained the asset or liability component. In cases where it is possible to select the valuation parameter, and thus the accounting principles (policy), each local government budget unit should determine which parameters it adopts for a given asset and liability component valuation. The adopted price categories should not change as of the balance sheet date. However, it is necessary to verify the level of these prices to comply with the prudence principle (applies to historical costs) or to take into account the current level of market prices or fair value treated equally with them (applies to current prices) (Fedak, 2020, p. 95).

On the other hand, balance sheet valuation is a process of determining the value of individual items in financial statements. The balance sheet valuation of assets and liabilities differs from the initial valuation in that, under the prudent valuation principle, the valuation of tangible assets should be based on the actual acquisition price or purchase price, net book value, or real purchase value adjusted for impairment down-offs. The consequences of changes in the value of assets and liabilities in the reporting period and at the balance sheet date are recognised because they either affect the value of assets or the amount of the financial result.

Table 1 shows the basic valuation parameters and examples of their applications.

Selecting a specific model for the balance sheet valuation of assets and liabilities affects the representation of the entity's asset and property situation and its financial result. In national accounting regulations – the Accounting Act, chapter 4 – the dominant valuation models are based on historical cost. In the Accounting Act, fair value is treated on an equal footing with other valuation parameters, and apart from the valuation of financial instruments, the hierarchy of input data used to determine fair value is not detailed. There are no guidelines on the use of data other than market value (Hońko, 2012, p. 62).

Table 1. Parameters for the Valuation of Assets and Liabilities under Chapter 4 of the Accounting Act

Valuation Parameters	Description	Applications	Valuation Time
Nominal value	This is the issue amount of cash, securities (e.g., shares, bonds), and capital (funds) specified in the memoranda or articles of association of capital companies, cooperatives, and entities operating in other organisational and legal forms.	– cash in hand and bank accounts – checks – own funds	A parameter used for both initial valuation (in the case of receivables and liabilities) and balance sheet valuation
Purchase price	This is the amount due to the seller, net of deductible value-added tax and excise duty (in the case of imports, increased by public law levy), and reduced by rebates, discounts, and other similar reductions and recoveries. Suppose the purchase price is expressed in a foreign currency. In that case, it is converted into Polish złoty using the average NBP exchange rate from the business day preceding the invoice issue date.	– tangible current assets	A parameter most often used for initial valuation. However, the choice of this parameter, in light of the Accounting Act, depends on the materiality of the purchase costs incurred
Acquisition price	This is the purchase price of an asset plus the costs directly related to the purchase and adaptation of an asset to a condition suitable for use or bringing it to trade, including the costs of transport and loading, unloading, storage, or bringing it to trade.	– tangible current assets – financial and non-financial fixed assets	A parameter most often used for initial valuation
Manufacture cost of the finished product	This includes costs directly related to a given product and a reasonable part of the costs indirectly related to the manufacture of this product. Direct costs include the value of direct materials used, acquisition and processing costs directly associated with production, and other costs incurred in bringing the product to the form and location at which it is located on the valuation date. The justified portion of indirect costs, appropriate to the period of product manufacture, includes variable indirect production costs and that portion of fixed, indirect production costs that correspond to the level of these costs at the normal utilisation of production capacity (article 28(3) of the Accounting Act).	– tangible current assets	A parameter most often used for initial valuation

Table 1 cnt'd

Valuation Parameters	Description	Applications	Valuation Time
	Product manufacture costs do not include costs resulting from unutilised production capacity and production losses, general management (i.e., those unrelated to bringing the product to the form and place at which it is on the valuation date), storage of finished products and semi-finished products (unless it is necessary to incur them in the production process) and the costs of selling products.		
Selling price	It is the market value of assets at which sellers offer them for sale on the open market.	– assets	A parameter most often used for initial valuation
Net selling price	It is the sales price of an asset that can be obtained as of the balance sheet date, net of value-added tax and excise duty, less rebates, discounts, and other similar items, as well as costs related to adapting the asset for sale and making this sale, and increased by the amount of subsidy due (article 28(5) of the Accounting Act).	– assets, commonly obtained without consideration	A parameter most often used for balance sheet valuation
Fair value	This is the amount for which a given asset could be exchanged and the liability settled under the terms of a market transaction between interested and well--informed, unrelated parties. The fair value of financial instruments traded on an active market is the market price less the costs associated with the transaction if their amount is significant. The market price of financial assets held by the entity and the financial liabilities that the entity intends to incur is the current purchase offer submitted to the market. In contrast, the market price of the financial assets the entity plans to purchase and the financial liabilities incurred is the current sales offer submitted to the market (article 28(6) of the Accounting Act).	– financial fixed and current assets traded on an active market – non-financial fixed assets received without consideration or by way of donation when there is no active market for the obtained item – valuation of assets and liabilities in the settlement of business combinations	A parameter most often used for initial and balance sheet valuation
Amount to be received	This is a receivable from the debtor, which they have undertaken to pay under a contract or in another form for the services (supplies, services) provided to them, together with legally due interest for delay in payment or compensation legally due to the entity, or for any other reason.	– long- and short-term receivables	A parameter most often used for balance sheet valuation

Table 1 cnt'd

Valuation Parameters	Description	Applications	Valuation Time
Amount to be paid	This is the amount of the liability toward the creditor to whom the entity is obliged to pay, under the terms of the contract and legal provisions, determined as of the balance sheet date or another date in the current or subsequent years, together with the interest due for delay in payment.	– long- and short-term liabilities	A parameter most often used for balance sheet valuation
Adjusted acquisition price	This is the acquisition price (value) at which a financial asset or financial liability was first entered into the accounting books (historical price), less the repayment of the nominal value, appropriately adjusted for the accumulated amount of the discounted difference between the initial value of the asset and its value at the maturity date, calculated using the effective interest rate and reduced by impairment write-downs (article 28(8a) of the Accounting Act). The effective interest rate is the rate at which future cash flows related to a given financial asset or liability expected to occur in the period to maturity are discounted to the current value as of the balance sheet date. It reflects the internal rate of return resulting from the contract with the seller or buyer of a given financial asset or liability. The adjusted acquisition price may be used to value assets and liabilities when: – the right to receive economic benefits from them (e.g., interest) is established in a fixed or realisable amount, – there is a maturity date (payment), – the entity intends and can hold the financial asset or liability until maturity.	– financial assets and liabilities, including loans granted, debt securities held to maturity but whose fair value cannot be determined, and credits and loans taken	A parameter most often used for balance sheet valuation
Standard price	Components of tangible current assets may be recognised in the accounting books on the date of acquisition or manufacture at the prices entered in the records, considering the differences between these prices and the actual prices of their acquisition or purchase, or production costs. As of the balance sheet date, the value of these components, expressed in standard prices, is brought to the level specified in article 34, section 1 or article 28, section 1, point 6 of the Accounting Act.	– tangible current assets	A parameter used for initial valuation

Source: The Accounting Act of 29 September 1994 (consolidated text, Journal of Laws of 2023, item 120, as amended), chapter 4; Adamek-Hyska *et al*. (2021, pp. 50–60).

However, the International Public Sector Accounting Standards (IPSAS) assign a dominant role to fair value models, which is a desire to promote the measurement of economic value. IPSAS are a result of the drive to standardise accounting in the public sector but are not currently widely used. In various countries, they are used selectively, usually in selected sections of the public finance sector or even only in selected entities (Nguyen & Dinh Khoi Nguyen, 2012; Brusca, Montesinos & Chow, 2013; Deaconu & Nistor, 2014; Hepworth, 2017; Turyna & Koeppl-Turyna, 2018; Chow & Aggestam Pontoppidan, 2019; Abdulkarim, Umlai & Al-Saudi, 2020; Amiri & Hamza, 2020; Mattei, Jorge & Grandis, 2020; Polzer, Grossi & Reichard, 2021; Schmidthuber, Hilgers & Hofmann, 2022; IPSASB, 2024). IPSAS became the basis for creating European Public Sector Accounting Standards (EPSAS). IPSAS are not currently used in Poland, and the Ministry of Finance is assessing the benefits of implementing EPSAS and developing an appropriate legal framework that will allow for their possible use in the future (Biondi, 2017; Dabbicco & Steccolini, 2019; Sforza, Cimini & Fanti, 2023; Eurostat, 2024). It is worth noting that models based on fair value, although strongly promoted in international accounting standards (IPSAS and EPSAS), indicate that fair value is not an unambiguous, easy-to-use category in practice and may be determined slightly differently depending on the standard (Jorge, Caruana & Caperchione, 2019; Adamek-Hyska *et al*., 2021; Dalwadi, 2023; Petrović, Radosavac & Mashovic, 2023, Smoleń-Bojańczyk, 2023).

Chapter 4 of the Accounting Act often causes considerable problems in the practice of local government budgetary units because these entities must also comply with the specific rules for valuation and determining the financial result contained in the public finance law,[1] which concerns, among others:

– records of the budget implementation of a local government unit,

– records of fixed assets owned by the State Treasury or local government units,

– valuation of individual assets and liabilities expressed in foreign currencies,

– application of legally defined charts of accounts,

– preparation of financial statements and other reports and the recipients of these reports.

The specific principles of asset valuation thus laid down take into account the nature of typical public finance sector units, the specific principles of their operation, and the legally defined principles of financial management.

[1] See: Regulation of the Minister of Development and Finance of 13 September 2017, on accounting and charts of accounts for the state budget, budgets of local government units, budgetary units, local government budgetary establishments, state earmarked funds, and state budgetary units based outside the borders of the Republic of Poland (Journal of Laws of 2020, item 342 as amended).

3. Review of Asset and Liability Valuation Parameters Used in Marshal's Offices – Methodology and Research Results

Marshal's offices are an auxiliary apparatus of the voivodeship board. In Poland, the Act of 5 June 1998 on voivodeship self-government (Journal of Laws of 2024, item 566) defines a voivodeship as a regional self-government community established for a three-level division of the territory of Poland.[2] The main fields of activity for the regional authority are the economy, economics, and civilisational development, as well as international economic cooperation, promotion of the region, and spatial planning (Dolnicki, 2009). The voivodeship boards perform their tasks with the help of marshal's offices, which provide a full service (personnel, legal, technical, organisational, and expert) to the committees of executive bodies (voivodeship board and voivodeship marshal) and legislative bodies (voivodeship assembly). These offices operate based on the provisions of the Act on voivodeship self-government, as well as based on the voivodeship statute. Marshal's offices are treated as local government budget units in the context of keeping accounts and preparing financial and budget reports.

The study puts forward three research theses, which are tied to the aim stated in the introduction:

T.1: Marshal's offices do not have a comprehensive accounting policy on the valuation of assets and liabilities.

T.2: Marshal's offices mainly use the historical value model for the valuation of assets and liabilities.

T.3: Local government units in EU countries and worldwide must develop coherent patterns of integrated reporting, particularly in implementing sustainable development goals.

In the first step of the research, to achieve the stated primary objective of the article and verify the research hypotheses, a review and analysis of the regulations of the voivodeship marshals on accounting policies concerning the valuation of assets and liabilities were conducted. Sections of accounting policy regulations were obtained through requests for public information via e-mail.

In addition, in the second stage of empirical research, additional information for the years 2020–2022 was obtained from the Public Information Bulletin (BIP) websites of the marshal's offices because, in this part of the financial statements, the audited entities should obligatorily disclose the methods used to value assets

---

[2] The territorial system of Poland was decided in the 1997 Constitution of the Republic of Poland. It was built in two stages (municipal reform in 1990 and county-voivodeship reform in 1998) with the adoption – as one of the most critical assumptions and a guarantee of the implementation of the principle of decentralisation – of the corporate nature of each of the local government units. Currently, there are 16 regions-voivodeships in Poland.

and liabilities. This part of the annual financial statements was also reviewed in terms of the use of non-financial performance measures. A comparative and descriptive analysis of the collected empirical materials was carried out in the following research stage. The study ends with synthetic conclusions drawn upon the adopted research theses.

Table 2 presents the parameters for the asset and liability valuation used in marshal's offices. The valuation parameters provided were either indicated in the analysed segments of the accounting policies of the marshal's offices or in their additional information. In places where "no records" are indicated, the marshal's offices did not provide the parameters of the indicated elements of assets and liabilities either in the accounting policies or in the additional information. However, what should be noted when analysing the full scope of additional information on these entities, even though they did not provide valuation principles, e.g., in the scope of intangible assets or own funds, changes in these components of assets or liabilities in the period under review are noted.

Table 2. Parameters for the Valuation of Assets and Liabilities in Marshal's Offices

Balance Sheet Components	Valuation in Accounting Books	Balance Sheet Valuation
Intangible assets	– 12 offices – acquisition price, manufacture cost, or value specified in the administrative decision – depending on the method of acquisition – 4 offices – no records	– 7 offices – initial value less depreciation and amortisation write-downs and write-offs for impairment – 6 offices – initial value less depreciation and amortisation write-offs – 3 offices – no records
Fixed assets	– 12 offices – acquisition price, manufacture cost, revaluation amount, or value specified in an administrative decision – depending on the fixed asset acquisition method – 4 offices – no records	– 7 offices – initial value less depreciation and amortisation write-downs and impairment write-offs – 6 offices – initial value less depreciation and amortisation write-downs – 3 offices – no records
Fixed assets under construction	– 10 offices – in the amount of costs incurred in connection with their acquisition or manufacture – 6 offices – no records	– 8 offices – in the amount of costs incurred in connection with their acquisition or manufacture less impairment write-offs – 1 office – in the amount of costs incurred in connection with their acquisition or manufacture – 7 offices – no records

Table 2 cnt'd

Balance Sheet Components	Valuation in Accounting Books	Balance Sheet Valuation
Long-term receivables	– 10 offices – nominal value – 6 offices – no records	– 10 offices – the amount of payment required, observing the prudence principle – 6 offices – no records
Long-term investment	– 10 offices – acquisition price (including 2 offices also provided fair value) – 6 offices – no records	– 10 offices – acquisition price adjusted for impairment write-offs (including 2 offices also provided fair value) – 6 offices – no records
Inventory	– 6 offices – acquisition price or manufacture cost – 4 offices – acquisition price – 2 offices – purchase price (assuming that the office does not keep inventory records of materials) – 1 office – only the entry on the valuation of the outflow of materials from the warehouse by the FIFO method – 3 offices – no records	– 6 offices – acquisition price or manufacture cost not higher than inventory net selling price – 10 offices – no records
Short-term receivables	– 13 offices – nominal value – 3 offices – no records	– 13 offices – the amount of payment required, observing the prudence principle – 3 offices – no records
Short-term investment	– 7 offices – nominal value for the valuation of cash, including 2 offices that indicated the valuation of shares at the acquisition price – 2 offices – market price – 1 office – acquisition price or market price, whichever is lower – 1 office – fair value – 5 offices – no records	– 6 offices – nominal value used for the balance sheet valuation of cash, including 2 offices which determined that stocks and shares were valued as of the balance sheet date at the acquisition price less impairment write-offs – 2 offices – acquisition price less impairment write-offs (although the principles of initial valuation were not specified) – 8 offices – no records
Deferrals	– 2 offices – "not occur" entry only – 14 offices – no records	– 2 offices – "not occur" entry only – 14 offices – no records
Own funds	– 5 offices – nominal value – 11 offices – no records	– 5 offices – nominal value – 11 offices – no records
Provisions for liabilities	– 5 offices – reliably estimated value – 11 offices – no records	– 5 offices – reliably estimated value – 11 offices – no records

Table 2 cnt'd

Balance Sheet Components	Valuation in Accounting Books	Balance Sheet Valuation
Long-term liabilities	– 11 offices – nominal value, including: • 1 office also determines the selling price for debt securities • 1 office also determines the issue value increased by the accrued interest rates for financial liabilities, – 5 offices – no records	– 11 offices – the amount due – 1 office – adjusted acquisition price (to the valuation of loans and credits) – 4 offices – no records
Short-term liabilities	– 11 offices – nominal value, including: • 1 office also determines the selling price for debt securities • 1 office also determines the issue value increased by the accrued interest rates for financial liabilities – 5 offices – no records	– 11 offices – the amount due – 1 office – adjusted acquisition price (to the valuation of loans and credits) – 4 offices – no records
Accrued expenses	– 5 offices – "not occur" entry only – 11 offices – no records	– 5 offices – "not occur" entry only – 11 offices – no records
Deferred income	– 2 offices – nominal value – 14 offices – no records	– 2 offices – nominal value – 14 offices – no records

Source: the authors.

A detailed comparative analysis of the accounting policy provisions and additional information from marshal's offices in Poland allows us to identify the following fundamental phenomena:

– in terms of valuation in the accounting books, the most precise entries concern the valuation of non-financial fixed assets, financial assets, and settlements. The vast majority of offices did not include valuation entries in the accounting books for deferred income and expenses, provisions for liabilities, and the entity's fund, which did not mean that these elements of assets and liabilities did not change;

– regarding balance sheet valuation, most offices did not include entries regarding the valuation of fixed assets under construction, inventories, deferred income, expenses, liabilities provisions, and the entity's fund, which did not mean that on the balance sheet date, the audited entities did not report the status of these assets and liabilities.

In marshal's offices, selected valuation parameters are based primarily on the historical cost model in the accounting books and the balance sheet. The core idea of this model is that at the moment of balance sheet valuation, it takes into account the initial value of assets and liabilities, i.e., the so-called historical cost, which may be the purchase price, acquisition price, manufacturing cost, or nominal value. Within these valuation models, we can distinguish sub-models based on the acquisition price (including amortised purchase price or non-amortised purchase price) and the adjusted purchase price (amortised cost) (Poniatowska, 2009, pp. 166–167).

On the other hand, models based on fair value, which take into account parameters such as net sales price, current value, or otherwise defined fair value, occur in marshal's offices in only two cases:

– valuation of fixed assets received without consideration or by way of donation,

– valuation of long-term and short-term investments.

The asset and liability valuation method in the marshal's offices is crucially influenced by the principle that these entities perform their tasks indefinitely, assuming their continuity of operations. Moreover, under the Polish public finance law, to limit subjectivity in valuation, but above all, to maintain comparability of reports over time and between public sector entities, these entities are required to apply uniform valuation methods, which is justified by the methodology of calculating macroeconomic indicators, including the size of the budget surplus (deficit), public debt, and the ability to service this debt. The assumption of the going concern is also justified by the application in the provincial government of the asset valuation method at historical cost, i.e., at the purchase price or production cost, and in areas not regulated in specific regulations, the application of the prudent valuation method specified in the Accounting Act.

Unfortunately, there are numerous gaps in accounting policies and in the additional information regarding the valuation of assets and liabilities. This is a very negative phenomenon, which may indicate a low awareness of the essence of accounting policy, especially in selecting methods for valuing assets and liabilities. This automatically has direct consequences in inconsistent and incomplete data in the additional information.

Under Directive 2014/95/EU on the disclosure of non-financial information and information regarding diversity, which is still applicable only until the financial year 2023, after examining the reports available in marshal's offices during the analysed period, no rules for reporting non-financial data were found (Directive 2014/95/EU). These entities are not obliged, and do not optionally use non-financial measures to assess their performance.

4. Discussion

Integrated reporting is evolving worldwide, and its dynamic development has been observed since 2013 when the International Integrated Reporting Framework was created and published by the International Integrated Reporting Council (IIRC, 2013). The emergence of integrated reporting as a new reporting form has sparked worldwide discussions on its validity and informativeness (Bek-Gaik, 2017, p. 11; Siemienova, 2023).

According to the framework structure, the purpose of an integrated report is to enable the organisation to better communicate its proposals for creating value in the short, medium, and long term by providing a concise message as to how the company's strategy, management system, operational results, and prospects, in the context of its external environment (vicinity), lead to value creation in the short, medium, and long term (IIRC, 2013, p. 7).

Integrated reporting of accounting agents is the subject of many scientific studies that concern:

– theoretical concept of integrated reporting, including the concept, nature, and function of integrated reporting; factors influencing the development of integrated reporting; framework structure of such reporting, as well as comparing integrated reporting with sustainability reports and CSR reports (e.g., Krasodomska, 2012; Berndt, Bilolo & Müller, 2014; Flower, 2015; Walińska, 2015; Walińska *et al*., 2015; Świderska & Bek-Gaik, 2016; Serpeninova, 2022),

– integrated reporting in practice, including analysis of the content of integrated reports and the perception of integrated reports by management staff and stakeholders (e.g., Jensen & Berg, 2012; Eccles & Krzus, 2014; Bek-Gaik & Rymkiewicz, 2015, 2016; Perego, Kennedy & Whiteman, 2016).

While integrated reporting has become widely accepted in the corporate sector, its implementation in local government is still evolving. Integrated reporting in local government in Poland and the EU reflects the growing trend toward transparency and accountability in public administration. This approach combines financial and non-financial information, strengthening communication about value creation and sustainable development efforts. There is a lack of a standardised integrated reporting framework for public sector entities in the EU and globally. This results in significant differences in the application of integrated reporting across countries (Nistor *et al*., 2019; Williams & Lodhia, 2021; Siemienova, 2023). There is significant variability in how integrated reporting is adopted in scope and form, with national regulations shaping practices and standards.

Based on the literature review (Zuchewicz, 2013) and analyses conducted by the authors, the following barriers to the development of integrated reporting in Polish local government units should be highlighted:

– lack of data in accounting policies and detailed and supplementary information to financial statements on the method of presenting intangible factors, such as intellectual capital, relations with stakeholders, or those related to location and impact on the natural environment,

– the valuation of assets and their sources based mainly on historical values causes an increasing discrepancy between the balance sheet value of assets and their market value,

– insufficient awareness of the consequences of the adopted solutions by people developing accounting policies,

– it is impossible to determine, based on the analysed content of accounting policies and detailed data contained in the additional information, all the significant conditions of operation of these entities, including, for example, the main risk factors,

– lack of prospective data enabling the estimation of the course of events in the future.

The disclosure and integration of financial and non-financial information requires technical expertise and significant investment in data collection and analysis systems. In addition, the lack of a clear regulatory framework for integrated public sector reporting makes it difficult for regional governments to implement best practices consistently.

Although there is no mandatory legal framework for integrated reporting in Polish local governments, some local governments in Poland have started experimenting with voluntary integrated reporting. For example, selected municipalities in Poland, such as Warsaw and Krakow, have begun publishing reports that combine traditional financial reports with sustainability indicators, such as environmental impact, social welfare initiatives, and management practices. These pilot projects aim to increase the visibility of local government's contribution to sustainable development and improve communication with citizens. In 2018, Manes-Rossi (2018) conducted case studies from different locations around the world, including Poland – using the city of Warsaw as an example, and confirmed differences in the levels of maturity and approach to integrated reporting in these entities. In the context of integrated reporting, researchers previously examined Warsaw in 2016, where the municipality was presented as an example of the slow implementation of integrated reporting in the public sector (Oprişor, Tiron-Tudor & Nistor, 2016).

With the growing importance of sustainable development and responsibility in public sector management, the authors believe there will be increasing pressure on Polish local governments to adopt the concept of integrated reporting. Integrated reporting promotes better communication with citizens, responding to their information needs regarding the sustainable development of public services (Bartocci & Picciaia, 2013; Lodhia, Kaur & Williams, 2020; Agliata *et al*., 2022).

5. Conclusions

The review of the parameters for the valuation of assets and liabilities included in the accounting policies and additional information of marshal's offices indicates significant deficiencies in the provisions of these documents regarding the valuation of assets and liabilities. Moreover, marshal's offices mainly use the historical value model to value assets and liabilities, which may constitute a significant barrier to implementing an integrated reporting system focused on sustainable development. Risks and opportunities are not limited to the definition and valuation of assets and liabilities for the financial statements. They are also not limited by the historical cost convention and the financial planning horizon (Wojturska, 2023, p. 19). Currently, the accounting of local government units in Poland (including voivodeships) mainly generates financial information; however, the importance of non-financial information, including social responsibility and the sustainable development of these entities, is increasingly recognised.

Introducing integrated reporting in these entities in the time frame of even the next few years is desirable, but may prove to be very difficult. The reason lies in the perception of integrated reporting as a laborious, demanding, and even complex process, and taking into account the impact of human factors (terms in office of authorities, employees) on the development of integrated reporting in all entities of the public finance sector, or the lack of the obligation to report non-financial, integrated reporting would not replace the previous reports, but would only potentially enrich the existing diverse forms of reporting. The authors believe that in the future, there will be a need to verify and unify legal solutions regarding reporting issues related to sustainable development in the integrated reports of these entities.

Authors' Contribution

The authors' individual contribution is as follows: Each contributed 50%.

Conflict of Interest

The authors declare no conflict of interest.

References

Abdulkarim, M. E., Umlai, M. I., & Al-Saudi, L. F. (2020). Exploring the Role of Innovation in the Level of Readiness to Adopt IPSAS. *Journal of Accounting & Organizational Change*, *16*(3), 469–495. https://doi.org/10.1108/JAOC-12-2019-0119

The Accounting Act of 29 September 1994, consolidated text (Journal of Laws of 2023, item 120, as amended) [Ustawa z dnia 29 września 1994 r. o rachunkowości, tj. Dz.U. 2023, poz. 120 z późn. zm.].

Act of 5 June 1998 on voivodeship self-government (Journal of Laws of 2024, item 566) [Ustawa z dnia 5 czerwca 1998 r. o samorządzie województwa, tj. Dz.U. 2024, poz. 566].

Adamek-Hyska, D. (2011). Kierunki harmonizacji rachunkowości jednostek sektora publicznego. In: M. Kostur (Ed.), *Problemy harmonizacji rachunkowości* (pp. 66–84). Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach.

Adamek-Hyska, D. (2015). Funkcja sprawozdawcza rachunkowości jednostki samorządu terytorialnego. In: B. Nita (Ed.), *Teoria rachunkowości, sprawozdawczość i analiza finansowa* (pp. 201–211). Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu.

Adamek-Hyska, D., Kumor, I., Strojek-Filus, M., & Wszelaki, A. (2021). *Modele wyceny aktywów i pasywów w świetle teorii i koncepcji rachunkowości*. CeDeWu.

Agliata, F., Tuccillo, D., Rey, A., & Filocamo, M. R. (2022). The New Frontiers of Reporting for Governmental Financial Sustainability. *Corporate Ownership and Control*, *19*(3), 64–73. https://doi.org/10.22495/cocv19i3art4

Al-Zubi, Z. (2015). The Extent of Applying the International Public Sector Accounting Standards by the Jordanian Public Sector. In: Z. Bekirogullari, M. Y. Minas (Eds), *Business & Economics – BE-ci 2015*, *Vol 4*. *European Proceedings of Social & Behavioural Sciences* (pp. 47–63). https://doi.org/10.15405/epsbs.2015.05.8

Amiri, A., & Hamza, S. E. (2020). The Transition to IPSAS Standards: The Extent of Adoption and the Influence of Institutional, Contingency and Economic Network Factors. *Journal of Accounting and Management Information Systems*, *19*(2), 215–251. https://doi.org/10.24818/jamis.2020.02002

Bartocci, L., & Picciaia, F. (2013). Towards Integrated Reporting in the Public Sector. In: C. Busco, M. Frigo, A. Riccaboni, P. Quattrone (Eds), *Integrated Reporting* (pp. 191–204). Springer. https://doi.org/10.1007/978-3-319-02168-3_12

Bek-Gaik, B. (2017). Sprawozdawczość zintegrowana – przegląd badań. *Zeszyty Teoretyczne Rachunkowości*, 92(148), 9–28. https://doi.org/10.5604/01.3001.0010.0987

Bek-Gaik, B., & Rymkiewicz, B. (2015). Sprawozdawczość zintegrowana w praktyce polskich spółek giełdowych. In: B. Micherda (Ed.), *Sprawozdawczość i rewizja finansowa: Uwarunkowania ekonomiczne, społeczne i regulacyjne* (pp. 60–83). Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.

Bek-Gaik, B., & Rymkiewicz, B. (2016). Tendencje rozwoju sprawozdawczości zintegrowanej w praktyce polskich spółek giełdowych. *Zeszyty Naukowe Uniwersytetu Szczecińskiego. Finanse, Rynki Finansowe, Ubezpieczenia*, 1(79), 767–785. https://doi.org/10.18276/frfu.2016.79-60

Berndt, T., Bilolo, C., & Müller, L. (2014). The Future of Integrated Reporting, Analysis and Recommendations. In: *4th Annual International Conference on Accounting and Finance* (*AF 2014*) (pp. 195–206). GSTF. https://doi.org/10.5176/2251-1997_AF14.64

Biondi, Y. (2017). Harmonising European Public Sector Accounting Standards (EPSAS): Issues and Perspectives. *Accounting, Economics, and Law: A Convivium*, *7*(2), 117–123. https://doi.org/10.1515/ael-2017-0014

Brusca, I., Montesinos, V., & Chow, D. S. L. (2013). Legitimating International Public Sector Accounting Standards (IPSAS): The Case of Spain. *Public Money and Management*, *33*(6), 437–444. https://doi.org/10.1080/09540962.2013.836006

Buk, H. (Ed.). (2013). *Międzynarodowe Standardy Rachunkowości*. *Część 1*. Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach.

Chow, D. S. L., & Aggestam Pontoppidan, C. (2019). The United Nations' (UN) Decision to Adopt International Public Sector Accounting Standards (IPSAS). *Journal of Public Budgeting, Accounting & Financial Management*, *31*(2), 285–306. https://doi.org/10.1108/JPBAFM-08-2018-0087

Dabbicco, G., & Steccolini, I. (2019). Building Legitimacy for European Public Sector Accounting Standards (EPSAS): A Governance Perspective. *International Journal of Public Sector Management*, *33*(2/3), 229–245. https://doi.org/10.1108/IJPSM-12-2018-0264

Dalwadi, P. (2023). Fair Value Accounting: Benefits, Challenges and Implications for Financial Reporting. *Vidya – a Journal of Gujarat University*, *2*(2), 121–124. https://doi.org/10.47413/vidya.v2i2.226

Deaconu, A., & Nistor, C. S. (2014). Valuation in the Public Sector. Reference Factor in a Credible and Fair Administration. *Transylvanian Review of Administrative Sciences*, *10*(43), 85–102.

Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and group. Official Journal of the European Union, L 330/1.

Dolnicki, B. (2009). *Samorząd terytorialny* (4th ed.). Oficyna a Wolters Kluwer business.

Eccles, R. G., & Krzus, M. P. (2014). *Integrated Reporting Movement: Meaning, Momentum, Motives, and Materiality*. Wiley.

Eurostat. (2024). *Aim of EPSAS*. Retrieved from: https://ec.europa.eu/eurostat/web/epsas (accessed: 3.01.2024).

Fedak, Z. (2020). *Zamknięcie roku 2020*. Rachunkowość.

Flower, J. (2015). The International Integrated Reporting Council: A Story of Failure. *Critical Perspectives on Accounting*, *27*, 1–17. https://doi.org/10.1016/j.cpa.2014.07.002

Grossi, G., & Steccolini, I. (2015). Pursuing Private or Public Accountability in the Public Sector? Applying IPSASs to Define the Reporting Entity in Municipal Consolidation. *International Journal of Public Administration*, *38*(4), 325–334. https://doi.org/10.1080/01900692.2015.1001239

Hepworth, N. (2017). Is Implementing the IPSASs an Appropriate Reform? *Public Money & Management*, *37*(2), 141–148. https://doi.org/10.1080/09540962.2016.1266174

Hońko, S. (2012). Wartość godziwa – parametr czy koncepcja wyceny? *Zeszyty Naukowe Uniwersytetu Szczecińskiego nr 684. Finanse, Rynki Finansowe, Ubezpieczenia*, 45, 53–68.

IIRC. (2013). *The International Framework*. Retrieved from: http://www.theiirc.org/wp-content/uploads/2013/12/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf (accessed: 8.12.2023).

IPSASB. (2024). https://www.ipsasb.org (accessed: 3.01.2024).

Jensen, J. C., & Berg, N. (2012). Determinants of Traditional Sustainability Reporting versus Integrated Reporting. An Institutionalist Approach. *Business Strategy and the Environment*, *21*(5), 299–316. https://doi.org/10.1002/bse.740

Jorge, S., Caruana, J., & Caperchione, E. (2019). The Challenging Task of Developing European Public Sector Accounting Standards. *Accounting in Europe*, *16*(2), 143–145. https://doi.org/10.1080/17449480.2019.1637530

Krasodomska, J. (2012). Zintegrowana sprawozdawczość spółek w 2020 roku. *Zeszyty Teoretyczne Rachunkowości*, 66(122), 101–110.

Laswad, F., & Redmayne, N. B. (2015). IPSAS or IFRS as the Framework for Public Sector Financial Reporting? New Zealand Preparers' Perspectives. *Australian Accounting Review*, *25*(2), 175–184. https://doi.org/10.1111/auar.12052

Legenkova, M. (2016). International Public Sector Accounting Standards Implementation in the Russian Federation. *International Journal of Economics and Financial Issues*, *6*(4), 1304–1309.

Lodhia, S., Kaur, A., & Williams, B. (2020). Integrated Reporting in the Public Sector. In: C. de Villiers, P.-C. Hsiao, W. Maroun (Eds), *The Routledge Handbook of Integrated Reporting* (1st ed.) (pp. 227–237). Routledge. https://doi.org/10.4324/9780429279621

Manes-Rossi, F. (2018). Is Integrated Reporting a New Challenge for Public Sector Entities? *African Journal of Business Management*, *12*(7), 172–187. https://doi.org/10.5897/AJBM2018.8498

Mattei, G., Jorge, S., & Grandis, F. G. (2020). Comparability in IPSASs: Lessons to Be Learned for the European Standards. *Accounting in Europe*, *17*(2), 158–182.

Nguyen, P. C., & Dinh Khoi Nguyen, T. (2012). International Harmonization and National Particularities of Accounting: Recent Accounting Development in Vietnam. *Journal of Accounting and Organizational Change*, *8*(3), 431–451. https://doi.org/10.1108/18325911211258371

Nistor, C. S., Stefanescu, C. A., Oprisor, T., & Crisan, A. R. (2019). Approaching Public Sector Transparency through an Integrated Reporting Benchmark. *Journal of Financial Reporting and Accounting*, *17*(2), 249–270. https://doi.org/10.1108/JFRA-06-2017-0048

Oprişor, T., Tiron-Tudor, A., & Nistor, C. S. (2016). The Integrated Reporting System: A New Accountability Enhancement Tool for Public Sector Entities. *Audit Financiar*, 7(139), 749–762. https://doi.org/10.20869/AUDITF/2016/139/747

Perego, P., Kennedy, S., & Whiteman, G. (2016). A Lot of Icing but Little Cake? Taking Integrated Reporting forward. *Journal of Cleaner Production*, *136*, 53–64. https://doi.org/10.1016/j.jclepro.2016.01.106

Petrović, D. V., Radosavac, A., & Mashovic, A. (2023). Implications of Applying Fair Value Accounting to Modern Financial Reporting. *Journal of Process Management and New Technologies*, *11*(1–2), 22–33. https://doiorg/10.5937/jpmnt11-44074

Polzer, T., Grossi, G., & Reichard, C. (2021). The Harmonization of Public Sector Accounting and Diffusion of IPSAS. In: I. Brusca, P. Gomes, M. J. Fernandes, V. Montesinos (Eds), *Challenges in the Adoption of International Public Sector Accounting Standards. Public Sector Financial Management* (pp. 17–34). Palgrave Pivot. https://doi.org/10.1007/978-3-030-63125-3_2

Poniatowska, L. (2009). Metody i modele wyceny bilansowej aktywów i pasywów. *Zeszyty Teoretyczne Rachunkowości*, *53*(109), 161–174.

Regulation of the Minister of Development and Finance of 13 September 2017 on accounting and charts of accounts for the state budget, budgets of local government units, budgetary units, local government budgetary establishments, state earmarked funds, and state budgetary units based outside the borders of the Republic of Poland (Journal of Laws of 2020, item 342 as amended) [Rozporządzenie Ministra Rozwoju i Finansów z dnia 13 września 2017 r. w sprawie rachunkowości oraz planów kont dla budżetu państwa, budżetów jednostek samorządu terytorialnego, jednostek budżetowych, samorządowych zakładów budżetowych, państwowych funduszy celowych oraz państwowych jednostek budżetowych mających siedzibę poza granicami Rzeczypospolitej Polskiej, Dz.U. 2020, poz. 342 z późn. zm.].

Schmidthuber, L., Hilgers, D., & Hofmann, S. (2022). International Public Sector Accounting Standards (IPSASs): A Systematic Literature Review and Future Research Agenda. *Financial Accountability and Management*, *38*(1), 119–142. https://doi.org/10.1111/faam.12265

Serpeninova, Y. (2022). Integrated Reporting: Chronological Literature Review. *Economic Journal of Lesya Ukrainka Volyn National University*, *1*(29), 42–49. https://doi.org/10.29038/2786-4618-2022-01-42-49

Sforza, V., Cimini, R., & Fanti, E. (2023). The Debate around EPSAS: A Structured Literature Review for Scholars and Practitioners. *Public Money & Management*, *43*(7), 649–658. https://doi.org/10.1080/09540962.2023.2207744

Siemienova, C. M. (2023). Experience of European Countries in the Preparation of Integrated Reporting. *Review of Transport Economics and Management*, 9(25), 85–94. https://doi.org/10.15802/rtem2023/278124

Smoleń-Bojańczyk, M. (2023). Kontrowersje związane z wyceną według wartości godziwej. *Społeczeństwo i Polityka*, 2(75), 119–140. https://doi.org/10.34765/sp.0223.a06

Świderska, G. K., & Bek-Gaik, B. (2016). Dokąd zmierza raportowanie biznesowe? *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, 274, 7–15.

Turyna, J., & Koeppl-Turyna, M. (2018). Public Sector Accounting in the European Union Member States – Assessment of Practices and Their Compatibility with IPSAS. *Problemy Zarządzania*, *16*(1), 34–61. https://doi.org/10.7172/1644-9584.72.2

Walińska, E. (2014). *Rachunkowość finansowa. Ujęcie sprawozdawcze i ewidencyjne*. Oficyna Wolters Kluwer Bussines.

Walińska, E., Bek-Gaik, B., Gad, J., & Rymkiewicz, B. (2015). *Sprawozdawczość przedsiębiorstwa jako narzędzie komunikacji z otoczeniem. Wymiar finansowy i niefinansowy*. Wydawnictwo Uniwersytetu Łódzkiego.

Walińska, E. M. (2015). Zintegrowany raport – początek końca sprawozdania finansowego? *Zeszyty Teoretyczne Rachunkowości*, *82*(138), 151–165. https://doi.org/10.5604/16414381.1155821

Williams, B., & Lodhia, S. (2021). Integrated Reporting in Public Sector Organisations: A Study of Australian Local Councils. *Journal of Environmental Management*, 280111833. https://doi.org/10.1016/j.jenvman.2020.111833

Wojturska, W. (2023). Raportowanie niefinansowe oraz zmiany przewidziane przez CSRD. In: J. Bednarek (Ed.), *ESG – przewodnik po regulacjach prawnych* (pp. 1–37). C.H. Beck.

Zuchewicz, J. (2013). Zintegrowane sprawozdanie finansowe jako instrument prezentacji gospodarczych i społecznych dokonań jednostki. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 314, 247–256. Retrieved from: https://www.wir.ue.wroc.pl/info/article/WUT8636540cecb0452b886555ac8b0937c5/ (accessed: 1.12.2024).

Krakow Review of Economics and Management
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie
4 (1010)
2025

KREM, 2025, 4(1010): 47–63
ISSN 1898-6447
e-ISSN 2545-3238
https://doi.org/10.15678/krem.18682

Determinants of Organisational Commitment among Employees Aged 50+

Michał Kędra[1], **Bartosz Sobotka**[2], **Rafał Muda**[3], **Krzysztof Leoniak**[4], **Damian Hamerski**[5]

[1] The John Paul II Catholic University of Lublin, Institute of Psychology, Aleje Racławickie 14, 20-950 Lublin, Poland, e-mail: michal.kedra@kul.pl, ORCID: https://orcid.org/0000-0002-9000-9898

[2] University College of Enterprise and Administration in Lublin, Bursaki 12, 20-150 Lublin, Poland, e-mail: bartosz.sobotka@syntea.pl, ORCID: https://orcid.org/0000-0002-0393-3645

[3] University College of Professional Education, Institute of Psychology, Powstańców Śląskich Square 1, 53-329 Wrocław, Poland, e-mail: muda.research@gmail.com, ORCID: https://orcid.org/0000-0003-4953-6642

[4] Maria Curie-Skłodowska University in Lublin, Institute of Psychology, Głęboka 45, 20-612 Lublin, Poland, e-mail: krzysztof.leoniak@mail.umcs.pl, ORCID: https://orcid.org/0000-0001-5630-6525

[5] Maria Curie-Skłodowska University in Lublin, Faculty of Economics, M. Curie-Skłodowskiej Square 5, 20-031 Lublin, Poland, e-mail: damian.hamerski@umcs.pl, ORCID: https://orcid.org/0000-0003-3742-2787

Suggested citation: Kędra, M., Sobotka, B., Muda, R., Leoniak, K., & Hamerski, D. (2025). Determinants of Organisational Commitment among Employees Aged 50+. *Krakow Review of Economics and Management / Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 4(1010), 47–63. https://doi.org/10.15678/krem.18682

ABSTRACT

Objective: The aim of the study was to identify differences in affective and continuance commitment among employees aged 50 and above, based on their demographic characteristics and job positions within the organisation.

Research Design & Methods: A study was conducted among employees aged 50+ in the Polish market who work in various full-time positions. Participants reported their socio-demographic characteristics, answered questions related to their job and history of job changes. Additionally, they responded to the Organisational Commitment Scale.

Findings: The results revealed that emotional commitment varies depending on the job position and the type of work performed. However, working in different positions differentiates continuance commitment. No differences were observed between men and women in both types of attachment.
Implications/Recommendations: The research results provide practical insights for individuals involved in recruiting, hiring, and collaborating with employees aged 50+.
Contribution: Knowledge about various aspects of organisational commitment allows for better job customisation and the maximisation of employee potential.

Article type: original article.

Keywords: organisational commitment, aging workers, employment, employee potential.

JEL Classification: D83, E24, J24, J53.

---

1. Introduction

The Polish job market is characterised by a low level of age diversity among workers. According to the latest forecasts, the ongoing process of population aging will result in a decline in the working-age population and, consequently, a continuing increase in the number of older workers (GUS, 2023). The group of workers with longer experience of work is subject to discrimination (Kunze, Boehm & Bruch, 2011) as there are jobs where both employers and colleagues tend to evaluate the productivity of older workers less favourably.

As a result, the issue of workforce age diversity is increasingly addressed in scientific research, primarily due to the creation of inclusive workplaces aimed at respecting differences among employees and creating conditions for the optimal utilisation of their potential (Cogin, 2012). One example of low employment rates for workers aged 50+ can be found in the modern business services sector, which has been a priority in economic policy and has been growing steadily. Since the 1990s, this term has encompassed the outsourcing of activities previously performed by internal company departments to external providers. During this time, its scope has expanded beyond production to areas such as human resource management and digitisation processes (Sobotka, Szymańska-Czaplak & Bruska, 2020). With the dynamic growth of centres and job opportunities, there is also an increasing demand for reliable and experienced employees, including those aged 50+.

Aging workers, due to their accumulated experience, play a significant role in many job positions, including the creation of work-life balance environments (Kulik *et al.*, 2014). Moreover, they are more motivated by intrinsic values such as autonomy, utilising their skills, and independence. They pay less attention to job-related perks and professional development opportunities (Inceoglu, Segers & Bartram, 2012). Research shows that in Poland, among workers aged 45+, important values include professional work and a strong connection with the employer, which contributes to organisational commitment and reduces the willingness to change jobs (Widerszal-Bazyl, 2015). In a meta-analysis conducted by Ng and Feldman (2012), six popular stereotypes regarding older workers (aged 40+) were examined, including lower work motivation, poorer health, and a lower propensity for change. None of these stereotypes were empirically confirmed. Only one of them (willingness to participate in training and career development) was consistent with research results, indicating that younger workers were more willing to participate in training. However, as the authors note, this stereotype may exaggerate the extent to which age negatively affects the willingness to engage in further self-improvement due to its weak or very weak indicators. These findings correspond to the work of Boumans, de Jong, and Janssen (2011), who investigated the relationships between work aspects, motivation, and job satisfaction with age. Research results suggest that older workers seem to require work that presents an intrinsic challenge and provides a sense of fulfillment more than younger workers. This indicates a search for consistent intellectual challenges and a focus on enriching their work from older employees. Given the above research findings, it is important to identify factors that may be relevant when considering a job change or remaining in the workplace among workers aged 50+.

The organisational commitment model proposed by Meyer and Allen (1991) may be important in the context of explaining the reasons for the intention to change or take up a new job. This concept describes the relationship between an employee and their job and the organisation where it is performed (Łaguna *et al*., 2015). Research demonstrates that a high level of organisational commitment brings numerous benefits for both the employee and the employer. Highly committed employees tend to go beyond their assigned duties, display more initiative, and have lower absenteeism rates. Furthermore, committed employees are less likely to quit or change jobs (Meyer & Allen, 1991; Meyer *et al*., 2012). From the employee's perspective, strong commitment can be associated with a higher quality of life, reduced burnout risk, and improved psychosomatic health. Studies highlight numerous findings indicating that psychological factors are linked to organisational commitment, for example self-efficacy (Syabarrudin, Eliyana & Naimah, 2020). However, in a meta-analysis on the antecedents, correlates, and consequences of organisational commitment, Meyer *et al*. (2002) also demonstrated the importance of demographic traits and workplace characteristics. Therefore, the aim of our study was to analyse selected determinants and job characteristics in relation to organisational commitment among individuals aged 50+.

2. Literature Review

Within the framework of the organisational commitment Meyer and Allen (1991) identified three primary components: affective, continuance and normative commitment. Affective commitment is defined as a strong emotional bond with the organisation, including identifying with its goals and values, as well as active engagement in organisational processes and activities. Emotionally committed employees take pride in their work within the organisation, express positive opinions about it, and derive satisfaction from it (Meyer & Allen, 1991). On the other hand, continuance commitment is characterised by perceiving potential costs and consequences of leaving the organisation. Individuals with a high level of this type of commitment fear losing financial and non-financial benefits associated with employment. Normative commitment involves a sense of moral obligation to continue employment, rooted in experiences gained at the workplace or even within the family, such as loyalty or a sense of duty. A good reflection of these three types of commitment is that affective commitment pertains to the desire to stay in the organisation, continuance commitment to the necessity of staying, and normative commitment to the obligation (Suma & Lesha, 2013).

Despite its broad universality and prevalence, the concept of organisational commitment is influenced by various cultural and organisational factors that can vary from one country to another. For example, research results on organisational commitment differences in India do not align with those in the culturally distinct context of the United States (Singh & Gupta, 2015). In a meta-analysis conducted by Meyer *et al*. (2012) regarding cultural determinants of organisational commitment (studies in 57 countries), it was observed that different types of commitment vary depending on whether the culture is collectivist or individualistic. As noted by the authors, these differences are significant in measuring engagement, making it impossible to directly translate research results from one culture to the conditions prevailing in another country.

Additionally, there are significant differences in various types of commitment among individuals of different age groups. Research on generational differences in organisational commitment shows that all employees are significantly committed to their work; however, older individuals (aged 45+) exhibit the highest level of affective commitment, while younger employees perceive work as a means to achieve personal goals (Singh & Gupta, 2015). Among younger workers (below age 25) or those with shorter tenures (below 10 years), long-term commitment to the organisation is lower. Therefore, demographic data are significant predictors of organisational commitment in the long perspective.

Abreu, Cunha and Rebouças (2013) found that specific characteristics related to job organisation, such as full-time employment in a single company for over 10 years, are also essential factors in organisational commitment. Furthermore, affective commitment was higher among employees in individualistic cultures (Fischer & Mansell, 2009). Thus, organisational commitment may depend on factors such as effort, job function, employee performance, and the perceived importance of one's position and duties (Jung & Yoon, 2016). Organisational commitment can also be associated with job satisfaction, productivity, reduced employee turnover, and flexibility (Saeed *et al*., 2014; Yousef, 2017). For instance, research conducted by Gangai and Agrawal (2015) showed that continuance commitment correlated with job satisfaction only among male employees, while affective commitment was not associated with job satisfaction at all. In a meta-analysis by Meyer *et al*. (2002) on the relationships between different components of commitment, it was found that the emotional aspect positively correlates with employee performance and well-being but negatively correlates with the intention to leave the organisation. Conversely, continuance commitment is not strongly related to subjective work experiences.

In studies on Polish employees, Lewicka (2017) found that older workers (the baby boomer generation) exhibit the highest levels of commitment, although it was not determined whether these relationships were due to generational affiliation, work tenure, or the age of the respondents. On the other hand, Dobrowolska and Ślazyk-Sobol (2015) demonstrated that the highest levels of organisational commitment are found among self-employed individuals. This result clearly indicates that organisational factors have a significant impact on the sense of attachment.

3. Study Objectives

In research concerning the values and competencies of employees, the role of generational and gender differences is emphasised. The aim of this research was to examine whether organisational commitment among workers aged 50+ differs in terms of demographic and organisational factors. Obtaining answers to these questions will contribute to a better understanding of the functioning of workers aged 50+ in a dynamically changing labour market, especially in rapidly developing sectors of the economy. The study aimed to explore the relationship between organisational commitment, gender, job positions, and organisational factors. The research applied measurements of affective and continuance commitment, which are empirically supported constructs known to influence individuals' intentions to remain with or change their current employment status (Beheshtifar & Allahyary, 2013; Albrecht & Marty, 2020). Considering the numerous factors influencing organisational commitment, including cultural contexts and demographic specifics, we formulated three exploratory research questions. Due to inconsistent findings, and results from similar studies (Dobrowolska & Ślazyk-Sobol, 2017) we did not propose specific hypotheses for these questions. This approach stems from the relatively understudied nature of the group in focus – employees aged 50+ in the Polish labour market.

Age and gender have been recognised as key factors in shaping organisational commitment (Meyer *et al*., 2012). However, the influence of these factors on commitment may vary across different cultural contexts (Al-Jabari & Ghazzawi, 2019). Therefore, in the first question, we decided to examine gender differences in organisational commitment:

Research question 1: What differences exist in affective and continuance commitment based on gender?

Balli and Yanik (2014) demonstrated that men differ from women in terms of both continuance and affective commitment. Men scored higher in affective commitment, while women scored higher in continuance commitment. In a study conducted on 2,960 Polish employed individuals, Adamchik and Sedlak (2024) observed that women and men displayed similar levels of commitment when other organisational variables were controlled. However, in a direct comparison, women demonstrated higher levels of commitment. There are also some studies that present differences between women and men in terms of factors such as work motivation, values, and sense of security (Arnania-Kepuladze, 2010; Barbulescu & Bidwell, 2013; Major, Morganson & Bolen, 2013). However, there are gaps in research on values related to organisational commitment, particularly among employees aged 50 and above, who can significantly differ from other generations (Cogin, 2012).

The next research question concerned differences resulting from job position:

Research question 2: What are the differences in affective and continuance commitment concerning job positions?

Perceived organisational support positively influenced organisational commitment (Artatanaya *et al*., 2023). As the authors indicate, this effect may be mediated by job satisfaction, which depends on the employee's position or recognition from their supervisor. In a study conducted on hospital staff, it was found that both emotional and continuance organisational commitment varied depending on the type of work performed (e.g., physical, administrative, technical). Additionally, the authors observed differences based on job type, tenure, and experience (Balli & Yanik, 2014). These results indicate that the level of commitment may differ depending on various organisational factors. In studies conducted on employees with high levels of specialised knowledge who worked intellectually, it was found that those with longer work tenure were more attached to the organisation than their younger colleagues (Bartkowiak & Krugiełka, 2015).

The third research question concerned differences in perceived organisational commitment based on organisational factors. To address this question, we considered two organisational indicators. The first involved changes in position over the last 10 years, while the second focused on the type of tasks performed.

Research question 3: How do work position and change of position differentiate the levels of affective and continuance commitment?

This question highlights the importance of exploring various organisational factors that could explain organisational commitment among older workers. For example, Dobrowolska and Ślazyk-Sobol (2017) showed that emotional commitment was lowest among individuals with unstable employment (e.g., fixed-term contracts), indicating that the work arrangement plays a significant role in organisational commitment. Moreover, three studies conducted by Stinglhamber *et al.* (2015) demonstrated that identification with the organisation increases affective organisational commitment, which negatively correlates with employee turnover. However, this series of studies controlled for factors such as level of function, organisational tenure, level of education, job autonomy, and perceived support. This provides evidence that commitment is not independent of organisational and other variables related to how employees perceive their position.

4. Method

4.1. Participants and Procedure

The study involved 346 participants from Poland, but for the final analyses, 280 participants who met all of the inclusion criteria were included. Power analysis using the G*Power, assuming $\alpha = 0.05$ and $1 - \beta = 0.90$, indicated that to obtain an effect size of = 0.25 in a one-way ANOVA for 3 groups, a minimum sample size of $N = 207$ is required. Among the participants, 47.9% were females. The age ranged from 50 to 60 years ($M = 52.93$, $SD = 2.45$). 18.2% of the participants lived in rural areas, 53.9% in cities with up to 250,000 inhabitants, and 27.9% in cities with over 500,000 inhabitants. 57.1% worked in the private sector, while 42.9% worked in the public sector.

The study was conducted online using a research panel. A purposive sampling method was applied to select employees aged 50+ from various companies. Each participant in the study had to meet the following criteria simultaneously: 1) provide informed consent to participate in the study, 2) be aged 50 or above, 3) be employed, 4) work full-time. The study excluded individuals who 1) did not consent to participate in the study, 2) were under the age of 50, 3) were not currently employed, 4) worked less than full-time. After passing the recruitment process, participants completed a questionnaire containing questions about the characteristics of their job and psychological scales to measure organisational commitment. Completing the entire questionnaire took approximately 15 minutes.

4.2. Measures

A set of custom questions concerning employment and two dimensions of the organisational commitment scale were used to measure the analysed variables.

The employment-related questions focused on aspects of employment and workplace organisation derived from the literature. They covered the type of job, job position, and changes in job position over time, such as "Have you worked in different positions in the last 10 years?". Participants responded to each of these questions by selecting one answer.

Continuance and affective commitment were measured using the Polish version of the Organisational Commitment Scale (Wnuk, 2017). This scale consisted of 12 statements (e.g., "This company/organisation means a lot to me"), to which participants responded on a scale ranging from 1 – strongly disagree, to 5 – strongly agree. The theoretical validity analysis of this tool revealed statistically significant relationships with perceived organisational support, support from supervisors, job satisfaction, and person-organisation fit. The scale's reliability, measured by Cronbach's α coefficient, was 0.87 for affective commitment and 0.68 for continuance commitment.

4.3. Data Analysis

A descriptive statistics analysis of both the continuance and the affective commitment scales was conducted. In preliminary analyses, a two-sample paired *t*-test was used to compare the levels of continuance commitment with affective commitment. Homogeneity of variance was tested using Levene's test. To compare the levels of organisational commitment, an independent samples *t*-test and one-way ANOVA were utilised. Significant effects were compared using the Tukey's *post-hoc* test.

5. Results

5.1. Preliminary Analysis

Skewness and kurtosis analysis did not reveal significant differences in the results within each subscale (Table 1). Kolmogorov-Smirnov test analysis showed that the distributions of variables are not close to the normal distribution ($p < 0.05$).

Table 1. Descriptive Statistics for Organisational Commitment ($N = 280$)

Variable	*M*	*SD*	*Sk*	*K*	Min	Max	*K-S*	*p*
Continuance	19.55	4.48	0.17	–0.44	7.00	30.00	0.13	< 0.001
Emotional	19.32	5.41	0.01	–0.31	6.00	30.00	0.11	< 0.001

Notes: *M* – mean, *SD* – standard deviation, *Sk* – skewness, *K* – kurtosis, *K-S* – Kolmogorov-Smirnov test, *p* – *p*-value.

Source: the authors.

5.2. Main Analysis

The main analyses focused on answering the three research questions. The results for each of these questions are presented in the following tables in this section. In response to the first research question, an independent samples *t*-test analysis was conducted (Table 2).

Table 2. Comparison of Organisational Commitment by Gender

Commitment	Group	*M*	*SD*	*t*	*df*	*p*
Gender						
Emotional	male	19.49	5.28	0.57	278	0.572
	female	19.13	5.57			
Continuance	male	19.15	4.59	–1.58	278	0.116
	female	19.99	4.32			

Notes: *M* – mean, *SD* – standard deviation, *t* – *t*-test result, *df* – degrees of freedom, *p* – *p*-value.
Source: the authors.

Before comparing means, Levene's test for homogeneity of variances was conducted. The test indicated that variances in both groups are homogeneous for emotional attachment ($F = 0.51$, $p = 0.475$) as well as for continuance attachment ($F = 0.23$, $p = 0.633$). The results of *t*-test did not reveal statistically significant differences between the male and female ($p > 0.05$) both in emotional and continuance commitment (Table 2).

In order to answer the second research question, which asked whether the type of work differentiates the level of commitment among employees aged 50+, a one-way ANOVA was conducted for both emotional and continuance commitment dimensions (Table 3).

Based on participants' responses, three groups were identified according to the type of work (physical, mental, physical and mental). Variances in the groups were homogeneous both for emotional ($F = 0.65$, $p = 0.552$) and for continuance commitment ($F = 1.79$, $p = 0.169$). The results of ANOVA indicated that employees differ in emotional commitment depending on the type of work, $F(2; 279) = 8.74$, $p < 0.001$, $Eta^2 = 0.059$. *Post-hoc* comparisons using Tukey's test revealed statistically significant differences ($p < 0.05$) in emotional commitment levels between intellectual workers ($M = 20.61$, $SD = 5.34$) and physical workers ($M = 17.50$, $SD = 5.30$), as well as among those working in intellectual and physical positions ($M = 18.69$, $SD = 5.09$). The results show that the employees in mental positions were the most emotionally committed. However, no differences were observed in continuance attachment, $F(2; 279) = 2.62$, $p < 0.074$.

Table 3. Type of Work Depending on Organisational Commitment

Commitment	Group	*M*	*SD*	*F*	*df*	*p*
Type of work						
Emotional	physical	17.50	5.30	8.74	2; 279	< 0.001
	mental	20.61	5.34			
	physical and mental	18.69	5.09			
Continuance	physical	19.91	4.96	2.62	2; 279	0.074
	mental	19.93	4.10			
	physical and mental	18.55	4.56			

Notes: *M* – mean, *SD* – standard deviation, *F* – one-way ANOVA result, *df* – degrees of freedom, *p* – *p*-value.

Source: the authors.

In response to the third research question, differences in organisational commitment were examined between three types of job positions (executive, specialist, managerial) and individuals who had or had not changed their position in the last 10 years (Table 4).

Table 4. Type and Position at Work Depending on Organisational Commitment

Commitment		*M*	*SD*	Test	*df*	*p*
Position at work						
Emotional	executive	17.85	5.15	$F = 6.94$	2; 245	< 0.001
	specialist	19.27	5.38			
	managerial	21.40	5.28			
Continuance	executive	18.47	4.35	$F = 2.26$	2; 245	0.107
	specialist	19.95	4.66			
	managerial	19.42	4.27			
Working in various positions (within the last 10 years)						
Emotional	no	19.85	5.13	$t = 1.44$	278	0.151
	yes	18.91	5.60			
Continuance	no	20.17	4.28	$t = 2.03$	278	0.043
	yes	19.08	4.58			

Notes: *M* – mean, *SD* – standard deviation, *F* – one-way ANOVA result, *t* – *t*-test result, *df* – degrees of freedom, *p* – *p*-value.

Source: the authors.

Variances between groups compared by Levene's test in emotional ($F = 0.24$, $p = 0.791$) and continuance ($F = 0.99$, $p = 0.371$) commitment were homogeneous. Significant differences were observed only in terms of emotional attachment, $F(2; 245) = 6.94$, $p < 0.001$, $Eta^2 = 0.054$. *Post-hoc* analysis indicated that both executive positions ($M = 17.85$, $SD = 5.15$) and specialist positions ($M = 19.27$, $SD = 5.38$) exhibited lower levels of this commitment compared to managerial positions ($M = 21.40$, $SD = 5.28$).

In the case of working in different job positions, variances in emotional ($F = 0.86$, $p = 0.355$) and continuance commitment ($F = 0.13$, $p = 0.911$) were homogeneous. Group comparison showed that participants who did not work in other positions had a higher level of continuance commitment ($t = 2.03$, $p = 0.043$, $d = 0.25$), but no differences were observed in emotional commitment between the groups.

6. Discussion

The aim of this study was to explore differences in organisational commitment based on socio-demographic and organisational characteristics among workers aged 50+. The study assessed both emotional and continuance commitment. We formulated three research questions, which focused on differences in affective and continuance commitment based on gender, job change, and selected organisational factors. Detailed data analysis led to several important conclusions regarding the functioning of individuals aged 50+ in organisations.

Firstly, the results showed that women and men aged 50+ did not differ significantly in terms of organisational commitment. Interestingly, the observed level of commitment in both groups can be described as average (scores below 20 on a scale from 6 to 30). This can be explained by studies indicating the blurring of fundamental differences in the perception of values that occur in individuals over 50, regardless of gender. Although Gangai and Agrawal (2015) found differences in the association of commitment with group engagement between women and men in their studies, it is important to note that those studies were conducted in a different organisational context and culture (India), which indicates the need to measure commitment with reference to culture.

The second conclusion concerns the response to the question of organisational factors that may influence the development of commitment. The aim of this question was to search for factors that may be important in organisational commitment. The analysis examined the type of work performed. The results showed that, the respondents did not differ in terms of continuance commitment, but the statistical significance of this comparison was close to the threshold indicating statistically significant effects ($p = 0.074$). Statistically significant differences were observed only in emotional commitment. The highest level of affective commitment was observed among those working in mental type positions. This is consistent with the results showing that people working in intellectual roles have a higher level of commitment (Bartkowiak & Krugiełka, 2015). However, the mixed type of position was characterised by the lowest level of continuance commitment.

The third conclusion addressed the question of differences in organisational commitment based on work position and previous position changes. In this case, it was observed that only emotional commitment differs depending on the position at work. The highest level was found among individuals in managerial positions. Additionally, individuals who have not changed position in recent ten years exhibit significantly higher continuance commitment, but there are no differences in emotional commitment among them. This result aligns with studies showing that individuals with unstable employment have lower emotional commitment (Dobrowolska & Ślazyk-Sobol, 2017), which may indicate that higher positions are associated with greater confidence in job stability. It can be assumed that managers have a higher level of identification with the organisation, which increases their level of commitment (Stinglhamber *et al.*, 2015).

The results of these analyses show an interesting profile of employees aged 50+, who, on the one hand, feel more emotionally committed if their position is higher, but on the other hand, perceive lower potential costs of leaving the organisation if they have worked in various positions over the last decade (possibly having received a promotion). Therefore, individuals who have changed positions at work are less concerned about losing various benefits associated with belonging to their organisation. It is worth emphasising once again that these are individuals aged 50+ who have significant work experience and are getting closer to retirement. According to research findings, tenure in one company promotes the development of strong commitment (Abreu, Cunha & Rebouças, 2013), especially in individualistic cultures (Fischer & Mansell, 2009). Adding the characteristics related to the age of workers aged 50+ such as increasing need for security, attachment to their role, or long-term effort invested (Jung & Yoon, 2016), this result is not surprising. This result is also consistent with other studies which have shown that commitment can be associated with satisfaction, performance, or flexibility (Saeed *et al.*, 2014), which are quite common in managerial positions.

7. Limitations and Future Directions

Despite the interesting findings that provide significant insights into the characteristics of workers aged 50+, this study also has several limitations that should be considered when interpreting the results.

Firstly, the study only included employees who were aged 50+ and worked full-time, which indicates that the sample was not representative. Therefore, despite the large sample size, the conclusions cannot be generalised to all workers aged 50+. There may be differences in organisational commitment between individuals who are currently not working and those who work part-time or in a different capacity. Future research should explore these relationships.

Secondly, considering the theoretical assumptions of this study, a comparison of emotional and continuance commitment was conducted based on gender, job change, type of work, and current job position. However, the study did not test other factors that may also be significant in the commitment of workers aged 50+ to the organisation, such as overall work tenure or job satisfaction (Saeed *et al*., 2014; Al-Jabari & Ghazzawi, 2019). In future research, it would be valuable to investigate these additional relationships.

Lastly, the study included the measurement of two key factors of organisational commitment. According to Meyer and Allen's (1991) theory, there is also the dimension of normative commitment, which is related to the moral aspect of working for a particular organisation. In future research, it would be worthwhile to consider this additional factor in the analysis of organisational commitment among workers aged 50+.

8. Practical Implications

The research findings provide practical insights that can be utilised by employers of workers aged 50+, as well as individuals who collaborate with or manage them. As shown, these employees exhibit strong commitment to their roles, and the stability of their commitment in terms of perceived benefits and costs associated with leaving (continuance commitment) is not differentiated by their job responsibilities or positions. Therefore, workers aged 50+ can be considered highly committed to the organisation they choose to work for. Furthermore, both women and men show similar levels of commitment, and while changing positions may decrease continuance commitment, it does not affect the sense of emotional engagement with the organisation. HR professionals contemplating the decision to hire individuals aged 50+ in an era of frequent employee turnover should keep this in mind.

For managers and collaborators, an important takeaway from this study is that the perception of potential benefits associated with staying or leaving a job is similar regardless of the type of work or position held. It is worth noting that the level of this commitment is quite high. Therefore, workers aged 50+ should not be seen as individuals who merely calculate the pros and cons of their positions, but rather as individuals who value job satisfaction, have an individual attitude towards their role, and exhibit emotional involvement. This conclusion is especially relevant for those working in intellectual positions and managerial roles. Based on these findings, human resource management strategies can be developed for employees aged 50+ to strengthen their commitment, thereby significantly impacting the performance of entire teams and organisations.

9. Conclusions

Organisational commitment is a construct that can have significant implications for decision-making regarding the retention or change of a job. In this study, the importance of commitment among employees with substantial work experience, who may also be open to new experiences related to changing jobs, was examined. Our study showed that the gender of employees aged 50+ does not differentiate their organisational commitment. The type of work differentiates only continuance commitment, whereas job position influences emotional commitment, and working in various positions affects continuance commitment. Those who are most emotionally committed are intellectual workers in managerial positions. The findings obtained can contribute to a better understanding of the needs and characteristics of experienced workers aged 50+, who can be valuable assets in the labour market.

Authors' Contribution

The authors' individual contribution is as follows: Each contributed a fifth.

Conflict of Interest

The authors declare no conflict of interest.

References

Abreu, M. C. S., Cunha, M. S., & Rebouças, S. M. P. (2013). Effects of Personal Characteristics on Organizational Commitment: Evidence from Brazil's Oil and Gas Industry. *The International Journal of Human Resource Management*, *24*(20), 3831–3852. https://doi.org/10.1080/09585192.2013.781527

Adamchik, V., & Sedlak, P. (2024). Gender and Organizational Commitment: Evidence from a Nationwide Survey in Poland. *Central European Management Journal*, *32*(4), 515–533. https://doi.org/10.1108/CEMJ-05-2023-0201

Al-Jabari, B., & Ghazzawi, I. (2019). Organizational Commitment: A Review of the Conceptual and Empirical Literature and a Research Agenda. *International Leadership Journal*, *11*(1), 78–119.

Albrecht, S. L., & Marty, A. (2020). Personality, Self-efficacy and Job Resources and Their Associations with Employee Engagement, Affective Commitment and Turnover Intentions. *The International Journal of Human Resource Management*, *31*(5), 657–681. https://doi.org/10.1080/09585192.2017.1362660

Arnania-Kepuladze, T. (2010). Gender Stereotypes and Gender Feature of Job Motivation: Differences or Similarity? *Problems and Perspectives in Management*, *8*(2), 84–93.

Artatanaya, I. G. L. S., Supiatni, N. N., Kencanawati, A. A. M., Marhaeni, K. E., & Muderana, I. K. (2023). The Effect of Perceived Organizational Support to Employee's Organizational Commitment. *International Research Journal of Management, IT and Social Sciences*, *10*(2), 101–109. https://doi.org/10.21744/irjmis.v10n2.2290

Balli, H., & Yanik, A. (2014). The Evaluation of Organizational Commitment in Health Employees. *IIB International Refereed Academic Social Sciences Journal*, *16*(4), 1–16.

Barbulescu, R., & Bidwell, M. (2013). Do Women Choose Different Jobs from Men? Mechanisms of Application Segregation in the Market for Managerial Workers. *Organization Science*, *24*(3), 737–756. https://doi.org/10.1287/orsc.1120.0757

Bartkowiak, G., & Krugiełka, A. (2015). Przywiązanie organizacyjne pracowników wiedzy i ich postawy wobec pozostawania aktywnym zawodowo w wieku 65 plus. *Zeszyty Naukowe Uczelni Vistula*, *44*(6), 5–23.

Beheshtifar, M., & Allahyary, M. H. (2013). Study the Relationship among Organizational Reputation with Organizational Commitment and Employees' Turnover Intention. *International Research Journal of Applied and Basic Sciences*, *6*(10), 1467–1478.

Boumans, N. P. G., de Jong, A. H. J., & Janssen, S. M. (2011). Age – Differences in Work Motivation and Job Satisfaction. The Influence of Age on the Relationships between Work Characteristics and Workers' Outcomes. *The International Journal of Aging and Human Development*, *73*(4), 331–350. https://doi.org/ 10.2190/AG.73.4.d

Cogin, J. (2012). Are Generational Differences in Work Values Fact or Fiction? Multi-country Evidence and Implications. *The International Journal of Human Resource Management*, *23*(11), 2268–2294. https://doi.org/10.1080/09585192.2011.610967

Dobrowolska, M., & Ślazyk-Sobol, M. (2015). Przywiązanie organizacyjne oraz satysfakcja zawodowa pracowników 40+ zatrudnionych w elastycznych formach pracy. *Społeczeństwo i Edukacja. Międzynarodowe Studia Humanistyczne*, *2*(17), 93–107.

Dobrowolska, M., & Ślazyk-Sobol, M. (2017). Zaangażowanie i przywiązanie organizacyjne a wypalenie zawodowe pracujących w elastycznych formach zatrudnienia – raport z badań empirycznych. *Zarządzanie Zasobami Ludzkimi*, *5*(118), 141–168.

Fischer, R., & Mansell, A. (2009). Commitment across Cultures: A Meta-analytical Approach. *Journal of International Business Studies*, *40*(8), 1339–1358. https://doi.org/ 10.1057/JIBS.2009.14

Gangai, K. N., & Agrawal, R. (2015). Job Satisfaction and Organizational Commitment: Is It Important for Employee Performance. *International Journal of Management and Business Research*, *5*(4), 269–278.

GUS. (2023). *Prognoza ludności na lata 2023–2060*. Departament Badań Demograficznych. Retrieved from: https://stat.gov.pl/obszary-tematyczne/ludnosc/prognoza-ludnosci/prognoza-ludnosci-na-lata-2023-2060,11,1.html (accessed: 10.09.2023).

Inceoglu, I., Segers, J., & Bartram, D. (2012). Age-related Differences in Work Motivation. *Journal of Occupational and Organizational Psychology*, *85*(2), 300–329. https://doi.org/ 10.1111/j.2044-8325.2011.02035.x

Jung, H. S., & Yoon, H. H. (2016). What Does Work Meaning to Hospitality Employees? The Effects of Meaningful Work on Employees' Organizational Commitment: The Mediating Role of Job Engagement. *International Journal of Hospitality Management*, *53*, 59–68. https://doi.org/10.1016/j.ijhm.2015.12.004

Kulik, C. T., Ryan, S., Harper, S., & George, G. (2014). Aging Populations and Management. *Academy of Management Journal*, *57*(4), 929–935. https://doi.org/10.5465/amj.2014.4004

Kunze, F., Boehm, S. A., & Bruch, H. (2011). Age Diversity, Age Discrimination Climate and Performance Consequences – a Cross Organizational Study. *Journal of Organizational Behavior*, *32*(2), 264–290. https://doi.org/10.1002/job.698

Lewicka, D. (2017). Przywiązanie organizacyjne w zróżnicowanych pokoleniowo grupach pracowników. *Zarządzanie Zasobami Ludzkimi*, 3–4(116–117), 67–86.

Łaguna, M., Mielniczuk, E., Żaliński, A., & Wałachowska, K. (2015). Przywiązanie do organizacji i zaangażowanie w pracę – koncepcje teoretyczne i problemy terminologiczne. *Medycyna Pracy*, *66*(2), 277–284. https://doi.org/10.13075/mp.5893.00169

Major, D. A., Morganson, V. J., & Bolen, H. M. (2013). Predictors of Occupational and Organizational Commitment in Information Technology: Exploring Gender Differences and Similarities. *Journal of Business and Psychology*, *28*(3), 301–314. https://doi.org/10.1007/s10869-012-9282-5

Meyer, J. P., & Allen, N. J. (1991). A Three-component Conceptualization of Organizational Commitment. *Human Resource Management Review*, *1*(1), 61–89. https://doi.org/10.1016/1053-4822(91)90011-Z

Meyer, J. P., Stanley, D. J., Herscovitch, L., & Topolnytsky, L. (2002). Affective, Continuance, and Normative Commitment to the Organization: A Meta-analysis of Antecedents, Correlates, and Consequences. *Journal of Vocational Behavior*, *61*(1), 20–52. https://doi.org/10.1006/jvbe.2001.1842

Meyer, J. P., Stanley, D. J., Jackson, T. A., McInnis, K. J., Maltin, E. R., & Sheppard, L. (2012). Affective, Normative, and Continuance Commitment Levels across Cultures: A Meta-analysis. *Journal of Vocational Behavior*, *80*(2), 225–245. https://doi.org/10.1016/j.jvb.2011.09.005

Ng, T. W. H., & Feldman, D. C. (2012). Evaluating Six Common Stereotypes about Older Workers with Meta-analytical Data. *Personnel Psychology*, *65*(4), 821–858. https://doi.org/10.1111/peps.12003

Saeed, I., Waseem, M., Sikander, S., & Rizwan, M. (2014). The Relationship of Turnover Intention with Job Satisfaction, Job Performance, Leader Member Exchange, Emotional Intelligence and Organizational Commitment. *International Journal of Learning and Development*, *4*(2), 242–256. https://doi.org/10.5296/ijld.v4i2.6100

Singh, A., & Gupta, B. (2015). Job Involvement, Organizational Commitment, Professional Commitment, and Team Commitment: A Study of Generational Diversity. *Benchmarking: An International Journal*, *22*(6), 1192–1211. https://doi.org/10.1108/BIJ-01-2014-0007

Sobotka, B., Szymańska-Czaplak, E., & Bruska, A. (2020). Potential of Vocational Education in Opole – State and Recommendations. *Journal of Modern Science*, *44*(1), 151–173. https://doi.org/10.13166/jms/125592

Stinglhamber, F., Marique, G., Caesens, G., Desmette, D., Hansez, I., Hanin, D., & Bertrand, F. (2015). Employees' Organizational Identification and Affective Organizational

Commitment: An Integrative Approach. *PloS One*, *10*(4), e0123955. https://doi.org/10.1371/journal.pone.0123955

Suma, S., & Lesha, J. (2013). Job Satisfaction and Organizational Commitment: The Case of Shkodra Municipality. *European Scientific Journal*, *9*(17), 41–51.

Syabarrudin, A., Eliyana, A., & Naimah, J. (2020). Does Employees' Self-efficacy Drive Their Organizational Commitment? *Systematic Reviews in Pharmacy*, *11*(4), 135–141.

Widerszal-Bazyl, M. (2015). Wartości związane z pracą w różnych pokoleniach. *Bezpieczeństwo Pracy – Nauka i Praktyka*, 10, 20–24.

Wnuk, M. (2017). Właściwości psychometryczne polskiej wersji skali przywiązania do organizacji. *Organizacja i Kierowanie*, 3(177), 109–125.

Yousef, D. A. (2017). Organizational Commitment, Job Satisfaction and Attitudes toward Organizational Change: A Study in the Local Government. *International Journal of Public Administration*, *40*(1), 77–88. https://doi.org/10.1080/01900692.2015.1072217

Krakow Review of Economics and Management
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie
4 (1010)
2025

KREM, 2025, 4(1010): 65–82
ISSN 1898-6447
e-ISSN 2545-3238
https://doi.org/10.15678/krem.18679

Participation of Financial Institutions in the Processes of Financial Stabilisation and Sustainable Development

Aneta Kosztowniak

SGH Warsaw School of Economics, Department of Applied Economics, Niepodległości 162, 02-554 Warszawa, Poland, e-mail: akoszt@sgh.waw.pl, ORCID: https://orcid.org/0000-0001-6088-1899

Suggested citation: Kosztowniak, A. (2025). Participation of Financial Institutions in the Processes of Financial Stabilisation and Sustainable Development. *Krakow Review of Economics and Management / Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 4(1010), 65–82. https://doi.org/10.15678/krem.18679

ABSTRACT

Objective: The aim of the article is to present the most important legal regulations in the field of ESG and their impact on the conditions of financial stability and the implementation processes of sustainable development in financial institutions.

Research Design & Methods: The research methods focus on presenting and assessing changes in ESG and climate disclosure scores for institutions in the global economy and green asset ratio (GAR) indicators for EU/eurozone countries. Empirical data come from online reports and databases from the Working Group on Climate-related Financial Disclosure (TCFD), Financial Stability Board (FSB), European Board Authority (EBA) and European Insurance and Occupational Pensions Authority (EIOPA), and Sustainalytics. The main period of analysis covers the years 2022–2024.

Findings: Data from the TCFD and FSB show that banks and insurance companies demonstrate the highest level of ESG disclosure, including in the area of strategy. Institutions from Europe, Asia-Pacific, and North America are leading the disclosure curve. Among EU/EEA countries, Slovakia, Iceland, and Luxembourg demonstrated the highest level of transformation activity in terms of the share of GAR in assets in 2023–2024.

Implications/Recommendations: Financial institutions actively shape the conditions for financial stability and sustainable development because they are subject to legal regulations in these areas. Financial and economic outcomes depend on the efficiency of financial institutions' management boards and the effectiveness of mitigating systemic risks (ESG, climate) in these areas. According to the Fit-for-55 report, financial institutions would incur the lowest costs under the baseline scenario.
Contribution: The analysis fills a gap in the research on the role of financial institutions in the global economy, including in the EU/EEA, in shaping the conditions for financial stability when implementing ESG transformation processes revealed, among others, in reporting and changes to GAR indicators.

Article type: original article.

Keywords: financial institutions, financial stability, ESG, legal regulations, disclosures, GAR.

JEL Classification: G15, G18, Q54, K22, K23.

1. Introduction

Financial stability is crucial for market participants to be able to work towards sustainable development (environmental, social, and corporate social responsibility, ESG), and financial institutions are key players in this regard. These institutions serve as channels for capital transfer and the implementation of most real-world processes in the economy.

The global consensus on the adoption of international regulations for sustainable development was defined by the UN in 2015 (Sustainable Development Goals, SDGs) (UN, 2015) and the Paris climate agreement (COP21), and signed by international institutions and countries. Legal regulations regarding ESG, taxonomy, and non-financial reporting have a broad impact on financial accounting.

Financial intermediaries such as banks, insurance companies, investment funds, pension funds, and others are implementing ESG regulations into their processes, management systems, strategies, and business models. European Union countries are leading ESG changes in the global economy through their legislative and implementation efforts, primarily by banks based in the EU/EEA.

The expansion of ESG regulations in the last decade in the global economy and the obligations of institutions to implement them have had both positive and negative effects on their functioning, depending on the efficiency of processes and exposure to risk.

ESG implementation processes are underway at varying degrees of advancement in individual countries and institutions, which determines varying levels of financial stability, development conditions, and financial costs. Therefore, it is important to identify the results of ESG regulation implementation in terms of taxonomy, disclosures, and, for example, the share of green assets in total assets (green asset ratio, GAR).

The aim of the article is to present the most important legal regulations in the field of ESG and their impact on the level of financial stability and the implementation processes of sustainable development in financial institutions.

The paper is structured around an introduction, a literature and research review, and a catalogue of key legal regulations in the field of sustainable finance. The empirical section presents the results of the ECB's work, identifying key challenges and differences between institutions regarding reporting, ESG disclosures, and financial stability. The discussion addresses research on the impact of financial stability on sustainable development and the effectiveness of ESG indicators for risk reduction in institutions. The executive summary includes a summary and conclusions.

2. Literature and Research Review

Financial system stability is understood as a state in which the financial system performs its functions continuously and effectively, even in the event of unexpected and adverse disruptions of a significant scale (NBP, 2025). This is important because such disruptions can affect the operations of institutions and the real economy.

Economic and financial literature emphasises the fact that maintaining financial stability is a necessary condition for sustainable economic development. The financial sector is one of the fundamental elements of economic systems, influencing the pace and development of the economy. Therefore, the actions these institutions undertake to both maintain stability and effectively utilise resources for economic development are crucial.

In recent years, ESG regulations have been introduced to support sustainable development and financial stability. However, institutions vary in their implementation processes, in their operational activities, and in their strategic plans. Delays and overly ambitious ESG implementation can also be a source of disruption for a diverse group of institutions. Therefore, analyses and research in this area are important to understand the current situation. A better understanding of the scale and scope of financial institutions' participation in financial stability and sustainable development would allow for adjustments to these frameworks for optimisation. Due to the relatively short implementation period and the lack of empirical research, developing these areas is considered justified.

The market destabilisation resulting from the 2007+ financial crisis led to the establishment of, among others, the Financial Stability Oversight Committee in the United States and the European Financial Stability Board. These are regional agencies of the Financial Stability Board, established in April 2009 by the G20. Since then, both in the literature and in economic practice, financial system risk has been increasingly perceived not only as external but also as internal, requiring supervision to ensure conditions for growth. The materialisation of systemic risk can result from the correction of previously accumulated imbalances in the financial system or the real economy (Borio, 2012, p. 23), or from a sudden shock generating a positive feedback mechanism (Dąbrowski, 2016).

Chiaramonte *et al*. (2022) conducted a study on the impact of ESG strategies on the stability of banks in the EU, using a difference-in-differences model. They found that banks' engagement in such strategies is associated with greater stability, i.e., a lower risk of default, during crisis years. The authors found that ESG strategies encourage more prudent banking activity, building more stable relationships with the financial community and strengthening reputation. These aspects are crucial for mitigating the potential negative impact of adverse events that typically occur during crises.

According to Saïdane and Abdallah (2020), regarding the relationship between financial stability and the stability of European banks over the period 2005–2017, using the panel vector autoregression method with the generalised method of moments (GMM) and the Granger causality test, the research results indicate the existence of a bidirectional causal relationship between stability and bank stability.

Climate risk may be a source of financial instability. This risk can negatively impact households and businesses and is therefore transferred to financial entities, which determine the level of risk (e.g., credit, counterparty, or liquidity) and the required capital buffers. A consequence of a short-term or large-scale escalation of climate risk may be the need for financial support under bailout conditions (ECB/ESRB Project Team, 2023; Kosztowniak, 2023).

As noted by Coleton *et al*. (2020) and Mobiquity (2021, 2023), the manner and scale of incorporating ESG issues into the strategy of financial institutions result from an individual assessment of the significance of motives (their own, stakeholders' expectations, the scale of ESG risk, the perception of benefits, supervisory expectations or regulatory incentives), as well as barriers and limitations related to the integration of these issues or the possibility of their implementation.

On the one hand (the positive side), financial institutions perceive ESG factors as an opportunity to expand their product offerings, differentiate themselves in the market, and build their brand, which will ultimately translate into increased company value and stakeholder satisfaction. On the other hand (the negative side), exposure to ESG risk may be associated with increased risk in the institution's operational or strategic activities, as well as in interactions with counterparties in the value chain.

Consistent with Kong *et al*.'s (2020) study of the impact of banking system stability on sustainable development over the period 2000–2016, as well as in the periods before and after the global financial crisis, the use of system GMM shows that banking system stability has a significant impact on sustainable development.

Di Tommaso and Thorton (2020) conducted a study on the impact of ESG activities on risk-taking in European banks. The study found that high ESG performance was associated with a moderate reduction in risk in banks with high or low risk-taking, and this effect depended on the characteristics of the board.

Research by Ozili and Iorember (2023) shows that financial institutions operating in a stable financial system are inclined to support the implementation of the SDGs. An analysis of 26 countries from 2011 to 2018 using the system GMM method shows that European and Asian countries have a high sustainability index compared to African countries.

The research by Fu, Lu and Pirabi (2023) on the relationship between green finance and sustainable development shows that:

– it is important to use CO_2 neutral practices,

– ESG factors should be incorporated into investment decisions,

– effective communication strategies can increase public awareness and support for climate policies,

– it is advisable to align financial incentives, promote transparency and take social equity into account in green finance initiatives.

3. Major Legal Regulations in the Area of Sustainable Finance

The European Commission (EC) defines sustainable finance (or financing) as the process of integrating ESG aspects into investment decisions in the financial sector, leading to long-term investments in sustainable economic activities and projects (ESMA, 2023; EC, 2024a).

At the EU level, the European Commission announced in 2018 the EU Action Plan on Sustainable Finance (EC, 2018), setting out a wide range of regulations in this area, as well as the European Green Deal in 2019 (EC, 2024b), which aims to achieve climate neutrality for the continent by 2050.

One of the first important legislative documents was the Non-financial Information Disclosure Directive (NFRD, Directive 2014/95/EU), which set out the basis for non-financial reporting.

Later came the Regulation on the Disclosure of Information on Sustainable Finance (SFDR, Regulation (EU) 2019/2088) on disclosure of information on sustainable investments by participants in the financial market and Regulation 2020/852/EU of the European Parliament and of the Council, known as the Taxonomy.

Another important step in improving regulations on sustainable finance was the Corporate Sustainability Reporting Directive (CSRD, Directive (EU) 2024/1760), the aim of which is to achieve climate neutrality of institutions and entities operating in the EU by 2050.

It is worth noting that the CSRD has a significant impact on banks' strategies. In addition to sustainability reporting and non-financial disclosure, the directive also impacts the terms of value creation strategies and opportunities for building competitive advantage.

European Sustainability Reporting Standards (ESRS, Commission Delegated Regulation (EU) 2023/2772) were adopted on 31 July 2023. These standards were defined as the only reporting standards under the CSRD Directive. For ESG risk disclosures under Pillar III, technical standards initially defined in 2021 (EBA, 2021a, 2021b) and revised in 2022 (EBA, 2022) apply.

In 2024, the Directive of the European Parliament and of the Council on corporate due diligence for sustainable development and amending the Directive (EU) (Corporate Sustainability Due Diligence Directive, CSDDD) (Directive (EU) 2024/1760), which introduces a due diligence obligation to counteract the negative impacts of business activities on human rights and the environment.

On 8 January 2025, EBA published guidelines on the management of environmental, social and governance (ESG) risks (EBA, 2025b), applicable from 11 January 2026, with the exception of small institutions, which will be covered by them by 11 January 2027 at the latest:

– identification and measurement of ESG risks,

– standards for managing and monitoring ESG risks and governance.

In 2025 important banks in Europe, including Poland, have already started the process of systematically implementing EBA regulations regarding the integration of ESG risks with traditional risks.

ESG objectives in the strategies of financial institutions focus on (Kosztowniak, 2025):

– environmental targets – including green asset indicators (GAR), the indicator of compliance of the banking portfolio with the EU Taxonomy (Banking Book Taxonomy Alignment Ratio), the number and volume of financing that meets the environmental objectives set out in article 9 of the Taxonomy Regulation (2020/852), and the calculation of the bank's carbon footprint (at levels 1, 2, 3),

– social purpose – such as activities for the benefit of the community and society, employee relations and improvement of working conditions, customer protection and product liability, and human rights,

– corporate governance objectives – including ethical considerations, risk strategies and management, inclusiveness and transparency.

Regulations regarding reporting by financial institutions in the area of sustainable development are supplemented by, among others:

– Global Reporting Initiative (GRI Standards) reporting standards (GRI Sustainability Taxonomy, 2025),

– Integrated Reporting Guidelines (International Integrated Reporting Council; IIRC, 2025),

– recommendations of the Working Group on Climate-related Financial Disclosures (TCFD, 2017).

4. Results of the European Central Bank's Work on Sustainable Development

The European Central Bank (ECB) is conducting key work on ESG issues, integrating ESG risks into financial and non-financial risk management and conducting climate stress tests (Germann, Kusmierczyk & Puyo, 2023). According to the ECB, risks related to climate change and rapid transformation are increasing, impacting monetary policy and the stability of financial systems.

In 2023, ECB worked on its Climate and Nature Plan 2024–2025, setting out strategic climate goals and three main areas for action: managing the transition to a green economy, understanding the increased physical impacts of climate change, and making progress on nature-related risks (ECB, 2023a).

The ECB's analysis of the impact of carbon pricing on the economy found moderate negative impacts on banks. It indicated that euro area companies invest during the transition period and bank lending conditions are more stringent for companies with high emissions and without credible transition plans (Ferdinandusse *et al*., 2023).

In 2023, the ECB published its first financial reports on the climate impact of Eurosystem corporate assets. The documents show that the carbon intensity of reinvestments fell by more than 65% in the 12 months following the start of planned reinvestments in October 2022 (ECB, 2023b). Furthermore, an analysis of the impact of climate change on the monetary policy transmission mechanism, with implications for monetary policy showed that, while the transition increases the cost of credit and reduces lending for all firms, its recessionary impact is milder for low-carbon firms and those committed to decarbonisation (Altavilla *et al*., 2023).

The ECB's analysis of banking supervision also found that, while credit institutions supervised by the Single Supervisory Mechanism have made significant progress on climate, many institutions have not achieved the expected progress in terms of environmental risk management practices (Elderson, 2023). Studies on transition risks and the links between climate and nature show that almost 75% of corporate loans in the euro area (almost EUR 3.24 trillion) were granted to borrowers with a high degree of dependence on ecosystem services (Ceglar *et al*., 2023).

5. Challenges and Differences between Institutions in Reporting, ESG Disclosures, and Financial Stability

One of the main challenges in the practice of implementing ESG is ensuring the appropriate link between non-financial reporting and financial reporting, including in the context of International Financial Reporting Standards (IFRS), which are mandatory for most financial institutions.

The impact of accounting on financial stability can occur through three channels: transparency, the response of institutions to accounting information, and the definition of prudential requirements for financial institutions.

Based on the analysis of IFRS and their interactions with risks related to, for example, the relationship between financial institutions and non-financial entities, four important problems related to financial stability and accounting risk, i.e.:

– incomplete consideration of climate risk in prices,

– impact on the initial and subsequent valuation of non-financial assets and liabilities,

– taking climate factors into account when modelling for expected credit losses,

– disclosing information on how risks, e.g., climate risks, are treated in financial statements.

According to data from the TCFD (2023) and FSB (2023), banks and insurance companies showed similar levels of ESG disclosures in the fiscal year 2022. However, the majority of these disclosures concerned strategy, including the impact of risks and opportunities, for banks (52%) and insurance companies (45%). Financial institutions disclosed significantly more than non-financial entities. Within the non-financial sector, entities from the energy, construction, and transportation sectors demonstrated the highest disclosure activity (Table 1).

In regional terms, in 2022, the highest level of ESG disclosures, including indicators assessing climate risks, were reported by institutions and companies from Europe (leaders), followed by those from the Asia-Pacific region and North America (Table 2).

The importance of addressing climate change in financial institutions and its impact on financial stability in EU countries is underscored by the results of the Fit-for-55 report prepared by the EBA (2023), EIOPA (2025), ESMA, and the ECB. The report includes a calculation of financial losses over the 2023–2030 period under three scenarios:

– baseline (B) implemented in accordance with the assumptions from 2023, with additional costs related to the green transformation,

– the first negative scenario (A1), where investors sell off the assets of companies with high CO_2 emissions, which hinders their green transformation,

– the second negative scenario (A2) is reinforced by other macrofinancial factors.

Table 1. Disclosures by Sector for the Financial Year 2022 (% of Companies)

Disclosure in Accordance with TCFD Recommendations		Banking (466)	Insurance (237)	Energy (430)	Buildings (543)	Trans-portation (323)	Agricul-ture, Food, Forest (370)	Tech-nology, Media (382)	Consumer Goods (359)
Management	Management supervision	41	43	58	61	40	31	19	35
	The role of management	28	28	38	35	24	19	13	19
Strategy	Risks and opportunities	52	45	54	55	33	32	17	28
	Impact on the organisation	23	27	38	35	24	25	12	16
	Strategy resilience	5	6	10	9	4	6	2	4
Risk management	Risk identification and assessment processes	26	29	27	29	18	15	6	13
	Risk management processes	32	32	32	29	23	19	9	21
	Integration with overall risk management	25	21	20	16	13	9	4	8
Metrics and goals	Climate-related indicators	43	40	58	63	43	42	30	43
	Scope 1, 2, 3 greenhouse gas emissions	40	37	54	75	39	36	28	38
	Climate goals	33	33	57	61	44	39	25	38
Average		32	31	41	43	28	25	15	24

Notes: Numbers in parentheses indicate the size of the population covered by the survey.

Source: the author, based on TCFD (2023), FSB (2023).

Table 2. Disclosures by Region for the 2022 Financial Year (% of Companies)

Disclosure in Accordance with TCFD Recommendations		Asia Pacific (724)	Europe (616)	Latin America (111)	Middle East and Africa (271)	North America (1,388)
Management	Management supervision	37	55	34	22	44
	The role of management	18	47	20	10	25
Strategy	Risks and opportunities	29	56	37	17	45
	Impact on the organisation	24	44	18	12	22
	Strategy resilience	5	16	3	2	3
Risk management	Risk identification and assessment processes	15	47	12	10	14
	Risk management processes	24	43	25	15	20
	Integration with overall risk management	13	27	13	8	12
Metrics and goals	Climate-related indicators	50	78	34	31	35
	Scope 1, 2, 3 greenhouse gas emissions	45	73	31	27	31
	Climate-related goals	34	73	38	22	38
Average		27	51	24	16	26

Notes: Numbers in parentheses indicate the size of the population covered by the survey.

Source: the author, based on TCFD (2023), FSB (2023).

Although the report states that the risk of transformation will not threaten financial stability in the EU, especially in the second negative scenario (A2), losses for banks, insurers, pension and investment funds range from 10.9% to 21.5% (Table 3).

The varied activity of financial institutions in implementing taxonomy, particularly in financing green investments, is confirmed by EBA data (EBA, 2025a). In 2023–2024, the shares of GAR assets in total assets in individual EU/euro area countries varied quite significantly (see Table 4). The leaders in this respect were Slovakia (SK), Iceland (IS), and Luxembourg (LU), maintaining shares above the EU/euro area average (0.32%). The lowest shares were recorded by Croatia, Bulgaria, and Greece (0.12–0.25%). However, in 2024 compared to 2023, the share of GAR assets in total assets increased in most countries, which indicates the gradual implementation of transformation processes (EBA, 2025a).

Table 3. Total Losses Relative to Exposures in Scope by Sector, 2023–2030 (in %)

Sector	First-round Effects			Amplification		
	B	A1	A2	B	A1	A2
Banking	8.82			0.03		
		6.68			0.05	
			10.90			0.09
Insurance	2.20			0.72		
		5.20	18.80		1.73	
						4.49
Institutions for Occupational Retirement Provision (IORP)	3.00					
		6.40				
			21.50			
Investment fund	4.10			2.56		
		6.20			5.12	
			16.20			9.15

Source: EIOPA (2025).

Table 4. Share of Taxonomy-aligned Assets, 2023–2024 (as % of GAR Assets)

Country (Code)	2023	2024
Slovakia (SK)	0.79	0.74
Iceland (IS)	0.54	0.55
Luxembourg (LU)	0.78	0.54
Norway (NO)	0.48	0.52
Sweden (SE)	0.74	0.50
Malta (MT)	0.44	0.43
Finland (FI)	0.39	0.41
Portugal (PT)	0.39	0.40
Netherlands (NL)	0.38	0.40
Belgium (BE)	0.36	0.40
Spain (ES)	0.37	0.37
Hungary (HU)	0.33	0.37
Latvia (LV)	0.37	0.35
Lithuania (LT)	0.33	0.35

Table 4 cnt'd

Country (Code)	2023	2024
Estonia (EE)	0.41	0.35
Cyprus (CY)	0.33	0.34
Denmark (DK)	.	0.34
European Union/euro area	0.32	0.32
France (FR)	0.31	0.29
Italy (IT)	0.27	0.29
Ireland (IE)	0.28	0.28
Germany (DE)	0.26	0.28
Poland (PL)	0.26	0.27
Australia (AT)	0.25	0.27
Romania (RO)	0.35	0.26
Albania (AL)	0.40	0.26
Greece (GR)	0.23	0.25
Bulgaria (BG)	0.23	0.23
Croatia (HR)	0.14	0.12

Source: EBA (2025a).

6. Discussion

Research on the importance of financial stability for sustainable development generally indicates a positive verification of this relationship, especially in the banking market of EU countries (Ozili & Iorember, 2023) and in countries with a developed financial system (Moldovan, 2015; Saïdane & Abdallah, 2020), and advanced sustainable development paths (Kong *et al*., 2020). Fu, Lu and Pirabi (2023) point to the positive importance of green investments in supporting sustainable development. These conclusions constitute arguments for the simultaneous support of the development of financial markets to achieve conditions of stability, which will contribute to the beneficial effects of sustainable development. The effects of mutual interdependence (so-called spillovers) are important here.

Di Tommaso and Thorton (2020) found that high ESG performance is associated with moderate risk reduction in banks with high or low risk taking, and this impact depends on management characteristics. These results are consistent with the "stakeholder" view of ESG activities. However, they note that high ESG performance is also associated with a decline in bank value, which is consistent with the concept of "overinvestment." This decline in bank value occurs despite a positive indirect relationship between ESG performance and bank value, through its impact on risk taking. Furthermore, the researchers conclude that there is a trade-off between bank risk reduction and a more stable financial system on the one hand, and bank value on the other. This conclusion seems valid because it takes into account a prudent approach to profit and risk management.

Many financial institutions point to climate change as one of the greatest challenges to sustainable development in 2019. The Network of Central Banks and Supervisors for the Greening of the Financial System (NGFS), which brings together central banks and supervisors, has identified climate-related risks as a source of financial risk, and central banks and supervisors are tasked with ensuring the resilience of the financial system to these risks (ESRB, 2016; NGFS, 2020).

From a reporting perspective, the scope of ESG disclosure is crucial. The challenge lies in the time required to disclose information relative to its credibility, as ESG disclosures under Pillar III (EBA, 2022) for banks are extensive and require a multifaceted analysis of indirect exposure to CO_2-related risks.

Challenges in the macroprudential tools highlighted by the European Systemic Risk Board (ECB/ESRB Project Team, 2021) may include:

– the systemic dimension of climate risk,

– macroprudential tools with microprudential measures,

– calibration taking into account microprudential measures,

– the use of two macroprudential tools, i.e., the systemic risk buffer and bank business models (Ayadi, Challita & Cucinelli, 2023).

7. Conclusion

Financial institutions participate in shaping the conditions for financial stability and sustainable development because they are subject to legal regulations that determine these conditions. The more stable the financing conditions, the better the opportunities to support ESG transformation processes, and vice versa. Although support for ESG processes has been ongoing since the 1970s, these processes have intensified in the last decade. Therefore, analyses of the impact of legal regulations on the conditions for stability and supporting sustainable development, with the active participation of financial institutions, are crucial. Analyses of these processes focus on their effects, both positive and, particularly importantly, negative, which can lead to increased systemic risk, reduced financial stability, and sustainable development. Financial institutions are key players in these processes, serving as channels for the transfer of capital and risk in the real economy.

The following conclusions can be drawn from the review of literature, research, and the data presented:

– The impact of ESG regulations (taxonomy) on the financial stability and sustainable development opportunities of financial institutions is multifaceted. This stems from the fact that EU and international regulations significantly influence the strategies, business models, and accompanying reporting of financial institutions. The TCFD, FSB, CSRD, CSDDD, and ESRS and EBA guidelines are of key importance.

– The impact of financial stability on sustainable development is generally positive, particularly in the EU banking market (Ozili & Iorember, 2023) and in countries with a developed financial system (Moldovan, 2015; Saïdane & Abdallah, 2020) and advanced sustainable development paths (Kong *et al*., 2020).

– Fu, Lu and Pirabi (2023) point to the positive impact of green investments in supporting sustainable development. Di Tommaso and Thorton (2020) found that high ESG performance is associated with moderate risk reduction in banks with high or low risk exposure, and this effect depends on the effectiveness of management actions.

– The need to manage ESG risks to ensure the financial stability of an institution is revealed in its transformation strategies, taking into account operational procedures and its organisational structure.

– Challenges in financial reporting primarily concern the correct valuation of assets and liabilities, rapid changes in company valuations that may lead to potential problems with financial stability, and the disclosure of accounting risks.

– EU supervisory authorities and the ESRB support the inclusion of ESG risk within systemic risk and the need for micro- and macro-economic oversight instruments. They also propose changes to existing ESG risk modelling, including climate and scenario analyses.

– The leaders in taxonomy implementation among financial institutions are banks and insurance companies from Europe, followed by North America and Asia-Pacific.

– The importance of implementing transformation in financial institutions and its impact on financial stability in EU countries is demonstrated by the results of the Fit-for-55 report, which indicate potential financial losses in these institutions between 2023 and 2030. According to the report, in the second negative scenario (A2), losses for banks, insurers, pension funds and investment funds could range from 10.9% to 21.5% of their exposure.

– The analysis of changes in GAR indicators in the assets of institutions in 2023–2024 shows that the fastest growth in transformation activities, through an increase in the number of green loans granted, was achieved by Slovakia, Iceland and Luxembourg among the EU/EEA countries.

Conflict of Interest

The author declares no conflict of interest.

References

Altavilla, C., Boucinha, M., Pagano, M., & Polo, A. (2023). *Climate Risk, Bank Lending and Monetary Policy* (Working Paper No. 687). Centre for Studies in Economics and Finance (CSEF).

Ayadi, R., Challita, S., & Cucinelli, D. (2023). Cooperative Banks, Business Models and Efficiency: A Stochastic Frontier Approach Analysis. *Annals of Operations Research*. https://doi.org/10.1007/s10479-023-05526-9

Borio, C. (2012). *The Financial Cycle and Macroeconomics: What Have We Learned?* (BIS Working Papers No. 395). Bank for International Settlements. Retrieved from: https://www.bis.org/publ/work395.htm (accessed: 11.11.2025).

Ceglar, A., Boldrini, S., Lelli, C., Parisi, L., & Heemskerk, I. (2023). *The Impact of the Euro Area Economy and Banks on Biodiversity* (Occasional Paper Series No. 335). European Central Bank. Retrieved from: https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op335~79fbc42228.en.pdf (accessed: 11.11.2025).

Chiaramonte, L., Dreassi, A., Girardone, C., & Piserà, S. (2022). Do ESG Strategies Enhance Bank Stability during Financial Turmoil? Evidence from Europe. *The European Journal of Finance*, *28*(12), 1173–1211. https://doi.org/10.1080/1351847X.2021.1964556

Coleton, A., Brucart, M. F., Gutierrez, P., Le Tennier, F., & Moor, C. (2020). *Sustainable Finance: Market Practices* (EBA Staff Paper Series No. 6). European Banking Authority. Retrieved from: https://eba.europa.eu/sites/default/files/document_library/Sustainable%20finance%20Market%20practices.pdf (accessed: 11.11.2025).

Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive 2013/34/EU of the European Parliament and of the Council as regards sustainability reporting standards. Official Journal of the European Union, Series L. Retrieved from: https://eur-lex.europa.eu/eli/reg_del/2023/2772/oj/eng (accessed: 11.11.2025).

Dąbrowski, I. (2016). *Mechanizmy sprzężeń zwrotnych a równowaga i dynamika systemu gospodarczego*. Oficyna Wydawnicza SGH.

Di Tommaso, C., & Thorton, J. (2020). Do ESG Scores Effect Bank Risk Taking and Value? Evidence from European Banks. *Corporate Social Responsibility and Environmental Management*, *27*(5), 2286–2298. https://doi.org/10.1002/csr.1964

Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups. Text with EEA relevance. Official Journal of the European Union, L 330/1. Retrieved from: https://eur-lex.europa.eu/eli/dir/2014/95/oj/eng (accessed: 11.11.2025).

Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting. Official Journal of the European Union, L 322/15. Retrieved from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022L2464 (accessed: 12.01.2024).

Directive (EU) 2024/1760 of the European Parliament and of the Council of 13 June 2024 on corporate sustainability due diligence and amending Directive (EU) 2019/1937 and Regulation (EU) 2023/2859. Official Journal of the European Union, L Series. Retrieved from: https://eur-lex.europa.eu/eli/dir/2024/1760/oj/eng (accessed: 11.11.2025).

EBA. (2021a). *EBA Report on Management and Supervision of ESG Risks for Credit Institutions and Investment Firms*. EBA/REP/2021/18.

EBA. (2021b). *EBA Roadmap on Strengthening the Prudential Framework. Implementation Timeline of EBA Mandates under EU Banking Package* (*CRD – CRR*). Retrieved from: https://www.eba.europa.eu/sites/default/files/2023-12/9dc534e8-8a3d-438f-88e3bc86e623d99e/EBA%20Roadmap%20on%20strengthening%20the%20prudential%20framework_1.pdf (accessed: 27.01.2024).

EBA. (2022). *Implementing Technical Standards* (*ITS*) *on Prudential Disclosures on ESG Risks in Accordance with Article 449a CRR*. EBA/ITS/2022/01. Retrieved from: https://www.eba.europa.eu/activities/single-rulebook/regulatory-activities/transparency-and-pillar-3/implementing-technical-standards-its-prudential-disclosures-esg-risks-accordance-article-449a-crr (accessed: 11.11.2025).

EBA. (2023). *One-off Fit-for-55 Climate Risk Scenario Analysis*. Template Guidance, 15 November. Retrieved from: https://eba.europa.eu/sites/default/files/2023-11/39f91f76-23b5-4a69-a50d-b3154022e62e/FF55%20-%20Template%20guidance_0.pdf (accessed: 11.11.2025).

EBA. (2025a). *ESG Dashboard*. Retrieved from: https://ebprstaewspublic01.blob.core.windows.net/public/tools-prod/documents/Big_Files/books/interactive-tools/2025/powerbi/ESG_dashboard_page.html (accessed: 11.11.2025).

EBA. (2025b). *Final Report. Guidelines on the Management of Environmental, Social and Governance* (*ESG*) *Risks*. EBA/GL/2025/01. Retrieved from: https://www.eba.europa.eu/publications-and-media/press-releases/eba-publishes-its-final-guidelines-management-esg-risks (accessed: 11.11.2025).

EC. (2018). Communication from the Commission to the European Parliament, the European Council, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the Regions. Action Plan: Financing Sustainable Growth. COM(2018) 97 final. Retrieved from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52018DC0097 (accessed: 27.01.2024).

EC. (2024a). *Overview of Sustainable Finance. What Is Sustainable Finance?* Retrieved from: https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance_en (accessed: 11.11.2025).

EC. (2024b). *What Is the European Green Deal?* Retrieved from: https://www.consilium.europa.eu/en/policies/green-deal/?ref=blog.energyelephant.com (accessed: 27.01.2024).

ECB. (2023a). *Climate Change and the ECB*. Retrieved from: https://www.ecb.europa.eu/ecb/climate/html/index.en.html (accessed: 31.01.2024).

ECB. (2023b). *Climate-related Financial Disclosures of the Eurosystem's Corporate Sector Holdings for Monetary Policy Purposes*. Retrieved from: https://www.ecb.europa.eu/pub/

pdf/other/ecb.climate_related_financial_disclosures_eurosystem_corporate_sector_holdings_monetary_policy_purposes2023~9eae8df8d9.en.pdf (accessed: 31.01.2024).

ECB/ESRB Project Team. (2021). *Climate-related Risk and Financial Stability*. Retrieved from: https://www.esrb.europa.eu/pub/pdf/reports/esrb.climateriskfinancialstability202107~79c10eba1a.en.pdf?71a273dc36a85ef05c8bed530466f900 (accessed: 31.01.2024).

ECB/ESRB Project Team. (2023). *Towards Macroprudential Frameworks for Managing Climate Risk*. December 2023. Retrieved from: https://www.esrb.europa.eu/pub/pdf/reports/esrb.report202312~d7881028b8.en.pdf (accessed: 11.11.2025).

EIOPA. (2025). *Stress Test: One-off Fit-for-55 Climate Risk Scenario Analysis*. Retrieved from: https://www.eiopa.europa.eu/browse/financial-stability/insurance-stress-test/stress-test-one-fit-55-climate-risk-scenario-analysis_en#results (accessed: 11.11.2025).

Elderson, F. (2023). *Powers, Ability and Willingness to Act – the Mainstay of Effective Banking Supervision*. European Central Bank. Retrieved from: https://www.bankingsupervision.europa.eu/press/speeches/date/2023/html/ssm.sp231207~10204b8b70.en.html (accessed: 31.01.2024).

ESMA. (2023). *Sustainable Finance – Implementation Timeline*. ESMA34-45-1580. Retrieved from: https://www.esma.europa.eu/document/sustainable-finance-implementation-timeline (accessed: 31.01.2024).

ESRB. (2016). *Too Late, Too Sudden: Transition to a Low-carbon Economy and Systemic Risk* (Reports of the Advisory Scientific Committee No. 6). European Systemic Risk Board.

Ferdinandusse, M., Kuik, F., Lis, E., & Sun, Y. (2023). Climate-related Policies in the Eurosystem / ECB Staff Macroeconomic Projections for the Euro Area and the Macroeconomic Impact of Green Fiscal Measures. *ECB Economic Bulletin*, 1.

FSB. (2023). *Progress Report on Climate-related Disclosures: 2023 Report*. Retrieved from: https://www.fsb.org/2023/10/progress-report-on-climate-related-disclosures-2023-report/ (accessed: 5.02.2024).

Fu, C., Lu, L., & Pirabi, M. (2023). Advancing Green Finance: A Review of Sustainable Development. *Digital Economy and Sustainable Development*, *1*, 20. https://doi.org/10.1007/s44265-023-00020-3

Germann, M., Kusmierczyk, P., & Puyo, C. (2023). *Results of the 2022 Climate Risk Stress Test of the Eurosystem Balance Sheet*. European Central Bank. Retrieved from: https://www.ecb.europa.eu/pub/economic-bulletin/focus/2023/html/ecb.ebbox202302_06~0e721fa2e8.en.html (accessed: 31.01.2024).

GRI Sustainability Taxonomy. (2025). Retrieved from: https://www.globalreporting.org/standards/gri-sustainability-taxonomy/ (accessed: 11.11.2025).

IIRC. (2025). *Integrated Reporting*. Retrieved from: https://www.ifrs.org/issued-standards/integrated-reporting/ (accessed: 11.11.2025).

Kong, Y., Ntarmah, A. H., Combinah, J., & Meynah, M. V. (2020). The Impacts of Banking System Stability on Sustainable Development: Conditional Mean-based and Parameter Heterogeneity Approaches. *The International Journal of Management, Accounting and Economics*, *7*(9), 482–505. https://doi.org/10.5281/zenodo.17217212

Kosztowniak, A. (2023). Climate Policy Relevant Sectors in the Polish Commercial Banks. *Central European Review of Economics & Finance*, *42*(1), 50–70. https://doi.org/10.24136/ceref.2023.004

Kosztowniak, A. (2025). Ryzyko ESG w instytucjach finansowych w gospodarce światowej. *Ekonomista*. Advance online publication. https://doi.org/10.52335/ekon/204852

Mobiquity. (2021). *A Benchmark for Sustainable Banking. Research Report*. May 2021. Retrieved from: https://f.hubspotusercontent10.net/hubfs/1868764/EU%20Whitepapers_cases_reports/sustainable-banking-report.pdf?hsCtaTracking=6b8a7dfc-535d-4212-b845-c231c29136ef%7C2c9d576e-4b54-4847-b935-30b7bf4c9724 (accessed: 31.01.2024).

Mobiquity. (2023). *Global Benchmark for Sustainable Banking 2023*. Retrieved from: www.mobiquity.com/insights/global-benchmark-for-sustainable-banking-2023 (accessed: 31.01.2024).

Moldovan, I. A. (2015). Does the Financial System Promote Sustainable Development? Evidence from Eastern European Countries. *Central European Business Review*, *4*(2), 40–47. https://doi.org/10.18267/j.cebr.125

NBP. (2025). *Raport o stabilności systemu finansowego*. Czerwiec 2025 r. Retrieved from: https://nbp.pl/system-finansowy/raporty-o-stabilnosci-systemu-finansowego/ (accessed: 11.11.2025).

NGFS. (2020). *Guide to Climate Scenario Analysis for Central Banks and Supervisors. Network for Greening the Financial System*. Retrieved from: https://www.ngfs.net/en/guide-climate-scenario-analysis-central-banks-and-supervisors (accessed: 12.01.2024).

Ozili, P. K., & Iorember, P. T. (2023). Financial Stability and Sustainable Development. *International Journal of Finance & Economics*, *29*(3), 2620–2646. https://doi.org/10.1002/ijfe.2803

Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector. Retrieved from: https://eur-lex.europa.eu/eli/reg/2019/2088/oj/eng (accessed: 11.11.2025).

Regulation 2020/852/EU of the European Parliament and of the Council of 18 June 2020 on establishing a framework to facilitate sustainable investment, amending Regulation (EU) 2019/2088. Retrieved from: https://eur-lex.europa.eu/TodayOJ/ (accessed: 11.11.2025).

Saïdane, D., & Abdallah, S. B. (2020). Sustainability and Financial Stability: Evidence from European Banks. *Economics Bulletin*, *40*(2), 1769–1780.

TCFD. (2017). *Recommendations of the Task Force on Climate-related Financial Disclosures. Final Report*. Retrieved from: https://www.fsb.org/uploads/P290617-5.pdf (accessed: 11.11.2025).

TCFD. (2023). *Task Force on Climate-related Financial Disclosures 2023 Status Report*. Retrieved from: https://www.fsb.org/uploads/P121023-2.pdf (accessed: 11.11.2025).

UN. (2015). *Paris Agreement*. Retrieved from: https://unfccc.int/process-and-meetings/the-paris-agreement (accessed: 27.01.2024).

Krakow Review of Economics and Management
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie

4 (1010)
2025

KREM, 2025, 4(1010): 83–102
ISSN 1898-6447
e-ISSN 2545-3238
https://doi.org/10.15678/krem.18678

Narcissistic CEOs and Tools for Mitigating Agency Problems

Elżbieta Bukalska[1], **Gabriela Dycha-Wąsik**[2]

[1] Maria Curie-Skłodowska University in Lublin, Faculty of Economics, M. Curie-Skłodowskiej Square 5, 20-031 Lublin, Poland, e-mail: elzbieta.bukalska@mail.umcs.pl, ORCID: https://orcid.org/0000-0001-8097-5964

[2] Maria Curie-Skłodowska University in Lublin, Faculty of Economics, M. Curie-Skłodowskiej Square 5, 20-031 Lublin, Poland, e-mail: gabriela.dycha@mail.umcs.pl, ORCID: https://orcid.org/0009-0007-3840-5205

Suggested citation: Bukalska, E., & Dycha-Wąsik, G. (2025). Narcissistic CEOs and Tools for Mitigating Agency Problems. *Krakow Review of Economics and Management / Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 4(1010), 83–102. https://doi.org/10.15678/krem.18678

ABSTRACT

Objective: There is little evidence on the choice of tools to mitigate agency problems. Because these tools are chosen by the CEOs (chief executive officers), we believe that their personality matters. We include the narcissism of the CEO to check whether it is an important factor affecting these kinds of decisions. The research aims to determine what tools to mitigate agency problems are chosen by narcissistic CEOs. We consider debt, dividends, and managerial ownership as potential tools for mitigating agency problems.
Research Design & Methods: Our sample covers 56 Polish companies over the six years of 2017–2022. We employ linear mixed models analysis.
Findings: We find that narcissistic CEOs refrain from ownership in the company they manage. They have no impact on the debt ratio and dividend payouts.
Implications/Recommendations: We believe that narcissistic CEOs use managerial ownership tools to diminish their risk (in order not to be associated with it in case something goes wrong). However, this increases the agency problems. Owners should be aware of such behaviour, bearing in mind the negative impact of a narcissistic CEO on the team and work efficiency.

Contribution: Our research contributes to the upper-echelon (top management) theory and corporate behavioural finance. The contribution lies in combining corporate finance issues (e.g., agency relation, debt ratio, dividend) and behavioural finance (CEO personal traits).

Article type: original article.

Keywords: agency theory, narcissistic CEO, managerial ownership, dividends, debt.

JEL Classification: G31, G40, M21, O16.

1. Introduction

There is an ongoing debate on agency relations that results from the different interests of owners and managers. The differences in interests usually have many, mostly negative, consequences for companies and their owners. In business practice, there are many tools identified to mitigate the managers' activities. Among these tools are managerial ownership, debt ratio, and dividend payments. Lots of research has been conducted on these tools, especially on their application and efficiency.

We want to expand on existing research by combining agency theory with upper-echelon (top management) theory and corporate behavioural finance. Upper--echelon (top management) theory provides evidence of the important role of the people in charge (chief executive officer, CEO). Behavioural finance provides evidence that behavioural biases and fallacies affect the CEOs' course of action. We attempt to include the CEO's personal traits (narcissism) in the choice of tools to mitigate the agency problems. The role of the CEO in implementing these tools is crucial as it is mostly their decision whether to buy shares of the company they manage, or whether to apply for credit.

The personal trait included in our research is narcissism. Over the last fifty years, the role of behavioural biases has been better and better understood. One CEO personality trait in particular – narcissism – has received significant attention. The increased attention results from higher employee awareness and their striving for a better working environment.

In academic research, narcissism is understood as a complex personality feature marked by an inflated sense of self-importance, a persistent search for admiration, and a limited capacity to take others' perspectives into account (American Psychiatric Association, 2013; see also Bukalska & Dycha, 2024). Existing research has proven that leader narcissism has a negative impact on teamwork efficiency (e.g., Fahy, 2017). However, existing research refers mostly to the relations between managers and workers. While our research attempts to describe the relationships between CEOs and owners.

Our research aims to identify the impact of narcissistic CEOs on the choice of dividend payouts, debt ratio, or managerial ownership as tools for mitigating agency problems. We believe the problem is important as it refers to the relationships built by narcissistic CEOs with owners (their supervisors). Additionally, we find a lack of research on the subject. So far, research has been conducted on narcissistic leaders and their impact on the teamwork of subordinates. In corporate finance, narcissism is researched as a CEO's behavioural trait with its impact on financial decisions (e.g., debt, investment, and earnings management), but with inconclusive results. Rarely is research conducted on the relationships of narcissists to their supervisors/owners.

The originality of our research lies in including the CEO's traits (narcissism) in the investigation of agency relations and the choice of tools to discipline the managers. Our contribution is threefold. We contribute to the upper echelon (top management) theory, providing extra evidence that the role of the CEO is important and affects the key corporate decisions. We also contribute to corporate behavioural finance by including personal traits and proving their significance. We contribute to the agency theory by investigating agency relations and providing evidence on the choice and substitution of tools mitigating agency problems.

Our research covers Polish companies listed on the Warsaw Stock Exchange. Our research covers six years, 2017–2022, and 56 companies with the same CEO over the six years; thus, we obtained 328 firm-year observations. We included companies with the same CEO over the six years of the sample, but only those with CEOs with less than 5% stake in the capital. We employ a linear mixed model analysis.

The rest of the paper is organised as follows. The next section includes the literature review (on agency relations and narcissism). This section finishes with a hypothesis statement. The subsequent section presents the methodology: how we identify narcissism, variables, the model, and the sample. Further, we provide the results of our research, presenting descriptive statistics, a correlation matrix, and regression analysis results. The following section includes a discussion of previous research, and we finish with conclusions.

2. Literature Review

2.1. Agency Relations and Tools for Mitigating Agency Problems

The widespread occurrence of the agency problem in different types of relations has made this theory one of the most important in the literature on finance and economics. Agency theory indicates that there is a conflict of interest between managers and company owners. Both parties seek to maximise their own utility, but their goals differ significantly (Rahmawati, Moeljadi & Sumiati, 2018). The primary goal for owners is to increase financial performance and dividends. Managers, on the other hand, seek only growth in their own wealth, that is, growth in their income in various forms, including, among others, salaries, perks, or transactions with entities related to those managers (Panda & Leepsa, 2017; Weiskirchner-Merten, 2023). The information asymmetry compounds the conflict between owners and managers.

Three tools (out of many others) can be distinguished to diminish agency problems: managerial ownership, debt ratio, and dividend payouts.

Managerial ownership refers to the percentage of shares owned by managers and directors. The duality of the owner acting as owner and manager significantly reduces the agency costs (Vo & Nguyen, 2014). Corporate ownership by managers can be seen as bridging the difference in interests between shareholders and managers. However, too much managerial ownership might lead to instrumental treatment of all resources (human and tangible) to maximise profits.

Leverage also mitigates agency problems that arise from management behaviour that conflicts with shareholder interests (de Jong & van Dijk, 1998). An increase in debt level disciplines managers. They have to act to increase profitability to get it higher than the cost of debt (Panda & Leepsa, 2017). However, debt also brings a higher risk of the company running into financial difficulties, even leading to bankruptcy (Cecchetti, Mohanty & Zampolli, 2011). Companies with a high level of debt risk large losses when economic conditions deteriorate, and when economic conditions improve, companies will earn large profits.

Agency problems might also be reduced by the payment of dividends (Jensen, Solberg & Zorn, 1992). A dividend policy is the decision to share profits with the owners of a corporation. The purpose of this policy is to distribute profits among the shareholders to reduce the amount of resources available for management to misuse (Kanojia & Bhatia, 2022). The higher the dividend payments, the lower the cash holdings left in the company. A low level of cash encourages managers to be more efficient. However, too high dividend payments might leave the company cashless and at risk of bankruptcy. This might hamper the company's growth, but also its short-term operating activities.

Another rarely researched problem is the switching between the tools available to mitigate agency problems. It seems obvious that it is impossible to use all of them in one company, as this might lead to the destruction of the company in a short time. This problem indicates that there is an interdependent relationship between dividend policy, debt policy, and managerial ownership. Managers who have ownership in a firm with high debt ratios tend to suffer from higher risk, and they will reduce the dividend ratio. Firms with higher managerial ownership tend to increase internal funds at the expense of low dividend payouts to finance investments. Jensen (1986) suggests that debt and dividends are substitute mechanisms for reducing the discretionary resources under managers' control, which implies a negative relationship between the two. Fama and French (2002) explain that, based on the trade-off and pecking order theory, debt and dividends are negatively related.

Vo and Nguyen (2014) find that managerial ownership has a negative relationship with debt ratio but a positive impact on dividends. They also find that dividends and debt negatively affect each other. Florackis, Kanas and Kostakis (2015) find a negative impact of managerial ownership on dividends and a negative impact of leverage on dividends. While Rahmawati, Moeljadi and Sumiati (2018) find no bidirectional causality between debt, dividend policy, and managerial ownership.

To sum up, agency relations result in a specific CEO behaviour with negative consequences for the functioning of the company and the owners' aims. Thus, owners utilise some tools to discipline managers. However, it is impossible to implement all of them, so it is necessary to choose from those available. Because managers are obliged to make everyday decisions and take responsibility, we believe that it is the CEO who chooses the specific tool according to their preferences. Their preferences strongly depend on their personal traits.

2.2. CEO Narcissism and Leadership

The research on narcissism is grounded in the theory of personality – behavioural, emotional, and cognitive patterns that comprise a person's unique adjustment to life (American Psychiatric Association, 2013). Personality is relatively stable over time. Theodore Millon (APA member) was one of the people who greatly influenced the psychology of disorders and DSM development. He perceived the different personalities as adaptive or survival styles, while disorders are styles of behaviour, cognition, and emotion that imply inflexibility and difficulties in handling stressful situations; he described 14 types of disorders (maladaptive patterns) with narcissism among them (Millon, 2012).

In corporate finance, the research on CEO narcissism lies within behavioural finance and upper echelon (top management) theory, and has recently drawn a lot of attention (as previously, overoptimism, overconfidence, and many other behavioural biases). The link between narcissism and leadership has long been recognised (Campbell *et al*., 2011) due to the large number of narcissistic people in leadership positions (a higher-than-average percentage of narcissistic people in society).

Brunell *et al*. (2008) investigated whether individuals with high indications of narcissism would be more likely to emerge as leaders. Recruitment for higher positions is the most suitable aim for narcissistic people who seek out roles that provide power, influence, and the opportunity to have an audience for their actions (Maynard *et al*., 2015; Fahy, 2017). Narcissistic individuals are more successful in convincing others of their potential – impression management in the asymmetrical information environment (Nevicka & Sedikides, 2021). Schnure (2010) demonstrated that even experienced interviewers evaluated narcissists' applications for a managerial job more favourably in a personnel selection interview.

When they achieve a high position, narcissistic managers are thought to create "blame and toxic cultures" in their organisations. They are said to be abusive managers. Evidence suggests that narcissism generally leads to problems in building relationships and a lack of empathy (Hamstra *et al*., 2021). Gong, Li and Chen (2018), Fahy (2017), Nevicka *et al*. (2018), and Cragun, Olsen and Wright (2020) find that narcissistic leaders have a negative impact on the team they manage. They use bullying and deception. Narcissistic leadership has a negative impact on the job satisfaction of subordinates and their well-being, whereas it increases stress and intentions to quit. On the other hand, narcissistic people can be charming and glamorous and tend to "shine" in social settings.

Due to observed inconsistent behaviour of narcissists, the actions of narcissistic CEOs are associated with both the light and dark sides of their personality. On the light side, narcissistic leaders have strong social skills and charisma, which reflect their need for acclaim and social approval, striving for uniqueness, grandiose fantasies, and charm (Back *et al*., 2013). On the dark side, narcissistic leaders tend to exploit others, have lower-quality relationships, and behave in unethical ways that reflect their need to dominate and control others, striving for supremacy, devaluation of others, and aggressiveness (Campbell *et al*., 2011). These are associated with a desire to reinforce and defend their own superior status (Back *et al*., 2013).

Nevicka and Sedikides (2021) find that highly narcissistic individuals alter their behaviour depending on the situation. They have strong abilities to manipulate others, but they are also intelligent enough to adapt their strategy depending on the social group they are in. According to Lubit (2002), they are unlikely to demonstrate the same behaviours when dealing with subordinates and supervisors.

The discrepancies in the behaviour of a narcissistic person could be explained by status differences between employees and their supervisors, and suggests that narcissists are more motivated to hide their negative side from supervisors. Narcissistic individuals' sensitivity to the status of others (Giacomin, Battaglini & Rule, 2018) leads them to seek social alliances with people that they perceive as having high status (Jonason & Schmitt, 2012) and to solicit their approval (Ashton-James & Levordashka, 2013). Boddy (2021) assumes that after getting to the very top, destructive CEOs are concerned only with their own interests and not those of the company, the owners, or the employees. Chatterjee and Pollock (2017) find that narcissists have an "others-exist-only-for-me" perspective that leads them to perceive everything and everyone as a tool providing the means for them to maintain their power and status.

We assume that narcissistic CEOs transfer this pattern of actions (the light side to the supervisors and the dark side to the subordinates) into corporate finance and into the relationship with owners (supervisors) within agency relations. According to their strategy, they would agree on implementing the specific tools for mitigating the agency problems, provided that the specific tool serves their own interests, i.e., remaining in position for the long term. Thus, narcissistic CEOs do not allow their company to get into financial difficulties. They adopt behaviours that allow them to "shine" during meetings with owners, showing their generosity and grandiosity to gain approval and to remain in position for the long term.

The considerations mentioned above lead us to the following hypotheses:

H1: CEO narcissism has a negative impact on the debt ratio

The research on the impact of narcissistic CEOs on debt ratio is inconclusive: Zhang *et al*. (2021) and Bajo, Jankensgård and Marinelli (2022) find a positive impact of narcissistic CEOs on debt ratio; Aabo and Eriksen (2018) find a negative impact, and the meta-analysis of Cragun, Olsen and Wright (2020) shows a lack of statistical significance regarding the overall relationship between CEO narcissism and financial leverage. Due to the inconsistent findings, we feel free to adopt our point of view. We believe narcissistic CEOs will not accept a higher debt ratio, as it leads to a higher financial risk. Higher financial risk increases the probability of going bankrupt, leading to their removal from their positions in disgrace. The narcissistic CEOs will not allow their company to get into financial difficulties. This implies that companies managed by narcissistic CEOs have lower debt ratios.

H2: CEO narcissism has a positive impact on dividend payouts

Previous findings of Oktari and Dianawati (2023) and Bajo, Jankensgård and Marinelli (2022) find a positive impact of narcissistic CEOs on dividend payouts. Narcissistic CEOs will propose or agree on higher dividend payments (even if the profitability is the same). Higher dividend payments allow narcissistic CEOs to show their generosity to the owners and convince them that they act in their interests. They would like to "shine" during the owners' meetings, and show their generosity and grandiosity to gain owners' approval and to remain in their positions for the long term.

H3: CEO narcissism has a negative impact on managerial ownership

We found only one research study that included managerial ownership and narcissistic CEOs (both being independent variables). This research shows a negative correlation between them (Byun & Al-Shammari, 2021). We believe that narcissistic CEOs perceive managerial ownership as a potential risk of losing invested capital, remuneration, position, admiration from others, and emotional supplies if anything goes wrong. Moreover, they are convinced they do not need any stake in the company to become the CEO.

3. Methodology

Our study followed a multi-step research design. We began by defining the sample and then established the procedures for assessing CEO narcissism and measuring financial variables. Once the data had been collected, we applied statistical techniques, including descriptive statistics, correlation analysis, and regression models. The regression analysis served as the primary method for testing our hypotheses.

3.1. Sample and Data Source

Our analysis spans a six-year horizon from 2017 to 2022, comprising three years preceding the crisis (2017–2019) and three years during the COVID-19 crisis (2020–2022). We consider this timeframe adequate to investigate the influence of CEOs on company outcomes.

The study focuses on firms listed on the Warsaw Stock Exchange (WSE). As of early 2023, the WSE main market comprised 410 companies. After excluding entities from the financial sector, such as banks, insurers, and investment funds, 300 firms that were continuously listed during the 2017–2022 period remained. We reviewed 1,920 annual reports to identify the CEOs. Within this group, 160 firms had the same CEO throughout the six-year horizon. However, in many of these companies, CEOs also held dominant or significant ownership stakes. Since, in such cases ownership and management overlap, agency conflicts are unlikely to arise. Therefore, firms where the CEO controlled more than 5% of shares were excluded from the analysis. The final sample consisted of 56 firms, generating 328 firm-year observations. It should be noted that the dataset does not represent a fully balanced panel, as certain observations were missing in some years.

Financial variables were sourced from company financial statements available in the Notoria Serwis database. Additional information, including CEO compensation, ownership, photo size, signature size, and social media presence, was gathered manually through a detailed review of annual reports. In total, 328 reports were carefully examined to extract these data.

3.2. Identification of CEO Narcissism

The approach applied to measure CEO narcissism draws on three observable features: the size of the CEO's handwritten signature, the presence and relative size of the CEO's photograph in the annual report, and the number of social media accounts maintained by the CEO (Chatterjee & Hambrick, 2007). The original index developed by Chatterjee and Hambrick (2007) was broader and included five components: 1) the CEO's cash compensation relative to that of the second-highest paid executive, 2) the CEO's non-cash compensation relative to the second-highest paid executive, 3) the prominence of the CEO's photograph in the annual report, 4) the number of times the CEO was mentioned in company press releases, and 5) the frequency of first-person singular pronouns used during interviews. Despite certain limitations, this index has been widely adopted in research on CEO narcissism (Cragun, Olsen & Wright, 2020). In our case, however, we were unable to incorporate interview pronoun usage due to a lack of access to such data, and we also excluded CEO compensation from the index since it represents the core focus of our study.

In line with the procedure of Chatterjee and Hambrick (2007), the prominence of the CEO's photograph in the annual report is assessed on a five-point scale:

1 point – no photograph of the CEO is included,

2 points – the CEO appears in a group photo with other executives,

3 points – the CEO is pictured alone, occupying less than half of a page,

4 points – the CEO is pictured alone, covering at least half a page, and accompanied by text,

5 points – the CEO is shown alone, with the photo occupying a full page.

The signature-based measure of CEO narcissism is determined according to a standardised procedure. A rectangle is drawn around the CEO's handwritten signature in the annual report, with its edges touching the outermost points of the signature. The signature's area is then calculated by multiplying the length and width of the rectangle (measured in centimetres). To account for differences in length of name, this area is divided by the number of letters in the CEO's name (Ham, Seybert & Wang, 2018).

The third indicator of CEO narcissism relates to social media activity. Following Christian and Sulistiawan (2022), CEOs are ranked on a three-point scale according to the number of personal social media accounts they maintain:

1 point – one or no social media accounts,

2 points – two accounts,

3 points – three or more accounts.

To construct the CEO narcissism index, we combined the three indicators – photograph prominence, signature size, and social media activity – by summing up the natural logarithms of their respective scores. This procedure produced a continuous measure ranging from 0 to 5, where higher values indicate higher levels of CEO narcissism.

3.3. Variables

Table 1 presents the set of variables (with their formulas) included in the research.

Table 1. The Set of Variables with Their Formulas

Variable	Formula	Unit
CEO narcissism	CEO narcissism index	from 0 to 5
Debt ratio	total liabilities to total assets × 100	%
Dividend ratio	dividend payout to total assets × 100	%

Table 1 cnt'd

Variable	Formula	Unit
CEO ownership	percentage of capital owned by CEO	%
Size	total assets (natural logarithm from total assets)	million PLN
Profitability	net profit to total assets × 100	%
Cash ratio	cash and equivalents to total assets × 100	%
CAPEX ratio	CAPEX to total assets × 100	%
CEO age	age	years
CEO tenure	number of years in the CEO position	years

Source: the authors.

3.4. Methods and Models

To verify the hypotheses, we implement models as follows:

$$\begin{aligned}\textit{Dividend Ratio}\\ &= \beta_0 + \beta_1 \textit{CEO narcissism} + \beta_2 \textit{Debt Ratio}\\ &+ \beta_3 \textit{CEO ownership} + \beta_4 \textit{Size} + \beta_5 \textit{Profitability} + \beta_6 \textit{Cash Ratio}\\ &+ \beta_7 \textit{CAPEX Ratio} + \beta_8 \textit{CEO age} + \beta_9 \textit{CEO tenure} + \varepsilon\end{aligned}$$

$$\begin{aligned}\textit{Debt Ratio}\\ &= \beta_0 + \beta 1 \textit{CEO narcissism}\\ &+ \beta_2 \textit{Dividend Ratio} + \beta_3 \textit{CEO ownership} + \beta_4 \textit{Size}\\ &+ \beta_5 \textit{Profitability} + \beta_6 \textit{Cash Ratio} + \beta_7 \textit{CAPEX Ratio}\\ &+ \beta_8 \textit{CEO age} + \beta_9 \textit{CEO tenure} + \varepsilon\end{aligned}$$

$$\begin{aligned}\textit{CEO Ownership}\\ &= \beta_0 + \beta_1 \textit{CEO narcissism}\\ &+ \beta_2 \textit{Debt Ratio} + \beta_3 \textit{Dividend Ratio} + \beta_4 \textit{Size} + \beta_5 \textit{Profitability}\\ &+ \beta_6 \textit{Cash Ratio} + \beta_7 \textit{CAPEX Ratio} + \beta_8 \textit{CEO age} + \beta_9 \textit{CEO tenure} + \varepsilon\end{aligned}$$

The sample covers 2017–2022 and data for 56 companies (with some missing data). This dataset makes using OLS regression analysis (ordinary least squares with a linear regression line) difficult to implement, as the sample has time-varying variables. These variables show dependence (e.g., the debt ratio is not random for the specific company over time but shows a specific change path). If a dataset were a balanced panel sample, it would be possible to implement a panel regression analysis with fixed and random effects. However, the panel sample was unbalanced due to some missing observations. To overcome some difficulties with implementing

OLS (longitudinal data) and panel regression analysis (missing observations), linear mixed models were used as a good method for analysing dependent, multilevel, hierarchical, longitudinal, or correlated data. Linear mixed model is an extension of simple linear models (OLS) to allow both fixed and random effects, and is used particularly when there is non-independence in the data arising from a hierarchical or time-varying structure.

Finally, the linear mixed model was implemented with fixed and random effects. Each model includes a time effect (variables 0–1 for each year to exclude the influence of external economic conditions on the results – year effect, and 0–1 for each industry – construction, manufacturing, trade, and services to exclude the influence of specific industry conditions) to model time and industry heterogeneity. SPSS software was employed.

4. Findings

Our empirical results consist of descriptive statistics, correlation matrices, and regression outputs. Among these, regression analysis served as the primary method for testing the hypotheses.

4.1. Descriptive Statistics

Table 2 presents the descriptive statistics of the sample companies.

Table 2. Descriptive Statistics

Variable	Mean	Median	Min	Max	Standard Deviation	Normality Test (S-W)
CEO narcissism	1.02	0.80	0.00	4.68	0.97	0.850***
Debt ratio	46.51	46.65	10.80	81.74	18.20	0.982***
Dividend ratio	3.04	0.63	0.00	110.51	7.97	0.344***
CEO ownership	0.89	0.16	0.00	5.00	1.34	0.710***
Size (mln PLN)	855.10	376.62	3.79	6,434.88	1,141.67	0.979***
Profitability	4.87	4.75	16.00	22.20	8.03	0.957***
Cash ratio	8.53	5.56	0.55	39.00	8.50	0.789***
CAPEX ratio	3.35	2.36	0.00	27.31	3.59	0.807***
CEO age	50.82	50.00	36	71	6.50	0.969***
CEO tenure	15.30	15.00	1	32	7.05	0.989**

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Source: the authors.

4.2. Correlation Matrix

Table 3 reports the correlation coefficients. Since the data are not normally distributed, we applied Spearman's rank correlation method.

The correlation coefficients between the independent variables do not exceed 0.4, indicating that no multicollinearity was detected that could distort the regression analysis (Shrestha, 2020). Therefore, regression analysis can be applied to model the relationship between the dependent variable and the full set of independent variables.

4.3. Regression Analysis Results

Table 4 presents the LMM regression analysis results for the tools of agency problem mitigation, along with the variance inflation factor for each variable (VIF).

The regression analysis results for the whole sample indicate that CEOs' narcissism negatively affects dividend payments, debt ratio, and CEO ownership. However, statistical significance was found only for the debt ratio and CEO ownership. Further investigation allows us to state that the best models are those with the minimum value of the Akaike Information Criterion (Polyzos & Siriopoulos, 2024). This led us to accept the fixed effect model for CEO ownership (with a statistically significant impact of CEO narcissism) and the random effects model for debt ratio (without a statistically significant impact of CEO narcissism). In this way, we find full confirmation of only H3 (assuming a negative impact of CEO narcissism on managerial ownership). We find no statistically significant evidence supporting or contradicting the H1 (assuming a negative impact of CEO narcissism on debt ratio) and H2 (assuming a positive impact of CEO narcissism on dividend payouts).

Our study results partially align with our assumptions: Narcissistic CEOs refrain from investing in the company they manage (in order not to be associated with it in case something goes wrong).

5. Discussion

Our findings are important for upper-echelon (top management) theory as we find that the CEO has a statistically significant impact on the decision-making process (Hambrick & Mason, 1984; Hambrick, 2007). Additionally, we find that specific personal characteristics of the CEO affect corporate decisions, which support corporate behavioural finance (Heaton, 2002; Malmendier & Tate, 2005; Hackbarth, 2008). Our findings also support previous research on the significant impact of narcissism (Campbell *et al*., 2011; Chatterjee & Pollock, 2017).

Table 3. Correlation Matrix (Spearman)

Variable	CEO narcissism	Debt ratio	Dividend ratio	CEO ownership	Size	Profitability	Cash ratio	CAPEX ratio	CEO age
CEO narcissism	1								
Debt ratio	–0.012	1							
Dividend ratio	0.044	–0.217***	1						
CEO ownership	–0.224***	0.104*	0.155**	1					
Size	–0.016	0.193***	0.331***	–0.001	1				
Profitability	–0.055	–0.337***	0.363***	0.076	0.116**	1			
Cash ratio	0.067	–0.098*	0.235***	0.028	0.160**	0.283***	1		
CAPEX ratio	0.031	–0.093*	0.210***	–0.063	0.229***	0.213***	–0.056	1	
CEO age	–0.309***	–0.120**	0.194***	0.186**	0.085	0.207***	–0.052	0.251***	1
CEO tenure	–0.199***	–0.128**	0.067	0.179**	–0.160**	0.131**	–0.153**	–0.186**	0.386***

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Source: the authors.

Table 4. Regression Analysis Results (Linear Mixed Models)

Specification	Dividend Ratio	Dividend Ratio	VIF	Debt Ratio	Debt Ratio	VIF	CEO Ownership	CEO Ownership	VIF
CEO narcissism	–0.175	3.814	1.156	–2.637**	–2.551	1.139	–0.221**	–0.256	1.115
Debt ratio	–0.043*	–0.063	1.236	×	×	×	0.014***	–0.001	1.225
Dividend ratio	×	×	×	–0.206*	–0.304	1.118	–0.002	0.010	1.132
CEO ownership	–0.064	–0.174	1.108	2.322***	1.559	1.085	×	×	×
Profitability	0.272***	0.272	1.324	–0.677***	–0.565**	1.298	0.004	–0.008	1.410
Cash ratio	–0.010	–0.037	1.121	0.004	–0.445	1.121	0.017*	0.012	1.112
CAPEX ratio	0.171	0.421	1.200	–0.568**	0.080	1.194	0.017	0.032	1.203
Size	0.005	–0.482	1.196	2.578***	3.390**	1.153	–0.082	0.031	1.192
CEO age	–0.004	0.123	1.605	–0.319*	1.098*	1.603	–0.002	0.053	1.599
CEO tenure	–0.117	–0.172	1.552	–0.166	–1.327**	1.543	0.017	–0.072	1.526
FE or RE	FE	RE	×	FE	RE	×	FE	RE	×
Year effects	yes	yes	×	yes	yes	×	yes	yes	×
Industry effects	yes	yes	×	yes	yes	×	yes	yes	×
–2LL	2,287.69	2,766.90	×	2,813.04	2,569.10	×	1,097.59	1,591.67	×
Akaike criterium	2,325.69	2,838.90	×	2,851.04	2,641.10	×	1,135.59	1,663.67	×
Conditional pseudo *R*-square	0.161	1.000	×	0.234	0.993	×	0.151	1.000	×

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Source: the authors.

Narcissistic CEOs use only one tool – managerial ownership. But they do not use this tool to diminish agency problems, as they refrain from having a stake in the company. Taken together, the lack of impact on the dividend payments and debt ratio, and refraining from managerial ownership, all mean they are not involved in actions to diminish the problems between owners (principals) and managers (agents).

When compared to previous research, our findings on the lack of impact of narcissistic CEOs on debt ratios are in line with those of the meta-analysis of Cragun, Olsen and Wright (2020) but contradict all those showing positive or negative impact (Aabo & Eriksen, 2018; Zhang *et al*., 2021; Oktari & Dianawati, 2023). Our findings on the lack of impact of narcissistic CEOs on dividend payouts contradict those of Bajo, Jankensgård and Marinelli (2022) and Oktari and Dianawati (2023).

The previous findings and ours lead us to think that narcissistic CEOs like to be at the centre of events and the decision-making process. Previous research shows that narcissistic CEOs create chaos and seek or create opportunities to "shine" (Oldale, 2020; Schmid, Knipfer & Peus, 2021). However, they refrain from taking risky actions. Previous research proves that narcissistic CEOs are reluctant to take risks (Aabo, Hoejland & Pedersen, 2021; Shen, Mollica & Dalla Costa, 2024). We believe that narcissistic CEOs perceive managerial ownership as a potential risk of losing invested capital, remuneration, position, admiration of others, and emotional supplies if anything goes wrong.

Moreover, we provide evidence supporting the idea that there is a substitution between tools of agency problem mitigation, especially negative relations (correlation) between debt and dividend, and a negative impact of debt ratio on dividend payouts. This is in line with previous research of Vo and Nguyen (2014) and Florackis, Kanas and Kostakis (2015).

6. Conclusions

The aim of the paper is to identify the set of tools for mitigating agency problems implemented by narcissistic CEOs. We take into account: debt ratio, dividend payouts, and managerial ownership. We find that narcissistic CEOs prefer to have a lower stake in the company they manage. This means that narcissistic CEOs choose only one tool, but by using this tool, they do not diminish agency problems.

Our findings have several implications, both theoretical and practical. Theoretical implications include our findings that extend existing knowledge on narcissistic leaders and their impact on corporate finance and agency relations. The practical implications are of interest to the owners. Narcissistic CEOs take the opportunity to "shine" and show their engagement, but without taking the risk of losing their position. Owners should be aware that narcissistic CEOs have a negative impact on the team they manage. This is connected to remaining in position and the "toxic" way of treating employees. In times of sustainability and bearing in mind the need to achieve sustainable development goals, the well-being of employees should be taken into account, and not only the financial wealth of owners. We believe this might be especially important for the post-communist countries as they try to transform to Western values of sustainability, including in the workplace.

The limitations of our research are that we focus on financial aspects and do not take into account organisational performance (and the way narcissistic CEOs treat employees). Combining financial and organisational performance might provide extra evidence on narcissism in the workplace. The limitations of our research provide a good basis for future investigation. We might expand our research on both the financial and organisational performance of narcissistic CEOs. It is also possible to extend the sample into other countries and include Hofstede's national culture factors.

Authors' Contribution

The authors' individual contribution is as follows: Elżbieta Bukalska 70%,
Gabriela Dycha-Wąsik 30%.

Conflict of Interest

The authors declare no conflict of interest.

References

Aabo, T., & Eriksen, N. B. (2018). Corporate Risk and the Humpback of CEO Narcissism. *Review of Behavioral Finance*, *10*(3), 252–273. https://doi.org/10.1108/RBF-07-2017-0070

Aabo, T., Hoejland, F., & Pedersen, J. (2021). Do Narcissistic CEOs Rock the Boat? *Review of Behavioral Finance*, *13*(2), 141–164. https://doi.org/10.1108/rbf-09-2019-0118

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). American Psychiatric Publishing. https://doi.org/10.1176/appi.books.9780890425596

Ashton-James, C. E., & Levordashka, A. (2013). When the Wolf Wears Sheep's Clothing: Individual Differences in the Desire to Be Liked Influence Nonconscious Behavioural Mimicry. *Social Psychological and Personality Science*, *4*(6), 643–648. https://doi.org/10.1177/1948550613476097

Back, M. D., Küfner, A. C. P., Dufner, M., Gerlach, T. M., Rauthmann, J. F., & Denissen, J. J. A. (2013). Narcissistic Admiration and Rivalry: Disentangling the Bright and Dark Sides of Narcissism. *Journal of Personality and Social Psychology*, *105*(6), 1013–1037. https://doi.org/10.1037/a0034431

Bajo, E., Jankensgård, H., & Marinelli, N. (2022). Me, Myself and I: CEO Narcissism and Selective Hedging. *European Financial Management*, *28*(3), 809–833. https://doi.org/10.1111/eufm.12328

Boddy, C. R. (2021). Corporate Psychopaths and Destructive Leadership in Organizations. In: S. M. Camgöz, Ö. T. Ekmekci (Eds), *Destructive Leadership and Management Hypocrisy: Advances in Theory and Practice* (pp. 67–81). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80043-180-520211005

Brunell, A. B., Gentry, W. A., Campbell, W. K., Hoffman, B. J., Kuhnert, K. W., & DeMarree, K. G. (2008). Leader Emergence: The Case of the Narcissistic Leader. *Personality and Social Psychology Bulletin*, *34*(12), 1663–1676. https://doi.org/10.1177/0146167208324101

Bukalska, E., & Dycha, G. (2024). Compensation of Narcissistic CEOs with Stake in Equity: A Study of Polish Companies. *Business Management*, *34*(1), 26–46. https://doi.org/10.58861/tae.bm.2024.1.02

Byun, K.-A., & Al-Shammari, M. (2021). When Narcissistic CEOs Meet Power: Effects of CEO Narcissism and Power on the Likelihood of Product Recalls in Consumer-packaged Goods. *Journal of Business Research*, *128*, 45–60. https://doi.org/10.1016/j.jbusres.2021.02.001

Campbell, W. K., Hoffman, B. J., Campbell, S. M., & Marchisio, G. (2011). Narcissism in Organizational Contexts. *Human Resource Management Review*, *21*(4), 268–284. https://doi.org/10.1016/j.hrmr.2010.10.007

Cecchetti, S. G., Mohanty, M. S., & Zampolli, F. (2011). *The Real Effects of Debt* (BIS Working Papers No. 352). Bank for International Settlements. Retrieved from: https://www.bis.org/publ/work352.htm (accessed: 10.08.2023).

Chatterjee, A., & Hambrick, D. C. (2007). It's All about Me: Narcissistic Chief Executive Officers and Their Effects on Company Strategy and Performance. *Administrative Science Quarterly*, *52*(3), 351–386. https://doi.org/10.2189/asqu.52.3.351

Chatterjee, A., & Pollock, T. G. (2017). Master of Puppets: How Narcissistic CEOs Construct Their Professional Worlds. *Academy of Management Review*, *42*(4), 703–725. https://doi.org/10.5465/amr.2015.0224

Christian, P. G., & Sulistiawan, D. (2022). When Narcissus Became a CEO: CEO Narcissism and Its Effect on Earnings Management. *Jurnal Dinamika Akuntansi dan Bisnis*, *9*(2), 135–148. https://doi.org/10.24815/JDAB.V9I2.24947

Cragun, O. R., Olsen, K. J., & Wright, P. M. (2020). Making CEO Narcissism Research Great: A Review and Meta-analysis of CEO Narcissism. *Journal of Management*, *46*(6), 908–936. https://doi.org/10.1177/0149206319892678

de Jong, A., & van Dijk, R. (1998). *Determinants of Leverage and Agency Problems* (CentER Discussion Paper Vol. 1998-82). Retrieved from: https://pure.uvt.nl/ws/portalfiles/portal/529666/82.pdf (accessed: 15.08.2023).

Fahy, P. (2017). How to Avoid Hiring a Narcissist: A Toxic Hire Will Hurt Your Team and Your Leadership Credibility. *The Journal of Medical Practice Management*, *33*(3), 146–149.

Fama, E. F., & French, K. R. (2002). Testing Trade-off and Pecking Order Predictions about Dividends and Debt. *The Review of Financial Studies*, *15*(1), 1–33. https://doi.org/10.1093/rfs/15.1.1

Florackis, C., Kanas, A., & Kostakis, A. (2015). Dividend Policy, Managerial Ownership and Debt Financing: A Non-parametric Perspective. *European Journal of Operational Research*, *241*(3), 783–795. https://doi.org/10.1016/j.ejor.2014.08.031

Giacomin, G., Battaglini, A. M., & Rule, N. O. (2018). Grandiose Narcissists Seek Status Selectively. *Social Cognition*, *36*(1), 20–42. https://doi.org/10.1521/soco.2018.36.1.20

Gong, Y., Li, J., & Chen, L. (2018). Humble and Narcissistic Leadership in Team Potency and Creativity: A Tale of Two Styles. *Academy of Management Proceedings*, *2018*(1), 15268. https://doi.org/10.5465/ambpp.2018.15268abstract

Hackbarth, D. (2008). Managerial Traits and Capital Structure Decisions. *Journal of Financial and Quantitative Analysis*, *43*(4), 843–881. https://doi.org/10.1017/S002210900001437X

Ham, C., Seybert, N., & Wang, S. (2018). Narcissism Is a Bad Sign: CEO Signature Size, Investment, and Performance. *Review of Accounting Studies*, *23*, 234–264. https://doi.org/10.1007/s11142-017-9427-x

Hambrick, D. C. (2007). Upper Echelons Theory: An Update. *Academy of Management Review*, *32*(2), 334–343. https://www.jstor.org/stable/20159303

Hambrick, D. C., & Mason, P. A. (1984). Upper Echelons: The Organization as a Reflection of Its Top Managers. *Academy of Management Review*, *9*(2), 193–206. https://doi.org/10.5465/amr.1984.4277628

Hamstra, M. R., Schreurs, B., Jawahar, I. M., Laurijssen, L. M., & Hünermund, P. (2021). Manager Narcissism and Employee Silence: A Socio-analytic Theory Perspective. *Journal of Occupational and Organizational Psychology*, *94*(1), 29–54. https://doi.org/10.1111/joop.12337

Heaton, J. B. (2002). Managerial Optimism and Corporate Finance. *Financial Management*, *31*, 33–45. https://doi.org/10.2307/3666221

Jensen, G. R., Solberg, D. P., & Zorn, T. S. (1992). Simultaneous Determination of Insider Ownership, Debt, and Dividend Policies. *The Journal of Financial and Quantitative Analysis*, *27*(2), 247–263. https://doi.org/10.2307/2331370

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, *76*(2), 323–329.

Jonason, P. K., & Schmitt, D. P. (2012). What Have You Done for Me Lately? Friendship--selection in the Shadow of the Dark Triad Traits. *Evolutionary Psychology*, *10*(3), 400–421. https://doi.org/10.1177/147470491201000303

Kanojia, S., & Bhatia, B. S. (2022). Corporate Governance and Dividend Policy of the US and Indian Companies. *Journal of Management and Governance*, *26*(4), 1339–1373. https://doi.org/10.1007/s10997-021-09587-5

Lubit, R. (2002). The Long-term Organizational Impact of Destructively Narcissistic Managers. *Academy of Management Perspectives*, *16*(1), 127–138. https://doi.org/10.5465/ame.2002.6640218

Malmendier, U., & Tate, G. (2005). CEO Overconfidence and Corporate Investment. *Journal of Finance*, *60*(6), 2661–2700. https://doi.org/10.1111/j.1540-6261.2005.00813.x

Maynard, D. C., Brondolo, E. M., Connelly, C. E., & Sauer, C. E. (2015). I'm Too Good for This Job: Narcissism's Role in the Experience of Overqualification. *Applied Psychology*, *64*(1), 208–232. https://doi.org/10.1111/apps.12031

Millon, T. (2012). On the History and Future Study of Personality and Its Disorders. *Annual Review of Clinical Psychology*, *8*, 1–19. https://doi.org/10.1146/annurev-clinpsy-032511-143113

Nevicka, B., De Hoogh, A. H. B., Den Hartog, D. N., & Belschak, F. D. (2018). Narcissistic Leaders and Their Victims: Followers Low on Self-esteem and Low on Core Self-evaluations Suffer Most. *Frontiers in Psychology*, *9*, 422. https://doi.org/10.3389/fpsyg.2018.00422

Nevicka, B., & Sedikides, C. (2021). Employee Narcissism and Promotability Prospects. *Journal of Personality*, *89*(4), 847–862. https://doi.org/10.1111/jopy.12619

Oktari, V., & Dianawati, W. (2023). Dividend Policy, CEO Narcissism, and Its Influence on Companies in Indonesia: A Behavioral Theory of the Firm Approach. *Cogent Economics & Finance*, *11*(2), 2276560. https://doi.org/10.1080/23322039.2023.2276560

Oldale, B. (2020). Narcissistic Personality Disorder: The Good, the Bad, and the Ugly. *Journal of Integrated Studies*, *12*(1), 1–35. Retrieved from: https://jis.athabascau.ca/index.php/jis/article/view/310 (accessed: 11.09.2023).

Panda, B., & Leepsa, N. M. (2017). Agency Theory: Review of Theory and Evidence on Problems and Perspectives. *Indian Journal of Corporate Governance*, *10*(1), 74–95. https://doi.org/10.1177/0974686217701467

Polyzos, E., & Siriopoulos, C. (2024). Autoregressive Random Forests: Machine Learning and Lag Selection for Financial Research. *Computational Economics*, *64*, 225–262. https://doi.org/10.1007/s10614-023-10429-9

Rahmawati, A., Moeljadi, M., & Sumiati, D. (2018). The Effects of Managerial Ownership, Leverage, Dividend Policy in Minimizing Agency Problem. *Investment Management and Financial Innovations*, *15*(4), 273–282. https://doi.org/10.21511/imfi.15(4).2018.22

Schmid, E. A., Knipfer, K., & Peus, C. V. (2021). Narcissistic Leaders – Promise or Peril? The Patterns of Narcissistic Leaders' Behaviors and Their Relation to Team Performance. *Frontiers in Psychology*, *12*, 660452. https://doi.org/10.3389/fpsyg.2021.660452

Schnure, K. A. (2010). *Narcissism Levels and Ratings of Executive Leadership Potential*. Paper presented at the 25th Annual Conference of the Society for Industrial and Organizational Psychology, Atlanta, GA.

Shen, Y., Mollica, V., & Dalla Costa, A. F. (2024). The Bright Side of CEO Narcissism and Its Impact on Accounting Conservatism. *Journal of Accounting Literature*, *46*(1), 1–25. https://doi.org/10.1108/jal-01-2023-0006

Shrestha, N. (2020). Detecting Multicollinearity in Regression Analysis. *American Journal of Applied Mathematics and Statistics*, *8*(2), 39–42. https://doi.org/10.12691/ajams-8-2-1

Vo, D. H., & Nguyen, V. T. (2014). Managerial Ownership, Leverage and Dividend Policies: Empirical Evidence from Vietnam's Listed Firms. *International Journal of Economics and Finance*, *6*(5), 274–284. https://doi.org/10.5539/ijef.V6n5p274

Weiskirchner-Merten, K. (2023). Capital Budgeting and Managerial Empire Building. *Accounting and Business Research*, *53*(4), 416–438. https://doi.org/10.1080/00014788.2021.2021502

Zhang, L., Liang, B., Bi, D., Zhou, Y., & Yu, X. (2021). Relationships among CEO Narcissism, Debt Financing and Firm Innovation Performance: Emotion Recognition Using Advanced Artificial Intelligence. *Frontiers in Psychology*, *12*, 734777. https://doi.org/10.3389/fpsyg.2021.734777

Krakow Review of Economics and Management
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie
4 (1010)
2025

KREM, 2025, 4(1010): 103–123
ISSN 1898-6447
e-ISSN 2545-3238
https://doi.org/10.15678/krem.18677

Crowdfunding as an Innovative Financial Policy Tool for SMEs: An Overview of the European Market

Oleksandra Werbowa[1], **Justyna Ziobrowska-Sztuczka**[2]

[1] University of Warmia and Mazury in Olsztyn, Institute of Political Science, Dybowskiego 13, 10-723 Olsztyn, Poland, e-mail: oleksandra.struk@uwm.edu.pl, ORCID: https://orcid.org/0000-0002-5316-9630

[2] University of Wrocław, Faculty of Law, Administration, and Economics, Uniwersytecka 22/26, 50-145 Wrocław, Poland, e-mail: justyna.ziobrowska@uwr.edu.pl, ORCID: https://orcid.org/0000-0002-9572-1438

Suggested citation: Werbowa, O., & Ziobrowska-Sztuczka, J. (2025). Crowdfunding as an Innovative Financial Policy Tool for SMEs: An Overview of the European Market. *Krakow Review of Economics and Management / Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 4(1010), 103–123. https://doi.org/10.15678/krem.18677

ABSTRACT

Objective: The research is focused on an overview and evaluation of the potential of crowdfunding in the financial policy of small and medium enterprises (SMEs), paying particular attention to the European market, including varying forms and types which depend on the funding method, rewards in return, and how it is taxed and reported.

Research Design & Methods: The study contains a review of crowdfunding based on investigations conducted by international organisations, as well as the analysis of the legal framework of crowdfunding platforms in EU regulations. A comparative analysis was conducted to highlight an overview of 663 crowdfunding platforms across 41 states, taking into account type, industry, rewards in return, and taxation and reporting processes. Based on data from selected crowdfunding platforms the authors present the most successful crowdfunding campaigns in 2022.

Findings: Online alternative finance is gaining ground in finance policies of SMEs. There is a consensus among European legislative bodies that crowdfunding should be encouraged as

a modern form of financing for the SME sector. However, in comparison to other developed economies, the EU crowdfunding market is underdeveloped. The authors highlighted the key features of the best crowdfunding campaigns in 2022. The Polish market strongly reflects the success of the various crowdfunding models.
Implications/Recommendations: The obtained results seem to become a benchmark for reducing risks as well as ensuring diversification and stability in the financial policy of SMEs.
Contribution: The issues discussed in the paper fill a research and methodological gap in research on crowdfunding as a way of financing SMEs.

Article type: original article.

Keywords: alternative finance, crowdfunding, financial policy, sharing economy, SME.

JEL Classification: G23, G32, G40, M13, O16.

1. Introduction

Companies in the small and medium enterprises (SMEs) sector are typically of a smaller scale and have fewer resources than big corporations. SMEs are known for their flexibility and ability to adjust to changing situations. Due to their size, SMEs can be quick to react to market fluctuations and adapt to new circumstances. Business development can be difficult, especially in the beginning when an entrepreneur is taking his/her first steps, thus one may face a variety of struggles and tribulations. Besides, obtaining financial resources (for instance buying new machinery, developing infrastructure or employing new personnel) is usually a priority in financial policy. This can be a challenge, particularly for fledgling businesses.

SMEs finance themselves from a range of sources, taking into consideration the particular needs and situation of the enterprise. These include equity finance (like selling the company, using financial tools like shares, bonds, etc., or funds coming from family and friends, investors, venture capital, and crowdfunding) or debt finance (where companies leverage their fixed assets to raise capital, i.e., bank loans, asset finance, trade finance, lines of credit). Additionally, forms of alternative finance such as factoring, leasing, and online financing have grown steadily in recent years, typically enabled by advancements in FinTech. Online alternative finance activity is being more widely included in SME finance policy initiatives. FinTech presents an opportunity for increasing SME access to finance, offering more convenient and accessible services, more precise credit risk assessments, and lower transaction costs. Considering current trends in the global crowdfunding market which is projected to grow from \$1.41 billion in 2023 to \$3.62 billion by 2030 at a compound annual growth rate (CAGR) of 14.5% in the forecast period (Fortune Business Insights, 2023), the article aims to examine and evaluate the potential of crowdfunding for financial policy of SMEs. In light of the research problem, we attempted to highlight the main challenges currently experienced by SMEs with a focus on crowdfunding as a significant way of obtaining funds.

Prior studies have examined various aspects of crowdfunding, highlighting its role in addressing financing challenges. For instance, Golić (2014) discusses crowdfunding as an alternative means of financing SMEs, outlining its advantages and mechanisms, while Arena *et al*. (2018) highlight crowdfunding as a democratised form of financing that enables individuals from diverse backgrounds to launch businesses. Further, Eldridge, Nisar and Torchia (2021) assess equity crowdfunding's impact on SME innovation and growth, using data from small firms in the UK to determine its effectiveness as a catalyst for post-campaign financing. Camilleri and Bresciani (2024) contribute to the discourse by conducting a systematic review to evaluate the theoretical foundations and practical implications of crowdfunding platforms for small businesses and startups, providing a nuanced perspective on the benefits and limitations of these disruptive technologies. Recent research by Marina *et al*. (2023) examines the success of crowdfunding in financing SMEs and startups during and after the COVID-19 pandemic in Indonesia and Malaysia, highlighting its potential resilience as a funding mechanism during economic disruptions.

Despite this growing body of knowledge, there remain significant gaps in understanding how crowdfunding can be strategically integrated into SMEs' financial policies to enhance diversification, stability, and risk management. While prior research, including studies by Cumming, Vanacker and Zahra (2021) and Stefanelli, Ferilli and Boscia (2022), highlights governance and decision-making aspects, there is a need for more data-driven insights into platform performance, commission structures, and campaign success factors to effectively inform SME strategies.

Existing studies tend to focus on either the general benefits of crowdfunding or specific outcomes such as post-campaign financing (Eldridge, Nisar & Torchia, 2021) or pandemic-era applications (Marina *et al*., 2023). However, a comprehensive understanding of the operational landscape of crowdfunding platforms – particularly within the context of divergent regulatory frameworks and taxation mechanisms in the European Union – remains underexplored.

Furthermore, despite the evident potential of crowdfunding to democratise access to capital, its limitations, such as high campaign failure rates, risks of intellectual property theft, and legal ambiguities, have not been analysed in relation to the practical implementation challenges faced by SMEs.

In addition, there is limited research on the comparative effectiveness of various crowdfunding models and platforms across different regions, as well as on the key characteristics of successful crowdfunding campaigns. The underdeveloped nature of the EU crowdfunding market compared to other developed economies, largely due to inconsistent licensing requirements and high compliance costs, underscores the need for a more detailed exploration of how regulatory harmonisation could enhance the scalability and efficiency of crowdfunding platforms.

By building on and extending the findings of prior research, this study aims to provide a comprehensive understanding of the potential of crowdfunding to address SMEs' financing challenges. It seeks to inform policy and practice by highlighting strategies that mitigate risks while fostering innovation and growth.

The study employs a multifaceted approach to explore the role of crowdfunding in the financial policies of SMEs. It integrates a comprehensive review of crowdfunding platforms and practices, leveraging research conducted by international organisations and analysing the legal frameworks governing crowdfunding platforms within the context of European Union regulations.

A comparative analysis was conducted on the selected crowdfunding platforms (among 663 available) across 41 states to identify trends and key characteristics, including platform type, industries served, rewards offered, and taxation and reporting mechanisms. This analysis provides a broad perspective on the operational landscape of crowdfunding. Additionally, the research draws on data from selected crowdfunding platforms to present the most successful crowdfunding campaigns of 2022, offering practical insights into effective crowdfunding strategies.

The study also examines commission costs associated with Polish crowdfunding portals to contextualise national practices within the broader European framework. Finally, the outcomes of a SWOT analysis are synthesised to highlight the potential of crowdfunding as a viable financial tool for SMEs, with recommendations aimed at mitigating risks and fostering diversification and stability in SME financial policies.

This methodology underpins the research's objective of evaluating crowdfunding's role in addressing SMEs' financial challenges and contributes to the development of actionable insights for policy and practice.

2. Developments in Crowdfunding

The 2008 financial crisis can be seen as a catalyst for the rise of crowdfunding as a form of financing for SMEs; since companies were unable to gain access to bank credit, particularly in Europe, crowdfunding became a sensible and reliable way to raise funds (Kirby & Worner, 2014, pp. 12–13). Moreover, this type of financing has been identified as a model fit for companies of all sizes, industries, and at all stages of advancement (Bouaiss, Maque & Meric, 2015). The reasons for the popularity of crowdfunding, according to Leoński (2022), is its simplicity – it allows crowdfunding organisers to collect funds, while in exchange for their support, the contributors receive an innovative product as well as a sense of participating in something unique.

Crowdfunding is a form of raising small amounts of money from a large number of people for a new project or venture via the Internet or a crowdfunding site, also known as a crowdfunding platform (Ziobrowska, 2016, p. 286). This is a digital solution made available online to an open audience by a crowdfunding service provider for crowdfunding collections (Liebert & Trzeciak, 2017, pp. 257–259). The activity of platforms varies in terms of finalising the transaction itself. Crowdfunding is used for a variety of reasons by individuals, creative professionals, non-profits, charities, and social enterprises looking for funds for a project with a social mission, as well as startups looking to launch an innovative new product or service and small businesses that are looking to expand.

According to the Fortune Business Insights (2023), North America and Asia dominate the global crowdfunding market with shares of 47.9% and 29.2%, respectively. Meanwhile, the European crowdfunding market accounts for 18% of the global market. Today, it has been affected by high inflation, regulatory changes, the war in Ukraine, and the deteriorating economic situation in many countries. These caused a reduction in the number of organisers and the overall number of collections, as well as periodic declines in the value of donations. The latter were most evident in April–June last year, just after the peak of the increase in collections caused by the outbreak of war in Ukraine, and in August–October 2022. Nevertheless, some collections broke records, despite the unfavourable economic conditions. Contrary to popular belief, 2022 was a challenging, though good, period for the crowdfunding industry in Poland, not including the equity crowdfunding sub-market.

Despite the fact that it is a noteworthy research area, there is still very limited academic research in this area (Bouaiss, Maque & Meric, 2015, pp. 23–39). Such studies are primarily conducted by international organisations. Thus, the OECD considers crowdfunding as filling a financing gap in the process of business development. Crowdfunding should be used by existing companies which, due to their early stage of development, could not obtain financing on the financial market (OECD, 2015, pp. 83–87; OECD, 2017, pp. 83–87). Meanwhile, the Association for Financial Markets in Europe (AFME) considers crowdfunding as a means to bridge the funding shortfall for SMEs, especially in the sphere of new and innovative undertakings and startups, for which it is essential to standardise the law in Europe (AFME, 2017, pp. 32–35). It is worth pointing out that the European Commission has already undertaken steps to establish a practical legal framework to promote crowdfunding and highlights its potential to finance SMEs (European Commission, 2014, 2015, 2016). The European Parliament in its resolutions also stressed the importance of crowdfunding and the need to spread this form of financing for SMEs, as well as the need for a dialogue with national regulatory institutions (European Parliament Resolution of 9 July 2015; European Parliament Resolution of 19 January 2016). In December 2014, the European Securities and Markets Authority (ESMA, 2014) published an opinion on the regulation of investment crowdfunding, in which it emphasised the need to spread this form of financing for SMEs and the lack of threats to the stability of the financial sector. In February 2015, the European Banking Authority (EBA, 2015) also published its opinion on crowdfunding as a loan agreement, where it points out the need to unify the law within the Eurozone and the EU, thus reducing credit risk, which determines the required development of crowdfunding (ESMA, 2014). Accordingly, these legislative undertakings demonstrate a consensus among European institutions in favour of developing crowdfunding as a modern form of financing for the SMEs sector. Crowdfunding, in essence, boosts the accessibility of companies to capital markets, cuts down the expenses of searching for investors and borrowers, and, through the implementation of common regulations at the EU level, can lead to a surge in cross-border transfers within the EU. Meanwhile, technology holds a pivotal role for financial institutions that depend on the crowdfunding model or incorporate it into existing financial offerings.

3. Regulation of European Crowdfunding Service Providers

The EU crowdfunding market is poorly developed compared to other developed economies, mainly because of disparate licensing requirements and the lack of common regulations across the European Union. This resulted in high compliance and operational costs, which prevented crowdfunding platforms from effectively scaling the provision of their services. As a result, small businesses had fewer available funding options, while investors faced more uncertainty when investing across borders.

The Regulation (EU) 2020/1503 on European Crowdfunding Service Providers (ECSP) for business was adopted on 20 October 2020. From 10 November 2021 the rules set by the regulation on ECSP for business entered into force directly across the EU. Existing crowdfunding platforms with prior authorisation under national rules had to receive authorisation under the new regulatory framework by 10 November 2022. In order to accommodate a smooth transition into the new regime and ensure continuity of services, this transitional period was extended to 10 November 2023 through the adoption of a Commission Delegated Act. The regulation lays down uniform rules across the EU for the provision of investment-based and lending-based crowdfunding services related to business financing (Regulation (EU) 2020/1503). It allows platforms to apply a single set of rules, which makes it easier for them to offer their services across the EU with a single authorisation. The regulation is a part of the technology-enabled innovation in financial services (FinTech) action plan that the Commission presented in March 2018 (European Commission, 2018).

According to the regulation, “crowdfunding is a form of financing directly connecting people who can give, lend or invest money with those who need funding for a specific project” (European Commission, 2018). The new rules are expected “to make it easier for crowdfunding platforms to develop and offer their services across national borders under a single regime,” thus increasing the availability of this innovative form of finance, which will help companies seeking alternatives to bank financing. Investors on crowdfunding platforms, meanwhile, will benefit from an aligned and enhanced investor protection framework, based on clear rules on information disclosures for project owners and crowdfunding platforms; rules on governance and risk management for crowdfunding platforms; strong and harmonised supervisory powers for national authorities overseeing the functioning of crowdfunding platforms.

The regulations concerning loan (debt) and investment (equity) crowdfunding models have been enforced in the European Union since 10 November 2021 (Regulation (EU) 2020/1503). The above regulation significantly reduced the earlier freedom of crowdfunding platforms, regulated their scope and introduced a framework for their activity. It should be noted that the Regulation (EU) 2020/1503 does not cover charitable collections or collections for activities like the release of records, the financing of a concert tour or a book. The new regulations require operators of a crowdfunding platform to hold a permit (licence) in order to operate legally. In addition, they need to prepare for new charges. The cost of a licence can reach up to €4,500.

4. Overview of Crowdfunding Platforms with Particular Attention to the European Market

Crowdfunding has made access to capital easier, faster – and in some cases, even possible at all. The United Kingdom saw the highest registration of platforms that took part in the Crowdspace survey of 2022 – 15% of the surveyed platforms had their origins there. 24% of crowdfunding platforms have a business presence in multiple countries, such as France, Italy, Greece, Estonia, Germany and Spain. As the second most preferred location, 11% of crowdfunding platforms have registered in Estonia (Crowdspace, 2022). In this country, the majority of platforms are peer-to-peer (P2P) lending marketplaces, and this also appeals to companies from the UK that want to penetrate the European crowdfunding market quickly. Estonia does not have any laws governing crowdfunding activities, although there is a good practices guide created by the FinanceEstonia crowdfunding task force. Platforms related to loans should be in possession of a professional licence and follow the Creditors and Credit Intermediaries Act. Peer-to-peer lending is also not included in the European crowdfunding regulations. Of all companies registered outside the EU (predominantly in the UK), 38% are intending to incorporate a company in the EU (Crowdspace, 2022). Those who are attempting to join the EU are aiming to operate in almost all European nations, which will likely conform to ECSP certification. Most platforms enable investors and benefactors from all across the European Economic Area to invest or donate through their portals, with certain platforms limiting their offerings to particular countries.

Generally, crowdfunding is carried out in two forms. Such platforms as Indiegogo.com (established in the USA) enable businesses to launch a project and raise any amount for a given goal (i.e., "keep it all," "take what you get"). This is a type of flexible financing, the upside of which is that the originator will receive some help. The downside of this funding approach is the high risk that comes with the possibility of not achieving the main goal (due to underfunding). The second type represents platforms that implement ventures only on the condition of achieving the goal that was specified by the project (i.e., "all or nothing") (Dziuba, 2012, pp. 88–89). Examples of this type of platform are Kickstarter.com (established in the USA) and PolakPotrafi.pl (established in Poland). Meanwhile, there are also alternative solutions, such as "all & more," in which the financiers and sponsors can retain the funds they raised if the project fails.

The other classification relates to the reward given in exchange for a contribution and is divided into four types: donation-based, rewards-based, investment-based and debt-based crowdfunding. Crowdfunding types depending on rewards in return and the way they are taxed and reported, with examples across Europe, are presented in Table 1. Moreover, Figure 1 highlights the number of particular crowdfunding platforms and cumulative share percentage according to type among 663 existing platforms across 41 states.[1] It is worth noting that a platform can simultaneously serve several kinds of crowdfunding, like donation and reward-based or equity and debt-based.

Considering the type of activity, we can indicate that most of them are concentrated around SMEs with a particular emphasis on real estate, green energy and startups (Fig. 2). It is worth noting that based on the results from Crowdspace (2022), sustainability and green energy offerings were hosted by 12% in 2021, 22% in 2022, thus the growing global trend for sustainable investment and green energy projects, in particular, is evident. Besides, according to the data of 41 states, the majority of these platforms are debt- and equity-based crowdfunding, thus providing financing to SMEs.

[1] Andorra, Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Monaco, Netherlands, Norway, Poland, Portugal, Romania, Turkey, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, Ukraine.

Table 1. Crowdfunding Types Depending on Rewards in Return and How They Are Taxed and Reported

Type	Reward in Return	Method of Taxing and Reporting	Examples
Donation-based crowdfunding	A donation without anything in return	Funds do not need to be reported, as they are considered a gift	Kickstarter, Indiegogo, CrowdFunder, and RocketHub; WhyDonate (Netherlands); fairplaid (Germany); zrzutka.pl (Poland); Bona Fides Invest (Croatia); Zaar (Malta); DALENDO (Luxemburg); Coop Crowdfunding (Denmark); FINTELUM (Latvia); Crowdbound (United Kingdom); 4fund.com (Poland); JustGiving (United Kingdom); OZÉ (France); Make-A-Wish (Liechtenstein – Switzerland); Geef (Netherlands); Produzioni Dal Basso (Italy); Energy4impact (United Kingdom); Betterplace (Germany); 1%Club (Netherlands); Babyloan (France); CrowdAboutNow (Netherlands); Startnext (Germany)
Rewards-based crowdfunding	A reward in return, often related to the project	Funds are typically considered to be business income. Therefore, the fundraiser can claim deductions for any expenses that were incurred to earn that business income	Crowd2Fund (United Kingdom); Booomerang.dk (Denmark); Karolina Fund (Iceland); Bona Fides Invest (Croatia); Zaar (Malta); Coop Crowdfunding (Denmark); FINTELUM (Latvia); Yes We Farm (Switzerland); Produzioni Dal Basso (Italy); Fund it (Ireland); Crowdfunder (United Kingdom); Zeste (France); Solar Green Point (Netherlands); Ginger (Italy); Crowd. Science (United Kingdom); Growfunding (Belgium); EcoCrowd (Austria; Germany); MiiMOSA (France); CroInvest (Croatia); Kocoriko (France); Dartagnans (France); Sponsor.me (Norway)
Investment-based crowdfunding (equity crowdfunding)	The investor receives a share in the company	Capital contributions are generally considered to be non--deductible	Recrowd (Italy); Funderbeam (United Kingdom); Folkeinvest (Norway); Bricksave (United Kingdom); Crowdway (Poland); Crowdberry (Slovakia); CapitalRise (United Kingdom); Find Funds (Poland); Fellow Funders (Spain); Walliance (Italy); Danube Angels (Austria); Dealflow (Norway); Spark Crowdfunding (Ireland); occollo (Czech Republic); finteo (Germany); CrowdedHero (Latvia); OOMNIUM (Switzerland); Vitofund (Latvia); LandEx (Estonia); SIPA immobilier (Switzerland)

Table 1 cnt'd

Type	Reward in Return	Method of Taxing and Reporting	Examples
Debt-based crowdfunding	Lending money to individuals or businesses via a platform in exchange for a set interest rate	The interest an investor collects would be classified as investment income and taxed accordingly. For the borrower, the interest payments would be deductible if the loan was used to earn business income	Ener2Crowd (Italy); Letsinvest (Lithuania); Maclear (Switzerland); ROCKETS Green (Austria – Germany); Crowdestate (Estonia); Raizers (Belgium – France); Fiduciam (Netherlands – United Kingdom); MICROWD (Spain); Goparity (Portugal); ecoligo (Germany); Winwinner (Belgium); Invest in Slovakia (Slovakia); Crowdbase (Cyprus); Rentujemy (Poland); Isicrowd (Italy); WiSEED (France); Kapitaal Op Maat (Netherlands)

Source: the authors, based on https://thecrowdspace.com/directory/reward-crowdfunding-platforms/ (accessed: 15.08.2023).

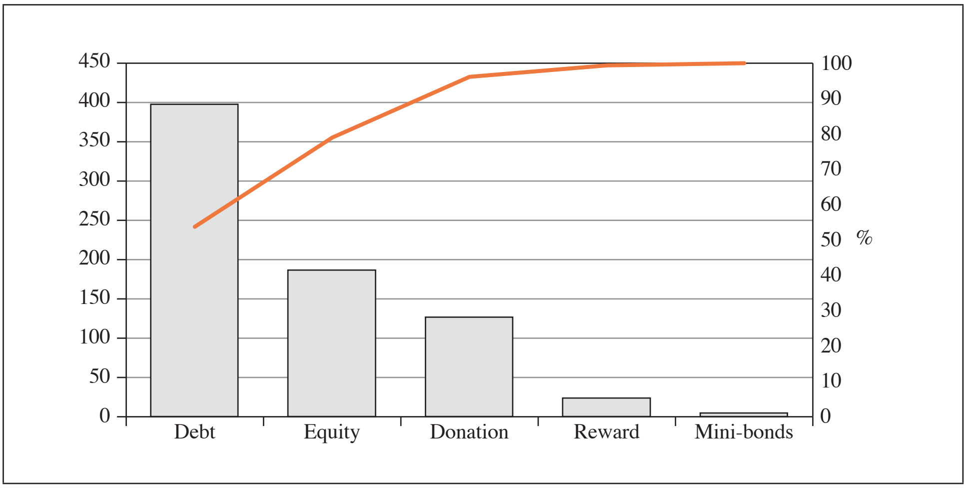


Fig. 1. Types of Crowdfunding Platforms among 663 Existing Platforms in Particular States

Source: the authors, based on data from https://thecrowdspace.com/platforms (last updated: 14.11.2023).

Crowdfunding platforms usually operate on a commission basis, whose value is currently around 5% of the capital raised, as shown in Figure 3. Among 16 platforms presented in Figure 3, the commission on Findfunds and Wspieram.to is the highest, compared to the other ones, especially, Zrzutka.pl and GoFundMe which are either free or very low. Besides, one should also take into account a payment system commission of around 3%.

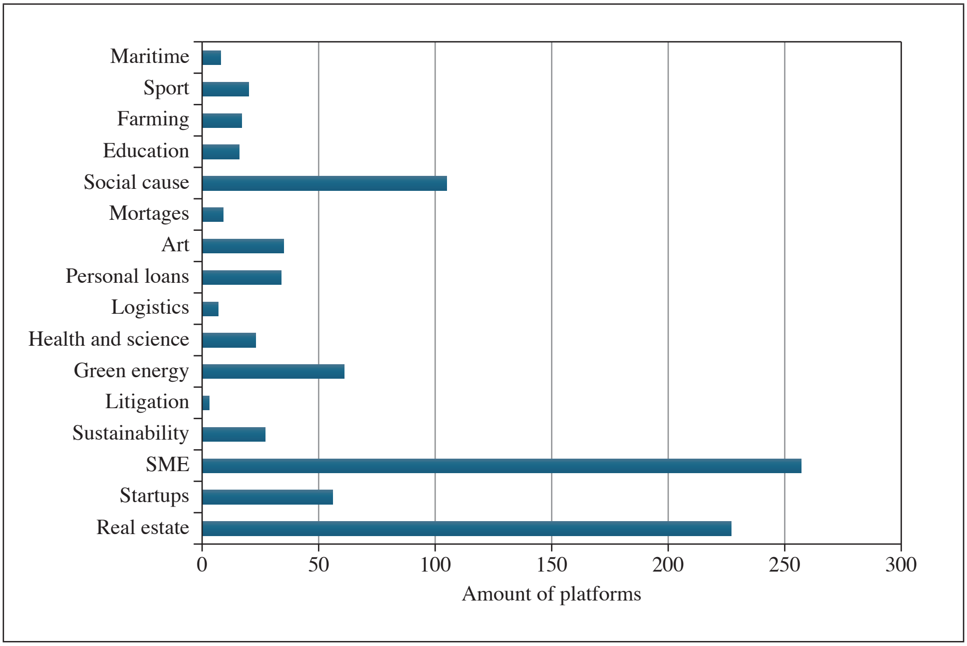


Fig. 2. Crowdfunding Types Depending on Industry across 41 States
Source: the authors, based on data from https://thecrowdspace.com/platforms (last updated: 14.11.2023).

The success of a crowdfunding campaign depends on a number of factors that can affect its results. These include the financial goal, the quality of the project, marketing communications at each stage of the campaign, the credibility of the project, and the trust of the community. A lack of information can lead to a disproportionate number of low-quality or high-risk projects being funded, as backers may not have sufficient information to distinguish between promising and less promising ventures. As Cumming, Vanacker and Zahra (2021) suggest, problems such as adverse selection could be significantly reduced if companies providing information on crowdfunding platforms present the facts. SMEs could potentially benefit more by adopting such an approach, as this will increase investor confidence in them and consequently pave the way for a more successful post-campaign entrepreneur-investor relationship (Eldridge, Nisar & Torchia, 2021). This could prove very significant, as companies that survive equity crowdfunding (ECF) could end up turning into empty shells or zombie companies, as pointed out by Signori and Vismara (2018).

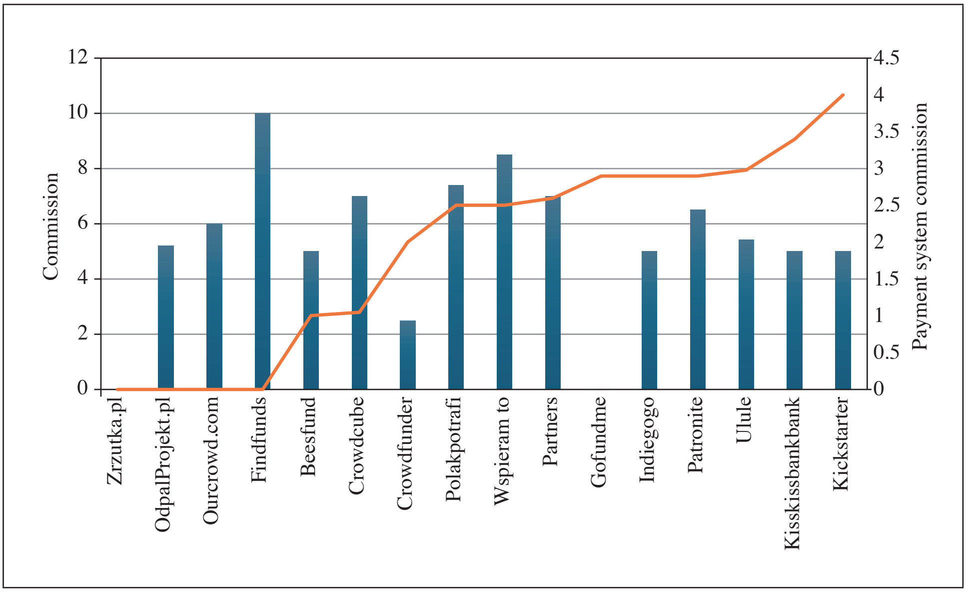


Fig. 3. Commission Expenses – in the Case of Selected Crowdfunding Platforms (Average Value, %)

Notes: Primary axis – bar chart, secondary axis – line chart.

Source: the authors, based on data from the listed crowdfunding platforms (accessed: 9.06.2023).

Table 2 shows the three crowdfunding campaigns that were most successful in 2022. They were conducted by the SPOKE company, the BLUETTI company and the writer Brandon Sanderson.

Table 2. The Most Successful Campaigns in 2022

Entity	Platform	Model and Type of Crowdfunding	Description	The Amount Collected
SPOKE company	Seedrs	Model: "all or nothing" Type of crowdfunding: equity crowdfunding	The goal: to raise £1.5 million to open a new distribution centre in Europe, introduce its own golf collection and hire a dedicated team of employees for the US market.	1,579 investors bought shares in the company, worth a total of more than £4.7 million.

Table 2 cnt'd

Entity	Platform	Model and Type of Crowdfunding	Description	The Amount Collected
Bluetti company	Indiegogo	Model: "keep it all, take what you get" Type of crowdfunding: product crowdfunding	The goal: to raise $10,000. BLUETTI AC500 and B300S kit, a response to the growing demand for clean energy and energy storage solutions.	During the first 24 hours, the campaign managed to raise $2.8 million. In the end, a total of $12.06 million was raised with the help of 5,072 contributors.
Brandon Sanderson	Kickstarter	Model: "all-or-nothing" Type of crowdfunding: reward-based crowdfunding and pre-sale-based crowdfunding	The goal: $1 million. Release in 2023 of four novels secretly written during the COVID-19 pandemic.	This goal was met after just 35 minutes. Little by little, as much as $41.75 million was eventually raised.

Source: the authors, based on data from the listed crowdfunding platforms (accessed: 18.05.2023).

The first campaign, conducted by the SPOKE company, ended the same day. As many as 1,579 investors purchased shares in the company, with a total value of more than £4.7 million. The original goal was thus exceeded three times. The funds were raised to open a new distribution centre in Europe, introduce a proprietary golf collection and hire a dedicated team of employees for the US market. This was the highest amount raised on the Seedrs platform in 2022 (Seedrs.com, 2023).

Another example is the campaign of the American company BLUETTI, which was conducted on the Indiegogo platform. Its goal was to raise $10,000. In order to receive the basic version of the AC500 and B300S kit, a minimum of $2,999 had to be contributed. Nonetheless, within the first 24 hours of the campaign, an astonishing $2.8 million was raised. However, the campaign ended on 30 October. By that time, as much as $12.06 million had been raised, and this was done with the help of 5,072 contributors. What is more, the BLUETTI AC500 and B300S kit went on sale in December (Indiegogo.com, 2023).

However, the biggest and the most successful campaign in the history was carried out in 2022 – on the Kickstarter. B. Sanderson, the writer, asked the crowdfunding community to finance his plan to release four books written secretly during the COVID-19 pandemic in 2023. In order for the novels to be published, Sanderson had to raise as much as $1 million. To get the book, contributors were required to donate $40 (e-book), $60 (audiobook), and $160 (physical, hardcover edition).

However, the scale of the undertaking was probably a surprise even to the author himself, since the goal was met within 35 minutes. Eventually, as much as $41.75 million was raised. The writer succeeded in breaking the Pebble record. The collection was launched on 1 March, and as early as 4 March, an amount higher than that raised by Pebble Time was received. It should be noted that the writer achieved this unprecedented result without even revealing what each novel would be about. The author only displayed the covers and declared that the stories in the four books would take place in the Cosmere universe. However, such a successful campaign would not be possible without Sanderson's pre-existing popularity. At the time of publishing the promotional video, his YouTube channel was not anonymous. It was followed by more than 300,000 subscribers, and the writer has been posting there for many years (Kickstarter.com, 2023).

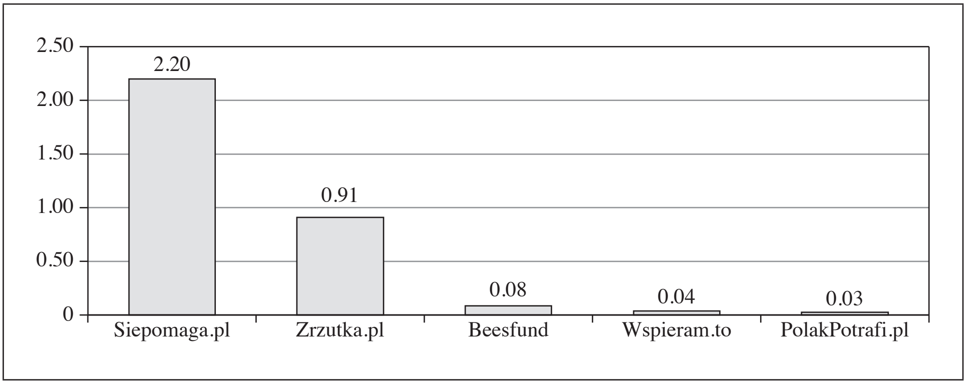


Fig. 4. Total Funds Raised on Selected Polish Platforms up to 2022 (Billion PLN)
Source: the authors, based on data from the listed crowdfunding platforms (accessed: 9.06.2023).

Considering the Polish experience in crowdfunding, we can state that it is a thriving market in the area of various crowdfunding models. For instance, Figure 4 presents the total money raised on selected Polish platforms up to 2022. Siepomaga.pl is the largest community of donors in the Polish online space. Over 11 years, more than PLN 2 billion has been raised from donors (Statista, 2021). Zrzutka.pl, a donation-based platform, is one of the most substantial and rapidly expanding crowdfunding platforms. During the 927,101 organised collections, a total of PLN 909,324,638 was contributed by 699,113 contributors (data as of 9 January 2023) (Zrzutka.pl, 2023). In comparison, PolakPotrafi.pl with around 4,374 projects raised PLN 26,924,841 from 265,171 contributors (data as of 9 January 2023) (PolakPotrafi.pl, 2023). The site, which is also of a donation-based nature, was established in 2011. It is widely regarded as a pioneering crowdfunding platform. Due to its numerous successes, rapid development and the amount of funds raised, it has been dubbed the Polish "Kickstarter" (Kalinowski, 2015, p. 39). Investment portals have also been developed on the Polish market. The most popular and successful among equity crowdfunding is Beesfund.pl. During 136 issues, a total of PLN 83,505,186 was raised from 79,379 registered investors (data as of 9 January 2023). The platform is prospering and has announced 22 new investment crowdfunding campaigns (Beesfund.pl, 2023).

In 2022, the companies, in collaboration with crowdfunding platforms raised PLN 25 million. 11 platforms carried out a total of 47 issues. Economic weakness, high levels of inflation, and high interest rates were the main factors hindering the development of the market in 2022. The value of the equity crowdfunding market from 2012 to the end of 2022 amounted to at least PLN 340 million, of which capital of PLN 300 million was raised with the support of platforms (in the period 2012–2022).

In 2022, there were a great number of Polish crowdfunding projects, whose campaigns met 100% or more of the target. It is worth mentioning that the Stock Exchange also includes in its new strategy the creation of new markets, including crowdfunding platforms. The creators of this solution are aiming for it to be applied under a licence from the Financial Supervision Commission. Moreover, such an application has already been submitted. The structure of the Polish economy is dominated by small businesses that do not qualify for a regulated market. Thanks to the crowdfunding platforms it will be possible to give them a leg up (Supernak, 2023).

5. Outcomes and Final Remarks

Consequently, there are a range of reasons why crowdfunding may or may not be a good idea for some small businesses and startups. Table 3 presents the results of SWOT analysis concerning crowdfunding as a form of SME financing based on literature review and own outcomes.

Crowdfunding ensures the development of new technologies making capital transfer easier. For businesses unable to access a bank loan or bring on an investor, crowdfunding may be a viable option as opposed to the months-long process of applying for a loan or obtaining investment from an angel investor. However, there is no guarantee of achieving the desired goal (i.e., if the contribution target is not achieved, for example in the case of new, complicated technology used in back-end data processing, that is unlikely to gain attraction, so the business goes away empty handed and the contributor gets his/her money back). Besides, businesses should have both the time and money to create a buzz and to generate a strong crowdfunding campaign. So, one may invest time and resources with no positive outcome.

Table 3. SWOT Analysis – Crowdfunding in SMEs Financial Policy

Strengths	Weaknesses
– easier access to money – crowdfunding is an option for businesses that are unable to secure a bank loan or attract an investor – time advantage – a bank loan application or securing investment from an angel investor could take months – marketing – a strong social media presence or an active community will help spread awareness and generate buzz much more easily – less due diligence – no obligation to write a business plan – global audience – traditional financing options limit you to the region you are in; with crowdfunding you can tap into funds and potential customers from all over the world – less pressure on the management – power is not concentrated around a particular group of shareholders because of an increased number of shares and the involvement of a large number of investors	– businesses should have the time and funds to build up their reach and put together a strong crowdfunding campaign – no guarantee of reaching the target – if the contribution goal is not met, businesses go away empty-handed and contributors get their funds back – global audience – a strong network or community is essential for visibility – no tough questions which can prevent you from identifying (and fixing) the weak areas in your business – low liquidity – crowdfunding investors may have to wait several years for their investment to pay off

Opportunities	Threats
– access to a crowd – a loyal customer base for the future – proof of concept and market validation – help with other forms of financing – if you are able to prove market demand through a crowdfunding campaign, it will be easier to attract investors such as venture capitalists and angel investors later on – the development of new technologies making capital transfer easier	– underestimating the costs (i.e., time and resources) – intellectual property – making the idea public makes it more easily copied or stolen by other companies with strong capital – a new, complicated piece of technology used in back-end data processing is unlikely to gain attraction – reputation damage – failure can damage a company's reputation and disappoint the hundreds (if not thousands) of people who supported it – law-breaking – evolving legislation and requirements (EU and national laws) – risk of bogus platforms – certain rights and responsibilities are offered to investors – the investors might want to sell their share – risk of potential fraudulent schemes in the equity crowdfunding process

Source: the authors, based on European Commission (2017), CFI Team (2022), Chojnacki (2021), Statista (2023), OECD (2022), Mordor Intelligence (2023), Stefanelli, Ferilli & Boscia (2022).

A good thing is that there is less due diligence and less pressure on the management, but there are no tough questions that can stop you from finding (and fixing) the weaknesses in your project. Moreover, crowdfunding investors could be waiting quite a while before their investment yields any profit. Crowdfunding also puts certain rights and responsibilities in the hands of investors, which can be sold on.

It allows one to access a wide international audience, which has its pros and cons. Leverage capital and prospective customers from around the world (i.e., one has an access to a crowd, that is, a loyal customer base for the future; proof of concept and market validation; a lively community promoting knowledge and stimulating interest much easier), but a strong network or community is essential for visibility. Conversely, making the concept open to the public makes it easier to be copied or hijacked by other companies with more robust resources. Furthermore, a failure can have a negative effect on a company's reputation and disappoint the hundreds (if not thousands) of people who supported it.

There is also a risk of bogus platforms, law-breaking and potentially fraudulent schemes in the equity crowdfunding process. Meanwhile, if you can show evidence of market demand through a crowdfunding campaign, it will be easier to bring in investors such as venture capitalists and angel investors later on.

Summing up, the inclusion of online alternative finance in SME finance policies is becoming more widespread. FinTech offers an opportunity to increase the access to financing for small and medium-sized enterprises, providing more convenient access to services, better credit risk assessment, and lowering the transaction cost. Bearing in mind the research problem, we endeavoured to underline key difficulties currently faced by SMEs, with the emphasis on crowdfunding as a principal approach of acquiring funds. The study provides an overview of crowdfunding, its forms and types depending on funding method, rewards in return and the way it is taxed and reported. Legislative undertakings display a consensus among European bodies to foster crowdfunding as a modern form of financing for the SME sector.

In comparison to other developed economies, the EU crowdfunding market is under-developed because of its divergent licensing requirements and the lack of consistent regulations across the European Union. This resulted in high compliance and operational costs, which prevented crowdfunding platforms from effectively scaling the provision of their services. Subsequently, small businesses had fewer accessible financing choices, while investors experienced more insecurity when investing abroad.

Based on data from selected crowdfunding platforms, the authors highlighted the key features of the best crowdfunding campaigns in 2022, which were conducted by the SPOKE company, the BLUETTI company and the Brandon Sanderson's campaign. Taking into account the Polish market, it is clear that the various crowdfunding models are flourishing. In 2022, there were a great number of crowdfunding projects, whose campaigns met 100% or more of the target. The greatest sum of money was gathered on Siepomaga.pl and Zrzutka.pl. Besides, the Stock Exchange also includes in its new strategy the creation of new markets, including crowdfunding platforms.

In essence, crowdfunding makes capital markets more accessible to companies, cuts the cost of looking for investors and borrowers, and, with the implementation of common regulations in the EU, may lead to an upsurge in cross-border investment.

Authors' Contribution

The authors' individual contribution is as follows: Each contributed 50%.

Conflict of Interest

The authors declare no conflict of interest.

References

AFME. (2017). *The Shortage of Risk Capital for Europe's High Growth Businesses*. Association for Financial Markets in Europe. Retrieved from: https://www.afme.eu/portals/0/globalassets/downloads/publications/afme-highgrowth-2017.pdf (accessed: 12.08.2023).

Arena, M., Bengo, I., Calderini, M., & Chiodo, V. (2018). Unlocking Finance for Social Tech Start-ups: Is There a New Opportunity Space? *Technological Forecasting and Social Change*, *127*, 154–165. https://doi.org/10.1016/j.techfore.2017.05.035

Beesfund.pl. (2023). https://www.beesfund.pl (accessed: 9.06.2023).

Bouaiss, K., Maque, I., & Meric, J. (2015). More Than Three's a Crowd… in the Best Interest of Companies! Crowdfunding as Zeitgeist or Ideology? *Society and Business Review*, *10*(1), 23–39. https://doi.org/10.1108/SBR-09-2014-0042

Camilleri, M. A., & Bresciani, S. (2024). Crowdfunding Small Businesses and Startups: A Systematic Review, an Appraisal of Theoretical Insights and Future Research Directions. *European Journal of Innovation Management*, *27*(7), 2183–2209. https://doi.org/10.1108/EJIM-02-2022-0060

CFI Team. (2022). *Equity Crowdfunding*. Retrieved from: https://corporatefinanceinstitute.com/resources/valuation/equity-crowdfunding/ (accessed: 12.08.2023).

Chojnacki, J. (2021). *Pierwszy million z crowdfundingu. Katalog platform crowdfundingowych*. Krakowski Park Technologiczny. Retrieved from: https://www.kpt.krakow.pl/wp-content/uploads/2021/09/pierwszy-milion-z-crowdfundingu--katalog-platform-crowdfundingowych-.pdf (accessed: 17.07.2023).

Crowdspace. (2022). *Crowdfunding Industry Report. Major Regulatory, Marketing and Tech Challenges*. Retrieved from: https://thecrowdspace.com/whitepapers/crowdfunding-industry-report-2022/ (accessed: 8.09.2023).

Cumming, D., Vanacker, T., & Zahra, S. (2021). Equity Crowdfunding and Governance: Toward an Integrative Model and Research Agenda. *Academy of Management Perspectives*, *35*(1), 69–95. https://doi.org/10.5465/amp.2017.0208

Dziuba, D. T. (2012). Rozwój systemów crowdfundingu – modele, oczekiwania i uwarunkowania. *Problemy Zarządzania*, *3*(38), 83–103. https://doi.org/10.7172/1644-9584.38.6

EBA. (2015). *Opinion of the European Banking Authority on Leading-based Crowdfunding*. EBA/Op/2015/03. Retrieved from: https://www.eba.europa.eu/sites/default/documents/files/documents/10180/983359/f6106173-dc94-4d22-ade8-d40fce724580/EBA-Op-2015-03%20%28EBA%20Opinion%20on%20lending%20based%20Crowdfunding%29.pdf?retry=1 (accessed: 10.06.2023).

Eldridge, D., Nisar, T. M., & Torchia, M. (2021). What Impact Does Equity Crowdfunding Have on SME Innovation and Growth? An Empirical Study. *Small Business Economics*, *56*, 105–120. https://doi.org/10.1007/s11187-019-00210-4

ESMA. (2014). *Opinion: Investment-based Crowdfunding*. Retrieved from: https://www.esma.europa.eu/sites/default/files/library/2015/11/2014-1378_opinion_on_investment-based_crowdfunding.pdf (accessed: 12.08.2023).

European Commission. (2014). Communication from the Commission to the European Parliament, The Council, European Economic and Social Committee and the Committe of the Regions. Unleashing the Potential of Crowdfunding in the European Union. COM(2014) 172 final.

European Commission. (2015). *Crowdfunding: Mapping EU Markets and Events Study*. Retrieved from: https://finance.ec.europa.eu/publications/crowdfunding-mapping-eu-markets-and-events-study_en (accessed: 18.08.2023).

European Commission. (2016). Commission Staff Working Document. Crowdfunding in the EU Capital Market Union. SWD(2016) 154 final.

European Commission. (2017). *Crowdfunding Explained: A Guide for Small and Medium Enterprises on Crowdfunding and How to Use It*. Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs. Publications Office. https://data.europa.eu/doi/10.2873/313319

European Commission. (2018). Communication from the Commission. FinTech Action plan: For a more competitive and innovative European financial sector. COM(2018) 109 final. Retrieved from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0109 (accessed: 12.09.2023).

European Parliament Resolution of 9 July 2015 on Building a Capital Markets Union (2015/2634(RSP). Official Journal of the European Union, C 265/76.

European Parliament Resolution of 19 January 2016 on stocktaking and challenges of the EU Financial Services Regulation: Impact and the way forward towards a more effective EU framework for Financial Regulation and a Capital Markets Union (2015/2106(INI)). Official Journal of the European Union, C 11/24.

Fortune Business Insights. (2023). *FinTech. Crowdfunding Market. Key Market Insights*. Retrieved from: https://www.fortunebusinessinsights.com/crowdfunding-market-107129 (accessed: 17.04.2024).

Golić, Z. (2014). Advantages of Crowdfunding as an Alternative Source of Financing of Small and Medium-sized Enterprises. *Proceedings of the Faculty of Economics in East Sarajevo*, 8, 39–48. https://doi.org/10.7251/ZREFIS1408039G

Indiegogo.com. (2023). https://www.indiegogo.com (accessed: 9.06.2023).

Kalinowski, Ł. (2015). „Crowdfunding" – nowy element tworzącej się gospodarki społecznościowej: wyzwania prawne. *Rynek – Społeczeństwo – Kultura*, 3(15), 38–45.

Kickstarter.com. (2023). https://www.kickstarter.com (accessed: 9.06.2023).

Kirby, E., & Worner, S. (2014). *Crowd-funding: An Infant Industry Growing Fast* (Staff Working Paper of the IOSCO Research Department, SWP3/2014). Retrieved from: https://www.iosco.org/research/pdf/swp/Crowd-funding-An-Infant-Industry-Growing-Fast.pdf (accessed: 12.08.2023).

Leoński, W. (2022). Crowdfunding as an Innovative Source of Financing Business Initiatives in Poland. *Procedia Computer Science*, *207*, 2921–2929. https://doi.org/10.1016/j.procs.2022.09.350

Liebert, F., & Trzeciak, M. (2017). Portal crowdfundingowy jako narzędzie wspierające realizację małych projektów. *Zeszyty Naukowe Politechniki Śląskiej*, 114, 255–271. https://doi.org/10.29119/1641-3466.2017.114.21

Marina, A., Imam Wahjono, S., Fam, S.-F., & Rasulong, I. (2023). Crowdfunding to Finance SMEs: New Model after Pandemic Disease. *Sustainability Science and Resources*, *5*(1), 1–19. https://doi.org/10.55168/ssr2809-6029.2023.5001

Mordor Intelligence. (2023). *Crowdfunding Market Size & Share Analysis – Growth Trends & Forecasts* (*2023–2028*). Retrieved from: https://www.mordorintelligence.com/industry-reports/crowdfunding-market (accessed: 16.02.2024).

OECD. (2015). *New Approaches to SME and Entrepreneurship Financing: Broadening the Range of Instruments*. OECD Publishing. https://doi.org/10.1787/9789264240957-en

OECD. (2017). *Financing SMEs and Entrepreneurs 2017: An OECD Scoreboard*. OECD Publishing. https://doi.org/10.1787/fin_sme_ent-2017-en

OECD. (2022). *Financing SMEs and Entrepreneurs 2022: An OECD Scoreboard*. OECD Publishing. https://doi.org/10.1787/e9073a0f-en

PolakPotrafi.pl. (2023). https://www.polakpotrafi.pl (accessed: 9.06.2023).

Regulation (EU) 2020/1503 of the European Parliament and of the Council of 7 October 2020 on European crowdfunding service providers for business, and amending Regulation (EU) 2017/1129 and Directive (EU) 2019/1937 (Text with EEA relevance). Official Journal of the European Union, L 347/1. Retrieved from: https://data.europa.eu/eli/reg/2020/1503/oj (accessed: 12.08.2023).

Seedrs.com. (2023). www.seedrs.com (accessed: 9.06.2023).

Signori, A., & Vismara, S. (2018). Does Success Bring Success? The Post-offering Lives of Equity-crowdfunded Firms. *Journal of Corporate Finance*, *50*, 575–591. https://doi.org/10.1016/j.jcorpfin.2017.10.018

Statista. (2021). *Value of the Crowdfunding Market in Poland from 2017 to 2021.* Retrieved from: https://www.statista.com/statistics/1127083/poland-value-of-the-crowdfunding-market/ (accessed: 19.06.2023).

Statista. (2023). *Crowdfunding in Europe – Statistics & Facts*. Statista Research Department.

Stefanelli, V., Ferilli, G. B., & Boscia, V. (2022). Exploring the Lending Business Crowdfunding to Support SMEs' Financing Decisions. *Journal of Innovation & Knowledge*, *7*(4), 100278. https://doi.org/10.1016/j.jik.2022.100278

Supernak, B. (2023). *GPW zakłada w nowej strategii utworzenie nowych rynków, w tym platformy crowdfundingowej.* Inwestycje.pl. Retrieved from: https://inwestycje.pl/gielda/gpw-zaklada-w-nowej-strategii-utworzenie-nowych-rynkow-w-tym-platformy-crowdfundingowej (accessed: 15.04.2024).

Ziobrowska, J. M. (2016). Crowdfunding jako nowoczesna forma wsparcia przedsięwzięć społecznych, kulturowych i biznesowych. *Finanse, Rynki Finansowe, Ubezpieczenia*, 3(81), 285–295. https://doi.org/10.18276/frfu.2016.81-25

Zrzutka.pl. (2023). https://www.zrzutka.pl (accessed: 9.06.2023).

Krakow Review of Economics and Management
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie

4 (1010)
2025

KREM, 2025, 4(1010): 125–140
ISSN 1898-6447
e-ISSN 2545-3238
https://doi.org/10.15678/krem.18672

Predictors of the Frequency of Consumption and Purchase of Convenience Food in Modelling Approaches

Anna Platta[1], **Anna Mikulec**[2], **Karolina Mikulec**[3], **Monika Radzymińska**[4], **Grzegorz Suwała**[5]

[1] Gdynia Maritime University, Faculty of Management and Quality Science, Department of Quality Management, Morska 81-87, 81-225 Gdynia, Poland, e-mail: a.platta@wznj.umg.edu.pl, ORCID: https://orcid.org/0000-0002-7963-1889

[2] University of Applied Sciences in Nowy Sącz, Faculty of Engineering Sciences, Zamenhofa 1a, 33-300 Nowy Sącz, Poland, e-mail: amikulec@ans-ns.edu.pl, ORCID: https://orcid.org/0000-0002-2737-5967

[3] SGH Warsaw School of Economics (graduate), Niepodległości 162, 02-554 Warszawa, Poland, e-mail: karolinaa.mikulec@gmail.com, ORCID: https://orcid.org/0009-0001-7631-2444

[4] University of Warmia and Mazury in Olsztyn, Faculty of Economic Sciences, Institute of Management Science and Quality, Oczapowskiego 4, 10-719 Olsztyn, Poland, e-mail: mradz@uwm.edu.pl, ORCID: https://orcid.org/0000-0003-0531-268X

[5] Krakow University of Economics, Institute of Quality Sciences and Product Management, Department of Food Product Quality, Rakowicka 27, 31-510 Kraków, Poland, e-mail: suwalag@uek.krakow.pl, ORCID: https://orcid.org/0000-0002-7857-2282

Suggested citation: Platta, A., Mikulec, A., Mikulec, K., Radzymińska, M., & Suwała, G. (2025). Predictors of the Frequency of Consumption and Purchase of Convenience Food in Modelling Approaches. *Krakow Review of Economics and Management / Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 4(1010), 125–140. https://doi.org/10.15678/krem.18672

ABSTRACT

Objective: To determine the variables influencing the frequency of consumption and purchase of convenience foods with the use of economic modelling.

Research Design & Methods: The empirical material consisted of the results obtained using computer-assisted web interviewing methodology (by means of Google Forms). The study was conducted among 393 respondents living in Gdynia (Northern Poland). The survey included questions in the following areas: lifestyle, attitudes towards new products, selection attributes of convenience foods, frequency of consumption and purchase of convenience foods, as well as demographic data (gender, age, and income). To achieve the objectives of the study, logistic regression analysis was used, thus predicting the probability of a set of independent variables influencing the regularity of purchasing convenience foods and the frequency of purchasing convenience food products for direct consumption (ready-to-eat).

Findings: Men were found to be almost three times more likely to consume convenience foods on a regular basis as women. In turn, individuals belonging to Generation Y have an approximately 70% higher chance of consuming convenience food products more regularly than representatives of Generation X. Moreover, the subjects for whom the freshness of consumed food is very important are about 59% less likely to purchase products for direct consumption (ready-to-eat) than individuals for whom the freshness of consumed products is not so important.

Implications/Recommendations: A potential segment of convenience food consumers are men, individuals from Generation Z, who value both the freshness and short preparation time of the products. Therefore, building awareness of convenience food brands/products should be especially targeted at this group of buyers.

Contribution: The presented models expand the knowledge of the factors determining the consumption of convenience foods.

Article type: original article.

Keywords: convenience food, regularity of consumption, purchase determinants, purchase predictors, purchase forecasting.

JEL Classification: A14, D10, M3, M31, Q13.

---

1. Introduction

The term "convenience food" represents a highly contentious category, subject to diverse definitions, interpretations, and applications. Convenience foods encompass a diverse spectrum of processed and semi-processed items, often contrasted with "fresh" foods composed of raw ingredients and prepared from scratch. This category is frequently regarded as one of the least healthy and most unsustainable dietary choices, owing to its low nutritional value, excessive packaging, and heavy reliance on imported ingredients (Jackson & Viehoff, 2016).

The convenience food category consists of any form of pre-packaged or prepared food designed for easy and rapid consumption, requiring minimal or no cooking or additional preparation. The convenience food segment constitutes approximately 6% of the global food market, resulting in retail sales of approximately USD 564 billion in 2022, projected to increase to USD 839 billion by 2028. The market is anticipated to grow at an annual rate of 6.28% (CAGR 2024–2028). A significant proportion of revenues is derived from China (USD 154 billion in 2024). Additionally, the market exhibits substantial development in Canada, the UK, the US, and other nations (Statista, 2023).

Initially, within the food sector, when deliberating upon the concept of convenience food, there was a diminished emphasis on quality and nutritional value, with a greater focus on convenience and accessibility. Nevertheless, due to the heightened interest in convenience foods, this category poses persistent challenges for food manufacturers. The provision of suitable products improves consumer satisfaction, consequently enhancing economic efficiency for producers (Oroian *et al*., 2017). A comprehensive understanding of consumer needs and expectations is an indispensable element for the success of new products (Cooper, 2018). Failure to incorporate market orientation into the design of new products, reluctance to conduct requisite market assessments, or oversight of consumer expectations are primary factors contributing to the failure of new products in the market (Cooper, 2019).

The convenience food market is undergoing evolution. Increasing consumer awareness propels current convenience food manufacturers to seek recipes that are both swift and straightforward to prepare, while concurrently possessing high sensory and nutritional quality. A novel trend is emerging in the market concerning the production of convenience foods with eco-friendly attributes (Stranieri, Ricci & Banterle, 2017; Ricci, Banterle & Stranieri, 2018). A recent shift in the evaluation of convenience foods is notable; it is no longer perceived as having adverse health effects and is now advocated as a means of supporting the dietary patterns of the elderly and other demographics (Nakano & Washizu, 2020). Identifying trends in convenience food consumption is imperative to ensure the nutritional needs of current and future generations are adequately addressed (Platta *et al*., 2023). Therefore, continuous analysis and monitoring of attitudes towards convenience food and market behaviour are of paramount importance.

2. Literature Review

There is a substantial body of literature elucidating the factors that influence the demand for ready-to-eat foods. The popularity of these products can be attributed to demographic shifts in households, such as an increased number of working women and a generational transition in household cooking skills (Brunner, van der Horst & Siegrist, 2010; Mallinson, Russell & Barker, 2016). Convenience foods represent an indispensable component of the contemporary household food basket. In some instances, this has resulted in a decline in the nutritional quality of the diet. Peltner and Thiele (2018) posit that it is imperative to offer convenience foods with a higher nutrient density and a lower energy density. Interventions designed to enhance cooking skills could prove an effective strategy for increasing the purchase of unprocessed foods, which, in turn, could contribute to an enhanced quality of diet.

Busy lifestyles, demanding work schedules, and multiple responsibilities in the context of a time of scarcity (Hena, Peeyush & Vimolwan, 2023), as well as a convenience orientation (Hena, Peeyush & Vimolwan, 2021), have been demonstrated to influence consumers' intentions to purchase and consume convenience foods. Attitudes and behaviours towards convenience foods may vary due to dissonance in awareness of dietary needs, attitudes towards new foods, lifestyle, and socio-demographic variables (Platta *et al*., 2023). Links between the consumption of ready-to-eat foods and inadequate nutritional status have been investigated in the literature. It has been observed that frequent consumption of instant or takeaway foods among school-aged children results in inadequate nutrient intake (Rahman *et al*., 2022). Research indicates that convenience, sensory appeal, health, price, and mood are pivotal factors influencing the choice of convenience foods (Januszewska, Pieniak & Verbeke, 2011). Age has been identified as a variable that strongly differentiates the consumption of various categories of convenience food, as well as overall consumption. Older consumers tend to consume fewer convenience products (Brunner, van der Horst & Siegrist, 2010). A study by Mallinson, Russell and Barker (2016) investigated whether household food waste is associated with a convenience food lifestyle in younger UK consumers (18–40 years). Through cluster analysis of 24 lifestyle factors, five distinct convenience profiles emerged: epicures (n = 135), traditional consumers (n = 255), casual consumers (n = 246), food-detached consumers (n = 151), and kitchen evaders (n = 141). Casual consumers and kitchen evaders were found to be the most reliant on convenience foods.

Attempts have been made in the literature to explain intentions to purchase convenience foods using the theory of planned behaviour (TPB). Stranieri, Ricci and Banterle (2017) examined the correlation between eco-friendly and health-conscious convenience foods, with a specific emphasis on factors influencing the acquisition of health-oriented convenience food items possessing environmentally sustainable features. Notably, the study spotlighted minimally processed vegetables adhering to voluntary standards associated with integrated agriculture.

The results indicate positive relationships with consumer purchasing habits, food-related environmental behaviour, gender, income, and knowledge. In contrast, other results (Ricci, Banterle & Stranieri, 2018) confirm the significant role of consumer trust, positively influencing attitudes towards the purchase of convenience foods with eco-friendly attributes and negatively affecting consumer concerns about agricultural practices in relation to environmental and health impacts.

While consumer studies elucidating convenience food consumption can be found in the literature (Adamczyk, 2010; Babicz-Zielińska, Jeżowska-Zychowicz & Laskowski, 2010; Mojka, 2012; Peura-Kapanen, Jallinoja & Kaarakainen, 2017;

Peltner & Thiele, 2018; Wróblewska, Pawlak & Paszko, 2018; Lemanowicz & Adamska, 2023; Platta *et al*., 2023), few of them focus on model-based approaches to assessing attitudes and behaviours (Mallinson, Russell & Barker, 2016; Stranieri, Ricci & Banterle, 2017; Ricci, Banterle & Stranieri, 2018). This study endeavors to redress this lack of scholarship.

The aim of the study was to determine the variables influencing the frequency of consumption and purchase of convenience foods using economic modelling. The following research hypotheses were formulated:

H1. Lifestyle, attitudes towards new foods and consumer-related variables (such as e.g., gender, generation, income) may influence the regularity of convenience food consumption.

H2. The purchase of convenience food products for direct consumption (ready-to-eat) may be related to the attitudes towards new foods, attributes of convenience foods, as well as demographic variables related to the consumer (gender, generation, income).

3. Methodology

The conducted research is a continuation of previous studies on the factors influencing the purchase and consumption of convenience foods, the results of which were only partially published (Platta *et al*., 2023). The empirical material consisted of the results obtained using a computer-assisted web interview surveying technique (by means of Google Forms). The survey was conducted in the spring of 2023 among a group of 393 respondents living in Gdynia (Northern Poland). The respondents were recruited using the snowball sampling technique. Detailed characteristics and the structure of the study sample are provided in Table 1. The surveyed sample of respondents is not representative. Therefore, the results cannot be generalised to the total population of prepared meal consumers in Poland.

A partially standardised interview questionnaire (Jeżewska-Zychowicz, 2015) was used in the study. The research tool consisted of the following scales:

– *Lifestyle*. The measurement included 4 statements rated on a 5-point Likert scale (Arvola *et al*., 2007): "I pay attention to the naturalness of food," "I value tradition in terms of the foods I consume," "I value the convenience and short preparation time of meals I consume," "I am health-conscious in my eating habits."

– *Food neophobia/The Food Neophobia Scale* (*FNS*). A modified scale developed by Pliner and Hobden (1992) was used in the study. The FNS consists of 10 statements. Statements 5, 6 and 10 of the FNS scale were changed to the following: "So-called healthy foods look too strange for me to eat" (5), "At parties/when I go out, I like to try new foods" (6), "I like trying new dishes" (10). Moreover, the scale itself was revised and the 7-point rating scale was replaced with a 5-point Likert scale. After recoding the statements in which higher points corresponded to a neophobic attitude, the answers were collated, and the following two indicators were calculated: mean value (X) and standard deviation (SD). Furthermore, three categories of attitudes corresponding to neophilia, ambivalent attitude, and neophobia were distinguished.

– *Factors (attributes, features) influencing the selection of convenience foods*. Participants were asked to rank the factors from the most important (1) to the least important (13). The following attributes and features were assessed: taste, affordable price, health considerations, naturalness, freshness, product familiarity, attractive appearance, long shelf life, food preparation does not require culinary skills, short preparation time, possibility of immediate consumption after purchase, possibility of consumption while travelling, product availability.

– *Frequency of consumption and purchase of convenience foods*. The survey participants indicated the frequency of consumption of convenience foods by responding to the following statements: "I eat convenience food products regularly" and "I buy convenience food products for direct consumption (ready-to-eat)" expressed on a 5-point Likert scale.

– *Demographics*: gender, age, income.

The subject of our research was respondents belonging to different groups of consumers (Generations X, Y, Z). Demographically, consumers can be divided into distinct groups by age. Commonly recognised age classifications include the baby boomer generation, born between 1946 and 1964; Generation X, born between 1965 and 1979; Generation Y, also known as millennials, born between 1980 and 1994; and Generation Z, born after 1995, often referred to as Generation C ("connected") or the post-millennial generation (Twenge, 2017).

Table 1. Study Sample Characteristics

Parameters	Number of Respondents	Percentage
Gender		
Female	197	50.13
Male	196	49.87
Generation		
X	134	34.09
Y	130	33.08
Z	129	32.83
Monthly income		
Allows meeting of basic needs	118	30.02
I/we can afford some, but not all expenses	184	46.82
I/we can afford to buy everything I/we need	91	23.16

Source: the authors, based on survey results.

The collected empirical material obtained from the questionnaires 3 and 4, after preliminary activities related to data coding and tabulation, was subjected to statistical analysis using the R 4.1.2 software. Logistic regression analysis was used to verify the research hypotheses established in the study, predicting the probability with which a set of explanatory/independent variables – X will affect: the regularity of purchasing convenience foods and the frequency of purchasing convenience food products for direct consumption (dependent/explained variables – Y), in accordance with the equation elaborated by Danieluk (2010). The ordered logistic regression models were constructed based on the Wald test. The likelihood ratio tests were also performed for the estimated models. Interpretations for individual independent variables were obtained using the odds ratio measure. The correctness of the models was assessed by means of the Brant test. In turn, the predictive power of the models was assessed using the count R^2 coefficient obtained on the basis of the prediction accuracy table. The significance level of $p < 0.05$ was assumed for all statistical analyses.

4. Results

4.1. Assessment of Factors Influencing the Regularity of Consumption of Convenience Foods

To confirm hypothesis 1, a multinomial ordered logit model was built. Due to the fact that the independent variable "I eat convenience food products regularly" was an ordinal variable, a change was introduced in the coding of the target variable, combining similar categories. As a result, three categories were obtained for the independent variable (Table 2).

Table 2. Changes in the Coding of the Independent Variable

Initial Value	Modified Value
no, rather no	no
neither yes nor no	neither yes nor no
rather yes, yes	yes

Source: the authors, based on survey results.

The following explanatory variables were examined: gender (categories: woman, man), generation (categories: X, Y, Z), income (categories: low, average, high), lifestyle scale, attitudes towards new foods (neophiliac, ambivalent, neophobic). Variables were selected based on the stepwise regression method. The Brant test was performed in order to check the correctness of the model, which allows verification of the null hypothesis regarding the assumption of proportionality of chances. Assuming the significance level of 5%, there were no grounds to reject the null hypothesis for the combined test, as well as for individual ones. Therefore, the required assumption of proportionality of chances has been met, which allows the model specification to be considered correct.

Table 3 presents the accepted final model with the variables influencing the regularity of consumption of convenience foods.

Table 3. The Model Containing the Variables Influencing the Regularity of Consumption of Convenience Foods

Variables	Specification	Coefficient	Std. Err.	*t*-value	*p*-value	95% Confidence Interval		Odds Ratio
Gender	male	1.079	0.212	5.096	0.000	0.668	1.499	2.943
Generation	Y	0.525	0.243	2.161	0.031	0.050	1.004	1.691
	Z	1.22	0.258	4.729	0.000	0.720	1.732	3.388
FNS	ambivalent	0.094	0.281	0.334	0.738	–0.458	0.647	1.099
	neophobic	–0.432	0.383	–1.129	0.259	–1.187	0.316	0.649
Income	average	0.253	0.247	1.023	0.306	–0.231	0.739	1.288
	high	0.007	0.302	0.022	0.983	–0.585	0.600	1.007
I pay attention to the naturalness of food	somewhat/rather disagree	–0.578	0.501	–1.153	0.249	–1.584	0.394	0.561
	neither disagree nor agree	–0.709	0.492	–1.441	0.150	–1.701	0.242	0.492
	somewhat/rather agree	–1.149	0.49	–2.346	0.019	–2.138	–0.203	0.317
	agree	–2.016	0.532	–3.788	0.000	–3.086	–0.989	0.133
I value the convenience and short preparation time of meals I consume	somewhat/rather disagree	–0.442	0.766	–0.577	0.564	–1.953	1.077	0.643
	neither disagree nor agree	–0.29	0.642	–0.452	0.651	–1.529	1.015	0.748
	somewhat/rather agree	0.859	0.6	1.431	0.153	–0.291	2.091	2.360
	agree	1.557	0.603	2.581	0.010	0.405	2.798	4.744
Constant term	no/neither yes nor no	0.364	0.725	0.502	0.616	0.668	1.499	2.943
	neither yes nor no/yes	1.883	0.731	2.577	0.010	0.050	1.004	1.691

Source: the authors, based on survey results.

To assess the reliability of the model, a prediction accuracy table was used. The count R^2 based on the calculation of the ratio of correctly qualified cases by the model to all cases analysed in the study was approximately 60%. Assuming the significance level of 5%, it was found that the statistically significant variables in the model are: gender, generation (categories Y, Z), "I pay attention to the naturalness of food" (categories: somewhat/rather agree, agree), "I value the convenience and short preparation time of meals I consume" (category: agree).

In order to interpret the impact of individual independent (explanatory) variables on the dependent (explained) variable, the odds ratio was used. The obtained results (Table 3) are as follows:

– men are almost three times more likely to consume convenience foods on a regular basis than women, assuming ceteris paribus,

– individuals belonging to Generation Y have about a 70% higher likelihood of consuming convenience food products more regularly compared to Generation X, assuming ceteris paribus,

– individuals from Generation Z are more than three times more likely to consume convenience foods regularly than Generation X, assuming ceteris paribus,

– individuals who somewhat/rather agree with the statement that they pay attention to the naturalness of food have about a 68% lower probability of consuming convenience food products on a regular basis compared to those who do not agree with this statement, assuming ceteris paribus;

– individuals who agree with the statement that they pay attention to the naturalness of food have about an 87% lower chance of consuming convenience foods more regularly in comparison to those who do not agree with this statement, assuming ceteris paribus,

– individuals who agree with the statement that they value the convenience and short preparation time of meals they consume are 4.7 times more likely to consume convenience food products regularly compared to those who do not agree with this statement, assuming ceteris paribus.

4.2. Assessment of Factors Influencing the Purchase of Ready-to-Eat Convenience Food Products

To confirm hypothesis 2 assumed in the study, a multinomial ordered logit model was built. Due to the fact that the independent variable "I buy convenience food products for direct consumption (ready-to-eat)" was an ordinal variable, a change was made in the coding of the target variable, combining similar categories. As a result, three categories were obtained for the independent variable (Table 2). The following explanatory variables were examined: gender (categories: woman, man), generation (categories: X, Y, Z), income (categories: low, average, high), attitudes towards new foods (neophiliac, ambivalent, neophobic), attributes of convenience foods: taste and smell, freshness, speed of preparation (binary variables, categories: yes, no). Variables were selected based on the stepwise regression method. To check the correctness of the model, the Brant test was performed again, as it allows verification of the null hypothesis regarding the assumption of proportionality of chances. Assuming the significance level of 5%, there were no grounds to reject the null hypothesis for the combined test, as well as for individual ones. So, again, the required assumption of proportionality of chances has been met, and thus the model specification may be considered correct. Table 4 presents the accepted final model showing the variables influencing the regularity of consumption of convenience foods. To assess the reliability of the model, a prediction accuracy table was used. The count R^2 based on the calculation of the ratio of correctly qualified cases by the model to all cases analysed in the study was approximately 69%.

Assuming the significance level of 5%, it was found that the statistically significant variables in the model are: freshness, speed of preparation, gender, generation (category: Z), income (category: high). To interpret the impact of individual independent (explanatory) variables on the dependent (explained) variable, the odds ratio was used. The obtained results (Table 4) are as follows:

– men are approximately 96% more likely to consume ready-to-eat products more often than women, assuming ceteris paribus,

– individuals for whom the freshness of products is very important are approximately 59% less likely to consume products for direct consumption (ready-to-eat) more often than those for whom the freshness of products is not so important, assuming ceteris paribus,

– consumers for whom a short time for food preparation is very important are almost 2.5 times more likely to purchase ready-to-eat products compared to those for whom a short preparation time is not so important, assuming ceteris paribus,

– individuals from Generation Z are 2.4 times more likely to consume ready-to-eat products more often than individuals from Generation X, assuming ceteris paribus,

– high-income consumers are 61% less likely to purchase ready-to-eat products compared to low-income individuals, assuming ceteris paribus.

Our study revealed that men were nearly three times more likely to consume convenience foods regularly than women. Other research (Lemanowicz & Adamska, 2023) indicates that the gender of respondents influences their attitudes toward the quality and nutritional value of convenience foods. Men were more inclined to perceive convenience foods as having high quality and nutritional value and were more likely to express a desire to consume them. Other findings (Daniels & Glorieux, 2015) indicate that single-living households, particularly single men, tend to prioritise convenience in their food preparation patterns compared to couples and households with children. The consumption of semi-convenient meal components appears to be more closely related to the conventional definition of home-cooking. Older generations, those with lower levels of education, those who are not in employment and those who adhere to traditional nuclear family structures are more likely to spend a larger share of their food budget on non-convenient and "shortcut" ingredients.

Table 4. The Model Containing the Variables Influencing the Purchase of Convenience Foods for Direct Consumption (Ready-to-Eat)

Variables	Specification	Coefficient	Std. Err.	*t*-value	*p*-value	95% Confidence Interval		Odds Ratio
Taste and smell	yes	–0.253	0.243	–1.042	0.297	–0.728	0.224	0.777
Freshness	yes	–0.886	0.258	–3.441	0.001	–1.396	–0.385	0.412
Quick preparation time	yes	0.877	0.29	3.027	0.002	0.315	1.455	2.405
Gender	male	0.675	0.228	2.962	0.003	0.231	1.126	1.964
Generation	Y	0.344	0.274	1.256	0.209	–0.192	0.884	1.411
	Z	0.88	0.286	3.079	0.002	0.326	1.449	2.412
FNS	ambivalent	–0.341	0.328	–1.042	0.298	–1.002	0.287	0.711
	neophobic	–0.788	0.425	–1.855	0.064	–1.630	0.040	0.455
Income	average	0.009	0.297	0.032	0.975	–0.580	0.589	1.010
	high	–0.95	0.332	–2.865	0.004	–1.608	–0.305	0.387
Constant term	no/neither yes nor no	–1.851	0.507	–3.649	0.000	–0.728	0.224	0.777
	neither yes nor no/yes	–0.749	0.497	–1.506	0.132	–1.396	–0.385	0.412

Source: the authors, based on survey results.

Additionally, our research demonstrates that individuals from Generations Y and Z are more inclined to consume convenience foods regularly when compared to Generation X. Moreover, research conducted by Barska (2018) focusing on Generation Y reveals that attributes such as convenience, speed of preparation, and time savings are crucial for individuals from this generation. Approximately 66% of millennial consumers admitted to consuming convenience foods. These findings align with a prior study (Platta *et al*., 2023), which revealed significant variations in the consumption of convenience foods based on factors such as gender, monthly income levels, and lifestyle. Generation Z was found to be more likely to express a desire to consume convenience foods. The results of other studies have indicated that factors such as age, gender, and culture appear to influence the likelihood of purchasing ready-to-eat meals (Luo *et al*., 2019). Older consumers tend to resist altering their traditional dietary habits, whereas younger generations are more inclined to adopt newly popularised food products (Keller, López & Moreno, 2015). The explanation for gender differences in food choices suggests that women are more likely to consume healthy foods due to weight control concerns and health-related beliefs (Luo *et al*., 2019).

Other studies conducted in the academic environment in India using the pathway model have demonstrated a positive relationship between sensory attractiveness, nutritional quality, safety attributes, healthiness, and the intention to purchase ready-to-eat food. These studies revealed that both purchase intent and consumption, as well as consumption and satisfaction, were positively associated with ready-to-eat-foods. Sensory attractiveness emerged as a key determinant influencing purchase intent, consumption, and consumer satisfaction with convenience food scarcity (Imtiyaz, Soni & Yukongdi, 2021). Choi, Lee and Hong (2022) conducted a segmentation of single-person households aged 19 to 39 in Vietnam, focusing on consumption of convenience food. The results suggest that convenience orientation may be the most effective criterion among market segmentation factors. The consumer type seeking simplicity and convenience demonstrated a preference for products with high convenience, while showing reluctance to invest significant effort in meal preparation and organisation. Furthermore, improving the ease of storing ready-to-eat meals was considered highly important. In contrast, the consumer type considering multiple options took various factors, including convenience, into account when selecting convenience foods, while the family safety-oriented type did not regard convenience as a key factor compared to other groups. These findings suggest that convenience plays a significant role in food consumption, given the dynamic and demanding lifestyle of modern consumers.

As noted by Bogard *et al*. (2024), there is a need to introduce standardised definitions of convenience in research, as well as to develop measurement tools that incorporate the multidimensional components of convenience and can be used to assess how convenience influences dietary choices across different settings. Convenience is a widely discussed concept, yet it is often inconsistently measured and ambiguously defined in the food environment and nutrition literature (Toure *et al*., 2021). This limits the ability to design and implement food-environment interventions aimed at improving or enhancing the convenience of consuming nutritious foods and dietary patterns to achieve health objectives (Bogard *et al*., 2024).

The commercial success of convenience food can be easily explained by its alignment with consumers' domestic routines and their perception of their busy lifestyles. It is also technically feasible, owing to industrial innovations and domestic technologies, and practically achievable through transformations in food retailing and supermarket shopping practices (Raj, Suvadarshini & Mishra, 2021).

5. Conclusion

Knowledge of consumer preferences regarding convenience foods is crucial from the perspective of companies offering such products. The obtained results are practical and can be applied in marketing communication. A potential consumer segment for convenience foods comprises men from Generation Z who value freshness while prioritising the speed of product preparation. Branding of convenience food products should be tailored to appeal to this specific group of buyers.

Our study is limited in subject as well as object scope. The study was conducted on a narrow study sample (X, Y and Z generations among the inhabitants of Gdynia). The models presented fitted to the empirical data would therefore need to be verified in a wider subject range. It would also be valuable to extend the research to a broader subject scope (with regard to assortment groups of convenience foods).

Acknowledgement and Financial Disclosure

Article presents the results of the research financed from a subsidy granted to the Maritime University of Gdynia (project number: WZNJ/2024/PZ/1).

Authors' Contribution

The authors' individual contribution is as follows: Anna Platta 80%, Anna Mikulec 5%, Karolina Mikulec 5%, Monika Radzymińska 5%, Grzegorz Suwała 5%.

Conflict of Interest

The authors declare no conflict of interest.

References

Adamczyk, G. (2010). Popularność „żywności wygodnej". *Journal of Agribusiness and Rural Development*, *4*(18), 5–13.

Arvola, A., Lähteenmäki, L., Dean, M., Vassallo, M., Winkelmann, M., Claupein, E., Saba, A., & Shepherd, R. (2007). Consumers' Beliefs about Whole and Refined Grain Products in the UK, Italy and Finland. *Journal of Cereal Science*, *46*(3), 197–206. https://doi.org/10.1016/j.jcs.2007.06.001

Babicz-Zielińska, E., Jeżowska-Zychowicz, M., & Laskowski, W. (2010). Postawy i zachowania konsumentów w stosunku do żywności wygodnej. *Żywność. Nauka. Technologia. Jakość*, 4(71), 141–153.

Barska, A. (2018). Millenial Consumers in the Convenience Food Market. *Management*, *22*(1), 251–264. https://doi.org/10.2478/manment-2018-0018

Bogard, J. R., Downs, S., Casey, E., Farrell, P., Gupta, A., Miachon, L., Naughton, S., Staromiejska, W., & Reeve, E. (2024). Convenience as a Dimension of Food Environments: A Systematic Scoping Review of Its Definition and Measurement. *Appetite*, *194*, 107198. https://doi.org/10.1016/j.appet.2023.107198

Brunner, T. A., van der Horst, K., & Siegrist, M. (2010). Convenience Food Products. Drivers for Consumption. *Appetite*, *55*(3), 498–506. https://doi.org/10.1016/j.appet.2010.08.017

Choi, S., Lee, T. J., & Hong, W. (2022). Home Meal Replacement (Convenience Food) Consumption Behavior of Single-member Households in Vietnam by Food Consumption Value. *Sustainability*, *14*(2), 1031. https://doi.org/10.3390/su14021031

Cooper, R. G. (2018). Best Practices and Success Drivers in New-product Development. In: P. N. Golder, D. Mitra (Eds), *Handbook of Research on New Product Development* (pp. 410–434). Edward Elgar. https://doi.org/10.4337/9781784718152.00030

Cooper, R. G. (2019). The Drivers of Success in New-product Development. *Industrial Marketing Management*, *76*, 36–47. https://doi.org/10.1016/j.indmarman.2018.07.005

Daniels, S., & Glorieux, I. (2015). Convenience, Food and Family Lives: A Socio-typological Study of Household Food Expenditures in 21-st-century Belgium. *Appetite*, *94*, 54–61. https://doi.org/10.1016/j.appet.2015.04.074.

Danieluk, B. (2010). Zastosowanie regresji logistycznej w badaniach eksperymentalnych. *Psychologia Społeczna*, *5*(14), 199–216.

Hena, I., Peeyush, S., & Vimolwan, Y. (2021). Investigating the Role of Psychological, Social, Religious and Ethical Determinants on Consumers' Purchase Intention and Consumption of Convenience Food. *Foods*, *10*(2), 237. https://doi.org/10.3390/foods10020237

Hena, I., Peeyush, S., & Vimolwan, Y. (2023). Assessing the Consumers' Purchase Intention and Consumption of Convenience Food in Emerging Economy: The Role of Physical Determinants. *Sage Open*, *13*(1). https://doi.org/10.1177/21582440221148434

Imtiyaz, H., Soni, P., & Yukongdi, V. (2021). Role of Sensory Appeal, Nutritional Quality, Safety, and Health Determinants on Convenience Food Choice in an Academic Environment. *Foods*, *10*(2), 345. https://doi.org/10.3390/foods10020345

Jackson, P., & Viehoff, V. (2016). Reframing Convenience Food. *Appetite*, *98*. https://doi.org/10.1016/j.appet.2015.11.032

Januszewska, R., Pieniak, Z., & Verbeke, W. (2011). Food Choice Questionnaire Revisited in Four Countries. Does It Still Measure the Same. *Appetite*, *57*(1), 94–98. https://doi.org/10.1016/j.appet.2011.03.014

Jeżewska-Zychowicz, M. (Ed.). (2015). *Innowacyjne produkty zbożowe z perspektywy konsumenta*. Oficyna Drukarska Jacek Chmielewski.

Keller, K., López, S. R., & Moreno, M. M. C. (2015). Association between Meal Intake Behaviour and Abdominal Obesity in Spanish Adults. *Appetite*, *92*. https://doi.org/10.1016/j.appet.2015.04.077

Lemanowicz, M., & Adamska, K. (2023). Determinanty postaw konsumentów wobec żywności wygodnej. *Turystyka i Rozwój Regionalny*, 20, 83–93. https://doi.org/10.22630/TIRR.2023.20.21

Luo, D., Yu, L., Westland, S., & Mahon, N. (2019). The Influence of Colour and Image on Consumer Purchase Intentions of Convenience Food. *Journal of the International Colour Association*, *24*, 11–23.

Mallinson, L. J., Russell, J. M., & Barker, M. E. (2016). Attitudes and Behaviour towards Convenience Food and Food Waste in the United Kingdom. *Appetite*, *103*, 17–28. https://doi.org/10.1016/j.appet.2016.03.017

Mojka, K. (2012). Wybrane produkty żywności wygodnej – ocena preferencji i częstotliwości ich spożycia wśród studentów. *Problemy Higieny i Epidemiologii*, *93*(4), 828–833.

Nakano, S., & Washizu, A. (2020). Aiming for Better Use of Convenience Food: An Analysis Based on Meal Production Functions at Home. *Journal of Health, Population and Nutrition*, *39*, 3. https://doi.org/10.1186/s41043-020-0211-3

Oroian, C. F., Safirescu, C. O., Harun, R., Chiciudean, G. O., Arion, H., Muresan, I. C., & Bordeanu, B. M. (2017). Consumers' Attitudes towards Organic Products and Sustainable Development: A Case Study of Romania. *Sustainability*, *9*(9), 1559. https://doi.org/10.3390/su9091559

Peltner, J., & Thiele, S. (2018). Convenience-based Food Purchase Patterns: Identification and Associations with Dietary Quality, Sociodemographic Factors and Attitudes. *Public Health Nutrition*, *21*(3), 558–570. https://doi.org/10.1017/S1368980017003378

Peura-Kapanen, L., Jallinoja, P., & Kaarakainen, M. (2017). Acceptability of Convenience Food among Older People. *Sage Open*, *7*(1). https://doi.org/10.1177/2158244017698730.

Platta, A. M., Mikulec, A. T., Mikulec, K., Suwała, G., & Radzymińska, M. (2023). Determinants of Purchase and Consumption of Convenience Foods – Survey of Polish Respondents. *Scientific Papers of Silesian University of Technology*. *Organization and Management*, 182, 361–376. https://doi.org/10.29119/1641-3466.2023.182.21

Pliner, P., & Hobden, K. (1992). Development of a Scale to Measure the Trait of Food Neophobia in Humans. *Appetite*, *19*(2), 105–120. https://doi.org/10.1016/0195-6663(92)90014-W

Rahman, N., Ishitsuka, K., Piedvache, A., Tanaka, H., Murayama, N., & Morisaki, N. (2022). Convenience Food Options and Adequacy of Nutrient Intake among School Children during the COVID-19 Pandemic. *Nutrients*, *14*(3), 630. https://doi.org/10.3390/nu14030630

Raj, S., Suvadarshini, A., & Mishra, B. B. (2021). Role, Relevance and Significance of Convenience Food – a Literature Review. Approach. *Global Media Journal*, *19*(41), 253.

Ricci, E. C., Banterle, A., & Stranieri, S. (2018). Trust to Go Green: An Exploration of Consumer Intentions for Eco-friendly Convenience Food. *Ecological Economics*, *148*, 54–65. https://doi.org/10.1016/j.ecolecon.2018.02.010

Statista. (2023). *Convenience Food: Market Data & Analysis*. *Report Market Insights*. Retrieved from: https://www.statista.com/study/48833/convenience-food-market-data-and-analysis (accessed: 20.01.2024).

Stranieri, S., Ricci, E. C., & Banterle, A. (2017). Convenience Food with Environmentally--sustainable Attributes: A Consumer Perspective. *Appetite*, *116*, 11–20. https://doi.org/10.1016/j.appet.2017.04.015

Toure, D., Herforth, A., Pelto, G. H., Neufeld, L. M., & Mbuya, M. N. N. (2021). An Emergent Framework of the Market Food Environment in Low- and Middle-income Countries. *Current Developments in Nutrition*, *5*(4), nzab023. https://doi.org/10.1093/cdn/nzab023

Twenge, J. G. (2017). *IGen: Why Today's Super-connected Kids Are Growing up Less Rebellious, More Tolerant, Less Happy and Completely Unprepared for Adulthood and What That Means for the Rest of Us*. Atria Books.

Wróblewska, W., Pawlak, J., & Paszko, D. (2018). Preferencje studentów i emerytów dotyczące owoców i warzyw nabywanych w formie żywności wygodnej w Lublinie. *Handel Wewnętrzny*, 2(373), 399–411.

Krakow Review of Economics and Management 4 (1010)
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie 2025

KREM, 2025, 4(1010): 141–159
ISSN 1898-6447
e-ISSN 2545-3238
https://doi.org/10.15678/krem.18667

Evaluation of Barriers to Entrepreneurship Development: A Comparative Student Survey

Anna Walczyna[1], **Anna Arent**[2]

[1] Lublin University of Technology, Department of Management, Nadbystrzycka 38, 20-618 Lublin, Poland, e-mail: a.walczyna@pollub.pl, ORCID: https://orcid.org/0000-0002-9193-4612

[2] Lublin University of Technology, Department of Management, Nadbystrzycka 38, 20-618 Lublin, Poland, e-mail: a.arent@pollub.pl, ORCID: https://orcid.org/0000-0002-5655-6353

Suggested citation: Walczyna, A., & Arent, A. (2025). Evaluation of Barriers to Entrepreneurship Development: A Comparative Student Survey. *Krakow Review of Economics and Management / Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 4(1010), 141–159. https://doi.org/10.15678/krem.18667

ABSTRACT

Objective: The research aimed to answer questions on how students evaluate the external conditions for starting a business in Poland, what variables differentiate their perceptions and whether these evaluations change over time.

Research Design & Methods: The surveys were conducted in the years 2016–2017 (517 people) and 2022–2023 (382 people) on a sample of students at the Lublin University of Technology using the same survey questionnaire. The following statistical methods were used to develop the results: descriptive statistics, factor analysis and the Mann-Whitney U test.

Findings: The research revealed the existence of four barriers to entrepreneurial development: legal, labour market, financial, and market. The barriers identified were rated higher in study one. Additionally, a pandemic barrier was diagnosed in group two. In the first study, work experience proved to be the variable that most differentiated the assessment of the barrier. The second is the area and level of study and entrepreneurial tradition.

Implications/Recommendations: The research shows that both studies identified analogous categories of barriers but with a slightly different structure. The assessments of the perception of business conditions made by the surveyed student-potential entrepreneurs are complemented by the opinions of already operating entrepreneurs on the impact of the external environment on entrepreneurship development. Knowledge acquired through education and professional work proved to be an important feature influencing the way barriers were assessed. These results can be helpful when making changes to educational programmes concerning business knowledge, internships and work placements.

Contribution: Expanding and completing the knowledge of the perception of the impact of external conditions on entrepreneurship development.

Article type: original article.

Keywords: entrepreneurship barriers, student entrepreneurship, entrepreneurial intentions, entrepreneurship development.

JEL Classification: I25, L26, M13.

---

1. Introduction

The determinants of entrepreneurship development have been an interest of researchers for many years. An assessment of the impact modality should be considered a particularly important aspect of the research conducted, given the importance of entrepreneurs in socio-economic development, including job creation (Skowrońska, 2023). In this context, the relationship between the perception of external conditions and the intention to become self-employed is explored. This problem is particularly relevant for students, who are a group facing a career choice. Every year, nearly 300,000 graduates receive a degree in Poland (GUS, 2023). Running their own business may be an alternative to full-time employment. However, its attractiveness is related to the conditions for starting a business and the possibilities for the company's subsequent growth. At the same time, the assessment of these conditions can change, both due to objective changes in the socio-economic environment and the subjective view of those entering or already operating in the labour market.

This article presents the research results on students' assessment of barriers to running a business. The research subject was:

– identification and evaluation of selected barriers to entrepreneurship, i.e., external environmental factors with negative impacts,

– variations in the evaluation of barriers to entrepreneurship over time and by selected characteristics of respondents.

The following research questions were posed in conducting the study:

1. What barriers to starting your own business do students identify?

2. Does the level and type of knowledge and work experience have an impact on the variations in the assessment of barriers?

3. Do entrepreneurial traditions in students' families have an impact on the differential assessment of barriers?

4. Does the way barriers are assessed change over time?

Due to the short study duration, conducting longitudinal research is difficult, so the research was comparative. It was conducted in 2016–2017 and 2022–2023 among students of Lublin University of Technology. During the period indicated, several changes in the socio-economic environment took place, including those related to the COVID-19 pandemic and the introduction of the so-called Polish Order, a plan to rebuild the Polish economy after the pandemic. However, conducting the research at the same university and maintaining identical sampling criteria allowed at least a partial revealing of the dynamics of the phenomenon under study.

The obtained results made it possible to conclude the existence of four barriers to the functioning of business entities, which can also be applied to starting a business. The research also confirmed the variability of the assessment and barrier constructs over time. The results enabled the identification of characteristics that influenced the variation in respondents' evaluations. These included level and area of study, work experience and entrepreneurial traditions.

This article presents a fragment of the research results on students' entrepreneurial intentions and the factors influencing their attitudes.

2. Literature Review

Entrepreneurship can be considered by analysing personality traits, the managerial process, the individual entrepreneur, the market, the economic factors of production and the function of small and medium-sized enterprises (self-employment) in the economy (Wach & Głodowska, 2022). In the latter context, entrepreneurship stimulates economic growth through activation of innovation processes and new job creation (Carree & Thurik, 2010; Wach & Głodowska, 2022). Consequently, the development of entrepreneurship affects the prosperity of society. From this perspective, identifying and examining the impact of various factors influencing the creation of new, and the development of already operating economic entities has become an important issue.

Generally, the determinants of entrepreneurial development can be divided into endogenous and exogenous. The first group includes factors inherent in the entrepreneur and his/her company (Piecuch, 2013). The second case relates to the environmental factors in which business is undertaken or conducted, in particular the macroeconomic environment, market and financial conditions and the geographical environment (Cuervo, 2005). In this aspect, it is possible to discuss the entrepreneurial ecosystem, which includes cultural, social and material elements (Spigel & Harrison, 2018) and economic and political (Urbaniec, 2022). In another approach, environmental factors include political, legal, business, economic and social conditions (Piecuch, 2013; Sendra-Pons, Comeig & Mas-Tur, 2022). The determinants identified can be described as the external dimensions of entrepreneurial activity conditioning entrepreneurial development (Lundström & Stevenson, 2005). The types of measures taken, reflected in systemic solutions for facilitating the establishment and development of business entities (Leszczewska, 2012; Ministerstwo Gospodarki, 2013), depends on the economic development level of the country in question (Acs & Szerb, 2007) but also the assessment of their current implementation and actual impact. These activities, contrary to the assumptions made, may not support, but hinder and inhibit the development of enterprises. They become barriers both to the functioning of economic entities and to the creation of new ones, preventing the exploitation of perceived opportunities in the environment (Khanin *et al.*, 2022). In the case of the small and medium-sized enterprises (SME) sector, these handicaps tend to be long-term, particularly concerning issues such as changes in the law and its lack of transparency, legal uncertainty or administrative burdens (Belas *et al.*, 2019; Al-Fattal, 2024). Barrier identification based on assessments made by existing, but also potential, entrepreneurs should be the starting point for introducing changes to the adopted system solutions for entrepreneurship development.

Generally, the main barriers to entrepreneurial development include financial, market, legal, social and informational conditions (Zdrajkowska & Zakrzewska-Bielawska, 2006). Barriers related to infrastructure and education (Danielak, Mierzwa & Bartczak, 2017) as well as administrative and legal aspects, including inspections by various institutions, were also mentioned (Grzegorzewska-Mischka & Wyrzykowski, 2017). Extending and detailing the list of entrepreneurial determinants that have a negative impact are the opinions of entrepreneurs expressed in the surveys conducted. Significant barriers include the legal system and fiscal policy, the high cost of raising capital, the shadow economy and strong market competition (Lisowska, 2015), high taxes and social security contributions, high fixed costs of running a business and labour costs, the prevalence of competition and its growth, difficulties in recruiting qualified staff, conflicting legislation and procedures, scarcity of capital for business development (Danielak, Mierzwa & Bartczak, 2017). Similar factors with a negative impact were identified in the Polish Economic Institute's (PEI) survey of micro-entrepreneurs in 2018 and 2019. They revealed that the most important impediments to growth were high taxes and other financial burdens, the increasing cost of employing staff, competition on domestic markets (including from the so-called grey area), problems in recruiting new staff, and the instability of the law, burdensome official controls and inflexible labour laws (Dębkowska *et al.*, 2019, 2020). Financial barriers also included the failure of counterparties to pay debts on time and difficulties in obtaining external funding sources (Dębkowska *et al.*, 2019).

Pandemic situations have proved to be an additional barrier to the operation of business entities from 2020 onwards. Regulations undertaken to limit the spread of the virus have increased the number of businesses that have suspended their activities (Ligaj & Pawlos, 2021) and have influenced a significant decrease in the economic activity of the remaining entities (Czech *et al*., 2020; Gorynia & Kuczewska, 2022). The negative impact of the pandemic on the functioning of many economic entities was long-term and associated with a variety of risks (Jedynak & Bąk, 2022). The 2020 PEI research also revealed that the pandemic influenced some changes in the assessment of the barriers indicated by entrepreneurs (Dębkowska *et al*., 2021).

The presented problem of difficulties in the operation and development of business entities, especially in the SME sector, also applies to future entrepreneurs, i.e., individuals or groups who intend to start a business. The assessment of the conditions for running a business is recognised as one of the factors influencing entrepreneurial intention (Schwarz *et al*., 2009; Sesen, 2013), understood as the intention to start a business (Engle *et al*., 2010). External factors change intentions, resulting in a change in the behaviour of the future entrepreneur (Kurczewska, 2010). Negative perceptions of the conditions for starting a business, both at the national (Tarnawa, 2022) and regional level (Bergmann, Hundt & Sternberg, 2016) can result in the abandonment of entrepreneurial intentions, despite positive attitudes towards entrepreneurship (Lüthje & Franke, 2003).

3. Methodology

Research on the barriers assessment of entrepreneurship development was conducted in April–May 2016 and November 2016–January 2017. They formed part of a broader study aimed at identifying students' entrepreneurial intentions and the factors shaping them. Another survey was conducted in November 2022–March 2023. The choice of dates was due to the educational organisation of the final semesters of the first and second-degree programmes in which the respondents studied (Arent & Walczyna, 2018). In both cases, a diagnostic survey was conducted using the same proprietary research tool. Based on a literature review and especially on the results of entrepreneurial surveys, it considers the following barriers: the complexity of business start-up procedures, the frequency of changes and the level of complexity of regulations, inspections and their negative effects on entrepreneurs, difficulties in obtaining sources of finance when setting up businesses, excessive budget commitments and running costs, difficulties in obtaining suitable employees and flexible employment, problems in entering and remaining in the market, market competition and unfairness of contractors. In the repeated survey the list of barriers was expanded to include a barrier related to the pandemic. Therefore, the assessment of environmental conditions was made based on 11 items in the first survey and 12 items in the second. Cronbach's alpha reliability coefficients were $\alpha = 0.74$ in the first study and $\alpha = 0.63$ in the second, which can be considered an acceptable level (Kline, 2013). In both cases, removing any of the items would have reduced the consistency of the scale.

Responses were scaled using a five-point Likert scale indicating attitudes to the given statement from “strongly agree” (5) to “strongly disagree” (1).

The following variables were used as variables that could differentiate the assessment of barriers: work experience – little/extensive; employment status – employed/not employed; entrepreneurial tradition – yes/no; level of study – first/second degree; area of study – social sciences/engineering and technical sciences. The selection of characteristics was based on the assumption that both the level of professional experience (past and employment status at the time of the survey) and the type and extent of knowledge possessed, resulting from the level and type of studies, as well as family entrepreneurial traditions, make it possible to gain knowledge about the realities of the environment and therefore also the problems of the functioning of business entities.

The first survey, using a paper survey questionnaire, was conducted among students at three Lublin universities. The sample selection was two-stage: In the first stage, purposive and included students of the last semesters of full-time first- and second-degree management studies, in the second stage, random and included students of the last semesters of full-time first- and second-degree studies in engineering and technical sciences (Arent & Walczyna, 2018). After five years, the survey was repeated among students studying at the Lublin University of Technology, and the selection was again purposive and random, consistent with the assumptions of the first survey. In both cases, a minimum sample size was established (Saunders, Lewis & Thornhill, 2007), which was: in the first survey – 573 people, in the second – 325. In the 2016–2017 survey, the final number of respondents was 729 people (727 questionnaires qualified for analysis), including 517 students of Lublin University of Technology. In the repeated survey, the final number of respondents was 383 people (382 questionnaires qualified). The comparative method was used only for the results obtained in both surveys from respondents of Lublin University of Technology.

Both surveys had a diverse group of respondents based on the characteristics adopted. The structure of both respondent groups was dominated by those without an entrepreneurial tradition (64% in survey one, 59% in survey two), those not working (62% each), and engineering and technical students (72% and 78%). Extensive work experience was held by 51% and 52% of respondents, respectively.

Due to the changes that emerged in higher education between 2016 and 2023, it was impossible to maintain complete consistency in the structure of the survey sample, especially concerning the study level criterion (first-degree students in the first survey 33%, in the second survey 60%). During the period in question, attitudes towards the continuation of second-level studies began to change, with some people, after obtaining their first degree, starting their careers and abandoning their master's studies, postponing them to a later period or changing their form to part-time study. This is confirmed by the decreasing number of second-degree students (Otto & Nowosielska, 2022).

The following statistical methods were used to answer the research questions: descriptive statistics (mean, standard deviation), factor analysis and the Mann-Whitney U test. Calculations were made using the Statistica Tibco 13.3 package.

4. Research Results and Discussion

The assessment of barriers to starting and running a business varied between the two study groups (Table 1).

Table 1. Evaluation of the Barriers Investigated in the First and Second Study

No.	Variable	*M*		*z*	*p*-value[a]
		First study	Second study		
1	Complicated and unclear procedures for setting up businesses	3.77	3.50	3.99375	**0.000065**
2	Frequency of change and complexity of regulations	4.05	4.14	–1.99156	**0.046420**
3	Inspections and their negative effects on entrepreneurs	3.65	3.22	6.04271	**0.000000**
4	Difficulties in obtaining financing for establishing businesses	3.63	3.42	2.83495	**0.004584**
5	Excessive budget obligations (taxes, insurance premiums, etc.)	4.20	4.10	1.76933	0.076841
6	Excessive costs of running a business	3.95	3.84	1.90188	0.057188
7	Difficulties in recruiting appropriate staff	3.28	3.08	2.70170	**0.006899**
8	Problems with flexible employment arrangements	3.12	2.83	4.60853	**0.000004**
9	Problems with entering and remaining in the market	4.06	3.98	1.58032	0.114034
10	Excessive market competition	3.66	3.29	5.33656	**0.000000**
11	Contractor dishonesty	3.58	3.27	4.83244	**0.000001**
12	Pandemic situation[b]	–	4.10	–	–

[a] Bold: $p \leq 0.05$ (statistical significance), [b] barrier examined only in the second study.

Notes: *M* – mean, *z* – Mann-Whitney U test value for group sizes > 20 (Stanisz, 2006), *p*-value – probability value.

Source: the authors.

Analysis of the results indicated that in survey one, respondents rated the barrier relating to problems with flexible working as the lowest and excessive budget commitments the highest. In the second survey, problems with flexible employment were mentioned again (lowest rating) and the frequency of changes and the level of complexity of regulations (highest rating). The rating of seven barriers was higher in the first study ($p < 0.05$) and one in the second. The student assessments presented are consistent with the survey results of entrepreneurs regarding significant barriers to starting and running a business (Danielak, Mierzwa & Bartczak, 2017; Dębkowska *et al*., 2019; Maison & Partners, 2020, 2024; Grant Thornton, 2022, 2024).

The barrier regarding the pandemic also achieved a high evaluation in study two. This result is also consistent with the results obtained by other researchers (Rembiasz & Siemieniak, 2021). A pandemic is perceived as a risk factor, with a barrier typically situational and difficult to predict, referred to as a "black swan." The higher assessment of the barrier regarding the frequency of change and the level of regulatory complexity in the second survey may also be indirectly related to the pandemic. To prevent its effects, the government's post-pandemic reconstruction programme COVID-19, the so-called Polish Order, was introduced in 2022. The programme involved a series of changes concerning, among other things, tax aspects and universal health insurance, which resulted in an increased burden on one-person business entities (Augustynowicz, 2022).

When comparing the results in the two periods, it is important to emphasise the lack of significant variation in the assessment of the three barriers – those related to the amount of budget commitments, the cost of running a business and entering the market. The similarity of student opinions in both surveys on the negative impact of the determinants indicated can be seen as highlighting their importance for doing business and their long-term nature. These results are confirmed – as noted earlier – by surveys of entrepreneurs, who rank the indicated factors among the significant barriers in subsequent years. It can be considered as an important aspect of the research conducted. Both people with business experience and potential future entrepreneurs evaluate the external conditions of business operations similarly. This is important for the second group since a negative assessment of the environment can affect concerns about running one's own business, thus causing the abandonment of positive entrepreneurial intentions.

The application of factor analysis made it possible to reduce the number of barriers studied. To conduct it, correlation matrices from both studies were analysed. Then, following the eigenvalue criterion, the percentage of explained variance (Table 2) and a visual assessment of the scatter plot, the number of factors in each study and their components were determined. Four factors were identified for the first study's results and five for the second.

Table 2. Eigenvalues for the First and Second Study (Extraction Method – Principal Components)

First Study			Second Study		
Factor	Eigenvalue	Percentage of total variance	Factor	Eigenvalue	Percentage of total variance
1	3.082	28.02	1	2.496	20.80
2	1.593	14.49	2	1.532	12.77
3	1.148	10.43	3	1.244	10.37
4	1.010	9.18	4	1.080	9.00
–	–	–	5	0.970	8.09
Cumulative percentage of explained variance		62.12	Cumulative percentage of explained variance		61.03

Source: the authors.

In both cases, the factor loadings of the questions were calculated using Varimax rotations, which indicated the assignment of individual questions to new factors (Table 3 and Table 4).

Table 3. Factor Loadings Matrix after Varimax Rotation for Barriers in the First and Second Study

No.	Factor	Barriers – First Study				Barriers – Second Study				
		B1-1	B1-2	B1-3	B1-4	B2-1	B2-2	B2-3	B2-4	B2-5
1	Complicated and unclear procedures for setting up businesses	**0.79**	0.02	0.21	0.01	–0.03	0.02	–0.03	**0.85**	0,12
2	Frequency of change and complexity of regulations	**0.77**	–0.03	0.29	0.00	**0.60**	–0.07	0.07	0.50	0.04
3	Inspections and their negative effects on entrepreneurs	**0.64**	0.30	–0.10	0.21	0.26	0.14	0.17	**0.59**	–0.10
4	Difficulties in obtaining financing to start businesses	0.27	0.01	0.03	**0.72**	–0.03	0.26	**0.48**	0.18	–0.07
5	Excessive budget obligations (taxes, insurance premiums, etc.)	0.24	–0.03	**0.74**	0.21	**0.83**	0.10	0.10	–0.06	0.06
6	Excessive costs of running a business	0.20	0.03	**0.77**	0.14	**0.78**	0.11	–0.02	0.10	0.13
7	Difficulties in recruiting appropriate staff	0.07	**0.86**	0.04	0.03	0.10	**0.79**	0.04	–0.02	–0.05
8	Problems with flexible employment arrangements	0.02	**0.78**	0.06	0.22	0.10	**0.79**	–0.03	0.09	0.00
9	Problems with entering and remaining in the market	–0.01	0.24	0.39	**0.60**	0.25	0.07	**0.72**	0.07	–0.09

Table 3 cnt'd

No.	Factor	Barriers – First Study				Barriers – Second Study				
		B1-1	B1-2	B1-3	B1-4	B2-1	B2-2	B2-3	B2-4	B2-5
10	Excessive market competition	–0.13	0.20	0.14	**0.68**	–0.03	–0.07	**0.77**	–0.04	0.16
11	Contractor dishonesty	0.05	0.37	**0.59**	–0.12	–0.22	**0.41**	0.33	0.03	0.34
12	Pandemic situation	–	–	–	–	0.12	–0.03	0.03	0.07	**0.91**

Notes: B1-1 – first study, first factor, B1-2 – first study, second factor, etc., B2-1 – second study, first factor, B2-2 – second study, second factor, etc. Numbers in bold indicate items assigned to a factor.

Source: the authors.

Table 4. Qualification of the Examined Determinants into Barriers Identified Based on Factor Analysis

Specification	First Study		Second Study	
	Factor	Originally studied determinant	Factor	Originally studied determinant
Legal barrier	B1-1	1, 2, 3	B2-4	1, 3
Labour market barrier	B1-2	7, 8	B2-2	7, 8, 11
Financial barrier	B1-3	5, 6, 11	B2-1	2, 5, 6
Market barrier	B1-4	4, 9, 10	B2-3	4, 9, 10
Pandemic barrier	–	–	B2-5	12

Source: the authors.

Factor analysis revealed four barrier categories (legal, labour market, financial and market) for both studies. Their comparison indicates the similarity of structures. For one construct (market barrier), the students' assessment did not change, and for both studies, the same original determinants after reduction were included in the new factor. In addition to similarities, partial dissimilarities were observed for the three barrier groups. According to the results of the initial survey, the frequency of changes and the complexity of regulations were identified as legal barriers. This can be considered as a broad interpretation of the studied factor by the evaluation respondents. In contrast, the analysis conducted for the second survey indicated that this factor should be classified as a financial barrier. The fundamental changes to the law in 2022 concerning the introduction of the Polish Order and its financial implications can also be indicated as a possible underlying reason. Additionally, the mid-year correction of the regulations has caused further problems with their application. Since some of the students already had professional experience and were working at the time of the survey, the problem of changing regulations and their complexity may have been perceived by them more in terms of financial implications than in a broader aspect, as was the case in the first survey. Some confirmation is provided by the value of the factor loadings for this determinant in the second survey (B2-1 – 0.60 and B2-4 – 0.50).

The second barrier that was categorised differently in the two surveys was the dishonesty of contractors. In the first study, it was perceived through the financial aspect – it can cause difficulties in enforcing receivables from counterparties and, therefore, financial consequences. In the second study, this condition was classified as a labour market barrier, which is not entirely justified and could result from a lack of broader knowledge about the consequences of unfair behaviour of contractors or a lack of contact with the indicated phenomenon in professional work.

The impact of the different categories of barriers was assessed based on the indices, which are the sum of the scores of the components creating new factors. The minimum and maximum values of the indices varied due to the number of components forming new factors in both studies (Table 4). For the three original conditions creating a new barrier, an index value of up to 6.5 was considered a weak impact, 6.5 to below 10.5 – an average impact, and 10.5 and above – a strong impact. With the two original factors forming a new factor, the strength of influence was rated as follows: up to 4.5 – weak influence, from 4.5 to below 7.5 – average influence and from 7.5 – strong influence. For the impact of the pandemic barrier (second study only), a weak impact was assumed for values up to 2.5, an average impact for values between 2.5 and 3.5, and a strong impact for values above 3.5. The following ranges were adopted for total barriers (excluding the pandemic barrier): 11 to under 25, 25 to under 40, 40 to 55.

Table 5. Evaluation of Barriers after Reduction in the First and Second Study

Variable	First Study			Second Study		
	Index – mean	Influence	*SD*	Index – mean	Influence	*SD*
Legal barrier	11.47	strong	2.105	6.67	average	1.561
Labour market barrier	6.39	average	1.656	9.16	average	1.930
Financial barrier	11.73	strong	2.052	12.05	strong	2.082
Market barrier	11.34	strong	2.169	10.66	strong	2.049
Pandemic barrier	–	–	–	4.10	strong	1.040
Barriers in general	40.94	strong	5.421	42.65	strong	5.070

Source: the authors.

In both surveys, the impact of the vast majority of barriers was rated as strong, with a relatively high agreement among respondents (Table 5). Only the labour market barrier in both surveys and the legal barrier in the second survey were average. In the case of the labour market barrier, the result may be a consequence of the structure of respondents in terms of their work experience and employment status at the time of the survey. However, half of the students participating in the study had no work experience, while less than 40% declared that they had a job. Consequently, a significant number of respondents had no exposure to the problem of entrepreneurs finding and hiring employees and, therefore, no knowledge of the difficulties involved. Simultaneously, the obtained result corresponds to the entrepreneurs' opinions, indicating problems related to the labour market after legal and financial barriers (Dębkowska *et al*., 2019, 2020, 2021). Although the results obtained are consistent both in the two groups of respondents and with the opinions expressed by entrepreneurs, the survey made it possible to partially demonstrate that the construct of individual barriers can be variable over time. A different assessment of the individual factors that create barriers can be influenced by phenomena occurring in the environment (in this case – the pandemic), but also by the knowledge and professional experience of respondents.

An examination of the differences in the barrier assessment according to the adopted criteria showed that in both periods, significant discrepancies occurred only in some cases (Table 6).

Table 6. Variation in the Evaluation of Barriers According to the Adopted Criteria (Mann-Whitney U Test)

Variable	Criterion	z	p-value
First study			
Labour market barrier	work experience	2.09984	0.035744
Financial barrier	employment status	3.03824	0.002380
	work experience	3.44625	0.000569
	level of study	–2.47896	0.013177
Barriers in general	work experience	2.33008	0.019802
Second study			
Labour market barrier	area of study	0.00000	0.032000
Financial barrier	level of study	–3.87632	0.000106
Pandemic barrier	traditions of entrepreneurship	–2.44722	0.014397

Source: the authors.

In the first survey, work experience, employment status and level of study proved to be the differentiating variable for the assessment of barriers (labour market, financial, general). In the second study, only area (labour market barrier) and level of study (financial barrier) proved to be the differentiating variables. Generally, these results indicate the importance of knowledge (both studies) and work experience (first study) in assessing the external determinants of starting a business. In the first study, respondents with extensive work experience and who were employed at the time of the survey rated the impact of the barriers indicated higher, which may reflect their better knowledge of the realities of the operation of businesses and the practical problems involved. Higher levels of knowledge, resulting from education but also greater work experience, characterise those studying at the master's level, which may be the reason for the higher assessment of the financial barrier. In the second study, the area of study was also a differentiating feature for the labour market barrier – respondents studying for a management degree rated the negative impact of the indicated condition lower. This is related to the greater extent of business knowledge included in the curriculum of these degree programmes than in the case of courses categorised as engineering and technology. This enables a more objective assessment to be made of environmental conditions. Entrepreneurial traditions only differentiated the assessment of the pandemic barrier. Respondents with entrepreneurs in their immediate environment rated the level of negative impact of this condition lower. Their assessment can be considered more objective and based on knowledge of the practical effects of the pandemic on economic practice. The restrictions on limiting the spread of the virus have not affected all industries. The vast majority of businesses continued to operate, although under epidemic restrictions. For this reason, the evaluation of this respondent group was slightly lower, and the difference was proved to be statistically significant. Comparison of the obtained survey results on barriers to entrepreneurship is difficult due to the variety of barrier catalogues used by researchers. Nevertheless, it is possible to see some similarities in the assessments regarding the financial barrier. The analyses indicate that variables such as educational level and entrepreneurial traditions play a crucial role in differentiating students' assessments of this barrier. Studies by Shahzad, Saleem and Fatima (2024) and Wyrwa and Sołtysiak (2016) indicate that there are converging elements, especially regarding the impact of education and entrepreneurial traditions on perceptions of the financial barrier.

A study was conducted to compare the assessment of barriers in two different periods using constructed indices. Due to changes in the qualification of the original determinants in the first and second surveys, a comparison was only possible for the combined assessment of barriers and the market barrier created by the same factors in both periods. In the second case, to ensure comparability of results, the assessment of the pandemic barrier was eliminated from the indices calculated for all barriers. The comparison resulted in the finding of significant differences in assessment (Mann-Whitney U test) for both the market barrier ($z = 4.81780$; $p = 0.000001$) and total barriers ($z = 6.78616$; $p = 0.000000$). Although the assessment of the impact intensity of both barriers was interpreted as strong, the two groups of respondents perceived the environmental conditions slightly differently.

5. Conclusions

The research resulted in answers to the research questions formulated. The types and assessment of barrier intensities to student self-employment and their variation by selected respondent characteristics are presented. The research also indicated similarities and differences in the student assessment of Lublin University of Technology in both periods. However, it is not entirely possible to answer the last of the questions concerning the variability of barriers over time. The diagnosed discrepancies in respondents' opinions may result from the diversity of the two groups surveyed. This constitutes a limitation. At the same time, the difficulty of conducting longitudinal studies among students should be indicated, as their time at university is relatively short, ranging from three to seven semesters. Surveying the same group of respondents would make it possible to identify actual changes in how external environment conditions are assessed and, therefore, systemic solutions aimed at potential entrepreneurs. Nonetheless, based on the results obtained, it is possible to outline the general direction of the necessary changes, which are also emphasised by the entrepreneurs themselves (Maison & Partners, 2023). These include, above all, further reducing the impact of the three highest-rated barriers: legal, financial, and labour market. Simplifying regulations, especially tax regulations, but also stabilising the law, reducing the financial burden imposed on entrepreneurs (e.g., extending the period of application of the start-up tax credit or so-called preferential social security contributions), making labour laws more flexible are examples of solutions that – at least in part – should improve the business environment, thereby encouraging newcomers to realise their positive entrepreneurial intentions.

Another limitation of the research conducted is the research sample in both studies is from one university (the same limited range of courses) and one academic centre. Among other things, this means that comparisons between regions in the country are impossible, while some of the barriers (e.g., the labour market barrier) may be regional.

The research shows that an important characteristic that influences the way barriers are assessed is knowledge, both from education and acquired through work experience. This issue seems to require further exploration for its practical aspect. Undertaking work during their studies facilitates students' entry into the labour market and accelerates their careers, although it can cause difficulties in combining education and employment. It also allows for learning about economic realities and, therefore, a more objective assessment of the determinants of entrepreneurship and, thus, the attractiveness of running one's own business as an alternative career path. As it appears, this is an aspect that universities should consider when changing their approach to shaping students' entrepreneurial competencies. This involves changes in the study programmes, which should broaden and deepen knowledge and skills in business, especially from issues indicated in studies as barriers to entrepreneurship. The increase in competencies can also be achieved by tightening cooperation with business environment institutions (including science and technology parks, business incubators, training and consulting centres, and entrepreneurship support centres), whose purpose is to provide broad support to already functioning companies, but also newly created entities (Hołub-Iwan *et al*., 2023). The organisation of internships, apprenticeships, study visits, competitions for business ideas, innovative products or technological solutions, and consulting are examples of activities that can be cooperatively implemented by various types of institutions operating in the environment of universities and in cooperation with universities. Entrepreneurs who successfully operate in the market can play an important role in this. Involving them in the educational process, for example, by sharing their own experiences, knowledge, and skills, should also increase students' competencies and reduce concerns about their business activities. Importantly, the given examples of activities are implemented, although their scope and range vary, and they are not always conducted in cooperation with environmental institutions. It seems that cooperation of this type and more intensive promotion of information on available support forms in starting and running businesses could significantly increase students' interest in business activities. After all, future entrepreneurs must be fully aware of existing support opportunities, as often the lack of knowledge in this area can also be a significant barrier to business initiatives.

The results also indicate a potential direction for further in-depth research, which should become, on the one hand, the search for other external factors (in addition to those analysed) that may have an impact on supporting or hindering the decision to start a business, and on the other hand, the identification of internal barriers that cause the abandonment of positive entrepreneurial intentions, especially among students.

Authors' Contribution

The authors' individual contribution is as follows: Each contributed 50%.

Conflict of Interest

The authors declare no conflict of interest.

References

Acs, Z. J., & Szerb, L. (2007). Entrepreneurship, Economic Growth and Public Policy. *Small Business Economics*, *28*(2–3), 109–122. https://doi.org/10.1007/s11187-006-9012-3

Al-Fattal, A. (2024). Entrepreneurial Aspirations and Challenges among Business Students: A Qualitative Study. *Administrative Sciences*, *14*(5), 101. https://doi.org/10.3390/admsci14050101

Arent, A., & Walczyna, A. (2018). Wybrane cechy demograficzne i indywidualne a intencje przedsiębiorcze studentów. *Zeszyty Naukowe Politechniki Śląskiej. Organizacja i Zarządzanie*, 132, 27–42.

Augustynowicz, E. (2022). Formy opodatkowania jednoosobowej działalności gospodarczej w świetle zmian Polskiego Ładu. *Zeszyty Naukowe Polskiego Towarzystwa Ekonomicznego w Zielonej Górze*, 17, 89–104. https://doi.org/10.26366/PTE.ZG.2022.229

Belas, J., Strnad, Z., Gavurová, B., & Cepel, M. (2019). Business Environment Quality Factors Research – SME Management's Platform. *Polish Journal of Management Studies*, *20*(1), 64–77. https://doi.org/10.17512/pjms.2019.20.1.06

Bergmann, H., Hundt, C., & Sternberg, R. (2016). What Makes Student Entrepreneurs? On the Relevance (and Irrelevance) of the University and the Regional Context for Student Start-ups. *Small Business Economics*, *47*(1), 53–76. https://doi.org/10.1007/S11187-016-9700-6

Carree, M. A., & Thurik, A. R. (2010). The Impact of Entrepreneurship on Economic Growth. In: Z. J. Ács, D. B. Audretsch (Eds), *International Handbook Series on Entrepreneurship: Volume 5. Handbook of Entrepreneurship Research* (2nd ed.) (pp. 557–594). Springer.

Cuervo, A. (2005). Individual and Environmental Determinants of Entrepreneurship. *The International Entrepreneurship and Management Journal*, *1*(3), 293–311. https://doi.org/10.1007/s11365-005-2591-7

Czech, K., Karpio, A., Wielechowski, M. W., Woźniakowski, T., & Żebrowska-Suchodolska, D. (2020). *Polska gospodarka w początkowym okresie pandemii COVID-19*. Wydawnictwo SGGW.

Danielak, W., Mierzwa, D., & Bartczak, K. (2017). *Małe i średnie przedsiębiorstwa w Polsce: Szanse i zagrożenia rynkowe*. Wydawnictwo Exante.

Dębkowska, K., Kłosiewicz-Górecka, U., Szymańska, A., & Ważniewski, P. (2021). *Mikrofirmy pod lupą w 2020 r.* Polski Instytut Ekonomiczny. Retrieved from: https://pie.net.pl/wp-content/uploads/2021/08/Mikrofirmy-pod-lupa-w-2020-r..pdf (accessed: 21.07.2023).

Dębkowska, K., Kłosiewicz-Górecka, U., Szymańska, A., Ważniewski, P., & Zybertowicz, K. (2019). *Mikrofirmy pod lupą*. Polski Instytut Ekonomiczny. Retrieved from: https://pie.net.pl/wp-content/uploads/2019/03/PIE-Raport_Mikrofirmy-red..pdf (accessed: 21.07.2023).

Dębkowska, K., Kłosiewicz-Górecka, U., Szymańska, A., Ważniewski, P., & Zybertowicz, K. (2020). *Mikrofirmy pod lupą w 2019 r.* Polski Instytut Ekonomiczny. Retrieved from: https://pie.net.pl/wp-content/uploads/2020/04/Mikrofirmy-2019.pdf (accessed: 21.07.2023).

Engle, R. L., Dimitriadi, N., Gavidia, J. V., Schlaegel, C., Delanoe, S., Alvarado, I., He, X., Buame, S., & Wolff, B. (2010). Entrepreneurial Intent: A Twelve-country Evaluation of Ajzen's Model of Planned Behavior. *International Journal of Entrepreneurial Behavior & Research*, *16*(1), 35–57. https://doi.org/10.1108/13552551011020063

Gorynia, M., & Kuczewska, J. (2022). *Zmiany wywołane pandemią COVID-19 w sektorze MŚP i ich wpływ na realizację procesów biznesowych*. Fundacja Platforma Przemysłu

Przyszłości. Retrieved from: https://przemyslprzyszlosci.gov.pl/raport-zmiany-wywolane-pandemia-covid-19/ (accessed: 21.07.2023).

Grant Thornton. (2022). *Bariery w biznesie: Edycja 2022*. Retrieved from: https://grantthornton.pl/wp-content/uploads/2022/02/Bariery-w-biznesie-2022-RAPORT-Grant-Thornton.pdf (accessed: 12.08.2023).

Grant Thornton. (2024). *Bariery w biznesie: Edycja 2024*. Retrieved from: https://grantthornton.pl/wp-content/uploads/2024/06/Bariery-w-biznesie-RAPORT-Grant-Thornton-edycja-2024.pdf (accessed: 5.01.2025).

Grzegorzewska-Mischka, E., & Wyrzykowski, W. (2017). Bariery rozwoju przedsiębiorczości w Polsce i krajach UE – analiza retrospektywna i porównawcza. *Przedsiębiorczość i Zarządzanie*, *18*(12), part 1, 175–196.

GUS. (2023). *Szkolnictwo wyższe w roku akademickim 2022/2023 (wyniki wstępne). Informacje sygnalne*. Retrieved from: https://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5488/8/9/1/szkolnictwo_wyzsze_w_roku_akademickim_2022-2023_-_wyniki_wstepne.pdf (accessed: 29.12.2023).

Hołub-Iwan, J., Gutta, K., Onyśków, W., & Pałko, K. (2023). *Raport. Ocena systemu funkcjonowania instytucji otoczenia biznesu w województwie lubelskim z uwzględnieniem identyfikacji potrzeb w zakresie usług przedsiębiorców. Województwo Lubelskie*. Retrieved from: https://www.lubelskie.pl/file/2023/06/Ocena-systemu-funkcjonowania-instytucji-otoczenia-biznesu-w-wojew%C3%B3dztwie-lubelskim-z-uwzgl%C4%99dnieniem-identyfikacji-potrzeb-w-zakresie-us%C5%82ug-dla-przedsi%C4%99biorc%C3%B3w.pdf (accessed: 5.01.2025).

Jedynak, P., & Bąk, S. (2022). Kluczowe czynniki sukcesu w zarządzaniu przedsiębiorstwami podczas pandemii COVID-19. *Studia i Prace Kolegium Zarządzania i Finansów*, 184, 65–78. https://doi.org/10.33119/SIP.2022.184.5

Khanin, D., Rosenfield, R., Mahto, R. V., & Singhal, C. (2022). Barriers to Entrepreneurship: Opportunity Recognition vs. Opportunity Pursuit. *Review of Managerial Science*, *16*(4), 1147–1167. https://doi.org/10.1007/s11846-021-00477-6

Kline, P. (2013). *Handbook of Psychological Testing* (2nd ed.). Routledge. https://doi.org/10.4324/9781315812274

Kurczewska, A. (2010). Intencje przedsiębiorcze, czyli co decyduje o przedsiębiorczości człowieka. *Przegląd Organizacji*, 10(849), 20–23. https://doi.org/10.33141/po.2010.10.05

Leszczewska, K. (2012). Działania państwa na rzecz eliminowania barier rozwoju przedsiębiorczości w Polsce. *Ekonomiczne Problemy Usług*, 97, 87–99.

Ligaj, M., & Pawlos, W. (2021). Wpływ COVID-19 na funkcjonowanie przedsiębiorstw w Polsce. *Gospodarka Materiałowa i Logistyka*, *73*(3), 60–65. https://doi.org/10.33226/1231-2037.2021.3.6

Lisowska, R. (2015). External Determinants of the Development of Small and Medium-sized Enterprises – Empirical Analysis. *Journal of Entrepreneurship, Management and Innovation* (*JEMI*), *11*(4), 115–138. https://doi.org/10.7341/20151145

Lundström, A., & Stevenson, L. A. (2005). *Entrepreneurship Policy: Theory and Practice. International Studies in Entrepreneurship* (Vol. 9). Kluwer Academic Publishers. https://doi.org/10.1007/b104813

Lüthje, C., & Franke, N. (2003). The 'Making' of an Entrepreneur: Testing a Model of Entrepreneurial Intent among Engineering Students at MIT. *R&D Management*, *33*(2), 135–147. https://doi.org/10.1111/1467-9310.00288

Maison & Partners. (2020). *Bariery prowadzenia działalności gospodarczej w Polsce: Raport z badania ilościowego*. Retrieved from: https://zpp.net.pl/wp-content/uploads/2020/12/MP_Bariery_17012020.pdf (accessed: 17.07.2023).

Maison & Partners. (2023). *Bariery prowadzenia działalności gospodarczej w Polsce: Raport z badania ilościowego przygotowany dla ZPP*. Retrieved from: https://zpp.net.pl/wp-content/uploads/2023/03/MP_Bariery-prowadzenia-dzialalnosci-gospodarczej-w-Polsce_2023.pdf (accessed: 5.01.2025).

Maison & Partners. (2024). *Bariery prowadzenia działalności gospodarczej w Polsce: Raport z badania ilościowego*. Retrieved from: https://zpp.net.pl/wp-content/uploads/2024/03/MP_Busometr_Bariery_2024.pdf (accessed: 5.01.2025).

Ministerstwo Gospodarki. (2013). *Strategia Innowacyjności i Efektywności Gospodarki. Dynamiczna Polska 2020* (Monitor Polski poz. 73).

Otto, P., & Nowosielska, P. (2022). *Magister w kryzysie: Coraz mniej osób wybiera dalszą naukę po licencjacie*. Retrieved from: https://serwisy.gazetaprawna.pl/edukacja/artykuly/8593708,studia-magister-licencjat-statystyki.html (accessed: 21.07.2023).

Piecuch, T. (2013). *Przedsiębiorczość: Podstawy teoretyczne* (2nd ed.). Wydawnictwo C.H. Beck.

Rembiasz, M. P., & Siemieniak, P. (2021). Postrzeganie ryzyka prowadzenia działalności gospodarczej w dobie pandemii COVID-19. *Horyzonty Polityki*, *12*(41), 91–106. https://doi.org/10.35765/HP.2134

Saunders, M., Lewis, P., & Thornhill, A. (2007). *Research Methods for Business Students* (4th ed.). Financial Times/Prentice Hall.

Schwarz, E. J., Wdowiak, M. A., AlmeriJarz, D. A., & Breitenecker, R. J. (2009). The Effects of Attitudes and Perceived Environment Conditions on Students' Entrepreneurial Intent: An Austrian Perspective. *Education + Training*, *51*(4), 272–291. https://doi.org/10.1108/00400910910964566

Sendra-Pons, P., Comeig, I., & Mas-Tur, A. (2022). Institutional Factors Affecting Entrepreneurship: A QCA Analysis. *European Research on Management and Business Economics*, *28*(3), 100187. https://doi.org/10.1016/j.iedeen.2021.100187

Sesen, H. (2013). Personality or Environment? A Comprehensive Study on the Entrepreneurial Intentions of University Students. *Education + Training*, *55*(7), 624–640. https://doi.org/10.1108/et-05-2012-0059

Shahzad, A. R., Saleem, M., & Fatima, N. (2024). Intrinsic Barriers to Entrepreneurship: Investigating the Impact of University Student Perception on Entrepreneurial Intentions.

Journal of Development and Social Sciences, *5*(3), 527–538. https://doi.org/10.47205/jdss.2024(5-III)46

Skowrońska, A. (Ed.). (2023). *Raport o stanie sektora małych i średnich przedsiębiorstw w Polsce 2023*. Polska Agencja Rozwoju Przedsiębiorczości. Retrieved from: https://www.parp.gov.pl/storage/publications/pdf/ROSS_2023_scalony_ost_popr.pdf (accessed: 28.12.2023).

Spigel, B., & Harrison, R. (2018). Toward a Process Theory of Entrepreneurial Ecosystems. *Strategic Entrepreneurship Journal*, *12*(1), 151–168. https://doi.org/10.1002/sej.1268

Stanisz, A. (2006). *Przystępny kurs statystyki z zastosowaniem STATISTICA PL na przykładach z medycyny: Tom 1. Statystyki podstawowe* (3rd ed., Rev. ed.). StatSoft.

Tarnawa, A. (Ed.). (2022). *Raport z badania przedsiębiorczości. Global Entrepreneurship Monitor: Polska 2022*. Polska Agencja Rozwoju Przedsiębiorczości. Retrieved from: https://www.parp.gov.pl/storage/publications/pdf/Raport-GEM-Polska-2022.pdf (accessed: 15.06.2023).

Urbaniec, M. (2022). Ekosystem przedsiębiorczości – otoczenie dla przedsiębiorczości. In: W. Pasierbek, K. Wach (Eds), *Słowniki społeczne: Vol. 5. Przedsiębiorczość* (pp. 107–120). Wydawnictwo Naukowe Akademii Ignatianum w Krakowie. Retrieved from: https://slownikispoleczne.ignatianum.edu.pl/pliki/przedsiebiorczosc.pdf (accessed: 24.08.2023).

Wach, K., & Głodowska, A. (2022). Entrepreneurship Research in Economics and Management: Understanding the Term and Research Trends. *International Entrepreneurship Review*, *8*(4), 7–24. https://doi.org/10.15678/IER.2022.0804.01

Wyrwa, D., & Sołtysiak, M. (2016). Przedsiębiorczość akademicka – postawy przedsiębiorcze studentów. *Zeszyty Naukowe PWSZ w Płocku*, *Nauki Ekonomiczne*, *24*, 259–270.

Zdrajkowska, H., & Zakrzewska-Bielawska, A. (2006). Bariery rozwoju małych i średnich przedsiębiorstw w Polsce i Wielkiej Brytanii. In: I. Hejduk, J. Korczak (Eds), *Gospodarka oparta na wiedzy* (pp. 723–733). Wydawnictwo Politechniki Koszalińskiej.

Krakow Review of Economics and Management
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie

4 (1010)
2025

KREM, 2025, 4(1010): 161–179
ISSN 1898-6447
e-ISSN 2545-3238
https://doi.org/10.15678/krem.18665

Corporate Value from the Perspective of Sustainable Development Research: A SciMAT Bibliometric Analysis

Joanna Błach[1], **Iwona Gorzeń-Mitka**[2]

[1] University of Economics in Katowice, Department of Corporate Finance and Insurance, 1 Maja 50, 40-287 Katowice, Poland, e-mail: joanna.blach@uekat.pl, ORCID: https://orcid.org/0000-0002-6546-2172

[2] University of Economics in Katowice, Department of Corporate Finance and Insurance, 1 Maja 50, 40-287 Katowice, Poland, e-mail: iwona.gorzen-mitka@uekat.pl, ORCID: https://orcid.org/0000-0002-2844-0054

Suggested citation: Błach, J., & Gorzeń-Mitka, I. (2025). Corporate Value from the Perspective of Sustainable Development Research: A SciMAT Bibliometric Analysis. *Krakow Review of Economics and Management / Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 4(1010), 161–179. https://doi.org/10.15678/krem.18665

ABSTRACT

Objective: This paper aims to synthesise the extant literature on corporate value in the context of sustainable development research over the past two decades with a focus on 2004–2023.
Research Design & Methods: The study uses various bibliometric analysis methods: citation analysis, keyword co-occurrence mapping, analysis of bibliographic productivity and impact indicators. The bibliometric analysis software SciMAT was used to develop visualisations of the identified research trends. Following the methodological rigour of PRISMA, the analysis covers 329 publications from the Scopus database from 2004 to 2023.
Findings: Results illustrate the evolution of corporate value research in the context of sustainable development, its increasing importance, interactions, stability and changes in the research network. Recent topics include sustainability reporting as one of the key determinants of corporate value and the role of innovation in sustainable business models. Potential areas of research include sustainability reporting, corporate governance, and R&D. A lack of research on sectors other than

manufacturing and regions other than Central Europe is noted, suggesting interesting avenues for future investigation.
Implications/Recommendations: This study can be used as a reference point for researchers investigating the determinants of corporate value within the context of sustainability. It identifies key areas where further action is needed to raise managers' awareness and understanding of the critical relationship between corporate value and sustainability issues.
Contribution: The presented literature review is one of the first such comprehensive studies in this area to use big data analytics. It identifies evolutionary changes, recent trends and outlines new directions for future research.

Article type: original article.

Keywords: corporate value, sustainable development, literature review, bibliometric analysis.

JEL Classification: G32, Q56, M14, L21.

1. Introduction

Corporate value is a key topic in the field of corporate finance and management, as value maximisation is seen as the main objective of modern corporations and the ultimate criterion for decision-making (Rappaport, 1999; Hillman & Keim, 2001). Scientific discussion is held on the definition of corporate value (Ramakrishnan & Thomas, 1992; Kyriazis & Anastassis, 2007) and its importance for shareholders (Rappaport, 1999; Lazonick & O'Sullivan, 2000), and other stakeholders (Freeman, 1998; Hillman & Keim, 2001; Jiao, 2010). It is linked to a variety of measures and valuation methods (Ramakrishnan & Thomas, 1992; Kyriazis & Anastassis, 2007). Many studies discuss the value creation process (Rappaport, 1999; Adams, 2017) and its determinants (Fama & French, 1998; Krause & Tse, 2016; Qiu *et al*., 2021).

A relatively new stream of literature links corporate value to sustainability issues: corporate social responsibility (CSR) (D'Amato & Falivena, 2020), environmental, social, governance (ESG) performance (Fatemi, Glaum & Kaiser, 2018; Wong *et al*., 2021), and sustainability reporting in connection to sustainable development goals (SDGs) (Krasodomska, Zarzycka & Zieniuk, 2024). The link between corporate value and sustainability is discussed. Most of the studies provide evidence of a positive relationship between corporate value and sustainability (e.g., Menz, 2010; Kuzey & Uyar, 2017). Yet, another group of studies supports the theory of value destruction, suggesting that managers may achieve SDGs at the expense of shareholders (e.g., Miralles-Quiros, Miralles-Quiros & Arraiano, 2017; Swarnapali & Le, 2018). Finally, some studies find no significant relationship between firm value and sustainability performance (Rudkin & Cai, 2019; Qing & Jin, 2023). Therefore, as the results are inconclusive, one may expect further studies in this field.

Understanding the importance to businesses of achieving sustainable development goals (Mio, Panfilo & Blundo, 2020), this paper aims to synthesise the extant literature and evolution of research on corporate value in the context of sustainability over the past two decades. The main objective of this paper is achieved by conducting a conceptual science mapping analysis of the extant research in this field, which aims to seek answers to the following research questions:

RQ1: What topics have so far dominated the enquiries of researchers analysing sustainable development related to corporate value, and what have they found?

RQ2: How has the volume of research on sustainable development and corporate value changed over time, and what factors are associated with this growth?

RQ3: What new themes are currently emerging in the literature on sustainability and corporate value?

These questions serve as a starting point for a bibliometric analysis to gain a deeper understanding of the scientific landscape around corporate value in the context of sustainable development. The rest of this paper is structured as follows: section 2 outlines SciMAT methodology and functionality; section 3 discusses mapping results; the final section concludes the study.

2. Methodology

2.1. Conceptual Research Design

As indicated in section 1, this paper aims to synthesise the extant literature and the evolution of research on corporate value in the context of sustainable development over the past two decades. The importance of this topic is highlighted by numerous literature review papers published recently (Mio, Panfilo & Blundo, 2020; Pizzi *et al*., 2020; Berrone *et al*., 2023). This paper falls into this stream of studies by adding value due to a different scope of analysis (evolution of research on corporate value in the context of sustainable development) and a different methodological approach (by using SciMAT software).

In this study, a variety of bibliometric analysis tools is used. In the pre-mapping phase (after preparing the relevant dataset), a temporal analysis and selected productivity and impact indicators were applied. Strategy diagrams resulting from co-word analysis graphically illustrate the themes of current research, emerging themes and potential trends for future research. The evolution map visualises the development of corporate value research in the context of sustainability.

2.2. Data Collection and Selection

The dataset of bibliographic records of publications on corporate value and sustainable development was created using data from Scopus. The study focused on a single database because, as demonstrated by Harzing and Alakangas (2016), the simultaneous use of multiple databases does not increase the number of relevant records subject to further analysis. The search was conducted according to PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) guidelines (Page *et al*., 2021) (Fig. 1).

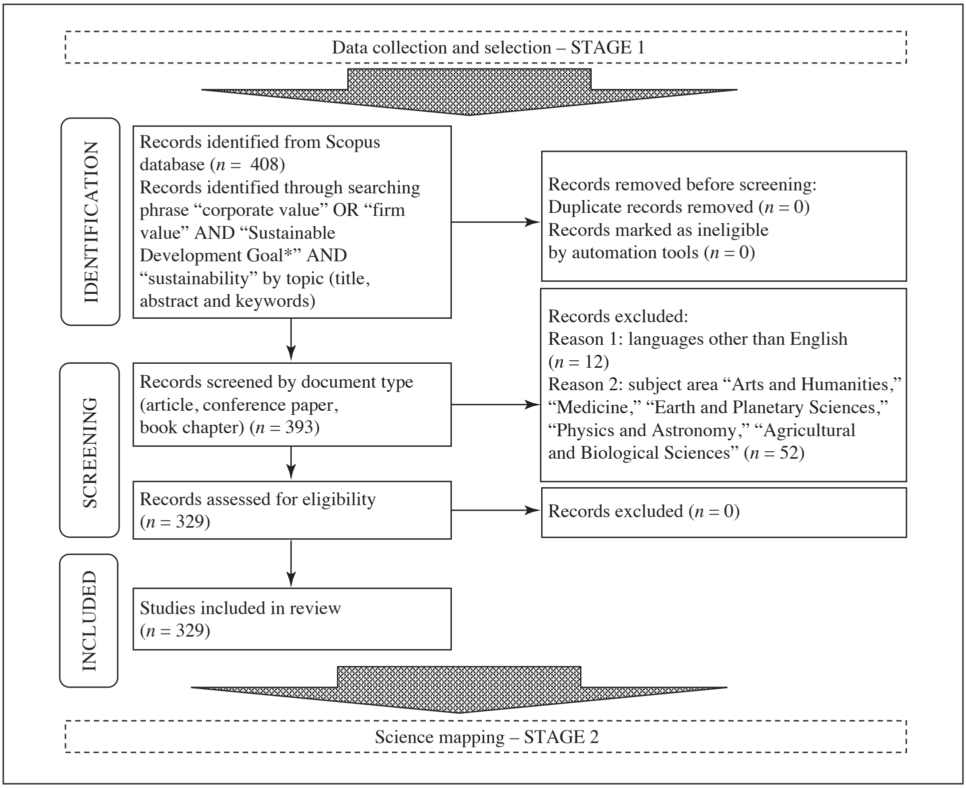


Fig. 1. Search for Research on Corporate Value in the Context of Sustainable Development in the Academic Literature – PRISMA Flow Diagram (Research Process – Stage 1)

Source: the authors.

All publications meeting the search conditions were included in the dataset, without limiting the dataset to full years.[1] The search used the phrases "corporate value" OR "firm value" in the titles, abstracts and keywords of the publications, and phrases "Sustainable Development Goal*" AND "sustainability" in similar criteria,[2]

[1] The analysis was conducted in November 2023. Publications from 2023 were deliberately included due to dynamic changes in the field, with 2021–2023 distinguished as a separate sub-period.

[2] Critics may argue that excluding terms like "sustainable development" results in a loss of specificity, but using broader terms like "sustainability," allows for capturing interdisciplinary

both occurring simultaneously. The search identified 408 academic articles, later filtered by document type (research articles, conference proceedings, book chapters) and publication language (English). After expert review, 52 publications unrelated to the subject were excluded, resulting in 329 records.

2.3. Science Mapping

The scientific mapping process is divided into two sub-stages. In the pre-mapping phase, the prepared dataset was subjected to a temporal and citation analysis with the application of tools available in the Scopus database. In the principal mapping phase, the acquired dataset was analysed using SciMAT (v1.1.04), which is an open-source software tool developed to perform science mapping analysis within a longitudinal framework (Cobo *et al*., 2011, 2012; Moral-Muñoz *et al*., 2020).

SciMAT has been validated for its robust capacity to map thematic evolution and elucidate conceptual connections in research using co-word and bibliographic coupling techniques. Studies (Cobo *et al*., 2012) demonstrated its effectiveness in identifying recurring themes based on empirical data. SciMAT's longitudinal analysis elucidates the evolution of core ideas and emerging trends, underscoring its methodological robustness (Ji *et al*., 2023). Furthermore, SciMAT's standardised workflows and visualisations facilitate replicability and reduce researcher bias (Pessin, Yamane & Siman, 2022). Despite challenges in keyword selection, SciMAT balances inclusivity and focus to maintain analytical clarity (Moral-Muñoz *et al*., 2020), making it a key tool for mapping research landscapes.

Although the most commonly used bibliometric mapping tools are VOSviewer, CiteSpace and Bibliometrix (Tomaszewski, 2023), the SciMAT was applied in this study due to its data processing capabilities and functionality enabling the evolutionary research.

In this study, the approach presented by Cobo *et al*. (2011) is adopted and applied in a similar way to previous studies by Sánchez-Teba *et al*. (2021), however the subject and scope of analysis is different. The longitudinal mapping analysis of research on the corporate value and sustainability nexus was conducted, focusing on finding relationships through a multi-faceted analysis of keyword co-occurrence. Following Cobo *et al*. (2011), the adopted approach included four steps. Steps 1 (detection of sub-structures) and 2 (clustering) use centrality and density measures. These measures allow visualisation of the research results by using thematic

---

perspectives and emergent insights (Ji *et al*., 2023). Recurring themes across subperiods reflect their ongoing relevance, not redundancy (Karakose *et al*., 2024).

Table 1. Mapping Measures

Step	Measure	Formula	Interpretation
1	Centrality measure	$c = 10 \cdot \sum e_{uv}$ where: c – centrality u – an item belonging to the cluster v – an item belonging to other clusters	c – assesses the external coherence of the network by measuring the degree to which the network interacts with other networks. In its raw form, c has no fixed upper limit because it grows with the number and strength of connections $(\sum e_{uv})$. After normalisation, c is scaled between 0 and 1: – 0 – the cluster is completely isolated from other clusters (no inter-cluster connections) – 1 – maximum interaction, meaning all connections of the cluster lead to nodes in other clusters
2	Density measure	$d = 100 \frac{\sum e_{ij}}{n}$ where: d – density i, j – items belonging to the cluster n – the number of items in the theme	d – assesses the internal coherence of the network by measuring its internal strength. It ranges from 0 to 100: – higher values, greater coherence or stronger interconnectedness within the network – 0 – there are no connections between items in the cluster, a lack of internal coherence – 100 – a fully connected network, every item is directly linked to every other item (maximum internal strength)
3	Equivalence index	$E_{ij} = \frac{C_{ij}^2}{C_i \cdot C_j}$ where: E_{ij} – the equivalence index $i, j, \ldots$ – keywords C_i – the number of occurrences of the keyword i C_j – the number of occurrences of the keyword j C_{ij} – the number of co-occurrences of the keywords i and j	E – identifies the similarity between keywords. It ranges from 0 to 1: – 0 – no co-occurrence (no similarity) between the two keywords – 1 – perfect similarity, whenever one keyword occurs, the other always does as well

Table 1 cnt'd

Step	Measure	Formula	Interpretation
4	Stability index	$S_{ij} = \frac{n_{t1t2}}{n_{t1} + n_{t2} - n_{t1t2}}$ where: S_{ij} – the stability index $t_1, t_2, \ldots$ – periods n_{t1} – the number of keywords related to period t_1 n_{t2} – the number of keywords related to period t_2 n_{t1t2} – the number of keywords shared by periods t_1 and t_2	*S* – assesses the degree of stability between two consecutive periods. It ranges from 0 to 1: – the closer to 1, the more consistent and stable the thematic elements are over time – 0 – complete instability, where there are no shared keywords between the two periods, a lack of continuity in thematic or conceptual focus – 1 – complete stability, all keywords from t_1 are retained in t_2 and vice versa, full thematic consistency across the periods

Source: the authors based on Cobo *et al*. (2011), Callon, Courtial & Laville (1991).

networks[3] and two-dimensional strategy diagrams.[4] Steps 3 (analysis of the evolution) and 4 (performance analysis) use the equivalence (Callon, Courtial & Laville, 1991) and stability measures (Cobo *et al*., 2011). Detailed description in Table 1.

These measures allow the creation of an overlay diagram[5] and a thematic evolution map[6] presented in section 3.2.

3. Results

3.1. Results of the Pre-mapping

As a result of the temporal analysis (distribution of publications and their citation rates) three stages of the evolution of research on corporate value in the context of sustainable development were distinguished (Fig. 2).

Changes in the annual number of scientific works and citations are considered important indicators for observing the development trend of a research field (Zou, Yue & Vu, 2018).

The first papers in this field indexed in the Scopus database are from 2004. However, until 2014, the annual number of publications addressing corporate value in the context of sustainable development was fewer than 10. The number of citations per year in this period was fewer than 60. Therefore, the authors refer to this period as "the emergence stage" (EME_Stage). During this period, interest in sustainability issues was slowly growing due to the implementation of the Millennium Development Goals (MDGs) introduced by the United Nations (UN) in 2001.

Between 2015 and 2018 the annual number of publications and their citations more than tripled. Therefore, the authors refer to this period as the strengthening stage (STR_Stage). For analytical reasons (correctness of the analysis using SciMAT), this phase was divided into 2 two-year sub-periods covering the years: 2015–2016 and 2017–2018.[7]

---

[3] Thematic networks represent the interrelationship of keywords in the form of circles of different sizes linked by lines of equal thickness. Each thematic network is labelled with the name of the most important "central" keyword of the topic. The size of the circles is proportional to the number of documents corresponding to each keyword, and the thickness of the lines between two circles "i" and "j" is proportional to the equivalence index (Cobo *et al*., 2011).

[4] A strategic diagram is a two-dimensional space obtained by plotting themes according to their measures of centrality and density (Cobo *et al*., 2011).

[5] Overlay graphs demonstrate the continuity and stability of the domain by presenting changes between consecutive periods. Stability is determined by a stability index (usually measured with the Jaccard index) (Cobo *et al*., 2011).

[6] A thematic evolution map illustrates the evolution of the clusters and the transitional and new elements of each period, as well as the elements shared by two successive periods.

[7] This approach stems from the recommendations to conduct analysis either for a similar number of elements (publications) in each sub-period or for periods of similar length.

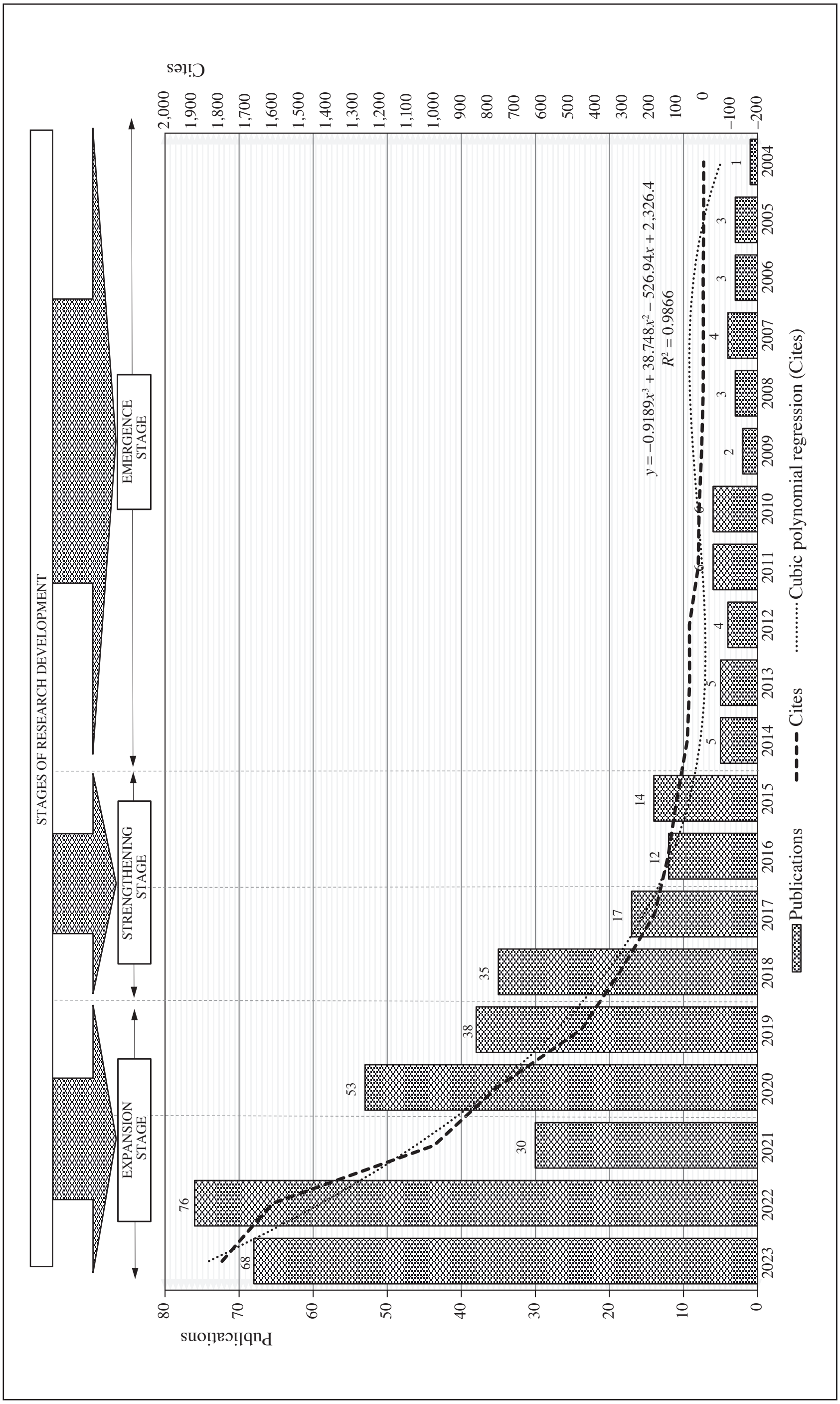


Fig. 2. Research Timeline on Corporate Value in the Context of Sustainable Development

Source: the authors.

The dynamic increase in the public interest in sustainability issues during this period is linked to the adoption of The UN 2030 Agenda for Sustainable Development in 2015 and the introduction of the Non-financial Reporting Directive (NFRD) in 2017.

Between 2019 and 2023 the annual number of publications and citations more than doubled. Therefore, the authors refer to this period as the expansion stage (EXP_Stage). Similarly to the previous phase, for analytical reasons, this one was divided into 2 two-year sub-periods covering years: 2019–2020 and 2021–2023. During this period key regulations were introduced, which led to the increasing importance of sustainability issues for businesses: the European Green Deal in 2019, the European Taxonomy in 2020, the Sustainable Finance Disclosure Regulation in 2021, and the Corporate Sustainability Reporting Directive in 2023.

Consequently, the dynamic increase in the number of research works on corporate value and sustainability issues observed in the analysed period corresponds to the growing public interest in sustainable development, the number of new regulations and obligations for businesses, financial institutions and investors, as well as the scale of international initiatives and partnerships created to promote sustainable development.

3.2. Results of the Principal Mapping

The Overlay Graph and Thematic Evolution Map

First, the overlay diagram was used to assess the stability of the development of research on corporate value in the context of sustainable development. A combination of this general overview with a thematic evolution map provides insight into research development in this field from its emergence (Fig. 3).

The thematic evolution map shows the increasing number of themes and keywords, used over multiple periods, illustrating the growing complexity and relevance of this research field, particularly in subperiods 4 and 5. The stability index (growing from 0.2 to 0.52) indicates the development of specialised knowledge.

In the first period (2004–2014), three main themes emerged (representing 12.46% of the studies), with "sustainable development" reappearing later. The themes "CSR" and "investment" have strong links with the themes of the second sub-period, while they are still present in the third sub-period.

In 2015–2016, three new themes appeared (accounting for 7.9% of the studies), with "sustainability" continuing in later periods. The others disappear and only one of them "corporate governance" is linked to the following sub-period. In the third period (2017–2018), three new main themes emerged (accounting for 15.19% of the studies), related to corporate reporting. In 2019–2020, four more main themes emerged from the "sustainability" theme (accounting for 27.36% of all works). Research on this topic was developed from an "industrial" and "R&D" perspective.

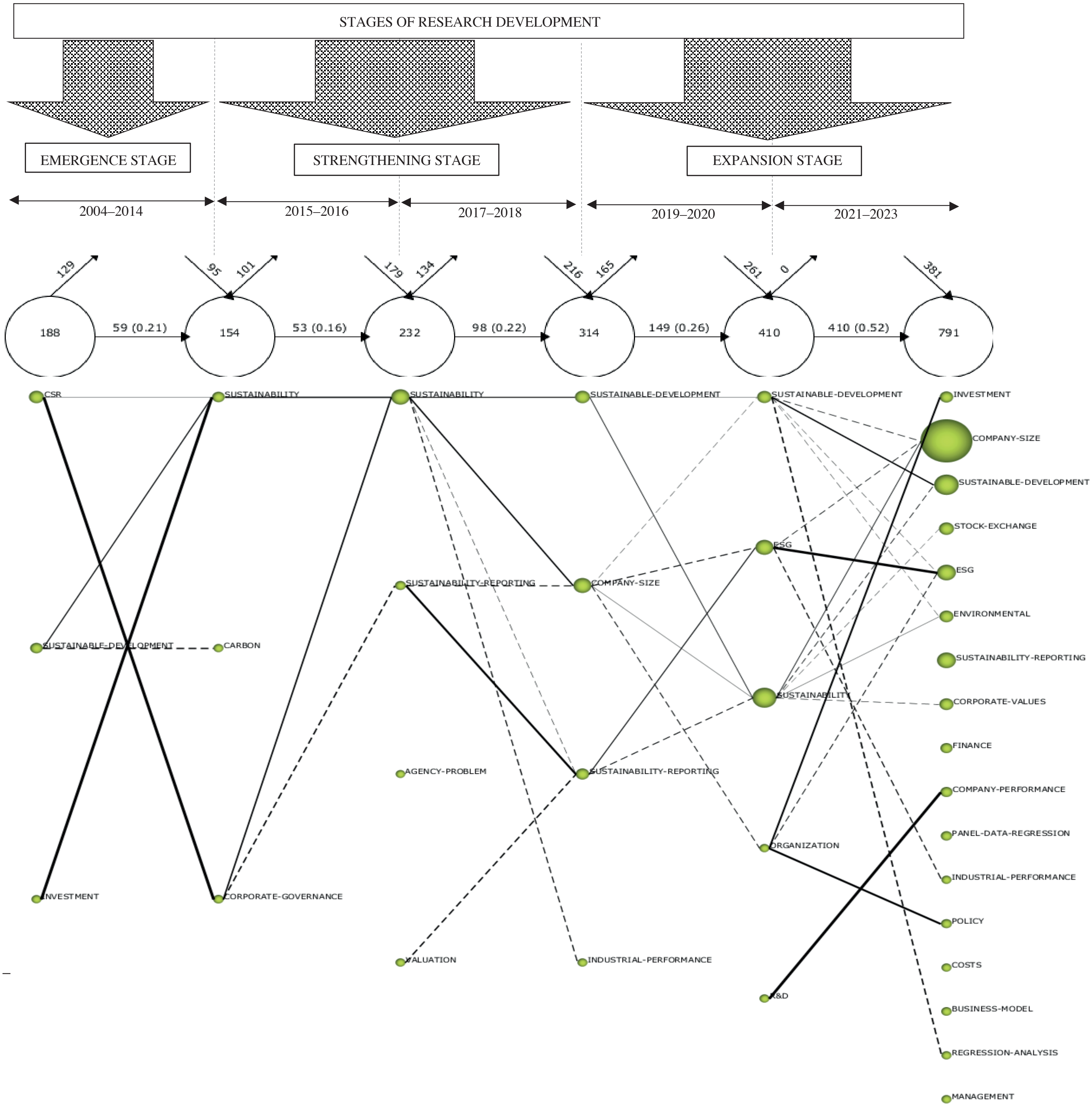


Fig. 3. Thematic Evolution Map with Overlay Graph
Source: the authors, using SciMAT.

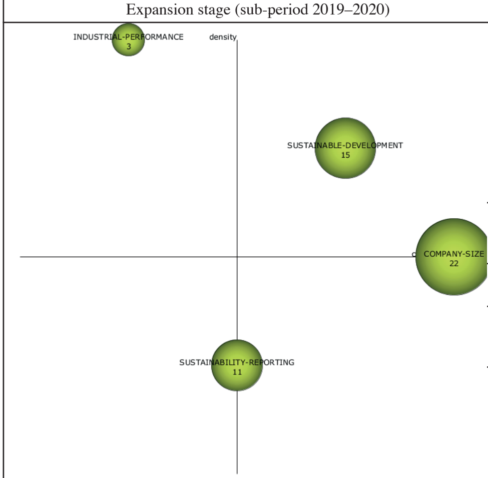
In the last period (2021–2023), ESG issues become more important, in the context of "corporate governance." It should be noted that the topic of "corporate value" is seen as complementary to the main sustainability topics throughout the period. This further supports the conclusion that the issue of corporate value in the context of sustainable development is in an evolutionary phase and should be emphasised among the emerging topics: "finance," "management," "business model" and "costs." While, "investment," "policy" and "esg" themes remained underdeveloped.

Detection of Research Themes (Expansion Stage)

Using the functionality of the SciMAT software we categorise themes identified through keyword co-occurrence analysis. Based on their centrality and density measures, the research themes were grouped into four categories: 1) motor (leading) themes (upper right quadrant (Q1), well-developed and important for the field), 2) highly developed and isolated themes (upper left quadrant (Q2), well-developed but peripheral areas of research), 3) emerging and declining themes (lower left quadrant (Q3), underdeveloped or irrelevant topics, may be developed and become relevant in the next period or disappear) and 4) basic and transversal themes (lower right quadrant (Q4), relevant for the field but not well developed yet, quite general).

As discussed in section 3.1, research on corporate value and sustainability has been developed intensively in recent years. Therefore, further considerations will focus on observing its development over the last five years: 2019–2023.

Expansion stage (sub-period 2019–2020)



Themes performance

THEME	NUMBER OF SUB-THEMES	H-INDEX	CITES	CENTRALITY RANGE	DENSITY RANGE
SUSTAINABLE--DEVELOPMENT	11	9	366	0.75	0.75
COMPANY-SIZE	11	9	200	1	0.5
SUSTAINABILITY--REPORTING	8	6	237	0.5	0.25
INDUSTRIAL--PERFORMANCE	3	3	44	0.25	1

Fig. 4. Strategy Diagram and Performance Analysis for the Expansion Stage (Sub-period 2019–2020)

Source: the authors, using SciMAT.

In the first sub-period of the expansion stage (2019–2020), four streams of research were identified. The motor themes include: "sustainable development" and "company-size." The "industrial-performance" studies were classified as peripheral, highly specialised topics, while the "sustainability reporting" issues proved to be important but underdeveloped (Fig. 4–6).

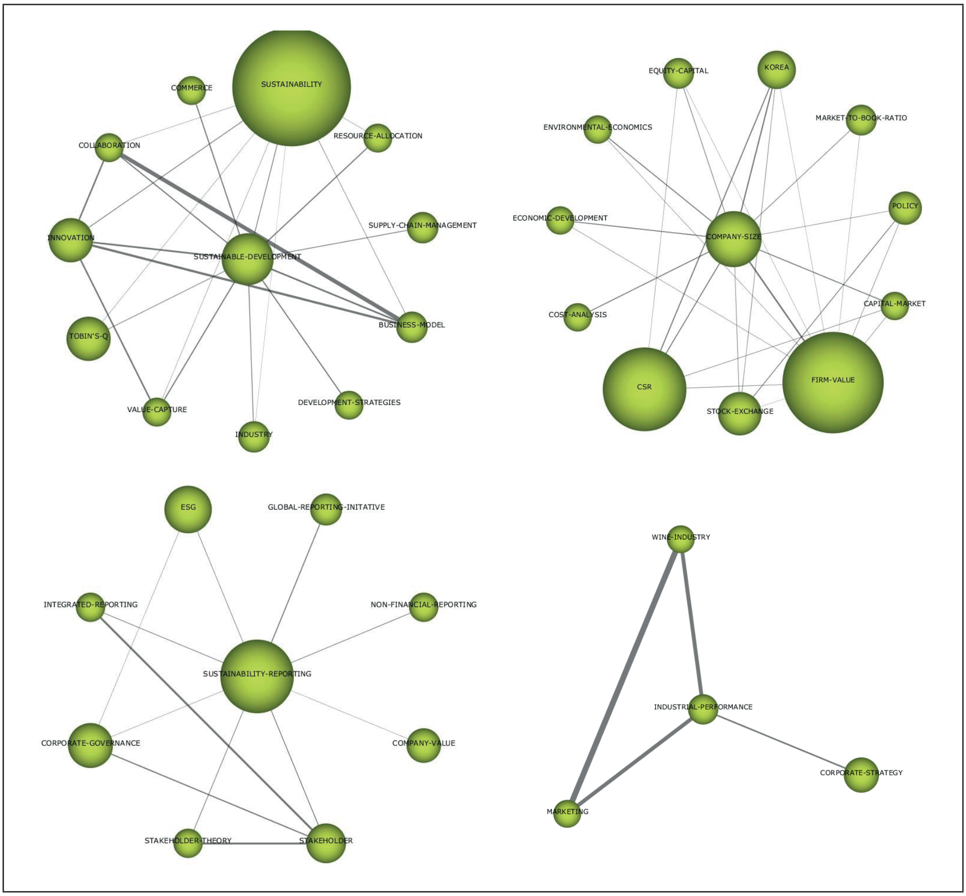


Fig. 5. Thematic Network Structures for the Expansion Stage (Sub-period 2019–2020)
Source: the authors, using SciMAT.

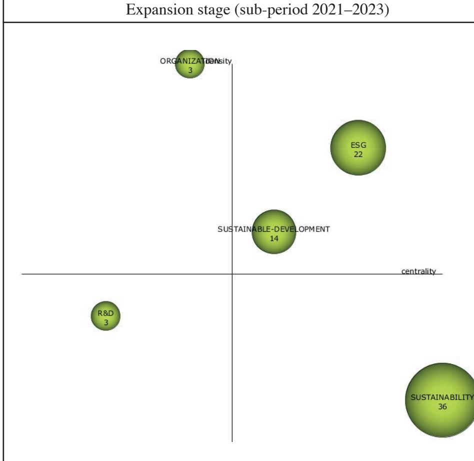
The main sub-themes for "sustainable development" are: "industry" and "commerce," which indicate the types of analysed sectors, and sub-themes directly related to company value: "value capture" and "Tobin's Q." The second leading theme is "company size," with the main sub-themes being "company value" and "CSR," "capital market," "stock exchange," "equity" and "market value to book value." This shows how capital market investors view the value of a company in the context of sustainability.

The most important sub-themes for "industrial performance" issues identified as a peripheral theme are: "corporate strategy" and "marketing."

The topic of "sustainability reporting" is quite important as a general topic, but still underdeveloped. It is built up, *inter alia*, of sub-themes related to reporting: "non-financial reporting," "integrated reporting" and "global reporting initiative" illustrating the increasing importance of these topics during this period, following the implementation of NFRD in the European Union. This issue is analysed in a study by Qureshi *et al*. (2020). They observed a positive relationship between sustainability disclosure, board gender diversity, and firm value. On the other hand, Tamayo-Torres, Gutierrez-Gutierrez and Ruiz-Moreno (2019) analysed ESG performance and found a positive relationship between governance performance (G) and market value; a negative relationship between social performance (S) and market value and a nonsignificant relationship between environmental performance (E) and market value. This mixed evidence opens avenues for further research.

In the second sub-period of the expansion stage (2021–2023), five streams of research were identified. The motor themes include: "ESG" and "sustainable development." The organisation-related studies were classified as peripheral, highly specialised topics, while the sustainability-related studies proved to be transversal themes. The emerging themes concentrated on the R&D-related research (Fig. 6–7).

Expansion stage (sub-period 2021–2023)



Themes performance

THEME	NUMBER OF SUB-THEMES	H-INDEX	CITES	CENTRALITY RANGE	DENSITY RANGE
SUSTAINABLE--DEVELOPMENT	10	3	91	0.6	0.6
ESG	11	4	82	0.8	0.8
SUSTAINABILITY	11	7	143	1	0.2
ORGANIZATION	4	1	6	0.4	1
R&D	2	2	7	0.2	0.4

Fig. 6. Strategy Diagram and Performance Analysis for the Expansion Stage (Sub-period 2021–2023)

Source: the authors, using SciMAT.

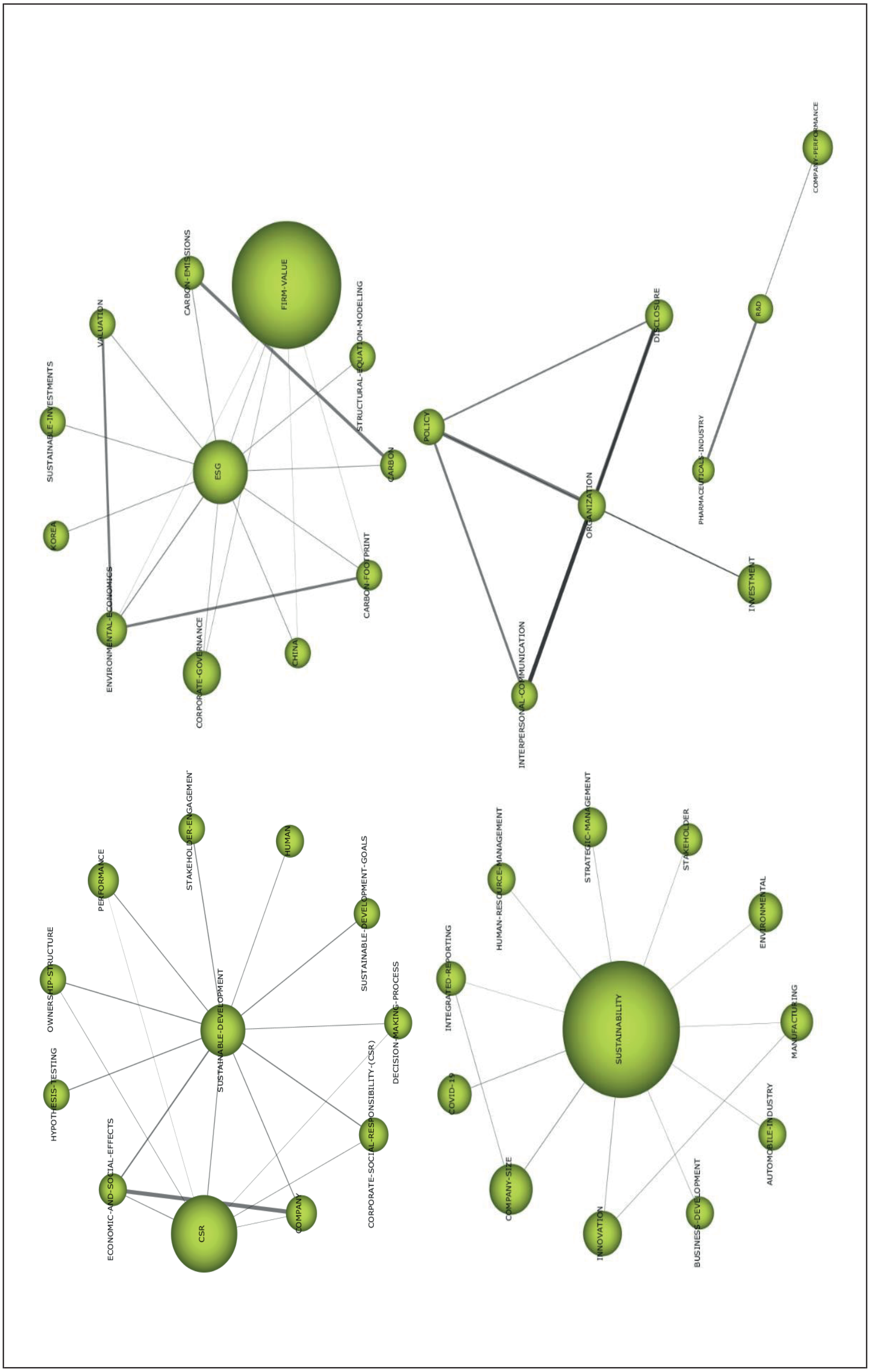


Fig. 7. Thematic Network Structures for the Expansion Stage (Sub-period 2021–2023)

Source: the authors, using SciMAT.

ESG theme as the leading topic is represented by 22 papers and consists of 11 subthemes, with “firm value” as the dominant one. The remaining subthemes are related to particular ESG components, others indicate the research method and the geographical scope of research.

The second leading topic is “sustainable development” represented by 14 papers, consisting of 10 subthemes, with CSR as the major one. The strongest link is identified between “company” and “economic and social effects.”

The general theme is “sustainability” represented by 36 documents and 11 subthemes, with “innovation” and “integrated reporting” as the major subthemes. Two subthemes indicate sectors of analysis and one subtheme is related to the consequences of the COVID-19 pandemic.

The corporate value topic was studied by many researchers during this period. Bofinger, Heyden and Rock (2022) found that a firm’s ESG profile affects its valuation. It suggests that ESG performance may increase the transparency of the company and reduce the negative consequences of asymmetric information. Zumente and Bistrova (2021) found that both financial and non-financial factors related to ESG performance are important for long-term value, including reputation, stakeholder trust and employee satisfaction. Govindan *et al*. (2021) found that diffused ownership improves social performance, while board diversity is positively associated with overall CSR and governance performance. However, they found no significant positive results for the value relevance of CSR performance.

4. Conclusion

This study provides a pioneering analysis of existing research on corporate value in the context of sustainability, representing the first attempt to present a structured conceptual framework. The examination of 329 articles published in 2004–2023 identified three main phases of development, subdivided into five periods. The results of the bibliometric analysis provide evidence for the growing interest in the research field, with emerging topics linked to sustainable reporting, R&D and corporate governance. The number of publications rose from fewer than 10 papers per year in the first sub-period, to over 70 papers per year for the most recent sub-period (2018–2023).

The main limitations of this study stem from the research method. Only one synonym per primary keyword was used in the Scopus dataset, which may have influenced the dataset’s content. Other parameters and the SciMAT software’s procedures, such as different similarity measures and clustering algorithms, also affect the results. Visualisation and performance analysis results are determined by the choice of analysis parameters. Variations in these parameters may provide ideas for other researchers exploring this field of study.

This study can be used as a reference point for researchers focusing on the determinants of corporate value in the context of sustainability. As for practical implications, the study identifies areas of knowledge in which actions would be required to raise managers' awareness and understanding of the relationship between corporate value and sustainability issues.

Authors' Contribution

The authors' individual contribution is as follows: Each contributed 50%.

Conflict of Interest

The authors declare no conflict of interest.

References

Adams, C. A. (2017). Conceptualising the Contemporary Corporate Value Creation Process. *Accounting, Auditing & Accountability Journal*, *30*(4), 906–931. https://doi.org/10.1108/aaaj-04-2016-2529

Berrone, P., Rousseau, H. E., Ricart, J. E., Brito, E., & Giuliodori, A. (2023). How Can Research Contribute to the Implementation of Sustainable Development Goals? An Interpretive Review of SDG Literature in Management. *International Journal of Management Reviews*, *25*(2), 318–339. https://doi.org/10.1111/ijmr.12331

Bofinger, Y., Heyden, K. J., & Rock, B. (2022). Corporate Social Responsibility and Market Efficiency: Evidence from ESG and Misvaluation Measures. *Journal of Banking & Finance*, *134*, 106322. https://doi.org/10.1016/j.jbankfin.2021.106322

Callon, M., Courtial, J. P., & Laville, F. (1991). Co-word Analysis as a Tool for Describing the Network of Interactions between Basic and Technological Research: The Case of Polymer Chemistry. *Scientometrics*, *22*(1), 155–205. https://doi.org/10.1007/BF02019280

Cobo, M., López-Herrera, A., Herrera-Viedma, E., & Herrera, F. (2012). SciMAT: A New Science Mapping Analysis Software Tool. *Journal of the American Society for Information Science and Technology*, *63*(8), 1609–1630. https://doi.org/10.1002/asi.22688

Cobo, M. J., López-Herrera, A. G., Herrera-Viedma, E., & Herrera, F. (2011). An Approach for Detecting, Quantifying, and Visualizing the Evolution of a Research Field: A Practical Application to the Fuzzy Sets Theory Field. *Journal of Informetrics*, *5*(1), 146–166. https://doi.org/10.1016/j.joi.2010.10.002

D'Amato, A., & Falivena, C. (2020). Corporate Social Responsibility and Firm Value: Do Firm Size and Age Matter? Empirical Evidence from European Listed Companies. *Corporate Social Responsibility and Environmental Management*, *27*(2), 909–924. https://doi.org/10.1002/csr.1855

Fama, E. F., & French, K. R. (1998). Taxes, Financing Decisions, and Firm Value. *Journal of Finance*, *53*(3), 819–843. https://doi.org/10.1111/0022-1082.00036

Fatemi, A., Glaum, M., & Kaiser, S. (2018). ESG Performance and Firm Value: The Moderating Role of Disclosure. *Global Finance Journal*, *38*, 45–64. https://doi.org/10.1016/j.gfj.2017.03.001

Freeman, R. E. (1998). A Stakeholder Theory of the Modern Corporation. In: M. B. E. Clarkson (Ed.), *The Corporation and Its Stakeholders* (pp. 125–138). University of Toronto Press. https://doi.org/10.3138/9781442673496-009

Govindan, K., Kılıç, M., Uyar, A., & Karaman, A. S. (2021). Drivers and Value-relevance of CSR Performance in the Logistics Sector: A Cross-country Firm-level Investigation. *International Journal of Production Economics*, *231*, 107835. https://doi.org/10.1016/j.ijpe.2020.107835

Harzing, A. W., & Alakangas, S. (2016). Google Scholar, Scopus and the Web of Science: A Longitudinal and Cross-disciplinary Comparison. *Scientometrics*, *106*, 787–804. https://doi.org/10.1007/s11192-015-1798-9

Hillman, A. J., & Keim, G. D. (2001). Shareholder Value, Stakeholder Management, and Social Issues: What's the Bottom Line? *Strategic Management Journal*, *22*(2), 125–139. https://doi.org/10.1002/1097-0266(200101)22:2%3C125::AID-SMJ150%3E3.0.CO;2-H

Ji, W., Yu, S., Shen, Z., Wang, M., Cheng, G., Yang, T., & Yuan, Q. (2023). Knowledge Mapping with CiteSpace, VOSviewer, and SciMAT on Intelligent Connected Vehicles: Road Safety Issue. *Sustainability*, *15*(15), 12003. https://doi.org/10.3390/su151512003

Jiao, Y. (2010). Stakeholder Welfare and Firm Value. *Journal of Banking & Finance*, *34*(10), 2549–2561. https://doi.org/10.1016/j.jbankfin.2010.04.013

Karakose, T., Polat, H., Tülübaş, T., & Demirkol, M. (2024). A Review of the Conceptual Structure and Evolution of Digital Leadership Research in Education. *Education Sciences*, *14*(11), 1166. https://doi.org/10.3390/educsci14111166

Krasodomska, J., Zarzycka, E., & Zieniuk, P. (2024). Voluntary Sustainability Reporting Assurance in the European Union before the Advent of the Corporate Sustainability Reporting Directive: The Country and Firm-level Impact of Sustainable Development Goals. *Sustainable Development*, *32*(3), 1652–1664. https://doi.org/10.1002/sd.2744

Krause, T. A., & Tse, Y. (2016). Risk Management and Firm Value: Recent Theory and Evidence. *International Journal of Accounting & Information Management*, *24*(1), 56–81. https://doi.org/10.1108/ijaim-05-2015-0027

Kuzey, C., & Uyar, A. (2017). Determinants of Sustainability Reporting and Its Impact on Firm Value: Evidence from the Emerging Market of Turkey. *Journal of Cleaner Production*, *143*, 27–39. https://doi.org/10.1016/j.jclepro.2016.12.153

Kyriazis, D., & Anastassis, C. (2007). The Validity of the Economic Value Added Approach: An Empirical Application. *European Financial Management*, *13*(1), 71–100. https://doi.org/10.1111/j.1468-036X.2006.00286.x

Lazonick, W., & O'Sullivan, M. (2000). Maximizing Shareholder Value: A New Ideology for Corporate Governance. *Economy and Society*, *29*(1), 13–35. https://doi.org/10.1080/030851400360541

Menz, K. M. (2010). Corporate Social Responsibility: Is It Rewarded by the Corporate Bond Market? A Critical Note. *Journal of Business Ethics*, *96*(1), 117–134. https://doi.org/10.1007/s10551-010-0452-y

Mio, C., Panfilo, S., & Blundo, B. (2020). Sustainable Development Goals and the Strategic Role of Business: A Systematic Literature Review. *Business Strategy and the Environment*, *29*(8), 3220–3245. https://doi.org/10.1002/bse.2568

Miralles-Quiros, M. M., Miralles-Quiros, J. L., & Arraiano, I. G. (2017). Sustainable Development, Sustainability Leadership and Firm Valuation: Differences across Europe. *Business Strategy and the Environment*, *26*(7), 1014–1028. https://doi.org/10.1002/bse.1964

Moral-Muñoz, J. A., Herrera-Viedma, E., Santisteban-Espejo, A., & Cobo, M. J. (2020). Software Tools for Conducting Bibliometric Analysis in Science: An Up-to-Date Review. *Profesional de la Información*, *29*(1), 290103. https://doi.org/10.3145/epi.2020.ene.03

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., (…) Moher, D. (2021). The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews. *BMJ*, *372*(71), n71. https://doi.org/10.1136/bmj.n71

Pessin, V. Z., Yamane, L. H., & Siman, R. R. (2022). Smart Bibliometrics: An Integrated Method of Science Mapping and Bibliometric Analysis. *Scientometrics*, *127*, 3695–3718. https://doi.org/10.1007/s11192-022-04406-6

Pizzi, S., Caputo, A., Corvino, A., & Venturelli, A. (2020). Management Research and the UN Sustainable Development Goals (SDGs): A Bibliometric Investigation and a Systematic Review. *Journal of Cleaner Production*, *276*, 124033. https://doi.org/10.1016/j.jclepro.2020.124033

Qing, C., & Jin, S. (2023). Does ESG and Digital Transformation Affect Corporate Sustainability? The Moderating Role of Green Innovation. *Sustainability*, *15*(11), 8442. https://doi.org/10.3390/su15118442

Qiu, S., Jiang, J., Liu, X., Chen, M.-H., & Yuan, X. (2021). Can Corporate Social Responsibility Protect Firm Value during the COVID-19 Pandemic? *International Journal of Hospitality Management*, *93*, 102759. https://doi.org/10.1016/j.ijhm.2020.102759

Qureshi, M. A., Kirkerud, S., Theresa, K., & Ahsan, T. (2020). The Impact of Sustainability (Environmental, Social, and Governance) Disclosure and Board Diversity on Firm Value: The Moderating Role of Industry Sensitivity. *Business Strategy and the Environment*, *29*(3), 1199–1214. https://doi.org/10.1002/bse.2427

Ramakrishnan, R. T. S., & Thomas, J. K. (1992). What Matters from the Past: Market Value, Book Value, or Earnings? Earnings Valuation and Sufficient Statistics for Prior Information. *Journal of Accounting, Auditing & Finance*, *7*(4), 423–464. https://doi.org/10.1177/0148558x9200700402

Rappaport, A. (1999). *Creating Shareholder Value: A Guide for Managers and Investors*. Simon and Schuster.

Rudkin, W., & Cai, C. X. (2019). Reaction Asymmetries to Social Responsibility Index Recomposition: A Matching Portfolio Approach. *Journal of Business Ethics*, *160*(3), 651–672. https://doi.org/10.1007/s10551-018-3921-9

Sánchez-Teba, E. M., Benítez-Márquez, M. D., Bermúdez-González, G., & Luna-Pereira, M. d. M. (2021). Mapping the Knowledge of CSR and Sustainability. *Sustainability*, *13*, 10106. https://doi.org/10.3390/su131810106

Swarnapali, R. M. N. C., & Le, L. (2018). Corporate Sustainability Reporting and Firm Value: Evidence from a Developing Country. *International Journal of Organizational Innovation*, *10*(4), 69–78.

Tamayo-Torres, I., Gutierrez-Gutierrez, L., & Ruiz-Moreno, A. R. (2019). Boosting Sustainability and Financial Performance: The Role of Supply Chain Controversies. *International Journal of Production Research*, *57*(11), 3719–3734. https://doi.org/10.1080/00207543.2018.1562248

Tomaszewski, R. (2023). Visibility, Impact, and Applications of Bibliometric Software Tools through Citation Analysis. *Scientometrics*, *128*, 4007–4028. https://doi.org/10.1007/s11192-023-04725-2

Wong, W. C., Batten, J. A., Ahmad, A. H., Mohamed-Arshad, S. B., Nordin, S., & Adzis, A. A. (2021). Does ESG Certification Add Firm Value? *Finance Research Letters*, *39*, 101593. https://doi.org/10.1016/j.frl.2020.101593

Zou, X., Yue, W. L., & Vu, H. L. (2018). Visualization and Analysis of Mapping Knowledge Domain of Road Safety Studies. *Accident Analysis and Prevention*, *118*, 131–145. https://doi.org/10.1016/j.aap.2018.06.010

Zumente, I., & Bistrova, J. (2021). ESG Importance for Long-term Shareholder Value Creation: Literature vs. Practice. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(2), 127. https://doi.org/10.3390/joitmc7020127

Krakow Review of Economics and Management
Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie
4 (1010)
2025

KREM, 2025, 4(1010): 181–198
ISSN 1898-6447
e-ISSN 2545-3238
https://doi.org/10.15678/krem.18700

Motives Stimulating the Implementation of Business Solutions Based on Technological and Environmental Trends: Evidence of Polish SMEs

Michał Nowicki

Lodz University of Technology, Faculty of Organization and Management, Institute of Management, Żeromskiego 116, 90-924 Łódź, Poland, e-mail: michal.nowicki@p.lodz.pl, ORCID: https://orcid.org/0000-0003-3307-5626

Suggested citation: Nowicki, M. (2025). Motives Stimulating the Implementation of Business Solutions Based on Technological and Environmental Trends: Evidence of Polish SMEs. *Krakow Review of Economics and Management / Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 4(1010), 181–198. https://doi.org/10.15678/krem.18700

ABSTRACT

Objective: To contribute to a better understanding of the dynamics of change in the small and medium-sized enterprises (SMEs) sector and to the preliminary identification of key motivational factors and their impact on the decision-making processes of Polish SMEs in implementing innovative business solutions based on selected contemporary leading technological and environmental trends, as a response to the changing landscape of sustainable competitiveness, from both an economic and a social perspective.
Research Design & Methods: CATI pilot research conducted in December 2023 on a population of n = 126 respondents, research data obtained by a specialised external entity DSC Research Group Ltd.
Findings: When asked about the motives that encourage taking actions related to the development of 1) Sustainable Technology Management and 2) Sustainable Environmental Management systems through the implementation of innovative solutions based on selected, currently leading technological and environmental trends, the respondents indicated that these are: 1) internal

motivation/belief that this is the right direction to support the development of the company, 2) customer expectations, and 3) requirements arising from standards and policies at international level, e.g., European Union regulations. The analysis of the structure of the replies made it possible to observe differences in the distribution of the various indications and to identify a certain tendency, which indicates that the more often a given factor was mentioned in the population as a motive/motivator for action, the higher the percentage of indications that it was the "range I" (main primary) motivator and, conversely, the less often a given factor was mentioned, the higher the share in the distribution of the replies of the indication that it was a tertiary (range III) motivator.
Implications/Recommendations: Relatively low scores for conditions such as: 1) "required by institutions that support and finance the development of enterprises (e.g., banks, venture capital)," 2) "required by our business partners" and 3) "required by standards and policies at local level (local authority policies)" may indicate that the so-called business environment institutions are either not ready, not aware of, or do not see the need to reward enterprises that want to develop in a sustainable way, based on innovative technological and environmental trends. This fact can be interpreted as evidence of the need to take measures to support the creation and development of sustainable business cooperation ecosystems.
Contribution: The conducted research contributes to the development of knowledge about motives that can encourage entrepreneurs to implement innovative business solutions based on today's leading technological and ecological trends in order to increase competitiveness while meeting the requirements and assumptions of sustainable development policies.

Article type: original article.

Keywords: technological trends, environmental trends, SME, business solution, competitiveness.

JEL Classification: M00, M20, M29, O39.

1. Introduction

A literature review indicates that contemporary enterprises are increasingly inclined towards implementing innovative business solutions that leverage modern technologies and consider changing environmental trends. With technological advancement and growing interest in sustainable development issues, businesses are seeking ways to adapt to the dynamically changing market environment and to utilise these changes as a source of competitiveness. In order to be effective in implementing change and to make effective use of the opportunities created by change, companies must focus on developing and implementing systemic solutions. In the context of the issues addressed in this article, the systems in question are specifically 1) Sustainable Technology Management (STM) that involves integrating principles of sustainable development with technological management processes within an organisation and 2) Sustainable Environmental Management (SEM) that involves integrating principles of sustainable development with environmental ("green") management processes within an organisation. STM, considering social, environmental, and economic aspects in technology-related decision-making, is a system aiming to achieve sustainable and balanced development. Key elements of STM include (Kamble, Gunasekaran & Gawankar, 2018; Cochran & Rauch, 2020; Furstenau *et al*., 2020; Yadav *et al*., 2020; El Baz *et al*., 2022; Satyro *et al*., 2022; Pereira & dos Santos, 2023):

– conducting assessments of the impact of technology on the natural environment, local community, and economic aspects,

– striving to minimise the negative impact of technology on the natural environment by reducing emissions, resource consumption, and waste generation,

– managing the life cycle of technology, from design to production, through use, to disposal and recycling,

– supporting sustainable social development by ensuring that technologies are used in a way that benefits the local community, improving quality of life, creating jobs, and supporting social equality,

– identifying and managing risks associated with the introduction of new technologies, including risks to the health and safety of workers, financial risks, and reputational risks,

– promoting innovative technological solutions that are in line with the principles of sustainable development and can contribute to solving global environmental and social issues,

– involving external stakeholders, such as the local community, non-governmental organisations, and governments, in the technology decision-making process to ensure social acceptance and increase benefits for all stakeholders.

The Sustainable Environmental Management system is also important. The nature and role of an organisation's environmental management system is critical to ensuring harmony between business activities and environmental protection. The SEM is a strategic approach that integrates economic, social and environmental objectives to achieve long-term sustainable operations. The main elements of the system, which together provide the structure and framework for the organisation's environmental activities, are typically as follows (Bond & Morrison-Saunders, 2011; Schoenherr, 2012; Kamble, Gunasekaran & Gawankar, 2018; Peters & Simaens, 2020; Różańska-Bińczyk, Matejun & Matusiak, 2020; Beltrami *et al*., 2021; Kristensen, Mosgaard & Remmen, 2021; Malik *et al*., 2024):

1. Environmental policy, which is the organisation's commitment to environmental protection and the pursuit of sustainable development objectives, outlining the objectives and principles of environmental protection, and how the organisation will seek to achieve them.

2. Environmental planning, which includes the identification of environmental aspects and impacts associated with the organisation's activities, risk analysis, and the setting of environmental objectives and strategies.

3. Implementation and operating procedures, which describe how environmental policies and plans are put into practice by assigning responsibilities for implementing measures, providing training for employees, and monitoring progress towards environmental objectives.

4. Monitoring and control procedures, which enable organisations to monitor their environmental activities and results on a regular basis in order to evaluate the effectiveness of the measures taken and to identify areas for improvement. Control also includes the application of procedures for dealing with environmental emergencies and incidents.

5. Evaluation and audit procedures, related to the need for periodic evaluation and audit of the environmental management system to verify compliance with legal and environmental requirements, international standards and the effectiveness of the measures taken by the organisation.

6. Continuous improvement procedures, which characterise the process of analysing environmental monitoring results and evaluating environmental activities, and implementing new solutions and innovations to improve the effectiveness of the environmental management system.

7. Stakeholder engagement scenarios, which require organisations to involve their stakeholders, such as employees, suppliers, customers, and the local community, in the environmental decision-making process and to promote openness, dialogue and cooperation in environmental activities.

The combination of the above-mentioned elements creates a comprehensive SEM system that enables organisations to manage the environment effectively and minimise the negative impact of their activities on the natural environment. On the basis of the above observations, it is fair to say that the development and improvement of STM and SEM systems is now a developmental challenge for companies seeking to build a strong and sustainable competitive position. Given the rapid and accelerating pace of technological change and the growing emphasis on social responsibility and environmental protection, it is essential to understand the motivations that drive companies to adapt these new business solutions.

2. Methodology of Pilot Studies

The pilot studies were conducted using the CATI technique and an original survey questionnaire comprising 12 statement/opinion questions, 5 assessment questions, 1 ranking question, and metric questions. The task of data collection and the creation of an anonymised, encoded database was entrusted in December 2023 to a specialised external entity – DSC Research Group Ltd.

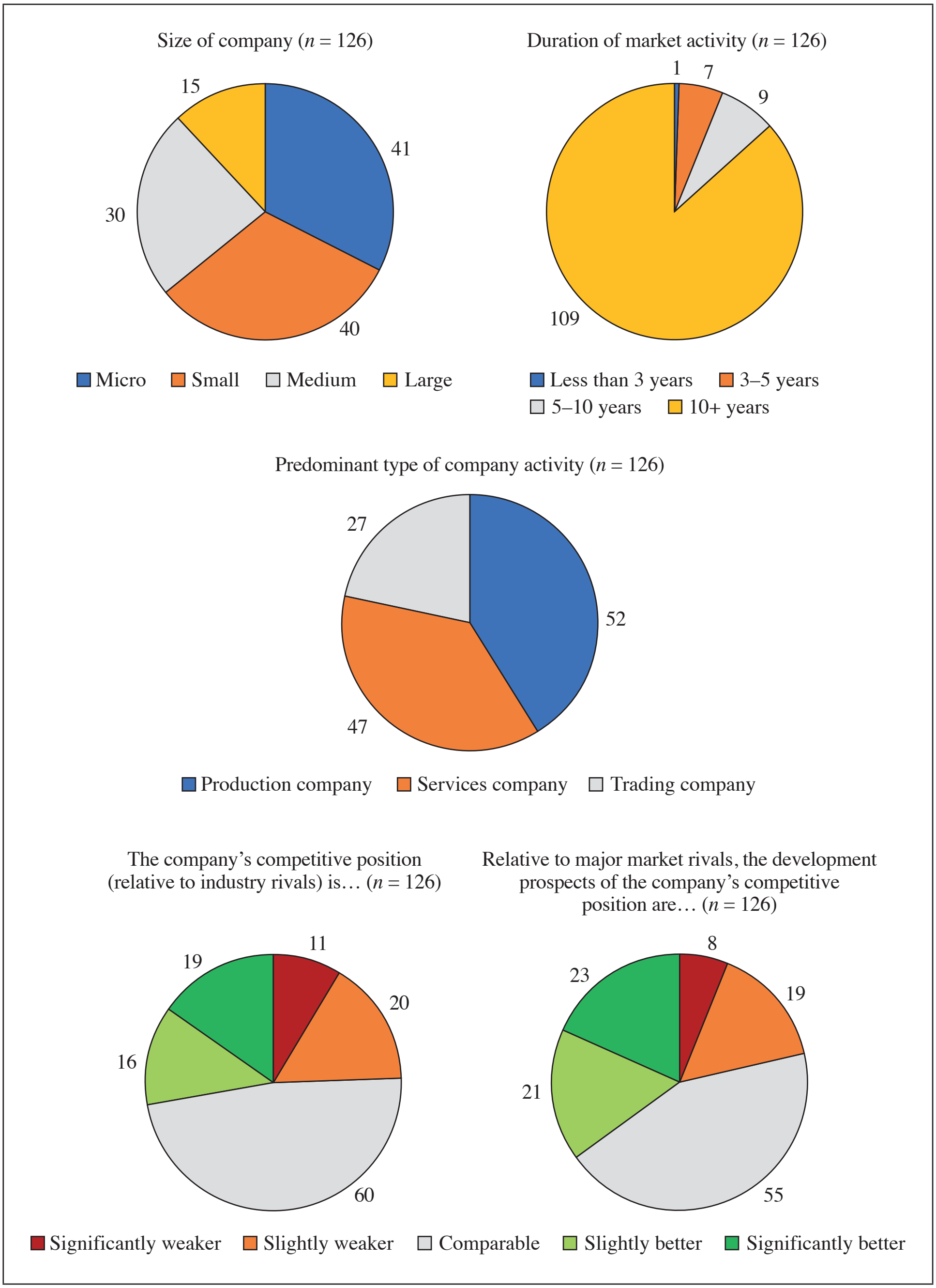


Fig. 1. Basic Metric Data

Source: the author.

Research data were collected from a total of $n = 126$ entities. In order to guarantee representativeness and minimise bias, the research sample was selected at random from a nationwide database of Polish companies. The selection process was based on the principle of equal opportunity, whereby each element of the population was afforded an equal chance of being selected for the sample. The process was based on randomisation techniques, which excluded the influence of subjective decisions and reduced the possibility of errors resulting from the inappropriate selection of participants. In order to be selected for the research sample, companies had to meet a number of criteria, which were established at the preselection stage:

– the size of the entity under study was classified as micro, small, medium, or large,

– the type of activity of the surveyed entity was classified as trade, manufacturing, or services,

– the length of time that the surveyed entity has been active in the market.

Given the structure of the research sample and its limited size ($n = 126$), it can be assumed that the sample is not representative of the entire population. Consequently, the results obtained (see Fig. 1) reflect only the situation of the surveyed entities, as noted in section 5.

At the beginning of the telephone interview, respondents were introduced to the topics and issues of the research. At this stage, it was indicated that based on a literature review, the dynamic and inevitable transformations accompanying the development of Industry 4.0 on one hand force, but on the other hand stimulate and support, the processes of reorganising business activities. Particularly in this context, technological trends and those related to environmental protection are increasingly assigned a significant role. Respondents were asked to provide answers that would help better define and understand the motives and reasons that could stimulate the willingness to invest in innovative solutions based on the examined trends presented in Figure 2.

The figure presents and provides a brief characterisation of the selected technological and environmental trends subject to the study. Among both groups, six specific trends were identified, each currently enjoying great interest from researchers and a rapidly growing stock of scientific studies on their role and significance, as well as their impact on the implementation of investment and business processes and projects among Polish SMEs.

3. Motives Stimulating the Implementation of Business Solutions Based on Selected Technological and Environmental Trends – Pilot Study Results

One of the questions asked respondents for their views on the motivations for implementing business solutions based on technology trends. Respondents indicated

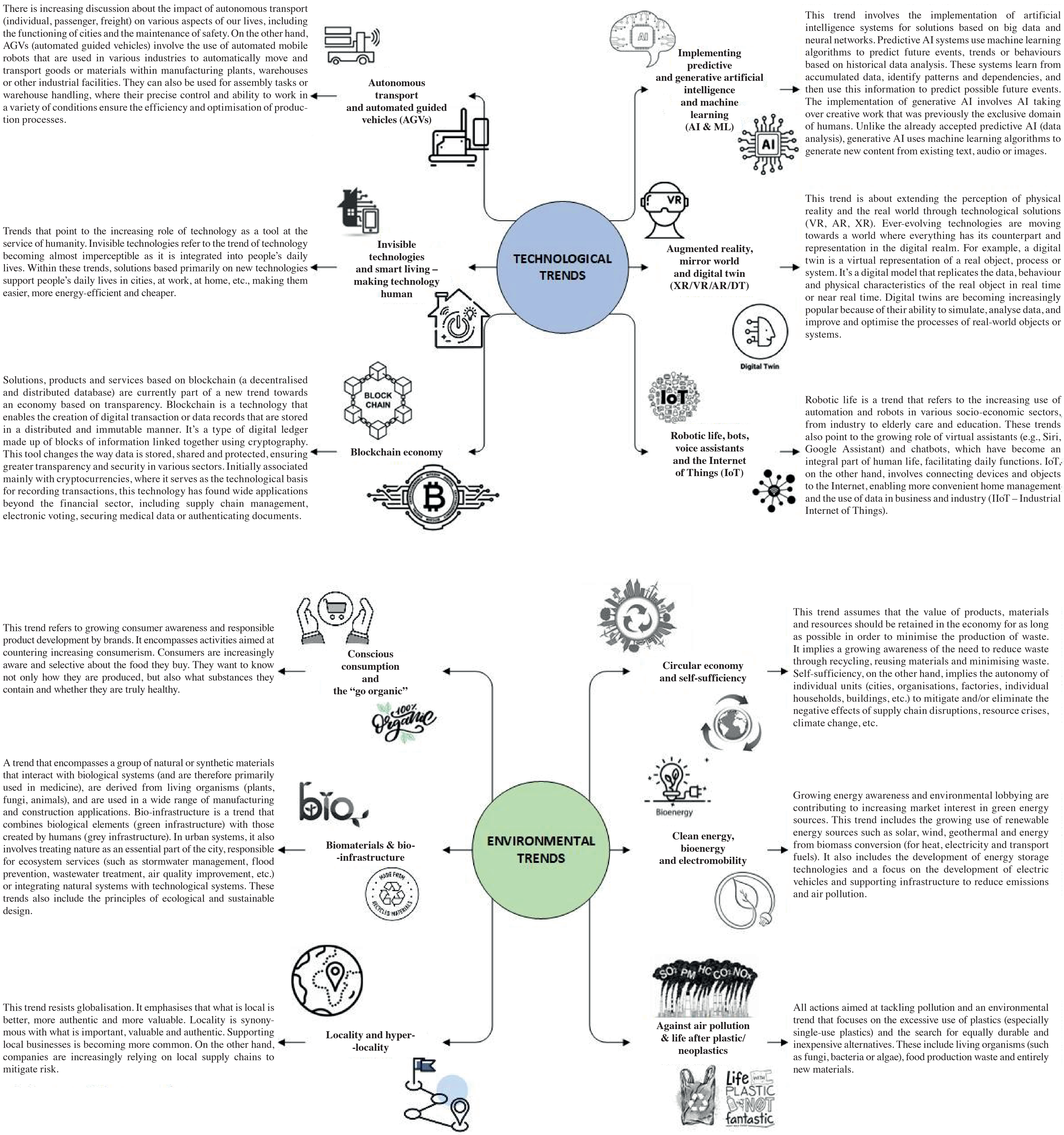


Fig. 2. Examined Sets of Technological and Environmental Trends – Brief Specification
Source: the author.

that they were most often internally motivated and convinced that this is the right direction to support the development of the company (75 indications = 59.52% of all votes), encouraged by customer expectations (68) and obliged to due to requirements deriving from standards and policies at international level, e.g., European Union regulations (57). Decisions to invest in business solutions based on technology trends were, on average, often influenced by requirements deriving from standards and policies at central/national level government policy (42), requirements established by business partners (37) and expectations of institutions supporting and financing business development (24). Finally, the least frequently mentioned motives were: requirements of investors and/or shareholders (21), requirements of local standards and policies/local government policies (21), and expectations of other company stakeholders (13). Figure 3 presents a graphical interpretation of the results.

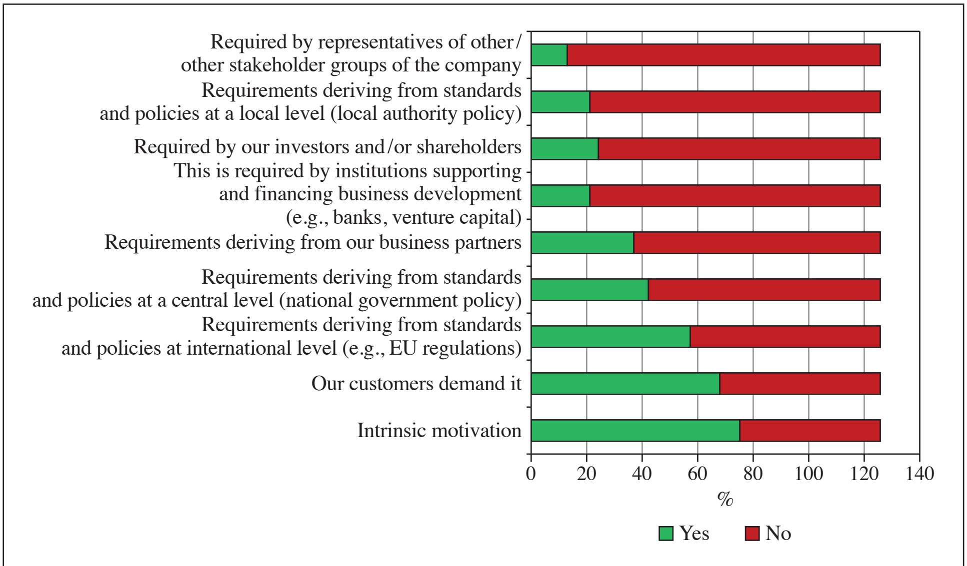


Fig. 3. Does a Given Premise Motivate the Implementation of Business Solutions Based on Technological Trends?

Source: the author.

Subsequently, respondents were asked to indicate the strength of a given motivator. If the respondent considered a given factor to be a motivator/motive for the use of business solutions based on technological trends (the respondent could indicate up to 3 out of 9), an attempt was made to examine the "importance rank" of this impact using a 3-point scale. The analysis of the structure of the responses allowed observation of differences in the distribution of the individual indications and identify a certain tendency, showing that the more often a given factor was mentioned in the population as a motive/motivator of actions, the higher the percentage of indications that it was the "range I" (primary) motivator, and vice versa, the less often a given factor was mentioned, the higher its share in the distribution of the responses of the indication that it was a tertiary motivator.

For example, respondents who declared that internal motivation (the factor most frequently indicated) stimulates the implementation of business solutions based on technological trends, indicated it as "range I" motivator 43 times, as "range II" 13 times, and as "range III" 19 times, whereas in the case of the least frequently indicated motivator – "requirements set by representatives of other/remaining stakeholder groups" that was indicated 13 times in total distribution of the individual indications is 2/4/7 (see Fig. 4).

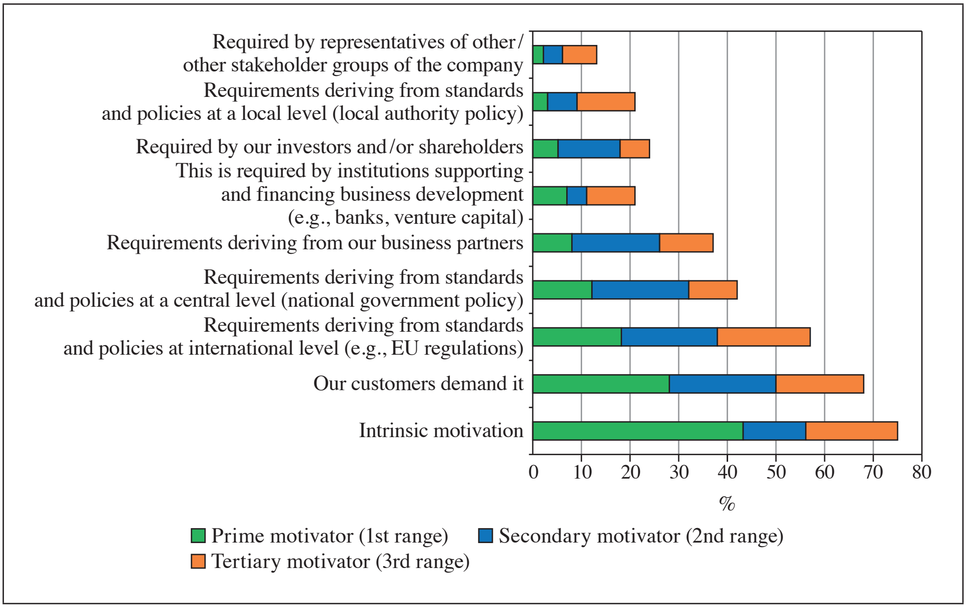


Fig. 4. Motives Driving the Implementation of Business Solutions Based on Selected Technological Trends – the Distribution of Responses in the Context of the Rank of the Motivator

Source: the author.

Using exactly the same principles, respondents were asked to indicate whether and to what extent the examined motives serve as incentives for implementing business solutions based on environmental trends. In comparison to technological trends, a shift occurred here – the most frequently indicated motives are requirements set by customers (68 mentions out of 126), internal convictions (60), and equally requirements stemming from international norms and policies (e.g., EU regulations) and those arising from norms and policies at the central level (national government policies), each receiving 54 mentions (see Fig. 5). Among the least frequently indicated motives were once again requirements set by representatives of other/remaining stakeholder groups (11) and requirements arising from norms and policies at the local level – local government policies (25), while the category "requirements set by representatives of institutions supporting and financing business development" was replaced with "requirements deriving from our business partners" (19).

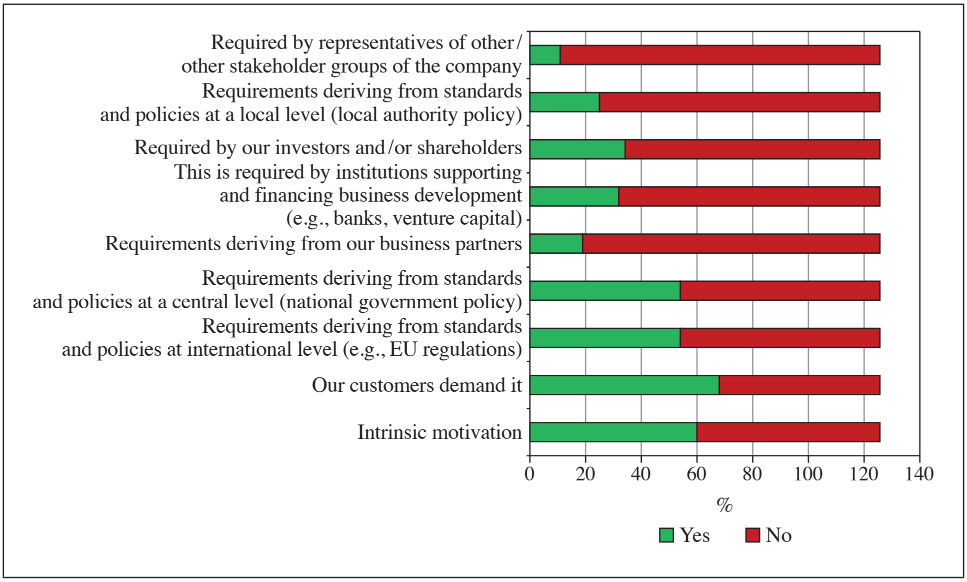


Fig. 5. Does a Given Premise Motivate the Implementation of Business Solutions Based on Environmental Trends?

Source: the author.

The observed dependency regarding the distribution of individual responses concerning the strength/character of impact depending on the number of indications of a given factor as a motivator is also evident for environmental trends (see Fig. 6). Once again, in the case of the most frequently indicated motivator, "it is demanded by our customers" (68 indications in total) the largest share of responses indicates it as "range I" (29), followed by "range II" (24), and finally, the smallest share indicates it as a "range III" motivator (15). Conversely, in the case of the least frequently indicated motivator, "requirements set by representatives of other/remaining stakeholder groups" – 11 indications in total, responses predominantly indicate it as a tertiary motivator (5/11), followed by secondary and primary motivators (3 mentions each).

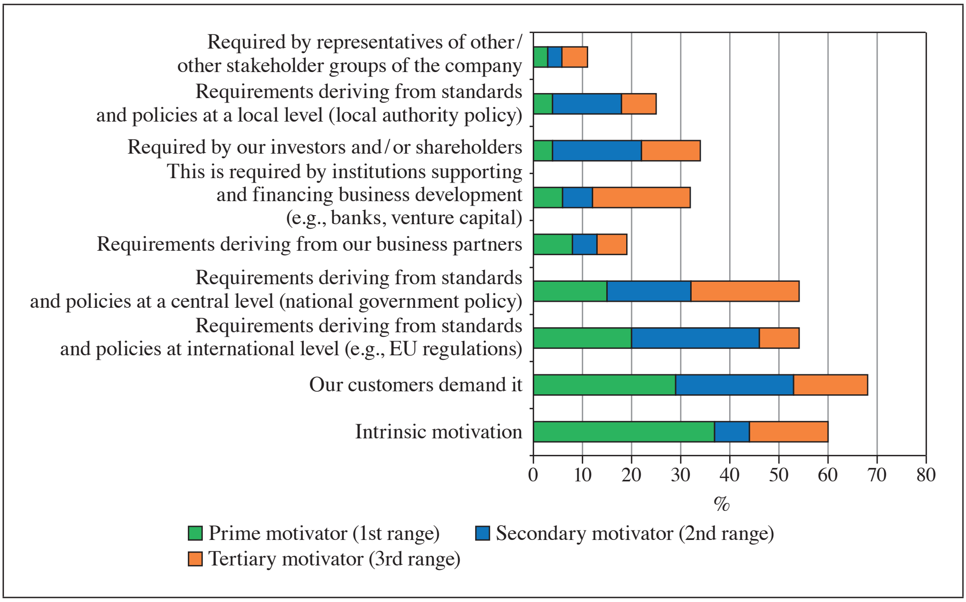


Fig. 6. Motives Driving the Implementation of Business Solutions Based on Selected Environmental Trends – the Distribution of Responses in the Context of the Rank of the Motivator

Source: the author.

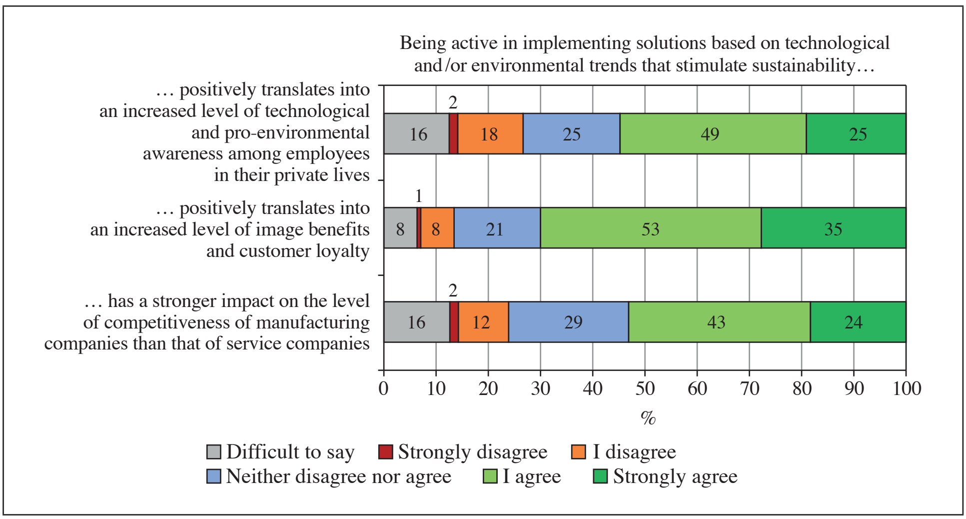


Fig. 7. Being Active in Implementing Solutions Based on Technological and/or Environmental Trends That Stimulate Sustainability

Source: the author.

As part of the conducted research, respondents were also asked to respond to the following statements:

1. The activity in implementing solutions based on technological and/or environmental trends stimulating sustainable development positively translates into an increase in the level of technological and pro-environmental awareness among employees in their private lives.
2. The activity in implementing solutions based on technological and/or environmental trends stimulating sustainable development positively translates into an increase in levels of brand reputation and customer loyalty.
3. Manufacturing enterprises are more engaged and effective than service enterprises in implementing solutions based on technological and/or environmental trends stimulating sustainable development.

The distribution of answers is presented graphically in Figure 7.

Analysing the obtained results, it can be indicated that respondents generally agreed more frequently with the presented statements than disagreed with them (statement I – 74 vs. 20, II – 88 vs. 9, III – 67 vs. 14). However, it is worth noting a considerable proportion of responses such as "difficult to say" and "neither agree nor disagree" (statement I – 41, II – 29, III – 45). Therefore, caution is advised when drawing final conclusions regarding the phenomena studied.

4. Research Implications and Discussion

The presented research results indicate that companies – respondents of the conducted research process – perceive the growing importance and impact of business solutions based on selected technological and environmental trends. In order to intensify their development, strengthen their competitive position, and gain recognition and reputation, they need to seek out and use all opportunities to build effective and efficient STM and SEM systems. The results of the pilot research indicate that the dominant premises are "internal conviction" that these actions are right, necessary and can bring benefits in the future, and that they are strongly inspired by customer influence. This result can be interpreted in a very positive way, firstly because it means that companies are aware of the role, importance and significance of conducting their business activities in a responsible and sustainable way, secondly because they also perceive the important role of adapting to the needs and specifics of the present time, characterised by the emphasis on intensifying initiatives related to rapid technological development and the increasing emphasis on environmental/ecological awareness, and thirdly because they accept the need to conduct activities in a business model that takes into account the expectations of customers who are increasingly sensitive to environmental issues, environmental protection, and conscious and sustainable consumption.

These results may suggest that respondents were aware of the significance, role, and importance of implementing business solutions based on technological and ecological trends as part of the development of 1) STM and 2) SEM systems. This orientation should be considered important and positive, because, as research results indicate, there are numerous advantages and benefits associated with initiatives developing the above-mentioned systems. The literature most often indicates that the implementation of STM activities is important for the creation of competitive advantage of contemporary companies, as it allows, among other things (Kagermann, Wahlster & Helbig, 2013; Martin, 2017; Lopes de Sousa Jabbour *et al*., 2018a, 2018b; Ghobakhloo, 2020; Gutterman, 2020; Novitasari & Agustia, 2023):

1. Strengthening social and environmental responsibility, as STM aims to minimise the negative impact of technology on society and the environment. Improving the quality of life of communities and protecting the natural environment are crucial for maintaining harmony between technological progress and social welfare.

2. Generating long-term benefits (e.g., reducing operational costs, improving company image, increasing innovation and market competitiveness), and contributing to saving natural resources, reducing greenhouse gas emissions, and reducing the amount of waste generated by technological processes.

3. Promoting socially and ethically responsible attitudes – STM takes into account social and ethical aspects, such as worker safety, human rights, social justice, and gender equality.

As a result, STM is important not only from an economic perspective but also from social, environmental, and ethical perspectives, contributing to the sustainable development of society and the planet. Complementary to it is the SEM system, whose importance is linked to the benefits that can be achieved by companies that implement environmental solutions. Some of the most commonly cited benefits in the literature include (Ambec & Lanoie, 2008; Ferenhof *et al*., 2014; Bugdol, Puciato & Borys, 2020; Bintara *et al*., 2023):

1. Preservation of reputation and trust: Companies that are committed to environmental protection are perceived as more responsible and trustworthy by customers, employees, investors, and the community. Implementing green solutions can therefore help to maintain a positive reputation and trust in the brand, in addition to the fact that, according to the principles of CSR, companies have a moral obligation to protect the environment and contribute to its preservation, and that implementing green solutions is an expression of commitment to sustainable development goals and social responsibility.

2. Conservation of resources: Implementing effective environmental solutions can help conserve resources such as energy, water and natural resources. This allows companies to reduce operating costs and increase competitiveness in the market. This type of benefit has been particularly noticeable in recent years – the rapid rise

in energy prices and the cost of CO_2 emissions for many companies that had not previously invested in infrastructure related to the "it's good to be green" concept proved to be a factor that slowed down their development opportunities and often threatened their survival.

3. Stimulating pro-innovation attitudes and accelerating technological development, as the implementation of environmentally friendly solutions often requires an innovative approach and the use of new technologies. This allows businesses to develop their technical skills and gain a competitive edge in the market.

4. Compliance with regulations and standards, i.e., the ability to comply with increasingly stringent environmental legislation that imposes obligations on companies in terms of emissions reduction, waste management or energy efficiency. By implementing green solutions, companies can comply with applicable regulations and standards, avoid fines and bans, and increasingly obtain additional financial resources to implement green solutions.

5. Increased competitiveness: Organisations that adopt sustainable environmental management practices are often seen as more attractive to customers, investors and employees, which can translate into increased competitiveness in the market.

In summary, the implementation of environmentally sound solutions is a key element of a sustainable development strategy for companies (Geissdoerfer *et al*., 2020; Adamik & Sikora-Fernandez, 2021; van Zanten & van Tulder, 2021; Martins *et al*., 2022; Saura, Skare & Riberio-Navarrete, 2022), contributing to sustainable economic growth (Schaltegger, Lüdeke-Freund & Hansen, 2012; Bansal & Song, 2017; Waddock, 2020), environmental protection and the improvement of the quality of life of local communities, as well as increasing added value for society and the natural environment.

5. Research Limitations and Further Action Plan

Due to time and financial constraints, as well as the fact that the conducted research was of a pilot nature, a forced simplification was applied in the research process, consisting of grouping the indicated technological and environmental trends into two broad groups. Consequently, the obtained results represent an "averaged" and "simplified" picture of the studied issues. Additionally, given the structure of the research sample and its limited size ($n = 126$), it can be assumed that the sample is not representative of the entire population. The results of the research process, although possessing some scientific and cognitive value, require further elaboration. Therefore, a research project is being prepared in which there is no intention to group trends into two large groups as was the case in the pilot studies. Another planned qualitative change will be to increase the research sample size (a minimum of 300 entities), increase emphasis on ensuring a higher representativeness of the sample considering the specificity of the Polish economy (dominance of micro-

-enterprises), as well as regionalisation of the research (probably based on the criterion of voivodeship) or focusing on pre-defined, selected industries. There is also consideration of increasing the number of specific trends studied to 10 and adding a category of economic trends. The planned changes should allow for obtaining more precise, accurate research material, the analysis of which would enable the provision of more precise answers to questions related to which trends, how, and to what extent they influence the readiness and willingness of enterprises to implement innovative business solutions, as well as what their main motivational factors are.

6. Conclusions

On the basis of the provided data and observations, it is fair to say that the development and improvement of STM and SEM systems is now a developmental challenge for companies seeking to build a strong and sustainable competitive position (Furstenau *et al*., 2020; Adamik, 2021; Ribeiro & Steiner Neto, 2021; Tarnovskaya, 2023; Sun, 2024). At the same time, it is becoming increasingly clear that in order to develop these systems effectively, along with the emphasis on intensifying technological development and the growing interest in sustainable development issues, organisations need to find adequate ways to adapt to the dynamically changing market environment and to use these changes as a source of competitiveness. In this context, the efficient implementation of business solutions based on technological and environmental trends is becoming increasingly important. Given the rapid and accelerating pace of technological change and the growing emphasis on social responsibility and environmental protection, it is essential to understand the motivations that drive companies to adapt these new business solutions. On the other hand, a slightly less optimistic observation can be made based on the perception that low results were recorded for premises such as "required by institutions that support and finance the development of enterprises" and "required by norms and policies at the local level," which may indicate that the so-called institutions of the business environment are either not ready, do not have an idea, or do not see the need to reward enterprises that want to develop in a sustainable way, based on innovative technological-ecological trends. Relatively low indicators were also noted for the premise "required by our business partners" as a motivator for intensifying efforts to implement innovative business solutions. This fact can be interpreted as an indication of the need for measures to support the creation and development of sustainable business cooperation ecosystems.

Acknowledgement and Financial Disclosure

The research project was funded by the "FU2N – Young Scientists Skills Improvement Fund" programme, which supports scientific excellence at the Lodz University of Technology.

Conflict of Interest

The author declares no conflict of interest.

References

Adamik, A. (2021). Change and Relational Strategies: Through an Organizational Intelligence Lens. In: K. M. Klimczak, Y. Shachmurove (Eds), *Organizational Change and Relational Resources* (1st ed.). Routledge. https://doi.org/10.4324/9781003172604

Adamik, A., & Sikora-Fernandez, D. (2021). Smart Organizations as a Source of Competitiveness and Sustainable Development in the Age of Industry 4.0: Integration of Micro and Macro Perspective. *Energies*, *14*(6), 1572. https://doi.org/10.3390/en14061572

Ambec, S., & Lanoie, P. (2008). Does It Pay to Be Green? A Systematic Overview. *The Academy of Management Perspectives*, *22*(4), 45–62. https://doi.org/10.5465/amp.2008.35590353

Bansal, P., & Song, H.-C. (2017). Similar but Not the Same: Differentiating Corporate Sustainability from Corporate Responsibility. *Academy of Management Annals*, *11*(1), 105–149. https://doi.org/10.5465/annals.2015.0095

Beltrami, M., Orzes, G., Sarkis, J., & Sartor, M. (2021). Industry 4.0 and Sustainability: Towards Conceptualization and Theory. *Journal of Cleaner Production*, *312*, 127733. https://doi.org/10.1016/j.jclepro.2021.127733

Bintara, R., Yadiati, W., Zarkasyi, M. W., & Tanzil, N. D. (2023). Management of Green Competitive Advantage: A Systematic Literature Review and Research Agenda. *Economies*, *11*(2), 66. https://doi.org/10.3390/economies11020066

Bond, A. J., & Morrison-Saunders, A. (2011). Re-evaluating Sustainability Assessment: Aligning the Vision and the Practice. *Environmental Impact Assessment Review*, *31*(1), 1–7. https://doi.org/10.1016/j.eiar.2010.01.007

Bugdol, M., Puciato, D., & Borys, T. (2020). Environmental Management Systems in the Context of Sustainable Development – the Identification of Open Problems. *Problemy Ekorozwoju*, *15*(2), 131–142. https://doi.org/10.35784/pe.2020.2.14

Cochran, D. S., & Rauch, E. (2020). Sustainable Enterprise Design 4.0: Addressing Industry 4.0 Technologies from the Perspective of Sustainability. *Procedia Manufacturing*, *51*, 1237–1244. https://doi.org/10.1016/j.promfg.2020.10.173

El Baz, J., Tiwari, S., Akenroye, T., Cherrafi, A., & Derrouiche, R. (2022). A Framework of Sustainability Drivers and Externalities for Industry 4.0 Technologies Using the Best-worst Method. *Journal of Cleaner Production*, *344*, 130909. https://doi.org/10.1016/j.jclepro.2022.130909

Ferenhof, H. A., Vignochi, L., Selig, P. M., Lezana, Á. G. R., & Campos, L. M. S. (2014). Environmental Management Systems in Small and Medium-sized Enterprises: An Analysis and Systematic Review. *Journal of Cleaner Production*, *74*, 44–53. https://doi.org/10.1016/j.jclepro.2014.03.027

Furstenau, L. B., Sott, M. K., Kipper, L. M., Machado, Ê. L., López-Robles, J. R., Dohan, M. S., Cobo, M. S., Zahid, A., Abbasi, Q. H., & Imran, M. A. (2020). Link between Sustainability and Industry 4.0: Trends, Challenges and New Perspectives. *IEEE Access*, *8*, 140079–140096. https://doi.org/10.1109/ACCESS.2020.3012812

Geissdoerfer, M., Pieroni, M. P. P., Pigosso, D. C. A., & Soufani, K. (2020). Circular Business Models: A Review. *Journal of Cleaner Production*, *277*, 123741. https://doi.org/10.1016/j.jclepro.2020.123741

Ghobakhloo, M. (2020). Industry 4.0, Digitization, and Opportunities for Sustainability. *Journal of Cleaner Production*, *252*, 119869. https://doi.org/10.1016/j.jclepro.2019.119869

Gutterman, A. S. (2020). *Sustainable Technology Management*. https://doi.org/10.2139/ssrn.3833976

Kagermann, H., Wahlster, W., & Helbig, J. (2013). *Securing the Future of German Manufacturing Industry: Recommendations for Implementing the Strategic Initiative Industrie 4.0. Final Report of the Industrie 4.0 Working Group*. Acatech – National Academy of Science and Engineering.

Kamble, S. S., Gunasekaran, A., & Gawankar, S. A. (2018). Sustainable Industry 4.0 Framework: A Systematic Literature Review Identifying the Current Trends and Future Perspectives. *Process Safety and Environmental Protection*, *117*, 408–425. https://doi.org/10.1016/j.psep.2018.05.009

Kristensen, H. S., Mosgaard, M. A., & Remmen, A. (2021). Integrating Circular Principles in Environmental Management Systems. *Journal of Cleaner Production*, *286*, 125485. https://doi.org/10.1016/j.jclepro.2020.125485

Lopes de Sousa Jabbour, A. B., Jabbour, C. J. C., Godinho Filho, M., & Roubaud, D. (2018a). Industry 4.0 and the Circular Economy: A Proposed Research Agenda and Original Roadmap for Sustainable Operations. *Annals of Operations Research*, *270*, 273–286. https://doi.org/10.1007/s10479-018-2772-8

Lopes de Sousa Jabbour, A. B., Jabbour, C. J. C., Foropon, C., & Godinho Filho, M. (2018b). When Titans Meet – Can Industry 4.0 Revolutionise the Environmentally Sustainable Manufacturing Wave? The Role of Critical Success Factors. *Technological Forecasting and Social Change*, *132*, 18–25. https://doi.org/10.1016/j.techfore.2018.01.017

Malik, A., Sharma, S., Batra, I., Sharma, C., Kaswan, M. S., & Garza-Reyes, J. A. (2024). Industrial Revolution and Environmental Sustainability: An Analytical Interpretation of Research Constituents in Industry 4.0. *International Journal of Lean Six Sigma*, *15*(1), 22–49. https://doi.org/10.1108/IJLSS-02-2023-0030

Martin, M. (2017), Management of Technology in the Process of Building Competitive Advantage of the Firm. In: Z. Leszczyński (Ed.), *Contemporary Issues of Accounting and Management in Poland and in Bulgaria* (pp. 117–125). Lodz University of Technology Press. https://doi.org/10.34658/9788372838346

Martins, A., Branco, M. C., Melo, P. N., & Machado, C. (2022). Sustainability in Small and Medium-sized Enterprises: A Systematic Literature Review and Future Research Agenda. *Sustainability*, *14*(11), 6493. https://doi.org/10.3390/su14116493

Novitasari, M., & Agustia, D. (2023). Competitive Advantage as a Mediating Effect in the Impact of Green Innovation and Firm Performance. *Business: Theory and Practice*, *24*(1), 216–226. https://doi.org/10.3846/btp.2023.15865

Pereira, R., & dos Santos, N. (2023). Neoindustrialization – Reflections on a New Paradigmatic Approach for the Industry: A Scoping Review on Industry 5.0. *Logistics*, *7*(3), 43. https://doi.org/10.3390/logistics7030043

Peters, J., & Simaens, A. (2020). Integrating Sustainability into Corporate Strategy: A Case Study of the Textile and Clothing Industry. *Sustainability*, *12*(15), 6125. https://doi.org/10.3390/su12156125

Ribeiro, O. C. R., & Steiner Neto, P. J. (2021). Sustainable Competitive Advantage and Green Innovation: A Review of Joint Scale Propositions. *Gestão & Produção*, *28*(3), e5669. https://doi.org/10.1590/1806-9649-2021v28e5669

Różańska-Bińczyk, I., Matejun, M., & Matusiak, B. (2020). Praktyki green HR we współczesnych przedsiębiorstwach. In: J. Cewińska, A. Krejner-Nowecka, S. Winch (Eds), *Zarządzanie kapitałem ludzkim – wyzwania* (pp. 77–91). Oficyna Wydawnicza SGH.

Satyro, W. C., de Almeida, C. M. V. B., Pinto, M. J. A., Jr., Contador, J. C., Giannetti, B. F., de Lima, A. F., & Fragomeni, M. A. (2022). Industry 4.0 Implementation: The Relevance of Sustainability and the Potential Social Impact in a Developing Country. *Journal of Cleaner Production*, *337*, 130456. https://doi.org/10.1016/j.jclepro.2022.130456

Saura, J. R., Skare, M., & Riberio-Navarrete, S. (2022). How Does Technology Enable Competitive Advantage? Reviewing State of the Art and Outlining Future Directions. *Journal of Competitiveness*, *14*(4), 172–188. https://doi.org/10.7441/joc.2022.04.10

Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2012). Business Cases for Sustainability: The Role of Business Model Innovation for Corporate Sustainability. *International Journal of Innovation and Sustainable Development*, *6*(2), 95–119. https://doi.org/10.1504/IJISD.2012.046944

Schoenherr, T. (2012). The Role of Environmental Management in Sustainable Business Development: A Multi-country Investigation. *International Journal of Production Economics*, *140*(1), 116–128. https://doi.org/10.1016/j.ijpe.2011.04.009

Sun, Y. (2024). Harnessing Technological Innovation for Competitive Advantage: A Strategic Framework. *Frontiers in Business, Economics and Management*, *13*(3), 128–131. https://doi.org/10.54097/fx56aw54

Tarnovskaya, V. (2023). Sustainability as the Source of Competitive Advantage: How Sustainable Is It? In: P. N. Ghauri, U. Elg, S. M. Hånell (Eds), *Creating a Sustainable Competitive Position: Ethical Challenges for International Firms* (*International Business and Management*, Vol. 37, pp. 75–89). Emerald Publishing Limited. https://doi.org/10.1108/S1876-066X20230000037005

van Zanten, J. A., & van Tulder, R. (2021). Improving Companies' Impacts on Sustainable Development: A Nexus Approach to the SDGs. *Business Strategy and the Environment*, *30*(8), 3703–3720. https://doi.org/10.1002/bse.2835

Waddock, S. (2020). Achieving Sustainability Requires Systemic Business Transformation. *Global Sustainability*, *3*, e12. https://doi.org/10.1017/sus.2020.9

Yadav, G., Kumar, A., Luthra, S., Garza-Reyes, J. A., Kumar, V., & Batista, L. (2020). A Framework to Achieve Sustainability in Manufacturing Organisations of Developing Economies Using Industry 4.0 Technologies' Enablers. *Computers in Industry*, *122*, 103280. https://doi.org/10.1016/j.compind.2020.103280

Reviewers 2025

Jan Acedański
Anna Adamik
Magdalena Ankiel
Šejma Aydin
Ryszard Bartkowiak
Jacek Batóg
Izabela Bednarska-Wnuk
Bartolomeo Rafael Bialas
Walter E. Block
Dominika Bochańczyk-Kupka
Yuliya Bogoyavlenska
Katarzyna Boratyńska
Alma Braimllari
Joanna Bruzda
Elżbieta Bukalska
Dorota Burzyńska
Petre Caraiani
Liudmyla Chvertko
Andrzej Cwynar
Szymon Cyfert
Matjaž Denac
Ivan Dimitrov
Przemysław Dmowski
Martina Dragija Kostić
Wojciech Drożdż
Nelson Duarte
Hanna Dudek
Jan Fazlagić
Tate Fegley
Stanisław Flejterski
Karol Flisikowski
Irina Georgescu
Marta Götz
Mariola Grzebyk
Anna Grześ
Mariangela Guidolin
Simona Hašková
Mariusz Hofman
Matej Hudák
Elmira Ismayilova
Karl-Friedrich Israel
Dejan Jakšić
Dominika Jakubowska
Marzenna K. James
Katarzyna Januszkiewicz
Malgorzata A. Jarossová
Sabrina Kalinkova
Magdalena Kalińska-Kula
Teresa Kamińska
Arkadiusz Kijek
Snežana Knežević
Emil Knezović
Jan Kofroň
Marcin Komor
Grzegorz Kończak
Tomasz Kopczewski
Dominik Kopiński
Aneta Kosztowniak
Gergely Kováts
Janusz Kraśniak
Paulína Krnáčová
Barbara Kryk
Małgorzata Krzywonos
Łukasz Lach
Dagmara Lewicka
Ewa Lisowska
Renata Lisowska
Aleksander Lotko
Małgorzata Lotko
Oksana Makovoz
Pavla Maříková
Agata Matarazzo
Alina Matuszak-Flejszman
Natalia Mazur
Ewa Mazur-Wierzbicka
William J. Mea
Paweł Mielcarek
Halyna Mishchuk
Hana Mohelská
Dorota Molek-Winiarska
Michał Moszyński
Marta Najda-Janoszka
Sergio Luis Nanez Alonso
Bozhidar Nedev
Janetta Nestorová Dická
Renata Nestorowicz
Silas U. Nsanzumuhire
Olena Oliinyk
Ercan Özen
Jan Pavel

Dorota Pekasiewicz
Fulvia Pennoni
Julia Perić
Ivica Pervan
Renata Pęciak
Radosław Pietrzyk
Krzysztof Piontek
József Poór
Olha Pyroh
Ognjen Ridic
Piotr Rogala
Sascha Rohn
Magdalena Rojek-Nowosielska
Elżbieta Roszko-Wójtowicz
Sylwia Roszkowska
Tomáš Sadílek
Natalia Samoliuk
Urszula Samotyja
Nataliia Savytska
Peter Šedík
Piotr Senkus
Tetiana Shkoda
Arkadiusz Sieroń
Blanka Šimundić
Beata Skowron-Grabowska
Beata Skowron-Mielnik
Agnieszka Skuza
Šime Smolić
Magdalena Sobocińska
Slavko Šodan
Elżbieta Sojka
Danijela Sokolić
Dariusz Sokołowski
Jiří Špalek
Marzena Strojek-Filus
Anna Strychalska-Rudzewicz
Andrea Sutoova
Katarzyna Szara
Katarzyna Szarzec
Andrzej Szuwarzyński
Beata Ślusarczyk
Magdalena Ślusarczyk
Małgorzata Tarczyńska-Łuniewska
Suat Teker
András Tétényi
Zsigmond Tibor
Bogusława Urbaniak
Slavomira Vargová
David Vykydal
Halina Waniak-Michalak
Aleksandra Wilczyńska
Tomasz Wiśniewski
Krzysztof Witkowski
Anna Wójcik-Karpacz
Anna Wziątek-Staśko
Maciej Zastempowski
Michel Zouboulakis

ISSN 1898-6447
e-ISSN 2545-3238

KRAKOW UNIVERSITY OF ECONOMICS
Rakowicka 27, 31-510 Kraków, Poland

The journal is available at krem.uek.krakow.pl