

ENVIRONMENTAL, SOCIAL, AND GOVERNANCE PRACTICES AND REPORTING READINESS IN SMALL AND MEDIUM-SIZED ENTERPRISES

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Abstract. Following the European Sustainability Reporting Standards (ESRS), in 2026, the non-financial reporting obligation will be extended to small and medium-sized enterprises listed on the regulated market and meet employment and financial criteria. The obligation will also affect their contractors, suppliers, customers, and all stakeholders that influence a company's overall Environmental, Social, and Governance (ESG) performance. The study aims to identify the Small and Medium-sized Enterprises' (SME) practices in the field of ESG and recognise whether they are ready to report on their ESG activities. A quantitative method was used to obtain a general picture of the approach to ESG practices. The study was conducted among 300 Polish companies. The study results show that about half of the surveyed small and medium-sized enterprises conduct ESG activities and monitor ESG indicators. More than half demonstrate basic or good readiness for ESG reporting following the adopted criterion. This study's contribution is twofold. First, it enriches the current state of knowledge by adding original insights into the ESG practices of SMEs, while most existing studies focus on the ESG activities of large enterprises. Second, the study's novelty is its attempt to assess the readiness for ESG reporting at the corporate and country levels.

Keywords: ESG practices, SME, machinery manufacturers, ESG reporting readiness.

JEL Classification: Q56, M14, L60.

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1. Introduction

Sustainability and sustainable development concepts are currently key topics that trigger many interests and challenges, mainly economic, environmental, and social, but also political, educational, and technological. It is reflected in European or global strategies and policies, e.g., the United Nations' 30 Agenda with the set of 17 Sustainable Development Goals, the EU Strategy for Sustainable Development, the European Green Deal or the European Green Order, which are also discussed in the scientific literature (e.g., Boix-Fayos & Vente, 2023; Dalal-Clayton, 2004; Ejdyś & Szpilko, 2022; Korzeb et al., 2024a). Sustainability as a research context is visible in many study directions, among which sustainable technologies emerge as an important topic. Development and discussions encompass technologies aimed at resolving environmental issues like water pollution (Bolisetty et al., 2019) and renewable energy (Chien et al., 2024) and highly specialised technologies like liposome preparation techniques, which

are analysed considering their green aspects (Leitgeb et al., 2020). Conducting sustainable business became crucial to business strategies and policy (Al-Amin et al., 2018). Therefore, some studies aim to explain a truly sustainable business (Dyllick & Muff, 2016) and its leadership (Hind et al., 2009). Once key concepts are known, comprehensive guidelines on their application in business practice are critical (Kopnina & Blewitt, 2014). Corporate sustainability must be measured using standardised methods (Montiel & Delgado-Ceballos, 2014) and implemented in the organisation's strategy (Rodrigues & Franco, 2019; Zimek & Baumgartner, 2017). Sustainable practices in the company can be strengthened by using Internet 4.0 technologies (Gładysz et al., 2024) but the key factor is effective leadership: managers should align their personal and professional values, and skillfully balance different interests to drive meaningful sustainable progress (Szczepańska-Woszczyna & Kurowska-Pysz, 2016). However, sustainable performance is no longer a matter of a single company but affects supply chains; therefore, there is a need for sustainability awareness throughout the supply chain (Mahler & Kearney, 2007; Villena & Gioia, 2020). This creates challenges and generates the need for research in areas such as sustainable transport (Zhao et al., 2020), sustainable mobility (Chakraborty et al., 2022; Gulc & Budna, 2024; Szpilko et al., 2023), and many others.

Corporate Social Responsibility (CSR) issues are gaining importance worldwide, along with sustainability concepts (Fernández-Gago et al., 2020; Sierra-Garcia et al., 2018; Warhurst, 2005). Organisations and companies disclose information to the public about the effect their activities have on the economy, society, and the environment (Taliento et al., 2019). The ESG (Environmental, Social, and Governance) strategy is closely related to CSR and sustainability concepts and considers environmental, social, and governance factors in the company's activities. These are standards and activities within the three pillars, but above all, they are a set of specific indicators that allow for the assessment of the company's activities in terms of social and environmental responsibility by investors, consumers, and contractors. ESG indicators can be used to assess and measure a company's performance and position it in various contexts. ESG ratings are increasingly used mainly by investors in decision-making to ascertain how a company treats its stakeholders (Mai, 2024). As Ken MacKenzie (Chairman of BHP group and Director/Dean of Melbourne Business School) stated at the Australian Financial Review Business Summit in 2020, "... the change in the tone in the market in terms of ESG has been remarkable. Going back 15 years ago, I'm not even sure we would have known what the ESG acronym meant. Well, today, the ESG individual specialists within our big shareholders are driving the [annual general] meeting..." (Arvidsson & Dumay, 2021). This statement illustrates the recent increase in the importance of ESG practices and reporting issues for companies. ESG practices or activities in an enterprise may include, for example:

- in the environmental field: identification and reduction of CO₂ emissions, investments in environmentally friendly technologies, implementation of the circular economy or electromobility, waste management, and climate risk management;
- in the social field: ensuring appropriate working conditions for employees, promoting diversity and equality, social commitment, health and safety work conditions, and the human rights policy;
- in the governance field: improving management processes and transparency, implementing ethical principles in the company, anti-corruption activities, and security and data protection.

By integrating ESG principles with Global Reporting Initiative (GRI) reporting, organizations can improve their operational resilience and contribute to broader societal well-being (Kamińska-Witkowska & Kaźmierczak, 2024). At the end of July 2023, the EU Commission adopted the European Sustainability Reporting Standards, the so-called ESRS. Thus, Europe now has an officially sanctioned set of ESG reporting guidelines applicable to all companies subject to the Corporate Sustainability Reporting Directive (CSRD) and required to report on sustainability issues. Although ESG reporting will formally first apply to the largest companies, it will also reach many smaller companies through requirements posed by their contractors, including export recipients. Thus, the question arises whether SMEs are ready. This exploratory study aims to identify the approach to ESG practices used by small and medium-sized companies and detect whether they engage in any ESG-related activities, monitor or plan to monitor any ESG indicators, and have sufficient resources to gather and process information needed for reporting. The study aims to recognise SME practices in ESG and their readiness to report on their ESG activities. This paper presents the results of the research on machinery manufacturers in Poland. Manufacturing companies are pressured to become more and more sustainable by using greener technologies, optimising their processes, and delivering more sustainable products, i.e., machinery, equipment, and solutions (Snodgrass, 2023; United Nations Industrial Development Organization [UNIDO], 2024). Therefore, they should be familiar with monitoring and reporting ESG activities and metrics, as it is clear evidence of sustainability in manufacturing policy.

The paper is structured as follows. The next Section describes the research context and the methodology of the study. Then, the research results are presented and discussed. The last part of the article contains a summary and conclusions. The limitations of the study and future research directions are also indicated.

2. Literature review and research context

2.1. Review of ESG studies

ESG factors are receiving increasing research interest in many countries (Galletta et al., 2022). A literature review of the WoS repository identified the main topics of ESG-related research. An analysis of the search results showed an increasing trend in the number of studies conducted on ESG worldwide (Table 1). The Table 1 presents the number of publications indexed in the WoS database between 2014 and 2023. The values given for each country/region, document type and research area consider the same period of time.

Over half of the studies were published in the last two years, which demonstrates the novelty and the importance of ESG issues as a scientific field. Over one-third of these works present the findings of authors from the USA and China. More than half of all publications extracted from the WoS database represent business economics. They mainly address the impact of ESG factors on the company's financial performance and/or value (FP, FV), which remains unsolved. Some studies (Azmi et al., 2021; Bruna et al., 2022; De Lucia et al., 2020) prove a positive relationship between ESG and FP and between ESG and credit risk (Brogi et al., 2022). Nonetheless, Zahid et al. (2022) revealed a negative relationship between ESG practices and FP, while several other authors showed no correlation between ESG results and company

results (e.g., Atan et al., 2018; Guenster, 2012; Humphrey et al., 2012). Lahouel et al. (2021) researched corporate social performance on FP, obtaining a negative and significant impact as a result. According to Cek and Eyupoglu (2020), social performance and corporate governance performance have a positive impact on economic performance, while environmental performance does not show a significant relationship with economic performance. To conclude, the relationships between ESG practices and financial performance are multifold and depend on many other factors.

Table 1. Search results for ESG-related works in the WoS database (source: elaborated by the author)

Category		Number of documents
Publication year	2023	1918
	2022	1153
	2021	557
	2020	370
	2019	248
	2018	131
	2017	108
	2016	96
	2015	101
	2014	49
Country/region	China	1384
	USA	1049
	England	518
	Italy	480
	India	335
	Australia	303
	Spain	284
	South Korea	273
	France	269
	Germany	258
	Malaysia	193
	Canada	187
Document type	Article	3516
	Early access	558
	Proceeding paper	350
	Review article	247
	Book chapters	71
Research areas	Business economics	3317
	Environmental sciences ecology	1488
	Science technology	1040
	Engineering	445
	Social sciences	193
	Computer science	192
	Government law	190

In terms of specific subjects raised by researchers in their works, different problems are discussed (Figure 1), including:

- ESG disclosure (approx. 1537 works), including improving ESG disclosure (Asif et al., 2023), factors that influence its transparency (McBrayer, 2018), effects of quantitative ESG disclosure (Liu, 2022), links between ESG disclosure quality and ESG investments (Wen et al., 2022), and environmental aspects of ESG disclosures in financial institutions (Broniewicz et al., 2024);
- risk management (approx. 1175 works), including integrating ESG risks into strategic and operational decision-making (Crawford & Nilsson, 2023), ESG risk management in industrial enterprises (Liu et al., 2024), financial institutions (Pyka & Nocoń, 2024), and tourism (Chung et al., 2023);
- review papers (approx. 970 works) with different perspectives and contexts, e.g., current and future research prospects (Li et al., 2021), company perspective (Bax & Paterlini, 2022), governance investments context (Kapil & Rawal, 2023), or cooperative banks as a background (Korzeb et al., 2024b);
- ESG reporting issues (approx. 860 works), e.g., ESG reporting quantity and quality (Arvidsson & Dumay, 2022), socio-economic factors of ESG reporting (Krambia-Kapardis et al. 2023), or voluntary ESG reporting (Kimbrough et al., 2024);
- risk analysis issues (around 650 works) in contexts such as a relationship between ESG risks and tail riskiness (Bax et al., 2023), downside risk (Yang et al., 2024) or hedge fund (Jin, 2024) and its impact on the firm's risk (He et al., 2023);
- ESG indicators (approx. 450 works), including their role in prioritising goals of organisations (Veenstra & Ellemers, 2020) or their connections with stock returns and sustainable performance (Ye et al., 2022) and value creation in the company (Nielsen, 2023).

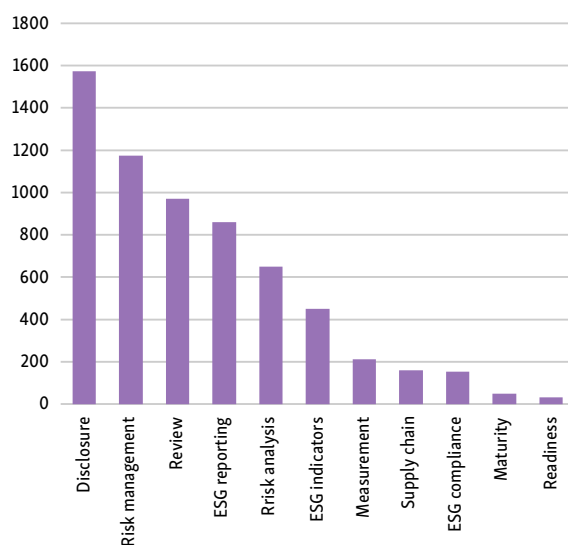


Figure 1. The most popular ESG-related topics in scientific publications (based on the WoS database collection)

Less frequently discussed were maturity (around 50 works, e.g., Bade et al., 2024; Cruz & Matos, 2023) and readiness (around ten works, e.g., Petelczyc, 2022; Alam et al., 2024) in the ESG area. Other ESG-related topics discussed by scholars in their research encompass relationships between ESG and market value (Ionescu et al., 2019), propositions of methodology for evaluating ESG performance (Reig-Mullor et al., 2022; Zopounidis et al., 2020) or an influence of management team faultiness on ESG performance as a whole (Chen et al., 2023).

Based on the review outcomes, ESG issues are gaining growing interest from researchers and are a novelty as a field of scientific research. ESG readiness is one of the least popular topics. This study aims to fill this research gap and enrich the literature in this field.

2.2. Importance of ESG reporting readiness

A company takes various steps and uses business strategies to achieve sustainable development and long-term profitability, and ESG reporting is an important element of these actions. It provides an overall picture of a sustainable company's business activities. ESG standards enable the evaluation of a company's sustainable performance. Environmental standards focus on the impact on the natural environment. Social standards evaluate management relationships with employees, users, customers and the communities they affect. Governance standards reveal the features of a company's policy, such as executive compensations, codes of ethics, audits, and shareholder rights (Mai, 2024).

The literature review revealed that research on readiness in the context of ESG is still insufficient. Alam et al. (2024) examined the role of ESG readiness in the context of climate change and geopolitical conflicts. Their study showed the critical role of ESG integration in decision-making processes in companies concerned about mitigating the effects of climate change. The study was conducted at the international and country levels, and ESG readiness was one of the variables. However, the author did not measure ESG readiness but used ESG rating indices extracted from the ND-GAIN database, which reflects country-level ESG performance.

Hostert (2023) researched the readiness of twelve large corporations for publishing sustainability reports following new Corporate Sustainability Reporting Directive (CSRD) standards. According to the author's observations and analysis, most large companies that already report their non-financial results are ready and adequately comply with different standards of sustainable reporting. However, SMEs would probably need time to compile their corporate report on sustainability. The author used an original tool to assess the readiness to report sustainability. It was developed based on different requirements and reporting standards. Due to its form, it can be applied in small samples and qualitative studies.

Mukhtar et al. (2023) examined the understanding of ESG concepts in higher learning institutions. The authors also identified the degree of readiness of the staff regarding ESG concepts and the strategies for dealing with readiness in higher education institutions in Malaysia. Their findings reveal that although the concept of ESG is known among academic staff, this knowledge is superficial, and there is a need to integrate ESG concepts holistically across the university. The level of readiness was deemed initial by over 50% of the respondents.

The author did not identify any study that addresses readiness in the context of ESG on a corporate level. Therefore, this study attempted to measure readiness on a national scale

(quantitative approach) in a more detailed way and using a structured questionnaire. According to Peterson (2013), readiness, in general, can be understood as a willingness and capacity by a person, a group of individuals or an organisation to apply a new practice to an existing procedure. Willingness to undertake a new practice in the context of ESG reporting is reflected, for example, in giving strategic importance to ESG activities (Tuntland, 2023). Leadership and direction are vital elements of readiness for change (in this case, change means implementing or developing ESG practice), turning the need for change into specific values, aims, and measured targets (Oakland & Tanner, 2007). ESG goals should be then integrated with the company's strategy and mission. ESG areas should be monitored, mainly through measurement, analysis, and appropriate management (Distefano, 2023). Motivation in readiness plays a crucial role in facilitating the implementation of new activities (Lehman et al., 2002). Both managers and employees should be aware of the ESG area and motivated to act in it, especially if they notice that something requires improvement. The company should continuously, effectively, and transparently analyse and manage environmental, social, and governance practices and risks (Khamisu et al., 2024). The important aspect of readiness indicated by Peterson (2023) is the capacity to apply a new practice. Adequate ESG resources, including financial, human, and information resources, are crucial for the capacity for change towards better ESG reporting. As Spanish studies revealed (Gutiérrez-Ponce et al., 2022), better disclosure and reports are provided by companies that have an organisational unit responsible for sustainability. The ability to easily generate ESG reports and comply with ESG reporting standards is also no less crucial (Hostert, 2023).

The following questions arise: Do companies consider ESG goals and activities to be important and strategic? Are they motivated to take such actions? Are they taking action to build awareness of ESG goals and activities within and outside the company? Do they have sufficient resources to collect and process the information needed for ESG reporting? Are they preparing reports, or do they feel ready to prepare an ESG report that aligns with current and future requirements? Answers to these questions would provide insight into companies' readiness for ESG reporting. This study uses a quantitative approach across smaller and larger companies to understand the companies' readiness for ESG reporting.

According to the NFRD directive 2026, the reporting obligation will be extended to small and medium-sized enterprises listed on the regulated market and meet employment and financial criteria. As of 2027, selected companies based outside the EU with a subsidiary or branch in Poland that generate annual revenues above EUR 150 million in the EU will have to comply. The report of the Polish ESG Association (2024) shows general changes in awareness among large enterprises that are already reporting ESG activities. The report was developed based on the results of surveys and in-depth interviews among almost 200 entities (mainly large organisations already preparing ESG reports and companies employing from 50 to 500 employees) and showed that the awareness and knowledge of the ESG concept is growing in all sectors. One of the report's conclusions is that large companies will require their smaller contractors to introduce ESG principles sooner or later. Within this study, a few unstructured interviews were performed with business practitioners (managers of big companies from the manufacturing sector) to confront the report findings. In the opinion of managers, ESG reporting will soon become an obligation for SMEs.

"(...) So, there is no turning back, especially since these companies operate in global markets. Well, now, we are already not only large companies but also medium and small companies, to a large extent, part of subcontracting, so these parts of ours, whether it is the construction or food industry, are there, and this carbon footprint simply has to be provided, so there is no escape from this and here, these administrative requirements affect us because of our work in the international environment" – president of the Management Board of the Evoluma Industrial Cluster (located in Poland).

"(...) we are manufacturing companies, and we cooperate with the Western and Chinese markets, and (...) we are talking about the issue of women's rights, children's rights,... well, these are other areas where we also have to pay attention to whether our supplier meets these legal requirements and protection of society" – sales and marketing manager of an equipment manufacturing company.

"We will all struggle (...) with ESG non-financial reporting" – HR specialist of a manufacturing company.

The development and implementation of an ESG strategy is often a condition imposed on companies by banks and other financing institutions (Szewczyk & Szustak, 2023). Furthermore, ESG is starting to become an opportunity to find new customers, stay in business, and enhance employee motivation (Henisz et al., 2019). ESG disclosure and practices influence the competitiveness of enterprises and countries (Plastun et al., 2019; Kim et al., 2021). However, companies are increasingly concerned about the costs of introducing ESG. Some estimate that adapting to the new realities will take up to 15% of revenues, which constitutes a huge barrier in gathering information and reporting ESG outcomes, especially for SMEs. The lack of professional advisors is one of the biggest challenges facing businesses today, as more and more organisations develop ESG strategies and reports, and the demand for experts increases (Polish ESG Association, 2024).

In this regard, important research questions arise: Are small and medium-sized enterprises ready for this? Do they monitor any of ESG activities? Are any of the three pillars neglected, or are they equally important for companies? This study aims to find answers to these questions. In the context of ESG practices, most studies focus on large companies (Shalhoob & Hussainey, 2023). As highlighted above, SMEs will soon also be struggling with ESG reporting obligations. Therefore, they were included in this study and received most of the author's attention during the analysis and conclusions. Due to feasibility issues, this research is conducted on a national scale and focuses on one sector.

3. Methodology of the study

The study applied a quantitative approach – a survey method with a structured questionnaire for gathering information and several statistical techniques to analyse the data. The detailed methodology of the study is presented in Figure 2.

Step 1 comprises a detailed study of scientific works and business reports on ESG-related issues. A review of the scientific publications in the WoS repository (one of the largest scientific databases) used the shortcut "ESG" to search titles, abstracts, and keywords. It resulted in finding around six thousand records, which were analysed mainly in terms of the subject raised by the authors. Then, desk research was carried out. Several reports and business practices

were analysed in terms of ESG activities and ESG readiness. Also, in this step, a few unstructured interviews were conducted to get to know the opinions of business practitioners on ESG awareness.

Step 2 designed a questionnaire based on the findings from the previous step. The main part of the questionnaire constituted 15 statements that respondents assessed on the 7-point Likert scale. The statements considered different kinds of practices that reflect the company's approach to ESG pillars and their readiness for ESG reporting.

A decision about the sample had to be made at the start of Step 3. It was assumed that research within one sector would give more coherent outcomes. Cross-sectoral research may give a more general picture of the condition of companies. However, it risks distorting average results by treating and comparing companies with extremely different operational activities (e.g., services and manufacturing, or manufacturing products of very different technology processes or impact on the environment). According to Snodgrass (2023) and the UNIDO report (2024), manufacturing companies are pressured to become more and more sustainable and are expected to use greener technologies and deliver more sustainable products. The machinery manufacturing companies often operate globally, what requires compliance with international ESG standards and a strong understanding of ESG reporting practices (Badea Florea & Olteanu Burcă, 2024). The machinery manufacturing sector is characterized by high levels of competition and technological advancement, which can significantly influence ESG practices and reporting. The focus on innovation, plays a crucial role in enhancing sustainability performance in machinery manufacturing sector, and is also connected significantly with ESG performance (Dicuonzo et al., 2022). Moreover, it was proved that the ESG performance can significantly boost innovation and sustainability outcome in machinery manufacturing industries (Zhou et al., 2023). Therefore, the survey was conducted within the machinery manufacturing sector. Approximately 9,500 companies operate in the machinery manufacturing industry in Poland, and the vast majority of them are considered small enterprises. The questionnaire was sent out to over 1,400 companies using stratified sampling (basic criteria: respondent position/function, company size, belonging to the sector/industry). The return rate was on the level of 20%. With the research sample of 300, the inference is subject to an error of max. 6% at a confidence level of 95%. The survey was carried out using the CAWI technique. The respondents group included lower- and higher-level managers, board members, and owners.

The next stage (Step 4) used several statistical tests and techniques (for quantitative data), including exploratory factor analysis, cluster analysis and correspondence analysis (for qualitative data). Exploratory factor analysis was applied to reveal the underlying structure of a relatively large set of variables (Costello & Osborne, 2005). Cluster analysis was used to group variables describing different readiness aspects. Variable clustering allows the removal of collinearity between variables and introduces greater clarity to the set of used objects (Lasek & Pęczkowski, 2010). Correspondence analysis can be used to explore the relationships between the categories of two or more qualitative variables. Its advantage is the possibility of presenting the result in a graphical form, which facilitates interpretation (Gatnar & Walesiak, 2004). A Kruskal-Wallis ANOVA and Median test were applied to compare multiple independent groups, as almost none of the variables meet the assumptions of normality. All statistical analyses were conducted using the Statistica package from StatSoft Polska.

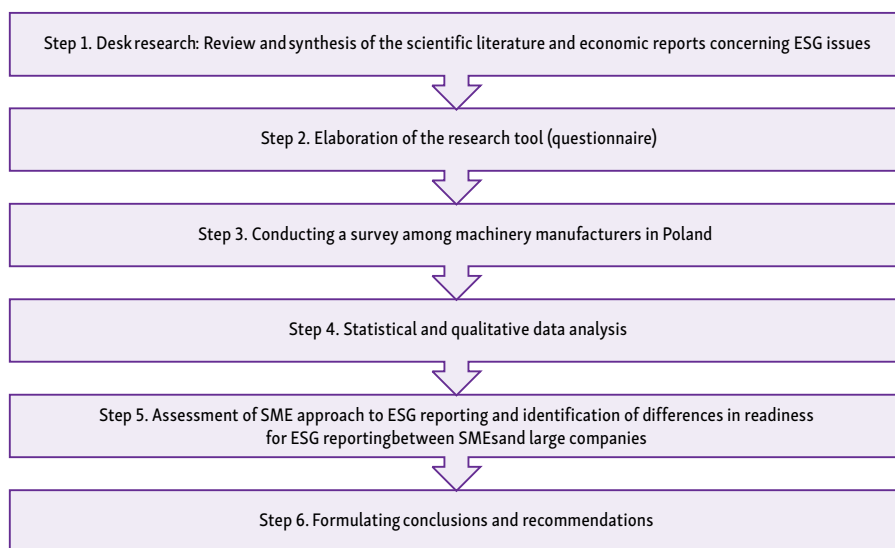


Figure 2. Methodology of the study

Step 5 assigned the level of each company's readiness based on the company's self-assessments of chosen statements and identified and discussed differences between groups of small, medium, and large manufacturers. The last step was to formulate conclusions about the findings.

4. Study results

4.1. ESG practices in machinery manufacturing companies

The characteristics of the surveyed group is presented in the Table 2. Over half of the companies were small size. Almost 70% of the respondents represented manufacturing company that operates on the market 25 years or less. Mid-level managers constitute around half of the respondents.

Table 2. The characteristics of the surveyed group

	Categories	Number	Percent
Company size	small	153	51%
	medium	89	30%
	large	58	58%
Respondent position/ function	owner	49	16%
	high-level manager/board member	114	38%
	mid-level manager	137	46%
How long the company operates	Less than 5	30	10%
	from 5 to 10 years	54	18%
	from 10 to 25 years	116	39%
	from 25 to 50 year	86	29%
	over 50	14	5%

Considering a very different approach to ESG activities, the surveyed companies were first asked for opinions on the effects of the implementation of ESG pillars on the company's operations. Mostly, manufacturers saw the introduction of ESG practices as an opportunity to improve the image and reputation of the company. Also, other perceived benefits of ESG practices encompass resource optimisation, an increase in innovation and competitiveness, an increase in operational efficiency, and reduced costs. Only 4% of respondents did not see any measurable benefits in monitoring and carrying out ESG activities (Table 3).

Table 3. Respondents' opinions about the effects of the implementation of ESG pillars on the company's operations

Percentage of responses	Effect description
44.30%	Improving the image and reputation of the company
40.00%	Resource optimisation
37.33%	Increasing innovation and competitiveness
37.00%	Increase operational efficiency and reduce costs
33.33%	Improve enterprise efficiency
32.67%	Long-term measurable and non-measurable benefits
26.00%	Easier access to financing and support from public and private institutions
9.67%	I don't know, it's not within my competence
4.00%	I don't see any measurable benefits

Next, the machinery manufacturers were asked whether they currently monitored or planned to monitor (in the perspective of the next five years) any environmental, social, and governance indicators. The list of indicators was created based on key actions and guidelines contained in the regulation documents (CSRD and ESRS). Almost half of the machinery manufacturers monitored basic indicators such as water consumption, waste management, power consumption, occupational health and safety or data policy protection (Figure 3). Manufacturers focused more on environmental indicators (three out of four most commonly monitored indicators belong to this group). However, some governance issues, e.g., the structure of governing bodies, their composition diversity, code of ethics, or social issues, e.g., labour turnover rate or equal pay index, seemed to receive more attention from the managers than, e.g., greenhouse gas emissions, which were monitored only by 30% of researched machinery manufacturers. Interestingly, only two answers in the sample said, "We do not monitor and do not plan to monitor it in five years" due to "high costs of monitoring indicators" and the belief that "this directive does not apply to us". So, it can be concluded that machinery manufacturers, even small in size, are aware of the necessity and/or benefits of monitoring their environmental, social, and governance practices, and they already do that or plan to do so in the next few years.

As shown in Figure 4, large machinery manufacturers focus more on environmental indicators – around 80% of them monitor at least one of such indicators. Around 65% monitor at least one indicator of the governance pillar. In medium companies, a similar pattern is noticeable in this matter, but the differences in the approach to the three pillars are less significant.

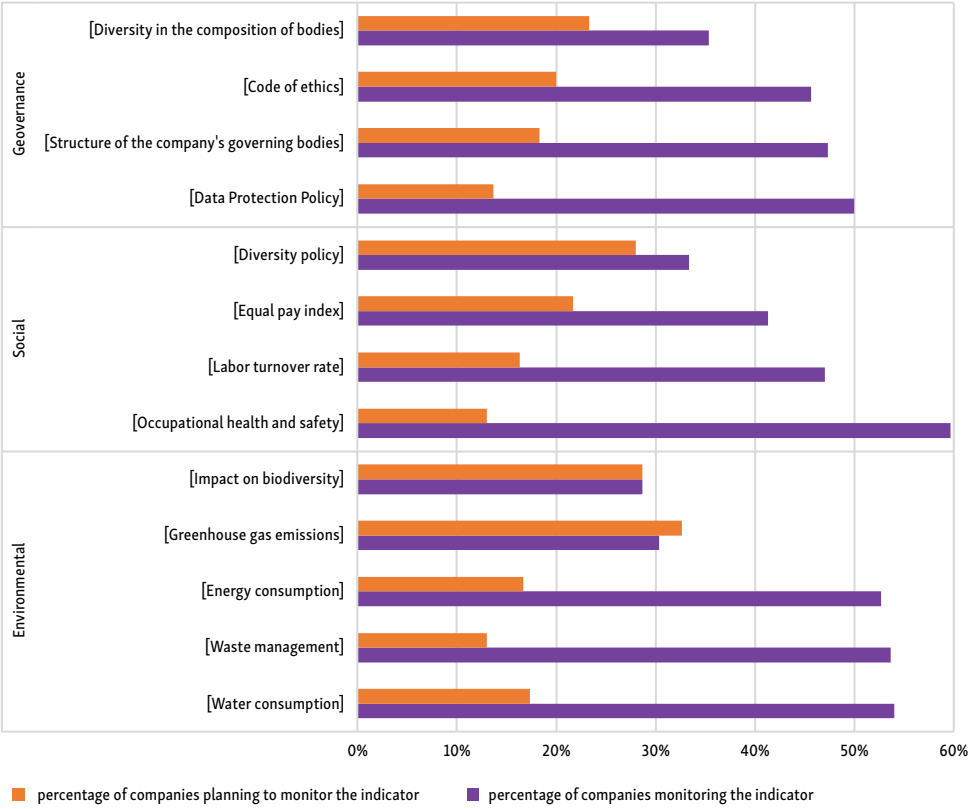


Figure 3. ESG indicators monitored/planned to be monitored by surveyed companies

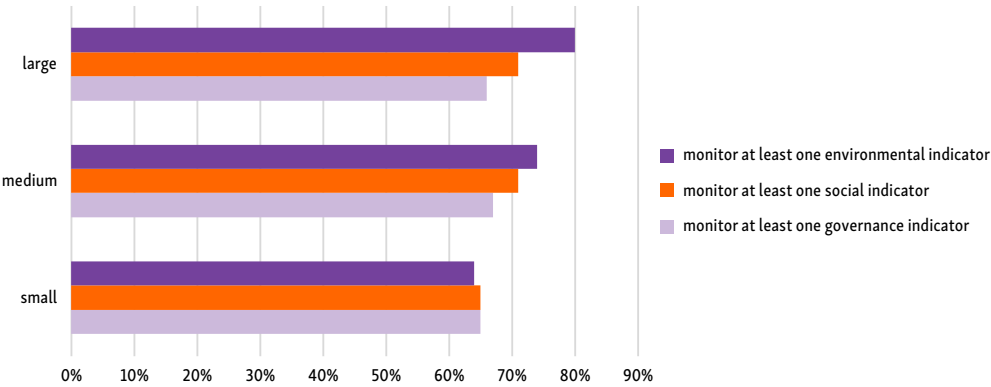


Figure 4. Percentage of companies that monitor at least one indicator within the three ESG pillars

For small machinery manufacturers, all three pillars are equally important. However, not more than 65% of them monitor the results of these activities.

An open question was included in the questionnaire to find out more about ESG practices. It is worth noting that manufacturers have become sensitive to the environmental impact of their production processes and final product; therefore, they consciously focus on inclusive management and the diversity of social activities. They also care about the transparency and equality of its governance practices. The list of practices and indicators assigned to each of the three pillars mentioned by respondents is presented in Table 4. It should be emphasised that no more than 12% of surveyed machinery manufacturers indicated these additional activities carried out in the field of ESG.

Table 4. Other ESG practices carried out by surveyed machinery manufacturers

	ESG practices and indicators
environmental	- Monitoring the development of organic products - Reduction of production waste and its recycling - Greenery maintenance index - Assessment of the implementation of the UN Sustainable Development Goals - Introduction of an ethical supply chain - Monitoring the environmental impact of products - Investments in green technologies - Optimising logistics for sustainability - Environmental risk assessment and management - Energy efficiency in production processes - Implementation of educational programmes on sustainable development
social	- Monitoring employee satisfaction and engagement - Investments in local social projects - Promotion of employee volunteering - Activities for the social and cultural integration of employees - Activities to increase the accessibility of the workplace for people with disabilities - Equality programmes, including gender, racial and ethnic equality - Anti-discrimination and diversity programmes - Supporting local communities - Promoting a healthy lifestyle among employees - Improving the working conditions of employees - Actions to combat labour exploitation
governance	- Monitoring and reporting on executive compensation - Transparency in decision-making - Increasing shareholder participation in strategic decisions - Transparency in reporting financial results - Monitoring and reporting on conflicts of interest - Establishing crisis management procedures - Rotation in the composition of the management board - Introduction of risk management systems - Compliance with international corporate governance standards - Implementation of anti-competitive and antitrust policies - Ensuring equal treatment of all shareholders

It can, therefore, be concluded that machine manufacturers are aware of and motivated to implement ESG practices. Although, it is worth noting that certain practices, such as occupational and health safety or energy and water consumption, may be undertaken for reasons other than ESG reporting, such as regulatory compliance or cost efficiency. Nevertheless, it is evident that many other initiatives, which go beyond standard requirements, are also being implemented to strengthen the company's ESG performance.

The catalogue (number) of monitored ESG indicators is characterised by high variability in the tested sample (coefficient of variation of 74%), ranging from 0 to a maximum of 18 currently monitored indicators, with an average value of 6.2 and a median of 6. Crosstabulation of this variable with the size of the company (Table 5) revealed some patterns. For example, an analysis of Table 4 by rows reveals that large companies more frequently monitor a vast catalogue of ESG indicators, while small companies monitor less than nine indicators. The chi-square test results (Table 6) confirmed a statistically significant relationship between these two variables. This is a prerequisite for conducting a correspondence analysis, which is used to detect relationships between nominal variables.

In the Correspondence Analysis (CA), two variables were used: the *size of the company* (variable categories: small, medium, and large) and the *catalogue of monitored indicators* (variable categories: less than 5, from 5 to 9, and over 10). The results are presented in the two-dimensional plot representing the similarity of all categories of these two variables.

The interpretation for categories of the two variables is made based on the distance between them. In this case, the similarities between the categories: (1) "large" and "more than 10", (2) "small" and "from 5 to 9", and (3) "medium" and "less than 5" (Figure 5) are apparent. This means that those answers occurred most frequently together, i.e., in one and the same respondent's answer.

Table 5. Cross table for variables: number of indicators monitored by company size

	less than 5	from 5 to 9	more than 10	total
small	60	56	37	153
medium	38	27	24	89
large	17	18	23	58
Totals	115	101	84	300

Table 6. Chi-square test results for variables: number of indicators monitored by company size

Statistics	Statistics: number of indicators monitored by an x size company		
	Chi-square	df	p-value
Pearson Chi-square	14.25133	df = 6	p = 0.02695
M-L Chi-square	13.9652	df = 6	p = 0.03003

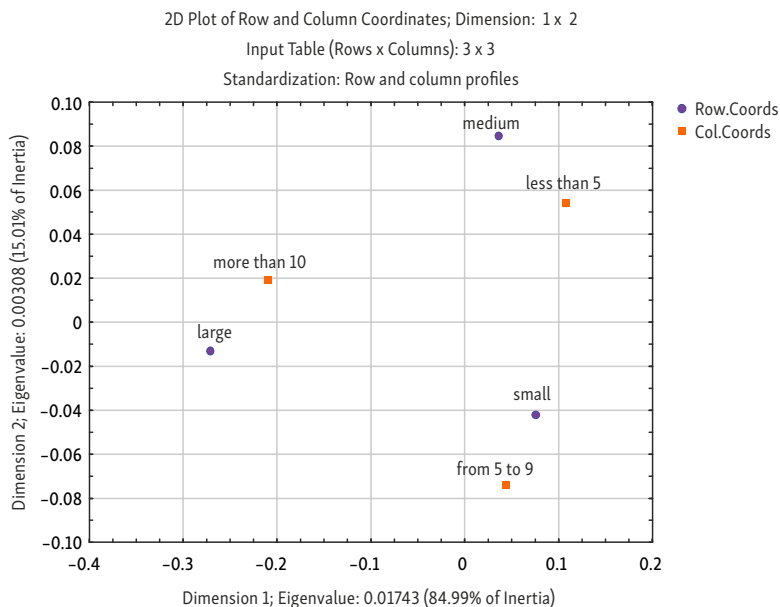


Figure 5. Map of perception for variables: catalogue of indicators monitored and the size of the company – correspondence analysis results

4.2. Readiness for ESG reporting in the surveyed companies

Respondents were asked to use a 7-point Likert scale to assess 15 statements that reflected different aspects of ESG practices (Appendix). Exploratory factor analysis (Quartimax rotation) revealed that all 15 items load strongly (between 0,75 and 0,84) onto a single dominant factor, explaining 64,5 % of the total variance. The Cronbach's alpha coefficient for the studied scale was 0.98, which indicates a very high internal reliability of the measurement tool. The obtained value suggests that all items in the scale are strongly correlated and measure the same construct.

Readiness can be easily categorised using such an approach and interpreted using the set for evaluation presented in Table 7, which is based on Britel and Cherkaoui (2022). The authors proposed an evaluation set for assessing the readiness for change.

Applying the above evaluation of readiness levels, a percentage score was calculated based on all 15 statement. Only 9% of the surveyed machinery manufacturers display insufficient readiness for ESG reporting (readiness score below 40%) and the next 27% indicate an average level of readiness. In contrast, 42% demonstrate a good readiness level, and 23% show excellent readiness. This suggest that hat 65% of organizations are relatively well-prepared or actively preparing to report on ESG issues. To further analyze overall readiness scores, a cluster analysis was conducted using with Ward's method as an amalgamation rule and square Euclidean distance as a distance measure. Grouping the statements (variables) resulted in five clusters that represent different aspects of the company's ESG actions (Figure 6). Cluster 1 contains statements that reflect the strategic approach to ESG actions. Cluster 2 comprises statements related to activities that demonstrate sustainable impact initiatives. Cluster 3 groups statements that represent the transparency of the company's activities. Cluster 4 con-

sists of statements that describe ESG-related resources. Finally, Cluster 5 includes statements corresponding directly to a company's self-assessment whether it feels ready to comply with various reporting standards and requirements. The level of readiness (percentage of a maximum possible result within each cluster) was calculated for all these five aspects of ESG. Such grouping of gathered information allows for a clearer presentation of the results and helps to create a more understandable picture of ESG readiness. It also identifies more problematic areas and compares the level of different ESG results between independent groups.

For each cluster, the respondents' results were calculated (as a percentage of the maximum possible result). Cluster 5, which comprises statements s12, s13, s14, and s15, directly relate to a company's self-assessment of its approach to ESG reporting and whether it feels ready to comply with various reporting standards and requirements. More than half of the companies represent a rather good level of readiness for ESG reporting standards compliance (result of 60% or more). Around 36% achieved a score below 0.6 (60%), categorised as a low and very low level of readiness, and in this group, not more than 3% displayed no readiness for ESG reporting. However, only 23% indicated an excellent level of readiness for ESG reporting standards compliance (Table 8).

Table 7. Evaluation of the level of ESG reporting readiness (source: elaborated by the author based on Britel & Cherkaoi, 2022)

Qualitative value	Maximum numerical value (in percentages)	Corresponding level of readiness	Description of the maturity level
Very low	20	No readiness for ESG reporting	Not ready for ESG reporting
Low	40	Low readiness for ESG reporting	The organisation displays insufficient readiness for ESG reporting
Medium	60	Average readiness for ESG reporting	The organisation has basic readiness for ESG reporting
Good	80	Good readiness for ESG reporting	The organisation displays good readiness for ESG reporting
Excellent	100	Excellent readiness for ESG reporting	The organisation displays excellent readiness for ESG reporting

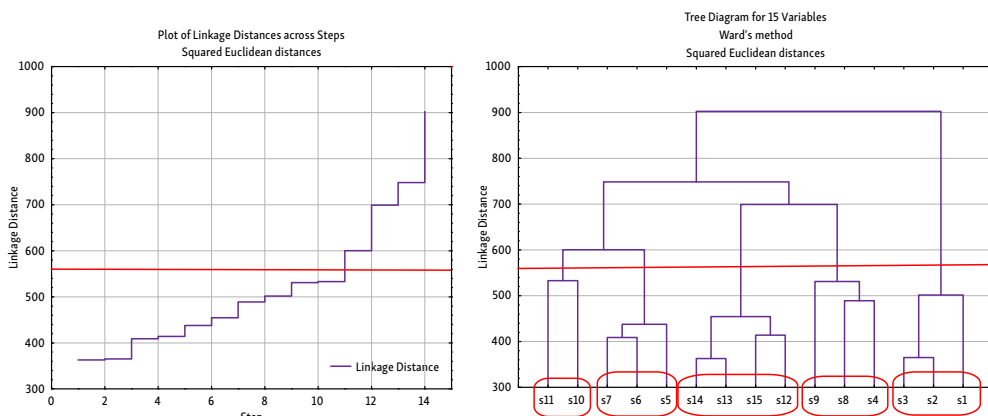


Figure 6. Cluster analysis (for variable) results; red rectangles represent five clusters

The distribution of the results of the remaining four clusters is shown in Figure 7. All distributions are left-skewed, where the mode and median values are greater than the mean. For all the ESG areas, the company scores are mostly between 0.5 and 1. Considering the strategic approach to ESG, only 19% of the surveyed companies achieved an average score below 0.5. In terms of sustainable impact initiatives and ESG resources, these results indicate 20% of the research sample; and in terms of transparency of activities – 21% of the surveyed machinery manufacturers. Most of the surveyed machinery manufacturers represent good or very good results in these four areas of ESG practices.

Table 8. Level of readiness for ESG reporting standards compliance of surveyed companies: the distribution of the results for Cluster 5

Range	Count	Cumulative Count	Per cent	Cumulative Per cent
$0 \leq x < 0.2$	8	8	2.67	2.67
$0.2 \leq x < 0.4$	26	34	8.67	11.33
$0.4 \leq x < 0.6$	76	110	25.33	36.67
$0.6 \leq x < 0.8$	120	230	40.00	76.67
$0.8 \leq x \leq 1$	70	300	23.33	100.00

Note: X – level of readiness calculated as a percentage of the maximum result available to achieve in the assessment of the statements grouped in Cluster 5.

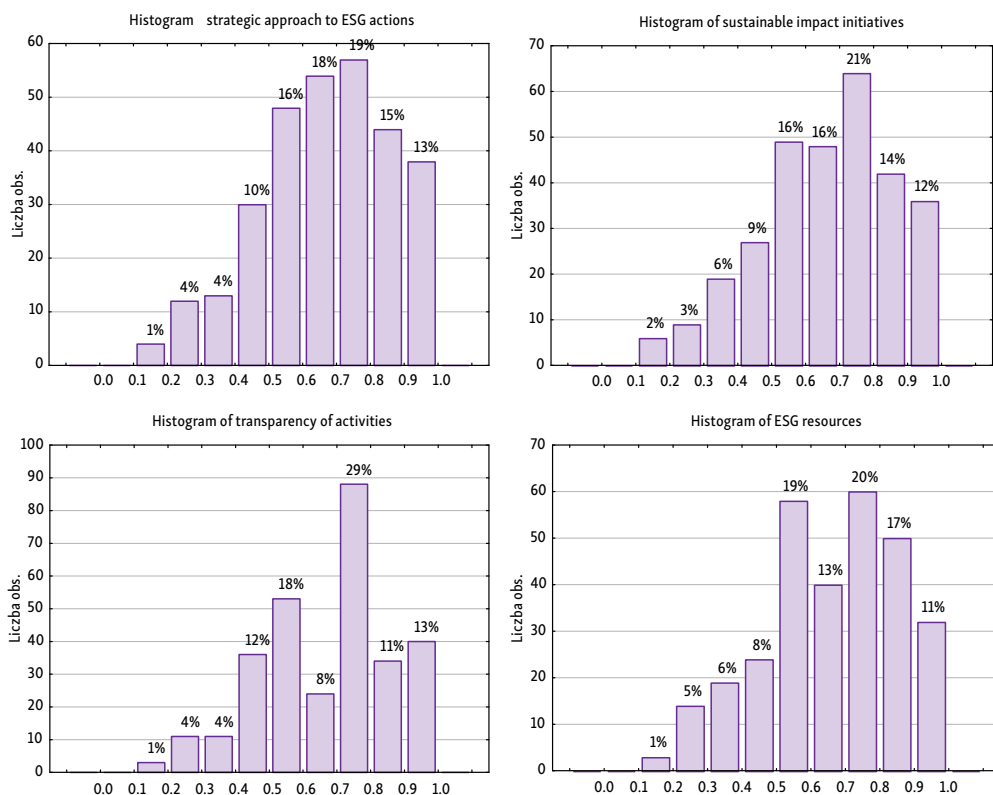


Figure 7. Distribution of the results for Clusters 1–4

Statistics for Cluster 5 are presented in Table 9. The statistics between groups do not differ much in terms of readiness. However, the Kruskal-Wallis test (Table 10) revealed significant differences between groups for other aspects of the ESG practices represented by Cluster 2 (sustainable impact initiatives), Cluster 3 (transparency of ESG activities), and Cluster 4 (ESG resources).

Table 9. Descriptive statistics for ESG reporting readiness

Size	Valid N	Mean	Median	minimum	maximum	st. dev.	Coeff. var.
small	153	0.63	0.64	0.18	1.0	0.19	30.27%
medium	89	0.67	0.68	0.28	1.0	0.17	26.24%
large	58	0.65	0.66	0.17	1.0	0.20	30.45%
All	300	0.65	0.64	0.18	1.0	0.19	29.09%

Table 10. Kruskal-Wallis ANOVA and Median test results

Variable name	Statistics H value	p-value
Sustainable impact activities	6.799	0.0334
Transparency of activities	7.587	0.0225
ESG resources	11.463	0.0032

The visualisation of these differences is well noticeable in the box and whisker plot (Figure 8). In terms of sustainable impact initiatives (first chart on the left) and ESG resources (first chart on the right), small companies represent the lowest level of average value. In all three aspects, the medium companies assessed their ESG practices and capacity the highest. Large companies present a similar level of ESG approach to small machinery manufacturers. According to the study results, the biggest differences turned out to be between small and medium-sized companies.

The predominance of assessments of medium-sized machinery manufacturers is visible in the scope of all ESG activities and practices (Figure 9). The highest level of the assessment for medium-sized manufacturers can be noticed in the transparency of activities (transparency of social impact and internal practices, standards, and procedures).

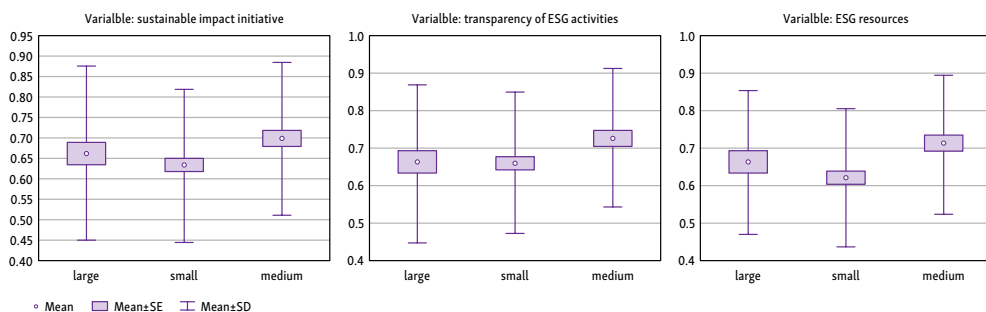


Figure 8. Box and whisker plot presenting the differences between groups of small, medium, and large machinery manufacturers in terms of different ESG aspects (Kruskal-Wallis ANOVA test results)

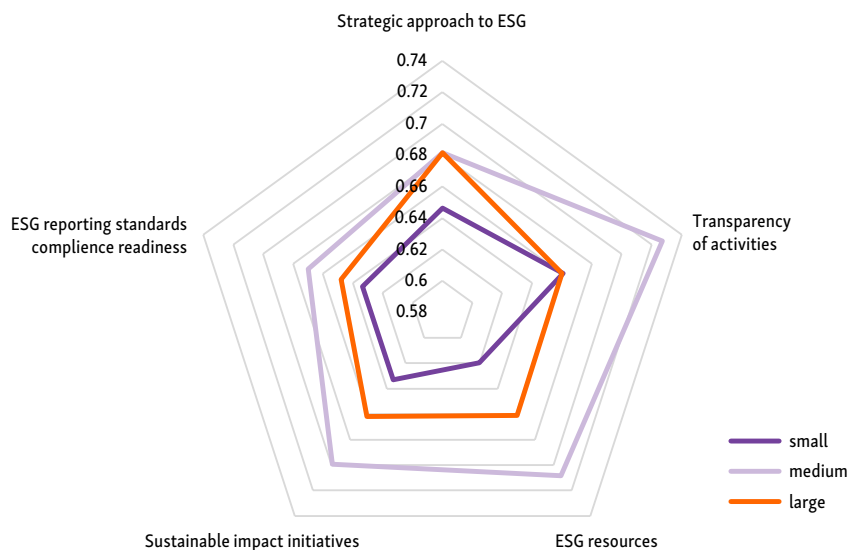


Figure 9. Radar chart presenting differences in the mean values in five analysed aspects of ESG-related activities

In general, small-sized companies scored the lowest across all dimensions, with ESG resources ranking last (0.62 on average) compared to the remaining four dimensions. The mean value for Cluster 1 (strategic approach to ESG) is comparable across all groups, ranging from 0.64 (small enterprises) to 0.68 (large and medium-sized companies). Transparency of activities is particularly high for medium-sized machinery manufacturers (mean value of 0.72 and median 0.79). In ESG resources, as mentioned above, there are significant differences across all three groups of machine manufacturers, considering their size, ranging from 0.61 on average for small enterprises to 0.71 for medium-sized companies.

5. Discussion

A manager's awareness of the concept of sustainable business development is significantly related to taking action on sustainability within the company, as well as to the manager's influence on employees and their behavior. Managers also take steps to support employee development and build relationships with external stakeholders (Szczepańska-Woszczyna & Kurowska-Pysz, 2016). According to this study, machinery manufacturers in Poland are rather aware of the necessity of acting on all three ESG pillars. Around half of them monitor at least several indicators, and from 10% to 30% declare planning to monitor them in the next five years. As Kocmanová et al. (2012) indicated, ESG indicators are especially informative about the company's sustainable performance when they are integrated into reporting in long-term perspective. Therefore, managers should monitor them voluntarily because even though there is no obligation to do it currently, in the future, the ESG performance of the company will be traceable and more transparent for the stakeholders. It is worth noting that certain ESG practices reported in the survey, such as monitoring occupational health and

safety indicators, or energy and water consumption, may be motivated by reasons other than ESG reporting. While these practices definitely contribute to ESG performance, they may not reflect an intentional ESG strategy. Therefore, future research should be conducted to explore the motivations and drivers behind these behaviours.

The results of the exploratory factor analysis revealed a single-factor solution, indicating that all examined statements measure a common primary construct. This suggests that companies perceive ESG reporting as a unified and consistent concept. They do not separate ESG into single environmental, social, or governance elements, but rather perceive ESG reporting as one integrated effort or mindset. This perception aligns with studies that present the idea of ESG as a holistic approach that can be measured by a unified framework (Kulkarni et al., 2023). However, due to methodological limitations of this study – specifically the focus on a single sector and country – the measurement tool requires further analyses to achieve full validation.

The gathered data suggest a positive trend in ESG reporting readiness. Only 9% of respondents show very low readiness (score between 20% and 40%), and none fall in the lowest category (from 0 to 20%) which indicates that a lack of ESG engagement is not widespread among the surveyed companies. Most organizations are positioning themselves toward integration and disclosure of ESG practices, although there is still a portion (approximately 27%) in the lower-middle range (from 40% to 60%) that may require further support or motivation to advance their ESG efforts. An interesting finding of this study is that medium-sized companies assessed their readiness and other ESG activities higher than large and small. At the same time, they are the group that monitors the smallest catalogue of indicators (usually, they choose no more than five from the listed indicators). However, among the respondents who revealed they monitor other indicators besides the listed, medium companies constitute the biggest part (around 40%). It occurred that they focus on less popular ESG practices, like implementing human resources management policies, increasing transparency in the decision-making process, investments in local social projects, development of organic products, implementation of educational programmes on sustainable development, maintenance of greenery, improvement of employee working conditions, or supporting local communities).

In terms of readiness for ESG reporting, it is rather optimistic that only 11% of machinery manufacturers assessed their capabilities on a very low level. However, quite a big part (36%) of the surveyed enterprises demonstrate a basic level of readiness. Previous studies stressed the importance of ESG influence on applying for financial support, finding new customers, becoming more competitive, or enhancing employee motivation (Henisz et al., 2019; Kim et al., 2021; Plastun et al., 2019; Szewczyk & Szustak, 2023). In this light, a low level of ESG readiness for reporting may generate a substantial barrier to a company's development or even staying in business.

As previous studies show, companies that focus on ESG are more successful with innovation. Lee et al. (2024) proved that ESG performance impacts both quantity and quality of corporate innovation. Including ESG principles in the company's innovation strategies supports future innovation performance, higher labor productivity, and strengthens company position on the market (Cabaleiro-Cerviño & Mendi, 2024; Sanclaudio et al., 2025). A good ESG performance also promotes green technology innovation and management innovation. Adopting ESG policy enhances companies' ability to pursue innovation activities and this way boosts

their innovation capacity (Broadstock et al., 2020). ESG reporting readiness is, therefore, closely linked with innovation management. In this light, this study also reveals that companies, especially small manufacturers, may slow down their ability to innovate effectively through ESG. The innovation potential connected with ESG practices is present, as the motivation of managers to implement ESG strategies, but it may still be underdeveloped. It is worth noting though, that surveyed companies are taking steps to build ESG awareness and transparency, which are important cultural prerequisites for sustained innovation, particularly in sustainability and process improvement.

Referring to the research questions that were formulated at the beginning of the research process, it can be stated that companies consider ESG goals and activities to be important and strategic, and they indicate quite strong motivation for implementing ESG practices, which was shown in high assessment of statements grouped in Cluster 1. They also undertake actions to build awareness of ESG goals and activities within the company and make them clear and transparent (as the results of Clusters 2 and 3 show). However, there are differences visible in the level of companies' self-assessment of transparency of ESG activities, sustainable impact initiatives, and ESG resources. Small manufacturers assessed their ESG capacity as lower than large and medium. The difference in resources needed for ESG reporting, including human, financial, and information resources, is the most significant. The fact of ESG resources was also confirmed by the experts during the informal interviews conducted by the author additionally during this study.

"(...) There is definitely a shortage of specialists in ESG reporting. Currently, these tasks are outsourced to external companies. Skills in calculating the carbon footprint are sought; there will certainly be an increasing demand for specialists in ESG reporting." – manager for occupational health and safety, environmental protection, representative of the integrated management system, and representative of a manufacturing company.

Given that no studies comparing ESG readiness and ESG practices across companies in terms of size were found in the literature, these findings provide original value to the field of ESG research.

6. Conclusions

Many studies and business practitioners emphasise a need to attribute strategic importance to ESG practices for small and medium enterprises to remain competitive and cooperate with larger partners. As subcontractors, suppliers, or clients of bigger companies, they are a crucial element of their supply chain and, therefore, their total ESG performance. The empirical study conducted within this work shows that about half of the small and medium machinery manufacturers in Poland carry out ESG activities and monitor ESG indicators. More than half display basic or good readiness for ESG reporting, following the assumed criterion. In the Polish machinery manufacturing sector, medium-sized companies seem to pay more attention to ESG practices and indicate better ESG readiness than large and small ones. However, a valuable effort could be a qualitative study investigating the reasons for such outcomes and the driving forces determining managers' decisions and actions.

This study contributes to the ESG research field theoretically and practically. It enriches the existing literature by adding more knowledge and original insight into the SME's practices in the ESG areas and readiness for ESG reporting. This can be used for scientific debate as a prerequisite for further research or developing new conceptual frameworks. The original approach to the research methodology reflects the novelty of this study and its theoretical contribution. While most existing studies focus on the ESG activities of large companies and the analysis of desk research data (mostly publicly available company reports), this study includes many small and medium-sized companies. It is conducted through a survey and uses empirical data. Thus, the study results identified actual differences in the approach to ESG within the companies, considering their size. In terms of practical contribution, the study results can benefit managers and owners of small and medium companies aiming to improve their sustainable performance and ESG maturity. They can use the developed questionnaire (Appendix) to assess all five ESG aspects or select the statements representing a chosen aspect as a basis to identify areas for potential improvements.

The study has certain limitations. The target group proved to be rather difficult to reach, as demonstrated by the low survey response rate (20%). Although some respondents expressed interest in the research – e.g., by providing comments in the open-ended questions – it was generally challenging to obtain a satisfactory sample size. The survey was addressed to both higher- and lower-level managers in order to collect the most accurate data possible in relation to the study's objectives. However, it is possible that respondents, regardless of their position, had insufficient knowledge of all ESG activities or reporting standards to correctly answer every question. Therefore, the study is rather exploratory. Moreover, it focuses on the Polish context and only one industry. It is unclear to what extent it can be generalised to other sectors or transferred to other countries, especially those where ESG is perceived completely differently, i.e., highly developed sustainable economies or third-world countries. However, it may represent a certain group of countries with a similar level of economic development and thus provide interesting comparative material for future research and a promise for scientific debate in this area. Therefore, the author believes the Polish context is not a significant drawback of this study. It provides an interesting insight into the awareness of ESG activities in small and medium-sized enterprises. The study also made an original attempt to assess readiness for ESG reporting at the company level and on a national scale. In the future, a valuable effort could be made in the form of a qualitative study to better understand the activities and motivations of companies to integrate ESG practices. In addition, further studies on the validation of the assessment tool for ESG reporting readiness could be beneficial. Such research would help companies more easily assess their readiness and interpret the results effectively. Developing recommendations for managers on ESG best practices and guidelines for increasing ESG maturity would have theoretical and practical value. These are potential and noteworthy future research directions that stem from this study.

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APPENDIX

15 statements assessed by surveyed machinery manufacturers

Please read the following statements and indicate to what extent you agree with each of them on a scale of 1 to 7, where 1 means "I strongly disagree" and 7 means "I strongly agree".

- S1.** *Our ESG goals are clearly defined, easily measurable, and realistic to achieve.*
- S2.** *We are clearly motivated to act in the ESG area.*
- S3.** *ESG goals and actions are integrated with the mission and strategy of the organisation.*
- S4.** *We analyse environmental risks and strive to reduce them in our enterprise.*
- S5.** *We have sufficient human resources with the appropriate knowledge and skills to efficiently implement programs related to ESG indicators*
- S6.** *We have the financial resources necessary to collect data to measure our ESG indicators*
- S7.** *We have the information resources (programmes, technologies) necessary to collect data to measure ESG indicators.*
- S8.** *We take action (such as training programmes, information campaigns, or employee benefits) to build awareness of our ESG activities among our employees.*
- S9.** *We effectively manage our environmental footprint (i.e., carbon, water, and energy).*
- S10.** *The social impact of our company on people in its environment (i.e., employees, customers, suppliers, and local communities) is understandable and transparent.*
- S11.** *Our internal practices, controls, standards and procedures are transparent and stable.*
- S12.** *We take action when we see ESG areas requiring improvement.*
- S13.** *Our annual ESG report is produced efficiently.*
- S14.** *We can easily generate ESG reports according to various standards*
- S15.** *We are able to meet current and/or future ESG performance reporting requirements.*