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PROSPECTS FOR THE GREEN ECONOMY IN THE SILESIAN REGION – SME ENTREPRENEURS' PERSPECTIVE

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Purpose: The article aims to explore how small and medium-sized enterprise (SME) entrepreneurs perceive the prospects for the green economy in the Silesian region, which is currently undergoing a profound economic transformation supported by the Just Transition Fund (JTF). The research adopts a comprehensive perspective on sustainability, consistent with the international policy framework defined by the Sustainable Development Goals (SDGs). It addresses a knowledge gap regarding the determinants influencing SMEs' adoption of green solutions and the relationship between financial standing, firm size, and willingness to engage in environmentally friendly practices.
Methodology: A mixed-methods approach was employed, integrating quantitative and qualitative techniques. Empirical data were collected through 635 computer-assisted telephone interviews (CATI) conducted among two groups of entrepreneurs: (a) SMEs with the potential to create green jobs and (b) green-sector SMEs. Additionally, 10 in-depth interviews (IDI) with non-randomly selected SME owners provided a qualitative understanding of motivations, barriers, and enabling factors.
Findings: The study reveals that SMEs perceive sustainability as both a challenge and an opportunity for business growth and competitiveness. Entrepreneurs acknowledge the key role of the JTF in enabling technological modernization, automation, and energy efficiency improvements. The analysis identifies clear differences between SMEs with potential for green job creation and those already operating in the green sector, reflecting varying levels of readiness and motivation to engage in the green transition.
Research limitations: The study focuses on a single region, which may limit generalizability. Future research could extend the analysis to other regions undergoing similar transformations or investigate sector-specific dynamics in greater depth.
Practical implications: The results highlight the need for tailored financial and informational incentives to encourage SMEs to integrate sustainability into their business models.

Social implications: Supporting SME participation in the green economy contributes to regional resilience, employment creation, and public awareness of sustainable development pathways.
Originality: This study fills a research gap by providing empirical evidence on the role of SMEs in implementing the green economy in a post-industrial region. It demonstrates the significance of the JTF as a catalyst for sustainable modernization and offers valuable insights for policymakers and practitioners promoting the green transition in similar contexts.
Keywords: green economy, SME, economic transformation, green management, ESG.
Category of the paper: Research paper.

1. Introduction

The first decade of the 21st century changed the outlook on the functioning of the global economy. The financial crisis that began in the US exposed the unreliability of the principles of liberal economic doctrine (Stiglitz, 2010). The response to the crisis became a conviction about the need to strengthen international cooperation in the search for global solutions to growing economic and social problems (Goswami, 2018). The social cost of the crisis has been the loss of public trust in banks, financial institutions, corporations, and public institutions and governments that have tolerated irregularities and risks in the economic system for years. The crisis has made societies and governments realise that a return to previous economic models is impossible and that it is necessary to search for new solutions (Antetomaso et al., 2018) for sustainable development.

The gradual evolution of the concept of sustainable development has brought the idea of the green economy into the EU mainstream. The search for an efficient economic model became the basis for the formulation of the next global and regional green strategies (European Commission The European Green Deal, 2019) and the creation of mechanisms to strengthen corporate responsibility for sustainable development (CSRD, 2022; CSDD, 2024).

The rejection of the traditional economic model based on fossil fuels and the adoption of a green economy model requires a fundamental change in the relationship between the economy and ecosystems. The emphasis on sustainability and environmental protection challenges entrepreneurs to integrate green solutions into their business models (United Nations Environment Programme, 2011).

The provision of non-refundable grants or soft loans to businesses that choose to implement the principles of the green economy will be key to their adoption. It is particularly important to lay the foundations for the development of micro, small and medium–sized enterprises. These entities play an important role in the economy, both in terms of employment and contribution to Gross Domestic Product (GDP).

Small and medium–sized enterprises play a key role in the economy. They are the dominant form of economic activity, accounting for between 95% and over 99% of all active enterprises, depending on the country (PARP Raport, 2023). SMEs are seen as an important source of economic growth, and their economic activity contributes to strengthening the competitiveness of regions. SMEs are known for their high level of product and process innovation. SME innovation manifests itself both in the creation of new solutions that can be captured by larger firms and in the adaptation of proven solutions to their own needs (Love et al., 2015), (Wellalage, Fernandez, 2019). As confirmed by research, this type of innovation fits with the thesis of the key role of SMEs in the adoption of the green economy (Del Brío, Junquera, 2003; Blundel et al., 2013; Higgs, Hill, 2018).

The green economy model is conducive to job creation (Kucęba, Ulewicz, 2016). Analysis of statistical data (GUS, 2023) shows that SMEs are more flexible and adapt faster to changing environments, creating more jobs than large enterprises (Voulgaris et al., 2004).

SMEs are a very diverse group of enterprises. There is no definition in the literature that clearly specifies the criteria for a business entity to belong to the group of micro, small and medium–sized enterprises (Magdziarczyk, Widera, 2024). Most often, quantitative and qualitative criteria are specified, considering differences in macroeconomic and socio–economic conditions, as well as the specificity of the industry in which these economic entities operate (Magdziarczyk, 2023; Wach, 2014). To implement a common economic policy within the EU Member States and the European Economic Area, in 2003 the European Commission adopted a uniform system for classifying companies operating in the European Union (European Commission, 2003). In Polish law, the concept of micro, small and medium–sized enterprises has been defined in accordance with the European Union guidelines in Article 7 of the Law on Entrepreneurs (Parliament of Poland, 2024). Three quantitative classification criteria have been adopted to distinguish SMEs: average annual employment in full–time equivalents (employees: micro 1-9, small 10-49, medium 50-249), net turnover from sales of goods, products, services and financial operations (turnover in euro: up to 2 million euro, up to 10 million euro, over 10 million to 20 million) and total assets in the balance sheet at the end of the financial year (assets in euro: up to 2 million euro, up to 10 million euro, over 10 million to 20 million).

In the economic structure of the EU, Poland or the Silesian Region, SMEs are numerically dominant and employ more than two thirds of the workforce (see: Table 1). The economic condition of SMEs is crucial for the proper functioning of the economy.

Table 1.
Type of enterprises and their number, structure and employees

Number and structure of enterprises by type						
Type of company	**EU**		**Poland**		**Silesian Region**	
	abs. numbers	%	abs. numbers	%	abs. numbers	%
Micro	21 851 492	93,5	1 963 893	95,0	515 471	96,2
Small	1 287 959	5,5	84 353	4,1	16 414	3,1
Medium	201 000	0,9	14 712	0,7	3 323	0,6
Large	42 000	0,2	3 251	0,2	531	0,1
Total	**23 382 451**	**100**	**2 066 209**	**100**	**535 739**	**100**
Number and structure of employees in enterprises by type						
Type of company	**EU**		**Poland**		**Silesian Region**	
	abs. numbers	%	abs. numbers	abs. numbers	%	abs. numbers
Micro	37 204 470	29,2	3 477 828	34,8	421 360	24,9
Small	24 743 146	19,4	1 664 747	16,7	297 124	17,5
Medium	20 088 003	15,7	1 519 964	15,2	342 318	20,2
Large	45 584 293	35,7	3 334 374	33,3	634 738	37,4
Total	**127 619 912**	**100**	**9 996 913**	**100**	**1 695 540**	**100**

Source: GUS (2024). Bank Danych Lokalnych, https://bdl.stat.gov.pl

The ability of companies to respond to changes in their environment is crucial to their growth. Although green economy practices are most developed in large companies, which will be required to report on their activities according to Environmental, Social, Governance (ESG) standards from 2024 (CSRD, 2022; CSDD, 2024), the active involvement of SMEs in the green economy process, facilitated inter alia by the support instruments (Just Transformation Funds – JTF) provided by the European Green Deal (European Commission The European Green Deal, 2019), is most important for the uptake of green economy principles. The JTF established on the basis of Article 175 of the Treaty on the Functioning of the European Union and a Regulation of the European Parliament and of the Council of the EU (European Parliament and Council of the European Union, 2021), aims to support regions and sectors affected by the transition, in particular those dependent on fossil fuels and with high greenhouse gas emissions.

For the period 2021–2027, the JTF has a budget of €17.5 billion, of which Poland received €3.85 billion, the largest amounts are dedicated for the regions of Lower Silesia, Silesia (the main JTF beneficiary in Poland – EUR 2.22 billion), Małopolska, Łódź, Wielkopolska and Lublin Regions. Adopting a green development model is particularly important in regions undergoing profound economic change. An example of such a region in Poland is the Silesian Region, which for many years was dominated by the mining, steel and energy industries. The economic transformation currently taking place there is being supported by several financial instruments, including those aimed at SMEs.

The aim of this paper is to gain an understanding of how entrepreneurs from the SME sector assess the prospects for the development of the green economy in the Silesian Region. To achieve this goal, the following research questions were formulated:

RQ1: What is the predilection to implement the Green Economy according to the size of the SME?

RQ2: Does the current financial situation of the SME influence the decision to implement and/or continue to implement the Green Economy in the business model?

RQ3: Will the estimated financial health of the SME in 2027 influences the decision to implement or continue to implement the Green Economy in the business model?

Finding answers to the given research questions required the analysis of statistical data and key publications connected to the definition of SMEs. The crucial is also to emphasis their role in the economy, as well as the characteristics of financial support instruments available in the Silesian Region and their results.

The article is divided into the following five sections: (1) Introduction, presenting the context and importance of green growth; definition of SMEs and sources of financial support in the Silesian Region; (2) Materials and Methods, describing the research methods used; (3) Results presenting; (4) Discussion the main findings of the study and their implications and (5) Conclusions and recommendations, summarizing the results and formulating recommendations.

The article is of a practical nature, diagnosing selected phenomena of the labour market in the Silesian Region.

2. Materials and Methods

The study employed a mixed methods approach (Creswell, 2008), drawing on data from two key investigations. The first, *The Labour Market in the Field of Green Economy in the Silesian Region* (2024), was conducted by the BST Group for the Voivodeship Labour Office in Katowice. The second was carried out within the framework of the *Sustainable Alliance Manager: Learning Experience towards Collaborative Skills with Green Consciousness* project (023–1–ES01–KA220–HED–000157968; SAMExperience), involving partners from Mondragon Unibertsitatea (Spain), West University of Timisoara (Romania), Lithuania Business College (Lithuania), Universita di Foggia (Italy), University of Katowice (Poland), and Resolvo Responsible Solution (Italy). These investigations provided the foundation for the analysis presented in this article.

The first study (see: Table 2), was carried out from August to December 2023. The sample was selected on a strati ed quota basis. A total of 635 computer–assisted telephone interviews (CATI) were conducted.

Table 2.
Number and structure of respondents

Number of employees	Entrepreneurs with the potential to create green jobs	Entrepreneurs in the green sector
Micro (1-9)	121	100
Small (10-49)	125	115
Medium (50 and over)	88	86
Total	334	301

Source: *The Labour Market in the Field of Green Economy in the Silesian Voivodeship* (2024).

The results of the survey had a confidence level of 95% and a maximum margin of error of 4%. The respondents were selected from two groups of entrepreneurs: (a) SME entrepreneurs with the potential to create green jobs and (b) SME green sector entrepreneurs. The research was conducted using a questionnaire consisting of 20 closed questions for entrepreneurs with the potential to create green jobs and 18 closed questions for SME green sector entrepreneurs. The questionnaire included questions on the number of employees, the type of business and the geographical region of the business. The number of employees was used for subsequent statistical analyses to identify differences in the views of the two groups of respondents.

In the first group of SMEs with the potential to create green jobs, 334 computer–assisted telephone interviews were conducted. The final qualification of an enterprise with the potential to create green jobs for the study was a consequence of the respondent's confirmation of carrying out activities or introducing solutions contributing to the improvement of the environment in at least two categories distinguished based on the provisions of the *Regional Innovation Strategy of the Silesian Region* (RISSW 2030).

In the second group of respondents: SME green sector entrepreneurs with jobs already classified as green, 301 computer–assisted telephone interviews were conducted.

Eligible companies in this group had to demonstrate that they are active in the green economy areas and/or use green economy related technologies identified in the RISSW (2021). The next study resulted from the tasks of the project Sustainable Alliance Manager: Learning Experience towards Collaborative Skills with Green Consciousness 2023–2026, which aims to develop knowledge on green consciousness and green competences among SME entrepreneurs. The analysis is based on the results of in–depth interviews (IDIs) conducted with SME entrepreneurs who have formed strategic alliances with partners operating in green sectors or using green sector–related technologies. The IDIs aimed to deepen the knowledge of the phenomena identified in a study commissioned by the Voivodship Labour Office in Katowice. Interviews were conducted between May and July 2024 with 10 non–randomly selected SME entrepreneurs from the green sector (Szreder (2004)). To conduct the in-depth interviews, 12 pre–prepared dispositions written in the interview questionnaire were used. The interviews were recorded and transcribed. In this article, expert statements have been marked as SAMExperience.

The research sought to identify the factors that determine the interest of the entrepreneurs surveyed in green solutions. In addition, it was decided to find out how companies with the potential to create green jobs di er in this respect from SME green sector entrepreneurs. For this reason, the survey, which consisted of three steps, was carried out separately in these two groups of companies.

Step 1. Chi-square test (Cramer, 1946) was used to identify factors that may significantly influence the interest of companies in implementing pro–environmental measures. It is a tool to examine the relationship between two qualitative variables.

Step 2. For those factors that were found to significantly influence interest in pro-environmental solutions, an additional correspondence analysis was conducted (Greenacre, 2021). This is an exploratory technique for examining contingency tables, the aim of which is to produce a suitable graph, known as a correspondence map, showing the relationships between the categories of variables under study. These relationships are inferred from the arrangement of the points representing these categories on the map. The closer the points analysed are to each other, the more the categories corresponding to them are related to each other.

Step 3. As already mentioned, the survey was carried out separately in the group of companies with the potential to create green jobs and separately among SME green sector entrepreneurs. Thus, in the final stage, the results obtained were compared and relevant conclusions were drawn, which were also confronted with the opinions of the experts participating in the in-depth interviews.

It should be emphasised that the aim of the study was achieved using appropriate data analysis methods. The choice of these methods was guided, among other things, by the scale of measurement of the variables, which very often determines the choice of appropriate statistical tools. This was also the case here the identification of relationships between the nominal variables studied and their categories was possible thanks to the chi–square test and correspondence analysis.

Given the applied nature of the article and the wide availability of relevant literature on the subject, a detailed description of the methods used has been omitted, as it is not necessary to explain the results of the study.

3. Results

In line with the stated aim of the research and the description of the analysis, the first step was to find out which characteristics of the SMEs surveyed had a significant impact on their interest in adopting green solutions. The results of the chi-square tests carried out are presented in Table 3.

Table 2.
Results of the chi–square tests carried out based on Respondents' Opinions on Companies' Interest in Implementing Environmentally Friendly Measures in the Silesian Voivodeship

	Green sector		Companies with green potential	
	χ^2	p-value	χ^2	p-value
Company size	13,313	0,038	14,468	0,025
Current financial and economic condition of the company	6,945	0,643	25,523	0,002
Future financial and economic health of the company	16,990	0,049	21,234	0,012

Source: authors' own work.

It is well known that if the calculated p–value is less than the accepted level of significance, we treat the verified relationship as statistically significant. In this case, this means that:

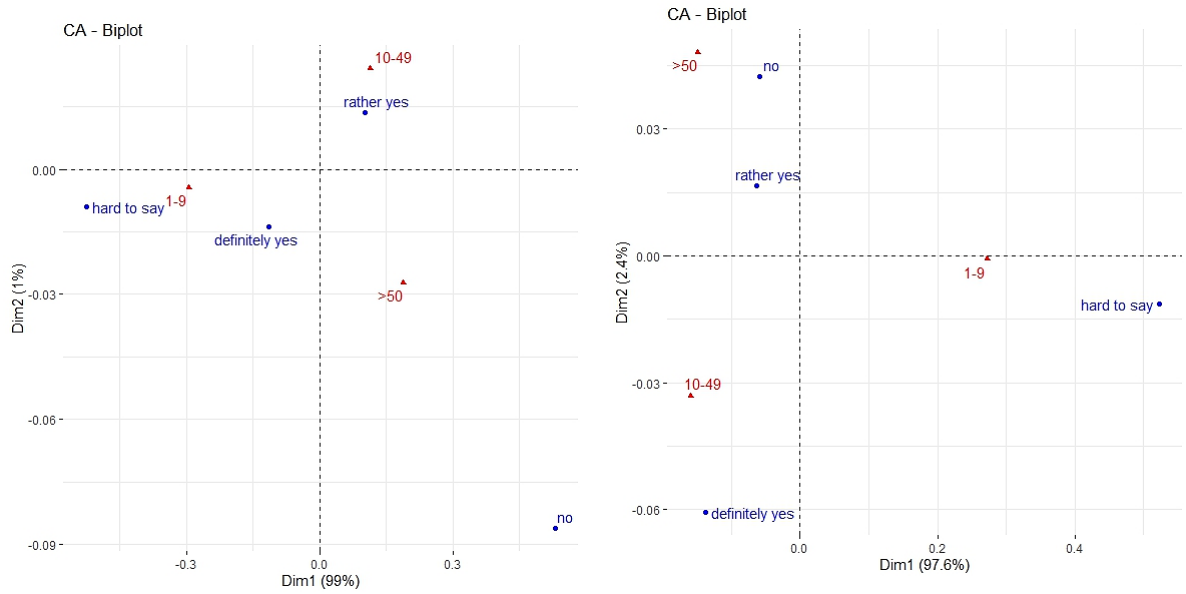
- The interest of companies in the green sector in introducing pro–environmental solutions depends significantly on: the size of these companies, their belief in their future financial condition and future employment situation, and their views on the future of the green economy in Silesia.
- In turn, among companies with the potential to create green jobs, interest in green measures is influenced by the size of these companies, their current financial situation, but also an assessment of their future financial condition and future employment situation, as well as views on the future of the green economy in Silesia.

In the next stage, the survey was extended by performing a correspondence analysis. As already mentioned, it made it possible to check which categories of factors, significantly influencing interest in pro–environmental activities, are most frequently associated with respondents' answers concerning this interest. As before, SME green sector entrepreneurs and companies with green potential were analysed separately, in each case interpreting and comparing the results of the analyses presented in the correspondence maps.

3.1. Size of SMEs and propensity to implement environmental solutions

Small (37.4%) and micro enterprises (36.2%) accounted for the largest number of respondents with the potential to create green jobs. Among the pro–environmental activities undertaken, respondents reported waste separation (95.9%) and recycling or use of recycled materials (28.1%). A slightly smaller group of respondents reduce energy consumption by purchasing energy efficient equipment (22.5%), upgrading buildings (19.2%) and using renewable energy sources (18.3%). Small (38.2%) and micro–enterprises (33.2%) were also the most common types of green sector respondents. The main areas of activity reported by respondents were waste collection and separation (75.2%), technologies for ecological, safe and efficient waste treatment and management (45.5%) and waste management and recycling (30.9%).

The analysis of the relationship between the size of the SME and the adoption of environmentally friendly solutions showed a relationship for both enterprises with the potential to create green jobs and those already active in the green sector. As shown in Figure 1, medium–sized enterprises with the potential to create green jobs are most likely to report that they are not interested in adopting green solutions, while medium–sized enterprises in the green sector are most likely to report that they are interested in adopting such solutions. Small enterprises with the potential to create green jobs and small enterprises in the green sector very often indicate a moderate interest in adopting innovative solutions.



(a) SME green sector entrepreneurs **(b) SME with the potential to create green jobs**

Figure 1. Relationship between interest in green solutions and company size among companies in (a) SME green sector entrepreneurs and (b) SME with the potential to create green jobs.

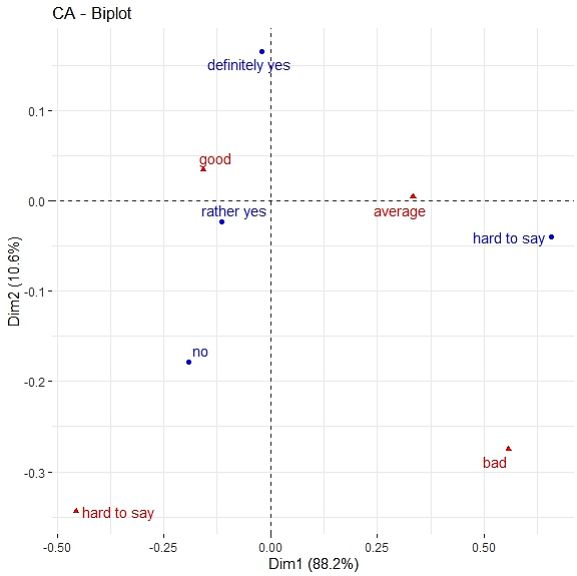
Source: own elaboration in R.

The flexibility of SMEs determines how quickly they engage in future–oriented industries, key to the green economy. An expert from SAMExperience stated that "Silesia's transformation depends on entrepreneurs' attitudes toward innovation and the availability of aid funds, with SME absorption being crucial". Another SAMExperience expert highlighted "that education and financial and regulatory incentives influence interest in green products and services among entrepreneurs and the public". Medium–sized enterprises show discrepancies in survey results due to their industry, as those in traditional sectors are less inclined to take risks. Companies with the potential to create green jobs locate their activities in more traditional sectors of the economy and hence have a lower propensity to take risks. However, according to SAMExperience expert: "in Silesia, industrial traditions, along with developed technical and social infrastructure, support the green economy's growth". This view is confirmed by studies on municipal institutional development (Frączkiewicz-Wronka et al., 2020).

3.2. Current financial condition of SMEs and propensity to implement green solutions

The financial condition of an enterprise is a key factor influencing the undertaking of activities related to a change of sector or type of activity, including the implementation of green solutions. Of the respondents with the potential to create green jobs, the majority (62.0%) consider their financial situation to be good and one in three (30.8%) consider it to be average. Only a small proportion of respondents (2.7%) gave a negative assessment. Enterprises with a higher number of employees are more likely to be in a better financial situation: 75.0% of small and medium-sized enterprises assess their situation positively, compared with 48.8% of micro enterprises. A similar trend can be observed among SME green sector entrepreneurs, where 66.4% rate their financial situation as good and 25.6% as average. Enterprises with a higher number of employees are more likely to have better ratings, with 81.4% of small and medium-sized enterprises rating their situation positively, compared with 52.0% of micro enterprises. Negative assessments are rare, but more common among micro enterprises (8.0%) than among enterprises with higher number of employees (0.9%).

When asked how the current financial situation of enterprises with the potential to create green jobs affects their willingness to implement the green economy, SMEs in good condition indicate that they are interested in such solutions, while enterprises in average condition very often do not formulate a clear answer about green solutions. Companies that are unable to assess their current financial situation are the most likely to report a lack of interest in environmental issues (Figure 2). There is no statistically significant relationship between SME green sector entrepreneurs, so there is no basis for a correspondence analysis and to create a correspondence map.



(b) SME with the potential to create green jobs

Figure 2. Relationship between interest in green solutions and current financial situation of the company among (b) SME with the potential to create green jobs.

Source: own elaboration in R.

The financial condition, the number and competence of the workforce and the vision of strategic development directions formulated by entrepreneurs determine the survival and growth of their companies. No less important are the developmental conditions occurring in the company's environment. Importance should be attributed to the ability of public labour market actors to create an ecosystem of labour market services (Kozak, 2023). Effective ecosystems of labour market services support the activity of entrepreneurs and foster the creation of the value they desire, which is the possibility of obtaining support for innovation from European funds. A product or service produced in a way that does not burden the environment is also a desirable public value that translates into the quality of life of society (Osborne, 2020). The introduction of SDGs including especially the funding of initiatives related to the implementation of the green economy by SMEs contributes to the financial condition of companies. Respondents from both SME groups surveyed perceive the in ow of funds under the Polish National Recovery Plan (NRP) as an opportunity to achieve a better position in the competitive market. An expert from SAMExperience said that "the increase in consumer awareness will force companies to implement green solutions, which in turn will influence the demand for increased specialists in the area of sustainability and ecology".

3.3. Future financial condition of SMEs and propensity to implement green solutions

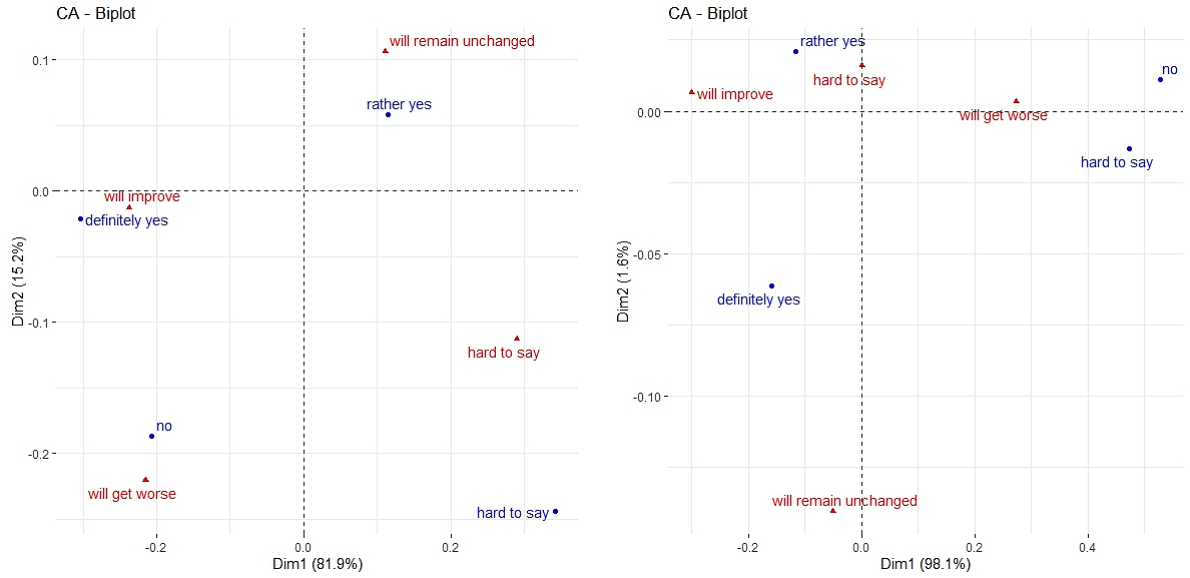
The entrepreneurs surveyed with the potential to create green jobs are most likely to believe that the financial situation of their enterprise will remain unchanged (40.1%) or improve (35.9%) in the perspective of 2027. One in five respondents was unable to assess the possible change in their company's situation in such a perspective (19.2%). Only 4.8% of employers expected the situation to get worse. An analysis of the responses to the question according to the size of the SME shows that medium-sized enterprises are more likely than other respondents to expect an improvement (43.2% against 28.1% for micro enterprises). On the other hand, micro enterprises were more likely to report no change in their financial situation in 2027 (47.1% compared with 31.8% of medium–sized enterprises), and they were more likely to perceive their current financial situation as average.

SME green sector entrepreneurs were the most likely to expect their financial situation to improve (39.5%) or remain unchanged (35.2%) by 2027. Few entrepreneurs expect their business to get worse in the coming years (3.7%). The larger the enterprise, the higher the percentage of employers who believe that the financial and economic situation will improve by 2027 (47.7% for medium–sized enterprises compared with 31.0% for micro enterprises). On the other hand, the distribution of answers among those who believe that their company's situation will not change is even and similar to the general distribution.

For enterprises with the potential to create green jobs, the assessment of future financial condition has a significant influence on the declaration of interest in green solutions. However, the declarations of the different groups of companies are slightly different for companies with potential than for SME green sector entrepreneurs. Figure 3 shows that companies that believe

their financial situation will improve are the most likely to express an interest in green measures ("rather yes" and "definitely yes"). However, the answer "definitely yes" to interest in green solutions was also frequently chosen by companies that did not expect their financial situation to change. In addition, the answer "rather yes" was often chosen by companies that had difficulties in assessing their situation. Companies that say their situation will get worse do not expect to implement environmental solutions.

When asked about the potential impact of a company's financial condition in 2027 on the decision to implement the green economy, respondents SME green sector entrepreneurs who expected their financial condition to improve were the most likely to indicate an interest in green measures. Companies that expect their situation to remain the same are more likely to be moderately interested in these measures. Companies that say their situation will get worse or have no opinion about their future green activities will not be acting in a pro–ecological way.



(a) SME green sector entrepreneurs **(b) SME with the potential to create green jobs**

Figure 3. Relationship between interest in green solutions and the future financial condition in (a) SME green sector entrepreneurs and (b) SME with the potential to create green jobs.

Source: own elaboration in R.

As a consequence of the activities of the public labour market actors, the level of use of subsidies for taking pro–environmental measures by entrepreneurs in the Silesian Region is very high. However, the results of the conducted survey indicate moderate support for the implementation of green solutions if they do not generate a better financial condition of the company. Respondents from companies in the green sector believe that they will take pro-environmental measures even if their condition does not change. The SAMExperience pointed out that, in his opinion, the mere fact of bene ting from a subsidy for the pro-environmental development of a company is a significant gain. It may not bring an immediate improvement in the SME's financial condition, but it will not be insignificant in the long run of the business for achieving a better position in the competitive market. The possibility to support the business with external funds is important. It is important to

convince respondents that the introduction of pro–environmental solutions will also bring them financial benefits in the future, as they see in ecology the possibility of gaining a competitive advantage by following trends.

4. Discussion

The implementation of sustainable development principles, including ESG (Environmental, Social, Governance) strategies, is becoming increasingly important for small and medium-sized enterprises (SMEs) in the Silesian region. Analysing scientific literature and available reports allows for a better understanding of the factors influencing the implementation of these strategies, as well as the benefits and challenges associated with their adoption.

Research indicates a positive correlation between the implementation of ESG strategies and the financial performance of enterprises. For example, companies engaging in pro-environmental and social activities often enjoy greater customer trust, which translates into increased sales and consumer loyalty (Garrido-Ruso et al., 2024). Additionally, investors are increasingly considering ESG practices when making investment decisions, which can facilitate SMEs' access to capital (Whelan et al., 2021). Momtaz and Parra (2024) demonstrated that ESG disclosure by SMEs can lead to improved financial performance, as it enhances investor trust and attracts financial institutions' interest.

A meta-analysis conducted by Friede, Busch, and Bassen (2015), as well as Whelan, Atz, Van Holt, and Clark (2021), found that in most cases, there is a positive relationship between ESG practices and financial performance. Similar conclusions were presented by Hamdi, Guenich, and Ben Saada (2022), showing that better financial performance can also contribute to improved ESG outcomes. However, research by Earnhart and Lizal (2006) suggests that the effectiveness of these strategies may depend on ownership structure and access to capital. Thus, implementing ESG strategies also comes with challenges. Smaller enterprises may encounter difficulties due to limited financial and human resources, which can hinder the effective adoption of comprehensive sustainability strategies (Gholami, Murray, Sands, 2022; Fatemi et al., 2018). Similarly, De Haas et al. (2021) highlight that financial and managerial barriers are key obstacles to the transition of SMEs towards a low-carbon economy. Additionally, a lack of awareness about the benefits of ESG may lead to resistance to change (Akhtar, Senadjki, Kumaran, 2023; Khan et al., 2016). Nicoara and Kadile (2023) emphasize that for SMEs in the United Kingdom, the key factors determining engagement in ESG include stakeholder pressures and opportunities to enhance reputation and client relationships.

An extensive body of literature suggests that the relationship between ESG (Environmental, Social, and Governance) performance and a company's financial results is complex and not always positive. While some studies highlight a beneficial correlation, others suggest no link

or even a negative impact. For instance, research conducted by Wasiuzzaman et al. (2022) indicates that ESG disclosure may, under certain conditions, negatively affect a firm's financial standing. Similar conclusions were drawn by Fahad and Busru (2021), who examined data from 386 companies listed on the Indian BSE 500 index between 2007 and 2016, noting that ESG initiatives sometimes impose financial burdens that outweigh their benefits in the short term.

The moderating role of firm size in the ESG-financial performance relationship has also been widely discussed. Studies by Ahmad et al. (2021) and Shakil (2021) emphasize that larger firms tend to benefit more from ESG engagement due to their resource availability and ability to integrate sustainability into long-term strategic planning. Conversely, smaller firms, constrained by limited financial resources, may struggle to realize immediate financial benefits from ESG adoption. However, Bahadori et al. (2021) argue that when controlling for firm size and debt levels, companies with stronger ESG performance tend to achieve higher profitability, suggesting that ESG initiatives may contribute to financial success under specific conditions.

Beyond firm size, other factors influencing the ESG-financial performance nexus have been explored. Studies by Van Linh et al. (2022), Chouaibi et al. (2022), and Sinha Ray & Goel (2022) examine ESG's impact on firms' market value, concluding that while ESG investments may enhance reputation and stakeholder trust, their financial implications depend on industry characteristics and regulatory environments. Despite these insights, the reverse causality—how financial performance influences ESG commitments—remains underexplored. Hamdi, Guenich, and Ben Saada (2022) highlight this gap, noting that few studies explicitly analyze whether firms with strong financial performance are more likely to enhance their ESG activities. Their research on 504 U.S. companies (2000-2020) supports stakeholder theory, demonstrating that firms with robust financial results tend to allocate greater resources to sustainability initiatives.

The bidirectional nature of the ESG-financial performance relationship cannot be overlooked. While financial strength influences a company’s ability to invest in ESG initiatives, ESG engagement can simultaneously enhance financial results by improving corporate reputation, increasing risk resilience, and optimizing operational efficiencies (Ahmad et al., 2021; Shakil, 2021). However, financial constraints, particularly among SMEs, present significant barriers to ESG investment. Research by Cuerva, Triguero-Cano, and Córcoles (2014) indicates that SMEs, often characterized by their risk-averse nature, hesitate to adopt new technologies due to concerns about prolonged return-on-investment periods. Similarly, findings from Fleiter, Schleich, and Ravivanpong (2013) suggest that high initial costs deter SMEs from implementing energy-efficient solutions, despite the long-term financial benefits. Thus, while ESG integration can yield advantages, financial limitations may hinder smaller enterprises from fully capitalizing on its potential.

Overall, while ESG practices can enhance corporate value in the long run, their financial implications vary depending on firm size, industry sector, and resource availability. Further research is necessary to explore the dynamic and bidirectional nature of this relationship, particularly within different economic contexts and regulatory frameworks.

This study contributes to filling the research gap by examining the relationship between financial standing and the willingness of SMEs to invest in green economy solutions. While much of the existing literature focuses on large corporations, fewer studies address the financial determinants of sustainability-driven investments among SMEs. This research specifically investigates how the size of an SME influences its inclination to adopt environmentally friendly business practices. The findings provide insights into the challenges that smaller enterprises face when integrating sustainability into their business models and highlight the role of financial stability in shaping investment decisions related to the green economy.

Human resources also play a key role in the process of implementing sustainable development. Employees with the right skills and environmental awareness can initiate and execute pro-environmental projects, contributing to the achievement of sustainability goals (Martínez-Conesa, Soto-Acosta, Palacios-Manzano, 2017). SMEs, despite being aware of the potential benefits of improved environmental management, face significant resource constraints, skill shortages, and a lack of knowledge in this area (OECD, 2018). Even when enterprises recognize the potential for improving competitiveness through pro–environmental initiatives, a lack of competencies and specialized knowledge often prevents their implementation (Nicoara, Kadile, 2023). Therefore, training and skill development in ESG are essential for the effective implementation of these strategies, particularly in the context of managerial barriers and limited access to experts (De Haas et al., 2021).

However, in practice, many SMEs encounter barriers such as limited resources for training and a lack of access to sustainability experts. Therefore, support from public institutions and industry organizations in terms of education and advisory services for SMEs is crucial (Bassi, Guidolin, 2021).

Access to financing is one of the key factors determining the ability of SMEs to implement sustainable development strategies. Financial institutions are increasingly considering ESG performance when assessing the creditworthiness of enterprises, offering better financing conditions to companies that meet specific standards. In Poland, support programs such as the "Circular Economy in SMEs" initiative, offered by the Polish Agency for Enterprise Development (PARP), aim to assist companies in transitioning towards a sustainable business model. However, despite the availability of such programs, many SMEs do not fully utilize them, often due to a lack of information or complicated application procedures (OECD, 2021). Additionally, De Haas et al. (2021) indicate that limited access to financing and regulatory uncertainty are significant obstacles to accelerating the ESG transition in the SME sector.

An essential challenge hindering the ecological transformation of SMEs is the difficulty in accessing financial resources. McDaniels and Robins (2017) emphasize that financial constraints remain a fundamental barrier, identifying several critical factors limiting capital availability. These include insufficient data on the specific financial needs of SMEs, asymmetry in information between enterprises and financial institutions, a lack of customized financial products suited to different business growth stages, bureaucratic and institutional restrictions, as well as a general lack of knowledge and expertise among SMEs regarding the effective use of available funding instruments.

Furthermore, a study by the European Commission (2018) underscores the extent of these financial limitations, revealing that over a quarter (27%) of SMEs across the EU regard inadequate financial resources as a significant challenge to implementing sustainability initiatives—an issue that is less pronounced among larger firms, where only 21% express similar concerns. Additionally, a shortage of specialized skills required for green transition poses another obstacle, with 15% of SMEs citing a lack of expertise as a limiting factor, compared to 13% of larger enterprises. These findings highlight the disparities between different business sizes in terms of their ability to secure funding and acquire the necessary competencies to transition towards environmentally sustainable models.

The combination of financial constraints and skill deficiencies suggests that SMEs face greater hurdles than larger corporations in adapting their business models to meet sustainability goals. Addressing these challenges requires targeted policy measures, improved financial instruments tailored to SMEs, and enhanced educational programs aimed at equipping smaller businesses with the knowledge and skills necessary to leverage green financing opportunities effectively.

In the Silesian region, there is a moderate utilization of available funds, which may be due to bureaucratic barriers and low awareness of financial support opportunities. Additionally, the lack of adequately qualified personnel and difficulties in accessing ESG experts and advisors represent significant obstacles to the development of sustainable practices in SMEs.

An analysis of research findings also shows that small and micro-enterprises are less likely to invest in green technologies compared to medium-sized firms, a trend confirmed by the existing literature. This is primarily due to limited access to capital and the smaller scale of their operations. In contrast, medium-sized firms are more inclined to invest in eco-innovations, which may be attributed to better access to EU funding and greater market pressure to integrate ESG principles.

Moreover, companies aligned with ESG standards gain access to more attractive financial instruments, such as green loans or transition bonds, which positively impact their financial performance. Research by Drempetic, Klein, and Zwergel (2020) found that large firms achieve higher ESG scores than smaller entities, likely due to their ability to invest in ESG reporting and sustainability strategies. Small firms, on the other hand, may encounter barriers related to limited financial and human resources (Drempetic, Klein, Zwergel, 2020).

In this context, implementing strategies that support SMEs in adopting ESG, such as certifications and tax incentives, is crucial. OECD (2021) suggests that improving access to financing and simplifying reporting procedures could facilitate the implementation of ESG strategies by smaller firms.

ESG certification and reporting are becoming increasingly important for SMEs, especially in the context of collaboration with larger entities and financial institutions. Transparency in ESG activities can enhance customer and business partner trust while also opening access to new markets and funding sources (Garrido-Ruso et al., 2024). Additionally, Kusuma, Muafi, and Kholid (2023) emphasize that the use of innovative IT solutions can improve the efficiency of ESG processes in SMEs, particularly in the context of ESG reporting and data analysis.

Despite the benefits of implementing ESG strategies, the SME sector still faces significant challenges related to access to financing, organizational barriers, and a lack of competencies and specialized knowledge. To support the ecological transformation of SMEs, coordinated actions from governments, financial institutions, and organizations supporting SME development are essential. These efforts should include simplifying financing procedures, promoting training programs, and developing an ecosystem that supports ecological innovation.

Research findings confirm that the implementation of a green economy in the SME sector in Silesia largely depends on access to financing, employee competency levels, and company size. Another favorable factor is the increasing regulatory and societal pressure to adopt ESG strategies. To accelerate this transformation, it is crucial to simplify financing procedures and provide educational support for entrepreneurs regarding the implementation of environmental solutions. Additionally, increasing the availability of ESG experts and advisors is essential to enable companies to effectively implement sustainable development strategies.

5. Conclusions and recommendations

Poland’s accession to the EU has opened the possibility of bene ting from a wide range of financial assistance, which has contributed to the dynamic socio–economic development of the country. The success of the decisions taken to stimulate entrepreneurship with the help of aid funds is particularly evident in the Silesian Region, which has gone from being a region in economic decline to being one of the regions with the highest potential and GDP dynamics in Poland.

The results of the research conducted confirmed the propensity of entrepreneurs, regardless of the size of the SME, to implement the principles of the green economy in their business models (RQ1). The transformation of the economy in the Silesian Region resulting from the transition away from coal is profound and affects many sectors. Experts emphasise that its effectiveness depends on the attitude of entrepreneurs and the effectiveness of support

instruments. SMEs show interest in green solutions, which can accelerate the development of the green economy in the region, the raising of environmental awareness and the development of technical and social infrastructure. The financial condition of enterprises plays a key role in their willingness to implement green solutions (RQ2). More than 60% of employers with the potential to create green jobs rate their financial situation as good, which increases their willingness to invest in green solutions. Companies with average financial condition are less decisive on this issue, and those who cannot assess their situation are often not interested in environmental issues. The decision to change the business model is also influenced by the estimated changes in the future financial condition of the SME (RQ3). Entrepreneurs with the potential to create jobs are generally optimistic about the future financial condition of their enterprise in 2027, predicting stability (40.1%) or improvement (35.9%). Medium–sized enterprises are more likely to expect improvement than micro enterprises. Similar trends can be seen among companies in the green sector, with medium sized companies more confident in the future improvement of their financial condition.

Enterprises that expect their financial situation to improve are the most likely to express an interest in green measures, while those that expect their financial situation to worsen are less likely to do so.

According to respondents from both groups, the development of the green economy will be promoted above all by simple and clear procedures for accessing public funding for environmentally friendly economic activities and by increasing public knowledge and awareness of ecology.

Preferential prices for green technologies and solutions will also be important. Factors hindering the development of the green economy were identified as high prices for environmentally friendly technologies and solutions, complicated procedures for public funding of pro ecological economic activities, legal regulations hindering green economy activities, and low levels of public knowledge and awareness of ecology.

Based on the results of the study, the following conclusions were drawn:

- For an effective green transformation in the region, it will be crucial to implement various incentives for entrepreneurs, especially in the SME sector, to encourage them to adopt green solutions. The JTF is an important source of support for SMEs in the Silesian Region, enabling companies to modernise technology, automate production and improve energy efficiency.
- Investments made under the JTF are expected to contribute to increasing the competitiveness of the regional economy and improving the quality of life of the population by creating new jobs and developing innovative solutions.
- Despite significant financial support, it will also be crucial to change the attitude of entrepreneurs towards the green transition, including in the SME sector, which will have a significant impact on the success and effectiveness of the implementation of the green economy.

Observation of market phenomena allows us to conclude that the green economy is becoming a factor of structural change in the economy and social life. The process of development of the green economy is accompanied by significant changes in the structure of production, changes in the share of individual sectors of the economy in the creation of GDP, changes in the structure of employment, new directions of investment and the pro le of specialisation of the economy of the regional, national and international aspect (Markandya et al., 2016).

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