

FINANCIAL LITERACY AND THE ADOPTION OF SUSTAINABLE STRATEGIES IN SMEs: A GLOBAL BIBLIOMETRIC ANALYSIS

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Abstract

This article explores the influence of financial and accounting education on the ability of small and medium-sized enterprises (SMEs) to adopt sustainable strategies. Financial literacy is becoming an essential competence for SMEs, especially in the context of current economic challenges, requiring the transition to a green economy and facing increased regulatory pressures (such as the European Green Deal and the Corporate Sustainability Reporting Directive – CSRD). The research aims to answer two fundamental questions:

- (1) To what extent does financial and accounting education influence the integration of sustainability into SME strategies? and
- (2) What are the main research directions on the connection between financial literacy and sustainable performance in SMEs, according to the scientific literature from 2019–2024?

To answer these questions, a bibliometric analysis of 345 relevant articles from the Web of Science database was conducted using the VOSviewer tool. The results highlighted the existence of significant clusters of terms linking the concepts of sustainability, financial performance and financial education. An emerging correlation was also identified between financial-accounting education and the ability of SMEs to access green financing, report according to ESG standards and adopt responsible business models.

The research findings highlight the importance of developing educational policies and public initiatives tailored to the needs of SMEs, especially in regions with low levels of financial literacy. The paper provides a relevant theoretical contribution to the sustainability literature and opens new directions for applied research on financial resilience and sustainability integration in the SME sector.

Keywords:

financial education; SMEs; sustainability; financial-accounting literacy; bibliometric analysis

JEL Classification

G53, M41, Q56

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Introduction

The global economy depends heavily on SMEs because they drive economic expansion and innovation and create employment opportunities. According to the World Bank, small and medium enterprises represent 90% of all enterprises and create more than 50% of worldwide employment. The World Bank also reports that SMEs generate 40% of GDP in emerging economies, and when informal enterprises are added to the calculation, the percentage rises substantially (World Bank, 2021, "Small and Medium Enterprises (SMEs) Finance"). The research by Bartolacci et al. (2019) shows that SMEs account for 60% of carbon dioxide emissions, together with 70% of global pollution. SMEs make up 99.8% of non-financial enterprises in the European Union and produce 53.1% of value added during 2023 (OECD 2023). These businesses serve as economic growth drivers that create more than 88.7 million employment opportunities (Eurostat, 2024). Businesses encounter various constraints, such as restricted financial opportunities, higher inflation rates and stricter sustainability standards.

The European Green Deal and the UN 2030 Agenda require SMEs to fulfil their essential role in achieving these goals. SMEs are essential for the European industrial ecosystem to advance innovation and competitiveness by developing sustainable technologies and solutions (including waste material recovery and carbon capture systems (Katsinis et al., 2024)).

The European Union adopted the Corporate Sustainability Reporting Directive (CSRD) to improve sustainability reporting in companies. This directive is an extension of the Non-Financial Reporting Directive (NFRD) and applies to all large companies and SMEs listed on regulated markets in the EU. The Directive was adopted in December 2022 and entered into force in January 2023: from 2024 for large companies, from 2025 for other large enterprises and from 2026 for listed SMEs. It is estimated that CSRD will affect around 50,000 companies across Europe, compared to around 12,000 covered by the NFRD. This includes a significant number of SMEs listed on regulated markets. There is a high impact on SMEs because they will need to align their reporting practices to the new standards to ensure transparency and sustainability, thus contributing to the transition to a green and sustainable economy (Sustainability Academy, 2023).

Financial literacy is becoming essential for SMEs in the transition to a sustainable future. Financially informed SMEs can make more effective strategic decisions, attract financing for sustainable projects and implement innovative solutions that support the circular economy and reduce environmental impact (Eurostat, 2024). Thus, financial literacy plays a central role in the relationship between entrepreneurs, financial markets, intermediaries and potential lenders (Civera et al., 2020). A recent study (Flash Eurobarometer 525, 2023) shows that only 45% of Europeans can do basic financial calculations. This reflects the need for educational programs to support the competitiveness of SMEs.

Although SMEs are the pillars of the European economy, they face significant barriers to adopting sustainable strategies, such as a lack of financial resources and skills, as well as the challenges associated with implementing the European Green Deal (Eurostat, 2024). In addition, many SMEs lack the financial knowledge necessary to understand the impact of their decisions on sustainability and to access dedicated financing (Flash Eurobarometer 525, 2023).

Financial literacy varies significantly between European Union countries, creating regional disparities that affect the sustainability performance of SMEs (Eurostat, 2024). Economic performance and sustainability are directly influenced by limited access to resources, and specific interventions are needed depending on the country and the SME context.

1. Review of the scientific literature

Sustainability in SMEs refers to their ability to integrate economic, social and environmental aspects into their activities, in order to contribute to sustainable development. SMEs are responsible for over 60% of global carbon emissions, but they have the potential to adopt more efficient practices to reduce their environmental impact (Maman et al., 2024).

Some studies reveal a lack of resources and skills to integrate sustainability for their operational processes (Decman et al., 2021). In 2024, a Eurostat report concluded that SMEs are essential for the transition to a green economy. The SMEs are limited by their small size and reduced access to financial and technological resources in order to implement sustainable practices. However, adopting these practices involves significant investments, which may be impossible for smaller SMEs.

Conforming to the literature, there is a direct connection between strong financial literacy among SME owners and their access to credit and financial management capacity. This reflects a direct positive impact on business performance (Masdupi et al., 2024).

Financial literacy is a vital factor determining the success and sustainability of SMEs, not only a set of skills. It influences their ability to obtain financing, manage financial resources and implement effective strategies to sustain growth in competitive markets (Masdupi et al., 2024). Access to finance directly influences the ability of SMEs to innovate, manage risks and expand their operations.

Lack of financial literacy is associated with difficulties in accessing finance, especially in developing economies. In these economies, SMEs face significant challenges related to collateral requirements and information asymmetry (Abdallah et al., 2024).

The purpose of global sustainability policies is to support SMEs in adopting responsible practices and to contribute to the development of a green and equitable economy. There are international initiatives, such as the UN 2030 Agenda, the Sustainable Development Goals and the Paris Agreement, which promote the integration of sustainability into SMEs strategies. These initiatives highlight the role of SMEs in reducing environmental impacts, creating decent jobs and technological innovation (Eurostat, 2024). The Paris Agreement also requires countries to adopt measures to reduce carbon emissions and support SMEs in the transition to a circular economy (Katsinis et al., 2024).

Some European policies, for example the European Green Deal, have the objective to accelerate the transition to an economy which is climate-neutral (by 2050). These policies include measures such as:

- Providing financial support through the Just Transition Fund;
- Implementing Environmental, Social, and Governance standards (Eurostat, 2024).

SMEs play a key role for these objectives, but they also face significant challenges, such as high reporting requirements and the integration of sustainability into their business strategies (Sustainability Academy, 2023). According to a report by the European Commission, SMEs' adaptation to these policies is essential for their long-term competitiveness and for reducing global emissions (Flash Eurobarometer 525, 2023). CSRD Directive requires companies, including listed SMEs, to adopt sustainable reporting and ESG standards. This contributes to more transparency and alignment with sustainability objectives (Bartolacci et al., 2019). Sometimes SMEs face difficulties in complying with these requirements because they lack financial resources and skills (Eurostat, 2024).

Implementing sustainability implies training, education and financial support for SMEs, but also public-private partnerships to support this transition (Katsinis et al., 2024). It is important to adapt the policies to the specificities of SMEs, as they are the backbone of the global economy (Flash Eurobarometer 525, 2023). Developing sustainability in SMEs is essential for reducing environmental impact, but also for creating long-term competitive advantage (Eurostat, 2024).

There is mixed evidence on the relationship between sustainability and financial performance. Some studies show that implementing sustainable practices can lead to long-term savings and attract environmentally sensitive customers (Permatasari and Gunawan, 2023). There are also studies which indicate that these benefits depend on the sector, resources and managerial skills of SMEs (Firman et al., 2024). Adopting sustainability can also be a factor of significant competitive advantage by building customer loyalty and reducing reputational risks. However, in the short term, companies may incur additional compliance costs.

Improved financial literacy helps SME owners avoid financial pitfalls, identify growth opportunities, and manage complex economic environments effectively, especially during times of crisis.

ESG indicators are a useful tool for assessing sustainable progress. According to Decman et al. (2021), SMEs should adapt these indicators to their size and industry specifics. Direct implementation of large company standards can be inefficient and costly. If they integrate ESG indicators, SMEs have the opportunity to assess and communicate more effectively their environmental and social impacts. However, these companies need technical support and financial education to use ESG indicators optimally.

Non-financial reporting is becoming a more and more important component of corporate reporting. Non-financial reporting is linking financial, social and environmental performance to provide a complete perspective on sustainability impact. Bartolacci et al. (2019). It is also an essential tool for transparency and alignment with stakeholder requirements. Maman et al. (2024) emphasize that SMEs need to adopt simplified solutions with minimized costs and maximized impact on strategic decisions. The benefits of non-financial reporting include attracting responsible investors and creating a positive public image (which can support customer loyalty). However, the process can be perceived as an administrative burden, especially for SMEs with limited resources.

Barriers for SMEs include high implementation costs, lack of expertise and limited access to finance. But there are also enabling factors, which include political support, access to new technologies and cross-sectoral cooperation. Bartolacci et al. (2019) highlight the importance of strategic partnerships to reduce costs and share knowledge. For example, collaborating with NGOs or participating in sustainable industry networks can accelerate the adoption of responsible practices.

SMEs often face difficulties in accessing financial resources compared to larger companies. They rely heavily on loans and equity, which can limit their operational capabilities and growth potential (Masdupi et al., 2024).

2. Research methodology

This study uses a mixed methodological approach, combining a systematic review of the specialized literature with a quantitative bibliometric analysis. The aim of this method is to identify dominant themes, conceptual connections and emerging research directions at the intersection of financial-accounting education, sustainability and the performance of small and medium-sized enterprises (SMEs).

Bibliographic data were collected from the Web of Science database, recognized as one of the most rigorous sources of international scientific literature. The query was performed using the following search formula:

TS= ("sustainab" AND ("SME*" OR "small business*" OR "small enterprise*" OR "medium enterprise*") AND ("financial" OR "economic" OR "ESG" OR "accounting" OR "performance" OR "impact" OR "report*") AND ("education" OR "literacy" OR "training" OR "knowledge" OR "capacity building") AND ("policy*" OR "finance*" OR "green*" OR "environment*"))*

This formula was built to reflect the connections between the concepts of sustainability, financial performance, economic and accounting education, as well as green policies applicable to SMEs. The search was restricted to scientific documents in English, published in the period 2019–2024, in the form of articles, book chapters, conference proceedings and books.

After applying the thematic filters corresponding to the fields of business, management, accounting, economics and finance, 345 relevant works were identified. The selected period reflects a stage of increasing academic interest in the subject, in parallel with legislative and technological developments in the field of sustainability and non-financial reporting. The significant number of publications since 2019 justifies the choice of this time window.

For the bibliometric analysis, the VOSviewer software (version 1.6.20) was used, specialized in building and visualizing maps based on relationships between terms, keyword co-occurrences, co-authorship networks and bibliographic coupling. The application allows the identification of thematic clusters and semantic networks within the analyzed corpus, providing a visual representation of the research structure in the studied field.

The results of the analysis provide an integrated perspective on how financial-accounting education is positioned in the specialized literature as a factor of influence on the capacity of European SMEs to implement sustainable strategies and access opportunities within the transition to a green economy.

3. Results and discussions

Understanding the evolution of research on the link between financial and accounting education and sustainability in European SMEs requires a detailed analysis of key bibliometric indicators. The analysis carried out on the Web of Science database reflects a constant increase in academic interest in these topics in the period 2019–2024, driven by regulatory pressures from the European Union (such as the CSRD Directive), but also by the need to align SMEs with the requirements of the green economy.

This growth is manifested both in the volume of publications and in the diversification of the topics addressed – from financial education and institutional capacity, to access to green finance and ESG performance. Recent developments in the field of European public policies, combined with social pressures regarding corporate responsibility, have favoured the emergence of new research directions that place financial and accounting education at the centre of sustainable strategies.

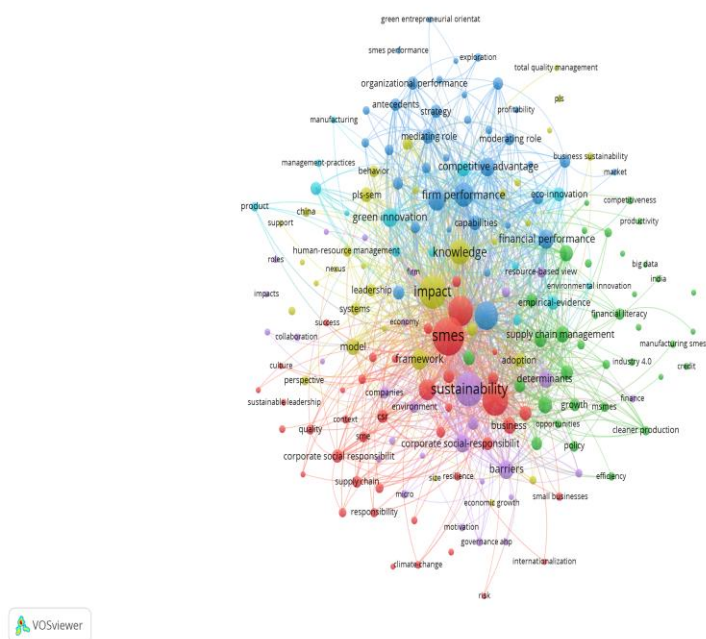


Figure 1: Co-occurrence map of the terms relevant to the research topic
Source: Own Data Processing Using VOSviewer, 2025

The analysis based on the co-occurrence map of relevant terms highlights significant connections between sustainability, financial performance and financial education, providing a solid basis for integrating financial-accounting education as an essential element in the sustainable strategies of SMEs. Terms such as financial performance (108 occurrences) and sustainability (161 occurrences) are present in most of the relevant clusters (red cluster), indicating that the adoption of sustainability is seen as an

opportunity to improve operational efficiency and competitive position in the market. However, the term financial literacy (58 occurrences), although present, has a relatively low frequency (green cluster) compared to other central terms such as corporate social responsibility (CSR) or innovation. This suggests that the impact of financial-accounting education on the implementation of sustainable strategies is still underexplored, representing an opportunity for research. Also, the cluster associated with the terms education and knowledge management (129 occurrences) emphasises the importance of capacity building and knowledge management to support SMEs in the process of adopting sustainable practices.

In addition, terms such as capacity building and skills development are correlated with improving SMEs' capabilities to respond to the requirements imposed by sustainable strategies and regulations such as the CSRD Directive. In this context, financial and accounting education becomes a catalyst for SMEs' alignment with ESG (Environmental, Social, and Governance) standards, allowing them to adopt innovative solutions to reduce environmental impact and optimise resources. Another relevant aspect is the relationship between education and sustainable finance. The cluster dedicated to green finance and policy suggests that SMEs that invest in financial education are better prepared to access green financing and implement green policies in their businesses. At the same time, the analysis shows that terms such as challenges and barriers are frequently associated with the difficulties encountered by SMEs in integrating sustainability, which underlines the need for support through training and education.

In conclusion, financial and accounting education is a central pillar in facilitating the transition of SMEs to sustainable strategies. It not only enhances financial reporting and management skills but also contributes to awareness of the economic and social benefits of sustainability. Integrating education into SME policies can transform the challenges associated with the green transition into opportunities for long-term growth and development. The results of the analyses suggest the need for further research to identify the optimal ways to implement financial and accounting education within SMEs, so that they become more resilient and competitive.

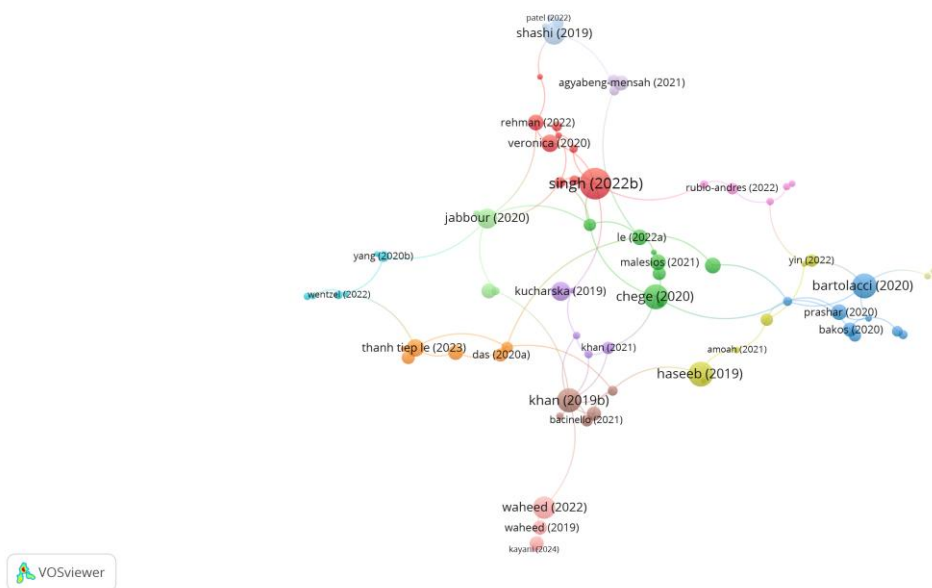


Figure no. 2: Author co-citation map

Source: Own Data Processing Using VOSviewer, 2025

Next, the citation analysis method was used to identify articles and authors that significantly contribute to this field. The minimum selection threshold for articles was 10 citations, which allowed a relevant filtering of high-impact publications. Following the analysis, the articles with the most citations were identified. The results highlight the importance of combining financial-accounting education with sustainable strategies. The majority of the selected articles demonstrated that SMEs that implement sustainable practices and eco-innovations benefit from advanced financial reporting and management skills.

This bibliometric analysis provides a solid methodological basis for integrating the research into the context of the specialised literature, highlighting the relevance of financial and accounting education in supporting SMEs to respond to the challenges and opportunities of the green transition.

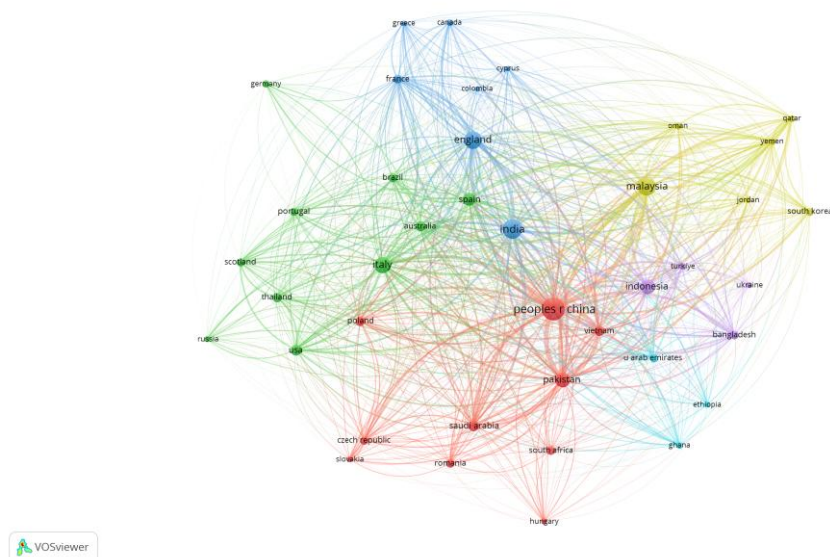


Figure 3: Bibliographic coupling map – countries
Source: Own Data Processing Using VOSviewer, 2025

The analysis based on the map generated by the bibliometric coupling - countries method highlights the connections between the states involved in research relevant to the topic of sustainability, financial-accounting education and SME performance. The analysed data provide insights into the contributions and international collaborations in the studied field.

The results show that countries such as China, Malaysia, India and Italy play a central role in the network of connections, with a significant number of documents (for example, China with 79 documents and 1612 normalised citations). These states demonstrate a strong influence in the field of research due to the large number of published works and citations received, which suggests a high interest in integrating sustainability into economic strategies.

In contrast, states such as Romania, Hungary or Slovakia are located at the edge of the network, with smaller but not negligible contributions. Romania, for example, is represented by 13 documents and an average normalised citation score of 0.80, indicating an emerging involvement in the research field, with potential for growth.

A notable aspect of the analysis is the clustering, which groups countries based on similarities in the references and topics addressed. For example:

Cluster 1 (red) includes European countries such as Romania, Poland, the Czech Republic, Slovakia and Hungary, which emphasise SME sustainability and financial education.

Cluster 2 (green) includes countries such as Italy, the US, and Brazil, highlighting extensive collaborations in areas such as financial performance and corporate social responsibility.

Cluster 3 (blue) brings together countries such as England, India and France, highlighting an extensive network of collaboration among European and Asian states. The dominant research themes within this cluster include global financial education, sustainability in emerging economies, and the integration of corporate governance best practices. England and India serve as central hubs within the network, reflecting a shared interest in advancing sustainable development across diverse economic contexts.

Cluster 4 (yellow) is dominated by Asian countries such as Malaysia, South Korea and Qatar, where research is focused on operational sustainability and the impact of education.

This analysis provides a solid basis for understanding the geographical dynamics of research and identifying areas where international collaborations can contribute to advancing knowledge. The results indicate the need for more extensive collaboration initiatives between countries with strong network influence and those with emerging activity, such as Romania. This approach can support the development of conceptual and practical frameworks better aligned with sustainability requirements.

The results from VOSviewer indicate that terms such as "sustainability", "financial performance", and "corporate social responsibility (CSR)" are among the most frequently used, highlighting the interdependence between sustainability and the financial performance of SMEs.

While the analysis indicates significant progress, gaps identified include:

- The absence of detailed studies that correlate financial literacy with access to sustainable finance.
- Lack of applied research specifically targeting SMEs in Central and Eastern Europe to identify systemic barriers to adopting sustainable strategies.

Policymakers should focus on targeted financial education programs and initiatives that promote financial inclusion to improve SME performance and economic growth (Civera et al., 2020).

Conclusions

This study highlights the importance of financial literacy as a key factor in facilitating the transition of small and medium-sized enterprises (SMEs) to sustainable business models. The results show that countries with high levels of financial literacy and supportive policies are better positioned to capitalise on the opportunities of the green economy.

Thus, countries that have invested in public policies for financial literacy and in supporting infrastructure for SMEs – such as China, Malaysia or Italy – are better positioned to capitalise on the opportunities of the green economy and to implement sustainable reporting standards. These countries can serve as benchmarks for the formulation of similar policies in emerging economies.

In contrast, Central and Eastern European countries, including Romania, have lower levels of involvement in applied research in the field and face difficulties in integrating sustainability into SME strategies. This gap reflects both the lack of relevant regional

data and research, as well as the need for initiatives adapted to the structural specificities of these economies. Another significant aspect highlighted by the study is the potential of financial and accounting education to reduce barriers to accessing green financing, providing SMEs with the necessary tools to navigate an increasingly complex economic and legislative environment. By acquiring skills in ESG reporting, responsible financial management and sustainable risk assessment, SMEs can become active actors in the transition to a circular and digital economy.

The main contribution is to highlight that financial literacy is not just a component of financial management, but a strategic factor in the ability of SMEs to access green finance, implement ESG standards and respond to regulatory pressures (such as CSRD). In addition, the geographical analysis reveals significant disparities between Member States, suggesting the need for tailored financial education policies, adapted to the regional context.

Despite its contributions, this study has several limitations :

- the bibliometric analysis was conducted exclusively using the Web of Science database. This is a highly reputable source, but it does not include all relevant studies indexed in other databases (such as Scopus or Google Scholar). This could result in the omission of significant publications.
- the analysis focused on the period 2019–2024, this may limit the historical perspective on the evolution of the topic.
- the study has a global perspective, but it lacks in-depth, country-specific or sector-specific insights, particularly regarding less-represented regions.
- bibliometric tools like VOSviewer are limited to quantitative relationships (e.g., co-occurrences or citations) and do not capture the full contextual or qualitative nuances of the literature analysed.

These limitations suggest opportunities for future research to adopt a mixed-methods approach, combining bibliometric analysis with qualitative methodologies (interviews, case studies or regional comparative assessments). By doing this, it will gain a deeper understanding of how financial literacy influences the adoption of sustainable strategies in SMEs.

Future research directions:

- Exploring differences between EU regions from the perspective of the impact of financial education on the sustainable performance of SMEs;
- Investigating the role of institutional actors (governments, chambers of commerce, educational institutions) in developing the sustainable financial capacity of SMEs.

In conclusion, the research highlights the need for concerted efforts – from authorities, educational institutions and economic actors – to strengthen the capacity of SMEs to adopt sustainable strategies. Investments in financial education, the development of inclusive public policies and the stimulation of international cooperation are essential for transforming sustainability from a regulatory constraint into a strategic opportunity for sustainable development and economic competitiveness.

References

- [1] Abdallah, W., Harraf, A., Ghura, H. & Abrar, M. (2024) 'Financial literacy and small and medium enterprises performance: the moderating role of financial access', *Journal of Financial Reporting and Accounting*. [Online] Available at: <https://doi.org/10.1108/JFRA-06-2024-0337>
- [2] Sustainability Academy (2023) CSRD: Corporate Sustainability Reporting Directive. [Online] Available at: <https://academia-de-sustenabilitate.ro/blog/csrd>
- [3] Bartolacci, F., Caputo, A. & Soverchia, M. (2019) 'Sustainability and Financial Performance of SMEs: A Bibliometric and Systematic Literature Review', *Business Strategy and the Environment*. [Online] Available at: <https://doi.org/10.1002/bse.2434>
- [4] Civera, C., Freeman, R.E. & De Colle, S. (2020) 'Stakeholder engagement: Meeting in practice to develop sustainability-oriented capabilities', *Business Strategy and the Environment*, 29(2), pp.639–651. [Online] Available at: <https://doi.org/10.1002/bse.2380>
- [5] Dečman, N., Petera, P., Remlein, M. & Rep, A. (2021) 'Non-financial reporting in selected European countries', in Remlein, M. (ed.) *Accounting challenges for sustainability and innovations*. Poznań: Poznań University of Economics and Business, pp.73–90. [Online] Available at: <https://doi.org/10.18559/978-83-8211-055-5/05>
- [6] Eurostat (2024) Employment statistics. [Online] Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?oldid=330227&title=Employment_statistics%2Fro
- [7] European Commission (2023) Flash Eurobarometer 525: Financial literacy and inclusion in the European Union. [Online] Available at: <https://europa.eu/eurobarometer>
- [8] Katsinis, A., Lagüera-González, J., Di Bella, L., Odenthal, L., Hell, M. & Lozar, B. (2024) *Annual Report on European SMEs 2023/2024*. Luxembourg: Publications Office of the European Union. [Online] Available at: <https://doi.org/10.2826/355464>
- [9] Maman, A., Dias, J.G. & Bassi, F. (2024) 'Sustainability-oriented management in the SMEs: A multilevel analysis in the European Union', *Journal of Environmental Management*, 365, 121559. [Online] Available at: <https://doi.org/10.1016/j.jenvman.2024.121559>
- [10] Masdupi, E., Firman, R., Rasyid, R. & Darni, M.O. (2024) 'Financial literacy and sustainability in SMEs: Do financial risk attitude, access to finance, and organisational risk-taking tolerance mediate?', *Asian Economic and Financial Review*, 14(1), pp.43–58. [Online] Available at: <https://doi.org/10.55493/5002.v14i1.4959>
- [11] Organisation for Economic Co-operation and Development (2023) *OECD Economic Outlook, Volume 2023 Issue 1*. Paris: OECD Publishing. [Online] Available at: https://www.oecd.org/en/publications/2023/06/oecd-economic-outlook-volume-2023-issue-1_62ef0395.html
- [12] Permatasari, P. & Gunawan, J. (2023) 'Sustainability policies for small and medium enterprises: WHO are the actors?', *Cleaner and Responsible Consumption*, 9, 100122. [Online] Available at: <https://doi.org/10.1016/j.clrc.2023.100122>
- [13] World Bank (2021) *Small and Medium Enterprises (SMEs) Finance*. [Online] Available at: <https://www.worldbank.org/en/topic/smefinance>