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GREENING OF SMEs IN WESTERN BALKAN COUNTRIES – EVIDENCE FROM FIRM-LEVEL ANALYSIS

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ABSTRACT: *The primary objective of this paper is to explore the determining factors and challenges that SMEs face in implementing green measures. A key focus is on identifying which SMEs, as key players in the enterprise sector, could potentially play a dynamic role in the green transition in the Western Balkan countries. To achieve this, a multinomial logit analysis was conducted on a sample of 1,160 firms from Montenegro, Serbia, North Macedonia, Bosnia and Herzegovina, and Albania. The results obtained reveal that internal*

factors (such as innovation and strategic orientation) and external factors (such as regulatory pressures and competition) significantly influence the adoption of green measures, particularly those that are more capital-intensive. The paper contributes to the literature by highlighting the complex interplay among firm characteristics, external factors, and the adoption of green practices.

KEY WORDS: SMEs, EU greening policies, Western Balkans, firm-level analyses

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1. INTRODUCTION

The ambitious European Green Deal (EGD) (European Parliament [EP], 2020) aims to introduce climate-neutral policies and actions at all societal levels, including the enterprise sector, which is critical in reducing greenhouse gas emissions by 2050. Greening policies and digitalisation, the so-called big “twin transitions”, are two main policy flagship initiatives with which the European Union (EU) is hoping to achieve climate neutrality by the year 2050. These policies also affect the Western Balkan (WB) countries with aspirations of joining the EU, especially those already in accession negotiations, and which have to align their policies with the EU ecosystems. Moreover, the WB countries have signed the Green Agenda for the Western Balkans (EP, 2020), which aligns completely with the EGD, encompassing five pillars: (1) reducing greenhouse gas emissions; (2) promoting a circular economy; (3) reducing air, water, and soil pollution; (4) fostering sustainable food production; and (5) protecting biodiversity and ecosystems (European Commission, 2023b). As a result, the WB region is undergoing significant reforms to align with EU green policies¹.

Climate change and environmental degradation significantly affect small and medium-sized enterprises (SMEs), with firms increasingly adopting sustainable practices globally, recognising the benefits of innovation and environmental responsibility rather than just complying with regulations. Global challenges such as frequent extreme weather conditions, rising heat, resource scarcity, and new laws and regulations promoting a more environmentally sustainable economy significantly affect SMEs' resilience, productivity, and profitability (Saget et al., 2022). As the most vibrant part of the enterprise sector, SMEs are recognised as critical actors in the green transition process, also in the WB region. Some progress towards that direction has been recorded, but it is still very modest, according to the OECD (2022) and the European Bank for Reconstruction and Development (EBRD, 2023).

The literature on transitioning to eco-friendly business practices is interdisciplinary, mainly incorporating environmental science, economics, and political economy. It is rather vast and well-evidenced and provides valuable

¹ Energy Community 2006–2023 provides a detailed overview of the progress of the National Energy and Climate Plans (NECPs) in each WB country.

insights into how and why firms transform their practices, products, and services to go green. In general, greening the business implies adopting environmentally friendly practices that aim to reduce negative environmental impacts while promoting efficient use of resources (Hoogendoorn et al., 2020). The existing research shows that going green not only benefits the environment but also contributes to the sustainable long-term growth and financial success of firms (Ambec & Lanoie, 2008; Bartolacci et al., 2020; Demirel et al., 2019; Hoogendoorn et al., 2020; Martín-de Castro et al., 2016).

The main goal of this paper is to assess progress in greening SMEs in the WB region, which still lacks more significant coverage in the literature. The focus is precisely on the group of ex-Yugoslav states that are in accession negotiations with the EU (i.e. Montenegro, Serbia, North Macedonia, and Bosnia and Herzegovina), plus Albania. Moreover, SMEs are of great importance to this region's economy, accounting for nearly 99% of all firms, producing over 60% of the value-added, and contributing to 75% of employment (OECD, 2022). It is therefore important to gain insights into what drives (or halts) them on their path of green transition.

The research questions (RQ) that are explored are the following:

RQ1: Can SMEs be the primary dynamic agents of the green transition?

RQ2: On which factors does the greening of the WB SMEs depend?

In order to explore these RQs, an econometric analysis was conducted to determine the factors influencing firms to implement various green measures by using the World Bank Group Enterprise Survey 2019 as the primary data source, supplemented when possible with newer data. The advantage of this database edition is that, along with topics such as standard areas (e.g. access to finance, corruption, infrastructure, labour, and performance measures), it offers a module on the green economy with a wide array of information on significant aspects related to environmental issues from the firm perspective.

The outline of the paper is as follows. After the Introduction, Section 2 offers an overview of recent literature on SMEs' contribution to green development at the EU level. Further, Section 3 provides a comparative analysis of the existing

institutional framework for green transition in selected WB countries, focusing on policies aimed at SMEs. In Section 4, an econometric analysis of the determinants of WB firms that pay significant attention to environmental issues is performed, followed by a discussion of the results' implications. Finally, Section 5 concludes.

2. BRIEF OVERVIEW OF THEORETICAL AND EMPIRICAL BACKGROUND OF EU GREENING POLICIES

Numerous empirical studies on climate change impacts have provided abundant evidence for pushing the policy agenda to tackle the societal threats caused by climate change. The European Commission (EC) considers the EGD a vital part of its new green industrial policy. Thus, in early 2023, it presented a Green Deal Industrial Plan (EC, 2023a), which intends to improve the competitiveness of Europe's industry as it pursues such a transition.

The EGD resolution (EP, 2020) identified specific business opportunities for SMEs' participation in a greener value chain. They are found in re-manufacturing, repair, maintenance, recycling, and eco-design, which, from this perspective, have great potential to become drivers of economic growth and job creation while, at the same time, making a significant contribution to addressing environmental challenges (see also the Green Action Plan for SMEs [EC, 2014]). The EC also adopted a specific European SME strategy (EC, 2020a) that aims to mobilise SMEs across EU industrial sectors to realise the objectives of the EGD and by implementing twin digital and green transitions that closely complement each other in achieving a climate-neutral, resource-efficient, and agile economy.

Not only does climate change incur the costs of mitigating business threats, it can also present many business opportunities (e.g. to advance their green technology and innovation). In such a way, SMEs can make an essential contribution to sustainable and resilient economic growth. Koundouri et al. (2023, p. 4) argue in favour of policies that open up opportunities for promoting technological innovation, economic development that is sustainable and environmentally responsible, and job creation in sustainable sectors. However, achieving such a transition requires substantial investments, which must be funded by both the private sector and the government, along with intervention policies and institutional frameworks to support them. Borowiecki et al. (2023, p. 3). further

argue that the shift to clean energy and green business production requires greater integration of electricity and deeper capital markets to support investment in new technologies. Additionally, they point out that moving towards a greener EU will come at a high cost for affected workers. Therefore, policies should aim to make labour reallocation smoother and, in general, to reduce green transition expenses.

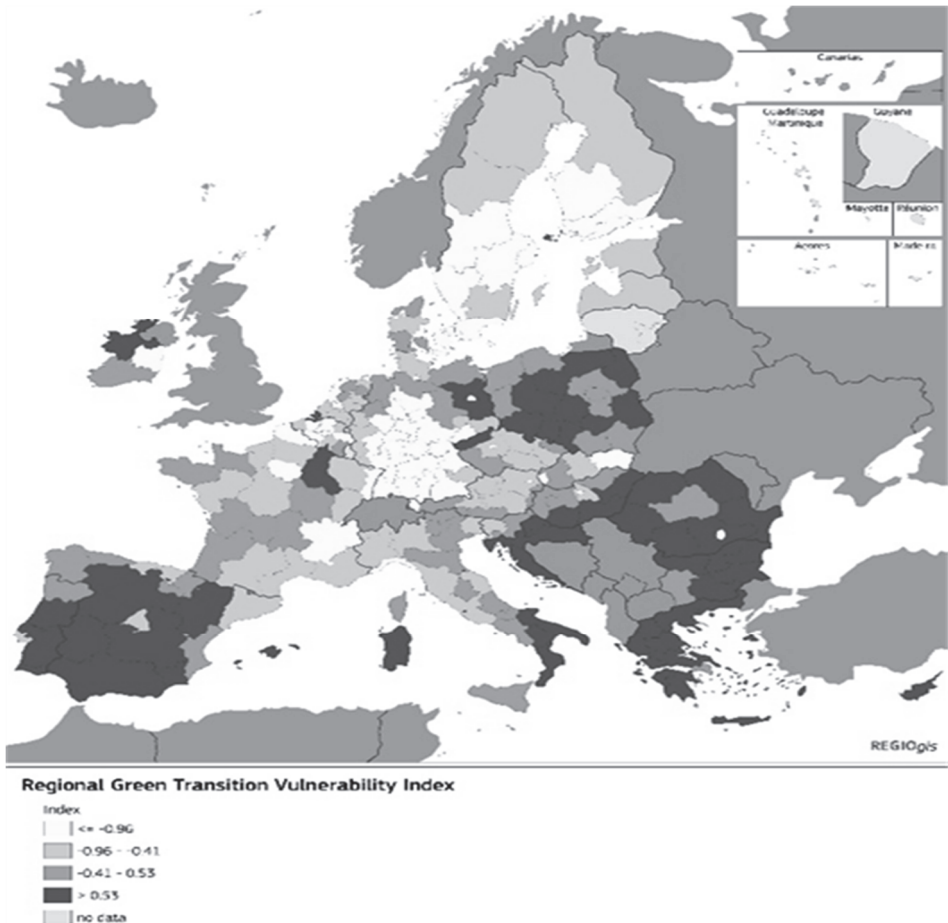
The EU Green Deal Investment Plan (EGDIP) already supports massive investments in green technologies, including those of SMEs. Some of the support funding programmes, such as Horizon Europe, will also be available to assist such a transition in the associated countries of the WB, which are burdened by energy production capacity dating from the 1970s and 1980s, heavy reliance on coal-powered thermal power plants, years of under-investment, and the declining quality of coal, to mention a few (EBRD, 2024).

Altogether, the EGDIP plans to mobilise at least €1 trillion in sustainable investments over the next decade to tackle climate change problems. The costs for such a substantial transformation will likely be enormous for society and the business sector, especially SMEs, which are the most vulnerable part of the enterprise sector. The EGDIP, therefore, includes the Just Transition Mechanism (JTM), which, in essence, ensures that the green transition costs are distributed fairly and justly among all those bearing them. This JTM portion of the EGDIP plans to raise a minimum of €100 billion in investments over the period 2021–2027. According to this EC document, most funding will be targeted to support workers and citizens of the regions most impacted by the transition. Rodriguez-Pose and Bartalucci (2023) argued that it is no wonder that the process confronts several potential discontents, especially at the regional level, where great disparities exist. More precisely, Central and Eastern European countries record the highest vulnerability according to the Green Transition Vulnerability Index (see Figure 1).

SMEs in the EU and globally play a crucial role in driving the transition towards an economy that is sustainable, circular, energy-efficient, and powered by renewable energy sources. The EC (2022a) report states that a typical SME emits an average of 67 tons of CO₂ and 75 tons of greenhouse gases. Despite the seemingly low absolute emission figures, SMEs' collective share in the total enterprise emissions is high at 63.3%, mostly due to their large numbers.

Furthermore, the size and relative share of SMEs' CO₂ emissions vary by sector, where the highest-emitting sectors are manufacturing, electricity, gas, steam, air conditioning supply, transportation, and storage. Thus, SMEs' crucial role in the economy and capability to generate and employ green technologies make them important for achieving energy and resource-efficient sustainability and transition (Koirala, 2019; OECD, 2018).

Figure 1: Regional Green Transition Vulnerability Index

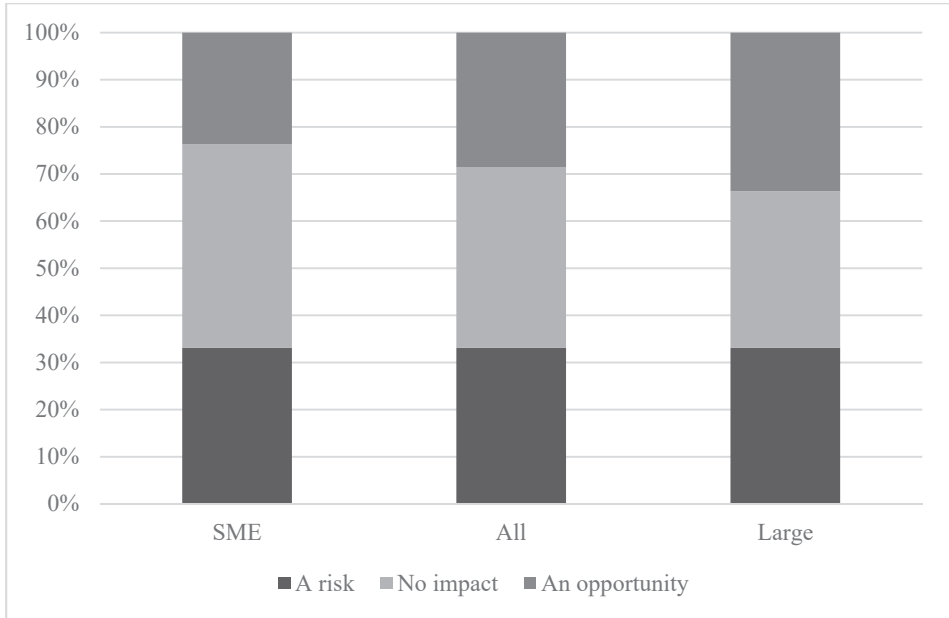


Source: Forging a Sustainable Future Together: Cohesion for a Competitive and Inclusive Europe, European Commission, 2024. <https://op.europa.eu/en/publication-detail/-/publication/c6e97287-ccc3-11ee-b9d9-01aa75ed71a1/language-en>

Due to global trends and regional policies, EU firms are gradually implementing eco-friendly practices, including investing in renewable energy sources, enhancing energy efficiency, improving waste management, etc. The European Investment Bank (EIB) Investment Survey 2023 shows that the percentage of SMEs investing in green measures is slightly lower than that of large companies. However, the trend of investing in green activities is the same – most businesses are investing in waste minimisation and recycling, while the lowest percentage is investing in new, less polluting technologies (EIB, 2023). Therefore, these companies could be seen as eco-adopters, utilising environmental technologies and implementing sustainable business practices; however, it is unlikely that sustainability is part of their core business model, which it is for eco-innovators and eco-entrepreneurs (Koirala, 2019). The greening of such firms encompasses complying with environmental regulations, and the focus should be on providing incentives to go above this minimum (OECD, 2018). Moreover, since the benefits of going green are sector-specific in the case of eco-adopters, it is expected that firm-level obstacles could explain differences in green measures implementation (Koirala, 2019).

Regarding the expected effect of stricter climate regulations on firm performance, most large companies perceive them as a chance to enhance their performance. At the same time, this view is not as widespread among SMEs (Figure 2). As a result, larger corporations, due to their size, can be seen as eco-entrepreneurs who proactively search for new opportunities created by shifts in values, rules, and issues and then develop and market solutions to address them. Moreover, their strategic objectives and incentives differ from those of SMEs, and they typically prioritise achieving greater sustainability as one of their primary business objectives (Koirala, 2019).

Figure 2: Expected impact of stricter climate regulations on firm performance



Source: Authors' compilation based on the European Investment Bank (2023) on the basis of question Q71: *Thinking about your company, what impact do you expect this transition to stricter climate standards and regulations will have on your company over the next five years?*

Another point that deserves special mention concerning the success of the twin transitions approach in Europe is their impact on the competitiveness of the business sector and national/regional economies in general. The competitiveness issue was particularly emphasised in the 2023 Green, Digital and Competitive SME Index produced by the Lisbon Council. The authors of the background policy brief, Hofheinz et al. (2023), argue that EGD goals cannot be achieved without assessing their impact on the overall competitiveness of the enterprise sector and how they impact and contribute to the increase in sustainability and efficiency of the business sector. Some of the goals and adopted policies contradict each other. The authors stress that it is of prime importance, therefore, to mobilise and activate the energy and talent of the private sector, especially the SMEs that should drive such a transition, as they represent more than 90% of all enterprises and employ more than half of total EU labour. The background research concludes that according to the assessed indicators, one could not yet observe a substantial positive link between firms' competitiveness and the green

transition. On the contrary, technology and the energy transition still mainly come in the form of high costs to most SMEs in the EU, which calls for the special attention of policy-makers since such costs could be reduced in the future through increased investment, market opening, smart regulation, and more innovation, which cannot happen overnight.

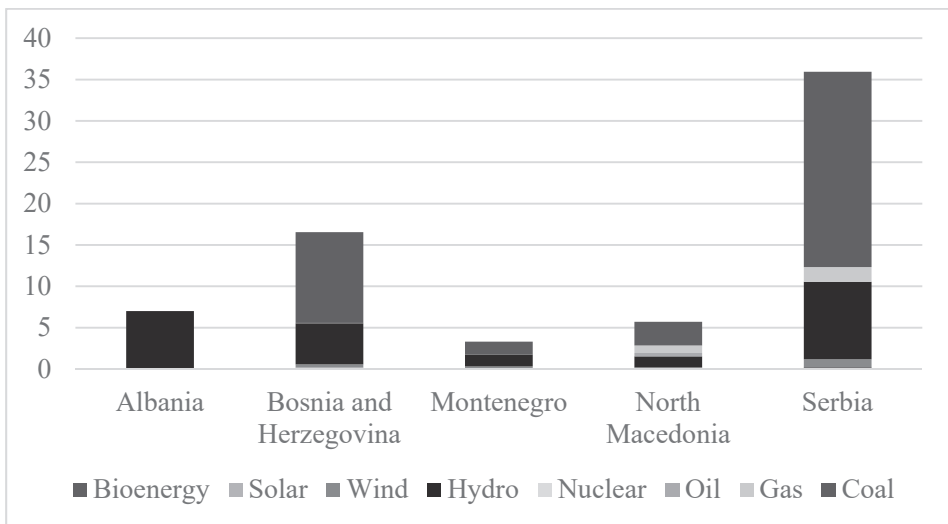
The increased internationalisation process of SMEs in the EU could contribute to the general increase of competitiveness of the EU enterprise sector, as green and ecologically conscious enterprises are better skilled and equipped to deal with strong market competition. They could also contribute to their participation in more sustainable and flexible green global supply chains that are more resilient to disruption and provide a viable alternative to the large multinational enterprises (MNE) that have so far been dominant in global trade and investment relations (EBRD, 2023). Although most of the global economic trade and global value chains (GVCs) have been dominated by MNEs, SMEs' flexibility and adaptability might be a key advantage in the times of economic uncertainty in which the world has lived in the last four years. The global disruptions caused by the COVID-19 pandemic in 2020/2021 showed how quickly EU SMEs adapted to exogenous market shocks. They quickly provided new and innovative products and found valuable market niches that responded to the increased demand caused by global supply and value chain disruptions during the pandemic.

Tagliapietra and Veugelers (2023, p. 1) stress that the European Green Deal will have to foster broad paradigmatic shifts in the EU's industrial structure. Thus, it is often referred to as "an industrial revolution against a deadline". In this context, green industrial policy emerges as a cornerstone of the EGD. As the authors rightly point out, the EU economies face the challenge of reconciling a green industrial policy's various and often conflicting objectives. Designing a successful green industrial policy that effectively combines policy goals such as decarbonisation with economic growth, maintaining employment levels, and striving for global competitiveness and resilience and security of supply might often be an immense challenge, especially in the short term. Needless to say, these challenges are even more demanding for WB countries as there are many more parallel tasks on their reform policy agenda.

3. SME GREENING IN THE WB: SNAPSHOT OF COMPARATIVE INSTITUTIONAL AND POLICY FRAMEWORK

In November 2020, the EC and WB countries endorsed a blueprint for the green transition of the WB called the Green Agenda for the Western Balkans and identified key pillars for achieving environmental sustainability in line with the EGD. Implementing that ambitious agenda relies on necessary regulatory and institutional reforms backed up by substantial investment within the Economic and Investment Plan for the WB. The plan is consistent with EU climate regulations, striving for carbon neutrality by 2050 and meeting energy and climate goals by 2030. The green transition is anticipated to have significant social and economic effects on the WB countries, which have traditionally relied on coal mining. Generally, the WB countries have made limited progress in advancing the Green Agenda due to their dependence on fossil fuels (except Albania). Figure 3 shows electricity production by source, and it is seen that the main source in all countries, except Albania, is coal.

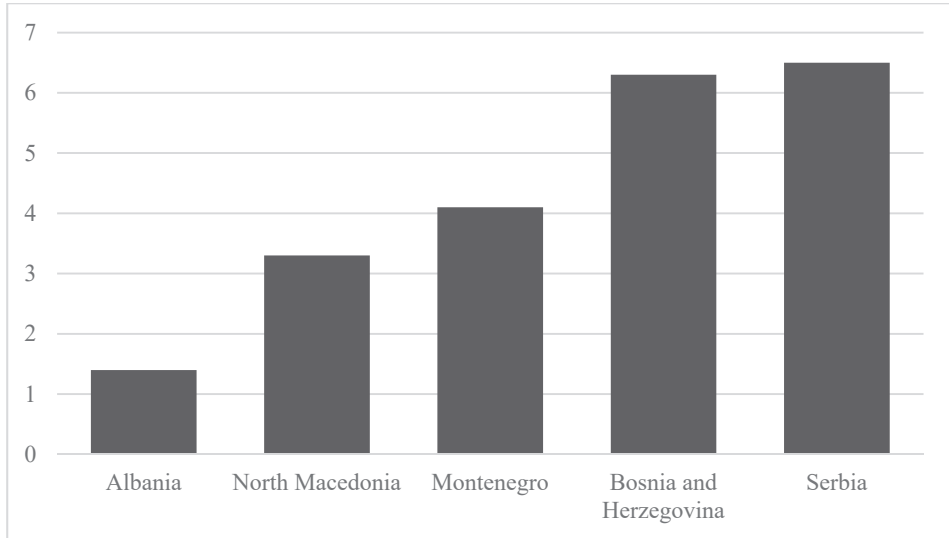
Figure 3: Electricity production by source (TWh)



Source: Our World in Data--Total Electricity Generation (2024).

<https://ourworldindata.org/grapher/electricity-production-by-source>

As a result of such trends, CO₂ emissions are the highest in Serbia and Bosnia and Herzegovina (Figure 4).

Figure 4: CO₂ emissions (tCO₂/per capita)

Source: IEA. <https://www.iea.org/data-and-statistics/data-tools/greenhouse-gas-emissions-from-energy-data-explorer>

Since the start of the Green Agenda for the WB in 2021, the EC has assigned €1.25 billion to support its implementation. The Economic and Investment Plan for the WB directs a significant amount of investments towards innovation and green growth of SMEs, especially through the WB Investment Fund, through their programmes SMEs Go Green, Climate Programme, Green Finance for Inclusion, and Green for Growth lending programmes.

The OECD (2022) assessed the changes that had taken place in the region since 2019 when the greening policies were first announced. It assessed the progress in the institutional framework for environmental policies targeting SMEs, including sectoral and innovation policies, and several key findings arose. Firstly, the greening policies had been integrated into strategic national documents with clear goals and dedicated budgets, with energy efficiency and eco-innovations being leading priorities among the set goals. However, SME greening policies had advanced unevenly across countries, mostly due to a lack of government finance for greening policy measures. When looking into the observed cluster of the WB countries, the OECD (2022) considered that the implementation of such policies had progressed the most in Bosnia and Herzegovina, Montenegro, and North

Macedonia, whose governments introduced several measures and financial incentives to support the transformation of environmental ecosystems and the transition towards the green performance of their SMEs. In all these countries, environmental policies are now an integral part of the SME strategies, and energy efficiency and eco-innovation hold a pivotal place. Secondly, there had been a reduction in the funding gap for SME greening through the support of state investment banks. Finally, another interesting finding is that systematic monitoring of behavioural change and concrete results of SME greening policies was still lacking in all the countries, especially when it comes to collecting data (OECD, 2022).

Moreover, according to the survey of Flash Eurobarometer 498 (EC, 2022b), the most common resource efficiency actions undertaken by EU SMEs pursuing the greening goals are minimising waste (64%), saving energy (61%), saving materials (57%), recycling by reusing material or waste within the company (47%), and saving water (46%). The report also provides information on specific SME greening policy actions for the WB countries (with the exception of Bosnia and Herzegovina, see Table 1), where the largest share of firms takes the following actions to be more resource efficient: saving energy, minimising waste, and selling their residues and waste to another company. The data show that the adoption of green measures is markedly lower in the WB than in the EU27. Also, the shares of measures are quite heterogeneous among the WB countries, where, for example, in Albania, almost 50% of SMEs state that they are not undertaking any actions to be more resource efficient. The relatively high share of SMEs in the WB countries reporting such answers could suggest that there may be a lack of financial sources and/or motivation to invest in green measures.

Table 1: SMEs' actions towards being more resource-efficient

<i>Q1 What action is your company undertaking to be more resource efficient?</i>	<i>EU27</i>	<i>HR</i>	<i>SI</i>	<i>MK</i>	<i>ME</i>	<i>RS</i>	<i>AL</i>
<i>Saving water</i>	46%	40%	34%	8%	31%	28%	8%
<i>Saving energy</i>	61%	51%	52%	22%	41%	44%	23%
<i>Using predominantly renewable energy (e.g. including own production through solar panels, etc.)</i>	19%	6%	12%	8%	6%	7%	4%
<i>Saving materials</i>	57%	47%	42%	11%	33%	38%	8%
<i>Switching to greener suppliers of materials</i>	33%	24%	34%	8%	25%	19%	6%
<i>Minimising waste</i>	64%	59%	57%	16%	43%	44%	10%
<i>Selling your residues and waste to another company</i>	24%	21%	22%	25%	20%	28%	12%
<i>Recycling, by reusing material or waste within the company</i>	47%	33%	36%	11%	21%	26%	18%
<i>Designing products that are easier to maintain, repair or reuse</i>	26%	25%	17%	8%	17%	17%	9%
<i>None</i>	9%	11%	12%	31%	15%	16%	49%

Source: Flash Eurobarometer 498: SMEs, green markets and resource efficiency (EC, 2022b)

Notes: HR (Croatia); SI (Slovenia); MK (North Macedonia); ME (Montenegro); RS (Serbia); AL (Albania)

According to the OECD (2021), encouraging small businesses to adopt eco-friendly practices is a complex issue since many SMEs prioritise short-term profits over long-term environmental concerns. When it comes to the perceived obstacles to setting up resource efficiency actions, at the EU level, the largest share of SMEs state that the complexity of administrative and legal procedures is the greatest obstacle (Table 2). Among the WB countries, a large share of SMEs also find the lack of specific environmental expertise and supply of required materials, parts, products, or services to be an obstacle.

Table 2: SMEs’ perception of difficulties with setting up resource efficiency actions

Q7 Did your company encounter any of the following difficulties when trying to set up resource efficiency actions?

	EU27	HR	SI	MK	ME	RS	AL
<i>Complexity of administrative or legal procedures</i>	34%	41%	19%	24%	31%	38%	13%
<i>Difficulty to adapt environmental legislation to your company</i>	21%	21%	12%	8%	10%	20%	7%
<i>Technical requirements of the legislation not being up to date</i>	18%	27%	13%	14%	22%	25%	2%
<i>Difficulty in choosing the right resource efficiency actions for your company</i>	21%	14%	12%	10%	11%	17%	12%
<i>Cost of environmental actions</i>	27%	17%	24%	12%	13%	14%	16%
<i>Lack of specific environmental expertise</i>	23%	18%	13%	10%	23%	22%	21%
<i>Lack of supply of required materials, parts, products or services</i>	24%	21%	20%	19%	23%	27%	27%
<i>Lack of demand for resource efficient products or services</i>	20%	23%	16%	12%	24%	20%	9%
<i>Complexity associated with environmental labelling and certification</i>	19%	11%	14%	7%	17%	13%	0%
<i>None</i>	32%	25%	41%	31%	38%	24%	35%

Source: Flash Eurobarometer 498: SMEs, green markets and resource efficiency (EC, 2022b)

Notes: HR (Croatia); SI (Slovenia); MK (North Macedonia); ME (Montenegro); RS (Serbia); AL (Albania)

Next, in both EU and the WB countries, SMEs perceive that grants or subsidies would have the greatest effect as the push factor towards more resource-efficient businesses (Table 3). This highlights the financial constraints' effect on greening businesses, especially among SMEs.

Table 3: SMEs' preferences regarding instruments/policies needed to be more resource efficient

Q8 Which of the following would help your company the most to be more resource efficient?

	EU27	HR	SI	MK	ME	RS	AL
A tool to self-assess how resource efficient your company is with respect to other companies	15%	7%	4%	4%	10%	7%	6%
Consultancy on how to improve resource efficiency in your company	25%	24%	23%	17%	24%	25%	21%
Grants or subsidies	36%	45%	55%	53%	55%	56%	18%
Advice on funding possibilities and financial planning for resource efficiency investments	20%	28%	26%	22%	30%	16%	19%
Demonstration of new technologies or processes to improve resource efficiency	22%	21%	15%	14%	11%	22%	12%
Database with case studies that show the benefits of resource efficiency for companies	16%	10%	9%	6%	3%	13%	4%
Better cooperation between companies across sectors so that new processes to re-use waste and by-products can be developed	26%	27%	16%	14%	17%	25%	22%
Clearer rules on the use of secondary raw materials	19%	12%	9%	12%	19%	18%	7%
None	17%	13%	18%	10%	16%	11%	31%

Notes: HR (Croatia); SI (Slovenia); MK (North Macedonia); ME (Montenegro); RS (Serbia); AL (Albania)

Source: Flash Eurobarometer 498: SMEs, green markets and resource efficiency (EC, 2022b)

4. ECONOMETRIC ANALYSIS OF CHARACTERISTICS OF GREEN SMES

4.1. Contextual framework for variables selection

Green measures are shown to be adopted differently in SMEs compared to large corporations. Since SMEs have unique characteristics affecting their approach to environmental issues, policymakers can promote green initiatives among SMEs by developing measures that consider such characteristics (OECD, 2018; OECD, 2021). Several internal and external factors influence companies when it comes to taking environmental action. Factors such as green financing, producing environmentally friendly outputs, green production processes, strategic orientation, and norms are only some of the factors that shape their decisions internally. Externally, the government's regulatory and policy frameworks directly and indirectly impact enterprises (Saget et al., 2022).

There is a growing body of literature that focuses on investigating the degree of importance entrepreneurs assign to environmental protection and sustainability (e.g. Aykol & Leonidou, 2015; Chien & Peng, 2012; Hoogendoorn et al., 2020; Nguyen et al., 2023). Despite resource constraints, it is unclear why and which SMEs engage in environmentally friendly practices. It is also unclear whether entrepreneurs who run such businesses are intrinsically motivated or more under pressure from various stakeholders or regulations. Nguyen et al. (2023) explored the differences between firms that adopt environmentally friendly practices for reasons of intrinsic motivation and those that do so due to extrinsic pressures. Their research revealed that women-led companies are more likely to adopt such practices for more intrinsic and extrinsic reasons than those run by men. However, they noted that the relationship weakens with increased market competition.

The factor most often analysed in the literature is the firm's size, closely related to access to resources. SMEs face challenges in investing in sustainable businesses due to their limited financial resources, while larger companies have more access to resources (see e.g. De Rademaeker et al., 2011; Tritto et al., 2023). The firm's age has also been shown to influence green practices, with older companies going green more than younger ones (Hoogendoorn et al., 2015; Trencansky & Tsaparlidis, 2014). However, the firm's age could also have the opposite effect (Ozturk & Ozen, 2021; Rizos et al., 2016).

Numerous studies have highlighted the significance of considering the sector or industry while analysing the propensity towards going green. For example, Perrini et al. (2007), Uhlaner et al. (2012), Demirel et al. (2019), and Tritto et al. (2023) have emphasised this aspect. Demirel et al. (2019) pointed out that industries, particularly those under stricter regulations, are more likely to be motivated to innovate towards sustainability and green businesses. This is because firms need to adhere to industry-specific environmental regulations and minimise the environmental impact of their industrial processes.

The implementation of green measures is also highly influenced by international trade, which includes direct and indirect exports of firms. Costantini and Mazzanti (2012) and Nguyen and Vu (2024), for example, suggest that firms exposed to global environmental standards are more likely to adopt green measures in order to stay competitive. Export-oriented firms, in particular, do this to gain a competitive advantage. However, participation in GVCs can have a mixed impact on firm-level green practices. While it facilitates the transfer and adoption of greener technologies, it can also result in the shift of polluting activities to less regulated environments (De Marchi et al., 2013).

Next, the different aspects of ownership structure should be included in the analyses, as well as the gender aspect. Type of ownership could impact the implementation of different green measures, where, for instance, foreign-owned companies might face pressure from international environmental standards, leading them to implement green measures (Christmann & Taylor, 2001; Hanousek et al., 2019). Additionally, research has shown that female presence in a company can influence its knowledge management practices and innovation levels (Nguyen & Vu, 2024), implying that companies led by men and those led by women might have different priorities regarding innovation and green measures.

Also, firms with advanced technological capabilities and more financial resources are shown to be better positioned to engage in green innovations (see, e.g., Agostino & Ruberto, 2023; Fernández et al., 2018; Wagner, 2017). In particular, access to finance is critical, as investments in green technologies can be substantially capital-intensive (Hoogendoorn et al., 2020). Finally, regulatory framework and pressures from stakeholders, such as customers, suppliers, and

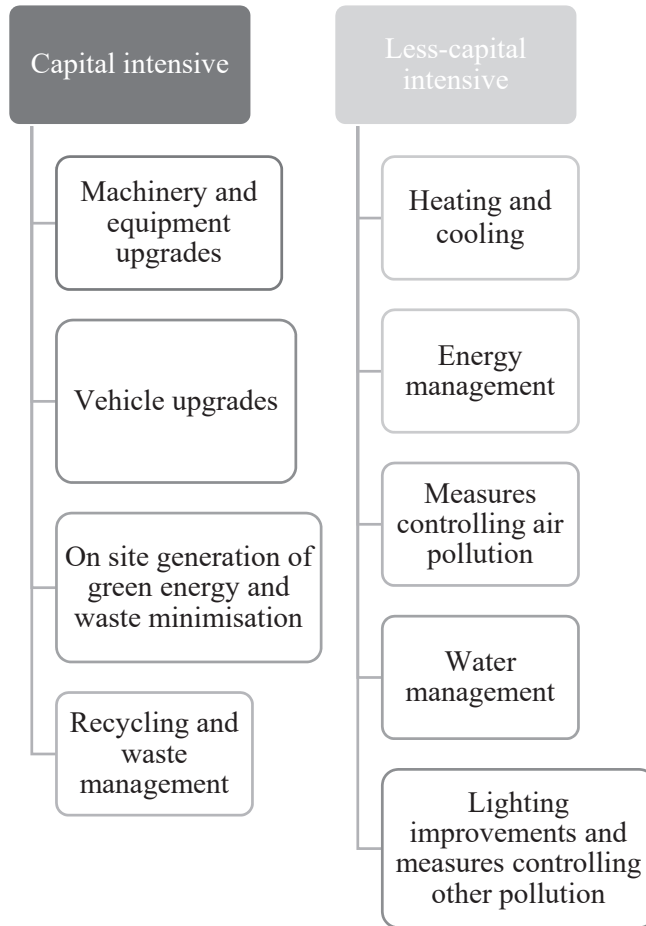
the community, can significantly (de)motivate firms to adopt green measures (Agostino et al., 2023; Hoogendorn et al., 2015).

Research on these issues for the WB countries is scarce and generally focuses on the experiences of individual countries. There is, for example, a paper by Silajdžić et al. (2015), who found that the main determinants of green-oriented firms encompass the owners' or managers' motivation, the firm's location, and a longer-term orientation towards sustainability.

4.2. Data and methodology

The World Bank Enterprise Survey 2019, within its Green Economy Module, provides data regarding businesses adopting environmentally friendly measures (such as upgrading machinery, equipment, vehicles, and on-site energy generation to reduce greenhouse gas emissions; enhancements to heating and cooling systems; waste reduction, recycling, and waste management; energy and water management; air pollution control; lighting systems; and other pollution control measures). These measures can be categorised into two groups, as illustrated in Figure 5. Although the more capital-intensive measures offer long-term benefits, they will probably require significant upfront investment, so it is reasonable to expect that there will be differences in factors that influence SMEs implementing these two types of measures.

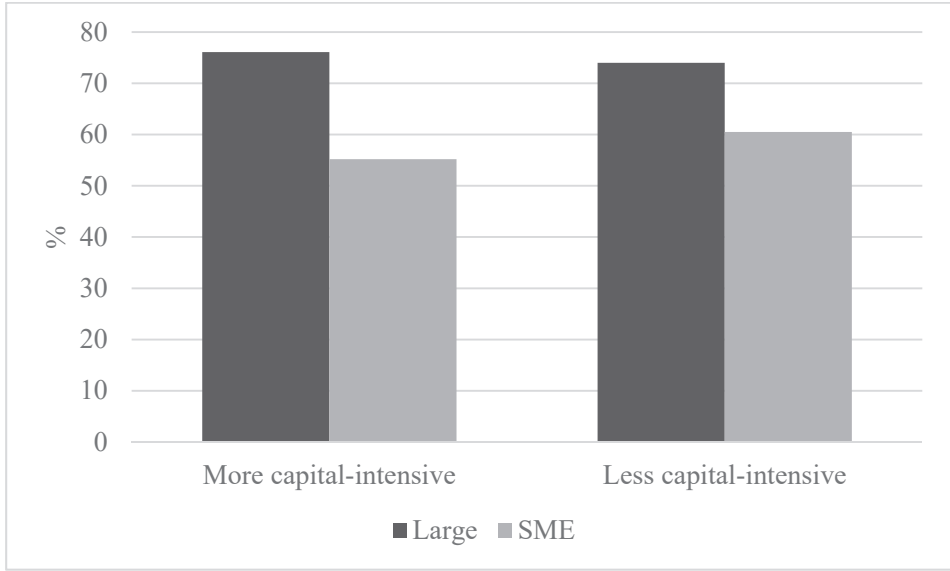
Figure 5: Greening measures from the World Bank Enterprise Survey



Source: Authors' compilation based on the World Bank Enterprise Survey 2019 and Kalantzis et al. (2022)

Figure 6 shows the share of firms with more and less capital-intensive measures at the level of the WB countries selected for the analysis. For the above-mentioned reasons, large firms implement more of each category. However, the share of firms implementing more capital-intensive measures is slightly higher in large firms, while the opposite holds for SMEs.

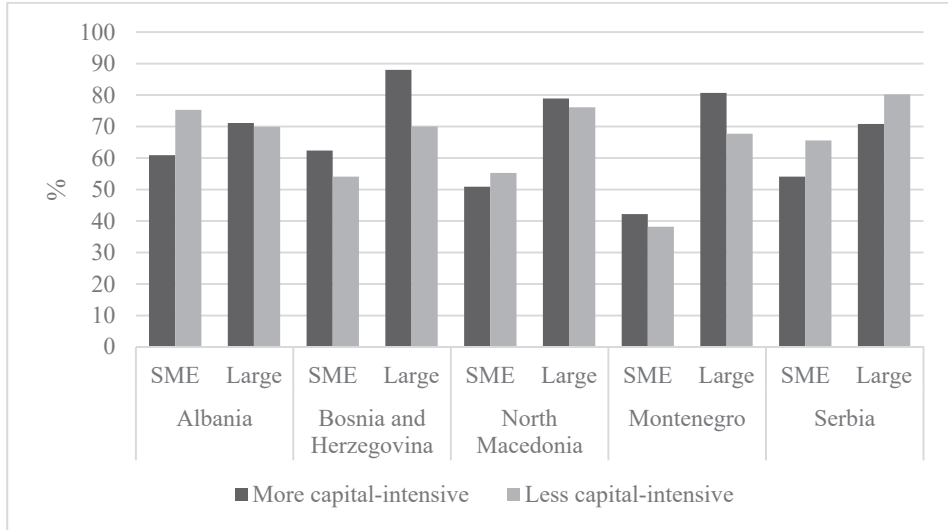
Figure 6. Share of firms implementing more and less capital-intensive measures (large firms vs. SMEs), all 5 WB countries



Source: Authors' calculation based on the World Bank Enterprise Survey 2019

Next, the observed heterogeneity among individual countries shown in Figure 7 justifies this paper's research approach, which examines the determinants of firms implementing different green measures.

Figure 7. Share of firms implementing more and less capital-intensive measures (large firms vs. SMEs), by individual country



Source: Authors' calculation based on the World Bank Enterprise Survey 2019

To examine the determinants of WB SMEs going green, a multinomial logistic regression was performed on a sample of 1,160 firms from Montenegro, Serbia, North Macedonia, Bosnia and Herzegovina, and Albania. A multinomial logistic regression is used when a categorical outcome variable has more than two values. The outcome is the log odds of one category's probability over the base category's probability. The dependent variable here is a categorical variable with a value of 1 if firms undertake no green measures, 2 if they undertake only less capital-intensive measures, and 3 if they undertake only more capital-intensive measures. The category 1 (i.e. firms undertake no green measures) is the base category, which means that the probability of being in other categories is compared to the probability of membership in the base category. Thus, with three categories in the outcome, there are two equations:

$$\ln \left(\frac{P_{\text{Less capital-intensive measures}}}{P_{\text{No green measures}}} \right) = \beta_0 + \beta_i X_i, i = 1, \dots, k \quad (1)$$

$$\ln \left(\frac{P_{\text{More capital-intensive measures}}}{P_{\text{No green measures}_1}} \right) = \beta_0 + \beta_i X_i, i = 1, \dots, k . \quad (2)$$

The independent variables X_i can be dichotomous or continuous. Like binary logistic regression, multinomial logistic regression uses maximum likelihood estimation to evaluate the probability of categorical membership (Jakšić et al., 2020). Following the previous literature review, the following independent variables are used (also obtained from the World Bank Enterprise Survey 2019): age of the firm (continuous variable, in years), sector (categorical variables for manufacturing, retail, services, and other service categories), innovation (binary variable of value 1 if a firm, in the last 3 years, introduced a new or improved product or if it introduced a new or improved process), GVC participation (binary variable of value 1 if a firm is a two-way trader), financial constraints imposed by informal sector competition (binary variable of value 1 if a firm perceives informal competition as a major obstacle), regulatory constraints (proxied by a binary variable of value 1 if a firm had an inspection), gender dimension (binary variable of value 1 if there are females in the ownership), membership of associations (binary variable of value 1 if a firm has such membership), quality certificate (binary variable of value 1 if a firm has an internationally recognised certificate), incorporated climate issues within the firm strategy (binary variable of value 1 if a firm has such a strategy), and exports (binary variable of value 1 if a firm is an exporter, indirect or direct).

4.3. Discussion of the results

Table 4 presents the results obtained from the analysis. The results are presented in relative log-odds. The likelihood ratio chi-square of 254.89 with a p -value < 0.0000 tells us that the model as a whole fits significantly better than an empty model (i.e. a model with no predictors).

Table 4. Results of the multinomial logit regression

	Less capital-intensive	More capital-intensive
Foreign technology	0.713** (0.293)	0.778*** (0.246)
Age	-0.022*** (0.004)	-0.014 (0.009)
Gender	0.31** (0.143)	0.131 (0.139)
Association	0.48*** (0.171)	0.47** (0.201)
GVC	-0.788*** (0.144)	-0.229 (0.216)
Exports	0.505 (0.343)	0.492** (0.221)
Informal sector competition	-0.342*** (0.127)	-0.267*** (0.087)
Innovation (product)	0.432* (0.259)	1.103*** (0.162)
Innovation (process)	-0.16 (0.137)	0.299 (0.232)
Quality certificate	0.934** (0.402)	0.867*** (0.314)
Inspections	0.605* (0.339)	0.506*** (0.178)
Strategy_environment	0.391 (0.535)	1.336*** (0.334)
Sector (Manufacturing=base)		
Other services	0.293 (0.362)	0.245 (0.154)
Retail	0.567 (0.564)	0.119 (0.278)
Services	-0.633 (0.502)	-1.244*** (0.346)
cons	-1.32** (0.513)	-0.36 (0.457)
Observations	1160	
Pseudo R ²	0.116	
LR chi2	254.89	
Prob > chi2	0.0000	

Note: Robust standard errors are in parentheses. The robustness was also tested by including country fixed effects, and all the relevant post-estimation tests were performed (Wald test, LR test, and test on the assumption of the independence of irrelevant alternatives (IIA)).

*** $p < .01$, ** $p < .05$, and * $p < .1$

The results obtained are mostly consistent with previous studies. The results for sector variables show that firms in the services sector (compared with firms in the manufacturing sector) are less likely to implement capital-intensive green measures relative to the base category of firms with no green measures. This is due to the generally higher use of energy and environmental impact associated with manufacturing, which encourages firms to adopt more substantial measures, as well as to the more stringent regulations for this sector. Also, the largest share of SMEs is found in this sector. Furthermore, the findings indicate that the gender dimension has a significant effect, but only on less capital-intensive measures, with firms that have females in ownership being more likely to implement less capital-intensive measures relative to the base category of firms with no measures. This is also in line with existing studies, such as the previously mentioned Nguyen and Vu (2024), Jensen (2023), and Gunawan et al. (2021), who showed that women are more likely (than men) to exhibit pro-environmental day-to-day practices that reflect their personal, ecological, social, and family values.

Additionally, firms using foreign technology are more likely to adopt both less and more capital-intensive green measures, with almost the same likelihood relative to the base category. This is due to access to superior and efficient technologies, which is in line with, for example, Costantini & Mazzanti (2012). Regarding firm age, it is statistically significant only for the second category, where it is observed that older firms are less likely to implement less capital-intensive green measures relative to the base category. This could be due to the established processes and a larger focus on economic than environmental performance.

Furthermore, the results show that firms' membership in various business associations has a positive effect, implying that firms with networking, cooperation, and other benefits stemming from associations are more likely (with almost the same relative log odds) to implement both less and more capital-intensive green measures relative to the base category of firms that implement no measures (Kesidou & Demirel, 2012; Wagner & Llerena, 2011).

The GVC variable, proxied as a two-way trader, is not statistically significant for more capital-intensive green measures and has a statistically significant negative effect on less capital-intensive measures (i.e. firms that are classified as two-way

traders are less likely to implement less capital-intensive green measures compared to firms that implement no measures). The results confirm the previous findings that participation in GVCs can have a mixed impact on firm-level implementation of green measures. While GVCs promote the implementation of green technologies, they can also lead to the transfer of polluting activities to less regulated environments (see De Marchi et al., 2013; De Marchi et al., 2019). WB countries are potential examples of such regulatory environments and this finding calls for further investigation since it indicates that in order to affect the adoption of more capital-intensive green measures, GVC participation should be in interaction with some other supporting factors such as position in the value chain, specific sector, and the nature of the international interactions (De Marchi et al., 2013; De Marchi et al., 2019; Gereffi et al., 2005). Another external market pressure variable, i.e. export, is statistically significant only for more capital-intensive green measures, implying that exporters are more likely to implement such measures relative to the base category of firms with no measures. External market pressures and standards can motivate firms to improve their environmental performance. These findings have implications for WB countries, which export a significant portion of their goods to the EU market, from the aspect of the introduction of the Cross Border Adjustment Mechanism, according to which, starting from 2026, the exports will be subject to carbon pricing if they do not meet EU emission standards. Firms that fail to align with the EU's standards may find their products becoming less competitive due to the added cost of carbon tariffs. This risk could encourage exporters to adopt green measures, especially capital-intensive ones, to minimise carbon emissions and maintain their market share in the EU in the long run.

The findings concerning the two innovation variables – product and process – show that only product innovation has a statistically significant effect, implying that firms that introduced product innovation are more likely to implement less and more capital-intensive green measures relative to the base category of firms with no measures. The explanation for this stems from the definition of these two types of innovation, where product innovation captures the introduction of a good or service that is new or significantly improved concerning its characteristics or intended uses (according to the OECD/Eurostat Oslo Manual, 2005). This includes significant improvements in technical specifications, components, and materials, utilising new knowledge or technologies. Very often,

and especially in the manufacturing sector, product innovation is driven by environmental regulations, and firms may also adopt green measures in order to ensure compliance and gain a competitive advantage².

The quality certificate variable is more statistically significant for more capital-intensive measures, indicating that firms with such certificates are more likely to implement such measures relative to the no measures category due to compliance with certification standards. The regulatory burden variable (proxied by inspections in firms) shows that, with a higher burden, SMEs are more likely to implement capital-intensive measures relative to the no-measures outcome, also confirming the above-reviewed literature highlighting that the regulatory framework has a significant role as an example of an external factor. In addition, firms with strategic objectives that mention environmental or climate change issues are more likely to implement more capital-intensive measures relative to the base outcome of no measures, reinforcing the critical role of strategic commitment to environmental issues in driving significant green initiatives

Finally, competition from the informal sector as a proxy measure of financial constraints was used. This is because informal firms often have lower costs as they evade taxes and regulatory compliance costs (see Perry, 2007), which could also encompass expenses related to environmental regulations. The cost advantage allows them to offer goods and services at lower prices, while formally registered firms facing this price competition may be hesitant to invest in expensive more capital-intensive green technologies, deterring them from long-term investments. The results confirm that firms that are exposed to the informal sector competition are less likely to implement both types of green measures relative to the base category of no green measures.

The results obtained confirm previous findings and show that internal factors (e.g. innovation and strategy) and external factors (e.g. regulatory pressures and competition) significantly influence the adoption of green measures, particularly more capital-intensive ones. Moreover, the results contribute to the literature by

² It should also be a case that although process innovation alone may not be significant, when combined with product innovation, it could lead to more advanced adoption of green practices. This should be tested in future studies through inclusion of interaction variables in the model.

highlighting the complex interaction between firm characteristics, external influences, and the adoption of green practices. As a result, energy efficiency and climate-neutral policies should be shaped according to the characteristics of enterprises and the context in which they operate to be most effective. In the WB countries, it is shown, nevertheless, that external factors have more significant weight, especially for more capital-intensive measures, highlighting the need for continuous policy and regulatory pressures from the EU level and international treaties.

4.4. Some implications for policy and business practices in the Western Balkans

The findings presented might be relevant for policy-making in the WB and business practices at the SME level, especially when considering the current EU debates regarding the reshaping and adjusting the current greening sustainability agenda, as well as discussions on green transition in the WB (see, e.g., Licastro & Sergi, 2021; Reuters Events, 2024; Uvalic, 2023).

Bearing in mind each WB country's specificities and high regional disparities, the results of the analysis indicate that national policymakers should consider continuously improving the business environment and greening ecosystems, which would encourage a further green transformation of SMEs and other firms and ease their transition into a green economy. Next, taking the SME perspective into account when adopting the greening measures in regulation and financing transition packages is essential for enabling progress in the overall greening of the economy. Furthermore, policymakers should improve monitoring of the success and impact of greening policies and improve tracking indicators, especially at the firm level, such as the EU Environmental Sustainability Reporting Standards (ESRS), which could track the greening policies results achieved by the SMEs and other firms with more preciseness than occasional surveys. Moreover, the categorisation of green measures from the aspect of capital intensity used in this paper is also useful from a policy perspective since less capital-intensive measures are more accessible to firms that have limited financial resources, and enabling these measures could be achieved through instruments such as tax breaks or increased information dissemination. Conversely, more capital-intensive measures involving substantial investment would require larger government support through subsidies and grants.

In response to our first research question (RQ1), decision-makers at the firm level, especially in SMEs, need to consider investing resources in improving labour and managerial skills required for adopting green technologies, adjusting to new ecosystems, and building leadership for greening business practices. In addition, increasing investments in capital-intensive green technologies will enable a smoother transition in the long run. It is also important to increase the proportion of SMEs that offer green innovative products and services by enhancing their participation in GVCs through decarbonised supply chains and identifying competitive market niches at national and regional levels. In order to achieve the above-mentioned, it is vital to ensure the efficient use of EU, national, and commercial funding to make it easier for small businesses to access green technologies and promote the development of innovative green products and services. Finally, it is essential to improve regional and EU cooperation within the WB region and to form strong partnerships in order to enhance green business practices.

Obviously, the scope of challenges for the WB countries is huge, bearing in mind all the institutional and environmental requirements for such an enormous transition. As the Just Transition Mechanism is not available at this point for such an immense change in the WB, it is evident that faster progress in EU accession negotiations is essential for ensuring adequate financial and policy support to achieve a green transition and matching Sustainable Development Goals in WB countries.

5. CONCLUSION

This paper examined the determinants of SMEs in the WB countries (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia) going green. Specifically, the study explored which firms have a higher likelihood of implementing more and less capital-intensive green measures relative to the base category of firms with no green measures being implemented. The results show that firms from the services sector are less likely to adopt capital-intensive greening measures than SMEs in the manufacturing sector, which was not surprising. Higher energy use and environmental impact associated with manufacturing encourage firms to implement more capital-intensive measures. One of the reasons for such a trend lies in the availability of EU funding for green transformation. It has been found that SMEs using foreign technology and those

that have implemented product innovation are more likely to adopt more capital-intensive green measures, possibly due to access to more efficient technologies. This highlights innovation funding as a critical factor for firms going green. Next, it is shown that external factors (such as regulations and competition from informal sector and international actors) have more significant weight, especially for more capital-intensive measures. These results answer our RQ2.

The findings obtained from the analysis offer some policy implications, suggesting that enhancing access to advanced technologies, improving the regulatory framework, and promoting cooperation through various networks can significantly impact the implementation of green measures in SMEs, especially those that are more capital-intensive. Additionally, the findings confirm various theoretical frameworks, such as stakeholder theory, resource-based theory, or institutional theory, while filling the gap in the literature through the analysis of a sample of WB countries. Finally, it opens up a research avenue for further analysis, especially concerning the variable encompassing the firms defined as two-way traders (a proxy for GVC), since the complexity associated with GVCs can have different effects on firms, depending on their position in the chain, specific sector, and the nature of the international interactions.

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