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Review

Eco-Efficiency, Environmental and Sustainable Innovation in Recycling Energy and Their Effect on Business Performance: Evidence from European SMEs

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Abstract: This paper examines the influence of adopting resource efficiency actions, saving water, saving energy, using renewable energy, saving materials, minimizing waste, selling scrap, recycling, using durable products, promoting environmental responsibility, and offering green marketing products and services on the performance of small and medium-sized enterprises (SMEs). More specifically, we investigate specific resource efficiency actions and their impact on production costs, investment, the available support for product expansion, and the effect of encountered barriers on SME performance. We develop a theoretical framework based on stakeholder- and resource-based theories to serve as the foundation for this analysis. We use these theories to explain the link between eco-efficiency actions, firm performance, and ecological behavior, along with public policy and innovation. This study uses Flash Eurobarometer survey datasets FL342, FL381, FL426, and FL456, which cover SMEs across time and sectors in 28 EU countries. The data are analyzed through descriptive and ordered logit regression analysis, using the Statistical Package for the Social Sciences (SPSS) to test the relationship between the above variables and the parameters. In terms of practical implications, these findings are crucial in helping SMEs pursue sustainable development. According to the findings, SMEs lack information on how implementing eco-efficiency action affects their financial health and sustainable innovation. This study can provide valuable insights into how implementing eco-efficiency practices can positively impact a company's bottom line, good health, and employees' well-being and how SMEs can use this information to make more informed decisions. Additionally, the findings can help inform policy makers about how to better support SMEs in pursuing sustainable development.

Keywords: sustainable practice; eco-efficiency actions; politics and policy making; green marketing businesses; sustainable innovation; environmental responsibility

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1. Introduction

Over the last century, businesses have pursued a market-oriented approach for profit maximization and business success, without paying attention to the adverse effects of environmental problems and the destruction of ecosystems. The world is going through many social and ecological problems, which are rising at an alarming rate and will continue to do so until businesses stop unsustainable practices. However, since the 1990s, business practices focusing on environmental and social responsibility have gained prominence

among businesses, researchers, and stakeholders. There are more manufacturing facilities as the global consumption pattern grows, resulting in unsustainable living practices globally and many other grave issues [1]. Therefore, rather than simply utilizing the enormous potential resources to earn profits and assume social responsibility for innovation, business development should be seen as a creative process leading toward socioeconomic and environmental sustainability.

It is crucial to have national policies and initiatives toward achieving sustainable development; there were already many established environmental regulations, such as the Intergovernmental Panel on Climate Change (IPCC), which addressed the possible causes of climate change and the natural environment's degradation [2]. Many governments worldwide have environmental and energy regulations, such as the Kyoto Protocol, the Doha Amendment to the Kyoto Protocol, and the United Nations' Sustainable Development Goals (UNHRC). A Green Action Plan was also adopted in 2014 to mentor SMEs by transforming environmental challenges into opportunities. These initiatives were vital in advancing the sustainable development agenda, good health, and the well-being of employees [3].

Sustainable development is moving toward the threefold idea of society, economy, promoting corporate innovation, and ecology, as these are the world's leading challenges (Figure 1). rapid industrialization and urbanization, deterioration of the environment, the current economic slowdown, and social inequality. Sustainable development first emerged with the Brundtland Report by United Nations' World Commission on Environment and Development (WCED), which specified an urgent need to protect the planet's resources and people's well-being at a superior level. Moreover, the concept of sustainable development can be explained through the lens of society's environmental, economic, and social areas, which has been consented to by many researchers [4,5].

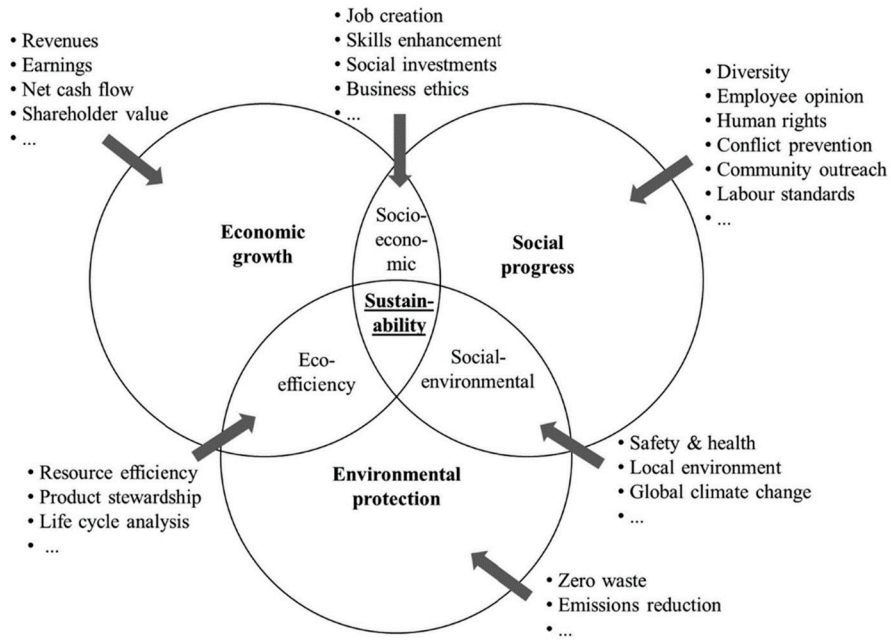

Figure 1. The description of sustainable development.

Sustainable development solves poverty, hunger, job creation, resource efficiency, environmental responsibility, health, and peace through sustainable channels [1]. It involves meeting the present needs, though not at the cost of losing the ability to meet society's future needs. Sustainable development aims to discover the intersection of financial, human, ecological, and technological systems, all in one. As such, businesses and stakeholders need to implement serious policies to cater to the world's problems. Sustainable development can only be achieved when governmental regulations and laws emphasize sustainability and environmental actions within all businesses and enterprises

and undertake several ecological measures. It was also linked to the balance between social and economic development with the protection and preservation of nature [2].

Achieving sustainable development and eco-efficiency has become essential over the years [6]. The World Business Council for Sustainable Development (WBCSD) first coined the term "eco-efficiency", which goes beyond just one particular activity to reduce environmental impact. Under eco-efficiency, the measures and activities that can reduce environmental problems and the ecological footprint are widely recognized in the literature and have practical implications [7]. Small and medium-sized enterprises (SMEs) make up the bulk of business ventures—specifically within the European Union. They are the epitome of economic growth, as they represent over 99% of all companies and 95% of private-sector firms. Since 98–99% of all European-based businesses are SMEs, they have contributed to a significant share, i.e., 85%, of all new jobs in Europe between 2002 and 2010 (OECD 2010a, 2005, 2004, 2000) [8], and they have employed around 90 million people within the European Union. However, this also indicates that SMEs could be responsible for most environmental degradation, if they do not undertake environmental actions and ignore the adverse environmental effects that they create [9].

There is an ongoing debate about whether SMEs can succeed at implementing eco-efficiency and resource efficiency measures and still perform better. Several studies investigated the case of SMEs' performance regarding environmental actions and strategies through multiple research parameters, but the empirical findings are mixed and diverse. Although a wide range of studies have a mutual consensus regarding SMEs' importance and potential to impact substantially, their findings vary [10]. Hence, there is a gap in the literature regarding SMEs and their overall effect on the environment, which requires further investigation. Ecological efficiency or eco-efficiency (Table 1) is a process undertaken by any entity (product organization or corporate social responsibility) toward dealing with products and services, strategies, systems, and actions that positively impact the environment while creating value [11].

Table 1. The eco-efficiency and economic performance.

Eco-Efficiency Years	Research Study	Definitions and Appraisals
1996 WBCSD	World Business Council for Sustainable Development	Achieving more value from lower inputs of material and energy, with reduced emissions
1998 OECD	Organization for Economic Cooperation and Development	Efficiency with which ecological resources are used to meet human needs
2000 and 2005	Lihni, Morioka, and Tsunemi Yamamoto	Ratio of economic performance to environmental influence
2007	Salmi	Eco-efficiency, economic performance, and environmental performance
2002	Müller and Sturm	Ratio of environmental performance to economic performance
2006	Castro and Chousa	Eco-efficiency is economic performance and environmental performance
2005	Huppes et al.	General goal of creating value while decreasing environmental impact
2006	Côté et al.	Producing more from less

To effectively apply sustainable development in response to the world's most pressing challenges such as rapid industrialization and urbanization, the deterioration of the environment, and the current economic slowdown, it is necessary to integrate economic, social, and environmental considerations into policy- and decision-making processes. Several practical

measures can be taken to address this problem, such as investing in clean technology and renewable energy, promoting sustainable transportation and land-use practices, reducing inequality, fostering inclusive growth, and promoting sustainable business practices to address these problems [3].

Political effectiveness in business is an important concept that has been gaining attention in recent years due to its increasing importance in the business world. It involves understanding and managing the complexities of the political environment in which organizations operate. It includes identifying and responding to external and internal political pressures and changes in the environment. The ability to effectively manage political pressures and influence outcomes is a critical factor in the success of organizations. Political effectiveness in business can be divided into three main categories: organizational structure, political relationships, and policy making. As the name indicates, the structure and processes of the organization, such as the divisions of labor, decision-making processes, and the relationships between different departments, fall under the category of organizational structure. Political relationships involve building and maintaining relationships with political actors, such as government officials, lobbyists, and other influential people. Finally, policy making involves developing and implementing policies that guide the organization's actions, such as regulations, laws, and other forms of guidance. Political effectiveness in business is essential for any organization that wants to be successful. Organizations must be able to adjust their strategies, policies, and operations to changing political and economic environments, while still ensuring that they remain competitive. Political effectiveness also allows organizations to take advantage of opportunities and mitigate risks. Ultimately, political effectiveness allows organizations to anticipate, respond to, and even shape the political environment in which they operate.

The remaining structure of the research article is as follows: Section 2 outlines this article's literature review, theoretical development, and hypotheses. Section 3 discusses the material, methods, and variable descriptions. Section 4 focuses on data, analyzes the study, and presents discussions, of the research and results. Section 5 discusses the conclusions and future research limitations.

In the context of this paper, eco-efficiency is broken down into two types of actions (resource efficiency actions and offering green products and services) to investigate SMEs' performance. The first element is resource efficiency actions, while the other aspect is green business (products and services) [12,13]. The first element provides the actions that form a system of processes and activities that lead a firm to be environmentally sustainable. In contrast, the second element is merely businesses offering green products that positively impact society and the environment [14].

2. Literature Review

This section explains eco-efficiency actions and the relevant concepts in light of the existing literature that is discussed. With the aim to discuss the importance of SMEs in applying environmental strategies and activities within the European business setting, this section is divided into several main parts.

First, this section focuses on what eco-efficiency means in a business environment according to the relevant literature and past research findings. In the second part, the concept of eco-efficiency is debated along with its components, i.e., resource efficiency actions and green business activity. The third part discusses the relevance of the theories, and the stakeholder- and resource-based view is addressed to investigate the relation between SME's eco-efficiency actions and performance. Finally, in the fourth part, the research gap is explored. Our research targets and stresses why these theories particularly help SMEs and the broader small business society.

2.1. Resource Efficiency Actions

Resource efficiency actions employ limited resources and minimize the environment's negative impact [15]. They allow firms to create more with less; in other words, resource

efficiency results from the processes where material and energy efficiency increase due to economic activity and growth. Resource efficiency actions are associated with green growth. According to Flash Eurobarometers 342, 381, 426, and 456, resource efficiency measures can be taken to save and efficiently manage resources but are not limited to saving water, electricity, and materials; using green and renewable energy sources; reducing waste; redesigning; and recycling [16].

2.2. Green Businesses

A green business offers goods and services that cater to ecological issues but have a minimal negative impact. Thus, green businesses are considered sustainable and responsible for green product innovations. Such companies are thriving in the developed world. Still, in the developing world, they struggle to make a significant impact since industrialization is at its peak in the developed world [17].

Small businesses can consider themselves green by reducing their environmental impact. This can include reducing waste, using energy-efficient lighting and appliances, and ensuring that renewable energy sources, such as wind or solar, power their operations. Furthermore, small businesses can also try to reduce their carbon footprint by switching to electric vehicles and transitioning from traditional forms of transportation. Businesses can also focus on educating their staff and customers about the importance of environmental sustainability. By implementing sustainable practices, small businesses can also consider the environment an integral part of their business activities. This can include sourcing local and organic materials when possible, utilizing green cleaning products, and investing in energy-efficient technology and equipment. Businesses can also participate in environmental initiatives, such as carbon offset programs or tree-planting initiatives. These activities can help to reduce companies' environmental impact, while also helping to promote their positive image.

Furthermore, small businesses can also ensure that their operations are carried out sustainably. This can include utilizing eco-friendly packaging, recycling materials, and conserving resources as much as possible. Businesses can also consider ways to reduce their water consumption, such as installing water-efficient fixtures or collecting rainwater for use in their operations. By taking these steps, businesses can help to reduce their environmental footprint and create a more sustainable future for the planet. It is important to note that considering the environment does not depend solely on the business scale. Big businesses can and should consider the environment as an integral part of their business activities. However, small businesses can significantly contribute to sustainability by taking proactive measures to reduce their carbon footprint and waste. Researchers also noted a positive link between green orientation and a higher market share. Hence, it would not be wrong to say that green businesses can be profitable. Small businesses can consider the environment an integral part of business activity and identify themselves as "green". For example, green businesses could be developing a natural product, managing their waste, building a sustainable solution to ecological problems, consulting on sustainability, or building environmentally sound buildings [18]. However, they differ in their attitudes and business activity. For instance, in some cases, they claim that their firm is "green", but their business activity causes non-green outcomes, such as a high carbon footprint and emissions. Hence, the mindset is vital when setting up a green business entity. On the other hand, some businesses start traditionally, i.e., firms with the sole goal of making a profit that are then turned into green entities, referred to as eco-sensitive organizations [19]. They are essential players in shaping the world's future and advancing eco-efficiency strategies.

2.3. Political Effects of Business and Policy Making Affect Outcomes

The literature on the political effects of business is a topic that has been widely studied by scholars and researchers in various disciplines due to its importance, as it helps in understanding the power dynamics between business and politics and how different economic policies, regulations, and laws can impact different businesses and sectors. One of the most

notable studies on the political effects of business is by political scientist David Vogel. His research focused on the political implications of corporate lobbying and how corporate involvement in politics and policy making affects outcomes. He found that corporations often use lobbying activities to influence policy outcomes in their favor, which can be seen in areas such as environmental regulation, labor law, and taxation. Other authors examined the political implications of different business structures, such as the differences between publicly traded and privately held companies. For example, researchers found that publicly traded companies typically have more resources and influence than privately held companies and can better influence political outcomes. Furthermore, public companies are also more likely to engage in corporate social responsibility activities, which can positively affect the public opinion of the company and its political influence. Finally, research on the political effects of business also looked at the impact of international trade and investment. Studies found that multinational corporations often have a greater influence on policy decisions than domestic companies and that this can be seen in areas such as trade agreements and other international economic policies. It is clear that the power dynamics between business and politics can be complex, so understanding these dynamics can help inform policy making and manage corporate influence.

The political suggestibility of business is an engaging area of the literature. Businesses are increasingly involved in the political process, and their influence on government policy can be significant. Understanding how businesses can influence politics provides important insights into the functioning of government and political decision making. At the most basic level, businesses can influence policy by lobbying for or against certain policies. This can be accomplished through direct contact with lawmakers, lobbying firms, or campaign contributions. Businesses can also indirectly use their economic power to influence policy by withholding investments, relocating operations, or engaging in boycotts. In addition to direct and indirect influence, businesses can shape the political environment through the media. Businesses can use their resources to generate positive coverage of their activities and negative coverage of their opponents' activities. They can also use their influence to shape public opinion on certain issues. Finally, businesses can influence the political process through involvement in think tanks and other policy-forming institutions. By participating in these organizations, businesses can shape the debate around certain policies and ensure their interests are represented in the policy-making process. Overall, the literature on the political effect of business suggestibility provides valuable insight into the workings of government and the role of businesses in policy formation. Businesses have significant power to shape politics and policy, either directly or indirectly. As such, understanding how businesses can influence the political process is essential for ensuring that government policies reflect the public's interests.

2.4. Relevance of Theories within the Research Context

Stakeholder theory has gained much prominence among scholars and organizations since its emergence in 1984. However, the term "stakeholders" was coined by the Research Institute in 1963 for the group of people who help organizations survive. Stakeholders are usually people or individuals who influence an organization achieving its goals [20,21]. There are always stakeholders when creating a particular system. Also, the primary stakeholders may be able to leverage the firm and influence major decisions.

Moreover, it is argued that firms behave more responsibly and accountably due to stakeholder influence while implementing complex and costly strategies toward business objectives [22]. Furthermore, stakeholders can help any firm utilize opportunities for a common and mutual goal to enhance its growth. However, most of the literature generally focuses on large firms rather than small firms. Accordingly, the practices of large firms cannot be correlated with those of small firms, since large firms prioritize their interests differently than SMEs do. As confirmed by many studies, SMEs can perform much better if there is pressure from multiple stakeholders to adopt environmental strategies [23].

However, it should be noted that although the significance of stakeholder theory has been positively interpreted, it has also faced some criticism. One such critique is that stakeholders' different natures and political, economic, and behavioral uncertainties can be a hurdle for businesses to grow, which might induce a conflict of interest between them. It is sometimes difficult to link eco-efficiency actions with firm performance under the stakeholder view because stakeholders' motivations might not be as sincere as the firm's own motivation [24]. For example, it is perceived that to understand the actions of SMEs in adapting environmental behavior, many strategic actors in terms of multiple stakeholders need to be considered. The literature showed that stakeholders can be essential in pushing sustainable practices within an organization. It would not be wrong to state that stakeholder theory is a classic theory focusing on corporate social responsibility and environmental sustainability and responsibility on numerous occasions [25]. Corporate social responsibility (CSR), a critical factor for achieving sustainable development, has become a norm within many companies across countries/regions. It has also been utilized to recognize stakeholders' importance in implementing environmental strategies influencing environmental responsiveness. Hence, corporate social responsibility aligns with the stakeholder theory to bring long-term value and an enhanced reputation for companies that fulfill their environmental commitments [26]. As such, having multiple stakeholders with shared goals and synergy can make any firm a sustainable corporation.

2.5. Resource-Based View

This theory defines resources as "assets, capabilities, processes, attributes, information, technology and knowledge possessed or controlled by a firm that aims to implement effective strategies that improve efficiency". The theory that identifies the resources to achieve a competitive advantage through firm-specific investments and creating value is called the RBV, which originated in 1991. Since then, it has become a fundamental theory, particularly in managing organizations [27].

Specific resource efficiency actions can impact SME performance in various ways, such as using renewable energy or minimizing waste. These actions can reduce production costs, such as cutting energy bills or reducing waste disposal fees, ultimately increasing profitability. Although this is true, some SMEs may have difficulty making the initial required investments, such as purchasing new equipment or implementing energy-efficient technologies, which can impede their growth. Furthermore, there is a lack of support for product expansion, especially for smaller companies with limited resources to invest in research and development. This can be especially problematic when SMEs cannot secure loans or other forms of funding, as they would be unable to invest in the necessary resources to grow their businesses. Without the proper support, these enterprises may struggle to maintain their sustainability. As a result, policy makers need to provide SMEs with financial incentives, technical assistance, and access to resources in order to pursue sustainable development. For instance, the EU introduced a green deal to help SMEs transition to sustainable production and consumption, providing them access to green finance, sustainable industrial policies, and green innovation.

The prior literature showed that this theory has widespread significance in helping organizations to carefully assess their resource structure and attain a competitive advantage. Thus, the RBV considers a "resource" as an essential asset for a firm's success. However, such a resource must be valuable, rare, and inimitable, to achieve a competitive advantage such that competitors cannot easily acquire it. This resource needs to be heterogeneous and aligned with the organization's capabilities [28]. Although there is some criticism, this theory cannot be used as a standalone concept and does not guarantee that a company can achieve a competitive edge by employing resources. However, many studies support the RBV because it correctly addresses that both tangible and intangible resources, if appropriately utilized, may lead to competitive advantage and, eventually, financial profit.

According to various studies, the RBV has implications for SMEs in their quest to become resource-efficient. In particular, some studies show that SMEs hardly succeed in the

current business world if they do not opt for technological resources. The most common reason is a lack of financial and human capital, making it challenging for SMEs to engage in proactive eco-efficient strategies and measures [29].

However, there is no conclusive argument that shows the kinds of resources that can enhance SMEs' context and their journey toward applying green practices. In this case, tangible and intangible resources can be paramount for smooth business operations. In particular, SMEs' success could depend on their organizational capabilities while implementing eco-efficiency actions and responsible business strategies. Hence, the term resource, in this context, is vital for SMEs in enabling progress toward environmental performance. In addition, SMEs' size is also questionable when applying ecological strategies. Some studies argue that firm size positively affects the degree of SMEs' proactiveness in using such systems [30]. There is no doubt that the firm's size plays a vital role in the application of eco-efficiency actions, but the scope of the SME in minimizing the ecological footprint matters too. The prior literature's findings showed that SMEs might easily opt for green development strategies more often than big companies because of their entrepreneurial inclination and personal leadership capabilities, which help them achieve sustainable development goals. Thus, it can be assumed that SMEs with specific organizational capabilities can develop their products/services through sustainable, innovative ideas for solving environmental problems. The detailed investigation in this paper aspires to help SMEs in this regard by assisting them in understanding which eco-efficiency actions positively impact firm growth and performance [31].

2.6. Theoretical of Development and New Hypotheses SMEs

This paper hypothesizes that SMEs have the potential to bring significant change and pave the way for sustainable development on a global level [32]. This overall framework can be broken down into six hypotheses that consistently test SMEs' performance, which are illustrated in Figure 2. In this context, SMEs' performance is defined as an increase in annual (last year) turnover while implementing eco-efficiency actions, as performance depicts positive or negative progress. Hence, it is taken as a dependent variable, while the independent variables are demonstrated by resource efficiency actions, offering green products and services, the impact of activities on production costs, investment regarding actions, and support toward those actions and encountered barriers.

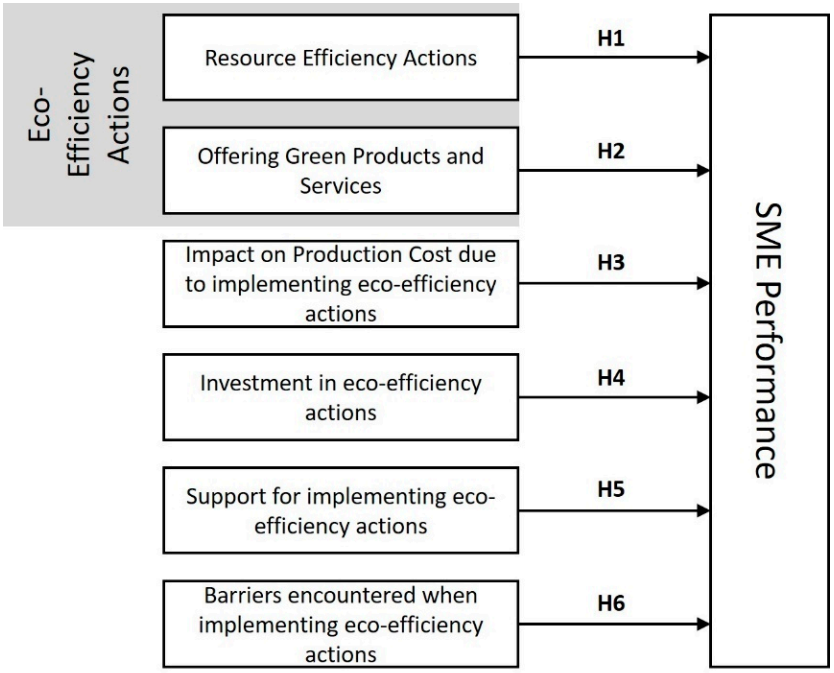

Figure 2. Hypotheses of this paper.

Thus, this paper's first hypothesis implies that resource efficiency actions help improve SMEs' performance.

Hypothesis 1 (H1). *Resource efficiency actions have a positive impact on the last year's turnover.*

Green businesses significantly minimize ecological issues by dealing with naturally produced goods/services that positively impact the environment. Such companies do not pollute the environment in any way and have a low carbon footprint. Another important trait of these businesses is their ability to deal with issues such as waste management, recycling, sustainable design, renewable or eco-energy solutions, and green logistics. Moreover, it can be deduced from the prior literature that many SMEs in green businesses successfully run their companies while dealing with green products and services [33]. Government subsidies and programs that help SMEs create and offer green products and services are on the rise within the European Union and its member states. Therefore, it is hypothesized that SMEs can gain positive firm performance by dealing with green products and services.

Hypothesis 2 (H2). *Offering green products and services (green business) has a positive impact on the last year's turnover.*

Companies are constantly struggling to discover ways to produce revenue from green products and services. There is a new model for an organization to break down its previous mode of production. Prior studies indicated that firms can perform better if their production costs are reduced, and, consequently, the profit margin is higher. Eco-efficiency actions can also be implemented in several ways: directly through the use of the latest eco-friendly technologies and indirectly by applying proactive environmental strategies within their business model [34]. Nevertheless, implementing resource efficiency actions might initially increase production costs [35]. There is no doubt that firm growth can be achieved through substantial investments while implementing eco-strategies, resulting in higher operational costs.

Moreover, rising energy and material prices can be challenging for SMEs. This seemingly supports the idea that implementing eco-efficiency actions has a downside for a firm's performance; however, this paper hypothesizes that this downside is only short-term and that these actions positively impact the firm's overall performance and its turnover [36]. For example, the organization can increase green product development by taking these actions, contributing to forming ecological behaviors and its psychological climate. Indeed, resource efficiency actions provide a sustainable perspective of cutting off operational costs, while investing in eco-strategies can make the firm more profitable in the long run. And the challenges above can be overcome by efficiently utilizing resources, such as optimizing energy consumption and lowering costs by going into efficient practices, such as reusing and recycling waste [37]. For this reason, knowing the relationship between resource efficiency actions and their impact on production costs is paramount for SMEs. If positive, it should be highly considered, which brings the following hypothesis of this paper.

Hypothesis 3 (H3). *The impact of resource efficiency actions on the production cost has a positive effect on the last year's turnover.*

Organizations always need investment to create opportunities and grow as successful business entities. And to do so, they need investment to enhance their economic growth and execute specific advanced actions and measures, such as investing in environmental management systems or the latest green technologies. Nevertheless, securing investment for implementing multiple ecological management strategies can be a significant challenge, especially for SMEs [38], since they typically find it challenging to reach out to potential stakeholders and investors. In addition, they are also reluctant to apply for funding from external sources to implement resource efficiency actions. Thus, for SMEs, there is significant uncertainty about whether this approach is successful.

A clear relationship between investment regarding resource actions and SME turnover is, hence, necessary, and this leads to the fourth hypothesis of this paper, where we hypothesize that, despite the barriers mentioned above, the improvement in the SME's last year's turnover of far outweighs any cost of investment needed to implement resource efficiency actions. If this hypothesis turns out to be valid, it, on the one hand, helps SMEs be more confident in using their investments to undertake resource efficiency actions [39]. On the other hand, it can encourage investors to help SMEs embrace innovative environmental management solutions through acquisition.

Hypothesis 4 (H4). *The cost of investment in implementing resource efficiency actions has a positive impact on the last year's turnover.*

The fifth hypothesis of the paper implies "support" as a vital factor in expanding SMEs' green products and services that make them more sustainable and, consequently, improve their performance. Indeed, support is crucial for SMEs when implementing eco-efficiency actions, especially during the expanding phase, due to their challenging nature. SMEs usually receive support for expanding their businesses through incentives, assistance, advice, and consultancy. Although other kinds of support exist, we focus on these four in this paper. Earlier research showed that companies that do receive help (either financial or technological) from the government are less reluctant to incorporate environmental management practices or are willing to do so [40]. However, SMEs are still relatively unaware of the available government support, despite several government initiative projects, and find it henceforth challenging to implement these resource efficiency actions. As such, the relationship between support for expanding their businesses (and whether all kinds of support financially bear fruit or not) and performance is necessary to help SMEs apply for licenses and the correct types of support.

This brings us to the fifth hypothesis of this paper, i.e., the support given to SMEs for expanding their business, regardless of its type, can lead to better firm performance. These SMEs could lead to better performance if encouraged and motivated by their green transformation leaders to create a green psychological climate [41]. An environment of ecological support can be a significant mediator for organizational development. Thus, in this field of environmental development, based on the above hypotheses, this article suggests the following hypothesis:

Hypothesis 5 (H5). *Support for expanding green products and services has a positive impact on the last year's turnover.*

This paper's final hypothesis states that SMEs face one or more barriers affecting their performance when implementing resource efficiency actions. The barriers can be legal and administrative complexities, costly eco-efficiency actions, a lack of specific expertise, difficulty choosing the right action, a shortage of demand for resource-efficient products/services, or a lack of supply of raw materials. These barriers are significant in understanding SMEs' performance while implementing eco-efficiency actions. If SMEs face any of the above obstacles, the circumstances can halt the whole process of them undertaking eco-efficiency actions and pursuing sustainability [42]. For example, SMEs with insufficient knowledge of sustainable materials or methods or a lack of access to the proper administrative resources are less likely to undertake advanced resource efficiency actions. Hence, this could be one of the main challenges for SMEs not undertaking such activities. Therefore, it is hypothesized that SMEs encountering one or more barriers while implementing resource efficiency actions can have their performance negatively affected.

Hypothesis 6 (H6). *The barriers encountered by SMEs harm the last year's turnover.*

3. Materials and Methods

3.1. Research Design, Data Collection, and Sample Size

This paper utilizes the Flash Eurobarometer survey "SMEs, resource efficiency, and green markets" (342, 381, 426, and 456) published in 2012, 2013, 2015, 2018, and 2020. These datasets are based on SME surveys from the EU-28 taken from several business sectors. European Commission conducts these surveys through telephonic interviews. The reason for choosing such an extensive survey is its relevance and importance within the European business setting. These surveys capture one of the most dominant business groups in the EU, i.e., SMEs; resource efficiency; and green markets (Table 2).

Table 2. The European countries' codes.

Country	Country Code	Country	Country Code
Belgium	BE	Latvia	LV
Czech Republic	CZ	Luxembourg	LU
Bulgaria	BG	Hungary	HU
Denmark	DK	Malta	MT
Germany	DE	The Netherlands	NL
Estonia	EE	Austria	AT
Greece	EL	Poland	PL
Spain	ES	Portugal	PL
France	FR	Romania	RO
Croatia	HR	Slovenia	SI
Ireland	IE	Slovakia	SK
Republic of Cyprus	CY	Finland	FI
Lithuania	LT	Sweden	SE
Italy	IT	United Kingdom	UK

3.1.1. Variable Description

In the table below (Table 3), all the variables used in the research are categorized into dependent, control, and independent variables.

Table 3. The variable types.

Variable	Type	Description
Dependent Variable		
Annual Turnover	Categorical	1. Increased, 2. Decreased, 3. Unchanged.
Control Variables		
Size	Categorical	The number of employees describes the size of the SME: 1. 1 to 9, 2. 10 to 49, 3. 50 to 249.
Sector	Categorical	1. Manufacturing, 2. Retail, 3. Services, 4. Industry. (Base category, industry.)
Country	Categorical	List of 28 European countries from which 27 dummy variables are formed. (Base country, Germany.)
Explanatory Variables		
Resource Efficiency Actions		

Table 3. *Cont.*

Variable	Type	Description
Saving Water	Categorical	Dummy Variables with value "1" mean if the SME is undertaking any specific actions to become more resource-efficient.
Saving Energy		
Predominantly Using Renewable Energy		
Saving Materials		
Minimizing Waste		
Selling Scrap		
Recycling		
Design Durable Product		
Impact on Production Cost	Categorical	Significantly decreased and slightly decreased are labeled as "Decreased" and coded as "1", otherwise "0"; similarly, significantly increased and slightly increased are marked as "Increased" and coded as "1", otherwise "0".
Investment	Binary	The term "high investment" means if, in the past two years, the SME has invested more than 10% of annual turnover in becoming more resource-efficient, it is coded as "1", otherwise "0".
Support	Binary	The categories are 1. Financial Incentives, 2. Assistance, 3. Consultancy, 4. Marketing, based on receiving specific support it is coded as "1", otherwise "0".
Offer Green Product	Binary	Code "1" if offering green products or services, otherwise"0". The categories are the complexity of administrative/legal procedures, difficulty to adapt legislation, choosing the right environmental action, cost of environmental actions, lack of specific environmental expertise, lack of supply of required materials, and lack of demand for resource-efficient products or services.
Encountered Barriers	Binary	

3.1.2. Dependent Variable

The performance of SMEs is carefully selected as a dependent variable. This variable was employed several times in the prior literature as a dependent variable. Based on the assumptions drawn from the Flash Eurobarometer surveys, the dependent variable is the last year's turnover [43]. The turnover effect can be evaluated through an increase, decrease, or lack of change, which can help analyze SMEs' performance, i.e., the dependent variable. In this context, this variable depends on eco-efficiency actions (resource efficiency actions and offering green products and services), undertaken resource efficiency actions' impact on production cost, investment toward eco-efficiency actions, support for business expansion, and encountered barriers while setting up resource efficiency actions.

3.1.3. Independent Variables

(a) Offer Green Products or Services

One aspect of eco-efficiency actions, i.e., offering green products or services, is considered an independent variable in this paper [44]. The SMEs were asked whether they deal in green or natural business. The answers were divided into three categories: (i) yes; (ii) not yet, but planning to do so; and (iii) no, and not planning to do so.

(b) Resource Efficiency Actions

SMEs demonstrated with "yes" or "no" if they have undertaken specific actions such as saving water, using predominantly renewable energy, saving materials, minimizing waste, selling scrap, recycling, and designing durable products. SMEs can take more of these actions [45].

(c) Effect of Eco-Efficiency Actions on Production Cost

Another independent variable in this paper is the effect of resource efficiency actions on production cost. To implement resource efficiency actions, SMEs must also consider the impact on production costs while undertaking resource efficiency actions [46]. This effect can be demonstrated in the dataset by the following categories: significantly decreased, slightly decreased, slightly increased, significantly increased, and no impact. This question was also asked of SMEs undertaking one or more resource efficiency actions.

(d) Investment in Implementing Resource Efficiency Actions

Investment is also considered an independent variable prone to impact SMEs' performance in this paper. In this context, investment indicates the average annual investment incurred by undertaking one or more resource efficiency actions within the last two years. The investment cost here is the percentage of a company's yearly turnover on its investment [47]. It can be examined within the following categories: up to 5% of annual turnover, 6–10% of annual turnover, 11–30% of annual turnover, 31–50% of annual turnover, and 51–75% of annual turnover. Only the SMEs that had taken one or more resource efficiency actions were asked this question.

(e) Type of Support to Expand the Range of Green Products and Services

Another critical variable is "support", which demonstrates the kind of support SMEs receive to expand the range of their products or services. This question was asked of only the SMEs that were offering any green product or service. Regarding "support" as an independent variable, there were multiple support categories. SMEs could receive financial incentives for enhancing their business, assisting with identifying potential markets or customers, using technical advice to introduce technological improvements or advanced processes, and using consultancy services for proper marketing and distribution [48]. These kinds of support are vital for SMEs to take an extra step to improve their performance while embracing eco-efficiency practices.

(f) Encountered Barriers while Trying to Implement Resource Efficiency Actions

The barriers encountered by SMEs while setting up resource efficiency actions can also affect their performance, and, hence, this is taken as an independent variable in this paper. SMEs were asked if they were taking one or more resource efficiency actions. Regarding the nature of these barriers, they can be in the form of difficulty in understanding administrative procedures, inability to cope with legal technicalities, lack of knowledge, lack of specific resources, high-cost difficulty in choosing the right kind of environmental action, lack of supply of required materials, and lack of demand for resource-efficient products or services [49]. These barriers can be a hurdle for SMEs and dissuade them from applying any resource efficiency actions. This is why it is crucial to investigate their relationship to analyze if there is any cause–effect factor.

3.1.4. Control Variables

(a) Company Size

The company's size is a control variable that, in this paper's analysis, depicts the number of employees and is taken as a control variable.

(b) Country

The member states of the European Union are a control variable for analysis. Within the sample size, there are almost 27 dummy variables, and the base is Germany.

(c) Company Sector

The sectors of any company are significant, which help in analyzing traits such as eco-consciousness and environmental efficiency of the company and its performance and growth (Table 4).

Table 4. The company sectors' descriptions.

Sector	Description
Manufacturing	Manufacturing
Retail	Wholesale and retail trade, repair of motor vehicles and motorcycles
Service	Transportation and storage Accommodation and food service activities Information and communication Financial and insurance activities Real estate activities Professional, scientific, and technical activities
Industry	Mining and quarrying Electricity, gas, steam, and air conditioning supply Water supply, sewerage, waste management, remediation activities, and construction

3.1.5. Reliability and Validity of Sample

There is always stress on a sample's reliability and validity, sample size, and dataset in any research. This study's uniqueness is that four surveys have never been used to investigate eco-efficiency actions within the European Union's SMEs in the prior studies. The sample size is extensive, considering that it contains SMEs, the most dominant business group within the European Union. Another uniqueness of utilizing this dataset within this study is its practical nature and the 28 European Union member states' data. Also, these four surveys are focused on one theme but conducted in different years, so this paper aims to analyze the trend of SMEs' eco-efficiency and performance. The previous Flash Eurobarometer surveys (FL 342, FL 381, FL 426, and FL 456) were used previously, but none of the related studies took an extensive sample of the EU's overall SMEs (Table 5).

Table 5. The previous studies used Flash Eurobarometers 342, 381, 426, and 456.

Year	Study	Flash Eurobarometer and Sample Size	Findings
2015	Hoogendoorn et al. [50]	FL 342—Theoretical research on SMEs dealing with environmental practices	SMEs having financial support within process-intensive and tangible sectors are involved in environmental practices.
2016	Sáez-Martínez et al. [51]	FL 381—3647 SMEs from 38 countries	There is a positive environmental attitude among European SMEs.
2016	Koszarek-Cyra [52]	FL426—Polish SMEs	Due to barriers in understanding and managing eco-practices, entrepreneurs find it challenging to be eco-efficient.
2016	González-Moreno et al. [53]	FL 381—European SMEs of the hospitality industry in Spain	Spanish SMEs within the hospitality sector are environmentally sustainable and enjoy a higher increase in sales.
2017	Rabadán and Sáez-Martínez [54]	FL381—258 SMEs within the water and waste management sector (38 countries)	Only 40% of European SMEs within the water and waste management sectors are environmentally responsible and willing to adopt environmental systems.
2017	**Pekanov Starčević et al. [55]**	FL 426—502 Croatian SMEs	There is a significant reduction in production costs for environmentally sustainable people. Firms are willing to implement green products or services and are profitable by generating a higher turnover.
2019	Jové-Llopis and Segarra-Blasco [56]	FL426—11,336 firms of EU-28	A U-shaped relationship was seen among eco-actions and firm growth and performance. High investment in implementing eco-strategies goes well with business growth.
2018	Aguado and Holl [57]	FL381—500 Spanish and 300 Norwegian SMEs from the service, manufacturing, and industry sectors	Norwegian SMEs behave pro-environmentally, and they are more market-driven than Spanish firms.

4. Discussions and Data Analysis

The data analysis uses Statistical Package for the Social Science (SPSS) software. The test of association (chi-square) and ordered logistic regression were applied to analyze the secondary data to investigate the impact of eco-efficiency actions and their impact on the production cost, investment, and support while undertaking eco-efficiency actions on SME performance within the European Union.

4.1. Ordered Logit Regression

This method is used to assess the impact of various eco-efficiency actions with the help of six logit models. The outcome variable in this study is the *turnover*: does the SME turnover *increase*, *decrease*, or remain *unchanged* for particular eco-efficiency actions? Hence, while it is unknown what the exact turnover or the exact change in the turnover is—meaning the difference between "increase" and "unchanged" can be different from the difference between "unchanged" and "decrease"—the three categories mentioned above can be observed. In mathematical terms, the outcome variable is y^*. It represents turnover and has three categories with probabilities: p_1, p_2, and p_3, corresponding to a turnover that increased, a turnover that remained unchanged, or a turnover that decreased, respectively [58]. These outcomes are regressed on the independent variables x, which are the different eco-efficiency actions and other control variables, such as the firm size, type of firm, etc. Based on the data from the Flash Eurobarometer surveys, we can study how much y^* depends on these variables x. It is assumed that the data satisfy the proportional odds assumption. To determine whether this assumption is correct for the variables x, the three categories are projected into binary models, called cumulative logit models. For example, look at category 1 versus categories 2 and 3 and then at category 3 versus categories 1 and 2. For each variable x, the logarithm of the odds is calculated as

$$b_0|_x = \log \frac{p_2 + p_3}{p_1}\bigg|_x$$

for category 1 versus categories 2 and 3 and

$$b_1|_x = \log \frac{p_1 + p_2}{p_3}\bigg|_x$$

for category 3 versus categories 1 and 2. If the proportional odds assumption is met, the ratios between the different $b_0|_x$ should not be different from the ratios between the different $b_1|_x$, apart from differences explained by sampling variability. In other words, the model's response is based on the uniformity of variance. In short, the coefficients are assumed to be relative to the constant regression coefficients between the log results of each index.

4.2. Logit Models of This Paper

This section discusses the different logit models used in this paper. First, an ordered logit model is utilized to investigate the impact of eco-efficiency actions on the last year's company turnover [59]. This model forms the basis of the first hypothesis's testing:

$$(Turnover)_i = (Offering\ green\ services/products)_{i,1}\beta_1 + (Control\ Variables)_{i,c}\beta_2 + e$$

Equation explains the first hypothesis of this paper. In the first equation, turnover acts as a dependent variable. Any change in the last year's turnover determines its current performance. As explained earlier, offering green services is a dummy variable, a component of the eco-efficiency actions that positively impact the environment [60]. The control variables in this equation are size, country, and sector. In the second-ordered logit model, the following equation forms the basis of the hypothesis's testing:

$$(Turnover)_i = (Resource - efficiency - actions)_{i,1}\beta_1 + (Control\ Variables)_{i,c}\beta_2 + e$$

As discussed earlier, the last year's turnover is also taken as a dependent and categorical variable. In this equation, the resource efficiency actions act as explanatory and categorical variables. These actions include the various measures that SMEs take toward environmental sustainability [61]. In this equation, the control variables include size, sector, and country, where the latter serves as dummy variables. The third ordered logit model is

$$(Turnover)_i = (Impact\ on\ production\ cost)_{i,1}\gamma_1 + (Control\ Variables)_{i,c}\gamma_2 + e$$

It links the production costs with the turnover. In particular, the independent variable represents the impact on production cost while undertaking eco-efficiency actions and their effects on turnover [62]. It is included as an explanatory and a categorical variable. This variable is based on the categories, i.e., an increase or decrease. It means that when an SME implements one or multiple eco-efficiency actions, there is also an impact on its production cost. Such costs can increase, decrease, or remain unchanged and, hence, can also impact the turnover, as shown in the following equation:

$$(Turnover)_i = (Investment)_{i,1}\delta_1 + (Control\ Variables)_{i,c}\delta_2 + e$$

The fourth hypothesis of this paper is tested. In Equation, the independent variable is "investment", while turnover is the dependent and control variables (size, sector, and country). The former is an explanatory and categorical variable that impacts the turnover while undertaking specific eco-efficiency actions. The investment can be either high or low, depending upon the other control variables acting as dummy variables, such as size, country, and sector. The following equation gives the fifth-ordered logit model:

$$(Turnover)_i = (Type\ of\ support)_{i,1}\theta_1 + (Control\ Variables)_{i,c}\theta_2 + e$$

It tests the fifth hypothesis of this paper. In equation, the type of support is an independent variable that impacts the turnover while undertaking eco-efficiency actions. This kind of support is a critical variable that is also an explanatory and categorical variable, such as monetary incentives, technical advice, consultation, and assistance. The control variables are the dummy variables such as size, country, and sector. Finally, the final ordered logit model is

$$(Turnover)_i = (Eco - barriers)_{i,1}\theta_1 + (Control\ Variables)_{i,c}\theta_2 + e$$

Next, we test this paper's sixth hypothesis: SMEs encounter barriers while implementing eco-efficiency actions. These barriers include difficulty understanding administrative and legal procedures, a lack of expertise, the need for specific resources, and the high cost of actions. These barriers are explanatory variables and essential to analyze since they can lead SMEs to not indulge in eco-efficiency actions. The control variables are also dummy variables, such as size, country, and sector.

4.3. Data and Analysis

In this section, statistical results regarding the test of the association are provided using the widely used statistical tests in investigating empirical research, i.e., chi-square tests, e.g., Yates, likelihood ratio, portmanteau test in time series, etc. A test of association may also refer to the chi-square test, Pearson's chi-square test (χ^2), or the chi-square test of association. It is a test used to determine the relationship between two or more categorical variables in a large sample size of unpaired data. The chi-square statistic measures how much the observed cell counts in a two-way table diverge from the expected cell counts. Based on the chi-square's distribution contexts, the tests help evaluate the variables. Usually, the

alpha level or significance level needs to be 0.05 or 0.10 as a criterion for hypothesis testing. However, in this study, an alpha level of 0.05 was used for all tests.

4.4. Order Logit Regression

Ordered logit regression is a kind of ordinal regression model used to predict the relationships among various dichotomous outcome variables by using the coefficients in the logistic equation to calculate the probability. It can be applied to more than two (ordered) response categories. Simply put, it helps investigate the link between an ordinal dependent variable and a set of independent variables. In this context, an ordinal is defined as unconditional-based and ordered as "poor", "good", and "excellent". However, extreme caution is required while interpreting the results of these regression models. Ordered logit regression within social science research, particularly regarding categorical data, is used to analyze the dichotomous outcome variables and predict the ordinal dependent variable. Ordered logit regression is used in this paper since the dependent variable is binary (also called dummy), with values of 0 or 1 and its definite nature. Furthermore, pseudo-R values are also used to verify the quality of a particular model. Again, lastly, chi-square is applied in all the models to figure out the association of models.

The ordered logit regression test is applied to six models using independent variables. Table 6 presents the regression results with turnover as a dependent variable. Time, sector, and country dummies are involved in all models to obtain the most precise results. This research dataset is based on questionnaires, with responses that are evaluated through categories. Moreover, to verify the quality of a particular model, pseudo-R^2 values are also used. Chi-square is applied to all the models to test their significance [63]. Table 6 presents the order logit regression results for all models with the last year's turnover as the SME performance. The total number of observations in all models is 48,503. With the help of order logit regression, the results can be predicted as follows:

Table 6. Order logit regression for 2012 (FL 342).

Order Logit Regression						
	DV: Last Year's Turnover					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Offer Green Product (Yes = 1, No = 0)	0.19(0.04)					
Size (Number of Employees)						
Size1:—(1–9)	−0.46(0.00)	−3.880(0.00)	−4.39(0.00)	−3.39(0.00)	−0.43(0.01)	
Size2:—(10–49)	−0.75(0.01)	−2.55(0.00)	−2.38(0.00)	−2.25(0.00)	−0.74(0.00)	
Size3:—(50–249)	−0.84(0.00)	−1.41(0.03)	−1.55(0.01)	−1.59(0.01)	−0.84(0.00)	
Resource Efficiency Actions						
Saving Water		−0.07(0.08)				
Saving Energy		0.02(0.68)				
Using Renewable Energy		0.05(0.28)				
Saving Materials		−0.03(0.41)				
Minimize Waste		0.05(0.19)				
Selling Scrap		0.12(0.00)				
Recycling		0.06(0.09)				
Design Durable Product						
Impact on Production Cost						
Slightly Decreased			−0.28(0.00)			
Slightly Increased			−0.21(0.00)			
Not Changed			−0.28(0.00)			
Investment						

Table 6. *Cont.*

Order Logit Regression						
Very Satisfied				−0.57(0.00)		
Fairly Satisfied				−0.58(0.00)		
Fairly Dissatisfied				−0.60(0.00)		
Very Dissatisfied				−0.58(0.00)		
Support						
Financial Incentives					12.94(0.001)	
Assistance with Identifying Market/Customers					−1.50(0.19)	
Tech Support/Consultation					0.10(0.96)	
Consulting for Marketing/Distribution					−0.41(0.75)	
Difficulties						
Complexity of Administrative/Legal Procedures						−0.0(0.63)
Difficulty in Adapting Legislation						0.05(0.31)
Technical Difficulties						−0.01(0.81)
Difficulty in Choosing the Right Environmental Action						0.06(0.21)
Cost of eco_actions						−0.05(0.29)
Lack of Specific eco_expertise						0.03(0.45)
Lack of Supply of Required Materials						−0.23(0.04)
Lack of Demand for Resource-Efficient Products or Services						−0.02(0.63)
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.060	0.020	0.030	0.02	0.05	0.050
Goodness of Fit						
Pearson's Chi-Square/Sig	39,144.61/0.00	20,767/0.00	16,175.3/0.00	12,132.34/0.00	28,579.514/0.00	27,456.35/0.00
Number of Observations	13,167	13,167	13,167	13,167	13,167	13,167
Order logit regression for 2013 (FL 381)						
Order Logit Regression						
DV: Last Year's Turnover						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Offer Green Product (Yes = 1, No = 0)	−0.07(0.14)					
Size (Number of Employees)						
Size1:—(1–9)	−0.04(0.00)	−0.05(0.00)	−0.03(0.00)	−0.02(0.00)	−0.86(0.00)	
Size2:—(10–49)	−0.28(0.00)	0.08(0.00)	−0.95(0.00)	−0.94(0.00)	−0.64(0.00)	
Size3:—(50–249)	−0.25(0.00)	−0.81(0.00)	−0.52(0.00)	−0.37(0.00)	−0.93(0.00)	
Resource Efficiency Actions						
Saving Water		0.17(0.00)				
Saving Energy		−0.16(0.00)				
Using Renewable Energy		−0.12(0.04)				
Saving Materials		0.14(0.01)				
Minimize Waste		−0.22(0.00)				
Selling Scrap		−0.31(0.00)				
Recycling		−0.32(0.00)				
Design Durable Product		−0.23(0.10)				

Table 6. *Cont.*

Order logit regression for 2013 (FL 381)						
Order Logit Regression						
Impact on Production Cost						
Slightly Decreased	−0.70(0.00)					
Slightly Increased	−0.54(0.00)					
Not Changed	−0.68(0.00)					
Investment						
Very Satisfied				0.01(0.82)		
Fairly Satisfied				−0.08(0.07)		
Fairly Dissatisfied				−0.50(0.00)		
Very Dissatisfied				−0.79(0.00)		
Support						
Financial Incentives					0.02(0.78)	
Assistance with Identifying Market/Customers					0.00(0.94)	
Tech Support/Consultation					−0.09(0.23)	
Consulting for Marketing/Distribution					−0.04(0.63)	
Difficulties						
Complexity of Administrative/Legal Procedures						0.04(0.24)
Difficulty in Adapting Legislation						0.02(0.69)
Technical Difficulties						0.06(0.22)
Difficulty in Choosing the Right Environmental Action						−0.003(0.94)
Cost of eco_actions						−0.15(0.00)
Lack of Specific eco_expertise						0.03(0.39)
Lack of Supply of Required Materials						−0.005(0.96)
Lack of Demand for Resource-Efficient Products or Services						−0.36(0.00)
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.04	0.03	0.040	0.160	0.030	0.050
Goodness of Fit						
Pearson's Chi-Square/Sig	35,429.18/0.00	22,703.56/0.00	19,588.02/0.00	12,997.89/0.00	10,817.96/0.00	10,012.96/0.00
Number of Observations	13,509	13,509	13,509	13,509	13,509	13,509
Order logit regression for 2015 (FL 426).						
Order Logit Regression						
DV: Last Year's Turnover						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Offer Green Product (Yes = 1, No = 0)	−0.44(0.00)					
Size (Number of Employees)						
Size1:—(1–9)	−3.20(0.00)	−3.43(0.00)	−3.52(0.00)	−3.35(0.00)	−3.46(0.00)	
Size2:—(10–49)	−1.49(0.00)	−1.64(0.00)	−1.54(0.00)	−1.53(0.00)	−1.67(0.00)	
Size3:—(50–249)	−0.41(0.00)	−0.48(0.00)	−0.08(0.64)	−0.28(0.26)	−0.52(0.00)	
Resource Efficiency Actions						
Saving Water	0.01(0.71)					
Saving Energy	0.07(0.84)					

Table 6. *Cont.*

Order logit regression for 2015 (FL 426).						
Order Logit Regression						
Using Renewable Energy	−0.04(0.44)					
Saving Materials	0.02(0.54)					
Minimize Waste	−0.03(0.51)					
Selling Scrap	−0.07(0.05)					
Recycling	−0.09(0.00)					
Impact on Production Cost						
Design Durable Product	−0.04(0.26)					
Slightly Decreased		−0.56(0.00)				
Slightly Increased		−0.55(0.00)				
Not Changed		−0.61(0.00)				
Investment						
Very Satisfied			−0.08(0.40)			
Fairly Satisfied			−0.09(0.27)			
Fairly Dissatisfied			−0.25(0.01)			
Very Dissatisfied			−0.63(0.00)			
Support						
Financial Incentives				0.09(0.18)		
Assistance with Identifying Market/Customers				0.02(0.76)		
Tech Support/Consultation				0.01(0.87)		
Consulting for Marketing/Distribution				0.08(0.65)		
Difficulties						
Complexity of Administrative/Legal Procedures						−0.03(0.54)
Difficulty in Adapting Legislation						0.005(0.90)
Technical Difficulties						−0.0007(0.98)
Difficulty in Choosing the Right Environmental Action						0.08(0.07)
Cost of eco_actions						0.03(0.48)
Lack of Specific eco_expertise						0.02(0.66)
Lack of Supply of Required Materials						0.06(0.24)
Lack of Demand for Resource-Efficient Products or Services						0.05(0.24)
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.37	0.38	0.430	0.39	0.38	0.39
Goodness of Fit						
Pearson's Chi-Square/Sig	11,8232.45/0.00	62,529.71/0.00	81,1792.53/0.00	32,634.13/0.00	94,384.07/0.00	74,38.07/0.00
Number of Observations	15,020	15,020	15,020	15,020	15,020	15,020
Order logit regression for 2018 (FL 456).						
Order Logit Regression						
	DV: Last Year's Turnover					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Offer Green Product (Yes = 1, No = 0)	0.25(0.04)					
Size						

Table 6. *Cont.*

Order logit regression for 2018 (FL 456).						
Order Logit Regression						
Size1:—(1–9)	−4.13(0.00)	−3.80(0.00)	−4.33(0.00)	−3.31(0.00)	−5.87(0.00)	
Size2:—(10–49)	−2.29(0.00)	−2.05(0.00)	−2.32(0.00)	−2.12(0.00)	−3.40(0.00)	
Size3:—(50–249)	−1.34(0.01)	−1.11(0.03)	−1.50(0.01)	−1.590(0.01)	−1.88(0.00)	
Resource Efficiency Actions						
Saving Water		−0.07(0.82)				
Saving Energy		−0.83(0.02)				
Using Renewable Energy		−0.56(0.18)				
Saving Materials		0.01(0.98)				
Minimize Waste		0.30(0.33)				
Selling Scrap		−0.11(0.69)				
Recycling		−0.54(0.07)				
Design Durable Product		0.07(0.83)				
Impact on Production Cost						
Slightly Decreased			0.58(0.00)			
Slightly Increased			0.67(0.00)			
Not Changed			0.29(0.00)			
Investment						
Very Satisfied				−0.37(0.03)		
Fairly Satisfied				0.40(0.02)		
Fairly Dissatisfied				0.46(0.00)		
Very Dissatisfied				0.23(0.18)		
Support						
Financial Incentives					2.94(0.01)	
Assistance with Identifying Market/Customers					−1.55(0.19)	
Tech Support/Consultation					0.10(0.96)	
Consulting for Marketing/Distribution					−0.41(0.75)	
Difficulties						
Complexity of Administrative/Legal Procedures						0.28(0.46)
Difficulty in Adapting Legislation						0.18(0.69)
Technical Difficulties						−0.58(0.16)
Difficulty in Choosing the Right Environmental Action						0.31(0.45)
Cost of eco_actions						0.04(0.89)
Lack of Specific eco_expertise						−0.53(0.19)
Lack of Supply of Required Materials						0.25(0.56)
Lack of Demand for Resource-Efficient Products or Services						0.44(0.28)
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-Squared	0.37	0.4	0.44	0.12	0.13	0.15
Goodness of Fit						
Pearson's Chi-Square/Sig	75.58/0.00	1228.56/0.00	147.181/0.00	30.79/0.00	2787.27/0.00	2483.21/0.00
Number of Observations	13,117	13,117	13,117	13,117	13,117	13,117

The tables above show the results of the ordered logit regression of SMEs' data taken from the Flash Eurobarometer datasets (FL 342, 381, 426, and 456). All the above tables comprise six models regarding offering green products and services, resource efficiency actions, the effect of resource efficiency actions on the production cost, the investment needed for implementing resource efficiency actions, and the support SMEs receive while expanding their products and services that encountered difficulties, respectively. These tables represent the critical results of all the hypotheses of this paper. All six models, as shown by four datasets (surveys), explain the relationships among the variables in different years.

Model 1 shows the result of one of the components of eco-efficiency actions, i.e., offering green services, and its impact on the last year's turnover throughout the four surveys. A Pearson's chi-square significance level of 0.000 depicts that the model is highly significant. The results demonstrate a positive and statistically significant relationship at 1% between the two factors, i.e., green products and services with annual turnover. However, the impact of green services on turnover significantly differs among SMEs within the EU-28 [64]. From the results, it is evident that providing green products or services is a binary variable. Moreover, in all four surveys, the firm's size does matter in explaining this relationship, as it is shown that large SMEs show a positive and significant relationship between offering green services and turnover compared to smaller SMEs [65].

Along with the firm's size, it is employed as an explanatory variable. The chi-square in the model reflects that it has an essential explanatory power and significantly influences the European SMEs' annual turnover [66]. All the Flash Eurobarometer datasets offering green products and services definitely impact the firm's turnover, as shown in Model 1 of all the above tables.

The above tables present the results of resource efficiency actions (saving water and energy, saving materials, waste management, renewable energy, selling scrap, recycling, and sustainable design) and their impact on turnover. In all the above datasets, the results reveal that not all but some of the resource efficiency actions have a significant effect on annual turnover [67]. For instance, water-saving is negatively and significantly related to turnover for all SMEs and has a different impact across different SMEs. However, it can be seen in FL 381 (2013) that saving energy has positive and significant effects, but it has a negative relationship with turnover in FL 426 (2015), which is also evident in the literature [68]. On the other hand, the remaining two datasets, FL 342 (2012) and FL 456 [69], show an insignificant relationship between these two factors.

Moreover, the relationship between saving energy and turnover also varies within the datasets of European SMEs. Renewable energy shows a positively significant relationship with turnover for FL 381 (2013) and FL 426 (2015) [70,71]. In the other two surveys, this relationship is insignificant. Saving materials and minimizing waste are positively related to turnover only for FL 381 (2013) and are negligible for all other surveys. The selling of scrap and recycling is positively and significantly associated with turnover for all datasets. The design and durable products are positively and significantly related to turnover for FL 426 (2015) [72].

The third model depicts the effect of resource efficiency actions on the production cost and its impact on the last year's turnover. Model 3 is significant, as indicated through the chi-square being at a significance level of 0.00. The results reveal that the effect of the change in production cost due to resource efficiency action has a negative and significant association with turnover when it is increased. However, turnover is only positively impacted when the production cost decreases due to these actions [73]. Additionally, the size of SMEs is a significant factor in explaining these relationships. The results partially support the third hypothesis of this study, i.e., when the cost of production is decreased due to resource efficiency actions, it pays well; otherwise, it does not. The investment in implementing resource efficiency actions and its impact on the last year's turnover is shown in the model of the tables. The overall Model 4 shows the significance level at 0.00, which means that the investment needed for implementing such actions is a significant

predictor of the turnover of the SME. Still, it is not a good measure [74]. The results show that high investment toward resource efficiency actions harms turnover. It can be inferred that increased investment does not guarantee high turnover and is not predicted as a formula for success. Other factors are involved for a firm to achieve high turnover other than investment in the SMEs' particular case [75]. Hence, based on the results extracted from the above tables, it can be seen that the results do not support the fourth hypothesis of this study.

Next, Model 5 shows the support that SMEs receive while expanding the products and services with the last year's turnover [76]. The support to implement such operations is categorized into four categories, i.e., financial incentives, assistance, consultancy services, and marketing. The results show that only financial incentives have a positive and significant relationship with the last year's turnover for FL 342 (2012) and FL456 (2018). It can also be seen in Table 5's descriptive results that financial incentives are the most common support that SMEs use. While other kinds of support have an insignificant relationship with SME performance for the rest of the years, financial incentives are still used by some SMEs. Hence, the findings of Model 5 in all the survey datasets from 5–14 to 5–17 partially support the fifth hypothesis of this study: a particular kind of support (such as financial incentive) that SMEs receive can positively impact their turnover.

Lastly, in Model 6 of all the survey datasets from 5–14 to 5–17, the categories of difficulties are the complexity of administrative/legal procedures, the difficulty to adapt legislation, technical challenges, the difficulty in choosing the right action, the high cost, a lack of expertise, a lack of supply of required materials, and a lack of demand for resource-efficient products or services [77]. The ordered logit regression of Model 6 indicates the difficulties' impact on the last year's turnover of SMEs. The values suggest that some of the importance of FL381 is negatively and significantly associated with turnover. For example, the cost of environmental actions and a lack of demand for ecological products and services harms turnover, indicating that these difficulties negatively impact turnover [78,79].

4.5. Robustness Check: Brant Test of Parallel Regression Assumption

Provide a robustness check for all four Flash Eurobarometer surveys to strengthen the findings [80,81]. The robustness check is used to verify the behavior of a "core" regression coefficient result. Therefore, for this paper's analysis, a Brant test is performed after an ordered logistic regression to test for the parallel regression assumption assumptions to provide additional estimates. SPSS's PLUM command was used to test the parallel lines hypothesis. The practical implication of violating the assumption is producing an incorrect result for that variable. The brunt command is a test that confirms if any variables violate the parallel lines assumption for each variable separately [82].

In other words, the purpose of the test of parallel lines is to check the proportional odds assumption for each explanatory variable separately. Hence, in this paper, we use the $p < 0.01$ level to figure out non-proportionality, as a large sample size was employed. The p values depict chi-square values in all four Since the p values are more significant than the significance levels for almost all variables, there is sufficient evidence that the parallel regression assumptions are not violated. The results of this paper are robust. For example, the premise of partial lines is upheld ($p > 0.01$) for all variables except for the "Decreased: impact on production cost and the firm's Size 1, which shows plausibility and understanding. It also suggests that the firm's Size 1 is under-represented relative to Sizes 2 and 3.

4.6. Study Results and Hypotheses

Based on the statistical results, it is evident that, in general, eco-efficiency actions positively impact SMEs' performance within the European Union, but there are some partial intakes. In short, the hypotheses are verified with the past research, as shown in, where there was a positive relationship between firm growth and green innovation for Slovenian SMEs and a positive relation between green research and development with

muscular financial growth for Polish and Hungarian public firms [83]. The results also strengthen this paper's argument that using different datasets or data sources produces heterogeneous results. The results partially support this study's first, third, and fifth hypotheses. All the actions show a significant level with the last year's turnover, which means that it is likely for a company to plan actions based on the previous year's turnover, eventually affecting their performance [84]. All the actions show significance with the last year's turnover. Particularly, green businesses are associated with the company's annual turnover. Hence, it is inferred that going green needs to be financially stable, since only those SMEs that go for green products and services have turnovers that might have been affected positively [85]. One of the components of eco-efficiency actions, i.e., offering green services and its impact on annual turnover, id shown in Model 1. It can be interpreted from all the Flash Eurobarometer datasets that offering green products and services can positively impact the firm's turnover. Furthermore, in EU-28, many SMEs offer green products or services or deal in green businesses. However, about 56% of SMEs are still not offering any products and services and are not planning to do so, as demonstrated during the surveys (Figure 3).

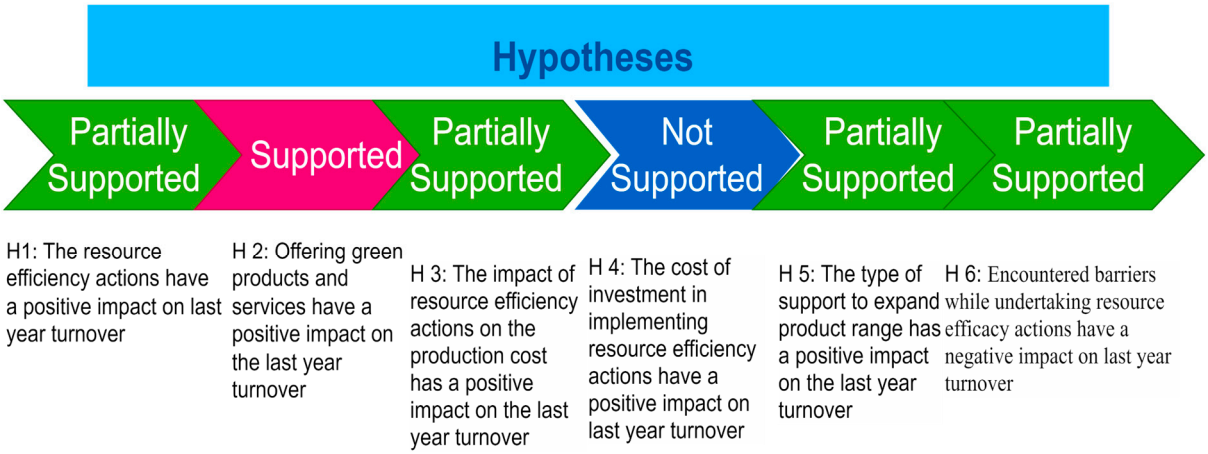

Figure 3. Testing of hypotheses.

Moreover, from other resource efficiency actions, it can be seen that SMEs were involved in most of the resource efficiency actions, dominantly saving energy in 2012 [86], saving energy in 2013, minimizing waste in 2015, and again saving energy in 2018, as shown in Table 5—Renewable energy is the least used resource efficiency action taken by SMEs throughout all the years. The relationship between resource efficiency actions and turnover varies concerning the size of SMEs, countries, and various sectors. The results show a negative relationship between saving water and energy toward firm performance, as depicted in a past study [87]. It is shown that only saving water, selling scrap, and recycling have a consistent association with turnover for all datasets, while other factors show variation in SMEs. Hence, it can be inferred that some resource efficiency actions have a positive and significant impact. In contrast, others have a negative or no relationship with its annual turnover.

Regarding the impact on production cost, the ordered logit regression results show a significant relationship between resource efficiency actions and their effect on production cost. This is also evident from the descriptive results in tables, which show that production costs decrease while implementing resource efficiency actions. It can be seen that the resource efficiency actions result in a slight decrease in the production costs for about 40% of SMEs and that about 5% of SMEs find their production costs are significantly decreased. It proves, along with the regression results, that the production costs while adapting resource efficiency actions positively impact its turnover. It can also be seen that the number of SMEs that reported the negative impact of these actions on their turnover is decreasing, which seems to indicate that such efforts have an initial increase in production

cost. Still, it can be compensated in later years. Hence, resource efficiency actions are primarily favorable for SMEs [88].

While investment in implementing such actions is essential in explaining SME performance, it does not show that high turnover adversely affects SME performance. However, from the descriptive statistics in Table 5, it is evident that most SMEs only spend a small amount of their turnover on resource efficiency actions. Half of the SMEs only invest 5% or less of their turnover, and only around 1% spend more than 30% on such actions, representing only a tiny percentage willing to invest in resource efficiency actions. Hence, it can be inferred that SMEs are not ready nor was an association between investment and an increase in turnover found.

The most significant support SMEs receive while expanding their products and services is financial incentives, which positively and significantly impact performance. As seen in Tables 5 and 6 of the descriptive results, financial incentives are a kind of support widely used by SMEs. With this kind of support being simplistic, SMEs opt for it. However, not all difficulties that SMEs face negatively impact turnover. Of all the barriers, only the high cost of environmental actions and a lack of demand for resource-efficient products and services negatively impact its turnover as such, difficulties exist, but the results show that not all problems negatively impact turnover. Hence, it can be inferred that the more significant the specific barriers were, the smaller the turnover during 2013 within the sample SMEs was.

5. Conclusions

In particular, the analysis showed that the SMEs implementing eco-efficiency actions by offering green services do not have a consistent pattern of improved or diminished turnover. Indeed, the impact of offering green services is significantly different throughout the EU-28 countries and depends on the company's size. For instance, only larger SMEs show a positive and significant relationship between offering green services and turnover. Firstly, compared to smaller SMEs, implementing resource efficiency actions and offering green products or services does not correlate with improved performance. Secondly, among the resource efficiency actions, some actions affect firm performance. In other words, some actions are insignificant or harm the firm performance. In particular, saving materials and minimizing waste are typically not a significant predictor of SMEs' performance. However, saving energy, saving water, recycling, and selling scrap have a definite positive influence on SMEs' performance, while predominantly using renewable energy and durable products has mixed results in all four surveys. Overall, resource efficiency actions impact SMEs' performance, but SMEs do not go beyond those resource efficiency practices that reduce their water and energy costs.

Regarding resource efficiency actions and their impact on production cost, the findings show a significant relationship between resource efficiency actions and their impact on production cost. However, it is noted that while implementing resource efficiency actions, SMEs notice a decrease in their production cost. These SMEs utilize specific resources to reduce input materials and energy consumption costs. Regarding investment, while implementing resource efficiency actions, the findings reveal that investment in implementing such actions is an essential factor in explaining SMEs' performance, but the high investment does not promise high turnover. Indeed, the results depict that increased investment in resource efficiency actions adversely affects SME performance, which is unprecedented in the literature. From the prior literature and this paper's findings, it is, thus, clear that SMEs need to imitate and substitute the unique resources and right stakeholders to perform better and gain a competitive position. There is no denying that these SMEs need to prioritize eco-efficient strategies to deploy the right resources and stakeholders. On an international scale, this indicates that despite being considered an eco-hub, the EU is still striving toward achieving a sustainable competitive edge.

Conclusively, SMEs can incorporate advanced resource efficiency actions, such as designing sustainable products, recycling, innovative environmental management, and waste management practices that positively impact turnover. It is vital to have stout

environmental beliefs and environmental customs toward green development prospects and sustainable development. Indeed, this study, for the first time to our knowledge in the literature, uses the four survey datasets for SMEs within the context of eco-efficiency. Thus, this paper fills the literature gaps. This paper can benefit small organizations and aspiring entrepreneurs who consider utilizing those resource efficiency actions and want to analyze whether these positively influence their performance. Moreover, this study's findings are crucial to encourage policy makers, institutions, and external stakeholders to support and help SMEs that are pursuing a sustainable business agenda by providing these SMEs with expert advice and technical consultation regarding investments and the proper utilization of organizational resources.

5.1. Practical Implications

Sustainable businesses are considered more appealing to achieving a competitive advantage in today's world, which is why companies and authorities are addressing the need for the immediate implementation of eco-efficiency actions and eco-innovation. This study's findings can be crucial for policy makers and significant stakeholders to inform such companies and authorities about SMEs and their quest to achieve sustainable development. This research has specific managerial and policy implications when bringing SMEs' eco-efficiency actions into the discussion. Within the European Union, SMEs are the most significant business group, and their impact is, thus, very substantial on the environment when implementing such eco-efficiency actions. However, SMEs are not so impactful; instead, they have a relatively poor impact on protecting the environment, and, hence, more work is needed to find appropriate tools to enhance the implementation of eco-efficiency actions among small businesses. In 2018, only two-thirds of SMEs actively dealt with eco-efficiency actions. This study implies that if SMEs need to strengthen their green performance, they must adopt green transformational leadership and resource efficiency actions to improve their business process for better performance and growth. While dealing with green strategies, SMEs must come forward and address the issues and challenges they face. They must create green development policies and introduce ideas to create a high-intensity green psychological climate among their employees and managers.

The findings suggest that SMEs mostly rely on their resources since they face barriers in understanding regulations, difficulty choosing the right eco-efficiency measure, and high costs involved in implementing eco-efficiency actions. In this context, my dissertation shows that governments and policy makers should encourage eco-efficiency initiatives and efforts through strategic managerial policies and legislative changes, such as reducing barriers (complexity in administrative procedures), assisting SMEs in choosing the right, and reducing organizational bureaucracy. Government regulations and support can be vital factors affecting entrepreneurs and small organizations' decisions in choosing eco-efficiency actions.

5.2. Limitations and Future Research Directions

This section highlights a few limitations of the study and presents future research possibilities. First, this article uses data gathered via third parties rather than collecting data directly from the companies themselves, which can be debatable. The cross-sectional data is collected from the questionnaire survey method in this study, and, hence, it can be argued for. For future research, a longitudinal study can be performed. Moreover, it is not easy to understand the exact financial situation of each SME through this dataset, since the data were categorical.

However, this study does highlight the direction of future research. The utilized dataset is relevant and vital as it covers a rich and large sample size and has been conducted by authorized institutions and researchers. Nevertheless, there can be more critical approaches toward utilizing this dataset, which have not been used in this dissertation due to several rationales, such as the non-relevance of some variables within the research aims and the difficulty in analyzing a highly significant dataset. In another context, this extensive

dataset can be employed to investigate other variables, such as analyzing demographics and sector-wise data. Different data collection techniques can be used, such as open-ended questionnaire tools, qualitative studies, mixed methods, case studies, etc., to extract individual opinions or examine eco-strategies' impacts on the turnover, performance, and growth of firms. It would also be interesting to direct future research toward comparing specific countries and see how these eco-efficiency actions locally impact SMEs. There can be comparative studies on this theme within the developed and developing nations of the European Union, Asia, or even South America.

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