

Introduction

In the rapidly evolving business environment, responding to the “green innovation” agenda has arisen as a critical issue and opportunity for businesses, regardless of their size or industry. The concept cannot be ignored, bearing the increased emphasis on the production of goods and services that meet the health standards and environmental responsibility to society (Weng and Lin, 2011). Among small and medium enterprises (SMEs), green innovation management is a key focus to capitalize on green innovation opportunities and remain competitive in the market (Polas et al., 2023a). SMEs are considering integrating green innovation practices into their operations, product development, and service delivery to create green ranking and value for their customers, employees, and stakeholders.

According to Cuerva, Triguero-Cano, and Córcoles (2014), green innovation practices and their management in the enterprise context are becoming increasingly relevant for the business operations of SMEs. Among the drivers are shifting regulatory requirements, consumer-sensitive demands for eco-friendly products and services, and the possibility of operational cost savings (Bilan et al., 2020). Green innovation management might also suggest legitimacy and improved brand reputation, boost competitiveness, and emphasize environmental responsibility. Considering these facts, most of the SMEs have started an active engagement that extends beyond their internal operations to improve their “green profile” throughout the lifecycle of their products and services, from procuring raw materials through production to customer use. The effective management of these green innovation practices is crucial for business success (Cheng and Shiu, 2012; Kurowska-Pysz, 2021).

As suggested by Azam et al. (2023), an effective integration of the green innovation concept in the management practices of SMEs is an interesting adventure. As well, it also has a significant challenge that requires keen evaluation (Azam et al., 2023). Due to a lack of resources and expertise, SMEs face various key challenges in their journey of adopting and implementing green innovation management compared to other established and bigger firms. In addition, they lag in technology adoption and assimilation. This is because their business operations and practices lack exposure, goodwill, and technical capabilities. In addition, Duque-Grisales et al. (2020) suggested that green compliance standards are critical aspects that SMEs struggle to achieve. However, the integration of these standards into the SMEs’ operations without affecting their bottom line is important. Pakhomova, Khoroshavin and Malyshkov (2017) further indicated that SMEs have limited market exposure and usually encounter obstacles concerning regulatory compliance.

However, there is a different observation from Ebrahimi and Mirbargkar (2017). Their study argues that these challenges should not be considered as barriers but

as opportunities where SMEs could demonstrate their agility and creativity in the demanding business environment. They have the advantage of quick adaptability to volatile market conditions and changing customers' preferences, which could give them an edge in the green economy.

Green innovation management in SMEs is also a demanding adventure, considering that in addition to developing new products, services, or technologies, it entails the transformation of the complete business processes to cultivate and foster a green culture throughout the organization (Huang et al., 2022; Riana et al., 2020; Wróblewski et al., 2018). Green culture requires significant investment from all concerned stakeholders, including employees and executives, and external partners like sector associates, customers, and suppliers. Establishing such a coherent network may challenge the SMEs (Kolasińska-Morawska et al., 2022). However, Rodrigues and Franco (2023) supported the idea that SMEs could be better positioned to accelerate their journey towards adopting green innovation management through such an integrated, like-minded network.

Green innovation is currently seen as a business strategy to gain a competitive advantage because it helps access new markets or develop new goods, services, and applications ethically through practices that address increasing environmental and health issues and concerns (Yurdakul and Kazan, 2020). This kind of innovation is significant because it enables businesses to compete in the market utilizing eco-friendly and effective technologies and makes it easier to adapt to new healthy consumption trends. Green innovation has evolved into a critical business aspect due to increasing demand to adhere to environmental standards and satisfy customer health and environmental preferences in recent years. As a result, the concept of green innovation in business management has attracted great interest in business and academia. An increasing body of literature is geared towards deeply understanding green innovation practices in business (Bani-Melhem et al., 2022).

However, SMEs are often overlooked in the discussion about green innovation. Although SMEs account for around 80% of all businesses in Poland and Thailand and contribute significantly to the economy and employment, many SMEs are still aware of their potential opportunities for green innovation (Wang and Yang, 2021). This study embodies reflections on those green innovation practices that have mostly been neglected till now and their utilization as a competitive strategy for businesses owned by SMEs. An exploration of different drivers of green innovation management in two different contexts, the Polish and Thai economies and regulatory regimes, has much to add to an important gap both in research and in policy.

The study proposes integrating smaller concerns into national changers through recognizing heterogeneities in capacities and constraints between small and large firms, dispersed across differing national contexts. Earlier in the past, when SMEs utilize green innovations as a competitive strategy, intense consideration may be placed by this book on earlier neglected practices of green innovation. The study examines several drivers of green innovation management in the context of the

Polish and Thai economies and their respective regulatory regimes. From their end, the SMEs can be national changers by virtue of their participation in the different dimensions of capabilities and constraints that the various national contexts afford them. The analysis, therefore, fills a great void in terms of both research and policy.

The literature has not adequately addressed the adoption of green innovation by SMEs and its incorporation and implementation within their business practices. Most of the research has been conducted in the domain of big corporations, large enterprises, and public or government institutions. Additionally, Carrillo-Hermosilla et al. (2009) indicated that compared to larger business corporations, SMEs may face various challenges while adopting and implementing green innovation practices in their management. These challenges act as barriers to SMEs' efforts to adopt green innovation. These challenges include a lack of adequate knowledge in the management regarding green innovation, a lack of knowledge regarding new possibilities within the management framework, the cost of developing green products and services, and insufficient competencies in the research and development (R&D) department, among others (Carrillo-Hermosilla et al., 2009).

In addition, SMEs have been considered extremely resistant to technological advancement compared to other large enterprises. SMEs have begun adopting green innovation management practices primarily due to stakeholder pressure. Another barrier they face is their limited ability to adopt these technologies in terms of technological advancement and managerial knowledge required to adopt green innovation.

The choice of variables in Poland and Thailand for this study was deliberate and tactical to compare the basis with some sound theoretical and pragmatic reasons that fit well the purposes of the study on green innovation management for SMEs. Thus, the choice of Poland and Thailand is a conscious effort to offer a North–South comparative view that enhances the study's theoretical contributions and empirical findings. This process would allow for a more globally meaningful conceptualization of green innovation management for SMEs because it captures very different challenges and opportunities that are reflected across highly unequal local contexts. The primary components include the following:

- *Representing Different Economic and Developmental Contexts:* Poland belongs to that group of European economies that are in the post-transition stage and are subject to EU environmental directives, as well as systematic regulatory mechanisms and institutional support for programmes such as the Green Innovation Hub, Eco-innovation Action Plan (EcoAP), and Polish Green Investment Scheme (Małecka et al., 2024; van Langen et al., 2021). Thailand is a developing Southeast Asian economy and has a rapidly expanding SME sector, although environmental enforcement is much informal and has limited institutional infrastructure for green innovation (Edelman, 2023; Kaplinsky, R., & Kraemer-Mbula, 2021).

- *High Economic Dependence on SMEs:* Both Poland and Thailand have high SME density; SMEs account for approximately 99.8% of businesses in Poland and 99.5% of businesses in Thailand, making them essential to each country's economic development, employment, and green agenda covering bio-circular green economy (BCG) model and Thailand 4.0 programmes (Arunmas, 2024; Tantivangphaisal, 2024; Siuta-Tokarska et al., 2023).
- *Underrepresentation in Existing Literature:* Most of the literature on green innovation focuses on big organizations or developed Western economies, whereas less than a handful of studies for comparison and management aspects have considered evaluating SMEs in Poland and Thailand (Baeshen et al., 2021; Rizos et al., 2016; Carrillo-Hermosilla et al., 2009; Rodrigues and Franco, 2023; Sri-sathan et al., 2023). The lack of prior research created a clear empirical gap that this study aimed to address.
- *Practical Accessibility and Feasibility:* From the point of view of proximity to the research materials, convenience of data collection, and established timelines in longstanding academic or professional networks through which SMEs' respondents in both countries can be traced, SMEs were selected.

Selection of empirical contexts such as Poland and Thailand was done upon considerations of several strategic and research-oriented concerns, such as cultural diversity, stages of economic development, eco-innovation approaches, and broader comparative value, to name a few. Cultural differences and managerial values of both were a strong consideration; Poland and Thailand represent distinct cultural orientations, particularly in terms of power distance, individualism vs. collectivism, and uncertainty avoidance.

Also, their contrasting approach to eco-innovation was a factor; here, it is in part the condition of regulatory or institutional factors that attach the Polish environmental green innovation management strategy to the condition of compliance with the binding EU environmental norms. On hindsight, one could argue that Thailand, above all others, has done most in creating free-market flexible conditions within which SMEs could operate; thus, they are developed to "go green" depending on emerging trends in markets, customers' preferences, and social pressures emanating from other stakeholders. The underexplored comparative pairing in existing literature was also considered; much of the green innovation literature at present concentrates on Western Europe, North America, and China; it is mainly limited regarding comparative research studying Eastern Europe and Southeast Asia. Poland and Thailand represent the cases chosen to fill this empirical gap, thereby providing a non-Western perspective within the international context with regard to promoting green innovation in SMEs. And finally, both countries are undergoing a green transition, which makes them strategically relevant to policy and practice. In their national agendas, they are particularly focusing on the development of SMEs and other environmental protection-related provisions or stipulations among their priorities; Poland is doing

this through its commitments under the European Green Deal, and Thailand is doing it via its BCG model.

Furthermore, SMEs lack the internal motivation driving them towards adopting green innovation. This implies the personal values observed by the owners and management of the SMEs, as well as their ethical principles. To a greater extent, SMEs lack personal beliefs, awareness, and commitment to social and environmental demands (Ashton et al., 2017). Also, Poland and Thailand have varying cultural practices and backgrounds, which significantly influence their management practices regarding green innovation. Due to cultural differences, the two countries differ in innovation perspectives, practices, and efforts. Considering the challenges and barriers SMEs face and the lack of literature on green innovation management, this study investigated the drivers of green innovation management adoption in SMEs. It was a case study conducted in Poland and Thailand. The research problem was addressed by engaging with the management discipline and practices in SMEs.

It was evident from the critical review of literature conducted for this study that the concept of green innovation management has not been adequately explored in Poland and Thailand. The specific research on the concept of “green innovation management” in SMEs is scarce. Related studies have researched aspects such as green innovation adoption in SMEs, particularly the drivers influencing the adoption (Indrawati et al., 2023; Jun et al., 2021; Thomas et al., 2022). An example is the study by Jun et al. (2021), who investigated the determinants of green innovation adoption in SMEs.

On the contrary, Thomas et al. (2022) investigated stakeholders’ influence on SMEs’ green innovation adoption. It was found that these studies have researched and developed the implications of the adoption of green innovation from the perspective of environmental conservation and management. They have therefore highlighted the application of green innovation technology to reduce the negative environmental impact of SMEs (Cuerva et al., 2014; Khan et al., 2023; Weng and Lin, 2011). A study by Weng and Lin (2011) evaluated the adoption of green innovation from the perspective of its contribution to technological, organizational, and environmental responsibility.

Additionally, few studies have investigated the aspect of green innovation among SMEs in Thailand (Tariq et al., 2019; Muangmee et al., 2021), while other studies have been carried out under the case of Poland (Wysocki, 2021). However, the literature review did not find a study comparing SMEs’ green innovation management practices in the European and Asian environments. This monograph thus sets out to capture this from the points of view of Poland and Thailand SMEs, to understand the drivers of green innovation management for SMEs across both spheres. This raises important datasets that help businesses and governments to understand green innovation drivers while crafting policies that ensure wider adoption for businesses. While some research exists on green innovation in general, the

management context-specific insights are limited, hindering the development of targeted strategies and initiatives. Considering these deficiencies in existing literature, this study was geared towards filling these research gaps.

With over 1800 studies related to green or eco-innovation in Poland and Thailand according to Scopus, only a smaller subset investigates SMEs or takes a management-oriented perspective; most of the studies seem to emphasize technological or environmental aspects without giving a deeper understanding of the management drivers across the different contexts (Thirakulwanich, 2024). Furthermore, bibliometric analysis and targeted abstract review confirm that very few comparative studies could be found that bridged both countries, Poland and Thailand. This fact certainly indicates the originality of the present research because it is the first-ever study to view green innovation management from a cross-national, SME-specific, and managerial perspective.

Green innovation management is a critical aspect for SMEs in their effort to adjust to the global shift towards green technology, their market competitiveness, and long-term success and growth. By embracing green innovation principles and integrating them into their core business management strategies and practices, SMEs stand in a position to produce green goods and services, address the consumers' environmental concerns and impacts, enhance brand reputation, boost competitiveness, as well as drive innovation and growth by developing a culture of creativity and problem-solving. To achieve this, a green innovation initiative requires the right mindset, resources, and support. In this regard, this research is geared towards answering the following research questions:

- RQ1:** What is the comparative status of SMEs' green innovation management practices in Poland and Thailand business environments?
- RQ2:** What are the drivers of SMEs' adoption of green innovation management in Poland and Thailand?
- RQ3:** What is the influence of green standards compliance on the drivers of SMEs' adoption of green innovation management?
- RQ4:** What are the actionable policy recommendations to enhance SMEs' adoption of green management in their business operations and strategies?

This study was guided by the main objective, i.e., to find out the drivers that influence the green innovation management in SMEs, under the case of Poland and Thailand. This main objective is addressed through the following objectives:

- RO1:** To compare SMEs' green innovation management practices in Poland and Thailand business environments.
- RO2:** To determine the drivers that influence SMEs' adoption of green innovation management in Poland and Thailand.
- RO3:** To determine the influence of green standards compliance on the drivers of SMEs' adoption of green innovation management.

RO4: To develop actionable policy recommendations to enhance SMEs' adoption of green innovation management in their business operations and strategies.

Typically, the main research objective is stated prior to the research questions, but it was purposely done so in reverse order. Framing the questions first allows a clearer prescription of the territory of the study by taking the reader through very specific lines of enquiry before finally summarizing them into a wider objective. These can provide clarity on the concept of analysing contextual, managerial, and regulatory aspects in two countries in a much more comparative way. However, the alignment between research questions and research objectives is still quite strong, ensuring coherence and logical consistency throughout the monograph. The following hypotheses were proposed for this research:

- H1:** Green regulations significantly influence SMEs' adoption of green innovation management.
- H2:** Green technical capabilities significantly influence SMEs' adoption of green innovation management.
- H3:** Green economic resources significantly influence SMEs' adoption of green innovation management.
- H4:** Green economic resources mediate the relationship between green regulations and the adoption of green innovation management in SMEs.
- H5:** Green human resources management significantly influences SMEs' adoption of green innovation management.
- H6:** Green standards compliance significantly influences SMEs' adoption of green innovation management.
- H7:** Green standards compliance moderates the influence of green regulations, green technical capabilities, green economic resources, and green human resources on the adoption of green innovation management in SMEs.
- H8:** There are significant differences in the effects of green innovation drivers on SMEs' adoption of green innovation management between Poland and Thailand.

The study lays its values in several aspects. Firstly, the monograph comprehensively explores green innovation management within SMEs in Poland and Thailand. These are two distinct economies with varied management practices, definitions of SMEs, and green innovation policies. The study provides cross-cultural insights by comparing SMEs' green innovation management practices in Poland and Thailand. These insights were useful in understanding the influence of economic, social, regulatory, and environmental policies on the adoption of green innovation practices and their incorporation into management practices.

Secondly, this study adds value to the concept of green innovation by incorporating the aspect of management. The study explored green innovation management

practices and their incorporation into the business lifecycle. Many SMEs face various management problems with regard to innovation, the adoption of new technologies, and their incorporation into management practices. This research explored these management context-specific issues.

Thirdly, the findings of the study identified the drivers of the adoption of green innovation management in SMEs. The findings were essential for guiding business leaders and the management of SMEs, as well as policymakers, in developing effective strategies that could be implemented by SMEs when adopting green innovation practices and incorporating them at the management level.

The study is expected to introduce a new conceptual model for the study of “green innovation management in SMEs” that provides new insights into this subject and could be adopted for future research. It also provides empirical results and findings regarding the drivers of green innovation management in SMEs, including multi-group analysis and comparison of the results between Poland and Thailand. Furthermore, the study also contributes to the existing literature on the adoption of green innovation management in SMEs and proposes new areas and gaps that could be explored by future researchers.

The organizational layout of this monograph covers five chapters:

The first chapter presents an in-depth exploration of the complexities associated with the management of green innovation, with a particular focus on its implementation in the contexts of Poland and Thailand. This study explores the underlying factors driving the increasing focus on green practices and developing strategies for managing green innovation. A review of relevant literature on the subject demonstrates an extensive knowledge of green innovation, wherein there are no significant disparities in its definition despite variations in terminology among different sources.

The second chapter presents a comprehensive review of the policies and theories adopted in this study. A major emphasis is put on the natural resource-based view (NRBV) framework and the triple bottom line (TBL) framework. The chapter provides an overview of the fundamental principles of the NRBV, highlighting the significance of how SMEs can effectively utilize organizational resources consistent with objectives related to green initiatives. Therefore, the review of literature presents an important basis on which these theories develop to explore the green innovation management concept in the SMEs’ context. In the development of this study’s literature, the two concepts, NRBV and TBL frameworks, have been considered to effectively assist SMEs focusing on Poland and Thailand in incorporating green practices into their innovation initiatives.

In the third chapter, the research study elaborates on the fundamental components and techniques adopted in carrying out the analysis. The robustness of the research methodology is emphasized, where the ability of the methods adopted to deliver objective results is discussed. The chapter also discusses the process adopted in the data collection and the development of instruments used in the data collection process. As well, the measuring scales utilized for assessing the catalysts for implementing green innovation management practices are explained. These scales play a crucial

role in converting abstract notions into measurable variables, facilitating the methodical examination of data. The data analysis process and techniques adopted are also discussed in this chapter, which include the confirmatory factor analysis (CFA), structural equation modelling (SEM), and multi-group SEM analysis.

Chapter four elaborates on the data analysis and the results obtained. The chapter starts by presenting the descriptive statistics analysis perspective on the fundamental trends and patterns observed in the research findings. The descriptive statistics analysis presents the demographic characteristics of the respondents. A series of tests was conducted to establish the reliability and validity of the measurement instruments employed and ensure that the results obtained are consistent and a reliable representation of the phenomena under investigation. The tests of the hypothesis and the relationship between the study variables are conducted using SEM analysis. A comparison of the two nations – Poland and Thailand – is conducted using a multi-group analysis technique. The findings of this chapter serve as guidance for the other chapters towards results, discussions, conclusions, and implications of the study.

In the concluding chapter (fifth chapter), the findings of the study are discussed, based on the set hypotheses, to address the study objectives. The chapter also discusses the implications of these findings, both managerial and theoretical aspects. The study's recommendations and limitations, as well as recommendations for future studies, are also discussed.