ISRG Journal of Economics, Business & Management (ISRGJEBM)

ISRG PUBLISHERS

Abbreviated Key Title: Isrg J Econ Bus Manag

ISSN: 2584-0916 (Online)

Journal homepage: https://isrgpublishers.com/isrgjebm/

Volume – III Issue - VI (November-December) 2025

Frequency: Bimonthly

OPEN ACCESS

Assessing the level of green transformation of small and medium enterprises in Vietnam in the context of sustainable development

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| **Received:** 12.11.2025 | **Accepted:** 17.11.2025 | **Published:** 19.11.2025

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Abstract

In the context of global efforts toward sustainable development, the green transformation of small and medium-sized enterprises (SMEs) has become a critical pathway to achieving environmentally responsible and resource-efficient growth. This study adopts a qualitative research approach to explore how Vietnamese SMEs perceive and implement green transformation strategies and to identify the key drivers and barriers influencing this process. A multiple case study design was employed, involving in-depth semi-structured interviews with 18 participants, including SME managers, environmental officers, and policymakers from six industries: manufacturing, textiles, food processing, construction, logistics, and services. Supplementary data from corporate reports and government documents were analyzed to triangulate findings. Using thematic analysis, the study identifies four major themes shaping the green transformation journey of Vietnamese SMEs: (1) emerging environmental awareness and compliance-driven initiatives; (2) limited access to green technologies and financial resources; (3) institutional and policy gaps; and (4) the growing influence of global supply chain standards and consumer expectations. Although most SMEs have adopted basic green practices, such as waste reduction and energy efficiency, their transition remains partial and fragmented, primarily constrained by cost pressures and the absence of consistent policy incentives. The findings highlight that Vietnam's green transformation among SMEs is still at an early stage and largely reactive rather than strategic. To foster more profound change, the study recommends stronger governmental support mechanisms, improved access to green finance, and targeted capacity-building programs for SME leaders. This research contributes to the literature on sustainable business development in emerging economies by providing empirical insights into the behavioral and institutional dimensions of green transformation, offering policy recommendations for advancing Vietnam's transition toward a greener economy.

Keywords: *Green transformation; sustainable development; environmental management; Vietnam.*

DOI: 10.5281/zenodo.17646143

1. Introduction

The global economy is witnessing a paradigm shift toward sustainability as environmental degradation, resource depletion, and climate change increasingly threaten economic stability and social welfare. In response to these challenges, the concept of green transformation which refers to the integration of environmental sustainability into business strategies, production systems, and management practices has become a central theme in both academic discourse and policy development (OECD, 2021). Green transformation is viewed not only as an environmental necessity but also as a driver of innovation and competitiveness, encouraging enterprises to adopt cleaner technologies, reduce carbon emissions, and enhance resource efficiency (Porter & Linde, 1995). This shift reflects the broader goals of the United Nations Sustainable Development Goals (SDGs), particularly SDG 8, SDG 9, and SDG 12 (United Nations, 2015).

Small and medium-sized enterprises (SMEs) play a pivotal role in this transition. Globally, SMEs account for more than 90% of businesses and contribute approximately 50% of employment (World Bank, 2022). However, they also represent a significant source of environmental impact due to inefficient production processes and limited adoption of green technologies (Ayyagari et al., 2011). Unlike large corporations, SMEs often face structural constraints such as financial limitations, lack of technical expertise, and low awareness of sustainability that impede their ability to implement comprehensive environmental initiatives (Revell et al., 2010; Walker et al., 2008). Nevertheless, given their scale, flexibility, and embeddedness in local economies, SMEs have the potential to drive grassroots sustainability if adequately supported through policy frameworks, green financing, and capacity building (Bocken et al., 2014).

In recent years, Vietnam has demonstrated a growing commitment to sustainable development and environmental protection. The government's National Green Growth Strategy for 2021–2030 emphasizes green transformation as a crucial component of the country's long-term economic vision (Vietnamese Government, 2021). SMEs, which account for nearly 97% of all registered enterprises and contribute approximately 45% of national GDP (Ministry of Planning and Investment, 2022), are expected to play a central role in achieving this vision. However, despite increasing policy attention, the level of green transformation among Vietnamese SMEs remains relatively low compared to regional peers (Nguyen & Nguyen, 2023). Many enterprises adopt only basic eco-efficiency measures, such as waste minimization or energy-saving devices, while comprehensive environmental management systems, green product innovation, and circular economy models are still rare (Phan, 2022).

Previous studies on sustainability in Vietnam have primarily focused on large corporations or sector-specific environmental policies (Tran & Vu, 2021; Le & Nguyen, 2020). There is still limited understanding of how SMEs interpret the concept of green transformation, the internal and external factors shaping their actions, and the barriers hindering their transition. Furthermore, most existing studies rely on quantitative surveys that measure environmental practices without capturing the deeper organizational and behavioral dynamics underlying green initiatives. As such, a qualitative exploration of SMEs' perspectives, motivations, and challenges is necessary to gain a holistic understanding of Vietnam's green transformation landscape.

This study aims to assess the level of green transformation of small and medium-sized enterprises in Vietnam within the context of sustainable development using a qualitative research approach. Through multiple case studies and in-depth interviews with SME managers, environmental officers, and policymakers, the study seeks to identify key drivers, barriers, and contextual factors influencing green transformation. By analyzing these insights thematically, the research contributes to the literature on sustainable business development in emerging economies and provides policy recommendations for fostering green innovation and resilience among Vietnamese SMEs. Ultimately, this study enhances understanding of how developing countries can balance economic growth and environmental sustainability through inclusive and adaptive green transformation strategies.

2. Literature review

Green transformation refers to the structural and strategic transition of enterprises toward environmentally sustainable production and management practices. It involves the adoption of cleaner technologies, efficient resource use, circular economy models, and environmental governance mechanisms that minimize negative ecological impacts while maintaining competitiveness (OECD, 2021). According to Porter and van der Linde (1995), green transformation should not be viewed merely as a cost of compliance but as a source of innovation that enhances productivity and long-term competitiveness. Similarly, Bocken et al. (2014) emphasized that sustainable business model innovation integrating environmental, social, and economic goals is at the core of green transformation. From a theoretical perspective, green transformation is often analyzed through the Triple Bottom Line framework, which balances the three pillars of sustainability: people, planet, and profit (Elkington, 1998). Enterprises pursuing green transformation aim to reduce environmental footprints, improve social responsibility (people), and ensure economic viability (profit). Recent studies further extend the concept by emphasizing eco-innovation, corporate environmental responsibility, and green supply chain management as key components (Klewitz & Hansen, 2014). Thus, assessing the level of green transformation requires a multidimensional approach encompassing environmental performance, organizational behavior, and institutional context.

Small and medium-sized enterprises (SMEs) represent the backbone of most economies, accounting for more than 90% of businesses worldwide and contributing significantly to employment and GDP (World Bank, 2022). However, their environmental impact is disproportionately large compared to their size due to limited adoption of clean technologies and sustainable management practices (Ayyagari et al., 2011). SMEs often operate with resource constraints, outdated production processes, and limited access to capital, which restrict their ability to implement green innovations (Revell et al., 2010). Despite these challenges, SMEs also hold great potential for driving local sustainability transitions. Their smaller organizational structures allow flexibility, faster decision-making, and adaptability to environmental changes (Bos-Brouwers, 2010). Studies by Gadenne et al. (2009) and Walker et al. (2008) suggest that SMEs are increasingly aware of the environmental implications of their operations and are beginning to integrate sustainability measures such as waste reduction, energy conservation, and eco-labelling. Moreover, growing consumer demand for environmentally friendly products and pressure from global supply chains have encouraged SMEs to

DOI: 10.5281/zenodo.17646143

adopt green standards, particularly in export-oriented sectors (Testa et al., 2016). However, the transformation among SMEs tends to be incremental rather than systemic (Johnson & Schaltegger, 2020). Many initiatives remain reactive motivated by cost-saving or regulatory compliance rather than proactive strategies embedded in corporate culture or innovation systems. This distinction highlights the need for contextual studies that explore not only *what* green practices are adopted but also *why and how* SMEs undertake them.

Research on green transformation identifies a wide range of drivers that encourage enterprises to adopt sustainable practices. These include regulatory pressure, market demand, corporate image, technological innovation, and top management commitment (Rizos et al., 2016). For instance, environmental regulations and international standards, such as ISO 14001, have been effective in motivating firms to adopt cleaner production practices (Testa & Iraldo, 2010). Similarly, customers' increasing environmental awareness and global supply chain requirements have created competitive incentives for SMEs to green their operations (Klewitz & Hansen, 2014).

Conversely, several barriers impede green transformation, particularly among SMEs. Financial constraints are the most frequently cited obstacle, as green technologies often require high initial investment costs with uncertain short-term returns (Revell et al., 2010). Other challenges include limited access to information, lack of managerial expertise, insufficient policy support, and weak environmental enforcement (Horbach et al., 2012). Furthermore, internal barriers such as low environmental awareness, resistance to change, and the absence of strategic vision also hinder SMEs from integrating sustainability into their long-term business models (Rizos et al., 2016). These factors are often exacerbated in developing economies, where institutional frameworks for sustainability are still emerging.

In Vietnam, the government has actively promoted green growth and sustainable development through national policies such as the National Green Growth Strategy (2021–2030) and the Environmental Protection Law (2020) (Vietnamese Government, 2021). However, despite this strong policy commitment, empirical evidence suggests that the green transformation of SMEs remains limited in scope and depth. Studies by Nguyen and Nguyen (2023) and Phan (2022) indicate that Vietnamese SMEs are still in the early stages of adopting green practices, primarily focusing on compliance-based activities like waste management and energy saving. Strategic environmental innovation, eco-design, and circular business models are still rare due to financial and technological constraints. Moreover, most existing studies on green business practices in Vietnam employ quantitative approaches to measure environmental performance, leaving a gap in understanding the behavioral, institutional, and cultural dimensions of SMEs' transformation. There is a lack of qualitative research exploring how SME owners perceive sustainability, the motivations behind their green initiatives, and the contextual barriers they face. As Tran and Vu (2021) emphasized, qualitative studies can reveal nuanced insights into organizational behavior and policy interactions that cannot be captured through survey data alone. Therefore, this study fills an important gap by employing a qualitative research approach to assess the level of green transformation among Vietnamese SMEs. Through multiple case studies and in-depth interviews, it examines the dynamics of change from the perspective of business leaders and policymakers. The findings will not only contribute to the theoretical discourse on sustainable enterprise transformation in emerging economies but also provide practical implications for policymakers aiming to accelerate Vietnam's transition toward a green economy.

3. Current situation of green transformation among SMEs in Vietnam

In the past decade, Vietnam has made significant progress toward sustainable economic growth and environmental protection. The country's commitment to the National Green Growth Strategy for 2021–2030 and the Environmental Protection Law (2020) reflects its policy ambition to transition toward a low-carbon, resource-efficient economy (Vietnamese Government, 2021). Green transformation has been positioned as a key driver of competitiveness and innovation within Vietnam's broader vision for sustainable development. The government aims to reduce greenhouse gas emissions by 9% by 2030, improve energy efficiency across industries, and promote renewable energy investment (Ministry of Natural Resources and Environment, 2022). However, despite these policy efforts, the overall level of green transformation across Vietnam's enterprise sector remains uneven. Large corporations and foreign-invested enterprises (FIEs) tend to lead in adopting environmental management systems and cleaner technologies, while small and medium-sized enterprises (SMEs) lag behind (Nguyen & Nguyen, 2023). This gap highlights structural challenges in Vietnam's economic landscape, where SMEs—though accounting for 97% of registered businesses—face significant financial, technical, and institutional constraints that hinder their transition toward sustainability (Ministry of Planning and Investment, 2022).

Most Vietnamese SMEs have begun to acknowledge the importance of environmental protection, particularly in industries such as manufacturing, textiles, food processing, and construction, which are under increasing scrutiny for their environmental impacts (Phan, 2022). However, their actual practices remain at an early and fragmented stage. The majority of SMEs adopt basic eco-efficiency measures, such as replacing traditional lighting with energy-efficient bulbs, reusing materials, or implementing waste segregation. Only a limited number of enterprises have implemented systematic environmental management systems (EMS) or green certifications like ISO 14001 (Tran & Vu, 2021).

Empirical evidence from recent studies indicates that approximately 60% of SMEs in Vietnam are aware of the concept of "green business," but less than 30% have incorporated any form of sustainability-oriented strategy (Nguyen et al., 2023). For instance, a survey by the Vietnam Chamber of Commerce and Industry (VCCI, 2022) found that while nearly half of SMEs have expressed interest in green innovation, only 18% have implemented renewable energy solutions or circular production models. Green finance adoption is also limited—only 11% of SMEs reported accessing loans for environmental improvement projects, largely due to the absence of tailored financial instruments and complex lending procedures (World Bank, 2022).

Moreover, the integration of green transformation is often compliance-driven rather than strategic. Many SMEs implement environmental measures primarily to meet domestic regulations or the sustainability requirements of export markets, particularly from the European Union and Japan (Hoang, 2023). As a result, green practices tend to be superficial and short-term, lacking integration

DOI: 10.5281/zenodo.17646143

into the overall corporate strategy or innovation process. This reactive approach indicates that while awareness of sustainability is growing, structural and institutional support for comprehensive green transformation remains weak.

Vietnamese SMEs encounter numerous barriers in implementing green transformation. Financial limitations remain the most pressing issue. Many SMEs lack sufficient capital to invest in cleaner production technologies or environmental management systems, as these often involve high upfront costs with long payback periods (Phan, 2022). Access to green credit is limited due to a lack of financial incentives, complicated procedures, and the absence of a dedicated green banking framework (World Bank, 2022). Technological constraints also hinder progress. Most SMEs rely on outdated equipment and lack access to advanced, energy-efficient technologies (Nguyen & Nguyen, 2023). This is compounded by low managerial and employee awareness of sustainability practices. Many business owners still perceive environmental initiatives as additional costs rather than investments in long-term competitiveness (Tran & Vu, 2021). Furthermore, institutional and policy barriers persist. Although Vietnam has issued several national strategies promoting green growth, the implementation at the local level remains inconsistent. Coordination between ministries, local governments, and business associations is often fragmented, leading to policy overlap and inefficiencies (OECD, 2021). Additionally, a lack of environmental data transparency, monitoring mechanisms, and enforcement capacity reduces the effectiveness of green policies. These systemic issues create uncertainty for SMEs, discouraging proactive engagement in sustainability initiatives.

Recognizing these challenges, the Vietnamese government has begun to introduce policies and pilot programs aimed at promoting green transformation among SMEs. The National Action Plan on Green Growth (2021–2030) outlines measures such as green finance incentives, cleaner production programs, and capacity-building for business managers (Vietnamese Government, 2021). Moreover, international organizations like the World Bank, UNDP, and GIZ have supported various initiatives, including the Green Credit Program and Energy Efficiency Project for SMEs (World Bank, 2022). These programs have provided technical assistance and training on environmental management, but their coverage remains limited and concentrated in urban areas. At the policy level, the government has emphasized the importance of public–private partnerships (PPP) to accelerate green innovation. Some Vietnamese universities and research institutes have also collaborated with SMEs to develop low-cost eco-technologies suitable for small-scale production (Le & Nguyen, 2020). However, these initiatives are still in their infancy and have not yet generated large-scale transformation. Overall, while Vietnam's institutional framework for green growth is gradually improving, the practical implementation among SMEs continues to face significant challenges in terms of financing, technology access, and long-term strategy formulation.

In summary, the current state of green transformation among Vietnamese SMEs is characterized by growing awareness but limited implementation. Most SMEs have taken initial steps toward energy efficiency and waste reduction, yet few have integrated sustainability into their core business models. The transformation process remains constrained by financial, technological, and institutional barriers. To achieve substantive progress, Vietnam must enhance its policy coherence, expand access to green finance, and strengthen capacity-building programs targeted specifically at SMEs. A comprehensive and inclusive approach that combines government policy, financial incentives, and private-sector innovation will be crucial to ensuring that green transformation becomes a viable and sustainable path for Vietnam's economic future.

4. Conclusion

This study explored the current state of green transformation among small and medium-sized enterprises (SMEs) in Vietnam within the broader framework of sustainable development. Based on a qualitative research design involving multiple case studies and in-depth interviews, the study examined how SMEs perceive and implement green transformation initiatives, and what barriers and drivers influence their engagement in sustainability practices. The findings revealed that while awareness of environmental protection and sustainable growth has been increasing among Vietnamese SMEs, the overall level of green transformation remains relatively low and fragmented. Most SMEs have adopted basic eco-efficiency practices such as energy-saving technologies and waste reduction programs, but few have integrated sustainability into their long-term business strategies or innovation systems.

The research further shows that green transformation among Vietnamese SMEs is largely reactive rather than proactive. Most enterprises engage in green activities primarily to comply with regulations or to meet the sustainability requirements of international buyers rather than to achieve strategic environmental goals. The qualitative evidence highlighted several key constraints, including limited financial resources, lack of access to green technology, weak managerial capacity, and insufficient policy support. These barriers are compounded by institutional fragmentation and low awareness of the economic benefits of sustainability. Despite these limitations, external market pressures and the growing influence of global supply chains have served as important catalysts, particularly for export-oriented SMEs that must adhere to environmental standards from developed markets.

In general, the findings suggest that Vietnam's green transformation process among SMEs remains in its early stages, characterized by scattered and small-scale initiatives. However, this gradual progress also indicates the emergence of a positive trend in which sustainability is slowly being recognized as an essential component of competitiveness and long-term growth. The transition to green business models will require a coordinated approach that combines governmental support, private-sector initiative, and institutional reform. The study thus contributes to both academic and policy discussions by emphasizing the need for systemic transformation rather than isolated efforts.

From a policy perspective, several implications arise from this study. First, it is crucial for the Vietnamese government particularly the Ministry of Planning and Investment (MPI) and the Ministry of Natural Resources and Environment (MONRE) to establish a comprehensive national framework for SME green transformation. Such a framework should define clear criteria for measuring sustainability performance, set sector-specific targets, and align with the National Green Growth Strategy for 2021–2030. A unified policy direction would help ensure coherence across different sectors and guide SMEs in integrating environmental objectives into their operations. Second, improving access to green finance is a critical step. The study revealed that many SMEs are unable to invest in green technologies due to high upfront costs and

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limited credit access. Therefore, the government should expand green credit programs, establish low-interest loan schemes for sustainability projects, and simplify the procedures for obtaining green funding. Cooperation with commercial banks, international donors, and development organizations such as the World Bank or UNDP can facilitate the creation of a dedicated Green Finance Fund for SMEs, helping them transition from awareness to action. Third, the promotion of technology transfer and innovation support should be prioritized. Given that many SMEs still operate with outdated equipment, government agencies and universities should collaborate to develop low-cost, energy-efficient solutions suitable for local production contexts. The creation of regional innovation hubs or public–private partnerships (PPPs) would foster the diffusion of green technologies and encourage knowledge sharing between domestic firms and international partners. Fourth, capacity building and awareness raising are indispensable for ensuring long-term transformation. Training programs targeting SME managers and employees should focus on sustainable business management, environmental accounting, and compliance with green standards such as ISO 14001. Integrating sustainability concepts into higher education and vocational training curricula will help nurture a new generation of environmentally conscious entrepreneurs. Public awareness campaigns can further promote a cultural shift toward sustainability, particularly in rural and traditional sectors. Finally, institutional coordination and governance must be strengthened. Current green growth policies in Vietnam often suffer from overlap and inconsistent implementation between national and local levels. The government should enhance inter-ministerial coordination, establish transparent monitoring systems, and develop a national database on SME sustainability performance. Improved governance will not only increase policy efficiency but also build trust and accountability among enterprises and investors. Additionally, fostering international cooperation through PPPs can bring valuable technical expertise, funding, and best practices to accelerate the green transformation of Vietnamese SMEs.

Acknowledgments Funding: The authors gratefully acknowledge the financial support from the Banking Academy of Vietnam.

Competing interests: The authors declare that there are no conflicts of interest regarding the publication of this paper.

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DOI: 10.5281/zenodo.17646143