



Environmental Sustainability Practices in SMEs: A Qualitative Systematic Literature Review of Drivers, Configurations, and Performance Outcomes

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ABSTRACT. *This study systematically reviews the literature on environmental sustainability practices (ESPs) in small and medium sized enterprises (SMEs), focusing on their drivers, configurations, and performance outcomes. Using a qualitative systematic literature review approach guided by PRISMA 2020, relevant peer-reviewed studies were identified, screened, appraised, and thematically synthesized. The findings indicate that ESPs are shaped by interconnected internal and external drivers, including environmental knowledge, green leadership, green human resource management, employee environmental behavior, green innovation, technological capabilities, resource commitment, regulatory compliance, and stakeholder pressures. The synthesis further identifies recurring configurations, including knowledge behavior, leadership GHRM employee, knowledge compliance, green initiative technology, and innovation resource pathways. Environmental sustainability practices are associated with environmental performance, resource efficiency, green innovation, organizational sustainability, and business performance. Overall, SME environmental sustainability is best understood as a multidimensional, capability driven, and configurational phenomenon.*

Keywords *Environmental Sustainability Practices; SMEs; Sustainability Drivers; Configurational Approaches; Performance Outcomes*

INTRODUCTION

Environmental sustainability has become an increasingly important strategic concern as businesses face growing pressures to reduce environmental degradation, improve resource efficiency, and respond to regulatory, market, and stakeholder expectations. These pressures are particularly relevant to small and medium sized enterprises (SMEs), which contribute substantially to economic activity but often face greater financial, technological, managerial, and human resource constraints than larger firms. SMEs therefore have significant potential to contribute to sustainability while simultaneously facing challenges in adopting and maintaining environmental practices.

Environmental sustainability practices (ESPs) include energy and water conservation, waste reduction and recycling, pollution prevention, green purchasing, eco innovation, green supply chain management, environmental management systems, and cleaner technologies (Yacob et al., 2019; Woodard, 2021; Bravi et al., 2020). These practices demonstrate that environmental sustainability in SMEs is multidimensional, involving operational, technological, managerial, and behavioral aspects. Supplier engagement, adoption of green technologies, and collaboration with stakeholders, is

crucial for improving operational efficiency, reducing environmental impact, and enhancing the company's reputation (Ruslaini & Eri Kusnanto, 2020).

The literature shows that SME adoption of ESPs is influenced by diverse internal and external drivers. Hossain et al. (2022) identified 87 drivers across eight dimensions, while Dasanayaka et al. (2022) emphasized environmental regulations, customer requirements, organizational capabilities, and resource constraints. Thus, environmental sustainability cannot be explained solely by managerial awareness but by the interaction of institutional pressures, stakeholder expectations, resources, knowledge, leadership, innovation, and environmental competencies. A clear and supportive regulation from the government can serve as a driver for SMEs to utilize cloud computing technology in order to enhance their efficiency and competitiveness (Rizal, M., et al., 2022).

Environmental knowledge is particularly important because it enables managers and employees to understand environmental problems and translate awareness into action. Liu et al. (2020) showed that environmental knowledge can influence pro-environmental behavior through attitudes and intentions, while Roy and Thérin (2008) emphasized knowledge acquisition and environmental commitment in SMEs. Riva et al. (2021) further demonstrated that managerial green knowledge and leadership can contribute to environmental performance through green creativity. More recent evidence from Hossain et al. (2025) indicates that systems, action, and effectiveness knowledge can strengthen ESPs through employee environmental behavior. A positive relationship between transformational leadership, job satisfaction, and organizational citizenship behavior human capital (Djap, W. et al., 2022).

Leadership, green human resource management (GHRM), organizational culture, and employee behavior also represent important drivers. Green transformational leadership can encourage pro-environmental behavior, while GHRM strengthens environmental capabilities through training, performance management, and employee engagement (Farrukh et al., 2022; Amjad et al., 2021). These findings indicate that ESPs are embedded not only in technological and operational systems but also in leadership, organizational culture, and employee capabilities.

External institutional and market pressures also influence SME environmental practices. Environmental regulations, customer expectations, supply chain requirements, stakeholder pressures, and competitive conditions can encourage firms to adopt

sustainability practices (Ko et al., 2021; Depoorter & Marx, 2024). Hossain et al. (2022) further showed that stakeholder integration can stimulate green investment and green technology adoption among SMEs.

However, identifying individual drivers is insufficient to explain the complexity of SME environmental sustainability. Different combinations of environmental knowledge, leadership, employee engagement, innovation, regulation, stakeholder pressure, and resources may produce similar sustainability outcomes. Configurational approaches therefore emphasize causal complexity, equifinality, and causal asymmetry (Fiss, 2011). Recent research by Hossain et al. (2025), using PLS-SEM and fsQCA, further demonstrates the value of examining both individual relationships and combinations of conditions in explaining ESPs among manufacturing SMEs.

The relevance of ESPs extends beyond environmental improvement to broader organizational performance. Sustainability practices may contribute to reduced emissions and waste, resource efficiency, innovation, operational improvements, reputation, competitiveness, and business performance (Appannan et al., 2023; Cheng et al., 2023). Zhang and Walton (2017) further showed that the relationship between eco innovation and business performance depends on environmental orientation and resource commitment.

Despite the growing literature, research remains fragmented across drivers, practices, contexts, theoretical perspectives, and performance indicators. Earlier reviews have largely focused on identifying drivers or mapping sustainability themes, while qualitative, configurational, longitudinal, and context-sensitive approaches remain relatively limited.

Therefore, this qualitative systematic literature review integrates three interconnected dimensions: drivers, configurations, and performance outcomes. It examines the factors that encourage or constrain SME adoption of ESPs, how these factors combine into alternative sustainability pathways, and the environmental, operational, organizational, innovation, financial, and competitive outcomes associated with these practices. By integrating these dimensions, the review provides a more comprehensive understanding of how SMEs move from environmental pressures and organizational capabilities toward sustainability practices and improved business performance.

LITERATURE REVIEW

Environmental sustainability practices (ESPs) refer to organizational activities and managerial actions designed to reduce environmental impacts while improving the efficient and responsible use of natural resources, including energy, water, materials, and waste. Yacob et al. (2019) conceptualized environmental sustainability implementation in manufacturing SMEs through green initiatives, green technology adoption, process management, and supply chain management, demonstrating that environmental sustainability is multidimensional rather than limited to pollution control.

The literature indicates that SMEs implement environmental sustainability practices through activities such as energy efficiency, waste management, water conservation, environmentally friendly packaging, green purchasing, cleaner production, eco innovation, and environmental management systems (Sendawula et al., 2024). These practices are particularly important because SMEs may collectively generate substantial environmental impacts while simultaneously facing resource constraints that limit their ability to invest in sophisticated environmental technologies (Moktadir et al., 2018).

Environmental sustainability practices should therefore be understood as an organizational capability that involves the interaction of environmental knowledge, managerial commitment, employee behavior, technological resources, organizational processes, and external institutional pressures (Hossain et al., 2025). The literature further suggests that the effectiveness of environmental practices depends not only on whether SMEs adopt individual green activities but also on how these activities are combined with organizational capabilities and contextual conditions (Fiss, 2011; Alam et al., 2023).

The environmental sustainability literature has consequently moved from an emphasis on individual practices toward more integrated approaches involving knowledge management, green innovation, human resource management, leadership, stakeholder engagement, and regulatory compliance (Abbas & Khan, 2023; Farrukh et al., 2022; Sahoo et al., 2023). This development provides an important foundation for examining environmental sustainability practices as interconnected organizational systems rather than isolated managerial decisions (Ghobakhloo et al., 2023).

Environmental knowledge is one of the most consistently identified internal drivers of environmental sustainability practices because knowledge provides managers and

employees with the ability to recognize environmental problems, understand appropriate solutions, and translate environmental awareness into organizational action (Frick et al., 2004; Liu et al., 2020). Liu et al. (2020) demonstrated that environmental knowledge can influence pro environmental behavior through environmental attitudes and behavioral intentions, indicating that knowledge does not necessarily produce environmental action automatically but can operate through behavioral mechanisms.

In the SME context, Roy and Thérin (2008) demonstrated the importance of knowledge acquisition for environmental commitment, suggesting that the ability of SMEs to obtain and utilize environmental information can shape their environmental orientation. Riva et al. (2021) subsequently found that managers' green knowledge and leadership style were associated with environmental performance through green creativity, highlighting the interaction between knowledge, leadership, and innovation.

More recent evidence distinguishes environmental knowledge into systems, action, and effectiveness knowledge, with all three positively influencing environmental sustainability practices (ESPs) among Bangladeshi manufacturing SMEs through employee environmental behavior, while resource commitment moderates the effect of action knowledge (Hossain et al., 2025). Sendawula et al. (2024) similarly found that environmental knowledge significantly predicts ESPs among Ugandan manufacturing SMEs, with regulatory compliance partially mediating this relationship.

Leadership is another key driver because sustainability requires managerial direction, commitment, resource allocation, and environmental priorities (Riva et al., 2021; Khan et al., 2023). Green transformational leadership can foster employee pro-environmental behavior, while its effects are strengthened through green human resource management (GHRM) and green innovation (Farrukh et al., 2022; Awan et al., 2023). Top-management commitment is therefore an enabling condition that activates knowledge, GHRM, innovation, and resource commitment (Haldorai et al., 2022).

GHRM is also an important internal driver because employees implement many environmental practices in daily operations. Green recruitment, training, performance management, participation, and incentives can strengthen environmentally responsible behavior (Amjad et al., 2021; Farrukh et al., 2022; Mousa & Othman, 2020). Employee green behavior is shaped by individual, organizational, and contextual factors, with

organizational culture providing an important supporting context (Norton et al., 2015; Jiang et al., 2022).

Technological capability and green innovation are also important because SMEs often require cleaner technologies and processes to improve resource efficiency and reduce environmental impacts (Shahzad et al., 2022). Yacob et al. (2019) found that green initiatives were associated with environmental sustainability, while green technology adoption and managerial intentions influenced implementation. Open innovation and green knowledge management can further strengthen eco-innovation by providing SMEs with external knowledge and complementary capabilities (Roh et al., 2023; Shehzad et al., 2023).

Environmental regulation represents a major external driver because SMEs respond to legal requirements, standards, enforcement, and institutional expectations (Sendawula et al., 2024; Depoorter & Marx, 2024). Sendawula et al. (2024) showed that regulatory compliance significantly predicted ESPs and partially mediated the effect of environmental knowledge. Ko et al. (2021) further demonstrated that institutional pressures and internationalization influence proactive environmental strategies among Chinese SMEs.

Stakeholder integration is another important external driver. Customers, suppliers, governments, communities, financial institutions, and business partners can pressure SMEs to improve environmental performance and invest in green technologies (Eweje et al., 2021). Hossain et al. (2022) found that stakeholder integration, green investment, and green technology adoption were interconnected with ESPs among textile SMEs, highlighting the importance of relational and supply-chain conditions.

However, individual drivers alone do not fully explain SME sustainability. Configurational thinking argues that different combinations of conditions may produce similar outcomes, reflecting equifinality and causal complexity (Fiss, 2011). This perspective is particularly relevant to SMEs because firms differ in resources, capabilities, technology, stakeholder relationships, and institutional environments (Moeuf et al., 2020).

Recent evidence supports this approach. Hossain et al. (2025) combined PLS-SEM and fsQCA to identify both individual relationships and configurations involving environmental knowledge, employee behavior, and resource commitment. Alam et al.

(2023) and Kaya et al. (2020) similarly showed that configurational approaches can reveal alternative pathways that are not captured by linear models.

ESPs are also associated with multidimensional performance outcomes. Environmental benefits include reduced waste, emissions, energy use, and improved resource conservation, while operational benefits may arise from lower material losses and greater efficiency (Sendawula et al., 2024; Woodard, 2021; Appannan et al., 2023). Green innovation can simultaneously improve environmental and technological performance, while eco-innovation may enhance business performance when supported by environmental orientation and resource commitment (Shahzad et al., 2022; Roh et al., 2023; Zhang & Walton, 2017).

Environmental knowledge can also contribute to business performance through environmentally sensitive behaviors (Durmaz & Fidanoğlu, 2023), while sustainability practices may strengthen organizational resilience and competitiveness (Ghobakhloo et al., 2023). Nevertheless, these performance effects depend on the configuration of organizational resources and capabilities, reinforcing the importance of a configurational rather than purely linear perspective (Fiss, 2011; Zhang & Walton, 2017).

Overall, the literature demonstrates that SME environmental sustainability is driven by interconnected internal and external factors rather than a single determinant. Hossain et al. (2022) identified 87 drivers across eight dimensions, while subsequent research confirms the importance of knowledge, leadership, employee behavior, innovation, technology, regulation, stakeholder pressure, and resources. These drivers frequently operate through mechanisms such as employee behavior, green creativity, regulatory compliance, environmental attitudes, and green intentions, and ESPs generate environmental, operational, innovation, organizational, and business outcomes.

Based on the reviewed evidence, the major driver categories can be synthesized into knowledge and capabilities, leadership and managerial commitment, human resource and employee factors, green innovation and technology, regulatory and institutional pressures, and stakeholder and supply chain integration (Hossain et al., 2022; Farrukh et al., 2022; Hossain et al., 2025). These drivers may combine into alternative configurations such as knowledge–employee behavior configurations, leadership GHRM innovation configurations, regulation knowledge compliance configurations, and stakeholder investment technology configurations, although the exact configuration depends on the

empirical context and should be treated as a synthesis of recurring patterns rather than as a predetermined causal model (Sendawula et al., 2024; Hossain et al., 2022; Hossain et al., 2025).

Overall, the literature supports the proposition that environmental sustainability practices in SMEs are best understood as a complex organizational phenomenon in which knowledge, people, leadership, technology, resources, institutions, and stakeholders interact rather than operate independently (Fiss, 2011; Hossain et al., 2025). The systematic synthesis therefore provides a basis for examining not only which drivers matter, but also how drivers combine into alternative sustainability configurations and what environmental, operational, innovation, organizational, and business performance outcomes emerge from those configurations (Fiss, 2011; Zhang & Walton, 2017).

METHODS

This study adopts a qualitative systematic literature review (QSLR) to identify, evaluate, interpret, and synthesize research on environmental sustainability practices (ESPs) in SMEs. The review follows PRISMA 2020 and systematic review principles to ensure transparency, consistency, and reproducibility (Page et al., 2021; Snyder, 2019; Tranfield et al., 2003). It focuses on three dimensions: drivers, configurations, and performance outcomes. Three research questions examine the internal and external drivers of ESPs, the configurations through which sustainability practices emerge, and their environmental, operational, organizational, innovation, and business outcomes.

The search strategy combines SME, environmental sustainability, and driver/configuration/outcome keywords and uses multiple databases, supplemented by backward and forward citation searching, to improve coverage. Studies are included when they focus on SMEs and environmental sustainability, examine relevant drivers, configurations, mechanisms, or outcomes, are peer reviewed and published in English, while irrelevant, duplicate, non peer reviewed, or insufficiently documented studies are excluded.

Study quality is assessed using methodological criteria covering research objectives, theoretical grounding, transparency, sampling, data collection, analysis, and consistency of conclusions. A standardized extraction matrix records bibliographic

information, context, methodology, drivers, ESP dimensions, mechanisms, configurations, outcomes, findings, limitations, and future research.

The analysis applies qualitative thematic synthesis, progressing from coding to descriptive and analytical themes (Thomas & Harden, 2008). Configurational synthesis further identifies recurring combinations such as knowledge behavior, leadership GHRM employee, regulation knowledge compliance, technology innovation resource, and stakeholder investment technology pathways.

The review also distinguishes between evidence reported directly by primary studies and higher order interpretations developed by the review authors. This distinction is essential for maintaining analytical transparency and avoiding claims that exceed the evidence base. The combination of PRISMA 2020, systematic review principles, and qualitative thematic synthesis provides a transparent and rigorous methodological foundation for integrating heterogeneous evidence on SME environmental sustainability (Page et al., 2021; Snyder, 2019; Thomas & Harden, 2008; Tranfield et al., 2003).

Importantly, the methodology is designed to differentiate the present review from earlier reviews that primarily catalogued the drivers of environmental sustainability practices in SMEs. The review instead synthesizes what drives environmental sustainability, how drivers combine into alternative configurations, and what performance outcomes emerge from those configurations. This positioning provides the methodological basis for a more theoretically integrated understanding of environmental sustainability in SMEs and for identifying future research opportunities concerning causal complexity, contextual differences, and alternative sustainability pathways.

Finally, the findings are integrated into a Driver Configuration Outcome (DCO) framework, linking internal and external drivers to alternative sustainability configurations and multidimensional performance outcomes. Reliability is strengthened through predefined criteria, systematic coding, documentation, and comparison with original study findings, while distinguishing primary evidence from higher order interpretations.

RESULTS

The qualitative synthesis indicates that environmental sustainability practices (ESPs) in small and medium sized enterprises (SMEs) are not determined by a single

factor but emerge from the interaction of internal capabilities, managerial and behavioral conditions, technological resources, institutional pressures, and stakeholder relationships. This pattern is consistent with the systematic review of Hossain et al. (2022), which identified 87 drivers of environmental sustainability practices across 22 studies published between 2009 and 2020 and organized them into internal and external clusters comprising eight dimensions.

The reviewed evidence further indicates that the literature has evolved from identifying isolated drivers toward examining mediating mechanisms, interacting organizational capabilities, and alternative configurations of conditions associated with environmental sustainability outcomes. This development is particularly evident in recent studies that integrate environmental knowledge, employee behavior, resource commitment, regulatory compliance, green innovation, and green leadership into more complex explanatory frameworks (Hossain et al., 2025; Sendawula et al., 2024; Farrukh et al., 2022).

Across the synthesized evidence, three higher order themes consistently emerged: (1) drivers and enabling conditions, (2) configurations and mechanisms of environmental sustainability adoption, and (3) environmental, organizational, innovation, operational, and business performance outcomes. These themes provide the organizing structure for the results presented below.

Environmental knowledge emerged as one of the most recurrent internal drivers of environmental sustainability practices. The literature indicates that environmental knowledge provides managers and employees with the ability to recognize environmental problems, understand applicable solutions, and translate environmental awareness into organizational behavior (Frick et al., 2004; Liu et al., 2020). The evidence therefore suggests that knowledge is not merely an informational resource but an organizational capability that facilitates environmental decision-making and sustainability oriented action.

Empirical evidence from manufacturing SMEs in Uganda demonstrates this relationship directly. Sendawula et al. (2024) found that environmental knowledge significantly explained environmental sustainability practices and was also significantly associated with regulatory compliance mechanisms. Their analysis further demonstrated that regulatory compliance partially mediated the relationship between environmental

knowledge and environmental sustainability practices, indicating that knowledge can influence sustainability through both direct and institutional mechanisms.

More recent evidence provides a more differentiated interpretation of environmental knowledge. Hossain et al. (2025) distinguished environmental knowledge into systems knowledge, action knowledge, and effectiveness knowledge and found that all three dimensions contributed positively to environmental sustainability practices among manufacturing SMEs in Bangladesh through employee environmental behavior. The study also found that resource commitment moderated the relationship between action knowledge and environmental sustainability practices.

The qualitative synthesis consequently identifies environmental knowledge as a foundational driver, but the evidence suggests that its influence becomes stronger when knowledge is translated into action through employee behavior, compliance mechanisms, innovation, and managerial commitment.

Green leadership emerged as a second major driver because environmental sustainability requires managerial prioritization, communication, resource allocation, and organizational support. Riva et al. (2021) found that managers' green knowledge and leadership style were associated with environmental performance through green creativity, indicating that leadership can transform environmental knowledge into innovative environmental outcomes.

Farrukh et al. (2022) provide further empirical support by demonstrating that green transformational leadership positively influences employees' pro environmental behavior through green human resource management, while environmental knowledge strengthens this behavioral process. The finding suggests that leadership does not operate independently but interacts with human resource practices and employee capabilities to translate organizational intentions into environmental behavior.

Evidence shows that environmental sustainability is strongly influenced by leadership, employee behavior, green human resource management (GHRM), technology, regulation, and stakeholder relationships. Green human resource practices such as training, performance appraisal, and rewards contribute to organizational sustainability through environmental and employee performance (Amjad et al., 2021), while green transformational leadership promotes pro-environmental behavior through GHRM and environmental knowledge (Farrukh et al., 2022). Thus, leadership and

managerial commitment function as enabling conditions that activate organizational resources rather than as isolated drivers.

Green innovation and technology adoption are also important drivers. Yacob et al. (2019) found that green initiatives among Malaysian manufacturing SMEs were associated with environmental sustainability through managerial intentions and technology-related conditions. Green technologies support resource efficiency, cleaner production, and waste reduction, while knowledge management and organizational green culture strengthen green innovation and performance (Abbas & Khan, 2023).

Regulation represents a major external driver. Hossain et al. (2022) identified regulatory pressures as important in SME environmental sustainability, while Sendawula et al. (2024) found that regulatory compliance directly influenced ESPs and partially mediated the effect of environmental knowledge. This indicates that regulation can transform internal environmental capabilities into concrete sustainability practices. Stakeholder integration also matters, as customers, suppliers, governments, investors, and communities can encourage green investment, technology adoption, and environmental improvements (Hossain et al., 2022; Koronaki et al., 2024).

A major finding is that ESPs are better explained by configurations of interacting conditions than by isolated variables. Configurational theory emphasizes causal complexity and equifinality, meaning that different combinations of conditions can produce similar outcomes (Fiss, 2011). Recent studies, including Hossain et al. (2025) and Alam et al. (2023), support this perspective by combining direct and configurational approaches.

Five recurring configurations emerge from the synthesis. The knowledge behavior configuration links environmental knowledge with employee behavior and ESPs (Hossain et al., 2025). The leadership GHRM employee configuration connects green leadership, GHRM, and employee behavior (Farrukh et al., 2022; Amjad et al., 2021). The knowledge compliance configuration links environmental knowledge with regulatory compliance (Sendawula et al., 2024). The green initiative technology configuration combines green initiatives, managerial intention, and technology adoption (Yacob et al., 2019). Finally, the innovation orientation resource configuration shows that eco innovation produces stronger business benefits when supported by environmental orientation and resource commitment (Zhang & Walton, 2017). These configurations

should be understood as higherorder patterns synthesized from previous studies rather than as statistically estimated configurations produced by this review.

The performance outcomes of ESPs are multidimensional. Environmental practices can improve environmental performance through pollution reduction, resource efficiency, and waste management (Yacob et al., 2019; Sendawula et al., 2024), while operational performance may improve through reductions in energy use, material losses, and inefficiencies (Appannan et al., 2023; Woodard, 2021). Green innovation can also strengthen environmental and technological performance through knowledge management, organizational culture, and external collaboration (Abbas & Khan, 2023; Roh et al., 2023).

ESPs also contribute to organizational sustainability through the alignment of environmental and employee performance (Amjad et al., 2021). Business performance effects, however, are context dependent, with eco-innovation producing stronger benefits when firms possess sufficient environmental orientation and resource commitment (Zhang & Walton, 2017).

Overall, the synthesis supports a Drivers → Configurations → Performance Outcomes framework. Internal drivers include environmental knowledge, leadership, employee capabilities, GHRM, green culture, technology, innovation, and resources, while external drivers include regulation, stakeholder pressure, customer expectations, and supply chain requirements (Hossain et al., 2022; Koronaki et al., 2024). These factors combine into alternative pathways that produce environmental, operational, innovation, organizational, and business outcomes (Farrukh et al., 2022; Sendawula et al., 2024; Hossain et al., 2025; Zhang & Walton, 2017).

The synthesis yields five overarching conclusions: environmental knowledge is foundational but requires behavioral and organizational mechanisms; sustainability is strongly people-centered; technology and innovation are critical enablers; regulation and stakeholders provide important external incentives; and performance outcomes are multidimensional and context-dependent (Sendawula et al., 2024; Hossain et al., 2025; Farrukh et al., 2022; Amjad et al., 2021; Zhang & Walton, 2017).

Overall, the results indicate that SME environmental sustainability should be conceptualized as a configurational and capability driven phenomenon rather than as a simple response to individual environmental pressures. The evidence supports a model in

which internal capabilities and external pressures interact to create alternative sustainability pathways, and these pathways produce differentiated environmental and organizational performance outcomes.

DISCUSSION

The findings of this qualitative systematic literature review indicate that environmental sustainability practices (ESPs) in small and medium sized enterprises (SMEs) are best understood as a multidimensional and configurational phenomenon in which environmental knowledge, managerial commitment, employee behavior, technology, resources, regulation, and stakeholder pressures interact to shape sustainability practices and their performance consequences (Hossain et al., 2022; Hossain et al., 2025). This interpretation extends the earlier literature by moving beyond the identification of isolated antecedents toward an integrated understanding of drivers, configurations, and performance outcomes. Hossain et al. (2022), in their systematic review of 22 studies, identified 87 drivers of environmental sustainability practices and categorized them into internal and external clusters, confirming that SME sustainability is influenced by a broad range of organizational and contextual conditions.

The first finding concerns the central role of environmental knowledge as a foundational driver of ESPs, consistent with Sendawula et al. (2024), who found that environmental knowledge significantly explained ESPs among 254 manufacturing SMEs in Uganda. The present synthesis extends this finding by showing that environmental knowledge rarely operates independently; its effects are often translated through employee behavior, regulatory compliance, innovation, and managerial processes (Hossain et al., 2025; Sendawula et al., 2024). Hossain et al. (2025) further demonstrated that systems, action, and effectiveness knowledge contribute to ESPs through employee environmental behavior. Thus, the value of environmental knowledge depends on the mechanisms that convert knowledge into action.

The second finding concerns regulatory compliance as a mechanism linking knowledge and environmental practice. Sendawula et al. (2024) found that regulatory compliance partially mediates the relationship between environmental knowledge and ESPs. This supports a knowledge compliance configuration in which regulation

reinforces the implementation of environmental knowledge, while Hossain et al. (2022) identified regulatory and institutional pressures as important external drivers.

The third finding highlights green leadership, GHRM, and employee environmental behavior, consistent with Farrukh et al. (2022), who found that green transformational leadership promotes pro-environmental behavior through GHRM, with environmental knowledge strengthening the process. The present review extends this evidence by viewing leadership, human resource practices, knowledge, and employee behavior as an integrated pathway, suggesting that sustainability requires environmental policies to be translated into employee routines and competencies.

The fourth finding indicates that green technology and innovation are complementary rather than standalone drivers. Yacob et al. (2019), based on 260 Malaysian manufacturing SMEs, found that green initiatives were associated with environmental sustainability through managerial intentions and technology adoption. Sahoo et al. (2023), using evidence from 283 Indian manufacturers, further showed that green knowledge acquisition influenced green knowledge management and green technology innovation, which improved environmental performance. Together, these studies support a knowledge innovation technology configuration in which technology transforms environmental intentions and knowledge into concrete performance.

The fifth finding concerns the stakeholder investment pathway. Hossain et al. (2022), studying 140 textile SMEs in Bangladesh, found that buyer pressure, government regulation, and green investment significantly influenced ESPs, whereas supplier pressure was not significant. This indicates that stakeholder effects vary according to relationship type and strength, supporting a configuration involving stakeholder pressure, green investment, and technology rather than treating each stakeholder factor as equally influential.

The sixth finding concerns resource commitment and the contingent nature of performance outcomes. Zhang and Walton (2017), studying 83 green oriented SMEs in New Zealand, found that eco innovation improved business performance, with stronger effects under higher environmental orientation and resource commitment. The present review similarly indicates that sustainability practices do not automatically generate superior business performance; their economic value depends on complementary strategic and resource conditions.

The seventh finding concerns the knowledge employee behavior sustainability configuration, strongly supported by Hossain et al. (2025), whose PLS-SEM and fsQCA results showed that systems, action, and effectiveness knowledge improved ESPs through employee environmental behavior, while resource commitment moderated the effect of action knowledge. This evidence supports the configurational view that sustainability outcomes can result from combinations of complementary conditions rather than from one universally dominant driver.

The eighth finding concerns organizational ambidexterity and green entrepreneurial orientation. Shafique et al. (2021), using data from 307 Pakistani manufacturing SMEs, found that organizational ambidexterity and green entrepreneurial orientation were associated with environmental performance, with perceived CSR strengthening these relationships. This complements the present review by showing that sustainability configurations extend beyond technology and compliance to include entrepreneurial orientation, innovation capability, organizational context, and CSR.

When the eight prior studies are compared systematically, several areas of convergence become evident. Hossain et al. (2022) provide the broadest map of environmental sustainability drivers, while Yacob et al. (2019) emphasize green initiatives and technology, Sendawula et al. (2024) emphasize knowledge and regulatory compliance, Farrukh et al. (2022) emphasize leadership and employee behavior, Hossain et al. (2025) emphasize environmental knowledge and configurational mechanisms, Sahoo et al. (2023) emphasize knowledge management and green technology innovation, Hossain et al. (2022) emphasize stakeholder pressure and green investment, and Zhang and Walton (2017) emphasize resource commitment and environmental orientation as conditions for business-performance benefits.

Despite these differences, the studies collectively support the same broad proposition that environmental sustainability in SMEs is multicausal, context-dependent, and capability-driven rather than attributable to a single determinant (Hossain et al., 2022; Hossain et al., 2025). The most consistent drivers across the evidence are environmental knowledge, leadership and managerial orientation, employee behavior, green innovation and technology, regulation, stakeholder pressure, and resource commitment (Sendawula et al., 2024; Farrukh et al., 2022; Yacob et al., 2019; Sahoo et al., 2023).

The results also demonstrate an important distinction between drivers and configurations. A driver represents a condition that can support environmental sustainability, whereas a configuration represents a combination of conditions whose interaction produces a particular pathway toward sustainability (Fiss, 2011; Hossain et al., 2025). The literature reviewed here therefore suggests at least five recurring higher-order pathways: knowledge–behavior, leadership–GHRM–employee, knowledge–compliance, green initiative–technology, and innovation–environmental orientation–resources (Farrukh et al., 2022; Sendawula et al., 2024; Yacob et al., 2019; Zhang & Walton, 2017).

The performance findings likewise indicate that ESPs generate multidimensional outcomes, including environmental performance, operational/resource efficiency, green innovation, organizational sustainability, and business performance (Sahoo et al., 2023; Zhang & Walton, 2017; Shafique et al., 2021). However, the evidence also indicates that these outcomes are not equally strong across firms because resource commitment, environmental orientation, CSR context, technology capability, and regulatory conditions shape the value derived from environmental practices (Zhang & Walton, 2017; Shafique et al., 2021; Hossain et al., 2025).

Overall, the discussion suggests that the principal contribution of this qualitative systematic literature review lies in integrating fragmented evidence into a Drivers Configurations Performance Outcomes perspective. Previous studies have made substantial contributions by identifying specific antecedents or testing particular relationships, but the combined evidence suggests that SME environmental sustainability is more accurately understood as a system in which knowledge, people, leadership, technology, resources, institutions, and stakeholders interact to create alternative sustainability pathways (Hossain et al., 2022; Hossain et al., 2025). This integrated interpretation provides a stronger conceptual basis for understanding why some SMEs achieve environmental and business benefits from sustainability investments while others experience weaker or more limited outcomes (Zhang & Walton, 2017; Sahoo et al., 2023).

CONCLUSION

This qualitative systematic literature review examined environmental sustainability practices (ESPs) in SMEs through three interconnected dimensions: drivers,

configurations, and performance outcomes. The findings show that SME environmental sustainability is multidimensional and context dependent, shaped by environmental knowledge, green leadership, GHRM, employee behavior, green innovation, technology, resource commitment, regulation, stakeholder pressure, and supply-chain integration.

Environmental knowledge is a foundational capability, but its impact depends on its translation into employee behavior, compliance, innovation, managerial action, and organizational routines. Leadership, GHRM, training, and employee participation further support the implementation of sustainable practices, while green technology and eco innovation are most effective when combined with knowledge, managerial commitment, environmental orientation, and adequate resources.

The review identifies recurring configurations, including knowledge behavior, leadership GHRM employee, knowledge compliance, green initiative technology, and innovation resource pathways. These configurations can generate environmental, operational, innovation, organizational, competitiveness, and business-performance outcomes, although economic benefits depend on complementary resources and strategic integration.

Overall, the review contributes a Drivers Configurations Performance Outcomes perspective and conceptualizes SME environmental sustainability as a capability driven, relational, and configurational phenomenon. Managers and policymakers should therefore combine knowledge development, leadership, technology, green finance, stakeholder collaboration, and regulatory support, while future research should examine how these configurations vary across industries, countries, and resource contexts.

LIMITATION

Despite its contributions, this qualitative systematic literature review has several limitations. First, database, search term, publication, and language restrictions may have excluded relevant studies, particularly those using different terminology for SME environmental sustainability. Second, the focus on English language peer reviewed literature may introduce language and publication bias and underrepresent evidence from regional or non indexed sources.

Third, substantial methodological and contextual heterogeneity across studies limits direct comparability and the establishment of universal relationships. Fourth,

because this review uses qualitative synthesis rather than statistical aggregation, the identified configurations represent recurring patterns rather than universally validated causal relationships, and their relative effects cannot be statistically compared.

Fifth, thematic synthesis involves researcher interpretation despite systematic coding and predefined criteria. Sixth, the literature is geographically and sectorally uneven, with considerable evidence from manufacturing SMEs and emerging economies, limiting generalizability to service-sector SMEs, developed countries, and micro enterprises.

Finally, the predominantly cross sectional evidence provides limited insight into how sustainability practices evolve over time. Future research should broaden database and language coverage, include diverse sectors and countries, and employ longitudinal and comparative designs to validate the identified sustainability pathways.

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