

Corporate social responsibility and environmental performance: the mediating role of green capabilities and green innovation

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Abstract

Purpose – The purpose of this study was to examine the relationship between corporate social responsibility (CSR) and environmental performance (EP) among manufacturing small to medium enterprises (SMEs) in the United Arab Emirates (UAE). The potential mediating effects of green innovation (GI) and green capabilities (GCs) within this relationship were also investigated.

Design/methodology/approach – A survey of 428 SME managers was conducted in the UAE. Mediation analysis uncovered significant positive impacts of CSR, GCs and green innovation on environmental performance.

Findings – The findings support the positive impact of CSR on EP, indicating that SMEs engaged in CSR practices tend to exhibit higher EP. While this is in line with the findings of previous research, this study further reveals a significant positive correlation between CSR and GC, emphasizing CSR's role in fostering capabilities that integrate environmental concerns into core business operations. These results demonstrate that GC positively influences firm EP thus highlighting the importance of cultivating GC for organizations striving for a sustained competitive advantage and exceptional performance in dynamic business environments.

Research limitations/implications – The methodology limits the ability to observe outcome variations over time. Future studies could benefit from longitudinal approaches to gain deeper insights into the dynamics of these relationships. Further research could also explore data from larger firms to examine potential variations in outcomes across different organizational sizes. Conducting similar studies in other countries in the region that have comparable cultural and economic contexts could offer further valuable insights. Nevertheless, this study found that CSR practices can enhance GCs and that GCs play a pivotal role in the CSR-GI nexus.

Practical implications – The results also have significant implications for managers, policymakers and business professionals. For example, the study's findings emphasize the importance of CSR initiatives in enhancing environmental management and fostering GI, thereby providing confidence in CSR investment outcomes. CSR was also found to positively influence firms' GCs, thus increasing the capacity of SME firms to build capabilities while improving environmental performance. These capabilities positively influence firms' GI, providing the potential to develop innovative products, practices and services that distinguish them among their competitors.

Social implications – Addressing the challenges of climate change, pollution and resource depletion is a critical goal for society. This study shows that CSR and sustainable practices in business can positively impact environmental performance while also providing significant benefits to businesses.

Originality/value – The study found that CSR practices can enhance GCs and that GCs play a pivotal role in the CSR-GI nexus. These results show that for firms engaged in CSR to achieve outstanding EP, they must cultivate GC, using the resources and capabilities gained from CSR to develop and execute effective GC, which will subsequently lead to GI. The authors' model contributes to the current body of knowledge by presenting a mechanism whereby CSR influences EP, while incorporating the mediating and moderating roles of GI and GC.

Keywords Corporate social responsibility, Environmental performance, United Arab Emirates, Green innovation, Small to medium enterprises, Green dynamic capabilities

Paper type Research paper

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Introduction

Addressing the challenges of climate change, pollution and resource depletion is a critical goal for business and society (Sia and Jose, 2019; Yousaf, 2021). As a result, scholars and practitioners have sought to align economic goals with social and environmental imperatives (Bansal *et al.*, 2022; Islam *et al.*, 2023). Businesses worldwide have been encouraged to include environmental stewardship as a measure of corporate performance and to focus on initiatives that support corporate social responsibility (Peng *et al.*, 2021; Donaldson, 2023). While numerous studies affirm the role of businesses in mitigating environmental degradation, they often stop short of explaining the mechanisms through which CSR initiatives yield measurable environmental outcomes, especially in smaller firms and within non-Western economies (Rehman *et al.*, 2021; Nazir *et al.*, 2021). More specifically, there remains a lack of theoretical integration and empirical validation regarding how CSR practices translate into enhanced environmental performance (EP), particularly in the SME sector (Adomako *et al.*, 2023). Our critical review of the literature uncovered an overrepresentation of large firms in CSR–EP studies (Shahzad *et al.*, 2023), and an industry concentration skewed toward high-emission sectors such as manufacturing or construction (Luo and Qu, 2023). Consequently, there is a need to shift scholarly focus toward small to medium-sized enterprises (SMEs), which account for a substantial share of employment and economic output globally (Forcadell *et al.*, 2021) but are underrepresented in sustainability-related research.

This study builds on prior work by addressing three important gaps. First, it integrates the Natural Resource-Based View (NRBV) and Dynamic Capability View (DCV) to explain how CSR contributes to EP, going beyond linear models that overlook intermediate capabilities. Second, it introduces green capabilities (GCs) and green innovation (GI) as dual mediators, variables that have often been studied in isolation or overlooked altogether. These constructs were selected based on their conceptual relevance to both NRBV and DCV theories, and because they represent internal mechanisms through which CSR can be operationalized into measurable outcomes. GC reflects a firm's ability to absorb, integrate and apply environmental knowledge, while GI represents the tangible outcome of that capability, manifested in eco-friendly processes and products (Chen *et al.*, 2006; Rehman *et al.*, 2022; Úbeda-García *et al.*, 2021). Empirically, prior studies have called for the exploration of mediating mechanisms that explain how CSR initiatives yield environmental outcomes (Kraus *et al.*, 2020; Úbeda-García *et al.*, 2021). GC and GI were selected over other possible variables because they directly capture a firm's internal readiness and strategic response to CSR, which is particularly critical in SMEs that often lack formal environmental systems. Third, it contextualizes the model in the UAE SME manufacturing sector, where the intersection of rapid industrialization and environmental vulnerability offers a compelling and underexplored empirical setting.

In addition to the need for CSR involvement among SMEs, environmental performance (EP) warrants specific attention as an important outcome variable. EP captures measurable environmental outcomes such as emissions reduction, resource efficiency, waste minimization and compliance with environmental standards (Huang *et al.*, 2016; Shashi *et al.*, 2019). In the UAE's context, where environmental degradation and high ecological footprints remain critical concerns, it becomes essential to evaluate whether CSR-related investments are generating measurable improvements in EP (Rehman *et al.*, 2022). Furthermore, the UAE's Net Zero 2050 commitment and its alignment with the Paris Agreement make it imperative for firms, including SMEs, to enhance their environmental metrics (KPMG, 2025).

The government of the UAE has implemented policies such as the UAE Green Agenda 2030 and the UAE Environmental Policy Framework, which directly encourage private sector firms to adopt sustainable practices and report on ESG metrics. In addition, the country's push toward clean energy investments, circular economy initiatives and industry-focused decarbonization targets makes it an ideal setting for examining how CSR links to

environmental outcomes through internal capabilities. Furthermore, the UAE's unique socio-cultural context, which includes strong government–business relations and a growing sustainability discourse driven by national and Emirate level visions, adds another layer of relevance for CSR research (AlSuwaidi *et al.*, 2021; Achi *et al.*, 2022). Despite this urgency, very few empirical studies investigate the CSR–EP relationship in UAE SMEs, making this study timely and policy-relevant.

The significance of CSR has increased over the years due to its influence on firm performance and the broader shift toward ethical and sustainable business practices (Bhardwaj *et al.*, 2018). Consequently, CSR is now widely adopted by multinational corporations and is often reported in annual disclosures (Bhagawan and Mukhopadhyay, 2024). Scholars have explored the relationship between CSR and multiple aspects of performance, including financial, environmental and organizational dimensions (Kraus *et al.*, 2020; Sardana *et al.*, 2020). While many studies validate CSR's positive association with firm performance (Lu *et al.*, 2020; Shashi *et al.*, 2019), they often lack insight into how CSR translates into specific environmental metrics, particularly in SME contexts where resource constraints and innovation limitations present unique challenges.

Moreover, previous research lacks a deep understanding of the mediating mechanisms (such as green capabilities and green innovation) that may explain how CSR initiatives influence environmental outcomes (Carroll, 2021; Kraus *et al.*, 2020). Existing studies have been found to be either inconclusive or do not account for important contextual variables like firm size, sector and region (Hsu and Chen, 2023; Hernández *et al.*, 2020). This study addresses these gaps by incorporating GC and GI as dual mediators, drawing on NRBV and DCV theories to propose an empirically testable framework that focusses on these critical limitations.

From a contextual perspective, the CSR literature is dominated by studies from Western countries, raising concerns about their applicability to other regions and within emerging economies (Nazir and Islam, 2020; Padilla-Lozano and Collazzo, 2022). This contextual gap has prompted scholars to examine CSR's influence on environmental outcomes from non-western perspectives (Dartey-Baah and Amoako, 2021; Conway, 2023). The UAE, for example, faces challenges in achieving Sustainable Development Goal 12 (responsible production and consumption) due to substantial waste generation within the country (Alves, 2023; Sachs *et al.*, 2022). To date, however, there has been limited published literature on CSR's relationship with environmental performance among SMEs in the UAE (Alketbi and Ahmad, 2024; Balasubramanian *et al.*, 2020). Given its ambitious national sustainability goals, aggressive industrialization agenda and policy-led green transition, the UAE presents a strategically relevant and policy-rich context for investigating CSR's environmental implications. To address this deficit, this paper focuses on the following research questions (RQs):

- RQ1. What is the relationship between CSR and environmental performance in the context of manufacturing SMEs in the UAE?
- RQ2. How do green capabilities and green innovation influence the relationship between CSR and environmental performance?

The study is important given the critical role of UAE SMEs in supporting the country's economic and environmental strategies. This is because SMEs constitute 94% of the UAE's private sector, with 11% engaged in manufacturing. The UAE plans to expand its manufacturing sector by 2030 as part of its economic diversification strategy. However, this industrial development poses environmental challenges. Not least among these is that the UAE has revised its Nationally Determined Contributions under the Paris Agreement to reduce domestic pollution. These initiatives emphasize environmental responsibility and encourage innovation in resource management. Therefore, SMEs must enhance their environmental efforts to align with government strategies and contribute to sustainability

goals. The research uses the UAE classification of SMEs, where size is based on annual turnover, and number of employees as outlined in [Table 1](#) (Dubai SME classification, 2013, p. 12).

2. Literature review and hypotheses development

2.1 Natural Resource-Based view and dynamic capabilities view theories

The Natural Resource-Based View (NRBV) and Dynamic Capabilities View (DCV) have evolved from the Resource-Based View (RBV), which is a theory that seeks to understand how firms function ([Lockett et al., 2009](#)). RBV is designed to highlight a firm's competitive advantage based on unique resources and capabilities ([Kraus et al., 2020](#)). From a strategic perspective, using natural resources and distinct internal skills can boost profitability and foster enterprise sustainability by curbing environmental impact. NRBV theory emphasizes natural resources and unique capabilities, such as technological expertise, innovation capacity and strategic alliances, that underpin a firm's competitive advantages ([Hart and Dowell, 2011](#); [Blaique et al., 2022](#)). However, its application in assessing the influence of CSR on environmental performance (EP), particularly regarding GI and GC, remains underexplored ([Singh et al., 2022](#)).

In contrast, DCV theory underscores a firm's adaptability to internal and external changes, illustrating how firms adjust, evolve and integrate strategic capabilities such as organizational learning, agility and adaptability to exploit competitive advantages amid shifting conditions ([López-Gamero et al., 2022](#); [Teece et al., 1997](#)). Embracing responsible practices enables organizations to deploy capabilities for financial success as well as socially responsible outcomes ([Bahta et al., 2020](#); [Le, 2022](#)). Dynamic capabilities can also be used to adapt to changing environmental conditions to achieve financial success while minimizing ecological impact.

Exploiting GCs within a firm can include integrating technological advancements, streamlining supply chains and developing eco-friendly products. Focusing dynamic capabilities (DC) on sustainability, can also lead to GI ([Dangelico and Vocalelli, 2017](#)). In short, GC encapsulates the interplay between a firm's resource base, including natural resources and technological assets, and its strategic competencies, offering an additional approach for scholarly exploration ([Teece, 2018](#)). Combining NRBV and DCV can also provide a more robust theoretical expansion of RBV, offering insights into how firms can leverage natural resources and DC to tackle sustainability challenges and gain competitive advantages ([Khan et al., 2020](#)). This approach paves the way for new theoretical insights in CSR research related to firms' environmental performance. As a result, this study uses CSR, GI and GC within the NRBV and DCV theoretical frameworks to uncover the influence of firms' EP.

The NRBV theory identifies three interrelated strategic capabilities; pollution prevention, product stewardship and sustainable development; that form the basis for achieving competitive advantage through environmental strategies ([Lau and Wong, 2024](#)). Pollution prevention involves minimizing waste and emissions at the source, leading to cost efficiency

Table 1 The UAE classification of SMEs

	Trade		Manufacturing		Services	
	No. of employees	Annual turnover (AED)	No. of employees	Annual turnover (AED)	No. of employees	Annual turnover (AED)
Micro	<= 9	<= 9 m	<= 20	<= 10 m	<= 20	<= 10 m
Small	<= 35	<= 50 m	<= 100	<= 100 m	<= 100	<= 100 m
Medium	<= 75	<= 250 m	<= 250	<= 250 m	<= 250	<= 250 m

Source(s): Dubai SME (2013, p. 12)

and risk reduction. Product stewardship broadens the firm's environmental responsibility across the product life cycle, encouraging collaboration with suppliers and customers. Sustainable development reflects the long-term strategies that align economic goals with environmental and social responsibilities (Singh *et al.*, 2022). These components are not only interdependent but also collectively form a foundation for firms to embed environmental concerns within their strategic orientation.

Within the context of this study, these NRBV capabilities are operationalized through CSR practices, which act as a vehicle to build green capabilities and drive green innovation, ultimately enhancing environmental performance. This aligns with prior research that regards NRBV as a cornerstone theory for organizational environmental management (Asiaei *et al.*, 2022; Coppola *et al.*, 2022). NRBV and its integration with DCV theory provide a more comprehensive lens to explain how firms, especially SMEs, can strategically reconfigure and adapt their resources in response to ecological and regulatory demands (Yi and Demirel, 2023). As natural resources are often scarce, inimitable and irreplaceable, their effective management through CSR-led strategies allows firms to build rare and valuable capabilities that create sustainable competitive advantage (Hoai *et al.*, 2023).

Furthermore, the NRBV is especially pertinent to SMEs in resource-constrained environments such as the UAE, where ecological challenges and external pressures are intensifying (Achi *et al.*, 2022; Nazir *et al.*, 2021). By integrating CSR into their strategic fabric, SMEs can enhance their ability to prevent pollution, develop eco-innovative products and processes and embed sustainability principles in operations.

2.2 Corporate social responsibility, green capabilities and environmental performance

While the concept of CSR has been widely discussed within the literature, there is a lack of agreement on its definition, potentially because there is no common way of quantifying CSR at the individual firm level (Kitzmueller and Shimshack, 2012; Newman *et al.*, 2020). In practice, there is a pattern within firms to broadly conceptualize CSR as well as what constitutes CSR activities (Forcadell *et al.*, 2023; Oduro *et al.*, 2024). Some studies also suggest that not all CSR enhances firm performance, leading some firms to focus on a few select CSR activities targeted at certain stakeholders (Belay *et al.*, 2024; Lin *et al.*, 2020). Moreover, prior studies on CSR activities do not provide clear directions for practice, which can mean that competing definitions have led to diverging biases (Yoo and Lee, 2018). For example, firms may adopt CSR differently, which may negatively impact productive engagements (Kumar *et al.*, 2023; Sharma and Singh, 2022). Thus, there is a need to provide practical guidance to companies on effective CSR activities (Nishma *et al.*, 2023; Yoo and Lee, 2018).

Following the stakeholder approach, firms are encouraged to engage with society on more and more issues and address stakeholder concerns in a comprehensive and balanced way (Forcadell *et al.*, 2023; Yusif and Hafeez-Baig, 2024). As a result, this study adopts the holistic CSR definition presented by Carroll (1991) where he outlined that "the social responsibility of business entails the simultaneous fulfilment of the firm's economic, legal, ethical and philanthropic responsibilities" (p.43). The social dimension of CSR may include objectives such as employment or fair income for all (Lu *et al.*, 2020). The economic dimension involves the organization's revenue and profits (Sánchez-Infante Hernández *et al.*, 2020), and the environmental dimension addresses the firm's initiatives for a greener planet (Jayarathna *et al.*, 2023).

This study focusses on the relationship between a firm's CSR activities and their impact on EP. Despite earlier studies suggesting a connection between CSR and firms' environmental outcomes, the literature presents conflicting findings regarding this relationship (Orazalin and Baydauletov, 2020). Nevertheless, CSR practices have been commended for

developing organizational strategies that actively address environmental and social concerns (Xiong and Luo, 2021), as well as enhancing organizational performance, and improving firms' competitiveness (Hang *et al.*, 2022; Mukhtar *et al.*, 2024). Since multinational firms worldwide are now investing trillions of dollars in CSR initiatives it is important to understand the relationship between CSR and environmental performance (Bhagawan and Mukhopadhyay, 2024; Adomako *et al.*, 2023). This may assist in addressing inconsistencies in the CSR-EP nexus and provide valuable theoretical and practical insights (Bonsu *et al.*, 2023). Hence, the following hypothesis is proposed:

H1. CSR positively influences firms' environmental performance.

Compared to larger firms, SMEs typically have limited financial resources and less advanced manufacturing technologies (Mittal *et al.*, 2018). However, many can implement decisions swiftly and are attuned to the external environment (Mousiolis *et al.*, 2015). The increasing emphasis on environmental sustainability has also introduced new imperatives for organizational innovation (Sia, 2020), particularly in the UAE, which is one of the few countries in the Middle East to commit to net zero emissions by 2050. The NRBV and DCV theories suggest that firms can simultaneously pursue environmentally friendly practices while achieving a competitive edge (Hart, 1995). Firm capabilities play a pivotal role in enabling product stewardship, pollution prevention and sustainable development, which are integral to GC (Rehman *et al.*, 2022). However, many organizations struggle to execute CSR initiatives due to a lack of these capabilities (Shen and Zhang, 2019).

GC include the ability to integrate, construct and reconfigure internal and external environmental protection resources (Rehman *et al.*, 2022). These capabilities enable organizations to adapt to the demands of a dynamic business environment (Ghasemzadeh *et al.*, 2022; Hermawati and Gunawan, 2021), foster continuous learning mechanisms to acquire and apply knowledge through the implementation of green CSR initiatives (Shehzad *et al.*, 2023). In the current business environment, businesses must identify opportunities and develop capabilities to adapt to environmental changes (Oliveira and Jabbour, 2017). Recent studies suggest that CSR positively influences the development and performance of GC, allowing manufacturing firms to assemble the necessary resources to develop and enhance GC (Halbusi *et al.*, 2023; Suki *et al.*, 2023). He *et al.* (2023) advise, however, that the impact of CSR activities on GC is evident through resource integration, recreation, knowledge and insight which leads to the following hypothesis:

H2. CSR positively influences firms' Green Capabilities.

In the contemporary business environment, which is characterized by rapid changes and intense competition, cultivating GC has become imperative for organizations aiming to achieve sustained competitive advantage and superior performance (Rehman *et al.*, 2022). GC enables firms to navigate swiftly through evolving business conditions by integrating, constructing and reconfiguring both internal and external resources related to environmental protection (Sahoo *et al.*, 2023). However, many enterprises overlook the importance of developing GC, leading to challenges in executing CSR initiatives (Shen and Zhang, 2019). GC streamlines environmental management practices across large organizations and SMEs (Sardana *et al.*, 2020), empowering firms to develop innovative green practices and enhance EP (Singh *et al.*, 2022). As such, GC represents a vital capability to support sustainability initiatives and address environmental concerns (Yang and Jiang, 2023).

Despite the importance of GC in enhancing EP, empirical evidence on this relationship remains inconclusive (Kiranantawat and Ahmad, 2023; Kraus *et al.*, 2020; Makhoulfi *et al.*, 2024). Moreover, existing studies focusing on GC are limited, in that they primarily concentrate on operational elements such as technological and marketing capabilities (Demirel and Kesidou, 2019; Cai and Li, 2018). The next hypothesis aims to investigate the relationship between a firm's GC and EP, highlighting the pivotal role of GC as a higher-order

capability essential for building and reconfiguring operational capabilities, thus influencing firm EP:

H3. GC positively influences firm environmental performance.

2.3 Corporate social responsibility, green innovation and environmental performance

High performing firms in CSR demonstrate an awareness of environmental risks to their markets and operations (Ramzan *et al.*, 2023). Research highlights CSR's crucial role in driving an organization's environmental innovation agenda, prompting firms to acquire information, knowledge and financial resources for internal investment in innovation (Joshi and Dhar, 2020). CSR practices stimulate investment in green, innovative manufacturing technologies and processes, fostering a corporate culture that prioritizes environmental sustainability (Shahzad *et al.*, 2020; Sarfraz *et al.*, 2023). This active pursuit of GI not only supports CSR but also responds strategically to environmental regulations, consumer preferences and community expectations (Yuan and Cao, 2022).

Consequently, CSR serves as a primary driver for organizations to cultivate GI, facilitating their transition toward environmentally sustainable business practices (Kraus *et al.*, 2020). Moreover, it acts as a facilitator of GI implementation as well as related changes that enhance environmental sustainability (Wen *et al.*, 2023). This dynamic interplay between CSR and GI underscores their transformative potential in fostering innovation and sustainability (Handayani *et al.*, 2017; Shahzad *et al.*, 2020). Moreover, firms with GI outperform competitors by enhancing EP, as GI aids in regulatory compliance, secures subsidies and improves environmental management practices (Meng *et al.*, 2023; Castellano *et al.*, 2022). The increased emphasis on GI initiatives within organizations leads to observable improvements in environmental metrics, further highlighting the positive impact of GI on EP (Araújo and Franco, 2021; Awan *et al.*, 2019). Despite existing studies, there is a need to delve deeper into the impact of GI on overall EP, particularly in the context of the UAE (Shashi *et al.*, 2019; Tang *et al.*, 2018). This study addresses this need by examining the influence of CSR on firms' GI and the subsequent impact of GI on EP (Castellano *et al.*, 2022; Wen *et al.*, 2023). This examination is supported by the following hypotheses:

H4. CSR positively influence firms' GI.

H5. GI positively influences firms' environmental performance.

2.4 Green capabilities and green innovation

The scholarly discussion highlights the role of GC in fostering creativity and the development of new products and processes (Chaudhuri *et al.*, 2022; Vázquez-Brust *et al.*, 2023). Companies equipped with GC can swiftly reconfigure resources to respond to opportunities and threats in their operating environment (Teece, 2018; Bhandari *et al.*, 2022; Wong and Ngai, 2021). Research by Singh *et al.* (2022) and Yousaf (2021) emphasizes GC's critical role in enabling firms to adapt to dynamic market landscapes and innovate around green products and services. This highlights how GC assists firms in shaping their environmental strategies (Singh *et al.*, 2022; Yousaf, 2021), emphasizing the link between GC and GI, enabling firms to strategically adjust their resource base to meet market demands (Helfat and Winter, 2011; Singh *et al.*, 2021). Teece (2017) argues that firms rely on robust GC to effectively orchestrate resources and deliver innovative solutions, creating value for customers.

Furthermore, Chen and Chang (2013) stress that GC empower companies to integrate resources efficiently, facilitating the development of environmentally friendly products and processes. Sun *et al.* (2022) assert that a company's ability to implement CSR practices,

critical for successful GI, depends on its GC. Enhancing GC is also imperative to foster sustained innovation (Joshi and Dhar, 2020). Thus, GC serves as a cornerstone for firms to undertake GI, influencing the success of green initiatives and encouraging investment in environmentally sustainable practices (Singh *et al.*, 2021). This study aims to illuminate the dynamic relationship between GC and GI, providing insights into how firms can strategically leverage their capabilities for environmentally conscious innovation and improved performance. These insights contribute to the formulation of the following hypothesis:

H6. GC positively influence firm's GI.

2.5 The mediating role of green capabilities and green innovation

Previous research has extensively examined the complex interconnections among CSR, GC, GI and EP, shedding light on how CSR impacts GC, GI and ultimately, EP. While existing literature emphasizes the positive influence of CSR on organizational performance, Hernández *et al.* (2020) outline a nuanced relationship between CSR and economic performance. Despite significant progress in research, a notable gap exists in understanding the direct relationship between CSR and EP compared to other performance dimensions. The inconclusive findings regarding this relationship suggest the presence of potential mediating or moderating factors, highlighting the need for a more comprehensive exploration that considers the mediating roles of GC and GI.

The integration of GC and the pursuit of GI offer firms' opportunities to enhance their ability to address sustainability challenges effectively. By leveraging GC, organizations can align their practices with environmental objectives, fostering innovation and ensuring competitiveness in environmentally conscious markets. Similarly, DC enable firms to maintain competitive advantages by facilitating swift adaptations to market changes. Theoretical frameworks like DCV and the RBV provide justification for firms to transform environmental pressures into drivers of green development to meet CSR obligations.

Firms are increasingly focusing on identifying opportunities for GI and enhancing their capacity for resource integration and mobilization to translate opportunities into GI practices. In this context, GC emerges as a vital element in addressing environmental concerns and establishing a foundation for EP. The intersection of GC and GI allows firms to strategically exploit opportunities in alignment with stakeholder expectations, optimizing performance and competitiveness. Building on insights from previous research, this study aims to explore the interplay between environmental resources and competitive advantage by drawing on theoretical frameworks like the NRBV and DC. With GC and GI emerging as pivotal mediating variables, the study proposes the following hypotheses to uncover and explain this association:

H7. GC mediates the relationship between CSR dimensions and environmental performance.

H8. GI mediates the relationship between CSR dimensions and environmental performance.

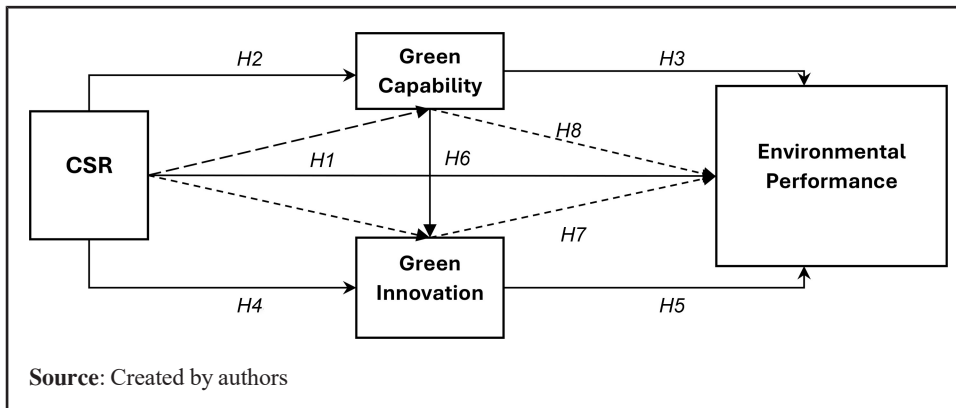
Figure 1 was developed based on the NRBV and DCV theories and informed by the previously cited literature that guided the development of the eight hypotheses.

3. Methodology

3.1 Sampling, data collection and questionnaire development

The manufacturing industry is a primary driver of economic growth but contributes significantly to environmental degradation. Consequently, there is a critical need to enhance GI performance in manufacturing firms to mitigate the industry's environmental impact. Focusing on manufacturing firms in the UAE, this study examines how CSR influences environmental performance. Cross-sectional data were collected using an online survey targeted at senior managers of UAE manufacturing companies. A questionnaire was developed by adopting

Figure 1 Conceptual framework for this study



existing scales extracted from the literature. All scales were authenticated in previous studies. Respondents were required to rank each item on a five-point Likert scale, with scores anchored as 1 ("strongly disagree") and 5 ("strongly agree"). To ensure content validity and readability, the questionnaire was pilot tested with 14 professionals from industry and academia. The CSR scales comprised of five factors; the economic, social, legal and ethical factors were adopted from [Salmones et al. \(2005\)](#) while the environmental factor was from [Ağan et al. \(2016\)](#). The sample item for CSR reads as "Our SME is concerned to improve the general well-being of society." GI scales were obtained from [Chen et al. \(2006\)](#) with a sample item reading as "Our SME chooses the materials of the product that produce the least amount of pollution for conducting the product development or design" while GC was taken from [Rehman et al. \(2022\)](#) and [Chen \(2008\)](#). A sample items reads as "Our SME has the ability that can quickly monitor the environment to identify new green opportunities." Finally, EP was measured using a scale adapted from [Singh et al. \(2019\)](#) and [Huang et al. \(2016\)](#), with a sample item as "Implementing environmental activities significantly reduces waste within the entire value chain process."

Following the pilot test, to reach the study participants, a cluster random sampling approach was used across all seven emirates of the UAE (Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al-Quwain, Fujairah and Ras Al Khaimah). These clusters were selected to ensure geographic representativeness across the country. The study targeted senior managers of manufacturing SMEs, as defined by the UAE's official SME classification (see [Table 1](#)), since they are key decision-makers in organizational sustainability practices. A total of 1,000 email invitations were distributed over a five-week period using a curated contact list of manufacturing firms sourced from publicly available business directories and professional databases. Each email included a link to the online survey and a cover letter explaining the study's purpose, ensuring confidentiality and emphasizing the voluntary nature of participation. Follow-up reminders were sent to non-respondents two weeks after the initial invitation to increase the response rate. After a careful data quality screening process, 428 valid responses were retained for analysis. The final sample size meets the minimum criteria suggested by the "10-times rule" for SEM, and checks for non-response bias confirmed that it was not significant. According to [Hair et al. \(2014\)](#), the "10-times rule" recommends a minimum item-to-response ratio of 1:10. This means that for each observed item in the most complex construct, at least ten responses are required to ensure adequate statistical power and stability in SEM analysis.

3.2 Data analytical approach

The study used partial least squares structural equation modeling (PLS-SEM) using SmartPLS4 to evaluate the research model. PLS-SEM analysis involves two steps: first,

assessing the measurement model to examine factor loadings, construct reliability, validity (both convergent and discriminant) and variance inflation factor (VIF) for reflective constructs, and outer weights and loadings for formative constructs at lower and higher order. The second step involves evaluating the structural model to test proposed hypotheses by assessing path coefficients and their significance.

Before conducting SEM, the data underwent thorough examination for outliers, data distribution, multicollinearity and common method bias. Outliers were detected using Boxplot analysis, revealing no significant outliers. Skewness and kurtosis statistics were within acceptable ranges, indicating no substantial violations of normality assumptions (see [Table 2](#) below).

Since the above [Table 2](#) is based on standardized scores, the mean and standard deviation for all constructs are 0 and 1, respectively. The skewness values range from -0.122 to -0.167 , suggesting a slight negative skew, with minor tails toward the left. Additionally, the distributions exhibit platykurtic characteristics, indicating a relatively flat shape compared to a normal distribution. The Cramér–von Mises test results further support this observation, as the p-values indicate that the assumption of normality is rejected at the 5% significance level for all constructs. Despite these minor deviations from normality, the data are deemed suitable for SEM, which is robust to moderate non-normality.

Multicollinearity was evaluated, and none of the correlation values exceeded the threshold of 0.85, as suggested by [Tabachnick and Fidell \(2007\)](#). Additionally, common method bias was assessed through VIF values in the inner model, all of which were below 3.33, indicating no significant threat from common method bias, as per [Kock \(2015\)](#).

4. Empirical results

4.1 Respondents' characteristics and organizational profiles

All participants were in management positions and had extensive knowledge of their respective firms, industries and the phenomenon being investigated. The majority were male (84.4%), which reflects the typical business landscape in the Middle East. The sample consisted of well-educated respondents who stay updated with the latest industry developments. Geographically, the sample companies were spread across all seven emirates, with a notable concentration in the larger emirates (Dubai 28.3% and Abu Dhabi 23.8%) due to their geographical size, population and economic wealth ([Central Intelligence Agency, 2022](#)). This distribution aligns with the broader population of companies in these districts, as reported by the [Khalifa Fund for Enterprise Development \(2013\)](#). Detailed information on respondent characteristics and organizational profiles are presented in [Table 3](#).

Table 2 Descriptive statistics for constructs (standardized)

Descriptives	CSR	Environmental performance	Green capability	Green innovation	Organizational agility
Mean	0.000	0.000	0.000	0.000	0.000
Median	0.079	0.077	0.038	0.059	0.048
Observed min	-2.264	-2.139	-2.197	-2.153	-1.991
Observed max	1.968	1.832	1.906	1.854	1.725
Standard deviation	1.000	1.000	1.000	1.000	1.000
Excess kurtosis	-0.858	-0.896	-0.843	-0.825	-1.028
Skewness	-0.124	-0.167	-0.122	-0.143	-0.143
Number of observations	428	428	428	428	428
Cramér-von Mises test statistic	0.315	0.325	0.213	0.185	0.419
Cramér-von Mises p value	0.000	0.000	0.004	0.008	0.000

Source(s): Created by authors based on values from SmartPLS output file

Table 3 Descriptive profiles of the sample respondents

<i>Demographic profiles</i>	<i>Frequency</i>	<i>%</i>
<i>Gender</i>		
Male	357	83.4
Female	71	16.6
<i>Age</i>		
21–30	86	20.1
31–40	149	34.8
41–51	129	30.1
51+	64	15.0
<i>Job</i>		
Executive	86	20.1
Manager	149	34.8
Senior manager	128	29.9
Top management	65	15.2
<i>Activity</i>		
Apparel and clothing	43	10.0
Metal and building	55	12.9
Food	86	20.1
Electrical	60	14.0
Pharmaceuticals	38	8.9
Petrochemical	10	2.3
Machinery	127	29.7
Others	9	2.1
<i>Employees</i>		
21–100	257	60.1
101–250	171	39.9
<i>Annual sales</i>		
AED 100 mil	26	6.1
AED 101–150 mil	235	54.9
AED151–250 mil	167	39
<i>Years in operation</i>		
Below 5	17	4.0
5–10	35	8.2
11–15	213	49.8
16–20	129	30.1
21–25	4	0.9
Above 25	30	7.0
<i>Ownership</i>		
Sole proprietorship	42	9.8
Partnership	108	25.2
Corporation	145	33.9
Limited liability	129	30.1
Other	4	0.9
<i>Location</i>		
Abu Dhabi	102	23.8
Dubai	121	28.3
Ajman	34	7.9
Sharjah	39	9.1
Fujairah	42	9.8
Ras Ai-Khaimah	56	13.1
Um Al Quwain	34	7.9

Source(s): Created by authors

4.2 Reliability and validity

A total number of 48 indicators were used to create 11 constructs as shown in [Table 3](#). These constructs were used to analyze the conceptual design in [Figure 1](#). SmartPLS ([Ringle et al., 2022](#)) was used to analyze the structural equation model presented in [Figure 1](#), using the partial least square approach, and data were bootstrapped to carry out all the necessary statistical tests. Out of the 48 indicators used, there are only 6 indicators that have loadings of less than 0.70, the cut off value suggested by [Hair et al. \(2014\)](#). However, these items were retained as they did not significantly impair the construct reliability and were theoretically important for content validity.

Construct reliability and convergence validity tests for the 11 first stage constructs are reported in [Table 4](#). Cronbach's alpha and the composite reliability values for these constructs are all more than the suggested cut off value of 0.70 ([Hair et al., 2022](#)), except for construct TCR (0.643), which, while marginally below the cutoff, still demonstrated acceptable reliability due to supporting composite reliability and factor loadings.

The results of the measurement model confirm that all constructs demonstrate strong internal consistency reliability, with Cronbach's alpha and composite reliability values exceeding the recommended threshold of 0.70 ([Hair et al., 2014](#)). Convergent validity is established as all AVE values are above 0.50, indicating that the latent constructs adequately explain the variance of their respective indicators. Discriminant validity is supported through the Fornell-Larcker criterion and HTMT ratio, which confirms that each construct is empirically distinct. These results validate the suitability of the measurement model and provide a strong foundation for proceeding with the structural model assessment.

4.3 Measurement model assessment

The structural model results are illustrated in [Figure 2](#) and summarized in [Table 5](#). All hypothesized path relationships were found to be significant at the 5% level, with standardized path coefficients ranging from 0.190 (Green Capability → Environmental Performance) to 0.680 (Green Capability → Green Innovation). These results demonstrate strong support for the hypothesized relationships in the conceptual framework.

The strongest relationship was observed between Green Capability and Green Innovation ($\beta = 0.680$, $t = 20.574$, $p < 0.001$), highlighting the critical role of capability development in driving environmentally oriented innovation. CSR was also found to have significant direct effects on Green Capability ($\beta = 0.615$), Green Innovation ($\beta = 0.227$) and Environmental Performance ($\beta = 0.648$), affirming its multi-dimensional influence across key sustainability domains. The positive effect of Green Innovation on Environmental Performance ($\beta = 0.251$) further reinforces the innovation-performance linkage. Additionally, the path from Green Capability to Environmental Performance, though weaker ($\beta = 0.190$), was still statistically significant, suggesting that capabilities contribute both directly and indirectly via innovation.

To further validate the measurement model, [Table 6](#) reports the outer loadings and reliability indices for each second-order construct (CSR, GC, GI and EP). All outer loadings exceeded the recommended cutoff of 0.70, with very high values observed for EP and GI indicators (e.g., EMP = 0.929, GPI = 0.913), suggesting strong indicator reliability. Each construct also demonstrated high composite reliability (ρ ranging from 0.893–0.931) and AVE values above 0.73, confirming robust convergent validity. The results substantiate the psychometric quality of the reflective measurement model.

4.4 Mediation and total effect analysis

This section discusses the results of the indirect, specific indirect and total effects in the structural equation model (SEM), with a focus on the target construct (EP). The mediation

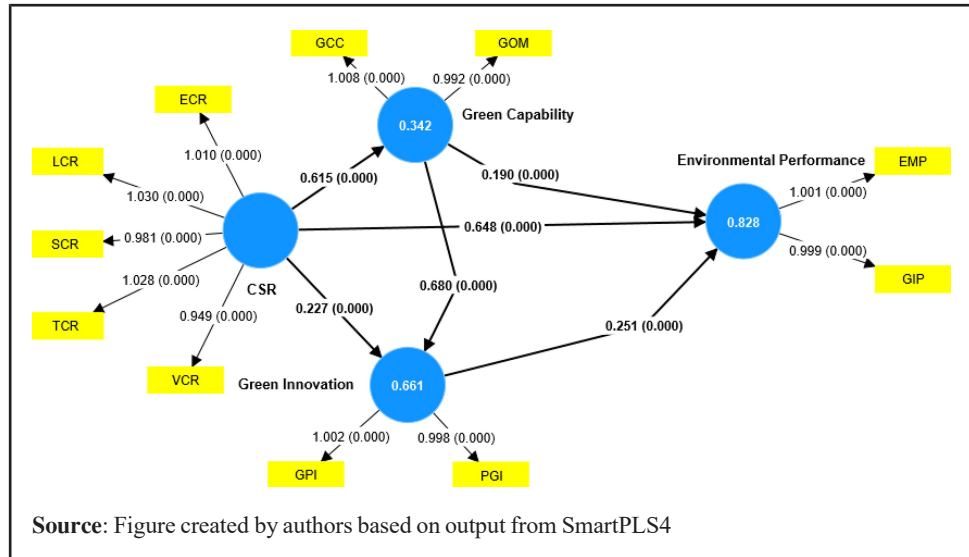
Table 4 Principal component analysis, reliability and convergence validity

Latent variable	Indicator	Standardized factor loadings	Construct reliability			Convergent validity Average variance extracted (AVE)
			Dijkstra-Henseler's rho (ρ_A)	Jöreskog's rho (ρ_C)	Cronbach's alpha (α)	
ECR	ECR1	0.693	0.760	0.759	0.759	0.513
	ECR2	0.724				
	ECR3	0.731				
SCR	SCR1	0.764	0.850	0.850	0.849	0.586
	SCR2	0.77				
	SCR3	0.737				
	SCR4	0.789				
LCR	LCR1	0.75	0.720	0.720	0.720	0.563
	LCR2	0.75				
TCR	TCR1	0.688	0.643	0.643	0.698	0.473
	TCR2	0.688				
VCR	VCR1	0.743	0.789	0.777	0.764	0.469
	VCR2	0.784				
	VCR3	0.572				
	VCR4	0.619				
GOM	GOM1	0.716	0.895	0.894	0.894	0.547
	GOM2	0.737				
	GOM3	0.743				
	GOM4	0.74				
	GOM5	0.734				
	GOM6	0.741				
	GOM7	0.769				
GCC	GCC1	0.751	0.838	0.833	0.828	0.501
	GCC2	0.763				
	GCC3	0.756				
	GCC4	0.6				
	GCC5	0.654				
GPI	GPI1	0.722	0.819	0.819	0.818	0.530
	GPI2	0.74				
	GPI3	0.745				
	GPI4	0.706				
PGI	PGI1	0.739	0.802	0.800	0.799	0.501
	PGI2	0.66				
	PGI3	0.713				
	PGI4	0.718				
EMP	EMP1	0.692	0.854	0.854	0.854	0.494
	EMP2	0.712				
	EMP3	0.71				
	EMP4	0.716				
	EMP5	0.695				
	EMP6	0.692				
GIP	GIP1	0.708	0.878	0.878	0.878	0.506
	GIP2	0.727				
	GIP3	0.701				
	GIP4	0.711				
	GIP5	0.719				
	GIP6	0.702				
	GIP7	0.711				

Source(s): Created by authors

analysis results, as summarized in [Table 7](#), provide further insights into the pathways through which CSR and GC exert their influence on GI and ultimately on EP.

The total indirect effect of CSR on Environmental Performance was found to be statistically significant at 0.448 (0.392 via GI and 0.056 via EP-related paths), indicating that CSR affects EP not only through direct influence but also through multiple intermediary routes.

Figure 2 Structural model results**Table 5** Conceptual framework coefficients

Path	Std. Coeff*	Unstd. Coeff**	Unstd. STDEV	Unstd. T-stat	Unstd. p-values	Decision
Green capability → green innovation	0.680	0.670	0.033	20.574	0.000	Accepted
CSR → environmental performance	0.648	0.597	0.027	23.762	0.000	Accepted
CSR → green capability	0.615	0.585	0.039	15.698	0.000	Accepted
Green innovation → environmental performance	0.251	0.246	0.034	7.485	0.000	Accepted
CSR → green innovation	0.227	0.213	0.038	5.908	0.000	Accepted
Green capability → environmental performance	0.190	0.183	0.034	5.571	0.000	Accepted

Note(s): *Unstandardized coefficient. **Standardized coefficient
Source(s): Created by authors

Among the specific indirect effects, the strongest pathway is CSR → GC → GI, with a coefficient of 0.392 ($p < 0.001$), suggesting that green capabilities are a critical conduit through which CSR initiatives drive innovation outcomes. This result aligns with the DCV (Teece, 2018), which posits that firms must develop internal capabilities to transform resources into innovation-led performance.

Another important mediating pathway is GC → GI → EP, which shows an indirect effect of 0.165 ($p < 0.001$). This finding underscores the sequential mediation role of green innovation in converting capability investments into improved environmental outcomes, reflecting a cascading effect of internal capability development (Rehman *et al.*, 2022; Aftab *et al.*, 2023). Additional specific indirect paths, such as CSR → GC → EP (0.107) and CSR → GC → GI → EP (0.096), further highlight the multi-step nature of CSR's impact on environmental outcomes. Notably, the path CSR → GI → EP (0.052) also emerged as statistically significant, though weaker, suggesting that CSR can directly influence innovation outcomes which subsequently enhance EP.

Turning to total effects, CSR exhibits a very strong overall impact on Environmental Performance ($\beta = 0.853$, $p < 0.001$), combining both direct and indirect effects. This result reinforces CSR's role as a strategic driver of sustainability outcomes in SMEs. Similarly, GC significantly influences GI ($\beta = 0.670$), EP ($\beta = 0.348$), and serves as a mediator in the CSR–EP relationship, further validating its central role in the proposed model.

Table 6 Outer loadings for the conceptual SEM model

Latent variable	Indicator	Loading	t-stats	p-values	Decision	Construct reliability			Convergent validity Average variance extracted (AVE)
						Cronbach's alpha(α)	Dijkstra-Henseler's rho (ρ_A)	Jöreskog's rho (ρ_C)	
Environmental performance	EMP	0.929	147.607	0.000	Accepted	0.84	0.84	0.926	0.862
	GIP	0.928	140.976	0.000	Accepted				
Green innovation	GPI	0.913	110.604	0.000	Accepted	0.795	0.795	0.907	0.83
	PGI	0.909	110.282	0.000	Accepted				
Green capability	GCC	0.905	112.915	0.000	Accepted	0.76	0.763	0.893	0.806
	GOM	0.891	81.460	0.000	Accepted				
CSR	LCR	0.880	78.561	0.000	Accepted	0.907	0.908	0.931	0.73
	TCR	0.878	74.468	0.000	Accepted				
	ECR	0.863	69.625	0.000	Accepted				
	SCR	0.838	55.994	0.000	Accepted				
	VCR	0.811	43.392	0.000	Accepted				

Source(s): Created by authors

Table 7 Summary of related path coefficients

Path	Coeff.	Std. dev.	T-statistics	p values	Decision
<i>Total indirect effects</i>					
CSR → green innovation	0.392	0.029	13.377	0.000	Accepted
CSR → environmental performance	0.256	0.020	12.655	0.000	Accepted
Green capability → environmental performance	0.165	0.025	6.704	0.000	Accepted
<i>Specific indirect effects</i>					
CSR → green capability → green innovation	0.392	0.029	13.377	0.000	Accepted
Green capability → green innovation → environmental performance	0.165	0.025	6.704	0.000	Accepted
CSR → green capability → environmental performance	0.107	0.020	5.362	0.000	Accepted
CSR → green capability → green innovation → environmental performance	0.096	0.015	6.366	0.000	Accepted
CSR → green innovation → environmental performance	0.052	0.011	4.849	0.000	Accepted
<i>Total effects</i>					
CSR → environmental performance	0.853	0.012	68.401	0.000	Accepted
Green capability → green innovation	0.670	0.031	21.570	0.000	Accepted
CSR → green innovation	0.605	0.029	20.939	0.000	Accepted
CSR → green capability	0.585	0.032	18.400	0.000	Accepted
Green capability → environmental performance	0.348	0.027	13.053	0.000	Accepted
Green innovation → environmental performance	0.246	0.034	7.279	0.000	Accepted

Source(s): Created by authors

5. Discussion, conclusion and implications

The aim of this study was to examine the relationship between CSR and EP among manufacturing SMEs in the UAE. The potential mediating effects of GI and GC within this relationship were also investigated. The findings of this study empirically support the proposed conceptual model that links CSR to EP, mediated by GC and GI. These results are consistent with and extend prior literature while also reinforcing the utility of the NRBV and DCV theoretical perspectives in explaining sustainability outcomes in SMEs.

First, the direct positive relationship between CSR and EP is consistent with earlier research (Singh *et al.*, 2019; Abbas *et al.*, 2023), confirming that socially responsible firms are more likely to integrate ecological considerations into their strategic agenda. From the lens of NRBV (Hart, 1995), CSR functions as a resource that promotes pollution prevention, product stewardship and long-term sustainable development; three pillars that are critical for achieving superior environmental outcomes (Hart and Dowell, 2011; Mishra and Yadav, 2021).

The significant mediating effect of green capabilities supports the assumptions of the DCV theory, which argues that firms must dynamically integrate and reconfigure their internal competencies to respond to environmental and market changes (Teece *et al.*, 1997; Ghasemzadeh *et al.*, 2022). In line with previous studies (Hermawati and Gunawan, 2021; Suki *et al.*, 2023), our results show that CSR drives the development of green organizational competencies, such as green resource management and eco-oriented knowledge sharing, which enable SMEs to translate sustainability values into operational effectiveness.

Likewise, CSR positively influences green innovation, reinforcing earlier findings that CSR can trigger innovation processes aimed at sustainability (Kraus *et al.*, 2020; Chen *et al.*, 2006). Green innovation (encompassing both product and process innovation) emerged as a strong predictor of EP, suggesting that CSR-driven firms are better positioned to develop environmentally responsible technologies and practices (Joshi and Dhar, 2020; Zheng and Zhang, 2023). This supports the DCV perspective, as CSR encourages firms to explore novel environmental solutions, overcome resource constraints and adapt to regulatory and stakeholder pressures (Tariq *et al.*, 2017; Cui *et al.*, 2023).

Furthermore, the mediation effects of GI and GC between CSR and EP emphasize the value of internal capability development as a mechanism through which social responsibility can lead to meaningful environmental outcomes. This supports the theoretical argument that CSR is not merely an external-facing strategy but also a dynamic internal resource that drives environmental competencies (Bocquet *et al.*, 2019; Islam *et al.*, 2023). The combined use of NRBV and DCV provides a robust explanation for how CSR helps SMEs build the rare, valuable and inimitable capabilities required for sustained green performance (Loureiro *et al.*, 2023).

Finally, the study offers theoretical insight into the pathways through which SMEs in emerging economies can achieve competitive advantage via sustainability. Given the UAE's strong policy focus on green economy transition, our results provide timely and contextually relevant guidance for SME managers and policymakers (AlSuwaidi *et al.*, 2021; Achi *et al.*, 2022). These findings also respond to recent calls for more integrative research that examines environmental CSR using both resource-based and capability-building perspectives (Yuan and Cao, 2022).

5.1 Theoretical implications

The discourse within the literature on the relationship between CSR, GC, GI and EP presents divergent scholarly views (Achi *et al.*, 2022; Bonsu *et al.*, 2023). Our study sought to improve our understanding of CSR and EP and specifically how green capabilities and green innovation influence the relationship between CSR and EP. The results not only shed light on the mechanisms underlying the impact of CSR on EP outcomes but also contribute to our understanding of GC and GI. Specifically, the study extends the NRBV by demonstrating that CSR serves as a strategic intangible resource that enables firms to develop pollution prevention capabilities, product stewardship and long-term sustainable development strategies, which collectively lead to enhanced EP (Hart and Dowell, 2011; Mishra and Yadav, 2021).

In parallel, the study advances the DCV by revealing that CSR strengthens firms' ability to dynamically configure and reconfigure green capabilities in response to evolving environmental demands (Teece *et al.*, 1997; Ghasemzadeh *et al.*, 2022). Specifically, our study found that CSR practices can enhance green capabilities and that green capabilities play a pivotal role in the CSR-GI nexus. These results show that for firms engaged in CSR to achieve outstanding EP, they must cultivate GC, using the resources and capabilities gained from CSR to develop and execute effective GC, which will subsequently lead to GI. This dual-path mediation structure offers a theoretical mechanism that helps reconcile prior inconsistent findings in the CSR-EP literature (Hong *et al.*, 2020; Kraus *et al.*, 2020). Our

model contributes to the current body of knowledge by presenting a mechanism whereby CSR influences EP, while incorporating the mediating and moderating roles of GI and GC.

Our results further highlight the role of CSR as a precursor to the development and nurturing of GC, thereby improving GI. The advancement of GI through the CSR-induced enhancement of GC contributes to corporate environmental management theory and DCV theory, emphasizing the integration, production and regeneration of resources essential for environmental protection ([Sarwar et al., 2023](#)). Moreover, by empirically validating the sequential mediation paths in a single framework, the study provides theoretical clarity on how SMEs can convert CSR investments into both capabilities and innovation outputs that foster sustainability ([Bocquet et al., 2019](#)).

Consequently, our findings empirically support the notion that GC and GI serve as bridging elements in the CSR-EP relationship. This study thus builds upon previous works like NRBV ([Broadstock et al., 2019](#)) and [Teece et al.'s \(1997\)](#) DCV, by testing a model with the unique characteristics of SMEs in the manufacturing sector. It also extends their work by:

- operationalizing GC and GI as dynamic mechanisms that translate CSR inputs into EP outcomes;
- providing empirical evidence for their sequential mediation effects; and
- positioning GC as both a strategic capability and a moderator in the CSR-GI linkage, thereby broadening the explanatory power of DCV in sustainability research ([Aftab et al., 2023](#); [Rehman et al., 2022](#)).

Our study also makes a significant contribution by incorporating CSR, GI, GC and EP within a single research model, and doing so in an emerging economy context. This addresses the persistent call for further studies on CSR in developing economies ([Bahta et al., 2020](#)). By applying and extending NRBV and DCV to a non-Western context, our study contributes to the contextualization of theory and addresses concerns about the over-reliance on Western empirical settings in sustainability scholarship ([Nazir and Islam, 2020](#); [Padilla-Lozano and Collazzo, 2022](#)). Additionally, while the literature has extensively examined large manufacturing firms, research on SMEs - known for their limited resources in addressing sustainability issues, remains scarce ([Kraus et al., 2020](#); [Rehman et al., 2021](#)). In addressing this gap, the study enriches the literature by focusing on collecting data from SMEs in the UAE, thereby offering theoretical insights with strong practical relevance for firms operating under resource constraints and policy-driven environmental pressures.

5.2 Practical implications

The results also have significant implications for managers, policymakers and business professionals. For example, our findings emphasize the importance of CSR initiatives in enhancing environmental management and fostering GI, thus providing confidence in CSR investment outcomes. In addition, CSR was found to positively influence firms' Green Capabilities, thus increasing the capacity of SME firms to build capabilities while improving environmental performance. These capabilities positively influence firms' GI, providing the potential to develop innovative products, practices and services that distinguish them among their competitors. This insight is particularly critical for SME managers aiming for sustainable growth, as it demonstrates that CSR engagement can lead not only to reputational benefits but also to the development of dynamic capabilities and market-driven innovation. CSR-driven green capabilities enhance organizational learning, responsiveness and innovation, enabling firms to meet evolving environmental expectations and customer demands ([Rehman et al., 2022](#); [Simmou et al., 2023](#)).

In keeping with the dynamic capabilities view, the link between GC and GI can also assist in improving corporate agility and adaptability to rapidly respond to evolving market demands

including environmental challenges. Managers are encouraged to treat CSR as a core strategic function, embedding it within their planning, knowledge management and operational processes to ensure that green innovations are continuously developed and refined. This involves internalizing CSR principles across business units, enhancing employee awareness of environmental goals and linking CSR metrics with innovation performance evaluations (Teece, 2018; Shehzad *et al.*, 2023).

Moreover, managers should initiate CSR-aligned training programs that build green knowledge and competencies across their workforce. This includes capacity-building in areas such as eco-design, waste minimization and sustainable procurement, which will facilitate the internal diffusion of green innovation practices. Strategic alignment between CSR and operational goals also allows firms to monitor sustainability outcomes more rigorously, ensuring that environmental goals are not viewed as peripheral but integrated into mainstream performance benchmarks.

In developing countries like those in the Middle East and North Africa (MENA) region, promoting CSR initiatives among SMEs is crucial, especially in the UAE if the nation is to achieve its Net Zero commitments. Policymakers can support this by offering incentives such as grants, tax breaks or subsidies for eco-friendly practices and enforcing environmental regulations aligned with CSR goals to ensure compliance with sustainable practices. To strengthen the policy–practice linkage, regulatory bodies should consider developing CSR capability toolkits, green innovation funding schemes and sustainability scorecards tailored to the SME sector. Such interventions can empower SMEs to overcome capability gaps and implement CSR in a way that yields long-term environmental and competitive advantages (Islam *et al.*, 2023; Achi *et al.*, 2022).

However, it is also essential for firms to recognize CSR practices as strategic investments contributing to sustainable competitive advantage. Our study provides assurance to the less resource rich SME sector that those that strategically allocate resources to CSR initiatives that align with their business objectives and market preferences will lead to positive and ongoing outcomes. As environmental regulations increase and market preferences shift toward sustainability, SMEs that embed CSR into their innovation and capability strategies will be better positioned to access new markets, improve stakeholder trust and reduce operational risks (Kraus *et al.*, 2020).

6. Limitations and future research

While this study contributes significantly to our understanding of the relationships between CSR, GI, GC and EP it also has certain limitations. Firstly, the use of a cross-sectional methodology may limit the ability to observe outcome variations over time. Future studies could benefit from longitudinal approaches to gain deeper insights into the dynamics of these relationships. Further research could also explore data from larger firms to examine potential variations in outcomes across different organizational sizes. Future studies might also consider incorporating environmental dynamism to provide a more comprehensive analysis. Finally, conducting similar studies in other Gulf or MENA countries with comparable cultural and economic contexts could offer valuable insights into potential variations in outcomes across different regions.

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Further reading

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