Management of Environmental Quality: An International Journal

How and when green capabilities drive sustainability under the boundary condition of environmental attitude

Arej Alhemimah
Department of History and Archeology, Faculty of Arts and Humanities, King Abdulaziz University, Jeddah, Saudi Arabia
Murad Ali
Newcastle Business School, Northumbria University, Newcastle, UK
Saeed Badghish
Faculty of Economics and Administration, King Abdulaziz University, Jeddah, Saudi Arabia
Alaa Shagagi
Jazan University, Jazan, Saudi Arabia
Hengky Latan
Department of Statistics, Economics and Management, HLC Consulting, Semarang, Indonesia, and
Hersugondo Hersugondo
Department of Management, Diponegoro University, Semarang, Indonesia

Received 30 May 2025
Revised 10 August 2025
12 October 2025
21 October 2025
Accepted 26 October 2025

Abstract

Purpose – This study builds on the natural resource-based view of dynamic capability to explore whether, how and when green dynamic capabilities (GDCs) contribute to green competitive advantage (GCA). Specifically, it investigates the role of marketing innovation capability (MIC) as a mediator and the effect of environmental attitudes (EA) as a moderator in this relationship.

Design/methodology/approach – A quantitative design and deductive approach were employed using a three-wave time-lagged dataset collected from 218 managers and their subordinates to examine hypothesized relationships using IBM SPSS 28.0 and the PROCESS macro.

Findings – The empirical findings revealed that MIC mediates the positive relationship between GDCs and GCA. Furthermore, the results indicate that the mediating effect was stronger when EA was high than when it was low.

Originality/value – This study makes valuable contributions to the literature by providing empirical evidence of the interplay between GDCs, MIC and EA in shaping a firm's GCA. These findings have significant implications for practitioners and policymakers in the hospitality and tourism industry, emphasizing the importance of developing GDCs and fostering EA to achieve superior performance through sustainable practices.

Keywords Green dynamic capabilities, Marketing innovation capability, Environmental attitude, Green competitive advantage, Hospitality and tourism industry, Saudi Arabia

Paper type Research article

1. Introduction

In the face of escalating environmental degradation, climate change (United Nations, 2024) and increasing pressure from stakeholders (Pinheiro *et al.*, 2023), the integration of environmental sustainability into core firm strategies has emerged not only as a moral imperative but also as a critical source of competitive advantage (Alhemimah *et al.*, 2025; Ali *et al.*, 2024; Kim *et al.*, 2025; Pfeffer, 2010). Conventional competitive strategies are no longer

Funding: The Deanship of Scientific Research (DSR) at King Abdulaziz University (KAU), Jeddah, Saudi Arabia has funded this project under grant no. (KEP-MSc: 69–246–1443).

Arej Alhemimah and Murad Ali share the Co-first Authorship of this study.

Management of Environmental Quality: An International Journal

e-ISSN: 1758-6119
p-ISSN: 1477-7835
DOI 10.1108/MEQ-05-2025-0390

sufficient in a firm landscape in which ecological performance is increasingly tied to market legitimacy and long-term survival (Porter and van der Linde, 1995). Consequently, green sustainability competitive advantage, in which firms leverage environmentally responsible practices to achieve superior performance, has gained significant scholarly interest (Ali *et al*., 2024). However, despite its theoretical appeal, the mechanisms by which green initiatives translate into green sustained competitive advantage remain underexplored, particularly in the context of green capabilities and firm strategies (Alhemimah *et al*., 2025). This study addresses this gap by examining how firms strategically cultivate green capabilities to outperform their competitors in an increasingly sustainable global economy.

This study offers three key rationales. First, prior research acknowledges the pivotal role of green dynamic capabilities (GDCs) in achieving green competitive advantage (GCA) (Wang and Ahmed, 2007). GDCs enable firms to adapt to dynamic green environmental demands, thereby fostering corporate sustainability (Alhemimah *et al*., 2025). GDCs represent the application of dynamic capabilities within the context of environmental management aimed at fostering sustainability (Qiu *et al*., 2020). A growing body of research has begun to explore how green capabilities, such as dynamic and marketing innovation capabilities, impact organizational green performance and competitive advantage (Papadas *et al*., 2019; Koentjoro and Gunawan, 2020; Qiu *et al*., 2020). Considering dynamic capabilities within an organization's strategic framework may enable firms to leverage their potential to enhance their competitive advantage in times of uncertainty (Teece *et al*., 1997). Therefore, DCs are important in maintaining the latest environmental changes. Hence, this study considers this a key factor influencing green organizational performance.

Second, theoretically, MIC serves as a crucial mechanism by which GDCs translate into tangible competitive outcomes by reshaping market offerings and customer engagement practices. A growing body of research highlights the importance of MIC within an organization's value chain (Roh *et al*., 2022). However, there remains a paucity of empirical studies that specifically address the role of MIC in enhancing an organization's green performance (Papadas *et al*., 2019; Roh *et al*., 2022). Consequently, this study included MIC as an antecedent factor influencing GCA. Roh *et al*. (2022) argue that green marketing innovation fosters environmentally conscious consumption behaviors as consumers increasingly prefer eco-friendly products (Lin *et al*., 2021), thereby strengthening an organization's GCA. Thus, in the current study, GCA was considered to be an outcome of both GDCs and MIC.

Finally, the literature has identified environmental attitude as a key boundary condition influencing the effectiveness of green initiatives (Zhang and Walton, 2017). Several studies explore the influence of firms' environmental performance (Agarni *et al*., 2022; Ali *et al*., 2023; Darsono *et al*., 2025; Fatoki, 2021a, b). For instance, Ali *et al*. (2023) found that green organizational culture, which corresponds to environmental attitude, alongside top management's decision-making in conditions of environmental uncertainty, exerts a moderating influence on the relationship between green capabilities and sustainability performance. Accordingly, this study conceptualizes environmental attitude as a moderator between dynamic green and marketing innovation capabilities. Literature conceptually supports the idea that firms with stronger environmental attitude tend to leverage their GDCs and MIC more effectively, leading to greater GCA. However, empirical studies examining these interrelationships, particularly within the context of hospitality and tourism, remain limited, warranting further investigation into how and when these factors interact to drive a sustainable competitive advantage.

The above discussion raises the following research question: *How, when and under what conditions do green dynamic capabilities translate into green competitive advantage and what roles do marketing innovation capability and environmental attitudes play in this process?* To answer this research question, this study aims to utilize the natural resource-based view (NRBV) of the dynamic capability perspective and makes several contributions. First, it investigates how green dynamic capabilities directly contribute to GCA. Second, it examines

the mediating role of marketing innovation capability in the relationship between dynamic green capabilities and GCA. Third, this study explored the moderating effect of environmental attitudes on the relationship between GDCs and MIC. Finally, this study addresses the moderated mediation effect of environmental attitudes on the pathway from green dynamic capabilities through marketing innovation capability to green competitive advantage. In addition, the hospitality and tourism sector, as a key driver of global economic growth, is increasingly transitioning toward sustainability in response to growing environmental concerns (Iftikhar *et al*., 2024). The green hospitality and tourism industry has emerged to address these concerns, focusing on reducing environmental impact through sustainable operations (Font and Tribe, 2001). This paradigm shift aligns with global efforts to combat climate change, conserve resources and foster ecological balance, while ensuring long-term competitiveness and business performance (Agarni *et al*., 2022; Alhemimah *et al*., 2025; Ali *et al*., 2023). Consequently, green practices such as energy-efficient technologies, waste reduction strategies and sustainable sourcing are becoming integral components of corporate strategies across hotels, resorts, restaurants and travel agencies (Chen *et al*., 2024). Saudi Arabia is one such country in the world.

2. Theoretical background and hypotheses development

Grounded in the natural resource-based view (NRBV) and informed by the dynamic capabilities perspective, this study explores the interplay between green dynamic capabilities (GDCs), marketing innovation capability, environmental attitude and green competitive advantage. As an extension of the resource-based view (RBV), the NRBV emphasizes that firms' green resources and capabilities, which are valuable, rare and inimitable, are sources of sustainable competitive advantages. This study borrows the original notion of "green dynamic capabilities" (Chen and Chang, 2013) and refer to Teece *et al*. (1997) to define it as "the ability of a company to exploit its existing resources and knowledge to renew and develop its green organizational capabilities to react to the dynamic market." The dynamic capabilities perspective emphasizes that simply having green dynamic capabilities is not sufficient; these capabilities need to be effectively utilized (Wilden *et al*., 2013). Marketing innovation capability acts as the mechanism through which green dynamic capabilities transform into a competitive advantage (Teece *et al*., 1997). For instance, firms that excel in marketing innovation can communicate their green initiatives to customers, differentiate themselves from competitors and capture market share, thereby mediating the relationship between GDCs and GCA. Furthermore, firms with strong contingency effects of environmental attitude are more likely to support and enhance green strategy implementations (Fernando *et al*., 2019; Rahman *et al*., 2025). This contingency of positive commitment amplifies the effectiveness of marketing innovation and strengthens the mediating effect when environmental attitude is high. The dynamic capabilities perspective explains how these capabilities are mobilized through marketing innovation to create value. The interplay between these frameworks, along with the moderating effect of environmental attitude, offers a comprehensive explanation of the relationships explored in this study (Qiu *et al*., 2020).

2.1 Green dynamic capabilities and green competitive advantage

Unlike operational capabilities, dynamic capabilities enable firms to remain competitive by adapting to changing environments and positioning them for long-term success (Wilden *et al*., 2013). While operational capabilities involve routine ongoing activities that maintain current products and services for existing customers using established techniques (Helfat and Winter, 2011), DCs also focus on strategic change. Specifically, they enable firms to realign their operations and resources to fit the evolving market conditions (Wilden *et al*., 2013). Dynamic capability refers to a firm's capability to adapt to shifting external conditions in order to maintain competitiveness and achieve sustained growth (Teece *et al*., 1997). Dynamic capabilities capture

an organization's ability to remain agile and future-oriented by continuously sensing market signals, seizing opportunities and transforming internal structures (Teece *et al*., 1997; Wilden *et al*., 2013). While operational capabilities help firms maintain efficiency in their current routines, dynamic capabilities enable strategic renewal, particularly in a sustainable space.

Recent empirical research has emphasized the strategic importance of green dynamic capabilities in enhancing hotel performance and driving sustainable competitive advantage. For instance, Pereira-Moliner *et al*. (2021) showed that capabilities such as quality management, HR development and sustainability practices significantly contribute to improved hotel outcomes, particularly when mediated by the differentiation advantage. Similarly, the adoption of a green innovation strategic orientation, supported by green intellectual capital, has been linked to enhanced environmental performance and market differentiation in hospitality firms (Dang and Wang, 2022). Complementing these findings, Alhemimah *et al*. (2025) demonstrated how dynamic capabilities aligned with green marketing strategies translate into environmental and brand-related advantages. Furthermore, the role of green organizational learning and motivation in fostering sustainable behaviors in hospitality enterprises has also been established (Alhemimah *et al*., 2024). This body of research underscores the growing imperative for hospitality organizations to embed green capabilities and innovation into their core operations to remain competitive in an environmentally conscious market.

However, several conflicting findings have pointed to the contingent nature of this relationship. For example, Baía and Ferreira (2024) suggest that the benefits of GDCs may vary depending on market maturity, regulatory environment or firm readiness. Others argue that the implementation of GDCs is resource-intensive and may not guarantee a competitive advantage unless supported by other organizational factors, such as absorptive capacity or leadership commitment (Papadas *et al*., 2019; Zameer *et al*., 2021). These mixed findings highlight a gap in understanding how and under what conditions GDCs translate into advantages, particularly in sectors, such as hospitality, where green transformation is still evolving. Despite these nuances, there is growing theoretical consensus that dynamic environmental capabilities are necessary for sustained market positioning in the context of increasing ecological awareness. By actively sensing and responding to environmental demands such as integrating renewable energy or offering eco-friendly services, firms can achieve legitimacy and differentiation, leading to a competitive advantage (Koentjoro and Gunawan, 2020). Based on this theoretical foundation and the existing but inconclusive empirical findings, we propose the following hypothesis:

H1. Green dynamic capabilities positively influence green competitive advantage.

2.2 Green dynamic capabilities, marketing innovation capability and green competitive advantage

Marketing innovation capability reflects a firm's capability to design and implement novel marketing approaches that align with environmental values and customer expectations. Firms with strong marketing innovation capabilities are better positioned to translate internal green initiatives into external values, thus creating meaningful differentiation in sustainability-conscious markets. The relationship between dynamic capabilities and marketing innovation has been acknowledged in literature as a strategic pathway through which firms convert internal strengths into market performance. For instance, Na *et al*. (2019) emphasized that effective marketing innovation is contingent on a firm's ability to manage and leverage intangible resources, particularly human capital. When dynamic green capabilities are present, they provide the foundational agility needed to support continuous marketing innovation, which reflects sustainability goals and responds to evolving consumer preferences.

Previous studies further support the idea that marketing innovation capability enhances a firm's ability to deliver unique environmental value propositions to the market (Fatoki, 2021a; Papadas *et al*., 2019). Such value creation is essential for firms aiming to develop and sustain a

green competitive advantage. Marketing innovation enables firms to communicate their environmental efforts more effectively, position themselves as responsible brands and respond flexibly to green market trends (Kar and Harichandan, 2022; Roh *et al*., 2022).

Importantly, the NRBV posits that competitive advantage arises not only from possessing valuable internal capabilities but also from deploying them in ways that are strategically aligned with market opportunities (Hart, 1995; Hart and Dowell, 2011). This study argues that marketing innovation capability serves as a mechanism through which green dynamic capabilities are operationalized. Rather than functioning in isolation, GDCs influence marketing innovation practices, which in turn shape how firms engage with sustainability-oriented customers and differentiate their offerings. Thus, marketing innovation capability has become a key channel through which green dynamic capabilities are converted into market-based advantages. By fostering alignment between internal and external market expectations, marketing innovation capability allows firms to transform their green capabilities into sustained competitive positioning. Based on this theoretical rationale and empirical support, the following hypothesis is proposed.

H2. Marketing innovation capability mediates the positive relationship between green dynamic capabilities and green competitive advantage.

2.3 The moderating role of environmental attitude

Environmental attitude (EA) describes the degree of concern and commitment toward environmental sustainability held by organizational members (Zhang and Walton, 2017). EA refers to an individual's psychological tendency to evaluate environmental issues, behaviors and protection efforts with a degree of favor or disfavor. It encompasses beliefs, feelings and behavioral intentions toward the environment and sustainable practices (Milfont and Duckitt, 2010). In addition, it reflects an individual's values, beliefs and behavioral intentions related to environmental conservation, including preferences for eco-friendly products and support for sustainable initiatives (Chowdhury *et al*., 2024). Environmental attitudes play a critical role in shaping employee engagement in sustainability. Environmental attitudes reflect the collective orientation, values and strategic commitment of employees toward environmental responsibility (Fernando *et al*., 2019). Previous studies have suggested that individuals with strong environmental concerns are more likely to engage in behaviors that support environmental protection (Khan and Khan, 2022).

This study posits that environmental attitude plays a moderating role in how firms translate green dynamic capabilities into marketing innovation. In other words, when firms have strong environmental attitudes, they are more likely to support and accelerate the conversion of sustainability-oriented capabilities into innovative market practices. EA is linked to a pro-environmental orientation, which tends to foster openness to eco-innovation, support investment in green technologies and enable adaptive marketing responses that emphasize sustainability (Fernando *et al*., 2019).

Empirical studies support the notion that firms with strong environmental attitudes are better equipped to implement marketing strategies that resonate with eco-conscious consumers (Lin *et al*., 2021). When environmental values are deeply embedded in organizational culture, marketing innovation becomes more authentic, targeted and impactful, thereby enhancing a firm's strategic use of its green capabilities. Given this rationale, this study posits that environmental attitudes strengthen the relationship between dynamic green and marketing innovation capability. In firms with strong environmental attitudes, GDCs are more effectively translated into innovative marketing efforts, amplifying their potential to generate green competitive advantage. Therefore, we contend that environmental attitude can affect the link between GDCs and MIC and propose the following hypothesis:

H3. Environmental attitude positively moderates the relationship between green dynamic capabilities and marketing innovation capability.

Finally, building on the preceding arguments, this study proposes a conditional indirect effect or moderated mediation model (see Hayes, 2022). This study argues for the indirect effect of GDCs on GCA through marketing innovation capability as well as for the moderating role of environmental attitude, and proposes a conditional indirect effect or moderated-mediation model (see Hayes, 2022), to explain the combined role of the aforementioned variables in the emergence of GCA. To this end, we expected that the strength of this indirect effect would vary among the different levels of environmental attitudes. Specifically, we hypothesize that environmental attitude serves as a key contingency factor that influences the indirect relationship between GDCs and GCA through marketing innovation capabilities. When high levels of GDCs interact with a strong environmental attitude, they are likely to function as a resource that enhances marketing innovation capability, ultimately leading to a superior green competitive advantage. Thus, we hypothesize as follows:

H4. The indirect effect of green dynamic capabilities on green competitive advantage via marketing innovation capability is stronger when environmental attitude is high.

3. Method

3.1 Data collection and sample

The data for this study were collected from a large research project that included several studies investigating green sustainability in the hospitality and tourism industry in Saudi Arabia. An e-questionnaire that was self-administered and distributed throughout Saudi Arabia was used for the data collection. Initially, random contacts were made with prospective responding managers from different firms in the hospitality and tourism sectors. These managers helped to connect the research team with subordinate employees to participate in the survey. This process helped to identify more than 500 individuals who agreed to participate in the study. Employees were selected as respondents for GDCs, EA and MIC, while GCA was assessed through managers.

To address concerns related to common method variance (CMV), three separate survey waves were conducted with an average of three months between each wave. Additionally, this research design enhances the validity of causal inferences regarding relationships between variables. At Time 1 (November–December 2022), 266 valid responses were collected from subordinate employees who rated their firms' green dynamic capabilities and provided detailed demographic information. At Time 2 (April–May 2023), 232 valid responses were collected from subordinate employees who rated their environmental attitudes and innovative marketing capabilities, along with their demographic information. Finally, at Time 3 (September–October 2023), 218 managers rated their firms' green competitive advantages and provided detailed demographic information. Thus, the analysis used a final sample of 218 valid responses from both the managers and subordinate employees. Table 1 provides a summary of the respondents' demographic information. The data were collected between November 2022 and October 2023.

Given that the data were collected through self-reporting, CMV could potentially bias results (Podsakoff *et al*., 2003). This study employed a marker variable approach to address potential CMV concerns (Miller and Simmering, 2023). Following the marker variable approach, a theoretically unrelated variable, "attitude toward blue color" as a marker variable, was introduced into the research framework. Table 3 shows that there is no statistically significant correlation between the marker variable and the main variables under investigation. These results suggest that CMV infection was an important issue in this study.

3.2 Operationalization/measures

The validity and reliability of the scales were ensured through several steps in the survey design process. As data were gathered in Saudi Arabia, one of the research team members – a

Table 1. Demographic characteristics of participants

Category	Items	Employee *n*	Employee %	Manager *n*	Manager %
Gender	Male	88	40.37	143	65.60
	Female	130	59.63	75	34.40
Age (years)	20–30	97	44.50	12	5.50
	31–40	98	44.95	74	33.94
	41–50	15	6.88	64	29.36
	51+	8	3.67	68	31.19
Tenure (years)	0–5	99	45.41	24	11.01
	6–11	54	24.77	87	39.91
	12–17	37	16.97	61	27.98
	18+	28	12.84	46	21.10
Industry	Tourism	218	100.00	218	100.00

Source(s): Authors' own work

native speaker, translated the survey from English into Arabic following back-translation procedures. A pre-test survey draft was conducted to identify and address any potential issues specific to the Saudi context and to ensure reliability, validity and comprehensibility in Arabic (Aguinis, 2025). Finally, a pilot test was conducted on a representative sample ($n = 91$) to assess the preliminary reliability and validity. The preliminary analysis suggests satisfactory levels of reliability, with all four constructs exhibiting Cronbach's alpha and composite reliability values exceeding 0.70.

The scale was adapted from previous studies and tailored to fit the research context (Heggestad *et al*., 2019). All participants responded to the scale statements on a seven-point Likert – "*1*" ("*strongly disagree*") to "*7*" ("*strongly agree*"). The scale of green dynamic capabilities was measured using a seven-item measure based on Joshi and Dhar (2020), which was built on the earlier studies of Chen and Chang (2013) and Pavlou and El Sawy (2011). The four-item scale of marketing innovation capability was adapted from Da Costa *et al*. (2018) and based on the work of Merrilees *et al*. (2011). The six-item scale used to measure environmental attitudes was adopted from Borin *et al*. (2011). A four-item green competitive advantage scale was assessed using the perceptual scale developed by Masri and Jaaron (2017). Finally, the survey included several questions to gather the demographic information of the participants (Table 1).

3.3 Analytical technique

In this study, the data were analyzed as follows. First, IBM SPSS Statistics version 29.0 was used to analyze the descriptive statistics, means, standard deviations, common method bias, factor analysis, *t*-tests and Pearson's correlation analyses of the investigated variables (Field, 2024). Second, this study adopted the PROCESS macro (Hayes, 2022; Model 7), which is well-suited for handling non-normal data and testing complex hypotheses. Specifically, it examines the direct, indirect and moderating relationship as well as moderated mediation analysis. Compared to other approaches that often assume multivariate normality, an assumption that is difficult to satisfy in practice, the PROCESS macro offers greater flexibility. It generates a bias-corrected percentile and bias-corrected and accelerated bootstrap confidence intervals, enabling a robust path analysis for direct, indirect, moderation and moderated mediation effects.

4. Results

The validity and reliability of the data were verified. First, Table 2 shows the factor loading values ranging from 0.66 to 0.96, with *t*-values ≥ 3.33, based on a two-tailed test, confirming

Table 2. Validity and reliability

Code	Item wording	FL	SE	*t*-value[a, b]	ω	ρ_c	AVE[c]
Green dynamic capabilities (GDC)					0.95	0.95	0.77
GDC1	The company has the ability that can fast monitor the environment to identify new green opportunities	0.89	0.02	54.43			
GDC2	The company has effective routines to identify and develop new green knowledge	0.89	0.02	43.64			
GDC3	The company has the ability to develop green technology	0.81	0.03	27.20			
GDC4	The company has the ability to assimilate, learn, generate, combine, share, transform, and apply new green knowledge	0.84	0.02	35.39			
GDC5	The company has the ability to successfully integrate and manage specialized green knowledge within the company	0.93	0.01	68.36			
GDC6	The company has the ability to successfully coordinate employees to develop green technology	0.87	0.02	46.65			
GDC7	The company has the ability to successfully allocate resources to develop green innovation	0.91	0.02	46.27			
Marketing innovation capability (MIC)					0.96	0.96	0.89
MIC1	Better at developing new ideas to help customers	0.95	0.01	98.20			
MIC2	More able to fast track new offerings to customers	0.96	0.01	108.59			
MIC3	Better able to manage processes to keep costs down	0.93	0.01	70.20			
MIC4	More able to package a total solution to solve customer problems	0.94	0.01	83.57			
Environmental attitude (EA)					0.84	0.83	0.66
EA1	I prefer to buy environmentally friendly products	0.85	0.04	23.28			
EA2	I believe human activities are a major reason for global warming	0.66	0.07	8.98			
EA3	I separate trash into recyclable and non-recyclable piles	0.85	0.03	27.86			
EA4	I prefer to buy products from environmentally friendly companies	0.88	0.03	26.64			
EA5*	I am willing to pay 10% more for environmentally friendly products						
EA6*	I would support a college course on sustainability for all college students						
Green competitive advantage (GCA)					0.91	0.91	0.72
GCA1	The company has the competitive advantage of low cost about environmental management or green innovation compared to its major competitors	0.90	0.02	49.46			
GCA2	The quality of the green products or services that the company offers is better than that of its major competitor's	0.91	0.02	59.12			
GCA3	The company is more capable of environmental R&D and green innovation than its major competitors	0.92	0.02	56.56			
GCA4	The company is more capable of environmental management than its major competitors	0.83	0.03	25.01			

Note(s): *Problematic item removed from final analysis, FL = Factor loading and SE = Standard error, [a]Test-statistics obtained by 5,000 bootstrap runs, [b]Absolute *t*-values >1.65 are one-tailed significant at 5% and ω = McDonald Omega coefficient; ρ_c = Composite reliability and AVE = average variance extracted, [c]Percentage of variance of item explained by latent variable

Source(s): Authors' own work

each item's reliability. Two items from the environmental attitude were deleted because the factor loadings were lower than 0.50. Next, the AVE values for all variables ranging from 0.66 to 0.89, surpassing the recommended threshold. This confirmed the convergent validity of the data (Table 2). Second, Table 2 shows that the values of the McDonald's omega coefficient (ω) ranging from 0.84 to 0.96, while the values of composite reliability (ρ_c) ranging from 0.83 0.96. These values are above the recommended value (> 0.70) suggest strong internal consistency of the variables. Finally, discriminant validity was evaluated using several approaches: the heterotrait-monotrait ratio (HTMT) and HTMT2 (Henseler, 2021). In the case of both HTMT and HTMT2 value below 0.85, they are generally considered acceptable for discriminant validity. This finding supports the discriminant validity of the constructs shown in Table 3.

4.1 Hypotheses testing

Table 4 shows the R-square (R^2), standardized beta coefficient (β), level of significance 5% (one-tailed test) and *t*-statistics value (*t-value*) for several models. As in the baseline model, the empirical results of this model show that the direct link green dynamic capabilities → green competitive advantage is statistically significant ($c' = 0.50$; $t = 7.31$, $p < 0.001$). Therefore, H1 is supported. Next, the direct link between green dynamic capabilities and marketing innovation capability is statistically significant ($a_1 = 0.38$; $t = 6.16$, $p < 0.001$). Finally, the direct link between marketing innovation capability and green competitive advantage was statistically significant ($b = 0.27$; $t = 3.39$, $p < 0.001$).

To investigate H3, we employed the product-indicator approach (Jaccard and Turisi, 2003). This approach is commonly used when a moderator has a linear impact on the strength of a moderated direct relationship. In this study, the interaction term was created by multiplying the marketing innovation capability (predictor) and environmental attitude (moderator) variables (Aguinis *et al.*, 2017). Following standard practices, the product indicators were normalized (Vanderweele, 2015). As shown in the interaction effect model (Table 4), the empirical results indicate that the beta coefficient of green dynamic capabilities × environmental attitude → marketing innovation capability is statistically significant ($a_1 \times a_3 = 0.13$; $t = 2.33$, $p < 0.01$), supporting H3.

To investigate H2 and H4, this study used Model 7 in the PROCESS macro (Hayes, 2022). This study used two options to calculate the indirect effects of the different values of environmental attitude: first, when the environmental attitude is equal to one standard deviation below the mean (*Mean*−1*SD*), moderate (mean) and one standard deviation above

Table 3. Mean, standard deviations, correlations and discriminant validity results

Construct	Mean	SD	VIF	1	2	3	4	5
1. Green dynamic capabilities	3.46	1.94	1.39	*0.85*	0.52 [0.58]	0.32 [0.25]	0.68 [0.66]	0.12 [0.11]
2. Marketing innovation capability	4.34	1.81	1.39	0.52**	*0.85*	0.37 [0.36]	0.54 [0.53]	0.06 [0.04]
3. Environmental attitude	5.21	1.39	1.17	0.28**	0.33**	*0.85*	0.37 [0.37]	0.13 [0.10]
4. Green competitive advantage	4.07	1.78	1.39	0.68**	0.50**	0.32**	*0.85*	0.23 [0.21]
5. Attitude toward blue color	3.13	0.65	1.00	−0.05	−0.05	0.02	−0.04	*0.85*

Note(s): Significance levels: $p < 0.05^*$; $p < 0.01^{**}$; SD = Standard deviation and VIF = Variance inflation factor
Diagonal and italicized elements are the cut-off values for HTMT
Above the diagonal elements are the HTMT values
Below the diagonal elements are the correlations between the construct's values

Source(s): Authors' own work

Table 4. Significant testing results of the structural model path coefficients

Structural path	Baseline model *R2* (Marketing innovation capability) = 0.23 *R2* (Green competitive advantage) = 0.44	Baseline model plus environmental attitude *R2* (Marketing innovation capability) = 0.28 *R2* (Green competitive advantage) = 0.45	Interaction effect model *R2* (Marketing innovation capability) = 0.30 *R2* (Green competitive advantage) = 0.45	Support
H1: Green dynamic capabilities → Green competitive advantage = *c'*	0.52*** (9.95)	0.50*** (7.31)	0.50*** (7.31)	Yes
Green dynamic capabilities → Marketing innovation capability = a_1	0.47*** (8.40)	0.42*** (7.07)	0.38*** (6.16)	
Marketing innovation capability → Green competitive advantage = *b*	0.22*** (3.95)	0.27*** (3.39)	0.27*** (3.39)	
H2: Green dynamic capabilities → Marketing innovation capability → Green competitive advantage = $a_1 \times b$	0.10* (2.38)	0.11*** (2.74)	0.10*** (2.59)	Yes
Environmental attitude → Marketing innovation capability = a_2		0.23*** (3.61)	0.26*** (3.61)	
H3: Green dynamic capabilities × Environmental attitude → Marketing innovation capability			0.13** (2.33)	Yes

Note(s): ns = non-significant; t (0.05, 4999) = 1.645; t (0.01, 4999) = 2.327; t (0.001, 4999) = 3.092
*$p < 0.05$; **$p < 0.01$ and ***$p < 0.001$, based on t (4999), one-tailed test
Bootstrapping based on n = 5,000 subsamples

Source(s): Authors' own work

the mean (*Mean*+1*SD*) (Hayes, 2022). Second, the environmental attitude values were the 16th, 50th and 84th percentiles of the sample distribution.

Figure 1(a) shows that GDC had a significant positive effect on GCA ($c = 0.63$; $t = 10.77$, $p < 0.001$). When marketing innovation capability is presented in the model as a mediator, the green dynamic capabilities reduces its direct effect on green competitive advantage. However, it still had a significant direct effect ($c' = 0.50$; $t = 7.31$, $p < 0.001$), as shown in Figure 1(b). However, Table 5 shows that the indirect effect of green dynamic capabilities on green competitive advantage via environmental attitude was consistently positive and increased with increasing levels of environmental attitude. The bias-corrected bootstrap 95% confidence interval for the conditional indirect effect was above zero for low to high levels of environmental attitudes (mean ± SD, Mean). This also suggests that the slope of the indirect effect of GDC on GCA via environmental attitude was stronger (steeper) at the 84th percentile value of environmental attitude ($\beta = 0.11$; $t = 2.75$, $p < 0.01$) and the 50th percentile value of environmental attitude ($\beta = 0.09$; $t = 2.25$, $p < 0.05$). However, the 16th percentile value was obtained for environmental attitudes. Although the point estimate suggests a positive indirect effect, it cannot be considered to be statistically significant. This was demonstrated by the bias-corrected bootstrap confidence intervals, which encompassed zero, indicating no significant differences from zero (Table 5). Figure 2 depicts the slope of the indirect effect as less steep at

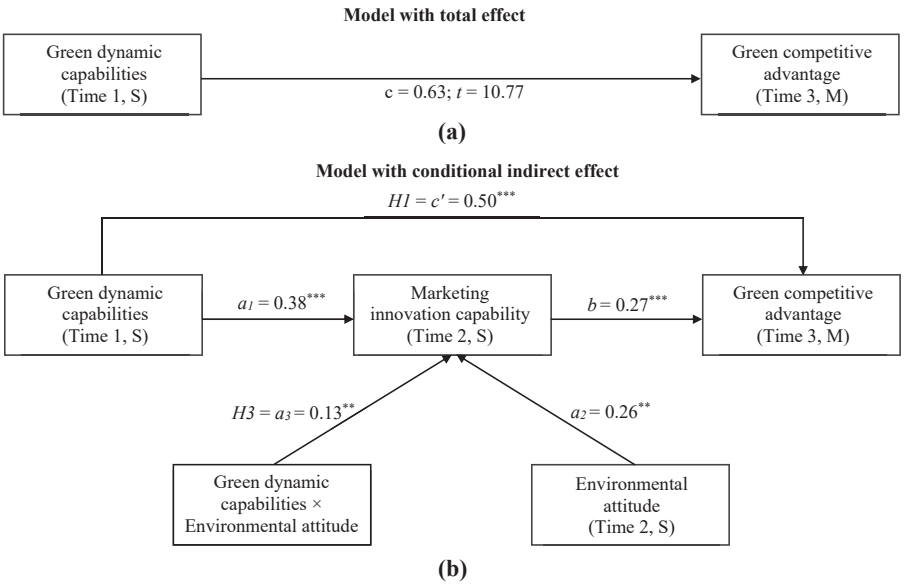

Figure 1. Summary of conditional indirect effect testing. **Note(s):** *H2* = Green dynamic capabilities → Marketing innovation capability → Green competitive advantage = ($a_1 \times b$) *H4* = Green dynamic capabilities → Marketing innovation capability → Green competitive advantage = ($a_1 + a_3$ Environmental attitude) × *b*. **Source(s):** Authors' own work

Table 5. Conditional indirect effects of green dynamic capabilities on green competitive advantage at the values of environmental attitude as moderator

Mediator	Environmental attitude	Indirect effect	Boot SE	95% confidence interval Lower	Upper
Marketing innovation capability	3.78	0.05	0.03	0.00	0.14
Marketing innovation capability	5.19	0.08	0.03	0.02	0.17
Marketing innovation capability	6.60	0.11	0.04	0.03	0.20

Note(s)*: Values for environmental attitude (moderator) are the mean and plus/minus one standard deviation (SD) from mean*

3.27	0.04	0.03	−0.01	0.15
5.50	0.09	0.04	0.03	0.17
6.75	0.11	0.04	0.04	0.21

Note(s): Values for environmental attitude (moderator) are 16th, 50th and 84th percentiles Bootstrapping based on $n = 5.000$ subsamples

Source(s): Authors' own work

higher levels than at lower levels of environmental attitude. These results provide evidence that H2 and H4 are supported.

4.2 Robustness of research model

This study investigates the potential presence of endogeneity bias and examines the linearity assumption within the research model (Latan, 2018). Initially, the study tackles endogeneity

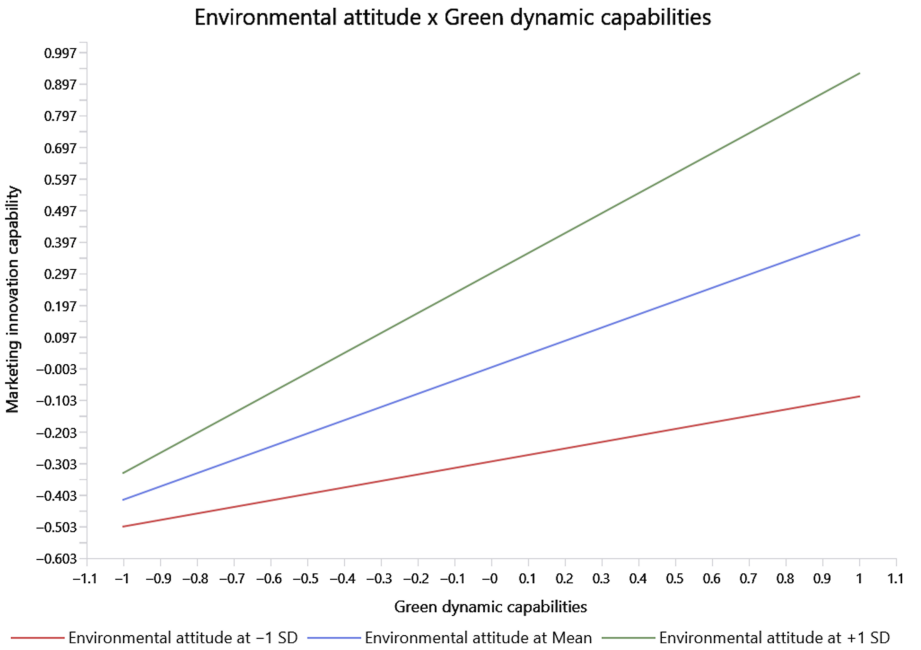

Figure 2. Moderating effect of environmental attitude on green dynamic capabilities – marketing innovation capability link. **Source(s):** Authors' own work

bias stemming from factors such as inverse causality, sample-selection bias, and omitted variables, which could potentially influence the main findings. Using the Gaussian copulas technique, the results suggest that none of the Gaussian copulas (i.e. GDC, MIC, EA and GCA) exhibits a significant level of significance ($p > 0.05$) (Park and Gupta, 2012). These findings confirm that the endogeneity bias does not compromise the accuracy of the estimates. Moreover, this study evaluates the linearity assumption regarding green competitive advantage to validate the correct specification of the theoretical research model (Wooldridge, 2020). By employing Ramsey's regression specification error test (RESET), the study found no evidence of model specification errors ($p > 0.05$), indicating the absence of nonlinear relationships that could impact the conclusions of the study.

5. Discussion

Drawing on the NRBV framework from the dynamic capability perspective of firms, we find empirical evidence confirming all the proposed hypotheses. First, the results of this study confirm that green dynamic capabilities positively influence green competitive advantage. This finding is aligned with NRBV, which posits that environmental capabilities serve as a foundation for sustainable competitive advantage (Hart and Dowell, 2011), and is consistent with previous studies (Alhemimah *et al*., 2025; Khan *et al*., 2019; Koentjoro and Gunawan, 2020; Qiu *et al*., 2020). Second, beyond the direct impact, this study confirms the mediating role of marketing innovation capability on the green dynamic capabilities – green competitive advantage link. This finding is in line with previous studies (Roh *et al*., 2022; Mubeen *et al*., 2023). Furthermore, in line with recent studies, green marketing innovation is a crucial pathway through which firms leverage internal sustainability practices to gain positive recognition and customer loyalty in environmentally sensitive markets (Fatoki, 2021a Kar and Harichandan, 2022; Roh *et al*., 2022). Third, findings of this study confirms the moderating

role of environmental attitudes in the relationship between green dynamic capabilities and marketing innovation capability. In the line of previous studies (Lin *et al.*, 2021), this study confirm that pro-environmental attitudes create a supportive context that encourages the transformation of GDCs into innovative marketing practices. This conditional pathway affirms that environmental attitude moderates both the GDC–MIC and MIC–GCA relationships, reinforcing their strategic relevance in green capability development. Finally, this study confirms the moderated-mediation mechanism – green dynamic capabilities × environmental attitude – marketing innovation capability – green competitive advantage link. In line of previous studies (Alhemimah *et al.*, 2025), this study confirms that the success of green capability transformation and innovation diffusion depends not only on internal resources but also on the broader environmental mindset shared by stakeholders. Firms operating in markets or organizational cultures that value sustainability are therefore better positioned to convert their green capabilities into innovation-driven competitive advantage. This insight reinforces the NRBV argument that environmental resources and capabilities yield superior performance when firms are embedded in contexts that recognize and reward sustainability (Alhemimah *et al.*, 2025).

5.1 Theoretical contributions

The findings of this study provide additional evidence to the existing literature. This study extends NRBV by demonstrating how dynamic capabilities are operationalized through marketing innovation to achieve competitive advantage (Baía and Ferreira, 2024; Teece *et al.*, 1997). This contribution implies that green dynamic capabilities are crucial for firms to adapt and thrive in an increasingly environmentally conscious market, reinforcing the argument that sustainable practices can serve as a source of competitive advantage (Hart and Dowell, 2011). Another theoretical contribution of this study is the empirical demonstration of how marketing innovation capability mediates the relationship between green dynamic capabilities and green competitive advantage within the NRBV, from the perspective of dynamic capability. The integration of innovative marketing capabilities allows firms to effectively communicate their environmental initiatives to stakeholders, thereby gaining a competitive edge. This integration highlights the crucial role of marketing in translating environmental strategies into tangible benefits, offering a strategic pathway for achieving a green competitive advantage (Alhemimah *et al.*, 2025). By bridging sustainability, innovation and competitive strategies, this study provides a comprehensive framework for firms to enhance long-term sustainability. This study highlights the moderating role of environmental attitudes in shaping how green dynamic capabilities (GDCs) influence marketing innovation capability. Firms with stronger pro-environmental attitudes are better positioned to translate dynamic green capabilities into more effective green marketing strategies. This study underscores the importance of embedding attitudinal and cultural factors into strategic models to explain how GDCs transform into sustainable outcomes. This supports the notion that green-oriented cultures enhance the effectiveness of dynamic capabilities and innovation efforts (Alhemimah *et al.*, 2025; Baía and Ferreira, 2024; Rahman *et al.*, 2025). Finally, within the NRBV framework, this study confirms that the indirect effect of green dynamic capabilities on green competitive advantage through green marketing innovation capability is stronger when environmental attitudes are high than when they are low. This finding highlights the importance of fostering an environmental culture within organizations to enhance the effectiveness of green practices (Ali *et al.*, 2023). This study indicates that firms whose green dynamic capabilities enhance their green innovative capabilities may experience improved performance in terms of a green competitive advantage. However, it is important to note that a high level of green dynamic capabilities alone does not guarantee a strong green competitive advantage. Rather, the positive influence of dynamic green capabilities on green innovation capability is important. Although this indirect effect is supported by this study, it is conditional on the environmental attitudes. Specifically, the indirect relationship is positive and significant when environmental

attitude levels are high. Conversely, this mediating relationship may become insignificant when environmental attitudes range from high to low levels.

5.2 Practical implications

This study offers valuable practical insights for practitioners and policymakers in the hospitality and tourism sector. First, firms should not view sustainability initiatives merely as compliance requirements but as long-term investments that enhance brand differentiation, customer engagement and operational resilience. A strong managerial commitment to environmental objectives can enhance an organization's reputation and consumer trust, thereby achieving a sustainable competitive advantage. The interrelationship between managerial attitudes, dynamic capabilities and marketing innovation underscores the vital role of leadership in driving sustainable business practices and achieving a long-term competitive advantage in an environmentally conscious market. Second, firms should understand that the role of MIC is equally crucial, as it amplifies the impact of GDCs, allowing firms to leverage sustainability more effectively in their marketing strategies. Specifically, the mediation role of MIC suggests that internal green capabilities must be actively translated into innovative marketing strategies such as eco-branding, storytelling and sustainable product promotions to deliver visible value to customers and stakeholders. The proactive stance of management in integrating green marketing strategies can further enhance an organization's ability to effectively communicate its environmental initiatives, foster environmentally conscious consumption behavior among consumers and strengthen market positioning (Roh *et al*., 2022; Na *et al*., 2019). Finally, this study highlights the critical role of environmental attitudes as a moderating factor that strengthens the link between GDC and MIC through GCA. For policymakers, these findings underline the need to support capability-building initiatives, incentivize sustainable innovation and promote environmental awareness. Offering grants and tax benefits and recognizing green marketing efforts can further encourage firms to embed sustainability into their core operations. Collectively, these practical implications stress that achieving green competitiveness requires a synergistic approach that combines internal capabilities, external innovation and a pro-environmental organizational mindset. Management's firm-level commitment to environmental attitudes profoundly influences decision-making processes and adoption of sustainable practices (Lin *et al*., 2021). By cultivating a culture of innovation and sustainability, managers can mobilize resources more effectively, implement eco-friendly processes and adapt to market and regulatory changes (Fernando *et al*., 2019).

5.3 Limitation and future directions

This study has several limitations. First, although the research context provides rich insights into green transformation in a growing industry, it may limit the generalizability of the findings to other regions or sectors with different environmental policies, consumer expectations and institutional structures. Second, although the effectiveness of GDCs and MIC may appear to hinge on the strength of environmental attitudes, this relationship is not unique to this study. Comparative findings in other non-tourism industries, such as manufacturing and technology (e.g. Abbas, 2024; Li *et al*., 2024), support similar conditional patterns, where organizational culture and leadership orientation moderate capability-performance linkages. This consistency strengthens, rather than weakens, the generalizability of the results and suggests that EA serves as a strategic amplifier across various sectors, not merely as a source of variability. To reinforce this position, future comparative studies should analyze the moderating effects across industry types to confirm the robustness of these findings beyond the tourism domain. Third, although the study employed a multi-source, dyadic, three-wave, time-lagged data collection method to address common method bias, concerns over causality may persist. Causal inferences regarding the long-term impact of these green strategies on organizational performance can only be fully addressed through longitudinal or experimental

designs in future research. Finally, this study employed a cross-sectional design, which restricts its ability to draw conclusions about causality. Longitudinal data offers a better understanding of how green dynamic capabilities evolve over time and influence marketing innovation and competitive advantage.

References

Abbas, J. (2024), "Does the nexus of corporate social responsibility and green dynamic capabilities drive firms toward green technological innovation? The moderating role of green transformational leadership", *Technological Forecasting and Social Change*, Vol. 208, 123698, doi: 10.1016/j.techfore.2024.123698.

Agarni, M.A., Ali, M., Albort-Morant, G., Leal-Rodríguez, A.L., Latan, H., Ali, I. and Ullah, S. (2022), "Make green, live clean! linking adaptive capability and environmental behavior with financial performance through corporate sustainability performance", *Journal of Cleaner Production*, Vol. 346, 131156, doi: 10.1016/j.jclepro.2022.131156.

Aguinis, H. (2025), *Research Methodology: Best Practices for Rigorous, Credible, and Impactful Research*, SAGE Publications, Thousand Oaks.

Aguinis, H., Edwards, J.R. and Bradley, K.J. (2017), "Improving our understanding of moderation and mediation in strategic management research", *Organizational Research Methods*, Vol. 20 No. 4, pp. 665-685.

Alhemimah, A., Baquero, A., Al-Romeedy, B.S. and Khairy, H.A. (2024), "Green organizational learning and sustainable work behavior in tourism and hotel enterprises: leveraging green intrinsic motivation and green training", *GeoJournal of Tourism and Geosites*, Vol. 55 No. 3, pp. 1134-1147, doi: 10.30892/gtg.55314-1286.

Alhemimah, A., Ali, M., Badghish, S., Latan, H. and Chiappetta Jabbour, C.J. (2025), "Go for green life: linking green dynamic capabilities and ethical leadership with green competitive advantage through green marketing strategy", *Management of Environmental Quality: An International Journal*, Vol. 36 No. 5, pp. 1051-1070, doi: 10.1108/meq-10-2024-0433.

Ali, M., Malik, M., Yaqub, M.Z., Chiappetta Jabbour, J.C., Lopez de Sousa Jabbour, A.B. and Latan, H. (2023), "Green means long life - green competencies for corporate sustainability performance: a moderated mediation model of green organizational culture and top management support", *Journal of Cleaner Production*, Vol. 427, 139174, doi: 10.1016/j.jclepro.2023.139174.

Ali, M., Shujahat, M., Fatima, N., Lopes de Sousa Jabbour, A.B., Vo-Thanh, T., Salam, M.A. and Latan, H. (2024), "Green HRM practices and corporate sustainability performance", *Management Decision*, Vol. 62 No. 11, pp. 3681-3703, doi: 10.1108/md-05-2023-0787.

Baía, E.P. and Ferreira, J.J. (2024), "Dynamic capabilities and performance: how has the relationship been assessed?", *Journal of Management and Organization*, Vol. 30 No. 1, pp. 188-217, doi: 10.1017/jmo.2019.88.

Borin, N., Cerf, D.C. and Krishnan, R. (2011), "Consumer effects of environmental impact in product labeling", *Journal of Consumer Marketing*, Vol. 28 No. 1, pp. 76-86, doi: 10.1108/07363761111101976.

Chen, Y.S. and Chang, C.H. (2013), "The determinants of green product development performance: green dynamic capabilities, green transformational leadership, and green creativity", *Journal of Business Ethics*, Vol. 116 No. 1, pp. 107-119, doi: 10.1007/s10551-012-1452-x.

Chen, C., Yan, Y., Jia, X., Wang, T. and Chai, M. (2024), "The impact of executives' green experience on environmental, social, and governance (ESG) performance: evidence from China", *Journal of Environmental Management*, Vol. 366, 121819, doi: 10.1016/j.jenvman.2024.121819.

Chowdhury, S., Ahmed, M.T., Oni, F.A. and Mamun, T.M. (2024), "Individualistic or collectivistic: which consideration motivates purchasing intention of organic foods? A developing country perspective", *Journal of Agribusiness in Developing and Emerging Economies*, Vol. 14 No. 5, pp. 1089-1108, doi: 10.1108/jadee-11-2022-0247.

Da Costa, J.C.N., Camargo, S.M., Machado Toaldo, A.M. and Didonet, S.R. (2018), "The role of marketing capabilities, absorptive capacity, and innovation performance", *Marketing Intelligence and Planning*, Vol. 36 No. 4, pp. 410-424, doi: 10.1108/mip-11-2017-0312.

Dang, V.T. and Wang, J. (2022), "Building competitive advantage for hospitality companies: the roles of green innovation strategic orientation and green intellectual capital", *Journal of Hospitality and Tourism Management*, Vol. 50, pp. 123-134.

Darsono, D., Hersugondo, H., Yuniawan, A., Kusumaningrum, H.P., Latan, H. and Ali, M. (2025), "Linking green finance to sustainability performance: the mediating role of CSR and the moderating effect of stakeholder pressures", *Journal of Economic and Administrative Sciences*, pp. 1-20, doi: 10.1108/JEAS-04-2025-0221.

Fatoki, O. (2021a), "Environmental orientation and green competitive advantage of hospitality firms in South Africa: mediating effect of green innovation", *Journal of Open Innovation Technology Market and Complexity*, Vol. 7 No. 4, p. 223, doi: 10.3390/joitmc7040223.

Fatoki, O. (2021b), "Green organizational culture and environmental performance: the role of green innovation", *Journal of Legal, Ethical and Regulatory Issues*, Vol. 24 No. 6, p. 1.

Fernando, Y., Jabbour, C.J.C. and Wah, W.X. (2019), "Pursuing green growth in technology firms through the connections between environmental innovation and sustainable business performance: does service capability matter?", *Resources, Conservation and Recycling*, Vol. 141, pp. 8-20.

Field, A. (2024), *Discovering Statistics Using IBM SPSS Statistics*, 6th ed., Sage Publications, Thousand Oaks.

Font, X. and Tribe, J. (2001), "Promoting green tourism: the future of environmental awards", *International Journal of Tourism Research*, Vol. 3 No. 1, pp. 9-21, doi: 10.1002/1522-1970(200101/02)3:1<9::aid-jtr244>3.0.co;2-q.

Hart, S.L. (1995), "A natural-resource-based view of the firm", *Academy of Management Review*, Vol. 20 No. 4, pp. 986-1014, doi: 10.2307/258963.

Hart, S.L. and Dowell, G. (2011), "A natural-resource-based view of the firm: fifteen years after", *Journal of Management*, Vol. 37 No. 5, pp. 1464-1479, doi: 10.1177/0149206310390219.

Hayes, A.F. (2022), *Introduction to Mediation, Moderation, and Conditional Process Analysis: a Regression-based Approach*, 3rd ed., Guilford, New York.

Heggestad, E.D., Scheaf, D.J., Banks, G.C., Monroe Hausfeld, M., Tonidandel, S. and Williams, E.B. (2019), "Scale adaptation in organizational science research: a review and best-practice recommendations", *Journal of Management*, Vol. 45 No. 6, pp. 2596-2627, doi: 10.1177/0149206319850280.

Helfat, C.E. and Winter, S.G. (2011), "Untangling dynamic and operational capabilities: strategy for the (n)ever-changing world", *Strategic Management Journal*, Vol. 32 No. 11, pp. 1243-1250.

Henseler, J. (2021), *Composite-Based Structural Equation Modeling: Analyzing Latent and Emergent Variables*, Guilford, New York.

Iftikhar, Y., Tufail, M.S., Ferasso, M. and Danish, R.Q. (2024), "Servant leadership and citizenship behavior in the Pakistani tourism and hospitality industry: the role of harmonious environmental passion and a green work climate", *Journal of Environmental Management*, Vol. 369, 122276, doi: 10.1016/j.jenvman.2024.122276.

Jaccard, J. and Turisi, R. (2003), *Interaction Effects in Multiple Regression*, 2nd ed., SAGE Publications, Thousand Oaks.

Joshi, G. and Dhar, R.L. (2020), "Green training in enhancing green creativity via green dynamic capabilities in the Indian handicraft sector: the moderating effect of resource commitment", *Journal of Cleaner Production*, Vol. 267, 121948, doi: 10.1016/j.jclepro.2020.121948.

Kar, S.K. and Harichandan, S. (2022), "Green marketing innovation and sustainable consumption: a bibliometric analysis", *Journal of Cleaner Production*, Vol. 361, 132290, doi: 10.1016/j.jclepro.2022.132290.

Khan, A.N. and Khan, N.A. (2022), "The nexuses between transformational leadership and employee green organisational citizenship behaviour: role of environmental attitude and green dedication", *Business Strategy and the Environment*, Vol. 31 No. 3, pp. 921-933.

Khan, S.Z., Yang, Q. and Waheed, A. (2019), "Investment in intangible resources and capabilities spurs sustainable competitive advantage and firm performance", *Corporate Social Responsibility and Environmental Management*, Vol. 26 No. 2, pp. 285-295, doi: 10.1002/csr.1678.

Kim, J., Ali, M. and Roh, T. (2025), "When Do green absorptive capacity and ambidextrous open innovation foster sustainable performance", *Business Strategy and the Environment*, Vol. 34 No. 7, pp. 9223-9241, forthcoming, doi: 10.1002/bse.70075.

Koentjoro, S. and Gunawan, S. (2020), "Managing knowledge, dynamic capabilities, innovative performance, and creating sustainable competitive advantage in family companies: a case study of a family company in Indonesia", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 6 No. 3, p. 90.

Latan, H. (2018), "PLS path modeling in hospitality and tourism research: the golden age and days of future past", in Ali, F., Rasoolimanesh, M.S. and Cobanoglu, C. (Eds), *Applying Partial Least Squares in Tourism and Hospitality Management*, Emerald, Bingley, pp. 53-83.

Li, W., Waris, I. and Bhutto, M.Y. (2024), "Understanding the nexus among big data analytics capabilities, green dynamic capabilities, supply chain agility and green competitive advantage: the moderating effect of supply chain innovativeness", *Journal of Manufacturing Technology Management*, Vol. 35 No. 1, pp. 119-140, doi: 10.1108/jmtm-07-2023-0263.

Lin, W.L., Ho, J.A., Sambasivan, M., Yip, N. and Mohamed, A. (2021), "Influence of green innovation strategy on brand value: the role of marketing capability and R&D intensity", *Technological Forecasting and Social Change*, Vol. 171, 120946.

Masri, H. and Jaaron, A.A.M. (2017), "Assessing green human resources management practices in Palestinian manufacturing context: an empirical study", *Journal of Cleaner Production*, Vol. 143, pp. 474-489, doi: 10.1016/j.jclepro.2016.12.087.

Merrilees, B., Rundle-Thiele, S. and Lye, A. (2011), "Marketing capabilities: antecedents and implications for B2B SME performance", *Industrial Marketing Management*, Vol. 40 No. 3, pp. 368-375, doi: 10.1016/j.indmarman.2010.08.005.

Milfont, T.L. and Duckitt, J. (2010), "The environmental attitudes inventory: a valid and reliable measure to assess the structure of environmental attitudes", *Journal of Environmental Psychology*, Vol. 30 No. 1, pp. 80-94, doi: 10.1016/j.jenvp.2009.09.001.

Miller, B.K. and Simmering, M.J. (2023), "Attitude toward the color blue: an ideal marker variable", *Organizational Research Methods*, Vol. 26 No. 3, pp. 409-440, doi: 10.1177/10944281221075361.

Mubeen, A., Nisar, Q.A., Patwary, A.K., Rehman, S. and Ahmad, W. (2023), "Greening your business: nexus of green dynamic capabilities, green innovation and sustainable performance", *Environment, Development and Sustainability*, Vol. 26 No. 9, pp. 22747-22773, doi: 10.1007/s10668-023-03574-6.

Na, Y.K., Kang, S. and Jeong, H.Y. (2019), "The effect of market orientation on performance of sharing economy business: focusing on marketing innovation and sustainable competitive advantage", *Sustainability*, Vol. 11 No. 3, p. 729, doi: 10.3390/su11030729.

Papadas, K.K., Avlonitis, G.J., Carrigan, M. and Piha, L. (2019), "The interplay of strategic and internal green marketing orientation on competitive advantage", *Journal of Business Research*, Vol. 104, pp. 632-643, doi: 10.1016/j.jbusres.2018.07.009.

Park, S. and Gupta, S. (2012), "Handling endogenous regressors by joint estimation using copulas", *Marketing Science*, Vol. 31 No. 4, pp. 567-586, doi: 10.1287/mksc.1120.0718.

Pavlou, P.A. and El Sawy, O.A. (2011), "Understanding the elusive black box of dynamic capabilities", *Decision Sciences*, Vol. 42 No. 1, pp. 239-273, doi: 10.1111/j.1540-5915.2010.00287.x.

Pereira-Moliner, J., Molina-Azorín, J.F., Tarí, J.J., López-Gamero, M.D. and Pertursa-Ortega, E.M. (2021), "How do dynamic capabilities explain hotel performance?", *International Journal of Hospitality Management*, Vol. 96, 102988.

Pfeffer, J. (2010), "Building sustainable organizations: the human factor", *Academy of Management Perspectives*, Vol. 24 No. 1, pp. 34-45, doi: 10.5465/amp.24.1.34.

Pinheiro, A.B., dos Santos, J.I.A.S., Cherobim, A.P.M.S. and Segatto, A.P. (2023), "What drives environmental, social and governance (ESG) performance? The role of institutional quality", *Management of Environmental Quality: An International Journal*, Vol. 35 No. 2, pp. 427-444, doi: 10.1108/meq-03-2023-0091.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.-Y. and Podsakoff, N.P. (2003), "Common method biases in behavioral research: a critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88 No. 5, pp. 879-903, doi: 10.1037/0021-9010.88.5.879.

Porter, M. and van der Linde, C. (1995), "Toward a new conception of the environment-competitiveness relationship", *The Journal of Economic Perspectives*, Vol. 9 No. 4, pp. 97-118, doi: 10.1257/jep.9.4.97.

Qiu, L., Jie, X., Wang, Y. and Zhao, M. (2020), "Green product innovation, green dynamic capability, and competitive advantage: evidence from Chinese manufacturing enterprises", *Corporate Social Responsibility and Environmental Management*, Vol. 27 No. 1, pp. 146-165, doi: 10.1002/csr.1780.

Rahman, S., Adeel, H., Ali, M., Bajaba, S. and Latan, H. (2025), "Power of green capabilities and artificial intelligence (AI): understanding how and when green innovation promotes sustainability", *Business Strategy and the Environment*, bse.70252, forthcoming, doi: 10.1002/bse.70252.

Roh, T., Noh, J., Oh, Y. and Park, K.-S. (2022), "Structural relationships of a firm's green strategies for environmental performance: the roles of green supply chain management and green marketing innovation", *Journal of Cleaner Production*, Vol. 356, 131877, doi: 10.1016/j.jclepro.2022.131877.

Teece, D.J., Pisano, G. and Shuen, A. (1997), "Dynamic capabilities and strategic management", *Strategic Management Journal*, Vol. 18 No. 7, pp. 509-533, doi: 10.1002/(sici)1097-0266(199708)18:7<509::aid-smj882>3.0.co;2-z.

United Nations (2024), *The Sustainable Development Goals Report 2024*, Department of Economic and Social Affairs, United nations, available at: https://unstats.un.org/sdgs/report/2024/ (accessed 15 July 2024).

Vanderweele, T.J. (2015), *Explanation in Causal Inference: Methods for Mediation and Interaction*, Oxford University Press, New York.

Wang, C.L. and Ahmed, P.K. (2007), "Dynamic capabilities: a review and research agenda", *International Journal of Management Reviews*, Vol. 9 No. 1, pp. 31-51, doi: 10.1111/j.1468-2370.2007.00201.x.

Wilden, R., Gudergan, S.P., Nielsen, B.B. and Lings, I. (2013), "Dynamic capabilities and performance: strategy, structure and environment", *Long Range Planning*, Vol. 46 Nos 1-2, pp. 72-96, doi: 10.1016/j.lrp.2012.12.001.

Wooldridge, J.M. (2020), *Introductory Econometrics: a Modern Approach*, 7th ed., Cengage Learning, Boston, MA.

Zameer, H., Wang, Y., Vasbieva, D.G. and Abbas, Q. (2021), "Exploring a pathway to carbon neutrality via reinforcing environmental performance through green process innovation, environmental orientation and green competitive advantage", *Journal of Environmental Management*, Vol. 296, 113383, doi: 10.1016/j.jenvman.2021.113383.

Zhang, J.A. and Walton, S. (2017), "Eco-innovation and business performance: the moderating effects of environmental orientation and resource commitment in green-oriented SMEs", *R&D Management*, Vol. 47 No. 5, pp. E26-E39.

Corresponding author
Murad Ali can be contacted at: murad2.ali@northumbria.ac.uk