

Green marketing practices and financial performance of manufacturing firms: The moderating role of organizational culture



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Abstract This paper investigated the moderating role of organizational culture on the relationship amid green marketing practices as well as financial performance of manufacturing firms. The survey utilized a self-administered questionnaire approach, gathering a total of 270 completed responses for data analysis utilizing Smart PLS-SEM (version 4). The study noted the occurrence of a significant positive relationship amid green internal marketing as well as financial performance. Second, there is a significant positive effect amid green marketing communication as well as financial performance. Third, there is a significant negative relationship amid green strategy as well as financial performance. However, the connection amid green product as well as financial performance is insignificant. Moreover, organizational culture has a significant moderation effect on the relationship amid green strategy as well as financial performance. Furthermore, organizational culture has a significant moderation effect on the relationship amid green product as well as financial performance. In addition, organizational culture has a significant moderation effect on the relationship amid green marketing communication and financial performance. However, organizational culture has an insignificant moderating effect on the relationship among green internal marketing as well as financial performance. This investigation underscores the necessity of adopting a comprehensive strategy to enhance the financial performance of firms. Managers must focus on strategic alignment, leadership commitment, employee engagement, effective communication, and continuous improvement to foster a culture that supports green marketing initiatives.

Keywords: green strategy, green internal marketing, green marketing communication, financial performance

1. Introduction

The increasing awareness of environmental sustainability has prompted manufacturing firms to adopt green marketing practices, which involve promoting products on the basis of their environmental benefits and sustainability efforts (Kumar et al., 2020). While the acceptance of green marketing practices is seen as a strategic response to consumer demand for environmentally responsible products, the impression of these practices on financial performance, particularly in developing nations, remains a topic of ongoing debate and investigation (Khan et al., 2021; Ha et al., 2023).

Research indicates that green marketing can enhance a company's brand image, customer loyalty, and competitive advantage, potentially leading to improved financial outcomes (Leonidou et al., 2020). The execution of relevant management practices enhances the performance of manufacturing firms (Akuma et al., 2024a; Akuma et al., 2024b). However, the relationship between green marketing practices and financial performance is not straightforward. Factors such as the cost of implementing sustainable practices, market conditions, and consumer perceptions can influence this relationship (Delmas & Pekovic, 2019).

One critical factor that may moderate the relationship between green marketing practices and financial performance is organizational culture. Organizational culture, defined as the shared values, beliefs, and norms that influence how employees think and behave within an organization, plays a significant role in shaping how green marketing practices are implemented and perceived (Hartmann & Vachon, 2022). A culture that supports sustainability and innovation can facilitate the successful adoption of green marketing practices, enhancing their impact on financial performance (Gürlek & Tuna, 2019).

Conversely, in organizations where the culture does not prioritize environmental sustainability or is resistant to change, green marketing initiatives may face significant challenges, limiting their effectiveness and financial benefits (Buciuniene & Kazlauskaitė, 2021). Thus, understanding the moderating role of organizational culture is essential for comprehensively evaluating the impact of green marketing practices on the financial performance of manufacturing firms.



Despite the recognition of organizational culture's importance, there is a paucity of empirical research examining how it influences the relationship between green marketing practices and financial performance in the manufacturing sector. Most studies have focused on the direct effects of green marketing or organizational culture independently, without exploring the interaction between these variables (Sharma et al., 2021). Addressing this gap is crucial for providing manufacturing firms with actionable insights into how they can align their marketing strategies with their organizational culture to achieve better financial outcomes.

While green marketing practices hold promise for enhancing financial performance in manufacturing firms, the moderating role of organizational culture remains underexplored. Studies such as those by Muisyo and Qin (2021) and Khan et al. (2022) highlight the importance of organizational culture but are among the few that delve into this aspect. This research aims to fill this gap by investigating how different organizational cultures influence the effectiveness of green marketing practices in driving financial performance, providing a nuanced understanding of the conditions under which these practices are most beneficial.

Moreover, existing research predominantly addresses firms in developed markets, where both sustainability practices and organizational cultures are more mature and institutionalized. This leaves a significant gap in understanding how these dynamics operate within developing countries, where cultural, economic, and regulatory contexts differ markedly (Hartmann & Vachon, 2020). Specifically, the objectives of this investigation are as follows:

- To assess the relationship between green strategy and financial performance.
- To examine the association between green internal marketing and financial performance.
- To evaluate the link between green products and financial performance.
- To examine the affiliation between green marketing communication and financial performance.
- To evaluate the moderating role of organizational culture in the relationship between green marketing practices and financial performance.

The subsequent sections of the paper will include literature summaries on green marketing practices, as well as the financial performance of manufacturing firms, followed by a presentation of the methodology of the investigation. The analysis and results provided in subsequent sections, with the paper concluding by discussing the findings and their theoretical and practical implications.

2. Literature Review

2.1. Theoretical foundation and hypotheses

Green marketing practices, financial performance and the moderating role of organizational culture constitute a complex interplay within the domain of manufacturing industries. This literature review aims to synthesize existing theoretical frameworks and literature to elucidate the relationships between these constructs.

2.2. Stakeholder theory (ST)

Stakeholder theory (ST) posits that firms are accountable to various stakeholders, including customers, employees, and communities, and must consider their interests in decision-making processes (Freeman, 2010). From this perspective, adopting green marketing practices serves to meet the expectations of environmentally conscious stakeholders, thereby enhancing firm reputation, legitimacy and, ultimately, sustainability performance (Lee & Park, 2019). Cogdill et al. (2017) recently revised the theory, asserting that companies should not concentrate solely on increasing their stock price without also taking into account the diverse groups and individuals impacted by the business's operations. These persons might ultimately become patrons or might be willing to assume some of the organization's risk (Cogdill et al., 2017). Recent advancements in stakeholder theory underscore the dynamic and interconnected nature of stakeholder relationships, emphasizing the significance of dialog, engagement, and collaboration between organizations and their stakeholders (Bansal & Roth, 2020).

Stakeholder theory has diverse applications across various domains, including corporate governance, strategic management, and sustainability. Organizations that adopt a stakeholder-oriented approach tend to focus on enduring value creation, balancing the interests of multiple stakeholders to enhance organizational resilience and legitimacy (Fassin & Van Rossem, 2022). Moreover, stakeholder theory provides a framework for addressing emerging challenges such as climate change, social inequality, and technological disruption, encouraging organizations to adopt proactive and inclusive strategies for sustainable development (Crane et al., 2023). Notably, organizational culture influences stakeholder engagement and commitment to sustainability goals, thereby shaping the effectiveness of green marketing strategies.

2.3. Institutional theory (IT)

IT, as originally formulated by DiMaggio and Powell (1983), emphasizes how institutional environments influence the development of formal structures in organizations. Key elements include isomorphism, coercivity, mimetics, and normativity,

through which organizations become similar over time due to pressures from regulatory bodies, cultural expectations, and professional standards (DiMaggio & Powell, 1983).

Institutional theory emphasizes the role of external pressures and institutional environments in shaping organizational behavior (Scott, 2014). Manufacturing firms operating in industries with strong regulatory frameworks or consumer demand for sustainable products are more likely to accept green marketing practices. Organizational culture acts as an internal mechanism through which these external pressures are interpreted and translated into strategic actions that support or hinder sustainability initiatives.

Scholars have further explored the interplay between institutional pressures and organizational responses. For example, Greenwood et al. (2020) highlight the role of institutional complexity, where organizations face conflicting demands from different institutional logics, leading to hybrid structures and practices. This complexity necessitates a more nuanced understanding of how organizations navigate and negotiate these competing pressures.

Additionally, the concept of institutional work has gained traction, with a focus on the actions of individuals and organizations aimed at creating, maintaining, and disrupting institutions (Lawrence et al., 2021). This perspective underscores the active role of agency within institutional theory, contrasting with earlier views that portrayed organizations as largely passive recipients of institutional pressures.

In the realm of corporate sustainability, institutional theory helps explain how and why firms adopt sustainable practices. Bansal and Song (2022) discuss how normative and coercive pressures drive organizations to incorporate sustainability into their business strategies. The growing emphasis on environmental, social, and governance (ESG) criteria by investors exerts normative pressure on firms to adopt more sustainable practices (Khan et al., 2023).

2.4. Resource-based view (RBV) theory

The RBV proposes that sustainable competitive advantage can be derived from valuable, rare, and nonsubstitutable resources (Barney, 1991). Firms leveraging these resources strategically through green strategies are likely to achieve superior financial performance outcomes over time (Hartmann & Vachon, 2022). Topical advancement within the RBV highlights the importance of resource orchestration, path dependence, and the role of context in shaping resource-based strategies (Eisenhardt & Martin, 2021).

RBV theory has significant implications for strategic management practices, informing decisions related to resource allocation, diversification, and innovation. Organizations that leverage their unique resources and capabilities can achieve superior performance and resilience in dynamic markets (Arend & Bromiley, 2022).

2.5. Social exchange theory (SET)

Social exchange theory suggests that when employees perceive organizational efforts toward sustainability as valuable and meaningful, they are more likely to reciprocate with increased commitment and effort (Blau, 1964). Green internal marketing (GIM) initiatives that foster a sense of purpose and alignment with employees' values can enhance job satisfaction, retention rates, and overall organizational performance (Wang et al., 2021).

Social exchange theory, originally developed by Blau (1964) and Homans (1958), suggests that human interactions are transactions where individuals seek to maximize their rewards and minimize their costs. In organizational contexts, SET has been used to analyze how employees' perceptions of fairness and support influence their behavior and performance (Cropanzano & Mitchell, 2005).

SETs involve key principles such as reciprocity, trust, and mutual benefit. When applied to workplace settings, this theory implies that positive exchanges between employers and employees, such as recognition, support, and fair treatment, can lead to increased employee engagement, commitment, and performance (Emerson, 1976).

2.6. Green strategy and financial performance of manufacturing firms

In response to global environmental challenges and regulatory pressures, manufacturing firms are increasingly adopting green strategies aimed at reducing their environmental impact and enhancing their sustainability (Delmas & Pekovic, 2019). Green strategies encompass a range of initiatives, including green product design, eco-friendly manufacturing processes, the adoption of renewable energy sources, and the implementation of sustainable supply chain practices (Sharma et al., 2021).

Green strategies in manufacturing involve integrating environmental considerations into core business activities and decision-making processes (Delmas & Pekovic, 2019). These strategies are motivated by various factors, including regulatory compliance, stakeholder expectations, competitive advantage, and corporate social responsibility (CSR) goals (Leonidou et al., 2020). Manufacturing firms implement green strategies to achieve operational efficiency, reduce the costs associated with resource consumption and waste management, and enhance brand reputation as environmentally responsible entities (Kumar et al., 2020).

Research indicates that firms adopting comprehensive green strategies can achieve multiple benefits, including improved environmental performance, enhanced market positioning, and potential cost savings through efficiency gains

(Sharma et al., 2021). Green strategy implementation often involves collaboration across functions, from research and development to production and marketing, to embed sustainability principles throughout the value chain (Delmas & Pekovic, 2019).

The financial performance of manufacturing firms is typically assessed through indicators such as profitability, return on investment (ROI), market share, and shareholder value (Kumar et al., 2020). The relationship between green strategy implementation and financial performance has garnered significant attention in the academic literature, with mixed empirical findings reflecting the complex nature of this relationship.

Studies suggest that firms committed to green strategies may experience initial costs associated with technology adoption and process redesign but can achieve long-term financial benefits (Delmas & Pekovic, 2019). For instance, Leonidou et al. (2020) argue that proactive green strategies can lead to enhanced brand equity, increased customer loyalty, and differentiation in competitive markets, thereby contributing positively to financial performance metrics.

Conversely, the financial impact of green strategies may vary depending on industry dynamics, regulatory environments, and consumer preferences (Sharma et al., 2021). Compared with firms operating in less environmentally sensitive industries, manufacturing firms operating in sectors with high regulatory scrutiny or strong consumer demand for sustainable products may realize greater financial returns from green investments.

This study is interested in the green strategy and financial performance of manufacturing firms, highlighting the complexities and opportunities associated with sustainability initiatives. By understanding these dynamics, manufacturing firms can develop strategies that leverage green investments to achieve competitive advantage and long-term profitability. Consequently, the following hypothesis is proposed:

H₁: There is a statistically significant relationship between a green strategy and financial performance.

2.6. Green internal marketing and the financial performance of manufacturing firms

Green internal marketing (GIM) has emerged as a strategic approach for manufacturing firms to engage employees in sustainability initiatives and align organizational goals with environmental stewardship (Akingbola et al., 2020). By fostering a culture of environmental responsibility and participation among employees, GIM aims to enhance organizational commitment to sustainability while potentially impacting financial performance indicators.

Green internal marketing involves promoting environmental sustainability initiatives and values among employees through effective communication, training, and engagement strategies (Wang et al., 2021). It emphasizes the role of employees as internal stakeholders who contribute to organizational sustainability goals through their daily activities and decision-making processes (Akingbola et al., 2020).

Manufacturing firms implement GIM to achieve several objectives, including improving employee awareness of environmental issues, encouraging pro-environmental behaviors, and fostering a sense of ownership and responsibility toward sustainability goals (Chen et al., 2021). Effective GIM initiatives integrate environmental considerations into organizational culture, policies, and practices, thereby influencing employee attitudes, behaviors, and organizational performance outcomes.

The financial performance of manufacturing firms is typically assessed through metrics such as profitability, return on investment (ROI), cost efficiency, and market competitiveness (Kumar et al., 2020). The relationship between GIM and financial performance is complex and context-specific and is influenced by factors such as organizational culture, industry dynamics, and market conditions.

Empirical research has proposed that manufacturing firms that invest in GIM initiatives can achieve tangible financial benefits over time (Wang et al., 2021). By engaging employees in sustainability efforts, firms may increase their operational efficiency, reduce their resource consumption, and lower the costs associated with waste management and environmental compliance (Akingbola et al., 2020). These efficiency gains contribute to improved profitability and competitive advantage, positioning firms as leaders in sustainable business practices.

Conversely, the financial impact of GIM initiatives may vary on the basis of the extent of employee engagement, management support, and the integration of sustainability into core business strategies (Chen et al., 2021). Firms with robust GIM practices are better equipped to navigate regulatory pressures, meet stakeholder expectations, and capitalize on market opportunities related to sustainable products and services.

GIM and financial performance in manufacturing firms highlight the strategic implications of engaging employees in sustainability efforts. By understanding these dynamics, manufacturing firms can develop and implement GIM strategies that enhance competitive advantage, promote sustainable business practices, and achieve long-term profitability. Consequently, the following hypothesis is proposed:

H₂: There is a statistically significant relationship between green internal marketing and sustainability performance.

2.7. Green product and financial performance of manufacturing firms

The adoption of green products by manufacturing firms has become increasingly prevalent as businesses respond to environmental concerns and regulatory pressures while seeking competitive advantage (Delmas & Pekovic, 2019). Green

products are designed to minimize their environmental impact throughout their lifecycle, from raw material extraction to disposal, and are marketed on the basis of their sustainability attributes (Leonidou et al., 2020).

Green products in manufacturing encompass a wide range of goods designed with environmental considerations in mind, such as reduced energy consumption, recyclability, and the use of sustainable materials (Kumar et al., 2020). These products aim to meet consumer demand for environmentally friendly alternatives while complying with regulatory standards and enhancing corporate reputation as environmentally responsible entities (Sharma et al., 2021).

Manufacturing firms adopt green products as part of broader sustainability strategies to differentiate themselves in competitive markets, attract environmentally conscious consumers, and mitigate risks associated with environmental regulations and resource scarcity (Leonidou et al., 2020). Green product innovation involves research and development efforts to integrate environmental features into existing product lines or create entirely new eco-friendly offerings that align with market preferences and regulatory requirements (Delmas & Pekovic, 2019).

Financial performance outcomes in manufacturing firms are typically evaluated through metrics such as profitability, return on investment (ROI), market share, and brand equity (Kumar et al., 2020). The relationship between green product adoption and financial performance is complex and is influenced by factors such as consumer preferences, competitive dynamics, and operational efficiencies associated with sustainable production processes.

Empirical research suggests that manufacturing firms that invest in green product innovation can achieve competitive advantages and financial benefits over time (Sharma et al., 2021). Green products often command price premiums because of their perceived environmental benefits and appeal to a growing segment of environmentally conscious consumers willing to pay more for sustainable products (Leonidou et al., 2020). This pricing strategy can contribute to increased revenue and profitability for firms that successfully differentiate themselves through green products.

Moreover, green product adoption can lead to operational efficiency and cost savings by optimizing resource use, reducing waste generation, and improving supply chain management practices (Delmas & Pekovic, 2019). These efficiency gains contribute to improved profitability and financial performance metrics, enhancing the overall sustainability of manufacturing operations.

The green product adoption and financial performance of manufacturing firms emphasize the strategic implications of sustainability-driven innovation. By understanding these dynamics, manufacturing firms can develop and implement green product strategies that align with market demands, regulatory requirements, and sustainability goals, thereby achieving competitive advantage and long-term profitability. Consequently, the following hypothesis is proposed:

H₃: There is a statistically significant relationship between green products and financial performance.

2.8. Green marketing communication and financial performance of manufacturing firms

Green marketing communication (GMC) has emerged as a strategic tool for manufacturing firms to communicate their environmental initiatives, values, and product offerings to consumers and stakeholders (Khan et al., 2020). Effective GMC strategies aim to enhance brand reputation, attract environmentally conscious consumers, and potentially influence financial performance metrics (Chen et al., 2021).

Green marketing communication encompasses a range of promotional activities aimed at highlighting a firm's commitment to environmental sustainability (Sharma et al., 2021). These activities include advertising, public relations campaigns, corporate social responsibility (CSR) reports, and digital marketing initiatives that emphasize eco-friendly practices, green product attributes, and sustainable supply chain management (Khan et al., 2020).

Manufacturing firms utilize GMC strategies to differentiate themselves in competitive markets, build trust with consumers, and enhance brand equity by demonstrating corporate social responsibility (Leonidou et al., 2020). GMC initiatives align organizational values with societal expectations regarding environmental stewardship, influencing consumer perceptions and purchasing behaviors (Sharma et al., 2021).

The financial performance outcomes of manufacturing firms are typically assessed through metrics such as profitability, return on investment (ROI), market share, and shareholder value (Chen et al., 2021). The relationship between GMC and financial performance is multifaceted and influenced by factors such as consumer responsiveness to environmental messaging, competitive dynamics, and organizational capabilities in delivering green promises.

Empirical research suggests that manufacturing firms that implement effective GMC strategies can achieve competitive advantages and financial benefits over time (Khan et al., 2020). Green messaging resonates with a growing segment of environmentally conscious consumers who prioritize sustainability when making purchasing decisions, leading to increased sales, brand loyalty, and market share gains (Leonidou et al., 2020).

Moreover, GMC initiatives contribute to brand differentiation and perceived value, enabling firms to command price premiums for green products and services (Sharma et al., 2021). These pricing strategies, coupled with operational efficiencies from sustainable practices, can enhance profitability and overall financial performance metrics.

The GMC and financial performance of manufacturing firms accentuate the strategic implications of leveraging environmental messaging to achieve business objectives. By understanding these dynamics, manufacturing firms can develop

and implement GMC strategies that resonate with stakeholders, strengthen brand equity, and contribute to sustainable growth and profitability. Consequently, the following hypothesis is proposed:

H4: There is a statistically significant relationship between green marketing communication and financial performance.

2.9. Moderating role of organizational culture

Organizational culture refers to the shared values, beliefs, norms, and behaviors that shape how employees perceive and respond to organizational initiatives (Hartmann & Vachon, 2022). Moreover, organizational culture refers to shared values, beliefs, norms, and behaviors that influence how employees perceive and respond to organizational initiatives (Freeman, 2020). A strong culture supportive of environmental sustainability is likely to facilitate the successful implementation and integration of green marketing practices within manufacturing firms (Gürlek & Tuna, 2019). Such cultures promote employee engagement, innovation in sustainable practices, and alignment with strategic objectives focused on long-term sustainability goals.

Recent research highlights the importance of aligning organizational culture with green marketing efforts. Firms with a strong culture of sustainability are more responsive to institutional pressures and more adept at integrating green practices into their core operations (Bansal & Song, 2022). Such cultures promote internal commitment to sustainability goals, which can translate into improved financial outcomes through enhanced operational efficiency and competitive advantage (Buciuniene & Kazlauskaite, 2021).

Conversely, organizations with a culture resistant to change may struggle to implement green marketing practices effectively, resulting in superficial compliance rather than genuine environmental commitment (Wright & Nyberg, 2021). Moreover, organizational cultures that are resistant to change or do not prioritize sustainability may hinder the effectiveness of green marketing initiatives (Buciuniene & Kazlauskaite, 2021). Weak or conflicting cultures with respect to sustainability may face challenges in implementing effective green marketing practices (Sharma et al., 2021). Resistance to change, a lack of management support, and conflicting priorities within the organization can hinder the adoption and success of sustainability initiatives, limiting their potential to contribute positively to financial performance (Hartmann & Vachon, 2022).

Moreover, leadership's role in fostering a sustainability-oriented culture is critical. Leaders who champion environmental values and demonstrate commitment to green initiatives can inspire and motivate employees, leading to a more cohesive and proactive approach to green marketing (Eccles et al., 2019). A lack of support from top management, inadequate resources for green initiatives, and conflicting priorities within the organization can undermine the implementation of sustainable practices and diminish their impact on financial performance (Sharma et al., 2021).

Empirical studies suggest a significant relationship between the organizational culture and financial performance of manufacturing firms. Cameron and Quinn (2019) argue that firms with a strong culture characterized by values such as innovation, customer focus, and teamwork tend to outperform competitors. Such cultures foster employee engagement and commitment, which can lead to higher productivity and operational efficiency, ultimately positively impacting financial performance.

Conversely, organizations with dysfunctional or negative cultures may experience lower employee morale, higher turnover rates, and decreased productivity, which can adversely affect financial outcomes (Schein, 2019). The alignment of organizational culture with strategic goals and market demands is critical for leveraging cultural strengths to achieve sustainable financial performance (Hofstede, 2020).

The integration of green marketing practices is significantly influenced by organizational culture, which shapes the adoption, implementation, and outcomes of sustainability initiatives. A supportive organizational culture fosters innovation, employee engagement, and strategic alignment with green marketing objectives, thereby enhancing the effectiveness of sustainability efforts. Moreover, organizational culture significantly influences financial performance in manufacturing firms by shaping employee behaviors, operational practices, and strategic decision-making processes. A strong and positive culture aligned with strategic goals enhances employee engagement, fosters innovation, and improves operational efficiency, thereby contributing to superior financial outcomes. Consequently, the following hypotheses have been suggested (Figure 1):

H5: There is a statistically significant moderation effect of organizational culture on the relationship between green marketing practices and financial performance.

H5a: There is a statistically significant moderation effect of organizational culture on the relationship between green strategy and financial performance.

H5b: There is a statistically significant moderation effect of organizational culture on the relationship between green internal marketing and financial performance.

H5c: There is a statistically significant moderation effect of organizational culture on the relationship between green products and financial performance.

H5d: There is a statistically significant moderation effect of organizational culture on the relationship between green marketing communication and financial performance.

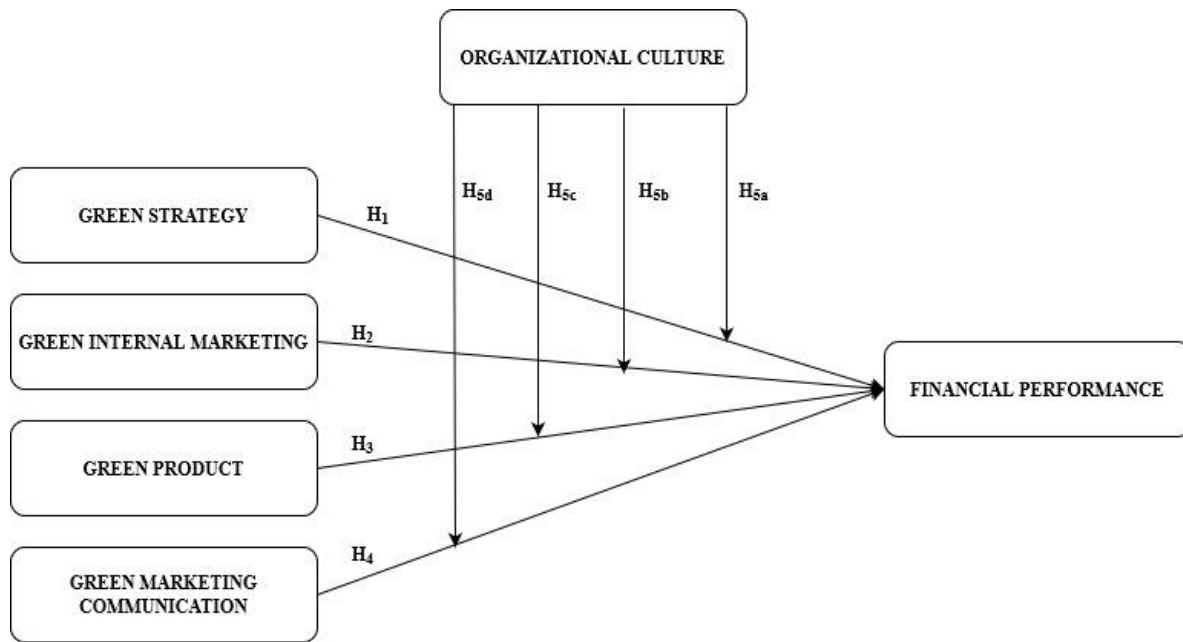


Figure 1 Conceptual framework.

3. Methodology

3.1. Survey instrument

The survey instrument was created by selecting questionnaires from the literature to assess the research model's constituent parts. Using information from a survey sample, the study assessed the validity and reliability of the instrument and tested the proposed relations. The question types used to assess green marketing practices have been modified (Mahmoud et al., 2017; Hossain & Khan, 2018; Vilkaite -Vaitone et al., 2022). Additionally, the questions used for sustainability performance were modified (Hasan & Aliyu, 2017). For the investigation, a 5-point Likert scale was used. Notably, two academic faculties (marketing and finance) assessed the content validity of the initial survey.

3.2. Sampling and data collection

This cross-sectional survey design targeted 634 manufacturing firms registered with the Association of Ghana Industries (AGI) as of 2024. These firms were categorized on the basis of their respective products. The study relied on the Krejcie and Morgan (1970) formula below to determine the minimum sample size.

$$S = \frac{X^2NP(1-P)}{d^2(N-1)+X^2P(1-P)} \quad (1)$$

where:

S = the required sample size.

X² = the table value of the chi-square for 1 degree of freedom at the desired confidence level (3.841)

N = the population size

P = the population proportion assumed to be 0.5 since this would provide a maximum sample size

d = the degree of accuracy expressed as a proportion (0.05)

According to the sample size determination formula of Krejcie and Morgan (1970), with a target population of 634 registered manufacturing firms, the minimum sample size required for this survey at a 95% confidence level and a 0.05 margin of error is 242. To attain this mark, 282 questionnaires were dispersed via Google Forms via simple random sampling techniques. A total of 270 questionnaires were retrieved, yielding a response rate of 95.7%. A manager from each firm completed one set of questionnaires. The manufacturing firms in the study are well known both domestically and abroad for their visibility and adoption of sustainable practices. The participants received a cover letter outlining the study's objectives and eligibility prior to the commencement of the survey. The participants were asked informally by researchers about whether they were interested in taking part in the study. After expressing interest, those who requested to fill out the questionnaire were asked to do so voluntarily.

4. Results and Discussion

4.1. Profile of respondents



In total, 270 valid responses were collected and used for statistical analysis. Of these, 64.5% (n=174) were males, and 35.5% (n=96) were females, indicating a greater number of male respondents than female respondents. The study employed the age classifications recommended by Yarlagadda et al. (2015), namely, young adults (<31 years), middle-aged adults (31 to 50 years) and senior adults (>50 years).

The study revealed that 39% (n=104) of the respondents were young adults, 53% (n=142) were middle-aged adults, and 8% (n=24) were senior adults, indicating that middle-aged managers composed the majority of the respondents. This suggests that the respondents are mature and experienced, making them well positioned and providing insights into the management accounting practices of manufacturing firms.

With respect to the positions held by the respondents, 16.7% (n=45) were chief executive officers (CEOs) or general managers, 58.7% (n=158) were senior managers, 12.5% (n=34) were board members, and 12.1% (n=33) were middle-level managers. This indicates that senior managers and CEOs together constituted 75.4% (n=203) of the respondents. These top-level employees, with their extensive experience, are thus capable of providing high-quality responses regarding their green marketing practices.

4.2. Data analysis

Statistical analysis was carried out via Smart PLS (version 4.0) software in an attempt to compare the interrelationship between green marketing practices and sustainability performance outcomes (Ringle et al., 2022). PLS-SEM was used because it is more flexible in handling various modeling challenges than the difficult and strict assumption related to the use of multivariate statistics (Boonlertvanich, 2019).

Hair et al. (2019) suggested that the number of pointers assessing a concept in the structural model should be 0.70 for investigations that utilize validated concepts to guarantee the dependability of the research items. This is due to the indication explaining more than 50% of the variance of the indicator. Because this investigation utilized validated constructs from prior research, a reliability test was conducted utilizing the indicators, employing a minimal reliability criterion of 0.70.

4.3. Evaluation of the measurement model

We appraised the measurement model via PLS-SEM (version 4). Six components composed the conceptual outline of this investigation, namely, financial performance, green internal marketing, green marketing communication, green products, green strategies and organizational culture.

To appraise the measurement model, the construct reliability, convergent validity, and discriminant validity of the six constructs were evaluated (Hair et al., 2019; Hanafiah, 2020). Reliability is established if Cronbach's alpha, composite reliability (rho_a), and composite reliability (rho_c) are all above 0.7. Additionally, to establish convergent validity, the average variance extracted (AVE) must exceed 0.5 (Ringle et al., 2022). Table 1 shows that the items, as well as the constructs in this investigation, had adequate degrees of convergent validity as well as reliability for each of the six constructs used in this investigation.

Table 1 Cronbach's alpha, composite reliability Rho_a and composite reliability rho_c.

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
FP	0.941	0.954	0.955	0.808
GIM	0.780	0.804	0.872	0.695
GMC	0.932	0.943	0.952	0.831
GP	0.902	1.057	0.921	0.701

Note: FP = Financial performance, GIM = Green internal marketing, GMC = Green marketing communication, GP = Green product, GS = Green strategy, OC = Organizational culture.

We used the most conservative method, the heterotrait–monotrait (HTMT) ratio, to evaluate discriminant validity (Henseler et al., 2015). The HTMT ratio has also recently been proven to be a better evaluation standard than other conventional appraisal techniques (Henseler et al., 2015). To prove discriminant validity, each concept's HTMT ratio needs to be less than 0.9. (Ringle et al., 2022). The findings of the HTMT are presented in Table 2, which reveals satisfactory discriminant validity.

4.4. Evaluation of the structural model

The structural model must be appraised to scrutinize the interrelationship among green marketing practices and financial performance. Consequently, the hypotheses of the investigation were tested.

4.5. Collinearity assessment

Collinearity among latent variables is evaluated via the variance inflation factor (VIF). A VIF of 5 or higher indicates a potential collinearity issue (Hair et al., 2011). The results shown in Table 3 indicate that all values are below 5, suggesting that

the model does not have any collinearity concerns (table 3). Thus, the model is not affected by common method bias (Kock, 2015).

Table 2 Discriminant validity assessment (HTMT).

	FP	GIM	GMC	GP	GS
GIM	0.601				
GMC	0.325	0.790			
GP	0.407	0.809	0.618		
GS	0.165	0.743	0.724	0.700	
OC	0.417	0.757	0.565	0.734	0.680

Table 3 Inner VIF.

	VIF
GIM -> FP	3.919
GMC -> FP	2.307
GP -> FP	2.160
GS -> FP	2.806

The significance of the path coefficients should be evaluated, together with the R-square (R^2) and the Stone–Geisser criterion (Q^2) for green marketing practices and financial performance, to appraise the structural model (Hair et al., 2017). Moreover, the R^2 value of 0.607 for financial performance is regarded as a medium score (Ali et al., 2017). This finding indicates that 60.7% of the four predictors are explained by the variance in financial performance. The variance explained above the minimum threshold R^2 assessment was 25% (Hair et al., 2016).

According to Ali et al. (2018), the assessment of Q^2 should be greater than zero to show that a structural model is prognostic. In this situation, we observed a Q^2 assessment of 0.459 for financial performance. These numbers demonstrate the model's good predictive ability.

4.6. Hypothesis testing (Direct effect)

In terms of the direct effect, three of the four direct hypotheses were supported: green internal marketing to financial performance ($\beta = 0.442$, $p < 0.05$), green marketing communication to financial performance ($\beta = 0.327$, $p < 0.05$), and green strategy to financial performance ($\beta = -0.779$, $p < 0.05$). However, the relationship between green products and financial performance is insignificant ($\beta = 0.152$, $p = 0.099$) (Table 4).

Table 4 Hypothesis analysis.

	Original sample (O)	f - square	T statistics (O/STDEV)	P values	Decision
GIM -> FP	0.442	0.126	6.676	0.000	Supported
GMC -> FP	0.327	0.051	4.181	0.000	Supported
GP -> FP	0.152	0.015	1.648	0.099	Not Supported
GS -> FP	-0.779	0.279	6.790	0.000	Supported

The investigation also appraised the effect size (f^2), which is a measure of whether a certain exogenous construct significantly affects an outcome variable. Subject to Cohen's (1988) suggestion, the results of the investigation revealed that green internal marketing has a small effect on financial performance. Moreover, green marketing communication has a small effect on financial performance. Notably, the green strategy has a medium effect size on financial performance. Nevertheless, green products have no effect on financial performance.

4.7. Moderation effect

One of the current research hypotheses aims to evaluate the moderating role of organizational culture in the relationship between green marketing practices and the financial performance of manufacturing firms. Moderation refers to a state in which the relationship between two constructs is not continuous but hinges on the value of a third variable denoted as a moderator variable (Hair et al., 2017).

In this context, the appraisal of the moderation effect was applied. Notably, organizational culture has a significant moderation effect ($\beta = 0.670$, $p < 0.01$) on the relationship between green strategy and financial performance. Furthermore, organizational culture has a significant moderation effect ($\beta = 0.230$, $p < 0.05$) on the relationship between green products and financial performance. Moreover, organizational culture has a significant moderation effect ($\beta = -0.561$, $p < 0.01$) on the relationship between green marketing communication and financial performance. However, organizational culture has an

insignificant moderating effect on the relationships among green internal marketing ($\beta = 0.121$, $p > 0.05$) and financial performance (Table 5).

Table 5 Hypothesis testing (moderation effect).

	Original sample (O)	f square	T statistics (O/STDEV)	P values	Decision
OC x GS -> FP	0.670	0.329	8.412	0.000	Supported
OC x GIM -> FP	0.089	0.004	0.909	0.363	Not supported
OC x GP -> FP	0.230	0.039	3.193	0.001	Supported
OC x GMC -> FP	-0.561	0.105	5.019	0.000	Supported

Table 5 shows that the moderating role of organizational culture has a strong effect on the relationship between green strategy ($f^2 = 0.329$) and financial performance. Furthermore, the moderating role of organizational culture had a medium effect size on the relationship between green products ($f^2 = 0.039$) and financial performance. Moreover, the moderating role of organizational culture has a large effect on the relationship between green marketing communication ($f^2 = 0.105$) and financial performance. However, the moderating role of organizational culture has no effect on the relationships among green internal marketing ($f^2 = 0.004$) or financial performance (Figueiredo et al., 2018).

4. Conclusions

Grounded in stakeholder theory, institutional theory, resource-based theory, and social exchange theory, this investigation contrasts the moderating role of organizational culture on the relationships among green marketing practices and the financial performance of manufacturing firms. Our results provide actual evidence that organizational culture plays a critical role in moderating the relationship between green marketing practices and the financial performance of manufacturing firms.

Overall, three of the four hypotheses related to the direct effect were supported. The study noted the presence of a significant positive relationship between green internal marketing and financial performance. This implies that manufacturing firms employ employees on the basis of their record in championing environmental activities, train their staff regularly in the firms' green marketing strategy and present their environmental and financial reports every year. These practices attract the patronage of environmentally conscious customers, which helps improve their financial performance.

Similarly, the relationship between green marketing communication and financial performance was also positively significant. This means that the practice of putting eco-labels on product packages and the websites of the firms as well as highlighting their eco-friendly products in advertisements attracted many customers to purchase their products and increased their profits.

In addition, there is a significant negative connection between a green strategy and financial performance. This implies that as firms focus less on the promotion of environmental preservation, their financial performance improves. The intuition here is that the awareness of a green strategy in a developing country such as Ghana has not reached the level needed to increase the financial performance of firms. However, the relationship between green products and financial performance is insignificant (Table 4).

The results of the investigation revealed that the moderating role of organizational culture has a large effect on the relationship between green strategy and financial performance. Furthermore, the moderating role of organizational culture had a medium effect size on the relationship between green products and financial performance. Moreover, the moderating role of organizational culture has a large effect on the relationship between green marketing communication and financial performance. However, the moderating role of organizational culture has no effect on the relationships among green internal marketing and financial performance.

Implicatively, manufacturing firms that engage in green internal marketing (such as looking at the environmental achievements of job seekers and contractors before engaging them as well as the annual presentation of environmental reports) are more likely to enhance their financial performance (FP). The improvements in FP include higher sales, profits, cash flows and market share. Furthermore, incorporating green marketing communication (such as using eco-friendly items that decay easily such as paper in packaging products, putting eco-friendly information on websites and engaging in green advertisements) leads to an increase in the FP of manufacturing firms. The improvements in FP include increases in overall sales, market share, operating profit, return on assets and operating cash flows. Moreover, a green strategy negatively contributes to the financial performance of manufacturing firms. Consequently, a minimum level of dialog with stakeholders about the environmental aspects of a firm can lead to greater financial performance and vice versa. Notably, even though green products are positively related to the financial performance of manufacturing firms, they do not significantly lead to favorable financial performance.

The next hypothesis considers the moderating role of organizational culture (OC) in the relationship between green marketing practices and the financial performance of manufacturing firms. The study noted the presence of a significant positive moderation effect of organizational culture on the relationships among green strategy and financial performance.

Similarly, the moderating role of organizational culture in the relationship between green products and financial performance was also significant. In addition, there is a significant negative moderating role of organizational culture on the connection between green marketing communication and financial performance. However, the moderating role of organizational culture in the relationship between green internal marketing and financial performance is insignificant (Table 5). Importantly, OC positively moderates the relationship between GS and FP such that OC strengthens the relationship between GS and FP. Furthermore, OC positively moderates the relationship between GP and FP such that OC strengthens the relationship between GP and FP. Moreover, OC negatively moderates the relationship between GMC and FP such that OC weakens the positive relationship between GMC and FP. However, there was no interaction effect of organizational culture on the relationship between green internal marketing and financial performance.

Green marketing practices play a pivotal role in shaping the financial performance of manufacturing firms, offering opportunities to reduce environmental impacts, enhance stakeholder relationships, and drive competitive advantage. The findings suggest that manufacturing firms can effectively leverage green marketing practices to increase their financial performance to meet growing consumer demand for sustainable products, comply with regulatory requirements, and enhance corporate reputation.

Overall, the relationship between green marketing practices and the financial performance of manufacturing firms in developing countries is complex and multifaceted. While there are significant challenges, including limited resources, consumer awareness, and regulatory environments, the potential benefits are substantial. Enhanced brand image, customer loyalty, operational efficiency, access to new markets, and investment opportunities can all positively impact financial performance. The keys to success lies in effectively integrating green marketing into corporate strategies and leveraging market opportunities while addressing the unique challenges faced in developing countries.

Organizational culture plays a critical moderating role in the relationship between green marketing practices and the financial performance of manufacturing firms in developing countries. A supportive culture can enhance the effectiveness of green practices, leading to better financial outcomes. In contrast, a resistant culture can hinder implementation and reduce potential benefits. Firms must focus on fostering a culture that values sustainability, addresses resistance to change, and leverages local cultural strengths to maximize the financial benefits of green marketing practices.

5. Theoretical Implications

Our study establishes a critical linkage between green marketing practices and the financial performance of manufacturing firms. Consequently, this study contributes to the investigation of green marketing practices as well as financial performance. This investigation enhances the pertinent inquiry by focusing on the aforementioned constructs.

Furthermore, the conceptualization of the moderating role of organizational culture on the link between green marketing practices and the financial performance of manufacturing firms offers a new direction for inquiry to increase knowledge of financial performance while also empowering manufacturing firms to adopt green marketing initiatives in an attempt to be competitive.

By analyzing the moderating role of organizational culture on the connections among green marketing practices and the financial performance of manufacturing firms, this investigation significantly adds to the body of knowledge. To ensure that the inquiry is pertinent and legitimate in the particular context of interest, the modified measurement of latent constructs in the study is essential. This can result in a more precise and detailed understanding of the connections between the different constructs and offer insightful information.

Manufacturing firms that effectively integrate sustainability into their marketing strategies can develop unique capabilities, such as eco-design, green branding, and environmental certifications, which enhance their sustainability performance. By aligning marketing strategies with sustainability goals, manufacturing firms can build trust and legitimacy with stakeholders, leading to enhanced reputation and long-term relationships.

The adoption of green marketing practices by manufacturing firms can be influenced by institutional pressures from regulatory agencies, industry associations, and societal norms. As green marketing practices become more widespread, they contribute to mainstream sustainability within the manufacturing sector, driving broader societal change.

6. Managerial Implications

The findings of this analysis have many implications. First, the moderating role of organizational culture in the relationship between green marketing practices and financial performance underscores the need for a holistic approach to sustainability. Managers in developing countries must focus on strategic alignment, leadership commitment, employee engagement, effective communication, and continuous improvement to foster a culture that supports green marketing initiatives. By doing so, they can enhance both their sustainability efforts and financial performance, creating long-term value for their organizations.

Moreover, this study facilitates the reduction of environmental footprints throughout the product lifecycle. By incorporating sustainability criteria into product design, production processes, and supply chain management, firms can

minimize resource consumption, pollution, and waste generation, thereby mitigating environmental risk and improving ecological efficiency.

Furthermore, green marketing practices contribute to stakeholder engagement and relationship building. By transparently communicating their sustainability initiatives and achievements, manufacturing firms can foster trust and loyalty among environmentally conscious consumers, investors, and communities. This not only enhances brand equity but also strengthens social licenses to operate and reduces reputational risk associated with environmental controversies.

In addition, there is a need for strategic alignment between sustainability objectives and overall business goals. Manufacturing firms must integrate environmental considerations into their strategic planning processes, ensuring that sustainability initiatives are aligned with core competencies, market positioning, and long-term growth objectives. This requires proactive engagement from top management, clear articulation of sustainability priorities, and allocation of resources to support green initiatives across the organization.

Green marketing practices offer manufacturing firms opportunities for innovation and differentiation in increasingly competitive markets. By investing in eco-design, sustainable sourcing, and green technologies, firms can develop innovative products and processes that reduce environmental impacts while meeting customer needs and preferences. This not only enhances market competitiveness but also strengthens brand identity and fosters customer loyalty, driving long-term profitability and market share growth.

Effective green marketing practices can also serve as a strategic tool for risk management, helping manufacturing firms mitigate environmental risks and regulatory compliance challenges. By proactively addressing environmental issues through transparent communication, stakeholder engagement, and responsible product stewardship, firms can reduce the likelihood of environmental liabilities, reputational damage, and regulatory sanctions. This requires proactive monitoring of environmental trends, adoption of best practices, and integration of sustainability into risk assessment and management processes.

Transparency and accountability are essential principles underpinning effective green marketing practices. Manufacturing firms must communicate transparently with stakeholders about their sustainability initiatives, performance, and progress toward environmental goals. This requires robust reporting mechanisms, adherence to sustainability standards and certifications, and engagement with external stakeholders, including investors, customers, NGOs, and regulatory bodies. By demonstrating accountability for their environmental impacts and commitments, firms can build trust, credibility, and long-term relationships with stakeholders, enhancing brand reputation and market legitimacy.

7. Limitations and Recommendations for Future Research

First, only manufacturing firms in Ghana were included in our research sample. The universality of the findings should be confirmed in follow-up investigations using diverse samples. To provide a more thorough explanation of this link, future research could expand on additional potential components, such as organizational culture, information technology (IT) integration, the regulatory environment, consumer awareness and education.

Longitudinal studies from other cultures and nations at various stages of development may be included in future studies. Such multicountry analysis allows researchers to compare mean responses and the strength of correlations, which contributes to a more comprehensive knowledge of green marketing practices and their effects on the sustainability performance of manufacturing firms.

Delving into consumer perceptions, attitudes, and behaviors toward green marketing messages and sustainable products can enhance the understanding of drivers and barriers to adoption, informing more targeted marketing strategies.

Examining the dynamics of multistakeholder collaborations and partnerships aimed at advancing sustainability goals within manufacturing ecosystems can shed light on effective strategies for collective action and impact.

Additionally, future studies may consider exploring the application of circular economic principles, such as product lifecycle extension, remanufacturing, and closed-loop systems, in driving sustainability performance and creating shared value for manufacturing firms and their stakeholders.

Ethical Considerations

The authors declare that the respondents provided consent for the research to be conducted.

Conflict of interest

The authors declare that they have no conflicts of interest.

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