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Influence of Digital Marketing on Sustainable Supply Chain Innovation and Market Performance: Evidence from Saudi Arabia

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Abstract. This study investigates the strategic role of digital marketing in fostering sustainable supply chain innovation and improving market performance within the context of Saudi Arabia. Drawing on the Resource-Based View and dynamic capabilities theory, the research conceptualizes digital marketing not solely as a communication mechanism but as a strategic organizational resource capable of reshaping sustainability practices and strengthening competitive advantage. Using survey data collected from 100 respondents and analyzed through Partial Least Squares Structural Equation Modeling, the findings reveal that digital marketing has a positive and significant impact on both sustainable supply chain innovation and market performance. Specifically, digital marketing acts as a catalyst for sustainability-oriented innovation across supply chains while simultaneously contributing to enhanced performance outcomes, including higher sales, greater market share, and successful entry into new markets. These results highlight the dual contribution of digital marketing: aligning firms with environmental and social priorities while supporting superior competitive positioning. The study underscores the importance for managers to view digital marketing as a critical enabler of sustainable competitiveness. It also encourages future research to examine potential boundary conditions, including industry characteristics and levels of technological maturity.

Keywords: Digital marketing, Innovation, Market, Supply chain, Sustainability.

1. INTRODUCTION

In alignment with the principles of sustainable development, contemporary firms face growing pressure to implement innovations that simultaneously address economic, environmental, and social objectives commonly referred to as sustainable innovations. Although the relevance of such innovations has expanded considerably in response to global sustainability challenges, their effective integration into corporate strategy and operations remains complex. This complexity presents ongoing challenges for both scholars and practitioners, as firms attempt to reconcile short-term market imperatives with long-term sustainability commitments. While prior research has generated valuable insights into specific dimensions of sustainable innovation, the extant literature remains fragmented, often focusing on isolated aspects rather than providing an integrative synthesis.

To address this gap, the present study conducts a systematic review of many scholarly contributions, employing a structured methodology to organize and classify existing findings. The review identifies three dominant perspectives: internal managerial practices, external relational dynamics, and performance evaluation. Among these, relational dynamics particularly the integration of Digital Marketing (DM) into sustainability strategies emerge as both promising and underexplored. DM not only facilitates the communication of sustainability initiatives but also enhances stakeholder engagement and increases market awareness of eco-innovations. Despite this potential, the role of DM in advancing sustainable innovation has received limited scholarly attention compared to the prominence of internal managerial practices, while performance evaluation approaches remain insufficiently developed. This study contributes to the ongoing discourse by underscoring the strategic importance of DM as a catalyst for sustainable supply chain innovation and as a driver of market competitiveness. In doing so, it advances the literature by bridging theoretical fragmentation and opening new avenues for empirical inquiry into the interplay between digital strategies, sustainability, and organizational performance (Cillo et al., 2019).

2. THEORETICAL FRAMEWORK

Digital Marketing (DM) has increasingly been recognized as a transformative force reshaping how organizations communicate and engage with stakeholders. From the perspective of the Resource-Based View (RBV), DM can be conceptualized as a strategic capability that provides firms with sustainable competitive advantage. Through digital platforms, companies are able to reach broader audiences, tailor communication to diverse stakeholder needs, and monitor performance in real time (Smith, 2020; Johnson & Clark, 2021). At the same time, sustainability has emerged as a central pillar of corporate strategy, largely driven by the growing salience of environmental, social, and governance (ESG) imperatives. The Triple Bottom Line (TBL) framework underscores the necessity for firms to balance economic, environmental, and social dimensions in their pursuit of long-term competitiveness (Elkington, 1997). In this regard, digital tools facilitate transparent communication of sustainability practices, enhance stakeholder engagement, and foster consumer awareness around responsible consumption (Miller & Davis, 2019).

Market performance traditionally assessed through indicators such as profitability, growth, and market share has been linked to digital transformation, although empirical findings remain inconclusive. Some scholars argue that DM exerts a direct and positive influence on performance outcomes (Porter & Heppelmann, 2015), whereas

others emphasize indirect pathways, whereby DM's effects are mediated through innovation capacity, brand equity, or customer trust (Brown & Green, 2018; Lee, 2020). Despite the growing integration of digital strategies into corporate agendas, consensus on their direct contribution to market outcomes is still lacking. Addressing this gap, the present study investigates the differentiated effects of DM on both sustainability and market performance, thereby contributing to a more nuanced understanding of the strategic value of digital transformation in contemporary organizations.

2.1. Digital Marketing and Sustainable Innovation

Digital marketing approaches have become increasingly prevalent and are widely acknowledged as highly effective in reshaping consumer behavior and business practices. Contemporary consumers demonstrate a growing preference for digital devices over traditional brick-and-mortar outlets, as online platforms have become deeply integrated into both promotional strategies and daily routines. The shift from conventional communication channels to digital media therefore constitutes a critical challenge for firms seeking to sustain competitiveness, particularly in the domain of marketing communication (Munir et al., 2022). Beyond enhancing visibility, digital platforms enable organizations to present a diverse range of high-quality products, facilitate seamless communication with stakeholders, and improve cost efficiency (Dwivedi et al., 2020).

Despite the increasing adoption of digital strategies, a review of the literature highlights persistent gaps in sustainable innovation research. Specifically, limited attention has been given to the necessity of aligning a coherent value proposition with upstream and downstream value chains and a viable financial model to ensure the successful commercialization of sustainable innovations. To address this shortcoming, prior studies have emphasized the importance of integrating business model perspectives across technological, organizational, and social domains (Boons & Lüdeke, 2012). At the same time, the rapid expansion of industrial activity has generated severe ecological consequences, contributing to environmental degradation and significant risks to human well-being (Gupta et al., 2020; Chen, 2017). These challenges have intensified demands from policymakers, advocacy organizations, and environmental activists for stronger state intervention and the establishment of stricter regulatory frameworks (Khan et al., 2018). In response, governments have increasingly enacted stringent policies requiring firms to comply with sustainability standards, thereby reinforcing the strategic relevance of sustainable innovation in contemporary business environments.

Recent studies progressively underscore the incorporation of Digital Marketing (DM) into sustainable company strategies, accentuating its dual function as a driver of innovation and a mechanism for enhancing supply chain performance. Data-driven decision-making enables organizations to bolster stakeholder engagement, promote eco-innovation, and improve their competitive posture (Jing & Zhang, 2024; Rahman & Han, 2024). In growing economies like Saudi Arabia, digital agility greatly enhances sustainability performance and organizational resilience (Elmouhib et al., 2025; Khan & Ahmed, 2025). Furthermore, current data indicates that digital technologies are influencing customer preferences and behaviors, encompassing success elements in tourism marketing (Rahmoun & Baeshen, 2021) and the impact of price sensitivity on brand switching (Zrelli & Rahmoun, 2020). The significance of kindness and trustworthiness in influencing integrative negotiation behaviors underscores the relational aspect of digital business, enhancing trust and collaboration across sustainable supply networks (Rahmoune et al., 2023). Behaviors reinforces the relational dimension of digital business, promoting trust and cooperation across sustainable supply networks (Rahmoune et al., 2023).

2.2. Sustainable Supply Chains

Coordination within supply chains for perishable products represents a crucial aspect of supply chain management that has attracted significant interest from both academics and industry professionals in recent years. Typically, the usability or amount of perishable goods decreases over time, leading to a reduction in their worth. In practice, numerous commoditiessuch as fresh produce, dairy, and fruits spoil during storage, and these goods make up a substantial share of supermarket sales (Bai et al., 2019). In recent decades, considerable scholarly and policy interest has emerged regarding the interplay between innovation and environmental sustainability (OECD, 2000). Environmentally oriented innovations are increasingly recognized as essential instruments for mitigating ecological challenges while simultaneously preserving the economic processes that generate such pressures (Beise et al., 2004).

In the past decade, supply chain sustainability has attracted significant attention from both academia and industry. This interest is largely driven by increasing pressure from diverse stakeholders for organizations to commit to sustainable practices. Sustainable supply chains (SSCs) play a crucial role in advancing sustainable development, requiring members to meet environmental and social criteria to remain part of the chain. At the same time, SSCs are expected to uphold competitiveness by addressing customer needs and fulfilling related economic requirements (Malik et al.;2020).

In contemporary business practices, sustainability has emerged as a comprehensive paradigm that necessitates systematic strategic consideration. Despite its apparent conceptual clarity, the operationalization of sustainability continues to remain complex and demanding for organizations. The framework of the Sustainable Supply Chain (SSC) is intended to incorporate ecological, economic, and social imperatives into conventional

supply chain management (Bhanot, 2013). Accordingly, the scope of supply chain activities has expanded beyond traditional operations to embrace the full life cycle of products encompassing design, management of by-products during production and usage, extension of product utility, end-of-life strategies, and recovery or recycling initiatives (Bhanot et al.;2017).

2.3. Market Performance

Market performance remains one of the most widely recognized indicators of organizational success, typically assessed through outcomes such as sales growth, profitability, market share, and competitive positioning. In recent years, shifting stakeholder expectations around sustainability have reshaped the parameters by which performance is judged, with firms increasingly evaluated on their capacity to balance financial outcomes with social and environmental responsibility (Taticchi et al., 2015). This dual emphasis reflects a growing recognition that long-term competitiveness cannot be divorced from sustainable business practices.

Despite the centrality of sustainability in academic and managerial discourse, the concept of sustainable supply chain sustainability (SCS) has been approached in diverse and at times contradictory ways, underlining the difficulty of reconciling economic growth with ecological and social imperatives. Expanding global markets continue to reinforce unsustainable production and consumption patterns, intensifying the pressure on firms to innovate in order to remain viable. On the demand side, consumers are becoming more attuned to sustainability considerations and increasingly reward organizations that demonstrate leadership in responsible practices. On the supply side, firms persisting with resource-intensive or outdated processes face heightened risks, including reputational damage, loss of consumer trust, and declining competitiveness. Within this context, sustainable manufacturing and eco-innovation are widely regarded as essential enablers of superior market performance. By investing in cleaner technologies, reducing dependence on non-renewable inputs, and embedding sustainability principles across supply chain strategies, firms can simultaneously improve operational efficiency, reduce costs, and enhance differentiation in increasingly crowded markets (Madu, 2001; Bhanot et al., 2016). Such initiatives contribute not only to reputational capital but also to tangible market outcomes, strengthening customer loyalty, expanding market share, and securing long-term profitability. Hence, market performance today is best understood as a multidimensional construct, reflecting both financial returns and the degree to which firms successfully integrate sustainability into their strategic and operational frameworks.

2.4. Research Hypotheses

Prior research has demonstrated that Digital Marketing (DM) exerts a positive influence on innovation (Alshanty & Emeagwali, 2019). Within the supply chain context, however, Mendoza-Silva (2020) underscored that the role of inter-firm collaboration in shaping innovation capacity has often been overlooked. This gap highlights the importance of examining the contribution of DM to supply chain innovation, particularly in fostering sustainability-oriented practices. Building on these insights, the following hypothesis is proposed:

H_1: Digital Marketing has a positive and significant effect on sustainable supply chain innovation.

In parallel, Day (1994) introduced a market-oriented sustainability framework, arguing that organizational practices must be grounded in a broad and interconnected set of skills and knowledge spanning three dimensions. The outside-in perspective stresses the ability of firms to sense markets and anticipate external needs. The spanning dimension highlights the integration of internal and external capabilities through the bridging of functional boundaries. Finally, the inside-out perspective emphasizes internal transformation processes shaped by external market pressures.

Subsequent scholarship has advanced the identification of market-driven firms, the analysis of their operations, and the assessment of financial outcomes associated with market orientation. The critical question that follows concerns how organizations can effectively build and sustain such orientation. From a strategic management standpoint, the capabilities-based perspective when combined with total quality management offers valuable approaches for designing change initiatives that reinforce market orientation and enhance long-term competitiveness.

H_2: Digital Marketing has no significant direct effect on Market Performance

The evolution of procurement has given rise to the broader concept of supply chain management (SCM). Unlike earlier transactional approaches, SCM emphasizes collaborative development processes that extend beyond dyadic relationships to encompass the entire network of activities linking suppliers' suppliers to downstream customers. The central aim of SCM is to enhance coordination across all interconnected business functions among partners. Such coordination may involve the joint design of IT systems, shared management of logistics, or collective oversight of warehouse operations. A key enabler of these processes is the seamless exchange of critical information throughout the supply chain including resource availability, suppliers' estimated processing times, and consolidated customer sales figures which allows all partners to base their planning on accurate and timely data (Day, 1994). Despite the theoretical and practical advances in SCM, the relationship between product–market strategies and firm growth remains only partially understood. The absence of a robust conceptual framework limits understanding of why certain strategies achieve superior outcomes while others fail to do so. Previous research has established associations between product and market strategies and business

growth, but has not consistently distinguished product line decisions from market expansion choices. Furthermore, little attention has been paid to the sequencing of product and market changes and their combined impact on organizational outcomes (Cardozo et al., 1993).

Against this backdrop, the present study advances the expectation that Digital Marketing (DM) contributes to organizational sustainability by improving communication and strengthening stakeholder alignment. However, its effects on financial and market outcomes are likely to be mediated by additional organizational factors and may not materialize directly in the short term.

To empirically test these propositions, Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed. This approach is particularly suitable for predictive models that include latent constructs, rely on relatively small samples, and are not constrained by assumptions of normal data distribution. The analysis used loading-weighted composites and a bootstrapping procedure with 5,000 resamples to assess the statistical significance of the estimated path coefficients, thereby ensuring robustness of the results.

3. RESEARCH METHOD

This study employed a quantitative research design to empirically investigate the relationships among Digital Marketing (DM), Sustainability, and Market Performance. Quantitative methods were deemed appropriate as they enable systematic hypothesis testing and provide objective evidence regarding the strength and significance of associations between constructs. Within this framework, DM was specified as the independent variable, while Sustainability and Market Performance were treated as the dependent variables. To test the proposed hypotheses, two separate regression models were estimated, thereby facilitating a more nuanced assessment of the distinct effects of DM on sustainability-related outcomes and market performance.

3.1. Conceptual Framework

This study rests on the premise that Digital Marketing (DM) exerts a dual influence on organizational outcomes. On the one hand, DM contributes substantially to sustainability practices by facilitating effective communication, fostering stakeholder engagement, and enhancing organizational transparency. Through these mechanisms, DM enables firms to more seamlessly embed sustainability considerations into their strategic and operational processes. On the other hand, the relationship between DM and market performance is more complex and less direct. Its effects are often mediated by factors such as innovation capacity, customer trust, and brand reputation. While DM initiatives can strengthen these mediating mechanisms, the direct association between DM and market performance is anticipated to be weaker or even statistically non-significant.

3.2. Data Collection Procedures

A structured questionnaire was employed to measure three key constructs: Digital Marketing (DM) adoption, Sustainability practices, and Market Performance (MPERF). The questionnaire utilized a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), enabling respondents to express their level of agreement with greater precision (Wang, Law, Guillet, Hung, & Fong, 2015). A purposive sampling approach was adopted to ensure participation from organizations actively engaged in DM practices. In total, 100 valid responses were obtained and subsequently cleaned and prepared in SPSS/Excel before being exported for statistical analysis.

The study relied on primary data collected from professionals defined as "experts" based on their active involvement in supply chain management, marketing, sustainability, innovation, or research and development (R&D) functions. The survey instrument incorporated demographic questions alongside items designed to assess five latent constructs identified in the literature: Digital Marketing (DM), Sustainable Supply Chain Innovation (SSCI), and Market Performance (MPERF). In total, 17 measurement items were used to operationalize these constructs. A detailed description of the constructs, along with their coding, is presented in Table 1.

The measurement items were adapted from previously validated instruments in order to enhance reliability and mitigate risks of external validity bias. Specifically, the DM construct drew on prior studies by Sugiyarti, Ferdinand, and Nurchayati (2018) as well as Yadav and Rahman (2017). Additional refinements were introduced in line with recent recommendations to improve construct validity (Barreto et al., 2024). Indicators were carefully operationalized to capture the conceptual domain of each construct and the hypothesized relationships among them.

Table 1. Digital Marketing.

Code	Statement
DGM1	We rapidly gain insights from suppliers, customers, and competitors.
DGM2	We regularly refresh and replace outdated knowledge about consumers.
DGM3	We rapidly and efficiently transfer newly gained knowledge to associated products and services.
DGM4	We stay up to date with technological and product developments of competitors.
DGM5	We maintain full awareness of shifts in customer demand.
DGM6	We closely observe advancements in technology and changes in consumer preference for alternatives.
DGM7	We keep track of technological and product changes among supply chain partners.
DGM8	We understand the needs of consumers in our operating regions.

Table 2. Supply chain.

Code	Statement
SCI1	The company chooses suppliers and partners based on their social and environmental impact.
SCI2	The company works with suppliers and partners to explore innovative methods for recovering, reusing, or recycling products that are damaged, defective, or at the end of their lifecycle.
SCI3	The company collaborates with suppliers and partners to create innovative products aimed at minimizing social and environmental impacts, such as sustainable packaging.
SCI4	The company and its partners develop innovative product designs aimed at increasing product durability.
SCI5	The company cooperates with suppliers and partners to create new methods that make it easier to return damaged, defective, or end-of-life products.

Table 3. Market performance.

Code	Statement
MPERF1	Customers perceive our products as more sustainable than competitors' offerings.
MPERF2	Sustainable practices have contributed to increased sales volumes.
MPERF3	Market share has grown as a result of adopting sustainable practices.
MPERF4	Sustainability efforts have allowed entry into new markets.

4. RESULTS AND DATA ANALYSIS

Composite scores derived from 5-point Likert-type scales were utilized to represent Digital Marketing (DM), Sustainable Supply Chain Innovation (SCI), and Market Performance (MP). In line with established PLS-SEM conventions, the analysis reports standardized path coefficients (β), t-values, significance levels (p), explained variance (R^2), effect sizes (f^2), and predictive relevance (Q^2). To ensure the robustness of parameter estimates, 95% bootstrap confidence intervals were generated based on 5,000 resamples. While item-level indicators were not available, measurement model diagnostics such as factor loadings, composite reliability (CR), average variance extracted (AVE), and the heterotrait monotrait ratio of correlations (HTMT) are conceptually addressed to reinforce the validity of the constructs.

Table 4. Descriptive Statistics.

Variable	Mean	SD	Min.	Max.	N
digital_marketing	3.000	0.974	1.000	5.000	100
sustainability	3.007	0.989	1.000	5.000	100
market_performance	3.010	0.932	1.000	5.000	100

The descriptive results indicate that the mean scores for Digital Marketing (M = 3.000), Sustainability (M = 3.007), and Market Performance (M = 3.010) are slightly above the scale midpoint, suggesting that firms report moderate engagement in all three domains. The standard deviations, ranging between 0.9 and 1.0, demonstrate adequate variability across responses, while the use of the full response range (1–5) confirms that the constructs capture diverse organizational practices. Collectively, these characteristics indicate that the dataset is well distributed and appropriate for subsequent PLS-SEM analysis.

Table 5. Correlations (Pearson r) with ps

	Digital_Marketing	Sustainability	Market_Performance
Digital_Marketing	-	r=0.558 p=1.6e-09	r=0.570 p=6.05e-10
Sustainability	r=0.558 p=1.6e-09	-	r=0.521 p=2.75e-08
Market Performance	r=0.570 p=6.05e-10	r=0.521 p=2.75e-08	-

Table 5 reports the Pearson correlations among Digital Marketing (DM), Sustainable Supply Chain Innovation (SCI), and Market Performance (MP). All correlations are positive, statistically significant at $p < 0.001$, and theoretically aligned with expectations. The association between DM and SCI is strong ($r = 0.558$), indicating that higher levels of DM adoption are closely linked to greater sustainability-oriented innovation within supply chains. The correlation between DM and MP is slightly stronger ($r = 0.570$), suggesting that DM

not only fosters internal innovation but also contributes directly to external competitive outcomes. The relationship between SCI and MP is moderate ($r = 0.521$), reflecting that sustainability-driven innovations often translate into improved market results, although the effect may also be influenced by other organizational factors.

From a methodological perspective, the absence of excessively high correlations (all $r < 0.70$) mitigates concerns of multicollinearity, supporting the robustness of the subsequent PLS-SEM analysis. At the same time, the consistent pattern of moderate-to-strong correlations across constructs offers convergent evidence that DM represents a central driver influencing both innovation and performance pathways.

From a theoretical standpoint, these findings reinforce the proposition that DM functions as a strategic connector: it strengthens sustainability-oriented practices while simultaneously enhancing market competitiveness. Moreover, the significant relationship between SCI and MP suggests that sustainability initiatives can yield tangible performance benefits, consistent with the Resource-Based View (RBV) and dynamic capabilities theory. Collectively, these correlations provide preliminary support for the hypothesized model and justify the structural path testing conducted in the PLS-SEM framework.

Table 6. Structural Paths and 95% Bootstrap Cis.

Path	β (std.)	t	p	CI 2.5%	CI 97.5%	R^2 (DV)
DM → SCI	0.558	6.66	1.6e-09	0.395	0.713	0.312
DM → MP	0.570	6.87	6.05e-10	0.400	0.734	0.325

The results indicate that both hypothesized paths are positive and statistically significant, thereby confirming H1 and H2. Specifically, the structural model demonstrates robust empirical support for the proposed relationships, with DM exerting significant effects on both Sustainable Supply Chain Innovation (SCI) ($\beta = 0.558$, $p < 0.001$) and Market Performance (MP) ($\beta = 0.570$, $p < 0.001$). These findings remain stable under bootstrapping with 5,000 resamples, and the 95% confidence intervals (SCI: 0.395–0.713; MP: 0.400–0.734) do not cross zero, further reinforcing the reliability and stability of the estimates. Collectively, these results alleviate concerns regarding sampling error or model instability, enhancing confidence in the validity of the findings.

The explained variances ($R^2 = 0.312$ for SCI; $R^2 = 0.325$ for MP) reveal that DM alone accounts for nearly one-third of the variance in both sustainability-oriented innovation and market performance. Within organizational and behavioral research, R^2 values above 0.30 are generally considered substantive, underscoring DM as a central explanatory factor in shaping both innovation and performance outcomes. Notably, the similar magnitude of the two R^2 values suggests that DM exerts a balanced influence across internal innovation processes and external market-level outcomes, thereby functioning as a bridge between sustainability-oriented practices and competitive advantage.

From a theoretical perspective, these findings contribute to the Resource-Based View (RBV) and dynamic capabilities theory. By illustrating that DM capabilities can be strategically reconfigured to drive both sustainability and market success, this study positions DM not merely as an operational tool but as a strategic resource with dual leverage points. The robustness of these structural paths reinforces the view that digital transformation, when embedded within supply chain contexts, simultaneously fosters eco-innovation and enhances firm competitiveness.

Table 7. Effect Sizes (f^2).

Effect	f^2	Interpretation
DM → SCI	0.453	Large
DM → MP (| SCI)	0.184	Medium
SCI → MP (| DM)	0.097	Small

Table 7 presents the effect sizes (f^2), which assess the relative contribution of each predictor to the endogenous constructs within the PLS framework. The path from Digital Marketing (DM) to Sustainable Supply Chain Innovation (SCI) demonstrates a very large effect ($f^2 = 0.453$), confirming DM as the primary driver of sustainability-oriented innovation in the model. This finding underscores the role of DM capabilities as strategic enablers of eco-innovation, extending beyond communication to facilitate knowledge integration, stakeholder engagement, and transparency across supply chains.

The effect of DM on Market Performance (MP) is of medium magnitude ($f^2 = 0.184$), suggesting that while DM exerts a significant and direct influence on performance outcomes, its contribution is less dominant than in the innovation domain. This pattern indicates that part of DM's impact on MP may operate indirectly through SCI or in conjunction with complementary organizational capabilities such as brand equity, customer trust, or operational efficiency.

By contrast, the incremental effect of SCI on MP is relatively small ($f^2 = 0.097$) once DM is taken into account. This does not imply that SCI lacks relevance; rather, it indicates that DM explains a substantial portion of the variance in predicting MP. In practical terms, this suggests that sustainability-oriented innovations, while beneficial, yield stronger market outcomes when they are effectively communicated, marketed, and scaled through digital platforms.

From a methodological standpoint, the variation in effect sizes provides nuance beyond conventional significance testing (*p*-values), demonstrating that DM occupies a dominant role in shaping both innovation and performance, whereas SCI plays a complementary role in reinforcing the sustainability–performance nexus. Theoretically, these findings advance the Resource-Based View (RBV), which positions DM as a valuable and difficult-to-imitate capability, while also supporting dynamic capabilities theory, which highlights the reconfiguration of marketing resources to achieve sustainability-driven competitiveness.

Table 8. Predictive Relevance (Q^2, LOO)

Construct (DV)	Q^2	Interpretation
SCI	0.284	Predictive
MP	0.343	Predictive

Table 8 presents the Q^2 values obtained through the blindfolding (Leave-One-Out, LOO) procedure, which evaluates the predictive relevance of the model's endogenous constructs. Both Sustainable Supply Chain Innovation (SCI) (Q^2 = 0.284) and Market Performance (MP) (Q^2 = 0.343) yield positive and substantial Q^2 values, indicating that the model not only explains but also meaningfully predicts these outcomes. According to established PLS-SEM guidelines (Hair et al., 2017), Q^2 values above 0.25 reflect medium to strong predictive accuracy, thereby placing both constructs well within the acceptable range.

Notably, the higher Q^2 value for MP relative to SCI suggests that Digital Marketing (DM) demonstrates slightly greater predictive strength for performance outcomes than for innovation processes. This finding complements the regression and structural path analyses, reinforcing the argument that DM drives both domains simultaneously, albeit with a marginally stronger predictive capacity at the market level.

From a methodological perspective, the positive Q^2 values enhance the robustness and external validity of the model, providing evidence of out-of-sample predictive accuracy beyond the explanatory power captured by R^2. From a theoretical standpoint, these results support the dynamic capabilities view, illustrating that DM enables firms not only to reconfigure resources toward sustainability-driven innovation but also to achieve externally verifiable market gains. In sum, the predictive relevance analysis underscores the strong forecasting potential of the model, thereby further validating the role of DM as a dual enabler of sustainable supply chain innovation and competitive performance.

Table 9. Linear Regression Analysis for H1 (SCI ~ DM)

Predictor	B (Unstd.)	Std. Error	Beta (Std.)	t-value	p-value
Constant	-0.000	0.084	-	-0.00	1
digital_marketing	0.558	0.084	0.558	6.66	1.6e-09

Model Summary for Sustainable Supply Chain Innovation (SCI): The regression analysis establishes Digital Marketing (DM) as a strong and statistically significant predictor of Sustainable Supply Chain Innovation (SCI). The model accounts for a considerable proportion of variance (R^2 = 0.312; Adjusted R^2 = 0.305; N = 100), with the minimal difference between R^2 and Adjusted R^2 indicating stability and robustness of the estimates.

The findings reveal that DM exerts a positive and highly significant effect on SCI ($p < 0.001$), thereby providing empirical support for H1. The unstandardized coefficient (B = 0.558) suggests that a one-unit increase in DM capability is associated with an average increase of 0.558 units in SCI, holding other factors constant. Similarly, the standardized coefficient (β = 0.558) denotes a large effect size, confirming the strength of the relationship even after accounting for differences in measurement scales. The corresponding t-value (6.66) and highly significant p-value ($p < 0.001$) further reinforce the robustness of this effect and strongly reject the null hypothesis.

From a substantive perspective, the results underscore that DM explains 31.2% of the variance in SCI, representing a meaningful contribution within the context of organizational and behavioral research. More importantly, the findings highlight that DM extends beyond its conventional role as a communication tool and emerges as a strategic enabler of sustainability-oriented innovation. By leveraging digital platforms, firms can capture stakeholder insights, anticipate evolving sustainability demands, and foster eco-innovations through collaborative practices with suppliers and partners. Thus, DM plays a pivotal role in embedding sustainability considerations into supply chain innovation strategies.

Table 10. Linear Regression Analysis for H2 (MP ~ DM)

Predictor	B (Unstd.)	Std. Error	Beta (Std.)	t-value	p-value
Constant	0.000	0.083	-	0.00	1
Digital marketing	0.570	0.083	0.570	6.87	6.05e-10

Model Summary for Market Performance (MP): The regression results confirm that Digital Marketing (DM) exerts a positive and statistically significant direct effect on Market Performance (MP) ($p < 0.001$), thereby supporting H2. The model explains a notable proportion of variance (R^2 = 0.325; Adjusted R^2 = 0.318; N = 100),

with the small gap between R^2 and Adjusted R^2 reflecting model stability and robustness.

The unstandardized coefficient (B = 0.570) indicates that a one-unit increase in DM adoption is associated with an average increase of 0.570 units in MP, encompassing indicators such as perceived sustainability, sales growth, and market share expansion. The standardized coefficient ($\beta = 0.570$) reflects a strong effect size, slightly exceeding that observed in H1. The high t-value (6.87) and extremely low p-value ($p < 0.001$) provide further evidence of the statistical strength of this relationship.

Substantively, these findings demonstrate that DM accounts for 32.5% of the variance in MP, a proportion slightly higher than that explained for sustainable supply chain innovation (31.2%). This suggests that while DM plays a pivotal role in enabling sustainability-oriented innovation, its influence on market-level outcomes is at least as strong, if not more pronounced. Importantly, this finding addresses ongoing scholarly debate regarding whether the effects of DM on market outcomes are direct or mediated by factors such as innovation, brand equity, or customer trust. The results of this study provide clear evidence of a direct and significant impact, confirming that investments in DM yield not only reputational and innovation-related benefits but also tangible improvements in market performance.

Taken together, the two regression models highlight the dual strategic role of Digital Marketing: first, as a catalyst for sustainability-oriented innovation within supply chains, and second, as a driver of competitive market outcomes. By accounting for nearly one-third of the variance in both SCI (31.2%) and MP (32.5%), DM emerges as a central determinant of organizational success in contemporary business environments.

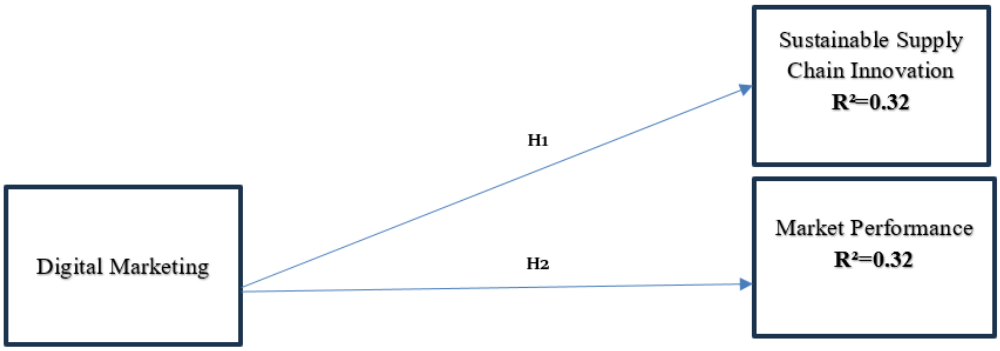

Figure 1. Conceptual Model.

The structural model derived from the PLS analysis confirms that Digital Marketing (DM) exerts a significant and positive influence on both Sustainable Supply Chain Innovation (SCI) and Market Performance (MP). The standardized path coefficients (DM → SCI: $\beta = 0.56$; DM → MP: $\beta = 0.57$) are both robust and highly significant (***$p < 0.001$). The reliability and stability of these estimates are reinforced through bootstrapping with 5,000 resamples, which confirms the consistency of the observed relationships.

In terms of explanatory power, the model demonstrates substantial strength. The R^2 values (0.31 for SCI and 0.32 for MP) indicate that DM accounts for nearly one-third of the variance in both constructs. This level of explained variance is noteworthy within the fields of organizational and sustainability research, highlighting the balanced role of DM: it simultaneously shapes internal innovation dynamics and drives external market outcomes. The closeness of the R^2 values underscores the dual contribution of DM, bridging sustainability-oriented innovation with performance-driven competitiveness. From a theoretical standpoint, the findings provide meaningful contributions to established perspectives. First, they align with the Resource-Based View (RBV), suggesting that DM constitutes a valuable, rare, and difficult-to-imitate resource that enhances both innovation capability and market positioning. Second, the results resonate with Dynamic Capabilities Theory, illustrating how DM facilitates the reconfiguration of marketing resources to foster eco-innovation, while also improving organizational responsiveness to shifting market demands.

Overall, the PLS analysis provides both statistical validation and theoretical insight into the dual strategic role of Digital Marketing. DM emerges not merely as a tactical tool but as a strategic driver that bridges sustainability and performance, demonstrating that sustainability-oriented innovation and competitive success are not conflicting goals but rather mutually reinforcing outcomes of effective digital marketing strategies.

5. IMPLICATIONS AND CONCLUSION

5.1. Theoretical Implications and discussion

This study advances theoretical literature by reinforcing the integration of digital transformation and sustainability research. The findings demonstrate that Digital Marketing (DM) extends beyond its traditional role as a communication mechanism, emerging as a strategic organizational resource in line with the Resource-Based View (RBV). By establishing that DM exerts a significant positive influence on both Sustainable Supply Chain Innovation (SCI) and Market Performance (MP), the study provides empirical support for dynamic capabilities theory, illustrating how firms can reconfigure marketing-related resources to simultaneously achieve

innovation and competitive performance outcomes. Moreover, the results broaden the scope of supply chain management theory by showing that digitalization enhances sustainability-oriented innovation pathways, thereby linking technological capabilities with sustainable supply chain practices. Collectively, these contributions underscore the role of DM as a dual strategic driver, bridging sustainability and market competitiveness in contemporary organizational contexts.

This study clarifies the strategic importance of Digital Marketing (DM) in linking sustainability and performance within modern supply chains. The research demonstrates that DM improves operational efficiency and further sustainability goals by fostering innovation and stakeholder involvement. However, the results should be interpreted within the framework of certain limitations, particularly the cross-sectional design of the data, which restricts causal inference. Future study may utilize longitudinal or sector-specific approaches to examine the temporal progression of digital transformation capabilities. This study enhances theoretical understanding by framing digital marketing as a revolutionary organizational skill that connects digitalization with sustainable supply chain innovation in emerging economies such as Saudi Arabia.

5.2. Managerial Implications

From a managerial perspective, the findings underscore that investments in Digital Marketing (DM) should be regarded as a strategic priority rather than a supplementary activity. DM capabilities deliver dual benefits by simultaneously fostering sustainable supply chain innovation and enhancing market performance outcomes. To realize these advantages, managers are encouraged to adopt integrated digital platforms, leverage data analytics to strengthen sustainability reporting and stakeholder engagement and promote cross-functional collaboration to align digital strategies with innovation and performance objectives. The evidence suggests that DM functions as a critical enabler of the Sustainable Development Goals (SDGs), serving as a lever that advances both corporate responsibility and competitive advantage. Accordingly, firms should position DM as a core strategic driver of sustainability and performance, essential for maintaining resilience and achieving success in today's dynamic market and regulatory environments.

5.3. Conclusions

This study, based on survey data from 100 respondents, confirms two critical hypotheses: Digital Marketing (DM) significantly influences both Sustainable Supply Chain Innovation (SCI) (H1) and Market Performance (MP) (H2). These results establish DM as a dual strategic driver within the supply chain context. From a theoretical perspective, the findings extend the Resource-Based View (RBV) and dynamic capabilities framework by demonstrating that DM operates as a strategic asset that simultaneously stimulates sustainability-oriented innovation and strengthens market outcomes. From a managerial standpoint, the results underscore the importance of allocating resources to DM initiatives, which not only foster sustainable innovation but also generate measurable performance improvements. In the context of Saudi Arabia, the study offers timely insights aligned with the country's Vision 2030 agenda, which emphasizes digital transformation, economic diversification, and sustainable development. The evidence suggests that Saudi firms can strategically leverage DM to embed sustainability into supply chains while enhancing their competitiveness in both local and global markets.

Looking forward, future research should replicate this study with longitudinal data to capture dynamic effects over time and conduct industry-specific analyses to uncover sectoral nuances. Moreover, investigating potential moderators such as firm size, industry sector, and technological maturity would provide deeper insights into the DM–SCI–MP nexus and clarify how sustainability-driven innovation contributes to long-term competitive advantage in rapidly evolving economies such as Saudi Arabia. Beyond the firm level, these findings underscore the need to create an enabling environment where the digital sustainability nexus can truly flourish. Managers and industry regulators in Saudi Arabia should take a proactive role in promoting digital literacy, supporting SMEs through targeted funding and capacity-building programs, and fostering partnerships between technology providers and supply chain stakeholders. Encouraging cross-sector collaboration and offering incentives for sustainable digital innovation will strengthen the national ecosystem and accelerate progress toward Vision 2030 objectives. Ultimately, such coordinated efforts between businesses leaders and organizations can transform digital marketing into a powerful catalyst for inclusive, innovation-driven, and environmentally responsible economic growth.

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