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The Role of Green Business Strategy in Enhancing Digital Marketing Strategy for Sustainable Business Intelligence

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ABSTRACT

This study aims to analyze the role of green business strategy in enhancing digital marketing strategy towards SBI in SMEs operating in the digital marketing and technology sectors in Jordan. The total sample consisted of 33 SMEs, each with 417 administrative employees. All these proposed hypotheses were tested by Smart PLS 4. These results proved that the digital marketing strategy impacts SBI directly and indirectly via the green business strategy. Also, the green business strategy moderates the impact of the digital marketing strategy on SBI in aligning sustainability objectives with marketing efforts. Thus, this study provides practical implications for SMEs to develop integrated digital and green strategies for driving sustainability-driven intelligence frameworks.

Keywords: Digital Marketing Strategy, Sustainable Business Intelligence, Green Business Strategy, Environmental Practices, Marketing Effectiveness, Organizational Intelligence
JEL Classifications: M31, O33, Q56

1. INTRODUCTION

In the era of rapid technological changes and a growing awareness of environmental issues, there is an increasing challenge to balance profitability with sustainability for businesses (Borges et al., 2021; Mio et al., 2020). SMEs within the digital marketing and technology sectors are particularly affected, struggling to leverage digital marketing strategies for competitive growth while appealing to the global demand for environmental responsibility (Maulana and Wulandari, 2019). This challenge raises, therefore, a very critical question as to whether or not SMEs will successfully integrate digital marketing with the green business strategy towards the attainment of SBI without sacrificing agility, innovation, and even financial stability Tarsakoo and Charoensukmongkol (2020).

While much literature exists on digital marketing strategies and sustainability practices, this research usually does not pay appropriate attention to the critical constraints of SMEs: limited resources, expertise, and scalability (Chatterjee et al., 2024). In addition, how green business strategies could act as an amplifier in magnifying the effect of digital marketing on SBI is not well explored (Nuseir et al., 2022). Most of the existing literature focuses on large companies, thus leaving big gaps in understanding how SMEs can use these strategies to make sense of the complexity facing them in today's business environment (Tavera Romero et al., 2021; Aljumah et al., 2022).

The paper therefore addresses this lacuna by analyzing the moderating role of green business strategies in enhancing the effectiveness of the implementation of digital marketing strategy in attaining SBI among SMEs. It would contribute to a better understanding of practical insights on how SMEs could align their marketing with sustainability objectives and use it as an enabler for effective, intelligence-based decision-making. The research will aim to answer the following key question: How do digital marketing strategies and green business strategies interact in driving sustainable business intelligence in SMEs?

2. LITERATURE REVIEW

2.1. Digital Marketing Strategy

The digital marketing strategy allows SMEs to use technologies to promote products, reach customers, and develop their competitive advantages (Zameer et al., 2022). It relies on social media, search engine optimization, and data analytics for better customer outreach and decision-making (Eboigbe et al., 2023). However, SMEs face remarkable challenges in implementing these strategies, such as reduced budgets, a lack of adequate expertise in advanced technologies, and difficulties in adapting to rapid changes in digital trends (Saura et al., 2020). Moreover, this pressure to meet these evolving consumer expectations for more personalized and transparent communication embeds even more complexity into the effort (Nuseir et al., 2022). Without proper integration of data analytics and innovative approaches, this may lead to SMEs not getting the full potential of their digital marketing initiatives (Maulana and Wulandari, 2019). Thus, the success of digital marketing strategies in SMEs depends on addressing these barriers and aligning efforts with broader sustainability objectives (Saura et al., 2020; Chatterjee et al., 2024).

2.2. Green Business Strategy

The green business strategy centers on the integration of environmentally sustainable practices within organizational processes and decision-making to balance economic growth with ecological responsibility (Gao et al., 2023). This strategy is increasingly critical, as stakeholders are increasingly demanding eco-friendlier business operations, especially in industries related to technology and marketing (Ijomah et al., 2024; Faruk et al., 2021). There are some drawbacks, therefore, of green strategies for SMEs, including the cost of implementation of green technologies, lack of awareness or expertise in green practices, and organizational resistance to change. According to Kumar et al. (2020), the benefits from a green strategy are mostly non-quantifiable; therefore, SMEs often cannot justify investments to stakeholders (Cavallo et al., 2021; Nayal et al., 2022). Given such challenges, green business strategies might unlock significant value by enforcing innovation, improving brand reputation, and maintaining compliance with environmental regulations (Low et al., 2020). Such challenges would, therefore, become opportunities for growth and sustainability, provided an entity is capable of successfully embedding its green practices (Dastane, 2020).

2.3. Sustainable Business Intelligence (SBI)

Business analytics for sustainability is described as an organizational capability related to the acquisition, analysis, and application of data that would help make more knowledgeable decisions, supporting operations to become more sustainable (Goede, 2021). Otherwise, SBI links up operational efficiency with strategic focus through insight driven by data into the environmental, social, and economic objectives (Mohamadina et al., 2012). For SMEs, the path toward achieving SBI is challenging due to a lack of access to advanced analytics, limited skilled human resources, and complexity in integrating sustainability metrics into traditional business intelligence frameworks (Rouhani et al., 2012). Moreover, sustainability indicators, by nature, are dynamic and require continuous monitoring and adaptation, posing an overwhelming challenge for SMEs with constrained resources (Nuseir et al., 2022). On the other hand, when SBI is put into practice, it can empower SMEs to better decision-making, optimize resource use, and increase trust among stakeholders (Goede, 2021). In addition, aligning SBI with digital marketing and green strategies provides an avenue to reach both competitive advantages and sustainable growth for SMEs (Borges et al., 2021; Mio et al., 2020).

2.4. Critical Examination of Hypotheses

2.4.1. Digital marketing strategy and sustainable business intelligence

Digital marketing strategies enable SMEs to adopt data-driven tools to optimize customer interaction, resource allocation, and strategic decision-making in manners that contribute to SBI (Wang et al., 2022). However, the effectiveness of digital marketing for achieving SBI may be questioned given several challenges. Most SMEs lack advanced analytical capabilities to process and use data generated through digital marketing initiatives (Kumar et al., 2021). Besides, the focus on short-term objectives related to increasing customer acquisition or revenue might reduce the attention given to longer-term sustainability goals (Goralski and Tan, 2020). This gap between theoretical potential and practical implementation, especially in resource-constrained SMEs, needs to be taken into consideration by the hypothesis (Hadiyati et al., 2024). Based on the considerations above, the hypothesis that follows is:

H_1: Digital Marketing Strategy Positively Impacts Sustainable Business Intelligence.

2.4.2. Digital marketing strategy and green business strategy

Digital marketing supports green business strategy by facilitating green products, creating awareness, and developing eco-friendly consumer behavior (Kabiraj and Joghee, 2023; London, 2020). However, as regards the direct link that digital marketing has with green strategies, some controversies still exist (Dhamija and Bag, 2020). For example, digital marketing campaigns are contributing to environmental degradation on the ground through high levels of energy use in data centers and unsustainable practices used in online advertising (Mehralian & Khazaee, 2022). Furthermore, SMEs may fail to connect their marketing initiatives with real green practices and, as such, could be accused of greenwashing (Hadiyati et al., 2024). This hypothesis challenges SMEs to effectively strike a balance between digital marketing and credible, measurable commitments to greening subject usually bedeviled by practical and ethical dilemmas (Kabiraj and Joghee, 2023; Aljumah, 2020). Based on the reasoning above, what arises from the hypothesis:

H_2: Digital Marketing Strategy Positively Impact Green Business Strategy.

2.4.3. Green business strategy and sustainable business intelligence

Green business strategies can enhance SBI by embedding sustainability metrics into decision-making processes, ensuring that data-driven insights align with environmental goals (Li, 2022). However, high costs, limited expertise, and a lack of clear

frameworks for measuring sustainability outcomes are common barriers to the adoption of green strategies in SMEs (Huang et al., 2022). Moreover, the relationship between green strategies and SBI can be susceptible to external factors such as regulatory pressures or consumer demand, which might be very extensive between different industries and regions (Gomez-Trujillo and Gonzalez-Perez, 2022). This hypothesis is a critical look at whether SMEs are capable of effectively integrating green strategies into their business intelligence systems, or whether the challenges outweigh the benefits (Rachmad, 2024; Masrianto et al., 2022). Based on the reasoning above, the hypothesis that comes up is:

H_3: Green Business Strategy Positively Impacts Sustainable Business Intelligence.

2.4.4. Digital marketing strategy, sustainable business intelligence, and green business strategy

While digital marketing strategies clearly have a central role to play in SBI, integrating green business strategies into such policies could strengthen the effects even further (Nozari et al., 2021). Green strategies will guarantee that messages are in step with sustainability and thus be all the more credible (Tavera Romero et al., 2021). Examples include the facilitation of knowledge regarding sustainable market trends through promotional campaigns of eco-friendly products via digital means while building brand credibility concurrently (Chen and Lin, 2021).

However, aligning fast-paced digital marketing with the deliberative process of implementing green strategies presents a challenge (Murgai, 2018; Dastane, 2020). SMEs can be beset by resource constraints, possible accusations of greenwashing, or external factors such as regulatory frameworks that vary and consumer awareness (Homburg and Wielgos, 2022). The hypothesis investigates how green strategies can effectively moderate the relationship between digital marketing and SBI for insights into how firms can achieve both sustainability and competitive advantage (Mishra and Mishra, 2022; Bhosale et al., 2020). From the above reasoning, the emerging hypothesis is:

H_4: Digital Marketing Strategy Positively Influence Sustainable Business Intelligence via Green Business Strategy as a Moderation.

The conceptual framework of this study is constituted of three major variables, where the independent variable represents a digital marketing strategy embracing the use of digital tools in customer engagement and driving growth (Figure 1). The moderating variable will be a green business strategy, an integration of sustainability practices into operations. The dependent variable will be sustainable business intelligence or SBI, representing data usage to inform decisions that support sustainability. The framework is designed to explain how green business strategy can moderate the impact of digital marketing on SBI and their interlinkages.

3. METHODOLOGY

The current research follows a descriptive-analytical approach. This study aims to investigate the relationships related to digital marketing strategy, green business strategy, and sustainable business intelligence that exist between the digital marketing and technology SME sector in Jordan. In this regard, a pilot test for this survey was conducted to ensure the clarity of the research questions. A sample of 28 employees participated in the pilot study, sampled from selected companies, to test the understanding and clarity of the questions on the questionnaire to ensure that respondents in the main study would answer the questions correctly.

3.1. Population and Sample

The population and sample are limited to SMEs in Jordan operating within the digital marketing and technological sectors. This study targeted a total of 33 selected companies engaging in digital marketing strategy and sustainable business practices as part of its target audience. A sample of 417 administrative employees has been drawn from different strata within organizations, thereby giving adequate representation through various levels of responsibility, both managerial and marketing positions. This enabled the study to obtain samples that give a wide knowledge of what happens in companies regarding such strategies.

3.2. Measurements

In the study, the measurement was done for three important variables that had dimensions as defined. Digital marketing strategy had five dimensions, which included using social media platforms, effective digital advertising campaigns, engaging with the audience through online content, data-driven marketing strategies, and the integration of digital tools into CRM (YachouAityassine et al., 2022; Purnomo, 2023) (see Appendix A for details). Sustainable business intelligence was measured through five indications: the extent of analytics data in decision-making regarding sustainability, alignment towards sustainable goals, integration of environmental data into the decision-making flow, monitoring of sustainability performance, and using business intelligence tools to achieve growth in sustainability (Goede, 2021; Nwaimo et al., 2024) (see Appendix A for details). It also gauged the green business strategy on seven dimensions: Adoption of renewable energy, reduction in carbon footprint, development of eco-friendly products, waste management, integrating sustainability into corporate culture, green technology implementation, and stakeholder engagement about sustainability (Leonidou et al., 2017; Begum et al., 2023; Castillo-Esparza et al., 2024) (see Appendix A for details).

3.3. Procedures and Analysis

The design of the survey questionnaire was to have its foundation based on the variables mentioned and their respective dimensions, allowing the representation of the items in the research focus. A pilot test was conducted on a subset of companies, where a sample size of 28 was drawn to test the clarity of the survey regarding understandability and to ensure reliability. After confirmation that the questions were well understood, the full sample of 417 employees was used for data collection.

Hypotheses testing and evaluation of structural relationships between the variables were done by Smart PLS 4. This paper has chosen Smart PLS 4 because it can handle complex models and is suitable for evaluating direct and indirect effects among

Figure 1: Conceptual research model

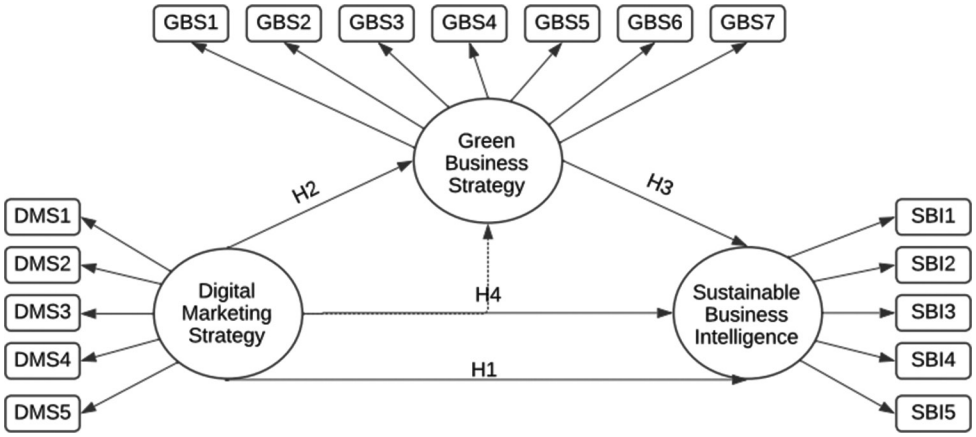

Table 1: Descriptive statistics of study variables

Variable	Mean	Standard Deviation	Min	Max
Digital marketing strategy	4.12	0.56	2.8	5.0
Sustainable business intelligence	4.05	0.61	2.5	5.0
Green business strategy	4.18	0.58	3.0	5.0

Table 2: Reliability analysis of constructs

Construct	Items	Loading	α	CR	AVE
Digital marketing strategy	DMS1	0.89	0.84	0.89	0.71
	DMS2	0.87			
	DMS3	0.83			
	DMS4	0.84			
	DMS5	0.86			
Sustainable business intelligence	SBI1	0.91	0.86	0.90	0.72
	SBI2	0.83			
	SBI3	0.87			
	SBI4	0.85			
	SBI5	0.86			
Green business strategy	GBS1	0.84	0.83	0.87	0.74
	GBS2	0.86			
	GBS3	0.85			
	GBS4	0.88			
	GBS5	0.83			
	GBS6	0.81			
	GBS7	0.85			

latent variables. The software allowed the analysis of how digital marketing strategies and green business strategies influence sustainable business intelligence in the context of SMEs. The tool was used to apply this tool to the study to draw meaningful conclusions about the interrelationships of the variables and how they combined to contribute to the overall business sustainability and intelligence in the companies studied.

4. RESULTS

4.1. Descriptive Statistics

Descriptive statistics were calculated to summarize the central tendencies and variability of responses for each variable, hence providing a preliminary view of the distribution of the data (Table 1). The means for DMS, SBI, and GBS were all rather high, with values above 4.00 on a 5-point scale, which may suggest

Table 3: Discriminant validity (Fornell-Larcker criterion)

Construct	DMS	SBI	GBS
Digital marketing strategy	0.84		
Sustainable business intelligence	0.47	0.85	
Green business strategy	0.53	0.45	0.86

Table 4: Path analysis results for direct hypotheses testing

Hypothesis	Path Coefficient	t-value	p-value	Result
DMS→SBI	0.46	5.85	0.04	Supported
DMS→GBS	0.41	4.92	0.02	Supported
GBS→SBI	0.52	6.21	0.01	Supported

that there was general agreement from the respondents regarding the items measuring these constructs. Standard deviations were average, reflecting a reasonable dispersion of responses, while the range from minimum to maximum values evidenced multiple opinions and visions regarding these variables (Cheah et al., 2024).

4.2. Reliability and Validity Tests

The Cronbach's Alpha and Composite Reliability for all constructs are above 0.70, thus reflecting internal consistency (Table 2). In other words, reliability for each construct is suggested to measure its items quite well. For convergent validity, the average Variance Extracted was established for all the constructs, with an AVE value of more than 0.50, which suggests that these constructs explain a good level of variance in their items. Hence, this also justifies the overall reliability of the constructs (Subhaktiyasa, 2024).

The Fornell-Larcker criterion is further evidence of discriminant validity, with the square root of each construct's AVE being higher than its correlations with other constructs (Table 3). This affirms that the constructs do indeed measure different concepts and are not converging (Subhaktiyasa, 2024).

4.3. Structural Equation Modeling (SEM)

The SEM was used to assess direct relationships among the constructs of the model. All the paths had a significance of at least $P < 0.05$. It can, thus, be said that DMS exerts a significant positive effect on SBI (Table 4). Further, it is observed that DMS and SBI have a significant positive effect on GBS. These findings provide very strong support for the positive relationships proposed in the model and underline how decisive digital marketing strategies

Figure 2: Conceptual structural model results

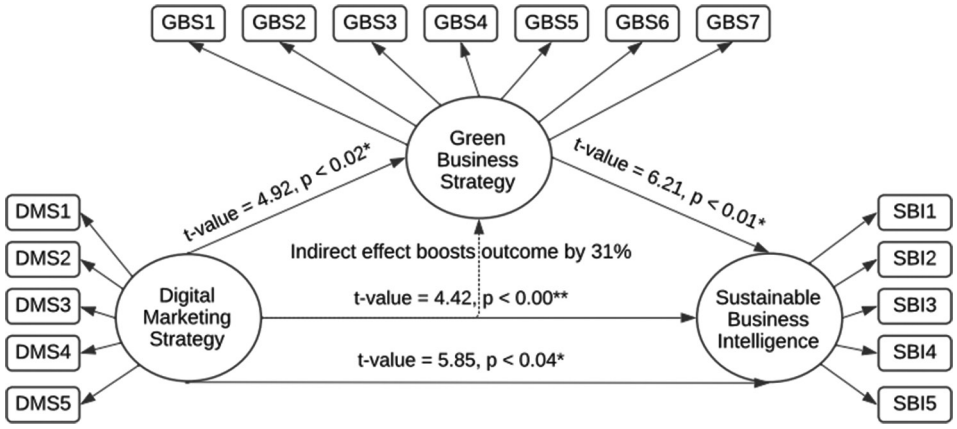

Table 5: Mediation analysis results

Path	Indirect Effect	Bootstrapped t-value	Bootstrapped P-value	Mediation Type
DMS→SBI→GBS	0.31	4.42	0.000	Partial

and sustainable business intelligence are in driving green business strategy (Subhaktiyasa, 2024).

4.4. Mediation Analysis

Mediation analysis was conducted to investigate whether SBI mediates the relationship between DMS and GBS. The results of the bootstrapping procedure, with 5,000 resamples, indicated that the indirect effect of DMS on GBS through SBI was significant, thus supporting partial mediation (Table 5). The analysis shows that while Digital Marketing Strategy directly influences Green Business Strategy, with Sustainable Business Intelligence, the relationship is enforced as a mediator. More precisely, the findings indicate that SBI leads to a 31% enhancement in the relationship of DMS to GBS, which elaborates its crucial role in enhancing the effectiveness of Digital Marketing Strategy on Green Business Strategy (Cheah et al., 2024).

4.5. Goodness-of-Fit Indices

All the goodness-of-fit indicators, including SRMR, indicated a good fit for the model (Table 6). The 0.054 value for SRMR means that the estimated model fitted the observed data very well (Cheah et al., 2024).

From these, the results show that the Digital Marketing Strategy greatly influences Sustainable Business Intelligence; while it, in turn, positively affects Green Business Strategy. The mediation analysis of these supports that Green Business Strategy plays the role of a partial mediator between Digital Marketing Strategy and Sustainable Business Intelligence, which provides proof that firms employing digital marketing strategies are most likely to go green with business intelligence tools. This will visually present the relative impact and importance of the structural model of Green Business Strategy as the key moderating variable that improves the overall relationship (Figure 2).

5. DISCUSSION

The first hypothesis states that a DMS has a positive effect on SBI. This relationship has already been confirmed through the analysis,

Table 6: Model fit indices

Fit Index	Threshold	Model Value	Fit
SRMR	0.08	0.054	Good Fit

showing that those companies with solid digital marketing are contributing more to making data-driven decisions that could provide sustainable outcomes. In this way, it coincides with the authors Wielgos and Homburg (2023) since digital marketing could enhance data gathering and allow for improving the current sustainability. On the other hand, such studies as Zaman (2022) include the opinion that digital marketing does not always contribute to sustainable decision-making; certainly for industries where digital means are used less, which again speaks against the generalization of such an effect across the industries.

The second hypothesis states that there is a relationship between DMS and GBS. This hypothesis is supported as it has been noticed that businesses that use digital marketing are more likely to apply green initiatives. Alkhayyat and Ahmed (2022); and Lies (2019), have indicated that digital marketing tools help the firm reach environmentally conscious consumers, thus encouraging green practices. On the other hand, some researchers, such as Low et al. (2020), hold the view that businesses are often focused on short-term profitability rather than long-term green strategies. This raises questions about whether digital marketing directly influences sustainable behavior in industries where minimal consumer interest in sustainability exists (Taufik and Kurniawan, 2023).

The third hypothesis is built on the relationship existing between Green Business Strategy and Sustainable Business Intelligence. Through the findings of the study, a positive relationship thus infers that companies applying the green strategy are most likely to utilize business intelligence in monitoring and optimizing their sustainability efforts. Results support Phiri (2020), work that showed that green business uses data analytics to improve sustainability practices. Saura et al. (2020), give opposing sentiment that numerous businesses run green strategies without embedding business intelligence tools, especially for those industries where environmental issues still are less of a concern

for them, therefore establishing the relationship between GBS and SBI does not apply in all sectors.

The final hypothesis involves the mediating role of Green Business Strategy in the correlation between Digital Marketing Strategy and Sustainable Business Intelligence. The results confirm partial mediation, implying that DMS directly affects SBI and indirectly through GBS. This result supports the argument of Gomez-Trujillo and Gonzalez-Perez (2022), that digital marketing strategies drive the sustainability effort, which is then optimized through business intelligence tools. However, Rachmad (2024); and Masrianto et al. (2022), show that GBS is not a basic intermediary in some industries within the relationship, given that digital marketing alone may influence SBI without the presence of any intermediate green strategy, thus calling for the strength of the mediating effect to be taken as a given across boards.

This research contributes to the theory by developing an understanding of how digital marketing strategies interact with sustainable business strategies, emphasizing the mediating role of green business strategy (Zameer et al., 2022). It enhances the knowledge of how digital marketing influences sustainable business intelligence and advances sustainability practices. The study also deepens the theoretical understanding of how technology integration drives sustainability in organizational contexts. It is a step forward in understanding the interplay between digital marketing, business intelligence, and sustainability (Gomez-Trujillo and Gonzalez-Perez, 2022).

For companies willing to use sustainability in digital marketing, some practical implications that are related to this study include value-added recommendations. The results indicated that digital marketing strategies raise the level of implementation in using green business practices (Tavera Romero et al., 2021). Thus, these findings might assist practitioners in aligning business intelligence with sustainability for enhanced strategic decision-making. It therefore helps businesses enhance their sustainable operations using data-driven digital marketing techniques so they would be able to contribute positively in such rapidly changing digital times with the sustainability part for decision-making (Mishra and Mishra, 2022; (Mishra & Mishra, 2022; Bhosale et al., 2020).

6. CONCLUSION AND FUTURE DIRECTIONS

This research investigates how Digital Marketing Strategy influences Sustainable Business Intelligence and Green Business Strategy. The results confirm that DMS has a significant positive influence on SBI and, in turn, GBS. Also, Sustainable Business Intelligence acts as a partial mediator between DMS and GBS, indicating that such intelligence plays a role in the promotion of sustainable practices through digital marketing. This research offers insights into how to use digital tools for the benefit of sustainability.

Despite these insightful results, the study still has its limitations. The sample confined to one sector may limit its generalizability to other industrial sectors. Besides, the measurements were subjective and based on self-report. Future studies can apply to a wide scope of industries and use objective measuring methods for validation.

Other mediators and moderators, such as organizational culture or market conditions, which may influence the relationship between digital marketing strategies and business sustainability, could be explored further in the future. It would also be useful to analyze what type of effects sustainable business intelligence has on business performance in the long term and for environmental protection. A better understanding of such dynamics can be gleaned from comparative studies conducted over various geographical regions.

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APPENDIX A

Constructs	Questionnaire Scale	References
Digital Marketing Strategy	DMS1: The company adopts social media sites for digital marketing. DMS2: The company's digital advertisement campaigns are very effective. DMS3: Online content is used to engage audiences. DMS4: The firm relies on data analytics in making its marketing decisions. DMS5: The firms have integrated CRM tools into their digital marketing strategies.	(YachouAityassine et al., 2022; Purnomo, 2023)
Sustainable Business Intelligence	SBI1: Data analytics of the firm are applied to make decisions related to sustainability. SBI2: The company has aligned itself with the goals of sustainability. SBI3: The company uses environmental data in decision-making SBI4: Sustainability performance is tracked using business intelligence tools by the company SBI5: The business intelligence tools are used by the company to attain sustainable growth	(Goede, 2021; Nwaimo et al., 2024)
Green Business Strategy	GBS1: The Company applies renewable energy GBS2: The company actively strives to reduce its carbon footprint GBS3: Eco-friendly products are developed by the company GBS4: The company applies efficient strategies for waste management. GBS5: The company integrates sustainability into its culture. GBS6: The company implements green technologies in its operations. GBS7: The company involves stakeholders in the sustainability decisions.	(Leonidou et al., 2017; Begum et al., 2023; Castillo-Esparza et al., 2024)