

GREEN MARKETING MIX (GMX) AND SUSTAINABILITY OF SMALL AND MEDIUM SCALE MANUFACTURING ENTERPRISES IN NORTH CENTRAL NIGERIA

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Abstract

The study investigated the effect of eco-friendly marketing approaches on the long-term viability of small and medium-sized manufacturing enterprises (SMEs) in north-central region, Nigeria. The study employed a cross-sectional survey methodology for data collection. It comprised 397 respondents selected from a total of 48,440 registered SMEs across three areas: Benue and Nasarawa states, and the Federal Capital Territory (FCT) of Abuja. The researchers applied Bowley's proportional allocation formula to determine the sample size. Data was gathered using a structured questionnaire featuring a five-point Likert scale. The research team conducted both descriptive and inferential statistical analyses, with a focus on multiple linear regression to evaluate the hypotheses. These analyses were performed using SPSS software, version 25.0. The findings revealed that several green marketing strategies had a significant positive effect on the sustainability of manufacturing SMEs in the studied area. Specifically, the development of environmentally conscious products, strategic placement of these products and eco-friendly promotional efforts were found to be particularly impactful. Interestingly, while green pricing strategies showed some benefits, their impact on SMEs sustainability was not statistically significant in this context. Based on the findings it was therefore recommended among others that manufacturing SMEs in north-central Nigeria should prioritize the creation and marketing of products that reduce ecological harm, that is; products and services that are ecologically beneficial and could promote sustainable business growth.

Keywords: Green marketing mix, business sustainability, manufacturing firms, small and medium enterprises.

1. Introduction

Driven by growing environmental awareness and stricter regulations, sustainability has become a focal point for global business leaders. The concept emphasizes that business success goes beyond only financial gains. It incorporates social and environmental considerations aim at balanced approach where economic prosperity aligns with social responsibility and environmental stewardship. This approach ensures that businesses do not only endure but also prosper in a manner that benefits wider stakeholders and future generations. Many academic studies (such as Bhatia & Kumar, 2021; Yang et al., 2021; Zhou et al., 2022) have shown that adopting environmentally friendly practices can improve a company's reputation in the market and financial performance, as evidenced by business metrics, financial indicators, customers, suppliers, and regulatory bodies (Asadi et al., 2020). This framework of sustainable business performance encompasses achieving success in Organisational, economic,

social, and environmental aspects (Tze San et al., 2022). Hence, to assess how well an organization is performing, it is important to look at its impact on economic, social, and environmental factors.

Climate change is currently recognized as one of the most urgent global issues, with businesses identified as major contributors to pollution (Luo & Zhang, 2021). Therefore, it is crucial to adopt green marketing practices and measures to mitigate this pollution (Rodrigues & Franco, 2023). Today, small firms face societal concerns about environmental degradation and increased competitive pressures (Andersén et al., 2020; Danso et al., 2019). This means that environmental responsibility is not only a concern for large organizations but also for SMEs (Khan et al., 2019). For SMEs, green marketing practices should be implemented because, even on a smaller scale, their impact on the environment is significant, both locally and regionally (Ahmed et al., 2023).

In many economies around the world, particularly in emerging nations like Nigeria, small and medium-sized enterprises are essential to both environmental impact and economic development. They have been recognized as essential forces behind economic growth and development (Papadopoulos et al., 2020). They make up the majority of companies around the world and play crucial roles in creating jobs and supporting economic stability (World Bank, 2021). They accounted for approximately 50% of jobs created globally and up to 90% of businesses (Etim et al., 2021). Recognizing their importance, governments worldwide should prioritize the growth of SMEs. The World Bank (2021) estimated that globally, 600 million jobs will be needed by 2030 to meet employment demands.

As small businesses operate within global markets, embracing sustainable practices becomes essential both ethically and strategically. The foundation of sustainable business practices lies in using the Green Marketing Mix (GMX). GMX encompasses marketing strategies, policies, and processes designed to be environmentally responsive, aiming to reduce or eliminate adverse impacts on people and the planet (Khan et al., 2019). This approach involves integrating environmental considerations into traditional marketing strategies across the entire cycle of creating and delivering value. In developing nations like Nigeria, for small and medium-sized enterprises, using GMX provides a way to boost competitiveness, strengthen brand reputation, and secure future sustainability in a global market increasingly influenced by expectations for sustainability from diverse stakeholders. In an era characterized by environmental concerns and increased public awareness, businesses that prioritize green practices stand to gain a considerable competitive edge by satisfying the rising demand for environmentally friendly goods and services (Musfar, 2023).

While sustainability and the advantages of Green Marketing Mix (GMX) are increasingly acknowledged, small and medium-sized businesses in developing nations including Nigeria, encounter specific hurdles. These include limited resources, inconsistent regulatory frameworks, inadequate institutional support, complex supply chains, and intense competition. These challenges constrain SMEs from fully integrating sustainable practices and implementing comprehensive GMX strategies into their business operations. Furthermore, despite global trends towards environmental

responsibility and consumer demand for eco-friendly products, there is limited empirical research on how SMEs in Nigeria implement and benefit from GMX practices. In north central particularly, there is a lack of practical research on environmental strategies and their impact on small and medium-sized businesses sustainability. Current research on the sustainability of small and medium-sized businesses in developing countries often overlooks a detailed examination of environmentally-focused strategies (for example, Tilt et al., 2021; Eijdenberg, 2019; Njiku & Nyamsogoro, 2019).

Given the current global environmental concerns, traditional marketing practices of small and medium-sized enterprises are no longer effective. Sustainability involves balancing social, economic, and environmental factors. The sustainability of small and medium-sized manufacturing enterprises in north-central Nigeria is examined in this study in relation to GMX framework.

Objectives

Thus, the specific objectives of the study are to:

1. Investigate how green products impact business sustainability of manufacturing SMEs in north-central Nigeria.
2. Explore how the pricing of eco-friendly products influences business sustainability of manufacturing SMEs in north-central Nigeria.
3. Evaluate how the placement of eco-friendly products affects business sustainability of manufacturing SMEs in north-central Nigeria.
4. Examine how promoting eco-friendly products impacts business sustainability of manufacturing SMEs in north-central Nigeria.
- 5.

2. Literature Review

2.1 Green Marketing Mix (GMX)

Green marketing has been described in various ways by different researchers. For example, Khan et al. (2019) define it as adopting marketing practices that are environmentally conscious, aim at minimizing negative impacts on the environment and human well-being. Giwa-Amu (2022) views green marketing as promoting ecologically friendly goods and services, such as toxin-free food, refillable containers, and phosphate-free products. According to Alhamad et al. (2019), green marketing involves Organisational strategies focused on changing products, manufacturing methods, and distribution practices to align with customer preferences and environmental goals. Green marketing, to put it simply, is the practice of advertising goods and services by emphasizing their positive environmental effects. This involves developing and marketing products that are eco-friendly or sustainable, as well as integrating eco-friendly practices into a company's broader business strategy. According to Nwankwo and Kanyangale (2023), adopting green marketing is crucial for companies aiming to achieve eco-efficiency, maximizing benefits while minimizing resource use and emissions.

The term "green marketing mix" describes the combination of strategies and tools a company employs to promote products or services that are friendly ecologically. It parallels the traditional marketing mix, known as the 4Ps (Product, Price, Place, Promotion), but with an emphasis on sustainability and environmental stewardship (Nguyen-Viet, 2023). Silaban et al. (2021) substantiate this perspective, highlighting that the green marketing mix involves using marketing strategies that are ecologically sound, mirroring traditional marketing practices but with a strong commitment to preserving and safeguarding the environment. The fundamental principle of green marketing is that every aspect of the marketing strategy should emphasize environmental responsibility throughout the entire process, starting from product development through to launch and promotion (Arseculeratne & Yazdanifard, 2014). This study therefore focuses on examining green product development, pricing, distribution (placement), and promotion as key strategies within the green marketing mix.

2.2 Green product

Kotler and Armstrong (2021) defined a product as something that can be presented to a specific market to fulfil a desire or need. Products encompass a wide range of items, not only tangible goods like smartphones, cars, pencils, or clothing, but also services, events, individuals, locations, organizations, ideas, or combinations thereof. A green product is defined as something, whether tangible or intangible, designed to provide added benefits to customers while minimizing negative impacts on ecological systems (Nwankwo & Kanyangale, 2023). Similarly, Ebhote and Izedonmi (2021) describe green products as goods or services that pose no harm to humans and are safe for consumption. These products are eco-friendly or possess ecological qualities, ensuring they do not pose risks to consumers, society, or the ecosystem at large. Therefore, a product is classified as green when the materials used are sourced in a way that preserves natural resources, and the manufacturing process is designed to be environmentally friendly, causing little to no harm (Eneizan et al., 2016b). The core concept of green products focuses on preventing, minimizing, or eliminating negative environmental impacts on soil, air, or water (Dauda et al., 2024). Mishra and Sharma (2014) note that production strategies for green products often adhere to the principles of environmentalism known as the 3Rs: reduce, reuse, and recycle.

2.3 Green pricing

The amount of money that customers pay for a product or service is termed price. It encompasses all the values that customers are willing to give up to obtain or use the product or service (Kotler & Armstrong, 2021). Unlike other elements of the marketing mix that represent costs for the organization, price is unique in that it generates revenue (Kotler & Armstrong, 2021). It is also the most adaptable element of the marketing mix, capable of being adjusted swiftly to align with current market conditions. Green pricing practices involve setting prices for eco-friendly products in a way that makes them more affordable for consumers and encourages them to pay more for products that benefit the environment (Mukonza & Swarts, 2019). According to Kotler and Armstrong (2021), green pricing reflects affordable pricing that recognizes the value of environmental conservation. Similarly, Silaban et al. (2021) suggest that eco-friendly products are priced lower than conventional

products, considering the extended product lifecycle due to recyclability and reusability. However, Gelderman et al. (2021) argue that green products might be more expensive due to additional costs associated with environmental protection and innovation.

2.4 Green placement (distribution)

Placement, or distribution, refers to the steps a company takes to make sure its products or services are available to customers. It is an essential element of the marketing strategy that helps customers easily get what they need. Green placement, also known as green distribution, involves choosing marketing channels that enable products or services to be moved in a manner that minimizes harm to the environment (Alabo & Anyasor, 2021). Green distribution aims to decrease the environmental impact linked with transporting, storing, and delivering goods or services. In supply chain management, according to Purwanti et al. (2019), green distribution includes activities focused on improving environmental impacts. From manufacturing to delivering products to customers, green distribution aims to integrate environmental considerations throughout the supply chain. Using eco-friendly distribution methods not only cuts down a company's adverse environmental impact but also boosts its image as a responsible and sustainable business.

2.5 Green promotion

Promotion involves activities that inform customers about a product or service and encourage them to make a purchase (Kotler & Armstrong, 2021). Green promotion, as defined by Kotler and Armstrong (2016), focuses on marketing communications that use eco-friendly language and information tailored to environmentally conscious consumers. It aims to provide truthful information about products or services without compromising customers' ethical and environmental values (Hashem & Al-Rifai, 2011). Green promotion employs marketing strategies that emphasize the environmental benefits and sustainability aspects of products, services, or the organization itself. It involves communicating to customers and stakeholders how the company's offerings contribute positively to environmental conservation or sustainability goals. Importantly, green promotion not only attracts environmentally conscious customers but also builds trust and loyalty by demonstrating a sincere commitment to sustainability.

2.6 Sustainable Business Performance

Sustainable business performance means that a company can achieve economic success while also making positive contributions to societal goals over time. It goes beyond simply making money to also consider broader impacts on society and the environment. Sustainable business performance encompasses economic, social, and environmental dimensions, highlighting the company's efforts to balance profitability with social responsibility and environmental stewardship (Asadi et al., 2020). In the context of small businesses, sustained performance across these three dimensions is seen as crucial for achieving sustainable innovation and overall business success. Sustainable business performance aims to generate value not only for shareholders but also for society and the environment. It involves a comprehensive approach that balances economic prosperity with social welfare and environmental responsibility, aiming to foster a more sustainable and resilient future.

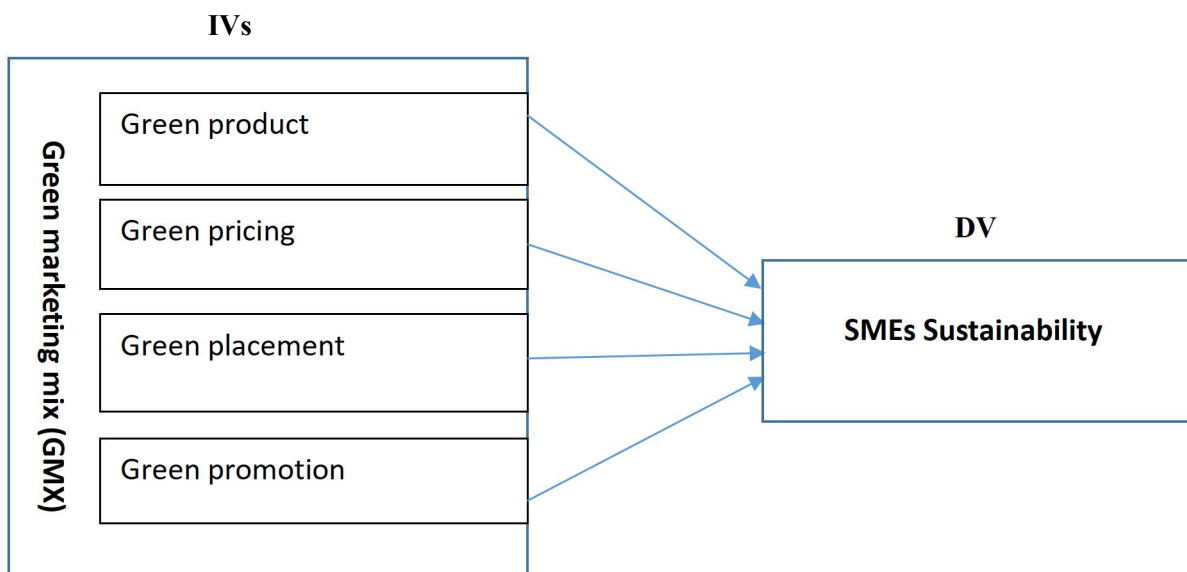
Several studies indicate that adopting environmentally friendly strategies can enhance a company's market standing and financial outcomes, as demonstrated by various corporate metrics (Asadi et al., 2020). Sustainable business performance, in this context, encompasses achieving Organisational success across economic, social, and environmental dimensions (Tze San et al., 2022). Therefore, evaluating Organisational success should consider economic, social, and environmental factors. To truly understand how well an organization is doing, you need to look at its financial health, its impact on society, and its environmental footprint, all of which help drive sustainable business practices.

2.7 Conceptual Framework

The diagram in figure 1 illustrates how the predictor variable (green marketing mix) and the criterion variable (SMEs sustainability) are connected. The predictor variable consists of factors like eco-friendly products, pricing, placement, and promotion, while the outcome variable is considered as a single, integrated idea.

Figure 1

The conceptual framework of how the green marketing mix connects with the sustainability of small and medium-sized manufacturing businesses in north-central Nigeria.



Source: Researchers' conceptualization (2024).

2.8 Theoretical Framework

2.8.1 The Natural Resource-Based View Theory

The Natural Resource-Based View (NRBV) approach was introduced by Hart (1995). It is an extension of the Resource-Based View (RBV) theory of Barney (1991). Meanwhile, because of the restriction of the RBV in explaining firm-level outcomes and its failure to consider the environmental impact of firms' activities (Andersen, 2021), Hart (1995) introduced the NRBV of the firm. Unlike the RBV, the NRBV takes into account the limitations imposed by the natural environment and can be

seen as “a theory of competitive advantage based upon the firm’s relationship to the natural environment” (Hart, 1995: 986). Table 1 below provides an overview of the NRBV theory.

Table 1: The theoretical structure of natural resource-based view theory

Strategic capability	Environmental driving force	Key resources	Competitive advantage
Pollution prevention	Reduce the amount of emissions, effluents, and waste as much as possible.	Continuous improvement	Lower costs
Product stewardship	Reduce the overall cost of products throughout their entire life cycle as much as possible.	Stakeholder integration	Pre-empt competitors
Sustainable development	As much as possible, reduce the impact on the environment caused by the firm's growth and development.	Shared vision	Future position

Note: Adapted from Hart (1995).

As shown in Table 1, the NRBV framework includes three key stages of strategic capability: pollution prevention, product stewardship, and sustainable development. According to Hart (1995), pollution prevention involves companies facing significant pressure to reduce emissions and waste generated by their operations. This pressure arises when inefficient use of resources leads to environmental degradation (Jaini & Hussin, 2019). Therefore, effective strategies such as exploring alternative materials, implementing recycling initiatives, and fostering innovation become necessary to manage emissions and waste processes (Cairncross, 1991; Willig, 1994). According to Hart and Ahuja (1994), by employing these methods, companies can develop cost-effective strategies and build a positive business reputation, which in turn improves their overall business performance.

Product stewardship aims to transform production and operational processes to prevent environmental contamination (Hart, 1995). Companies often seek input from stakeholders or external experts to incorporate green elements into product development and design (Fiksel, 1993). Sustainable development, on the other hand, strives to reconcile the often-strained relationship between business activities and environmental concerns (Jaini & Hussin, 2019).

The three essential strategic capabilities of NRBV within firms are evidently interconnected, working together to provide sustainable competitive advantage. This interconnectedness involves two critical dimensions: path dependence and embeddedness (Hart, 1995). Path dependence dictates that companies must first implement a pollution prevention strategy before proceeding to product stewardship. Conversely, embeddedness suggests that both pollution prevention and product stewardship strategies should be implemented simultaneously to effectively safeguard the environment (Makower, 1993).

Furthermore, these three strategies are relevant when they are aligned with a shared vision of sustainable development and are committed to a unified direction (Senge, 1990). Therefore,

companies that embrace a shared vision of sustainability are more likely to mobilize necessary resources and develop capabilities in pollution prevention and product stewardship, while also guiding technological innovation and market orientation (Hart, 1995).

The natural resource-based view offers a theoretical framework that helps manufacturing SMEs to articulate and execute green marketing mix strategies with effectiveness and efficiency. By utilizing their distinct natural resources and capabilities, SMEs can distinguish themselves in the marketplace, appeal to environmentally conscious customers, and make substantial contributions to sustainability objectives.

2.9 Empirical Review

The integration of the Green Marketing Mix (GMX) into business strategies has become increasingly vital for the sustainability of small and medium scale manufacturing enterprises (SMEs) in North Central Nigeria. As these enterprises strive to balance economic growth with environmental responsibility, the adoption of GMX practices offers a pathway to achieving long-term sustainability. This empirical review examines the role of GMX in enhancing the environmental and economic performance of SMEs.

Research by Nuryakin and Maryati (2020) examined the relationship between eco-friendly product competitiveness, success, and innovation in Batik-Yogyakarta, Indonesia. Their survey of 223 SME owners and managers revealed that both competitiveness and success of green products act as important mediators in enhancing eco-friendly product development. The study highlighted that improvements in green process innovation directly enhance green product competitiveness and success, which in turn boost innovation performance in the green product sector.

A study conducted by Maziriri and Maramura (2022) focused on South African manufacturing SMEs, investigating how green product and process innovations impact competitive advantage and performance. Using quantitative methods and structural equation modelling, they confirmed that both types of innovations positively influence sustainable competitive advantage and SME success in the sector. Setyawati et al. (2020) explored the influence of religiosity on the relationship between green marketing strategies and business performance among Indonesian SMEs. Their survey of 235 Muslim entrepreneurs, analysed using Smart PLS v.3, found that green product development, promotion, and pricing strategies positively affect firm performance. However, green distribution strategies showed no significant impact. Ali (2023) assessed the impact of green supply chain practices (GSCP) on operational performance in manufacturing companies, using the resource-based view theory. The study, involving 407 textile SME executives, confirmed that GSCPs positively influence both business process performance (BPP) and overall SME performance, with BPP playing a crucial role in enhancing the GSCP-SME performance link.

Mafini and Muposhi (2017) investigated the effects of green supply chain management practices on environmental cooperation and financial performance in South African SMEs. Their quantitative study of 312 SMEs in Gauteng Province used Structural Equation Modelling to demonstrate that green procurement, logistics, and manufacturing positively influence environmental cooperation in SMEs, with green manufacturing showing the strongest impact. Ajayi et al. (2021) studied the impact of green distribution and procurement practices on environmental and operational performance of SMEs in Oyo State, Nigeria. Their survey of 455 SME operators, analysed using regression and correlation methods, revealed significant effects of green distribution and procurement on SME environmental performance. The researchers recommended adopting green supply management to enhance SME operations in Nigeria. Maziriri (2020) examined the influence of green packaging and green advertising on competitive advantage and business performance of manufacturing SMEs in Gauteng, South Africa. Using quantitative methods and structural equation modelling, the study found that both green packaging and advertising positively impact the competitive edge and business performance of the sampled SMEs.

3. Methodology

The study utilized a survey method to gather data from participants. This approach was chosen because surveys are effective for systematically collecting quantitative data about respondents' attitudes, opinions, behaviours, and other characteristics. Also, this study is cross-sectional, which means that data was gathered from participants at just one particular moment in time.

The study targets all registered small and medium-sized enterprises (SMEs) situated in Benue and Nasarawa states, as well as the Federal Capital Territory (FCT) in Abuja, Nigeria. These states were selected due to their significant concentration of SMEs. According to the NBS/SMEDAN (2021) MSME survey, the total number of registered SMEs in Benue, Nasarawa, and the FCT was reported to be 48,440. Using the Yamane (1967) formula for determining sample size based on the study population, approximately 397 respondents were chosen for the sample. Therefore, the study's minimum sample size is 397 respondents. However, according to Israel (2013), it is recommended to increase the minimum sample size by 10-30% to account for non-response and ensure a robust sample size. In this study, 20% was added to the calculated minimum sample size of 397. This addition resulted in 79 more respondents, making a total of 476 questionnaires administered across the states. Additionally, the specific sample size for each state and the Federal Capital Territory (FCT) was calculated using Bowley's proportional allocation technique.

The study employed a simple random sampling approach to choose 476 small and medium-sized manufacturing enterprises (SMEs) for the research. In each selected SME, either the owner or the manager filled out the questionnaire on behalf of the company. The questionnaire had two parts: Section "A" collected demographic details, and Section "B" contained questions rated on a five-point scale, ranging from Strongly Agree (5) to Strongly Disagree (1). These questions evaluated the green marketing strategies and sustainability practices of manufacturing SMEs in north-central Nigeria.

The questionnaire proved reliable, with Cronbach's alpha values for each sub-scale between 0.840 and 0.920, all above the acceptable reliability level.

The study employed the descriptive and multiple linear regression analyses to analyse the data of this study with the aid of SPSS v25. The descriptive analysis summarized the demographic data and identified patterns in green marketing practices among the enterprises. The multiple linear regressions examined the effect of GMX components (green product design, pricing, promotion, and distribution) on the sustainability of these enterprises. The regression model determined the strength and direction of the relationship between green marketing practices and sustainability outcomes, offering insights into their contributions to environmental, economic, and social performance.

Analytical Model Specification

Given that the study examined the causal relationships between multiple independent variables and a single dependent variable (sustainability of manufacturing SMEs), the application of multiple regression analysis was appropriate. The model is as follows

$$\text{SUST} = \alpha + \beta_1\text{GPT} + \beta_2\text{GPR} + \beta_3\text{GPL} + \beta_4\text{GPRN} + \varepsilon;$$

Where:

SUST: Sustainability is the dependent variable.

GPT: Green Product

GPR: Green Pricing

GPL: Green Placement

GPRN: Green Promotion

ε : error term.

α : Constant

4. Data Analysis and Interpretation of Results

In this study, a total of 476 questionnaires were distributed and 88% were completed and returned, resulting in 419 responses that were deemed sufficient for analysis. Of these respondents, 77.4% were male (325 individuals), while 22.4% were female (94 individuals), indicating a predominance of male participants. This highlights a gender disparity common in many developing countries, including Nigeria.

Regarding age groups, 1.4% of respondents were aged 15-19, 2.6% were aged 20-24, 25.5% were aged 25-29, and the majority, 70%, were over 30 years old. This suggests that most respondents were adults capable of making informed decisions.

In terms of marital status, 81.7% (343 individuals) were married, while 18.1% (76 individuals) were single, indicating that a large number of respondents had marital responsibilities.

In terms of educational qualifications, 6.2% had Senior School Certificates, 36.4% had ND/Diploma certificates, 42.9% had B.Sc./HND certificates, and 14.3% had masters or other advanced degrees. This indicates that the majority of respondents were literate and capable of providing meaningful responses to the survey questions.

The multiple linear regression analysis investigated how the green marketing mix (GMX) impacts the sustainability of manufacturing SMEs in north-central Nigeria. The findings are outlined and explained as follows:

Regression Analysis

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F Change	Sig. F Change
1	.579 ^a	.335	.328	.76928	52.093	.000

a. Predictors: (Constant), GPRN, GPT, GPR, GPL

Table 2 illustrates the regression model's fit to the data. The R-squared value (R^2) indicates that approximately 33.5% of the variation in the sustainability of manufacturing SMEs (SUST) is explained by the predictors: green promotion (GPRN), green product (GPT), green pricing (GPR), and green placement (GPL). This suggests that these factors are not the sole determinants of sustainability. Interestingly, the sustainability of manufacturing SMEs is likely influenced by numerous other factors beyond the four predictors examined. This complexity implies that the model captures only a portion of the variability. Additional significant predictors, such as government policies, market conditions, or technological advancements, may also play a crucial role. The adjusted R-squared, which accounts for the number of predictors, is a bit lower at 32.8%. Though the R^2 is low, it does not pose a problem to the study because the F-statistics (P-value = 0.00) value of the model is significant at 5%. The standard error of the estimate is 0.76928, reflecting the average discrepancy between the actual and predicted values.

Table 3: Regression Model Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.630	.145		4.342	.000
	GPT	.233	.038	.254	6.161	.000
	GPR	.038	.049	.033	.770	.441
	GPL	.208	.055	.167	3.759	.000
	GPRN	.417	.050	.366	8.293	.000

a. Dependent Variable: SUST

Table 3 presents the results of the multiple regression analysis, including unstandardized coefficients (B), standardized coefficients (β), t-values, and significance levels (p-values) for the predictor variables and the constant term in the model.

The constant term ($\beta_0 = 0.630$, $p < .001$) is statistically significant, indicating the baseline level of sustainability when all predictor variables are zero. This suggests that there are other factors contributing to sustainability beyond those included in the current model.

Green product (GPT) demonstrates a positive and statistically significant relationship with sustainability ($\beta = 0.233$, $\beta = 0.254$, $p < .001$). The standardized coefficient suggests that for each

standard deviation increase in GPT, sustainability increases by 0.254 standard deviations, holding other variables constant.

In contrast, green price (GPR) exhibits an insignificant effect on sustainability ($\beta = 0.038$, $\beta = 0.033$, $p = .441$). Green placement (GPL) shows a positive and statistically significant impact on sustainability ($\beta = 0.208$, $\beta = 0.167$, $p < .001$). Green promotion (GPRN) emerges as the strongest predictor of sustainability in the model ($\beta = 0.417$, $\beta = 0.366$, $p < .001$). The magnitude of its standardized coefficient indicates that GPRN has the most substantial relative impact on sustainability among all variables in the model. This highlights the crucial role of marketing and communication strategies in fostering sustainable practices and outcomes. However, the relative magnitudes of the standardized coefficients (β) provide insight into the comparative importance of each predictor. The order of influence, from most to least, is GPRN ($\beta = 0.366$), GPT ($\beta = 0.254$), GPL ($\beta = 0.167$), and GPR ($\beta = 0.033$). This hierarchy offers valuable guidance for prioritizing sustainability initiatives in manufacturing SMEs.

5. Discussion of Findings

The study found that most of the factors studied (except for GPR) positively and significantly affect the sustainability (SUST) of small and medium-sized manufacturing businesses. Specifically, the analysis indicated that green products (GPT) notably contribute to enhancing sustainability, which aligns with previous research by Nuryakin and Maryati (2020), Setyawati et al. (2020), and Maziriri and Maramura (2022). This suggests that producing environmentally friendly goods can help improve the sustainability of these enterprises. These findings are supported by a variety of literature, resulting in the hypothesis being rejected.

The analysis revealed that green pricing (GPR) does not significantly affect the sustainability of small and medium-sized manufacturing enterprises (SMEs), as indicated by a p-value of 0.441. This means that the pricing strategies related to environmentally friendly products do not play a crucial role in determining how sustainable these SMEs are. Despite efforts to set prices that reflect environmental concerns, this study suggests that other factors might have a greater impact on the overall sustainability of manufacturing SMEs. This finding contrasts with Setyawati et al. (2020), who found that pricing strategies focused on green products positively influence firm performance. Consequently, this study accepts the hypothesis it initially proposed.

Additionally, the analysis found that green placement (GPL) has a significant and positive effect on the sustainability of manufacturing SMEs in north-central Nigeria, as shown by a p-value of 0.000. This discovery is consistent with studies by Mafini and Muposhi (2017), Ajayi et al. (2021), and Ali (2023). It suggests that the strategic distribution or placements of green products are vital for boosting the sustainability of manufacturing SMEs. The findings are backed by multiple sources in the literature, which resulted in rejecting the hypothesis proposed in the study.

Lastly, the analysis showed that green promotion (GPRN) significantly enhances the sustainability of manufacturing small and medium-sized enterprises (SMEs), as evidenced by a very low p-value of 0.000. This means that promoting environmentally friendly practices and products is beneficial for enhancing the sustainability of SMEs in manufacturing. It suggests that efforts in green marketing and promotion can lead to tangible improvements in the environmental and economic sustainability of these businesses. This finding is in consonance with that of Maziriri (2020) who found that both green packaging and green advertising positively influence competitive advantage and business performance among the SMEs. Hence, the formulated hypothesis is hereby rejected.

The findings of this study is equally supported by the NRBV which suggests that small and medium-sized businesses can achieve a competitive edge by adopting eco-friendly activities like offering green products (items that benefit the environment or are made with minimal environmental impact), using green placement (efficient distribution methods that reduce environmental footprint), and employing green promotion (marketing that highlights environmental benefits). These practices help SMEs stand out from competitors and support their long-term sustainability goals by meeting consumer preferences and regulatory demands for sustainability.

6. Conclusion

The study titled “Green marketing mix (GMX) and sustainability of small and medium-scale manufacturing enterprises in North Central Nigeria” examines the period from 2023 to 2024 using a multiple regressions analysis. It concludes that eco-friendly products, green placement, and green promotion significantly contribute to the sustainability of manufacturing SMEs in North Central Nigeria, while green pricing has a positive but non-significant impact. By creating products with reduced environmental impact or clear environmental benefits, manufacturing SMEs can satisfy consumer demand for sustainability and reduce their environmental footprint. Additionally, sustainable logistics not only align with consumer preferences for eco-responsible practices but also improve operational efficiency and potentially lower resource and transportation costs, thereby enhancing SMEs’ sustainability credentials and competitiveness. Effective communication of eco-friendly practices strengthens brand reputation, attracts environmentally conscious consumers, and positions SMEs competitively in a market increasingly focused on sustainability. Finally, the positive yet statistically insignificant impact of green pricing suggests that while pricing products with environmental benefits positively influences perceptions, it may not significantly impact overall sustainability outcomes for these businesses.

Recommendations

Based on the results of this study, the following recommendations are made:

1. Since green products greatly affect the sustainability of manufacturing SMEs, it is advised that these businesses focus on creating and promoting eco-friendly products. By focusing on creating products that have reduced environmental impact or offer clear environmental benefits, SMEs can enhance their sustainability credentials.
2. Since green pricing shows a positive but insignificant influence on the sustainability of manufacturing SMEs, it is advisable for these businesses to supplement pricing strategies with other initiatives that have a more pronounced impact on sustainability. This could include focusing on developing eco-friendly products, optimizing distribution to reduce environmental footprint, or enhancing green marketing efforts.
3. Manufacturing SMEs should prioritize implementing eco-friendly practices in their distribution and logistics operations. This includes optimizing transportation routes, reducing packaging waste, and choosing suppliers with strong environmental credentials. By focusing on sustainable placement strategies, SMEs can reduce their carbon footprint while also improving operational efficiency and potentially reducing costs associated with logistics.
4. Considering the substantial benefits of green promotion to the long-term viability of manufacturing SMEs, it is recommended that these businesses emphasize and highlight their eco-friendly practices and products in their marketing efforts. This includes clearly communicating their environmental benefits, sustainability initiatives, and commitments to consumers and stakeholders.

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