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Green Ocean Strategy and Sustainability of the Oil Palm Industry in the Niger Delta, Nigeria

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ABSTRACT

This study examined the relationship between Green Ocean Strategy and the sustainability of the oil palm industry in the Niger Delta, Nigeria. Specifically, the study examined the association between Market Innovation and sustainability, assessed the association between Value Proposition and sustainability, examined the association between Cost Structure and sustainability, and determined the joint associations between the three variables and overall sustainability of the oil palm industry. The study adopted a quantitative research design. A total of 540 questionnaires were administered, of which 501 valid responses from stakeholders in the oil palm industry across the selected Local Government Areas in Delta, Edo and Akwa Ibom States, representing a 92.8% response rate were subsequently analysed using descriptive statistics and multiple regression analysis. The regression results showed that the model explained 76.8% of the variance in Overall Sustainability ($R^2 = 0.768$; Adjusted $R^2 = 0.766$). Market Innovation (MI) has a positive and statistically significant association with Overall Sustainability ($\beta = 0.378$, $p < .001$). Holding the other determinants constant, a one-unit increase in Market Innovation is associated with an estimated 0.389-unit increase in Overall Sustainability. Value Proposition had the largest standardized coefficient among the three predictors ($\beta = 0.564$, $p < .001$). In contrast, Cost Structure (CS) has a very small positive coefficient ($\beta = 0.026$) and is not statistically significant ($t = 0.777$, $p = .438$). The findings indicate that Value Proposition and Market Innovation are more prominent strategic variables in explaining sustainability within the study sample, whereas Cost Structure appears to play a more limited role in the overall model. The study concludes that sustainability-oriented value creation and market innovation constitute important strategic considerations for the oil palm industry. It recommends greater emphasis on sustainable value creation and market innovation, while encouraging firms to integrate cost management with resource efficiency and other sustainability-oriented practices.

KEYWORDS: Green Ocean Strategy, Market Innovation, Value Proposition, Cost Structure, Sustainability, Oil Palm Industry.



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Introduction

The oil palm industry remains one of the most economically significant agricultural sectors in Nigeria, particularly in Southern Nigeria where favourable climatic and ecological conditions support its cultivation. Historically, the industry has contributed immensely to rural livelihoods, export earnings, food security, employment generation, and the supply of industrial raw materials. By the nineteenth century, oil palm had

become a major export commodity for the British Empire due to its extensive use in soap production, candle making, and industrial lubricants, earning the description of “green gold” because of its immense economic value. By the nineteenth century, oil palm had become an important export commodity because of its extensive use in soap production, candle making, and industrial applications (Attah, 2014; Akeem et al., 2024).

Despite this historical importance, the sustainability of the Nigerian oil palm industry, particularly in the Niger Delta has become a major concern. The industry now faces monumental challenges including environmental, economic, and social arising from unsustainable production practices, weak institutional coordination, inadequate technological innovation, land-use conflicts, ecological degradation, and limited integration of host communities into value-chain governance (Mohammad Sabli et al., 2026). Greater emphasis has often been placed on expanding production and achieving short-term economic gains than on long-term sustainability and environmentally responsible growth.

Globally, increasing demand for palm oil has intensified concerns over deforestation, biodiversity loss, greenhouse gas emissions, and community displacement (Pacifci & Cristiano, 2026). In the Nigeria Niger Delta, these challenges are compounded by coastal encroachment, oil-related environmental degradation, land scarcity, and increasing conflicts between plantation operators and host communities. Expanding plantation activities continue to exert pressure on land resources, contributing to disputes over land ownership, livelihood displacement, and social exclusion. These developments have raised important questions regarding the sustainability and governance of the industry.

Evidence of these structural challenges is reflected in recent production statistics. According to the United States Department of Agriculture (USDA), Nigeria produced approximately 1.5 million metric tons of palm oil during the 2023/2024 market year against an estimated domestic demand of about 2.4 million metric tons (Balogun, 2025). This significant production deficit highlights persistent weaknesses, including low productivity, inadequate value-chain coordination, insufficient technological modernization, and the absence of sustainability-driven strategic frameworks. While leading producers such as Malaysia and Indonesia have strengthened their competitiveness through coordinated sustainability policies, innovation systems, and strategic investments, Nigeria's oil palm industry continues to experience fragmented development approaches that undermine its long-term sustainability (Shehu et al. (2021).

These challenges have made sustainability a strategic necessity rather than merely an environmental concern. Consequently, there is an increasing need for innovative strategic frameworks capable of simultaneously addressing economic viability, environmental protection, and social inclusion. One emerging framework is the Green Ocean Strategy (GOS), which promotes sustainable value creation through Market Innovation, Value Proposition, and Cost Structure. Unlike traditional competitive strategies that focus primarily on market expansion, Green Ocean Strategy integrates sustainability into strategic decision-making and organizational development (Sikandar et al., 2026). It emphasis is profitability without undermining the values of the water, the land, the sky, the forest, the low animals, and human existence which defines a good-care for earth.

The broad-based objective of this study therefore, is to examine in holistic perspective; the level of association between GOS and Sustainability within the context of oil palm industry. Specifically, the study examine the association between Market Innovation and the sustainability; examine the association between Value Proposition and the sustainability; examine the association between Cost Structure and the sustainability; and determine the joint association between Market Innovation, Value Proposition and Cost Structure and the overall sustainability of the oil palm industry in the Niger Delta, Nigeria.. Tentatively, the study postulated that Market Innovation has no significant association with the sustainability; Value Proposition has no significant association with the sustainability; Cost Structure has no significant association with the sustainability; and that Market Innovation, Value Proposition and Cost Structure have no significant joint association with the sustainability of the oil palm industry in the Niger Delta, Nigeria. Multiple regression analysis was conducted to examine the extent to which the variables; Market Innovation, Value Proposition and Cost Structure were associated with Overall Sustainability of the oil palm industry. The model comprised the three variables and Overall Sustainability as the dependent variable

Statement of the Problem

The oil palm industry, once a backbone of Nigeria's economy and a major source of employment, rural livelihoods, foreign exchange, and industrial raw materials, has experienced sustained decline despite the country's favourable ecological conditions. Historically, Southern Nigeria was a global hub of oil palm production, while countries such as Malaysia and Indonesia now leading producers and exporters, developed their industry from seedlings they originally obtained from Nigeria. Despite rising global demand for palm oil across food, cosmetics, pharmaceuticals, biofuel, automobile, aviation, and other industries, Nigeria has struggled to regain its competitive advantage.

The industry's decline has traditionally been attributed to economic inefficiencies and environmental challenges, including unsustainable production, deforestation, biodiversity loss, and greenhouse gas emissions. However, these explanations do not fully capture the contemporary socio-environmental conflicts confronting the industry in the Niger Delta. Land acquisition disputes involving large plantation operators and host communities have generated resistance, protests, litigation, and conflicts. These tensions are further aggravated by shrinking cultivable land and climate-related challenges such as coastal erosion, sea-level rise, saltwater intrusion, and flooding. Consequently, continued expansion through plantation acreage may intensify environmental degradation, community conflicts, and climate vulnerability. These realities expose the limitations of conventional growth strategies and raise a critical question: how can Nigeria increase oil palm productivity and competitiveness without worsening environmental degradation and socio-economic conflicts?

The Green Ocean Strategy (GOS) provides a potentially transformative response. Unlike conventional expansion models, GOS promotes simultaneous economic value creation, environmental stewardship, and social inclusion (Ajimisogbe et al. 2024). It emphasizes innovation, technological advancement, value addition, circular resource utilization, and stakeholder collaboration and participation rather than continuous territorial expansion (Ajimisogbe et al. 2024).

Despite its relevance, empirical studies on GOS and oil palm sustainability in the Niger Delta remain limited. Existing literature focuses predominantly on environmental and economic dimensions, with insufficient attention to strategic innovation, community inclusion, and climate resilience. This study therefore investigates how GOS can revitalize the oil palm industry while balancing economic competitiveness, environmental protection, and equitable social development.

Review of Related Literature

The Concept of Green Ocean Strategy (GOS)

Green Ocean Strategy (GOS) represents an emerging strategic management perspective that extends conventional competitive strategy by integrating economic value creation with environmental responsibility and social considerations. Its intellectual foundation can be traced to the value-innovation logic of Blue Ocean Strategy, which emphasizes the simultaneous pursuit of differentiation and cost efficiency in the creation of new market spaces (Kim & Mauborgne, 2005). However, whereas Blue Ocean Strategy is principally concerned with creating uncontested market space and new demand, Green Ocean Strategy broadens the strategic objective by incorporating sustainability into the process of value creation.

This distinction is important in the context of the oil palm industry because competitive performance cannot be considered independently of environmental and social consequences. The industry's traditional emphasis on productivity, market expansion and profitability has increasingly been followed by concerns relating to deforestation, biodiversity loss, resource depletion, greenhouse-gas emissions and community relations. Consequently, a strategy that merely creates new markets without addressing these consequences may only treated short-term competitiveness without necessarily improving long-term sustainability. The Green Ocean strategy therefore provides a basis for considering competitiveness and sustainability as interconnected strategic concerns.

Ajimisogbe et al. (2024) conceptualize Green Ocean Strategy as an approach through which organizations can combine innovation, value creation and sustainability to achieve competitive advantage while at the same time addressing environmental and social concerns. Tanțău and Mateeșescu (2013) similarly associate the Green Ocean Innovation Model with the creation of new opportunities through environmentally

conscious innovation. These perspectives suggest that the distinctive feature of GOS is not simply the introduction of “green” activities, but the incorporation of sustainability considerations into the strategic logic of how organizations create, deliver and capture value.

The relevance of this perspective becomes clearer when GOS is examined through its core strategic variables. Although the broader literature identifies several sustainability-oriented practices, the present study focuses specifically on Market Innovation, Value Proposition and Cost Structure as the dimensions used to operationalize Green Ocean Strategy. These variables are analytically relevant because they capture three interconnected aspects of strategic value creation: how firms develop and access markets, what value they offer to stakeholders, and how efficiently they organize the resources and costs required to deliver that value.

Green Ocean Strategy and Sustainability

The relationship between Green Ocean Strategy and sustainability can be understood through the proposition that strategic competitiveness increasingly depends on the ability of firms to create economic value without undermining environmental resources or social wellbeing. Sustainability itself is multidimensional, encompassing economic, environmental and social considerations (Mensah, 2019). In the present study, Overall Sustainability is therefore treated as a composite construct incorporating environmental sustainability, economic sustainability and social sustainability.

This composite treatment is particularly relevant to the oil palm industry. Environmental performance may involve deforestation control, biodiversity conservation and emissions reduction, while economic sustainability involves profitability, competitiveness, regulatory compliance and value-chain continuity. Social sustainability, on the other hand, incorporates issues such as land rights, labour conditions, smallholder welfare and relationships with host communities. The three dimensions may reinforce one another, but they may also involve trade-offs. For example, investments in environmentally responsible technologies may initially increase costs but subsequently improve resource efficiency, market acceptance or regulatory compliance.

Previous studies provide evidence for different aspects of this relationship. Campos et al. (2021) demonstrate the economic and ecological value associated with ecosystem conservation, suggesting that environmental protection can also have economic implications. Stuart et al. (2023), through their discussion of social licence to operate, highlight the importance of community and stakeholder relationships in sustaining organizational activities. Similarly, Abdul Majid et al. (2021) show the importance of certification frameworks in promoting sustainability within the palm oil sector. Taken aforesaid together, these studies indicate that sustainability in the oil palm industry cannot be reduced to environmental protection alone. Rather, it requires an integrated consideration of market, economic, environmental and social factors. This provides the conceptual basis for examining whether specific strategic variables of GOS are associated with Overall Sustainability.

Variables of Green Ocean Strategy

Market Innovation

Market Innovation refers to the development and application of new products, markets, business models, distribution approaches and market practices in response to changing customer and stakeholder expectations. In a sustainability context, however, market innovation extends beyond conventional market expansion. It involves identifying opportunities where innovation can at the same time respond to market needs and sustainability concerns. Kniazieva and Zavodovskyi (2024) associate sustainable marketing innovation with social responsibility, suggesting that innovation in marketing can influence not only commercial performance but also an organization's social capital. Aithal (2023) similarly emphasizes technological innovation and business value creation as mechanisms through which organizations can develop new opportunities and respond to changing market conditions. These arguments indicate that market innovation may be particularly relevant in industries characterized by changing consumer expectations and increasing sustainability requirements.

The oil palm industry provides a useful setting for examining this relationship. Sustainability certification,

traceability, product differentiation, digital technologies and new distribution mechanisms can create opportunities for producers to respond to environmentally and socially conscious markets. Abdul Majid et al. (2021), for example, demonstrate the relevance of certification schemes to sustainable palm oil production, while Lin et al. (2020) illustrate how blockchain technology can improve transparency and traceability within agricultural systems. The analytical implication is that market innovation may operate at the intersection of commercial opportunity and sustainability demand. Firms that respond to changing market expectations through certification, traceability, sustainable product differentiation and technological applications may be better positioned to satisfy customers while simultaneously addressing regulatory and sustainability requirements. However, the existence of these opportunities does not by itself establish that market innovation produces sustainability. The empirical question is whether variation in market innovation is statistically associated with variation in Overall Sustainability among stakeholders in the study area.

Green Ocean Strategy and Market Innovation

The relationship between Green Ocean Strategy and Market Innovation is particularly important because the creation of new market opportunities constitutes a central feature of strategic innovation. Blue Ocean Strategy emphasizes value innovation as a means of creating new demand (Kim & Mauborgne, 2005), while Green Ocean Strategy introduces sustainability considerations into this value-creation process. The distinction is significant for the oil palm industry. Traditional market competition may encourage firms to increase output and reduce costs, whereas a sustainability-oriented market innovation approach may encourage firms to differentiate products through certification, traceability, responsible sourcing and environmentally responsible production.

Evidence from the palm oil literature supports the relevance of these practices. Certification frameworks have been identified as mechanisms for promoting sustainability (Abdul Majid et al., 2021), while blockchain applications have been proposed to improve supply-chain traceability and transparency (Hirbli, 2018; Lin et al., 2020). Budiadi et al. (2019) also demonstrate how alternative production systems such as agroforestry may contribute to livelihood resilience. The literature therefore suggests that market innovation in the oil palm industry is broader than the development of new products. It also involves new ways of creating, communicating, verifying and delivering sustainable value. Nevertheless, much of the existing evidence examines these practices individually or from environmental and supply-chain perspectives. There remains comparatively scanty empirical evidence showing whether Market Innovation, treated as an integrated strategic variable, is associated with Overall Sustainability in the Niger Delta.

Value Proposition

Value Proposition concerns the benefits and value that an organization offers to customers and other stakeholders. In a conventional strategic context, value proposition is often associated with differentiation and customer satisfaction. Within a Green Ocean framework, however, the concept becomes broader because value must incorporate environmental and social attributes alongside economic and functional benefits. Baldassarre et al. (2017) linked sustainable value proposition design with the integration of sustainable business model innovation and user-driven innovation. Their perspective is important because it demonstrates that sustainability-oriented value cannot be designed separately from the firm's perspective; it requires consideration of users and other stakeholders. Laukkanen and Tura (2022) similarly show the relevance of customer-perceived value to sustainable value propositions.

The implication for the oil palm industry is that value may increasingly depend on attributes such as responsible sourcing, product quality, traceability, certification, environmental performance and social responsibility. Voora et al. (2020) demonstrate the importance of sustainability considerations within global palm oil markets, while Verhaeghe and Ramcilovic-Suominen (2024) highlight the implications of the EU's deforestation-free regulatory framework for products associated with deforestation risks.

These studies collectively suggest that value proposition has moved beyond the traditional question of "What does the customer receive?" to include "How is that value created, and what environmental and social consequences accompany its creation?" This is particularly relevant to the oil palm industry because access to some international markets increasingly depends not only on price and product quality but also on evidence of responsible production and traceability practices. Consequently, a sustainability-oriented value proposition have the potential to provide an important strategic linkage between market expectations and

organizational sustainability practices. The present study therefore examines Value Proposition as a distinct dimension of GOS rather than assuming that its influence is automatically captured by Market Innovation.

Cost Structure

Cost Structure represents the summation and management of the costs associated with producing and delivering goods and services to target audience. In the context of Green Ocean Strategy, cost management is not limited to reducing expenditure. Rather, it involves examining how resource efficiency, waste reduction, energy efficiency, production methods and environmental and social costs affect the long-term sustainability of organizational operations. Bocken et al. (2014) demonstrate that sustainable business models require organizations to reconsider conventional approaches to value creation and resource use. Sudjono (2024) similarly emphasizes the need to balance profitability and environmental responsibility within sustainable business models. These perspectives imply that cost efficiency and sustainability can potentially be complementary where cost reductions result from more efficient resource utilization rather than from practices that transfer environmental or social costs to other stakeholders.

This distinction is particularly important in the oil palm industry. Production costs include land preparation, labour, fertilizers, pesticides, machinery, harvesting, processing and transportation. However, some costs associated with oil palm production may not be fully appreciated when viewed from conventional financial calculations alone. Take for instance, environmental degradation, conflict management, and resource depletion may generate external costs that affect the long-term sustainability of the industry. Research on integrated oil palm production also suggests that alternative production systems can provide opportunities for both resource efficiency and livelihood diversification. Devendra (2004) examined integrated tree-crop and ruminant systems involving oil palm, while Ha et al. (2025) examined the advantages and limitations of oil palm-ruminant integration. These studies indicate that cost-related decisions can have consequences extending beyond immediate expenditure.

However, the literature also suggests that cost efficiency does not automatically translate into sustainability. A firm may reduce operating costs in ways that increase environmental degradation or social costs. Therefore, the important analytical question is not whether lower costs are inherently sustainable, but whether the configuration and management of costs within a sustainability-oriented business model are associated with Overall Sustainability. This analysis is especially relevant to the present study because Cost Structure is tested against Market Innovation and Value Proposition. The empirical analysis therefore provides an opportunity to determine whether cost-related practices exhibit an independent association with sustainability after the other strategic variables have been considered.

Sustainability in the Oil Palm Industry

Sustainability in the oil palm industry requires simultaneous consideration of economic performance, environmental integrity and social wellbeing. The multidimensional character of sustainability means that improvements in one dimension may not necessarily imply improvements across all dimensions. The environmental dimension is particularly prominent in the palm oil literature because expansion and production can be associated with deforestation, biodiversity loss and greenhouse-gas emissions. Pacifici and Cristiano (2026) examined the implications of oil palm plantation expansion for terrestrial mammals, while Purnama et al. (2025) reviewed environmental impacts associated with palm oil biodiesel. Souza et al. (2010) similarly examined greenhouse-gas emissions and energy balances associated with palm oil biofuel.

Economic sustainability is also central to the industry because producers must remain commercially viable while responding to increasing environmental and regulatory requirements. Mohammad Sabli et al. (2026), for example, used econometric analysis to examine resource efficiency and economic performance in oil palm plantations. This indicates the importance of linking resource utilization with economic outcomes rather than treating environmental and economic objectives as completely separate concerns.

The social dimension is equally important, particularly in areas where plantation activities intersect with local livelihoods and community interests. Stuart et al. (2023) emphasize the importance of social license to operate, while Budiadi et al. (2019) demonstrate the potential relevance of oil palm production systems to farmers' livelihood resilience. These studies indicate that long-term sustainability depends partly on the extent to which industry activities are compatible with the interests and wellbeing of affected stakeholders.

The literature therefore supports the treatment of sustainability as a composite construct in this study. Rather than examining environmental, economic and social sustainability as completely isolated outcomes, the study considers Overall Sustainability as an integrated measure reflecting their interconnected nature.

Theoretical Review

Blue Ocean Strategy and Green Ocean Strategy

The theoretical foundation of this study is derived from Blue Ocean Strategy developed by Kim and Mauborgne (2005). The theory proposes that organizations can create new market spaces through value innovation rather than competing exclusively within existing markets. Value innovation involves simultaneously increasing customer value while pursuing cost efficiency. The relevance of this theoretical position to Green Ocean Strategy lies in the extension of value innovation to sustainability. While Blue Ocean Strategy provides an explanation for how firms can escape conventional competitive pressures through differentiation and value creation, Green Ocean Strategy adds environmental and social considerations to the strategic value equation.

The theoretical implication is that sustainable competitiveness may emerge when organizations identify market opportunities in which economic value, customer value and sustainability objectives can be pursued simultaneously. Market Innovation reflects the creation and development of new market opportunities; Value Proposition reflects the benefits delivered through those opportunities; and Cost Structure reflects the resource and cost summation needed to create and deliver the value. Accordingly, the theoretical framework of the study does not assume that all three dimensions necessarily contribute equally to sustainability. Rather, it provides a basis for empirically testing the relative statistical associations of Market Innovation, Value Proposition and Cost Structure with Overall Sustainability. This theoretical position is consistent with the present empirical model, which specifies the three GOS as independent variables and Overall Sustainability as the dependent variable.

Empirical Review

Terry et al. (2026), in their study titled "Innovation for Sustainable Development: Assessing Sustainability-Oriented Innovations in the UK Palm Oil Supply Chains," examined the adoption of Sustainability-Oriented Innovations (SOIs) among UK food manufacturing firms in the palm oil sector. The study, grounded in Eco-Innovation Theory, employed a three-phase sequential analytical approach to assess sustainability practices within the global palm oil industry. The researchers highlighted key environmental and social issues such as deforestation, biodiversity loss, and labour exploitation, while noting that empirical research on SOIs remains limited. The study therefore mapped existing SOI adoption patterns and assessed the effectiveness of the framework proposed by Adams, Jeanrenaud, Bessant, Denyer, and Overy (2016). Findings showed that larger organisations were more engaged in advanced SOIs, driven mainly by legislative pressure, stakeholder expectations, and corporate sustainability mandates.

Sunandar et al. (2026), conducted a study titled "Circular Economy Mapping in the Palm Oil Value Chain: Towards a Conceptual Framework for Sustainable Transition" in Indonesia. The study aimed to map Circular Economy (CE) opportunities across all stages of the palm oil value chain including pre-production, cultivation, processing, and consumption; while developing a conceptual framework to support sustainable transition in Indonesia's palm oil sector. The research is one of the first to provide a phase-based mapping of CE practices in the oil palm industry and proposed an integrative framework to consolidate fragmented sustainability efforts into a unified model. Methodologically, a systematic literature review was carried out using Scopus and Web of Science, following the PRISMA protocol. Studies published between 2017 and 2025 were thematically analysed to identify CE opportunities, drivers, barriers, and value chain linkages. Findings showed that CE opportunities exist across all phases of the value chain; however, integration between these phases remains weak, and coordination among stakeholders is still largely unstructured and insufficiently aligned for a systemic transition. This finding is significant for the present study because it suggests that individual sustainability practices may not be sufficient unless they are connected through broader strategic and organizational arrangements.

Ngwu, P.O. (2026), in the study titled "Marketing Strategies of Local Palm Products (LPP) in Onitsha South-East, Nigeria," examined the marketing strategies and challenges affecting local palm product producers in Onitsha. The study specifically assessed the influence of distribution and promotion strategies on locally

produced palm products and identified the major challenges faced by producers in these areas. The research was anchored on the Diffusion of Innovations Theory and adopted a descriptive survey design. Data were collected from 130 respondents selected through convenience sampling from a population of 194 registered small-scale palm product producers. A structured questionnaire based on a four-point Likert scale was used for data collection, while reliability testing produced a Cronbach's alpha coefficient of 0.933. Weighted mean analysis was employed for data interpretation. Findings showed that marketing strategies had a moderate influence on the performance of local palm products, particularly in distribution (WM = 3.07) and promotion (WM = 3.05). However, producers faced significant challenges in promotion (WM = 3.39) and distribution (WM = 3.26), mainly due to financial limitations, inadequate access to modern promotional platforms, logistical constraints, and competitive market pressures. Although the study focused on local palm products rather than Overall Sustainability, it provides empirical support for the relevance of market-related strategies within the palm-product sector.

Just shortly after the above research, Satnyoto et al. (2024) also in Indonesia in their article; "Indonesia's Strategy in Dealing with The European Union Green Protectionism in The Oil palm Trade" emphasized that Indonesia as the producer of 59% of global oil palm is facing green protectionism in the EU market. The study analyzes Indonesia's response to EU market protectionism. The study uses the perspective of protectionism and the dynamics of state adjustment behaviour in conflicts of national interest. The country's adjustment strategy theory is complemented by the behavioral choice strategy theory in facing international sanctions. The authors use qualitative methods, with literature study, observation, and supplemented interviews. Findings show that Indonesia must perform proactive conformance to find new markets for Indonesian oil palm. This is relevant to the Value Proposition dimension because international market access increasingly requires firms to demonstrate compliance with sustainability-related requirements.

In a related matter, Usapein, et al. (2022) through their article "Transition pathway oil palm research framework toward a bio-circular-green economy model using SWOT analysis: a case study of Thailand" focused on the development of strategies to research oil palm throughout the supply chain in Thailand. The SWOT factors (the strengths, weaknesses, opportunities, and threats) were adopted through interviews with stakeholders. The stakeholders were feedstock producers, crude oil palm (CPO) producers, government agencies, biodiesel producers, oil palm refinery producers, and researchers. They reviewed 140 research projects supported by ARDA from 2013–2017. For each project, they constructed a matrix of stakeholders of oil palm value chain to identify users in each project. They divided users into four categories: (1) farmers, (2) oil palm mills, (3) oil palm refineries and biodiesel, and (4) oleochemical industry. The results of the SWOT survey indicated 77% respondents understood the clear structure of oil palm industry and that Thailand Oil Palm Board supervises and sets appropriate policy guidelines. The wide range of expertise for researchers and policymakers was strength of oil palm management policy in Thailand. Likewise, 83% of respondents understood that lack of research output to develop policy frameworks, integrating policy knowledge for relevant personnel with specific expertise, and applying data science in policy research were the weaknesses.

Taken together, the empirical literature indicates that innovation, market adaptation, stakeholder coordination, resource efficiency and regulatory compliance are increasingly important to sustainable oil palm development. However, these studies differ substantially in their units of analysis, geographical contexts, methodologies and outcome measures. Some focus on individual practices, others on policy or value-chain processes, while relatively few examine the combined statistical association of Market Innovation, Value Proposition and Cost Structure with a composite measure of Overall Sustainability. This distinction provides the basis for the present study. Rather than examining one sustainability practice in isolation, the study empirically examines whether the three selected dimensions of Green Ocean Strategy are jointly and independently associated with Overall Sustainability among oil palm stakeholders in selected areas of the Niger Delta.

Gaps in the Literature

Although previous studies have examined sustainability as it pertains to production, innovation, value creation, resource efficiency and environmental management in agriculture and in the oil palm industry, however, the literature provides scanty empirical evidence on the combined association between Market Innovation, Value Proposition and Cost Structure and overall sustainability within the Niger Delta oil palm

industry. In other instances, sustainability were examined through individual environmental, economic or social dimensions rather than in its composite value. The present study instead treats Overall Sustainability as a composite construct incorporating environmental, economic and social considerations. This approach reflects the interconnected nature of sustainability challenges within the oil palm value chain. Consequently, the specific empirical gap addressed by this study is the limited evidence on the individual and joint statistical associations of Market Innovation, Value Proposition and Cost Structure with Overall Sustainability in the oil palm industry in the Niger Delta, Nigeria. The study addresses this gap by estimating a multiple regression model involving the three dimensions and Overall Sustainability as the dependent variable.

Research Methodology

The study adopted a descriptive survey research design and employed a multi-stage sampling procedure involving purposive and snowball sampling techniques. This is due to the wide geographical coverage and uneven distribution of oil palm activities. In the first stage, three (3) states; Delta, Edo, and Akwa-Ibom were purposively selected from the nine states of Niger Delta. Selection was based on the prominence of oil palm production, processing activities, and contribution to the industry. In the second stage, three (3) Local Government Areas (LGAs) were purposively selected from each of the three states; Delta - Ndokwa East, Ndokwa West, and Ughelli North; Edo - Ovia North-East, Owan West, and Ughelli North; and Akwa-Ibom - Abak, Etim Ekpo, and Essien Udim, resulting in nine (9) LGAs. The selection criteria included the intensity of oil palm activities, accessibility, and the presence of key industry stakeholders. At the third stage, respondents were selected using purposive and snowball sampling techniques. Eligible respondents comprised stakeholders directly involved in the oil palm value chain, including producers/farmers, processors, marketers/traders, plantation or mill managers, and other relevant industry stakeholders within the selected LGAs. Respondents were included where they had direct knowledge or experience of oil palm production, processing, marketing or related industry activities. The approach enabled the study to obtain responses from diverse oil palm stakeholders across the selected LGAs and provided substantial empirical coverage of the study area. A total of 540 questionnaires were administered, with 60 questionnaires allocated to each of the nine selected LGAs. Of these, 501 questionnaires were properly completed and returned, representing a response rate of 92.8%, approximately 93%. Unfortunately, thirty-nine questionnaires were not included because they were not returned. However, the 501 return was considered adequate for multiple regression analysis, providing sufficient statistical power to detect significant relationships among the study variables while ensuring broad representation of stakeholders across the selected states and enhancing the generalizability of the study findings.

Testing of Hypothesis

Model for Overall Sustainability

The model equation for the effect of Green Ocean Strategy variables on the overall sustainability of the oil palm industry in the Niger Delta is expressed as:

$$\hat{Y}(\text{OS}) = -0.622 + 0.389(\text{MI}) + 0.651(\text{VP}) + 0.027(\text{CS}) + \varepsilon$$

Table 1: ANOVA^a on Overall Sustainability

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	181.676	3	60.559	547.274	< .001
Residual	54.996	497	0.111		
Total	236.672	500			

- a. Dependent Variable: Overall Sustainability
b. Predictors: (Constant), Market Innovation, Value Proposition, and Cost Structure.

Table 2: Coefficients^a on Overall Sustainability

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	-0.622	0.158	—	-3.94	< .001
Market Innovation (MI)	0.389	0.033	0.378	11.272	< .001
Value Proposition (VP)	0.651	0.026	0.564	19.041	< .001
Cost Structure (CS)	0.027	0.032	0.026	0.777	.438

a. Dependent Variable: Overall Sustainability

Significant at $p < 0.05$ Decision Rule: Reject H_0 if $p\text{-value} < 0.05$

Findings

The regression results indicate a positive and statistically significant association between Market Innovation and overall sustainability ($\beta = 0.378$, $p < .001$). This suggests that higher levels of market innovation within the study sample are associated with higher reported levels of sustainability. Similarly, Value Proposition recorded a positive and statistically significant association with overall sustainability ($\beta = 0.564$, $p < .001$). Its standardized coefficient was larger than that of Market Innovation, indicating a stronger relative contribution to the prediction of sustainability within the estimated model. In contrast, Cost Structure showed a positive but statistically non-significant association with overall sustainability ($\beta = 0.026$) and is not statistically significant ($t = 0.777$, $p = .438$). This finding indicates that, within the study sample, variations in cost structure were not sufficiently strong to establish a statistically significant independent relationship with overall sustainability at the 5% significance level.

Theoretical Contributions

The study contributes to the emerging Green Ocean Strategy literature by extending the value-innovation logic of Blue Ocean Strategy to a sustainability-oriented context. It provides empirical evidence that strategic dimensions of Green Ocean Strategy may not contribute equally to sustainability. In particular, the relatively stronger contribution of Value Proposition suggests that sustainable value creation may represent an important mechanism through which strategic differentiation is associated with sustainability outcomes in the oil palm industry. The study also reinforces the multidimensional character of sustainability by considering economic, environmental and social considerations rather than treating sustainability solely as an environmental concern.

Conclusion

This study examined the relationship between Green Ocean Strategy and the sustainability of the oil palm industry in the Niger Delta, Nigeria, with particular attention to Market Innovation, Value Proposition and Cost Structure. The findings indicate that the strategic dimensions do not contribute equally to overall sustainability. Market Innovation and Value Proposition demonstrated positive and statistically significant associations with sustainability, while Cost Structure showed a positive but statistically non-significant association. Among the predictors, Value Proposition recorded the stronger standardized contribution.

The findings therefore suggest that sustainability-oriented value creation and market innovation are important strategic considerations for oil palm firms within the study sample. However, the findings should be interpreted as evidence of statistical association rather than causal effects, given the survey design and non-probability sampling procedure. The results also suggest that conventional approaches to cost management may not, on their own, be sufficient to generate broad sustainability outcomes unless they are integrated with resource efficiency and other sustainability-oriented practices.

Recommendations

It is hereby recommended for the oil palm firms in the study areas to:

1. Firms should strengthen Market Innovation by giving attention to product differentiation, sustainable market development, improved distribution systems, traceability mechanisms and innovative approaches to reaching environmentally and socially conscious markets.

2. Oil palm firms should give greater strategic attention to sustainability-oriented Value Proposition by incorporating product quality, traceability, ethical sourcing, certification, responsible production and other sustainability attributes into the value they offer to customers and other stakeholders.
3. Cost Structure should be treated as a supporting rather than stand-alone sustainability strategy but should instead emphasize resource efficiency, waste reduction, efficient input utilization, energy efficiency and other practices capable of generating economic and sustainability benefits simultaneously.

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