EFFECT OF CUSTOMER INTEGRATION ON THE PERFORMANCE OF RENEWABLE ENERGY FIRMS IN FEDERAL CAPITAL TERRITORY

AIMUFUA, Veronica Uche[1], JOHN, Charity Tani[2] & JEZHI, Godwin Iya[3]
Department of Business Administration, Nasarawa State University, Keffi
Email: uchebuluofu@gmail.com, jezhigodwiniya@gmail.com

Abstract
This study investigated the effect of customer integration on the performance of selected renewable energy firms in the Federal Capital Territory (FCT), Abuja, Nigeria. Specifically, the research explored how customer feedback monitoring, customer involvement, and information sharing with customers influenced firm performance. Using a cross-sectional survey design, data were collected from 86 employees across four renewable energy firms and analysed using multiple regression analysis. The findings revealed that all three dimensions of customer integration—customer feedback monitoring, customer involvement, and information sharing—positively and significantly affected firm performance. Information sharing, in particular, was identified as the most significant predictor of performance, highlighting its importance in driving operational efficiency and service improvement. Based on these findings, the study concluded that integrating customers into business processes was crucial for improving firm performance in the renewable energy sector. The research recommended that firms should enhance customer feedback monitoring systems, increase customer involvement in product and service development, and invest in better information sharing platforms to foster customer loyalty and improve performance outcomes.
Keywords: *Customer integration, firm performance, renewable energy, customer feedback monitoring, information sharing.*

INTRODUCTION

In today's global business landscape, organizations are increasingly recognizing the value of aligning their operations with the dynamic needs and expectations of their customers. Customer integration has emerged as a critical driver of competitive advantage, allowing firms to respond more efficiently to market demands, foster innovation, and improve customer satisfaction (Aslam et al., 2023; Awwad, Anouze, & Ndubisi, 2022). Globally, successful firms in diverse sectors have demonstrated that integrating customers into key operational and strategic processes leads to enhanced performance outcomes, including productivity, profitability, responsiveness, and long-term sustainability (Wu et al., 2021). This paradigm shift towards customer-centricity is particularly prominent in sectors where demand patterns are volatile and innovation is essential to survival, such as in the renewable energy industry (Martinelli & Tunisini, 2019).

Customer integration refers to the extent to which customers are involved in the planning, design, decision-making, and feedback processes of an organization's value chain (Martinelli & Tunisini, 2019). It promotes active engagement and collaboration between firms and their customers to co-create value, share information, and align offerings with customer expectations (dos Santos Hentschke, Torres Formoso, & Echeveste, 2020). Studies have affirmed that customer integration is fundamental to enhancing firm performance as it facilitates better demand forecasting, fosters innovation, and enhances customer loyalty (Prahalad & Ramaswamy, 2004; Flynn et al., 2010; Aslam et al., 2023; Marty, 2021).

In the literature, customer integration is broadly conceptualized in three major dimensions: customer feedback monitoring, customer involvement, and information sharing with customers. Customer feedback monitoring refers to systematic collection, analysis, and utilization of feedback from customers regarding products, services, or processes. It enables firms to identify performance gaps, improve service delivery, and adapt to changing needs (Wu et al., 2021). Customer involvement reflects the participation of customers in product development, decision-making, and co-creation activities. It ensures that solutions are tailored to real-world demands and enhances customer ownership (dos Santos Hentschke et al., 2020). Information Sharing with Customers encompasses the timely and transparent exchange of operational data, updates, and insights with customers, leading to increased trust, reduced uncertainty, and enhanced collaboration (Marty, 2021). These dimensions are particularly crucial in the renewable energy sector, where customer needs for reliability, affordability, and sustainability are constantly evolving (Aslam et al., 2023).

Performance, in this context, refers to the ability of these firms to deliver consistent, efficient, and customer-satisfying energy solutions while achieving operational and financial objectives (Belghitar et al., 2019). It includes metrics such as service quality, customer satisfaction, innovation rate, market reach, and financial viability (Taouab & Issor, 2019). However, despite the immense potential of renewable energy, many firms continue to face performance constraints linked to weak customer engagement and limited integration strategies (Fadhilah & Subriadi, 2019). The renewable energy sector plays a pivotal role in driving global energy transition and sustainability. In Nigeria, and particularly in the Federal Capital Territory (FCT) Abuja, renewable energy firms have become key players in addressing the country's energy access challenges through the deployment of solar, wind, and hybrid energy solutions. There is growing evidence that the integration of customers into strategic and operational processes may significantly enhance the performance of renewable energy firms in FCT-Abuja. For instance, involving customers in solution design could lead to more tailored and acceptable technologies, while feedback monitoring could inform continuous improvement strategies. Moreover, effective information sharing may reduce resistance, improve trust, and foster long-term relationships with customers. While these possibilities are theoretically appealing, the practical application and impact of customer integration on the performance of renewable energy firms in the FCT remain underexplored and insufficiently evidenced.

Nevertheless, renewable energy firms in FCT-Abuja are confronted with numerous performance challenges. Many grapples with issues such as limited customer feedback systems, low adoption of co-creation models, poor communication infrastructures, and weak customer engagement practices. Furthermore, firms are frequently affected by high operational costs, inconsistent policy environments, and competition from conventional energy providers. These issues not only impede performance but also threaten the sustainability of firms in the sector. Several renewable energy firms in Nigeria have shut down or downsized due to performance-related inefficiencies and inability to respond effectively to customer needs. Given these concerns, it is imperative to examine the effect of customer integration on the performance of renewable energy firms in FCT-Abuja.

Ideally, renewable energy firms are expected to operate in a manner that ensures high performance, adaptability, and customer satisfaction. In a well-functioning renewable energy ecosystem, firms are integrated with their customers, respond quickly to feedback, involve clients in decision-making, and share relevant information transparently. This promotes mutual trust, innovation, and efficiency. Globally, firms that adopt strong customer integration strategies tend to enjoy superior performance and customer loyalty.

However, the situation in Nigeria, and particularly in the Federal Capital Territory (FCT) Abuja, presents a different reality. Despite the growing demand for sustainable energy solutions, many renewable energy firms have recorded suboptimal performance, evidenced by limited market penetration, poor customer retention, service delivery issues, and financial instability. According to the Renewable Energy Association of Nigeria (REAN), over 30% of small to medium-sized renewable energy startups ceased operations between 2020 and 2023 due to operational inefficiencies and lack of customer-centric strategies. In FCT-Abuja, several firms have struggled to survive amidst increasing customer dissatisfaction, poor feedback mechanisms, and weak engagement models.

Theoretically, although customer integration has been widely linked to improved firm performance, there remains a scarcity of empirical studies that examine this relationship within the context of the Nigerian renewable energy sector. Much of the existing research has focused on manufacturing and service sectors, leaving a gap in understanding the dynamics of customer integration in energy-based enterprises. Moreover, the specific influence of each dimension of customer integration—feedback monitoring, involvement, and information sharing—on firm performance in this context has not been sufficiently explored.

Failure to address these problems could result in the continued underperformance and collapse of renewable energy firms, ultimately undermining Nigeria's efforts to achieve energy access, sustainability,

and economic development. It may also discourage private investments and weaken customer trust in clean energy solutions. Therefore, this study is both timely and critical in identifying actionable strategies for improving firm performance through customer integration. The broad research objective of this study is to investigate the effect of customer integration on the performance of renewable energy firms in the FCT-Abuja. The specific objectives are to:

i. examine the effect of customer feedback monitoring on the performance of renewable energy firms;
ii. investigate the effect of customer involvement on the performance of renewable energy firms; and
iii. assess the effect of information sharing on the performance of renewable energy firms.

LITERATURE REVIEW

Customer Integration

Customer integration has increasingly become a strategic imperative in today's competitive business landscape, particularly within supply chain and service-oriented environments. Conceptually, customer integration refers to the degree to which firms incorporate their customers into internal processes, decision-making, and value creation activities (Flynn et al., 2010; Martinelli & Tunisini, 2019). It involves a collaborative relationship where customers are not passive recipients of goods and services, but active contributors to product development, quality improvement, and service delivery optimization (Aslam et al., 2023; dos Santos Hentschke et al., 2020). Lambert and Cooper (2000) further described customer integration as a critical component of customer relationship management (CRM), where organizations engage in joint planning and problem-solving with customers to achieve mutual benefits. The overarching goal of customer integration is to enhance responsiveness, customization, and alignment between what customers expect and what firms deliver (Wu et al., 2021; Marty, 2021).

Customer integration has been closely linked to improved organizational performance, particularly in dynamic sectors like renewable energy where customers often require tailored solutions. Through practices such as early involvement in design stages, regular feedback solicitation, and proactive communication, firms can reduce product failure rates, shorten innovation cycles, and enhance customer satisfaction (Zhao et al., 2011; Awwad et al., 2022). In the renewable energy industry, integrating customers helps in understanding localized energy needs, environmental concerns, and affordability issues. As such, customer integration provides firms with a strategic lens to co-create value, foster loyalty, and maintain a competitive edge, particularly in an emerging and customer-driven market like Nigeria's renewable energy sector.

As a working definition, this study explains customer integration as the extent to which firms actively involve their customers in internal operations, strategic decision-making, and value creation processes to enhance responsiveness, service quality, and mutual benefit. It encompasses collaborative practices such as feedback monitoring, co-development of products and services, and transparent information sharing, aimed at aligning firm outputs with customer expectations and fostering long-term loyalty.

Customer Feedback Monitoring

Customer feedback monitoring is an integral aspect of customer integration, as it involves systematically collecting, analysing, and responding to customer opinions, experiences, and suggestions (Wu et al., 2021). It is defined by Okon et al. (2024) as the firm's ability to track and respond to customer perceptions through mechanisms such as surveys, reviews, complaints, and customer satisfaction indices. Feedback monitoring provides organizations with real-time insights into service gaps, performance shortcomings, and areas for innovation (Martinelli & Tunisini, 2019). It plays a vital role in quality management and customer relationship strategies by ensuring that customer voices are not only heard but acted upon.

This study defines customer feedback monitoring as the systematic process by which firms collect, analyse, and respond to customer inputs—such as opinions, complaints, reviews, and satisfaction ratings—in order to identify service gaps, improve quality, and enhance customer satisfaction. It serves

as a dynamic mechanism for capturing real-time insights into customer experiences and translating them into actionable improvements, thereby strengthening organizational responsiveness and performance outcomes.

In the renewable energy context, customer feedback monitoring is particularly important due to the technical nature of energy products and services. Clients may experience issues with installation, functionality, or maintenance that must be addressed promptly. Monitoring such feedback enables firms to make evidence-based decisions that improve service delivery and enhance customer trust (Marty, 2021; dos Santos Hentschke et al., 2020). According to Mourtzis et al. (2018), firms that invest in feedback systems tend to have better market adaptability and service efficiency. Therefore, in this study, customer feedback monitoring is examined as a key dimension of customer integration that can significantly influence the performance outcomes of renewable energy firms in FCT-Abuja.

Customer Involvement

Customer involvement refers to the extent to which customers are actively engaged in the firm's value-creation processes, especially in areas such as product design, development, and service customization (dos Santos Hentschke et al., 2020). Ennew and Binks (1999) described customer involvement as a collaborative mechanism through which customers contribute knowledge, preferences, and innovation inputs to the firm. This interaction allows companies to tailor their offerings to better meet the expectations and contextual realities of their target audience (Wu et al., 2021; Awwad et al., 2022). The concept is rooted in the co-creation perspective, where value is seen as a joint outcome of firm-customer collaboration rather than a unidirectional process (Aslam et al., 2023; Marty, 2021).

In the renewable energy sector, customer involvement is vital in shaping energy solutions that are environmentally, socially, and economically acceptable to users. Due to the decentralized nature of solar energy and other off-grid technologies, customers often play a role in defining technical specifications, financing models, and operational preferences. According to Sawhney et al. (2005), high levels of customer involvement can lead to faster adoption of new technologies, increased satisfaction, and stronger brand loyalty. Within the FCT-Abuja context, renewable energy firms that involve customers in the early stages of project design and implementation are more likely to deliver sustainable, user-friendly solutions. Thus, customer involvement represents a strategic asset for improving performance outcomes in this sector (Martinelli & Tunisini, 2019).

This study defines customer involvement as the extent to which customers are actively engaged in a firm's value creation processes, including the design, development, and customization of products or services. It emphasizes collaborative interaction where customers contribute knowledge, preferences, and innovative ideas, enabling firms to co-create tailored solutions that better align with user needs and enhance business performance.

Information Sharing

Information sharing refers to the open and timely exchange of relevant data, insights, and knowledge between a firm and its customers. According to Simatupang and Sridharan (2002), information sharing is a critical enabler of supply chain integration, as it reduces uncertainty, enhances transparency, and fosters trust. It encompasses both transactional information (e.g., pricing, delivery times) and strategic information (e.g., long-term plans, innovations). In customer integration frameworks, information sharing serves as the communication backbone that supports feedback loops, decision-making, and mutual learning between firms and customers (Aslam et al., 2023; Marty, 2021).

In renewable energy operations, information sharing is essential for educating customers about energy solutions, maintenance requirements, and benefits of renewable systems. Lack of information often contributes to misconceptions and low adoption rates. Firms that communicate proactively with customers are better able to manage expectations, reduce service disputes, and promote informed decision-making (Wu et al., 2021; dos Santos Hentschke et al., 2020). Li et al. (2006) emphasized that transparent communication can also enhance customer satisfaction and reduce perceived risks associated

with new technologies. Therefore, in this study, information sharing is conceptualized as a vital dimension of customer integration that influences how renewable energy firms in FCT-Abuja engage and retain their customers while improving performance.

This study defines information sharing as the deliberate and timely exchange of relevant, accurate, and useful information between firms and their customers to facilitate transparency, build trust, and support collaborative decision-making. It encompasses the communication of product specifications, service updates, operational changes, and technical support details, allowing customers to make informed choices and engage meaningfully with the firm. In the context of renewable energy, this involves sharing data on system performance, maintenance schedules, and energy usage to empower customers and improve service effectiveness.

Firm Performance

Firm performance is a multi-dimensional concept that reflects how well an organization achieves its strategic objectives in areas such as financial sustainability, customer satisfaction, innovation, and operational efficiency (Taouab & Issor, 2019). According to Richard et al. (2009), firm performance encompasses both subjective measures (e.g., customer satisfaction, employee morale) and objective indicators (e.g., revenue growth, return on assets). In the context of emerging sectors like renewable energy, performance metrics often include service reliability, technology adoption, customer feedback responsiveness, and scalability of operations (Bolton et al., 2024).

In Nigeria's renewable energy sector, firm performance is often challenged by infrastructural deficits, funding constraints, and customer hesitancy. As a result, performance should be assessed beyond financial indicators to include customer-centric outcomes such as satisfaction, service continuity, and community impact (Belghitar et al., 2019; Fadhilah & Subriadi, 2019).

Studies by Kaplan and Norton (1992) introduced the Balanced Scorecard approach, which supports a broader evaluation of performance that aligns with customer and process perspectives. In this study, firm performance refers to the overall effectiveness of renewable energy firms in delivering value, maintaining competitiveness, and sustaining operations within the FCT-Abuja context. It is presumed that greater customer integration enhances these performance dimensions by fostering responsiveness, trust, and operational alignment (Bolton et al., 2024; Taouab & Issor, 2019).

Firm performance in this study refers to the extent to which a company achieves its operational, financial, and strategic objectives, often measured through indicators such as customer satisfaction, service quality, innovation effectiveness, revenue growth, and market competitiveness. Within the renewable energy sector, firm performance reflects how well an organization delivers reliable and affordable energy solutions, maintains customer relationships, adapts to environmental demands, and sustains long-term growth in a dynamic and emerging market like FCT-Abuja.

Customers Feedback Monitoring and Performance

Agag et al. (2023) investigated the influence of customer feedback metrics (CFMs) on firm performance, noting that while CFMs are widely used in practice, their actual impact on performance outcomes has been understudied. The study applied a multiple regression panel analysis using longitudinal data from the American Customer Satisfaction Index covering the period 2005–2020. Key CFMs examined included customer satisfaction (SAT), Top-2-Box, Net Promoter Score (NPS) proportion, NPS value, and Customer Effort Score (CES), while firm performance was measured using gross margin, sales growth, and Tobin's Q. The study further explored how environmental factors such as munificence, power, and dynamism moderated these relationships. Findings showed that the effectiveness of CFMs varied by industry; Top-2-Box was most predictive in the online booking, hotel, and online shopping industries, SAT was best suited for electronic and telecom firms, CES was most useful in restaurants, and NPS was the most effective in holiday park firms. The authors recommended that firms prioritize investment in CFMs most relevant to their industry context to improve resource efficiency and

performance. A critical gap in the study was its limited focus on emerging sectors such as renewable energy in developing countries, suggesting a need for further research to contextualize these findings.
Gremyr et al. (2022) examined how customer feedback acts as an activation trigger for absorptive capacity and value co-creation within quality functions, particularly amidst digitalization and an increasing focus on services. Using a qualitative research design, the study involved interviews with quality managers from 17 UK and Swedish firms and secondary data from firm websites. The results indicated that feedback-based activation triggers enhance absorptive capacity, especially when processes for responding to codified product feedback are in place. However, firms lacked established processes for handling personalized, service-related feedback, which hampers their ability to engage in value co-creation. The study recommended that firms invest in digital capabilities to manage personalized feedback more effectively. A gap in the study was its limited focus on service sectors, where personalized feedback is more prevalent.

Customers' Involvement and Performance
Sampson and Chase (2022) assessed the factors that drive optimisation of customer involvement and the study aimed to identify the optimal balance of customer interaction and participation in service delivery. Using a theoretical framework based on servitization and self-service technologies, they analyzed how varying levels of closeness to customers affect operational efficiency and service quality. Their findings suggest that excessive interaction can reduce efficiency, while high levels of participation may harm quality and personalization. The authors recommended using their decision-making framework to determine sustainable positioning for different offerings. However, the study primarily relied on conceptual analysis without empirical validation across diverse industries.

Dean et al. (2024) explored customer involvement in co-development activities, specifically problem-solving and decision-making, in new product development (NPD). The study aimed to contrast how these activities influence NPD outcomes such as innovativeness and development speed, while considering customer need specificity as a boundary condition. Data was collected from 308 managers in the innovation domain using surveys. The findings revealed that customer involvement in problem-solving and decision-making distinctively impacts NPD outcomes, with customer need specificity interacting differently with these activities to further affect innovativeness and development speed. The study extended the knowledge-based view (KBV) and addressed previous inconsistencies in the literature regarding customer involvement in co-development. It recommended that firms carefully manage customer involvement, balancing innovation with development speed. A gap in the study was its focus solely on innovation-related activities and the need for broader investigation across different sectors and product types.

Customer Information Sharing and Performance
Kiprotich et al. (2022) examined the influence of information sharing on the performance of manufacturing firms in Kenya. The study aimed to determine how information sharing affects the performance of these companies, with a focus on the quality, type, and communication technology used for information exchange. An explanatory research design was employed, utilizing a sample of 264 procurement managers from Kenyan manufacturing firms. The study used questionnaires to collect primary data, and data analysis was conducted using descriptive statistics and linear regression. The findings revealed that information sharing significantly influenced firm performance. The study concluded that information sharing is crucial for improving performance in the manufacturing sector and recommended enhanced collaboration among industry participants to improve the quality of shared information. The study's gap lies in its regional focus, suggesting the need for broader studies in different geographical contexts.

Baba et al. (2021) investigated the role of information sharing (IS) and supply chain collaboration (SCC) in enhancing firm performance (FP) in the context of manufacturing firms in Ghana. The objective was to determine how IS and SCC contribute to improved firm performance. Using structural equation modeling, data was collected from 201 respondents across manufacturing firms in Ghana. The findings showed that both IS and SCC positively influenced firm performance, with a direct relationship between

supply chain collaboration and improved firm performance. The study concluded that higher levels of IS and SCC are critical to achieving high performance in firms. However, the study's limitation in geographic scope reduces the generalizability of the results. The unique aspect of the study lies in its simultaneous examination of IS, SCC, and FP.

Resource Based View Theory

This study is benchmarked on the Resource-Based View (RBV) Theory. The theory was proposed by Jay Barney in 1991, and it has become one of the most influential frameworks in strategic management for understanding firm competitiveness. The core assumption of the RBV is that firms achieve and sustain competitive advantage through the possession and deployment of valuable, rare, inimitable, and non-substitutable (VRIN) resources. Resources can be tangible or intangible, and include organizational capabilities, processes, knowledge, and relationships.

The RBV theory argues that internal firm resources, rather than external market conditions, are the primary drivers of superior performance. Customer integration is viewed as an intangible resource that enhances organizational capabilities by improving knowledge flow, innovation, and customer alignment. The theory assumes that firms that can effectively manage customer relationships and utilize customer knowledge as a strategic asset are more likely to outperform competitors.

However, the RBV has been criticized for being static and overly inward-looking. Critics such as Priem and Butler (2001) argue that it underemphasizes the role of external dynamics, such as market volatility and regulatory changes, which are especially relevant in the renewable energy sector. Despite this, the strength of the RBV lies in its ability to explain how firm-specific capabilities—such as customer integration practices—can serve as a sustainable source of competitive advantage.

Applied to this study, the RBV supports the proposition that customer integration (through feedback monitoring, involvement, and information sharing) is a strategic resource that renewable energy firms in FCT-Abuja can leverage to improve performance. These practices provide access to customer insights and co-creation opportunities that enhance operational adaptability, innovation, and customer satisfaction—critical for firms operating in challenging and evolving markets like Nigeria's energy sector.

METHODOLOGY

This study adopted a cross-sectional survey research design, which was appropriate for examining the relationship between customer integration and firm performance at a single point in time. This design was justified as it allowed the researcher to collect data from a relatively large number of respondents, enabling efficient and cost-effective analysis of the current state of customer integration practices and performance outcomes across the selected renewable energy firms.

The population of the study comprised employees of four (4) selected renewable energy firms in FCT-Abuja. The firms included: Abuja Solar Company Office, Basol Energy, GVE Projects Ltd, and JRB Solar Investment. These firms were purposively selected based on the following criteria: (1) they are officially registered and operational within FCT-Abuja; (2) they provide solar or hybrid renewable energy solutions to residential and commercial customers; and (3) they have implemented customer-facing processes such as sales, installation, and after-sales services. These selection criteria are supported by the recommendations of Yin (2014), who argued that purposive selection ensures relevance and contextual appropriateness of study subjects in applied research.

Information obtained from the heads of operations in each firm indicated that the total accessible population was ninety-eight (98) employees. Given the manageable size of the population, the entire population was adopted as the sample size, using a census sampling technique. The use of the entire population as the sample was justified by Israel (1992), who posited that for small populations (fewer than 200), using the full population enhances the reliability of the findings and eliminates sampling error. The census sampling technique was appropriate as it ensured that all perspectives were captured, thereby improving the representativeness and robustness of the results.

Primary data was used for this study, and the method of data collection was the use of a structured questionnaire. The questionnaire was designed to capture responses on the three dimensions of customer integration—customer feedback monitoring, customer involvement, and information sharing—as well as on firm performance indicators.

To ensure the quality of the instrument, reliability was assessed using Cronbach's alpha. The reliability coefficients for the key variables were as follows: Customer Feedback Monitoring (0.81), Customer Involvement (0.84), Information Sharing (0.79), and Firm Performance (0.87). These values exceeded the minimum acceptable threshold of 0.70, indicating a high level of internal consistency (Nunnally & Bernstein, 1994). Validity was determined using content validity, which involved expert review of the questionnaire items to ensure they were relevant, clear, and aligned with the study objectives.

Finally, the data analysis was conducted using multiple regression analysis with the aid of Statistical Package for Social Sciences (SPSS) Version 23. This statistical technique was appropriate as it allowed the researcher to examine the predictive effect of the independent variables (dimensions of customer integration) on the dependent variable (firm performance), and to determine the strength and significance of the relationships.

Table 1: Measurement of Variables

Variable	Measurement Source(s)	Scale	No. of Items
Customer Feedback Monitoring	Martinelli & Tunisini (2019)	5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)	5 items
Customer Involvement	Ennew & Binks (1999); dos Santos Hentschke et al. (2020)	5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)	5 items
Information Sharing with Customers	Flynn et al. (2010)	5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)	5 items
Firm Performance	Zhang & Cao (2018)	5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)	5 items

Note: References marked with * could not be fully verified. It is recommended to confirm source accuracy for final reporting.

RESULTS AND DISCUSSION

The sample size for this study was 98 employees, and an equal number of questionnaires (98) were distributed. Out of the 98 questionnaires distributed, 86 were successfully retrieved, representing an 87.8% response rate. A preliminary analysis of the retrieved 86 questionnaires indicated that they were suitable for further analysis, as they met the necessary requirements for the study.

Table 2: Demographic distribution

Demographic Variable	Frequency	Percentage (%)
Age		
18-25	18	20.9
26-35	32	37.2
36-45	25	29.1
46 and above	11	12.8
Gender		
Male	55	63.9
Female	31	36.1
Average Work Experience		
1-5 years	19	22.1
6-10 years	33	38.4
11-15 years	21	24.4
16 years and above	13	15.1

Source: Fieldwork, 2025

The major assumptions of multiple regression analysis were satisfied, indicating that the data were suitable for the intended analysis. Given that all assumptions were met, further analysis proceeded with confidence in the robustness of the regression model.

Table 3: Model Summary on customer integration and performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.766[a]	.587	.572	.93602

Predictors: (Constant), Information Sharing with Customers, Customer Involvement, Customer Feedback Monitoring

Source: Fieldwork, 2025

Table 4: ANOVA on customer integration and performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	102.250	3	34.083	38.902	.000[a]
	Residual	71.843	82	.876		
	Total	174.093	85			

a. Predictors: (Constant), Information Sharing with Customers, Customer Involvement, Customer Feedback Monitoring

b. Dependent Variable: Performance

Source: Fieldwork, 2025

Table 5: Coefficients on customer integration and performance

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.189	.290		-.652	.516
	Customer Feedback Monitoring	.333	.096	.332	3.479	.001
	Customer Involvement	.274	.077	.281	3.538	.001
	Information Sharing with Customers	.350	.091	.345	3.865	.000

a. Dependent Variable: Performance

Source: Fieldwork, 2025

The results presented in Table 3, Model Summary on customer integration and performance, show that the model has a good explanatory power. The coefficient of determination, R-square, is 0.587, indicating that approximately 58.7% of the variation in performance can be explained by the predictors, which include information sharing with customers, customer involvement, and customer feedback monitoring. The adjusted R-square value of 0.572 indicates that the model is well-adjusted, taking into account the number of predictors in the model. The standard error of the estimate is 0.93602, which is relatively low, suggesting that the model's predictions are reasonably accurate.

Table 4, ANOVA on customer integration and performance, presents the analysis of variance, which assesses the overall fit of the regression model. The regression model has an F-statistic of 38.902 with a p-value of 0.000, which is significant at the 0.05 level. This indicates that the model is fit and it significantly explains the variation in performance, confirming that the independent variables (information sharing, customer involvement, and customer feedback monitoring) collectively have a significant effect on performance.

Table 5, Coefficients on customer integration and performance, provides the individual regression coefficients for each predictor. The unstandardized coefficients for customer feedback monitoring, customer involvement, and information sharing with customers are all positive, suggesting that an increase in these factors is associated with an improvement in performance. Specifically, customer feedback monitoring has a coefficient of 0.333, with a standardized coefficient (Beta) of 0.332, indicating that it has a moderate positive effect on performance. The p-value of 0.001 suggests that this relationship is statistically significant. Customer Involvement has a coefficient of 0.274 and a Beta value of 0.281, implying a moderate positive effect on performance. Its p-value of 0.001 also indicates statistical

significance. Information Sharing with Customers has the highest coefficient of 0.350 and a Beta of 0.345, showing that it has the strongest positive effect on performance. The p-value of 0.000 confirms that this effect is statistically significant.

Findings

Hypothesis 1: Customer feedback monitoring positively influences firm performance.

The results support this hypothesis, as the coefficient for customer feedback monitoring is positive and statistically significant ($p = 0.001$). This indicates that an increase in customer feedback monitoring leads to better firm performance. This finding suggests that organizations should prioritize monitoring customer feedback to enhance their performance outcomes.

Hypothesis 2: Customer involvement positively influences firm performance.

This hypothesis is also supported, as customer involvement has a significant positive effect on performance ($p = 0.001$). This implies that higher levels of customer involvement in processes positively contribute to improved performance. This result aligns with the notion that customer participation is a critical factor in enhancing organizational success.

Hypothesis 3: Information sharing with customers positively influences firm performance.

The findings fully support this hypothesis, with a highly significant positive effect ($p = 0.000$). The strongest coefficient (0.350) indicates that information sharing is a key driver of firm performance. It emphasizes the importance of transparent and open communication with customers to achieve better outcomes.

CONCLUSION AND RECOMMENDATIONS

The study concludes that customer integration significantly influences the performance of renewable energy firms in the Federal Capital Territory (FCT), Abuja. Specifically, customer feedback monitoring, customer involvement, and information sharing with customers have positive and statistically significant effects on firm performance. The findings indicate that effectively integrating customers into various business processes leads to improvements in organizational performance, thereby enhancing overall competitiveness and success in the renewable energy sector.

The study concludes that monitoring customer feedback plays a critical role in improving the performance of renewable energy firms. The positive and significant effect observed supports the notion that feedback monitoring helps firms identify areas for improvement and better align their offerings with customer needs and expectations. The study concludes that customer involvement positively impacts firm performance. This supports the importance of customer-centric strategies that value customer contributions. The study concludes that fostering transparent and effective communication with customers enhances organizational performance. This underscores the strategic importance of maintaining open channels of information with customers to improve service delivery and operational efficiency.

Based on the study findings, the following recommendations are proffered.

i. Firms should establish and strengthen mechanisms for gathering, analysing, and acting upon customer feedback, which currently is does not seem to a part of their culture. Given the significant impact of customer feedback monitoring on performance, firms should invest in systems and technologies that allow for real-time feedback collection. This can be achieved through regular feedback loops with customers, which is then integrated into the firm's quality control and improvement processes.

ii. Firms should develop and implement strategies to involve customers more directly in key business processes, such as product development, service delivery, and marketing, which currently is being practiced by these firms. It is imperative because it helps foster closer relationships and give customers a sense of ownership and engagement, which will these firms generate new ideas, improve customer satisfaction, and boost performance.

iii. To leverage the strong impact of information sharing on performance, renewable energy firms should focus on creating transparent and effective communication strategies with their customers, which is currently not at optimal level. This includes sharing product updates, service innovations, and industry-related knowledge, which can lead to stronger customer loyalty and improved decision-making. Hence, these firms should invest in CRM (Customer Relationship Management) systems that facilitate real-time information exchange, newsletters, and customer portals to enhance the flow of relevant information between the company and its customers.

REFERENCES

Agag, G., Durrani, B. A., Shehawy, Y. M., Alharthi, M., Alamoudi, H., El-Halaby, S., Hassanein, A., & Abdelmoety, Z. H. (2023). Understanding the link between customer feedback metrics and firm performance. *Journal of Retailing and Consumer Services, 73*, 103301. https://doi.org/10.1016/j.jretconser.2023.103301

Aslam, H., Waseem, M., Roubaud, D., Grebinevych, O., Ali, Z., & Muneeb, D. (2023). Customer integration in the supply chain: The role of market orientation and supply chain strategy in the age of digital revolution. *Annals of Operations Research*. https://doi.org/10.1007/s10479-023-05191-y

Awwad, A., Anouze, A. L. M., & Ndubisi, N. O. (2022). Green customer and supplier integration for competitive advantage: The mediation effect of sustainable product innovation. *Sustainability, 14*(16), 10153. https://doi.org/10.3390/su141610153

Baba, V., Wang, T., Adzani, S., & Abdul-Hamid, Z. (2021). Information sharing and supply chain collaboration: Strategy for higher firm performance in Ghana. *American Journal of Industrial and Business Management, 11*, 635-645. https://doi.org/10.4236/ajibm.2021.116041

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Belghitar, Y., Clark, E., & Kassimatis, K. (2019). A measure of total firm performance: New insights for the corporate objective. *Annals of Operations Research, 281*(1), 121–141. https://doi.org/10.1007/s10479-018-2983-z

Bolton, J., Butler, F. C., & Martin, J. (2024). Firm performance measurement in strategic management: Some notes on our performance. *Journal of Management History, 30*(3), 456–474. https://doi.org/10.1108/JMH-09-2023-0094

Dean, T., Zhang, H., & Xiao, Y. (2024). Customer involvement in co-development: Problem-solving and decision-making in new product development. *European Journal of Marketing, 58*(1). https://doi.org/10.1108/EJM-12-2022-0917

dos Santos Hentschke, C., Formoso, C. T., & Echeveste, M. E. S. (2020). A customer integration framework for the development of mass customised housing projects. *Sustainability*, 12(21), 8901. https://doi.org/10.3390/su12218901MDPI+2ResearchGate+2ResearchGate+2

Ennew, C. T., & Binks, M. R. (1999). Impact of participative service relationships on quality, satisfaction and retention: An exploratory study. *Journal of Business Research*, 46(2), 121–132. https://doi.org/10.1016/S0148-2963(98)00016-2SCIRP+3ResearchGate+3ScienceDirect+3

Fadhilah, A. N., & Subriadi, A. P. (2019). The role of IT on firm performance. *Procedia Computer Science, 161*, 258–265. https://doi.org/10.1016/j.procs.2019.11.122

Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management*, 28(1), 58–71. https://doi.org/10.1016/j.jom.2009.06.001ResearchGate+1IU Indianapolis ScholarWorks+1

Gremyr, I., Birch-Jensen, A., Kumar, M., & Löfberg, N. (2022). Quality functions' use of customer feedback as activation triggers for absorptive capacity and value co-creation. *International Journal of Operations & Production Management, 42*(13), 218–242. https://doi.org/10.1108/IJOPM-11-2021-0692

Kaplan, R. S., & Norton, D. P. (1992). The Balanced Scorecard – Measures that drive performance. *Harvard Business Review, 70*(1), 71–79.

Kiprotich, E. K., Gachunga, H. G., & Bonuke, R. (2022). Influence of information sharing on performance of manufacturing firms in Kenya. *Journal of Economics, Finance and Management Studies, 5*(10), 2920–2927. https://doi.org/10.47191/jefms/v5-i10-12

Lambert, D. M., & Cooper, M. C. (2000). Issues in supply chain management. *Industrial Marketing Management, 29*(1), 65–83. https://doi.org/10.1016/S0019-8501(99)00113-3

Li, S., Ragu-Nathan, B., Ragu-Nathan, T. S., & Rao, S. S. (2006). The impact of supply chain management practices on competitive advantage and organizational performance. *Omega, 34*(2), 107–124. https://doi.org/10.1016/j.omega.2004.08.002

Martinelli, E. M., & Tunisini, A. (2019). Customer integration into supply chains: Literature review and research propositions. *Journal of Business & Industrial Marketing, 34*(1), 24–38. https://doi.org/10.1108/JBIM-07-2017-0162

Martinelli, E., & Tunisini, A. (2019). Customer integration into supply chains: Literature review and research propositions. *Journal of Business & Industrial Marketing*, 34(1), 95–110. https://doi.org/10.1108/JBIM-07-2017-0175ResearchGate+1Ingenta Connect+1

Marty, J. (2021). Consumer/user/customer integration in supply chain management: A review and bibliometric analysis. *Supply Chain Forum: An International Journal*, *23*(2), 181–196. https://doi.org/10.1080/16258312.2021.1984168

Mourtzis, D., Vlachou, E., Zogopoulos, V., Gupta, R. K., Belkadi, F., Debbache, A., & Bernard, A. (2018). Customer feedback gathering and management tools for product-service system design. *Procedia CIRP, 67*, 577–582. https://doi.org/10.1016/j.procir.2017.12.264

Okon, I. P., Baba, M. Y., Nehemiah, E., Suleiman, F. Y., & Daniel, C. (2024). Customer feedback and service quality in the Akwa Ibom State hospitality sector. *European Journal of Business and Innovation Research, 12*(1), 42–52. https://www.eajournals.org/

Priem, R. L., & Butler, J. E. (2001). Is the Resource-Based "View" a useful perspective for strategic management research? *Academy of Management Review, 26*(1), 22–40. https://doi.org/10.5465/amr.2001.4011928

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring organizational performance: Towards methodological best practice. *Journal of Management, 35*(3), 718–804. https://doi.org/10.1177/0149206308330560

Sampson, S. E., & Chase, R. B. (2022). Optimizing customer involvement: How close should you be to your customers?. *California Management Review, 65* (1), 119–146. https://doi.org/10.1177/00081256221118117

Sawhney, M., Verona, G., & Prandelli, E. (2005). Collaborating to create: The Internet as a platform for customer engagement in product innovation. *Journal of Interactive Marketing, 19*(4), 4–17. https://doi.org/10.1002/dir.20046

Simatupang, T. M., & Sridharan, R. (2002). *The collaborative supply chain*. The International Journal of Logistics Management, 13(1), 15–30. https://doi.org/10.1108/09574090210806333

Taouab, O., & Issor, Z. (2019). Firm Performance: Definition and Measurement Models. *European Scientific Journal, ESJ*, *15*(1), 93. https://doi.org/10.19044/esj.2019.v15n1p93

Wu, X., Wang, Q., Wang, L., & Zhao, X. (2021). Customer integration and the performance of third-party logistics firms: a moderated mediation model. *International Journal of Logistics Research and Applications*, *26*(6), 615–632. https://doi.org/10.1080/13675567.2021.1969349

Zhang, M., & Cao, J. (2018). Supplier relationship management and firm performance in a Chinese context: The moderating role of institutional environment. *International Journal of Production Economics*, 195, 72–83. https://doi.org/10.1016/j.ijpe.2017.10.007

Zhao, X., Huo, B., Flynn, B. B., & Yeung, J. H. Y. (2008). The impact of power and relationship commitment on the integration between manufacturers and customers in a supply chain. *Journal of Operations Management, 26*(3), 368–388. https://doi.org/10.1016/j.jom.2007.08.002