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INVENTORY MANAGEMENT OPTIMIZATION AND PERFORMANCE OF MAIN POWER ELECTRICITY DISTRIBUTION COMPANY, ENUGU STATE, NIGERIA

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Abstract

This study examined the effect of inventory management optimization on Main Power Electricity Distribution Company (MPEDC), a subsidiary of Enugu Electricity Distribution Company (EEDC), Enugu State. Specifically, the study investigated the relationship between inventory levels and operational efficiency of Main Power Electricity Distribution Company, and the effect of inventory management practices on customer satisfaction within the study area. The study made use of descriptive survey research design. The population of the study consisted of 210 personnel of the company, selected from the main office and the three districts/Feeder wise of the company. The major statistical tools of analysis were frequency tables, percentage as the descriptive statistics, and Pearson Correlation and multiple regression analysis as the inferential statistics. Findings from the study suggest that inventory levels have significant positive effect on operational efficiency; inventory management practices have significant positive effect on customer satisfaction. The study concludes that inventory management optimization is a critical driver of operational, financial and customer-related outcomes within the electricity distribution company in Enugu. The study recommends that Electricity Distribution Companies should maintain optimal inventory levels through real-time

tracking and demand forecasting the prevent stockouts and ensure uninterrupted operational activities.

Keywords: Inventory Management Optimization, Operational Efficiency**,** Inventory Management Optimization, Inventory Levels, Customer Satisfaction

Introduction

Effective inventory management is a critical component of organizational success, particularly for utility service providers such as electricity distribution companies. Inventory optimization ensures that necessary materials, spare parts, and equipment are available when needed without tying up excessive capital in stock, thus enhancing service delivery, minimizing downtime and improving overall operational efficiency. In Nigeria, the electricity sector has faced persistent challenges, including infrastructural decay, inefficient supply chains and financial mismanagement, issues that were exacerbated following the privatization of the Power Holding Company of Nigeria (PHCN) in 2013 (Akinyemi, 2020). Despite reforms, distribution companies like MPEDC have struggled to maintain optimal service levels partly due to poor inventory practices, leading to frequent equipment failures, extended power outages and customer dissatisfaction (Ejiogu, 2022).

Before privatization, inventory management practices in Nigeria electricity sector were largely bureaucratic, manual and reactive, resulting in inefficiency and waste. Despite the shift to private management and the expectation of enhanced operational standards, MPEDC continues to face similar inventory-related bottlenecks, albeit in a competitive market environment (Chukwu & Okafor, 2020). These challenges suggest that inventory optimization, using modern techniques such as demand forecasting, economic order quantity (EOQ), just-in-time (JIT) inventory systems and technology-based inventory tracking has not been fully implemented or effectively utilized. But the importance of inventory optimization in improving organizational performance cannot be overstated (Chen, Li & Zhang, 2023). Proper inventory control ensures the availability of the right

materials in the right quantity at the right time, thereby minimizing downtime, reducing operational costs and increasing customer satisfaction (Forkuoh, 2023). Assessing the effect of inventory management on service delivery at the Electricity Company of Ghana Limited. Kwame Nkrumah University of Science and Technology. In contrast, poor inventory management leads to inefficiency, service disruption, increased costs and loss of customer trust, all of which can negatively affect an organization's overall performance, including financial performance.

Despite the vital role inventory management plays in ensuring electricity distribution, there are still visible weakness in inventory management practices at Main Power Electricity Distribution Company (MPEDC), Enugu State. These weaknesses, continues to pose operational and financial burden, characterized by inability to properly forecast demand, limited stock visibility, manual record keeping and inadequate modern technologies. If these lapses are unaddressed, Main Power Electricity Distribution Company (MPEDC) in Enugu State might become prune to prolonged fault response, frequent service interruptions, escalating operational costs and increasing customer dissatisfaction, all of which further erode public trust and revenue sustainability in an already fragile power sector. In light of these, it becomes necessary to investigate how the optimization of inventory management can directly influence performance of MPEDC, Enugu State. The specific objectives however are to:

(i) Investigate the effect of inventory levels on operational efficiency of Main Power Electricity Distribution Company, Enugu.

(ii) Evaluate the effect of inventory management practices on customer satisfaction in Main Power Electricity Distribution Company, Enugu.

Review of Related Literature

Inventory Optimization

Inventory optimization involves using mathematical models and algorithms to determine the optimal inventory level, levels and policies for a company. Guga and Musa (2015) observe that inventory management optimization involves planning, coordinating and controlling inventory from raw materials to finished goods. It is an opinion which highlights the relevance of inventory optimization in supply chain management of any organization. Concerning the algorithmic approaches to inventory management optimization, Perez, Hubbs, Li and Groossmann (2021) note that it involves using mathematical models and algorithms to determine optimal inventory policies. They opined equally that the approach is crucial in today's fast-paced business environment. In the same vein, robust optimization approaches to inventory management involve considering uncertainty and variability in demand and lead times to determine optimal inventory policies (Shafiee, Kazemi, Jafarnejad, Chaghooshi, Sazvar and Amoozad, 2021).

Stadtler, Kilger and Meyr (2015) define inventory optimization as an organizational function that encompasses methods and tools that aim to determine the best trade-offs between conflicting objectives such as service levels, lead times and cost efficiency in multi-echelon supply chain networks. Chopra and Meindl (2016) state that inventory optimization involves managing inventory levels in a supply chain in such a way that the right amount of inventory is available at the right time and location to meet demand at lowest possible cost. To Simchi-Levi, Kaminsky and Simchi-Levi (2018), inventory optimization is the process of balancing the conflicting objectives of maximizing customer service levels and minimizing inventory investment by using advanced analytics, forecasting and supply chain modeling. Inventory optimization has become increasingly vital in today's dynamic and globalized business environment and its benefits include

improved service levels, reduced carrying and holding costs, enhanced cash flow as well as mitigation of stockout and overstock risks through better planning and forecasting.

Organizational Performance

Organizational performance refers to the ability of an organization to achieve its goals and objectives efficiently and effectively. Gutterman (2023) prefer to define it as a measure of how well an organization is achieving its objectives. A definition that highlights the importance of goal attainment in evaluating organizational performance. He describes it further as the organization's ability to achieve its economic goals efficiently and effectively, utilizing resources to attain financial outcomes like profitability, return on assets and sales growth. He also emphasizes the importance of incorporating non-financial factors, such as sustainability and stakeholders' expectations, into performance assessment. Alami and Makhtari (2023) observe that organizational performance encompasses both financial and non-financial indicators, including environmental and societal dimensions. They discussed the challenges in evaluating performance due to the complexity and diversify of influencing variables. Moumin (2024) defines organizational performance as the organization's ability to achieve its goals, integrating both financial and non-financial measures. He emphasizes also the importance of frameworks like the Balanced Scorecard to assess performance across various dimensions, including customer satisfaction and environmental impact. Osintsev and Khalilian (2023) define organizational performance as the organization's ability to achieve its objectives, highlighting the positive impact of innovation and strategic planning on performance. Poi and Nwokah, (2021) discuss the multidimensionality of organizational performance, identifying ten perspectives and 161 performance indicators. They stress the importance of considering various stakeholders, assessment environments and time frame in performance evaluation.

Inventory Levels

Inventory levels refer to the quantity of goods or materials that a business holds at a particular point in time. Managing these levels is critical for balancing supply and demand, minimizing costs and ensuring efficient operations. Below are scholarly definitions and discussions on inventory levels. According to Priniotakis and Argyropoulas (2018), inventory levels are fundamental to inventory management, directly impacting a business's ability to meet customer demand and avoid stockouts or overstocking. They emphasized that maintaining appropriate inventory levels if essential for customer satisfaction and operational efficiency. Mohamed (2024) highlights the role of inventory levels in various inventory management strategies, such as Just-in-Time (JIT) and Vendor-Managed Inventory (VMI). He notes that maintaining optimal inventory levels is vital for reducing costs and improving supply chain performance. The EOQ model, as discussed by Guga and Musa (2015), determines the optimal inventory level that minimizes the total cost of ordering and holding inventory. This model, according to them, is fundamental in inventory management for setting appropriate inventory levels. Waters (2017) discusses inventory levels within the broader context of supply chain management, emphasizing their importance in ensuring smooth operations and customer satisfaction. Syntetos, Babai and Altay (2016) note that safety stock is a critical component of inventory management that helps mitigate stockouts and cost sales due to demand uncertainty

Inventory Management Practices

Inventory management practices play pivotal role in modern business operations, impacting operational efficiencies, financial security and competitive advantages. Effect inventory management practices involve orchestrating inventory at the intersection of finance, supply chains and strategic decision-making. In the opinion of Chase, Jacobs and Aquilano (2020), Just-in-Time (JIT) inventory is an inventory management practice where materials and products are ordered and received only as they are needed in the production

process, minimizing inventory holding costs. In the same vein, Economic Order Quantity (EOQ) is a popular inventory management practice and according to Heizer, Render and Munson (2020), it is a mathematical model that determines the ideal order quantity a company should purchase to minimize the total cost of inventory, including ordering and carrying costs.

The basic EOQ is the simplest of the three models namely; the economic order quantity model, the economic order quantity model with noninstantaneous delivery and the quantity discount model. It is used to identify the order size that will minimize the sum of the annual costs of holding inventory and ordering inventory. The unit purchase price of items in inventory is not generally included in the total cost because the unit cost is unaffected by the order size unless quantity discounts are a factor. If holding costs are specified as a percentage of unit cost, then unit cost is indirectly included in the total cost as part of holding costs.

Operational Efficiency

Operational efficiency is a measurement of resource allocation and can be defined as the ratio between an outputs gained from the business and an input to run a business operation. When improving operational efficiency, the output to input ratio improves (Hussein, N.A. (2021). Nykyforchyn (2022) refers to perational efficiency as the degree of efficiency with which a company manages its operations to generate the maximum output with the minimum of input. To him, it's about integrating tactical and strategic levels within an enterprise, focusing on maximizing output with minimal input. In the opinion of Odumusor, (2023), operational efficiency connotes the effectiveness in the utilization of resources such as time, money and labour to achieve maximum output with minimum input. So, emphasis here is the effective utilization of resources to achieve maximum output

with minimal input, highlighting the role of strategic objectives like cost reduction and resource optimization in the process.

Kozielski (2017) discusses operational efficiency within the context of Eastern Europe business paradigm, focusing on streamlining core process to respond effectively to market changes. To him, operation efficiency involves techniques and strategies adopted to accomplish the basic goal of delivering quality goods and services by streamlining the firm's core processes. Musah et al (2019) did not differ significantly from the above opinion when they stated that operational efficiency is summed as techniques and strategies adopted firms to accomplish the basic goal of delivering quality goods and services, which can be achieved by streamlining the firms' core processes thereby effectively responding to continually changing market forces in a more cost-effective manner

Customer Satisfaction

Kotler and Keller (2016) define customer satisfaction as a person's feelings of pleasure or disappointment resulting from comparing a product's perceived performance (or outcome) in relation to his or her expectation. It has equally been defined as a measure of how well a product or service meets customer expectations. Zerbino (2021) defines customer satisfaction as a measure of how well a company's products or services meet or exceed customer expectations. It is quantified by the number or proportion of customers whose experiences surpass established satisfaction goals. To Aimee (2019), customer satisfaction refers to the customer's evaluation of products or services, determining whether their needs are meet or not. It is influenced by the comparison of a product with competitors and the extent to which expectations are satisfied or exceeded. Shaikh (2024) notes that customer satisfaction is described as a consumer's feeling of pleasure or disappointment resulting from comparing a product's perceived performance to their expectations.

Theoretical Framework

The theory upon which the study is being anchored is the Resource-Based View (RBV) Theory the choice of the theory was informed by the fact that its framework has the capacity to effectively explain the issues involved in inventory optimization and its effect on performance electricity Distribution Company in Enugu State, Nigeria, more than any other theory. The theory as developed by Barney in 1991, postulates that organizations can achieve sustainable competitive advantage by leveraging their internal resources and capabilities. The theory argues that resources that are valuable, rare, inimitable and non-substitutable (VRIN) can be a huge source of sustained competitive advantage. RBV theory treats inventory as a strategic asset, when optimized, it can become a valuable, rare, inimitable and non-substitutable (VRIN) resource. It focuses on how inventory contributes to competitive advantage and organizational performance. Its strength lies more in its usefulness for long-term strategic planning, emphasizing the importance of resource uniqueness and firm capabilities. The theory's best application is when used to understand how inventory optimization contributes to competitive positioning, long-term performance and resource strategy.

Empirical Review

Olanrele (2024) investigated the efficiency performance of electricity distribution companies in Nigeria. Research design is data envelopment analysis (DEA). Eleven (11) electricity distribution companies across the country were used in the study statistical tool is DEA, using data from 2015-2022. Findings showed that all DISCOs are technically inefficient to varying degrees; efficiency worsened during the COVID-19 pandemic. The study concludes that there is need for improved operational strategies to enhance efficiency in electricity supply. Olayemi, Mukhtar, Bernard, Duru and Alfa (2023) did a study that assessed the technical efficiency of electricity distribution companies in Nigeria: the boots-trapped data envelopment analysis (BDEA) approach. The study covered the eleven (11)

electricity distribution companies (DISCOs) across the country. The design for the study is ex-post facto. Statistical tool for analysis is BDEA, using data from 2014-2021. Findings are that the technical efficiency of DISCOs varies, with some performing below optimal levels. The study concludes that enhancing technical efficiency requires targeted interventions and policy reforms.

Odumusor (2024) investigated the effect of inventory management on production efficiency of manufacturing firms in Nigeria. The study's design is descriptive survey research. Population is 707 employees from which 370 was determined as the sample size through the application of Taro Yameni's statistical formula. Both descriptive and inferential statistics were deployed in analyzing the data. Findings suggest that inventory availability, accuracy and coverage significantly and positively influenced production efficiency. The study concludes that efficient inventory management practices are essential for enhancing production efficiency in manufacturing firms.

Forkuoh (2023) assessed the effect of inventory management on service delivery at the Electricity Company of Ghana Limited. The design was descriptive survey research design. The population is 250 employees across four (4) regions in Ghana. Statistical tool is structural equation modeling (SEM). Findings showed that significant positive relationship exists between inventory management practices such as Economic Order Quantity (EOQ), re-order levels, Just-in-Time (JIT) systems and Activity-Based Costing (ABC) analysis and customer satisfaction. The study concludes that implementing effective inventory management practices enhances customer satisfaction in the electricity distribution sector.

Methodology

This study adopted a descriptive survey research design to enable the systematic collection and analysis of primary data on inventory management practices within Main Power Electricity Distribution Company (MPEDC), Enugu State. The design was considered appropriate as it facilitates the description of existing conditions and supports generalisation of findings across the study population, particularly where relevant data are not readily available in official statistical records. The area of the study was Enugu State, Nigeria, which hosts MPEDC, a subsidiary of Enugu Electricity Distribution Company (EEDC). Although MPEDC operates across all seventeen local government areas of the state, the study focused on three major feeder-wise districts; Nsukka North Region, Ogui Region, and North Feeder-wise Region, selected due to their operational significance and concentration of service centres. The population of the study comprised 210 staff members drawn from MPEDC headquarters and the selected districts, including inventory and store officers, procurement and supply chain officers, operations managers, logistics and distribution officers, finance and accounts staff, internal auditors or compliance officers, and IT/data management officers. Given the manageable size of the population, the heterogeneous nature of the respondents, and the need for high precision, a census sampling technique was adopted, whereby all members of the population were included in the study. Data were collected using a structured questionnaire designed in line with the study objectives. The validity of the instrument was ensured through expert review by the research supervisor and other academic staff in the Department of Business Administration, whose recommendations were incorporated into the final version of the questionnaire. Reliability was established through a pilot study involving 20 staff of MPEDC in Awka, and the internal consistency of the instrument was assessed using Cronbach's Alpha coefficient, with values of 0.70 and above considered acceptable for the study.

Data Analysis

Table 4.1 Analysis of Questionnaire

Questionnaire	**Frequency**	**Percentage**
Questionnaire Returned	194	92.4
Questinnaire not Returned	16	7.6
Total Questionnaire Administered	**210**	**100**

Source: Field Survey, 2025

Table 4.1 and figure 4.1 shows that a total number 210 questionnaires were administered to the respondents. Only 194 questionnaires representing 92.4% were duly filled and returned, while 16 questionnaires representing 7.6% were not returned.

Table 4.2: Gender of the Respondents

S/N	Gender	Frequency	Percent
1.	Male	126	64.9
2.	Female	68	35.1
	Total	194	100.0

Source: Field Survey, 2025

Table 4.2 is the presentation and analysis of the respondents' gender. It shows that 126 of them representing 64.9 percent of the sample are males, an indication that the work force is dominated by male workers. The table also showed that 68 respondents representing 35.1% are females.

Table 4.3: Age Bracket of the Respondents

S/N	Age Bracket	Frequency	Percent
1.	18 – 27	57	29.4
2.	28 – 37	88	45.4
3.	38 – 47	30	15.6
4.	48 – 57	16	8.2
5.	58 and above	3	1.4

Total	194	100.0

Source: Field Survey, 2025

Table 4.3 shows that 29.4% of the respondents are between the ages of 18 to 27 years, 45.4% fall within 28-37 years, 15.6% fall within 38-47 years, 8.2% falls within 48-57 years and 1.3% are 58 years and above. Based on the analysis, it means that the majority of the respondents (about 90.4%) are within their young, productive and vibrate age (18-47yeras).

Table 4.4: Educational Attainment of the Respondents

S/N	Educational Attainment	Frequency	Percent
1.	WAEC/SSCE	7	3.6
2.	OND/NCE	61	31.4
3.	HND/B.Sc	94	48.5
4.	Professional Cert.	23	11.9
5.	Higher Degree	9	4.6
	Total	194	100.0

Source: Field Survey, 2025

Table 4.4 shows the educational attainment of the respondents. It shows that 3.6% of the respondents are just WASSCE holders, 31.4% are OND/NCE holders, 48.5% are HND/B.Sc holder, 11.9% has professional certification and 4.6% of the respondents has a higher university degree. Based on the analysis, it means that the majority of the respondents are graduates with a reasonable percentage having a professional certification.

Table 4.5: Organizational Tenure of the Respondents

S/N	Organizational Tenure	Frequency	Percent
1.	Below 5 years	37	19.1
2.	5 – 10 years	59	30.4
3.	11 – 15 years	76	39.2
4.	16 and above years	22	11.3
	Total	194	100.0

Source: Field Survey, 2025

Table 4.5 shows the organizational tenure of the respondents in Main Power Electricity Distribution Company, Enugu State. It shows that 19.1% of the respondents have below 5 years' organizational tenure, 30.4% have between 5-10 years organizational tenure, 39.2% have between 11-15 years organizational tenure and 11.3% have 16 years and above organizational tenure in Main Power Electricity Distribution Company.

Data Analysis Based on Research Questions

Research Question 1: What is the effect of inventory level on operational efficiency of Main Power Electricity Distribution Company in Enugu

Table 4.6: Mean scores on the effect of inventory level on operational efficiency of Main Power Electricity Distribution Company in Enugu

S/N	Statement	SA (5)	A (4)	D (3)	SD (2)	UND (1)	Total	Mean $\bar{X}$	Results
	Inventory Level								
1	Our company maintains adequate inventory levels to meet operational needs.	80	85	15	10	4	194	4.17	Significant
2	The company's operational costs are minimized through efficient inventory control.	89	60	30	10	5	194	4.12	Significant
3	Effective inventory control supports strategic decision-making in operations.	75	75	20	15	9	194	3.99	Not Significant
4	Balanced inventory levels enhance the overall operational efficiency of the company	81	60	33	10	10	194	3.99	Not Significant

Significant mean value 4.07

Based on the significant mean value of 4.08 as shown on Table 4.6, adequate inventory levels that meets operational needs (= 4.17) and efficient inventory control that minimizes operational cost (= 4.12) affect operational efficiency Main Power Electricity Distribution Company in Enugu. However, respondents were not certain; whether inventory controls that supports strategic decision making (= 3.99) and balanced inventory levels (= 3.99) affect the operational efficiency Main Power Electricity Distribution Company in Enugu.

Research Question 2: How does inventory management practices affect customer satisfaction of Main Power Electricity Distribution Company in Enugu

Table 4.7: Mean scores on how inventory management practices affect customer satisfaction of Main Power Electricity Distribution Company in Enugu

S/N	Statement	SA (5)	A (4)	D (3)	SD (2)	UND (1)	Total	Mean X	Results
	Inventory Management Practices								
1	Our organization maintains accurate and up-to-date records of inventory at all times.	69	78	30	10	7	194	3.99	Not Significant
2	Inventory levels are regularly reviewed to avoid overstocking and stock-outs.	70	85	25	7	7	194	4.05	Significant
3	We use formal inventory control techniques in managing inventory.	82	79	9	13	11	194	4.07	Significant
4	There is effective coordination between purchasing, production, and sales departments in inventory management.	77	71	18	20	8	194	3.97	Not Significant

Significant mean value 4.02

Based on the significant mean value of 4.02 as shown on Table 4.7, inventory level management affects the customer satisfaction of Main Power Electricity Distribution Company in Enugu by regularly reviewing inventory level to avoid overstocking and stock-outs. (= 4.05) and by using formal inventory control techniques in managing inventory (= 4.07). However, respondents were not certain whether; maintaining accurate and up-to-date records of inventory at all times (= 3.99), and effective coordination between purchasing, production, and sales departments in inventory management (= 3.97) affect the operational efficiency Main Power Electricity Distribution Company in Enugu.

Test of Hypotheses

The stated hypotheses were analysed using the multiple linear regression statistics at 0.05 level of significance.

Test of Hypothesis One

Ho: Inventory level has no significant effect on operational efficiency of Main Power Electricity Distribution Company in Enugu, Nigeria.

Table 4.8[a] Model Summary of Hypthesis One

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.957[a]	.916	.916	.34591

a. Predictors: (Constant), InventoryLevel

From the table 4.10[a] above, R = 0.957 which represents the linear correlation coefficient indicates a very strong positive relationship between the independent variable (inventory level) and the dependent variable (Operational efficiency). R square = 0.916 which represents the coefficient of determination shows that 91.6% of the variation in operational efficiency is explained by the predictor.

Table 4.9[b] ANOVA[a] of Hypothesis One

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	251.707	1	251.707	2103.650	.000[b]
	Residual	22.973	192	.120		
	Total	274.680	193			

a. Dependent Variable: OperationalEfficiency
b. Predictors: (Constant), InventoryLevel

The ANOVA results in table 4.10[b] indicate that the regression model with the predictor (inventory level) significantly explains changes in operational efficiency of Main Power Electricity Distribution Company in Enugu, Nigeria. The very low p-value (.000) confirms that the model is statistically valid and meaningful overall.

Table 4.10[c] Coefficients[a] of Hypothesis One

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.023	.052		-.443	.658
	InventoryLevel	1.089	.024	.957	45.866	.000

a. Dependent Variable: OperationalEfficiency

The coefficient of inventory level, represented by β_1 in Model (1) with a value of 1.089 in Table 4.10[c] shows that when inventory level is increased by one unit, operational efficiency will increase by over 100 percent. The t-value of 45.866 and its corresponding p-value of .000 are indications that the coefficient is significant because 0.05 threshold is greater than

.000. Consequently, the null hypothesis is rejected while the alternative which suggests that inventory level has significant and positive effect on operational efficiency of Main Power Electricity Distribution Company, Enugu is accepted.

Test of Hypothesis Two

Ho: Inventory management practices have no significant effect on customer satisfaction of Main Power Electricity Distribution Company, Enugu.

Table 4.11[a] Model Summary of Hypthesis Two

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.951[a]	.905	.904	.34041

a. Predictors: (Constant), InventoryMgtPractice

From the table 4.11[a] above, R = 0.951 which represents the linear correlation coefficient indicates a very strong positive relationship between the independent variable (inventory Management Practices) and the dependent variable (Customer Satisfaction). R square = 0.905 which represents the coefficient of determination shows that 90.5% of the variation in customer satisfaction is explained by the predictor. The adjusted R Square still explains 90.4% of the variance confirming a strong explanatory power. Std. Error of the Estimate of 0.34041 indicates the average distance that the observed values fall from the regression line; smaller values mean better fit.

Table 4.11[b] ANOVA[a] of Hypothesis Two

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	211.261	1	211.261	1823.108	.000[b]
	Residual	22.249	192	.116		
	Total	233.510	193			

a. Dependent Variable: CustomerSatisfaction
b. Predictors: (Constant), InventoryMgtPractice

The ANOVA results in table 4.11[b] indicate that the regression model with the predictor (inventory management practices) significantly explains changes in customer satisfaction of Main Power Electricity Distribution Company in Enugu, Nigeria. The very low p-value (.000) confirms that the model is statistically valid and meaningful overall.

Table 4.11[c] Coefficients[a] of Hypothesis Two

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.139	.052		2.694	.008
	InventoryMgtPractice	.989	.023	.951	42.698	.000

a. Dependent Variable: CustomerSatisfaction

The coefficient of inventory management practices, represented by β_2 in Model (2) with a value of .989 in Table 4.11[c] shows that when inventory management practices is increased by one unit, customer satisfaction will increase by 98.9 percent. The t-value of 42.698 and its corresponding p-value of .000 are indications that the coefficient is significant because 0.05 threshold is greater than .000. Consequently, the null hypothesis is rejected while the alternative which suggests that inventory management practices have significant and positive effect on customer satisfaction of Main Power Electricity Distribution Company, Enugu is accepted.

Discussion of Findings

Inventory levels have significant positive effect on operational performance of Main Power Electricity, Distribution Company (MPEDC), Enugu. The result is consistent with that of Akinlabi (2021) when he found from his study that positive and significant relationship exists between inventory levels and operational efficiency of listed oil and gas companies in Nigeria. The finding that inventory levels have a significant and positive effect on the operational efficiency of the Main Power Electricity Distribution Company in Enugu State, indicates that the organization's ability to maintain adequate stock of critical materials directly influences its service delivery performance. In the electricity distribution sector, operational efficiency depends heavily on the availability of essential components such as transformers, feeder pillars circuit breakers, metres, cables, fuses, safety gear and maintenance tools. When these items are sufficiently available, technical teams can

respond more rapidly to fault, reduce downtime and execute planned maintenance without delays. A positive relationship suggests that increases in well-managed inventory levels lead to improvement in key operational outcomes such fault-resolution speed, network reliability, customer satisfaction and overall service continuity.

Iinventory management practices have significant positive effect on customers satisfaction in Main Power Electricity Distribution Company Enugu. The study is in line with that of Jekey and Bazia (2024) when they found from their study that positive and strong relationship exists between inventory management practices and customer satisfaction in cement companies in Port Harcourt, River State, Nigeria. The result suggests that the availability, quality and timely supply of critical materials directly shape customers' experiences. In electricity distribution, inventory does not refer to stock in the traditional retail sense; rather, it includes transformers, cables, poles, meters, fuses, replacement parts and technical tools' required for uninterrupted power supply and quick fault resolution. Efficient management of these items ensures smooth operations, reduces downtime and enhances service reliability, factors that customers value highly.When essential materials are available in the right quantity and at the right time, technical teams can respond promptly to network faults, damaged lines, transformer failures and other operational issues. This reduces the duration of outages and enhances the overall reliability of power supply.

Summary of Findings

The following were the findings of the study

1. Inventory levels have significant and positive effect on operational efficiency of Main Power Electricity Distribution Company, Enugu State.
2. Inventory management practices have significant and positive effect on customer satisfaction in Main Power Electricity Distribution Company, Enugu State.

Conclusion

The study investigated the effect of inventory management optimization on performance of Main Power Electricity Distribution Company (MPEDC), Enugu State, Nigeria. Findings revealed that inventory levels have a significant and positive effect on operational efficiency, indicating that maintaining adequate and well-managed/monitored stock levels enhances the company's ability to deliver services reliably and without unnecessary delays. The study also established that inventory management practices exert a significant and positive influence on customer satisfaction. This underscores the importance of structured inventory procedures, timely stock replenishment and efficient handling of materials in improving customer experience and service delivery. Overall, the study concludes that inventory management is a critical driver of operational, financial, and customer-related outcomes within the electricity distribution company in Enugu. Strengthening inventory planning, monitoring and optimization practices will therefore enhance efficiency, reduce costs, improve turnover and ultimately contribute to improved service delivery and customer satisfaction.

5.3 Recommendations

Based on the findings of this study and the conclusions drawn from them, the following recommendation were made.

1. The company should maintain optimal inventory levels through real-time tracking and demand forecasting to prevent stockouts and ensure uninterrupted operational activities.
2. It is important for the organization to strengthen its inventory management procedures to guarantee timely availability of materials needed for fault repairs, thereby improving service delivery and customer satisfaction.

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