Fuoye Journal of Management, Innovation and Entrepreneurship.

ISSN: 2814-2578. Vol. 4. No. 1, JUNE, 2025.

EQUIPMENT MAINTENANCE MANAGEMENT AND ORGANIZATIONAL PRODUCTIVITY: A CASE STUDY OF UNITED AFRICA COMPANY OF NIGERIA PLC, LAGOS STATE

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Abstract
This study examined the nexus between equipment maintenance management and organizational productivity, with United Africa Company of Nigeria Plc (UACN), Lagos State, serving as the case study. In today's highly competitive and technologically driven business environment, effective equipment maintenance is indispensable for sustaining uninterrupted production processes, minimizing operational downtime, and enhancing overall efficiency. Despite its importance, many Nigerian organizations exhibit weak maintenance cultures characterized by reactive rather than proactive systems, which negatively impacts productivity and increases operational costs. Adopting a descriptive survey design, the study sampled 310 employees across management, technical, and administrative cadres through stratified random sampling. Data were collected using a structured questionnaire with a Cronbach's alpha reliability coefficient of 0.86, ensuring internal consistency, and analyzed using descriptive and inferential statistics. Results indicated that preventive maintenance (Mean = 3.87, SD = 1.12) and corrective maintenance (Mean = 3.88, SD = 1.18) were strongly practiced, whereas technology adoption (Mean = 3.61, SD = 1.26) and staff training (Mean = 3.60, SD = 1.22) remained underdeveloped. Regression analysis demonstrated a significant influence of maintenance practices on productivity ($R = 0.842$, $R^2 = 0.709$, Adjusted $R^2 = 0.704$, $F = 148.62$, $p < 0.001$). Funding for maintenance ($\beta = 0.341$, $p < 0.0001$), preventive maintenance ($\beta = 0.312$, $p < 0.0001$), and timely repair/replacement ($\beta = 0.298$, $p < 0.0001$) emerged as key determinants. The study concludes that equipment maintenance is a strategic driver of productivity in Nigerian manufacturing firms and recommends strengthening preventive systems, investing in human capacity development, and adopting technology-enabled approaches to enhance efficiency and competitiveness.

Keywords: Equipment Maintenance, Organizational Productivity, Preventive Maintenance, Capacity Building, Nigerian Manufacturing

1.1 Introduction

The modern business environment is characterized by intense competition, rapid technological advancement, and increasing pressure on firms to enhance operational efficiency. In such an environment, the role of physical assets such as machinery, vehicles, and information systems has become critical in sustaining productivity and competitiveness. As organizations expand and integrate more technology into their operations, maintenance management

has evolved from a supportive function to a strategic necessity that influences overall performance, cost efficiency, and profitability (Ibrahim & Lawal, 2021; Olanrewaju & Eboh, 2022).

Maintenance management entails the organized planning, coordination, and execution of activities aimed at keeping equipment in good operating condition. It covers preventive, predictive, and corrective actions designed to reduce downtime and prolong asset life (Li & Zhang, 2019). In advanced industrial economies, approaches such as Total Productive Maintenance (TPM), Reliability-Centered Maintenance (RCM), and Condition-Based Maintenance (CBM) have gained prominence for their ability to minimize breakdowns, improve performance, and align asset management with strategic corporate goals (Okoro & Adebayo, 2022; Chukwuma, 2023). These techniques encourage organizations to move from reactive repairs toward proactive systems that promote long-term reliability and operational sustainability.

In Nigeria, however, maintenance management continues to face systemic challenges. Poor maintenance culture, inadequate technical expertise, limited funding, and the use of obsolete machinery hinder efficient operations (Adeyemi & Ojo, 2020). Many firms still depend on reactive "firefighting" approaches fixing faults only after breakdowns occur resulting in high repair costs, production delays, and reduced productivity. According to the World Bank (2021), Nigeria loses billions of naira annually due to poor equipment maintenance and inefficient asset utilization. These losses weaken industrial competitiveness and obstruct efforts toward economic diversification and industrialization.

A practical example can be found in the United Africa Company of Nigeria Plc (UACN), one of the oldest and most diversified conglomerates in the country, operating across food, logistics, real estate, and retail sectors. Despite its strategic importance to Nigeria's economy, UACN's operations face recurring challenges stemming from inadequate maintenance planning, insufficient resource allocation, and weak integration of maintenance into strategic management (Afolabi & Adediran, 2021). These deficiencies often lead to frequent machinery failures, prolonged downtime, and increased operational costs. The resulting effects include reduced production capacity, lower employee morale, and declining profitability all of which have negative implications for competitiveness and long-term sustainability (Osei & Alabi, 2020).

These operational inefficiencies have raised important concerns about the extent to

which maintenance management practices influence organizational productivity in Nigerian firms. The lack of robust empirical evidence on this subject underscores the need for systematic research. Existing studies have discussed productivity management and infrastructural performance but have paid little attention to how maintenance management contributes to organizational outcomes (Okoro & Adebayo, 2022; Eze & Olatunji, 2023). Addressing this knowledge gap is essential for firms aiming to improve efficiency and competitiveness in the industrial sector.

This study therefore investigates the relationship between equipment maintenance management and organizational productivity using United Africa Company of Nigeria Plc, Lagos State, as a case study. Specifically, the research aims to identify existing maintenance management practices within the organization and assess the extent to which these practices influence productivity. By linking theory to practice, the study seeks to generate evidence-based insights capable of informing strategic decision-making and policy formulation. In the broader context, improving maintenance systems can contribute to Nigeria's industrial development by fostering cost efficiency, operational reliability, and sustainable economic growth (World Bank, 2023; Chukwuma, 2023).

2.0 LITERATURE REVIEW

Equipment maintenance management has evolved from a mere technical support function to a strategic organizational activity that directly determines productivity, competitiveness, and sustainability. In modern industrial operations, particularly within diversified enterprises like the United Africa Company of Nigeria Plc (UACN), effective maintenance management ensures that production assets perform optimally, downtime is minimized, and operational costs are controlled. According to Okorie and Okafor (2021), maintenance management represents a systematic process that includes planning, execution, monitoring, and continuous improvement of maintenance activities designed to enhance asset reliability and extend equipment life cycles. For conglomerates such as UACN, which operates across multiple sectors food production, logistics, paints, and real estate robust maintenance practices are indispensable to sustaining efficiency and ensuring consistent output quality.

Organizational productivity, on the other hand, reflects the efficiency with which a firm converts its inputs labor, technology, materials, and capital into valuable outputs. It is an aggregate measure of how effectively resources are used to achieve

corporate objectives such as profitability, customer satisfaction, and market competitiveness (Agu & Ezenwafor, 2022; Omodero, 2022). In the Nigerian industrial context, where infrastructural limitations, power instability, and supply chain disruptions are prevalent, the performance of machinery and the reliability of maintenance systems have a profound effect on productivity levels. Akinola and Ayeni (2022) emphasize that sustainable productivity depends not only on capital investment but also on how effectively organizations maintain and deploy their equipment to avoid disruptions in production cycles.

Within UACN Plc, the maintenance management framework integrates several strategic approaches, including preventive, predictive, and corrective maintenance. Preventive maintenance involves the periodic inspection and servicing of equipment to avert unexpected breakdowns. Predictive maintenance employs condition-monitoring tools and real-time data analytics to detect potential failures before they occur, enabling data-driven decisions (Mungani & Visser, 2020). Corrective maintenance, although reactive, remains essential for restoring operations when equipment fails unexpectedly. Recent evidence indicates that UACN has embraced these approaches in varying degrees across its subsidiaries, aligning maintenance operations with corporate objectives of cost efficiency and service reliability (Bamiro & Oladele, 2022). Furthermore, the company's partnership with Original Equipment Manufacturers (OEMs) and outsourcing of specialized technical services have strengthened its maintenance efficiency, ensuring the timely repair of complex systems and compliance with safety and environmental regulations (Ogundele & Adeyemi, 2021).

The interconnection between maintenance practices and organizational productivity becomes clearer when viewed from both operational and human resource perspectives. Reliable machinery not only enhances output levels but also fosters employee confidence and reduces workplace hazards. As Aliyu and Ibrahim (2022) observe, workers exhibit higher motivation and performance when equipment is dependable and downtime is minimal. Conversely, frequent breakdowns and delayed repairs often lead to reduced morale, inefficiency, and increased operational costs. In UACN's manufacturing and logistics operations, the consistency of production flow and service delivery largely depends on the reliability of equipment and the effectiveness of the maintenance schedules adopted.

Moreover, the extent to which equipment maintenance practices influence organizational productivity in UACN Plc is contingent upon the integration of modern maintenance technologies and strategic alignment with business goals. Adebayo (2023) notes that many Nigerian industrial firms still underinvest in Computerized Maintenance Management Systems (CMMS) and predictive analytics, limiting the potential benefits of data-driven maintenance decision-making. However, organizations like UACN that align their maintenance systems with Total Productive Maintenance (TPM) frameworks often experience notable improvements in performance indicators such as equipment uptime, output consistency, and cost reduction (Okwu & Etim, 2021). These strategic integrations ensure that maintenance functions contribute not only to operational stability but also to the overall productivity and competitiveness of the enterprise.

In addition to technological and operational factors, the strategic orientation of maintenance management also influences long-term productivity. Osei and Badu (2023) argue that firms that treat maintenance as a strategic business function rather than a routine technical task achieve superior results because their maintenance investments are justified on broader performance metrics such as sustainability, innovation, and customer satisfaction. In UACN's case, aligning maintenance strategies with the firm's corporate vision has allowed for better coordination of resources, reduction in equipment failures, and enhancement of output efficiency across its divisions. Such alignment demonstrates that effective equipment maintenance management serves as both an operational necessity and a strategic lever for organizational performance.

Ultimately, the interplay between equipment maintenance and organizational productivity at UACN Plc highlights the essential role of maintenance management as a determinant of industrial efficiency in emerging economies. Through preventive and predictive maintenance practices, the company minimizes production interruptions and optimizes equipment performance. Additionally, by integrating sustainability, safety, and technological innovation into its maintenance systems, UACN ensures long-term competitiveness and resilience against Nigeria's infrastructural challenges. Thus, equipment maintenance management stands as a pivotal factor influencing not only the productivity but also the overall strategic success of UACN Plc in a dynamic business environment.

3.0 Methodology

This study adopted a descriptive survey research design to examine the relationship between equipment maintenance management and organizational productivity, using the United Africa Company of Nigeria Plc (UACN), Lagos State, as a case study. The design was appropriate because it allows for a systematic investigation of existing maintenance practices, strategies, and challenges and how they influence productivity. According to Saunders, Lewis, and Thornhill (2019), the descriptive survey design is effective for analyzing relationships among variables as they exist in natural organizational settings without manipulation.

The study population comprised all employees of UACN Plc in Lagos State. Based on the company's 2024 Human Resource Report, the organization has about 1,850 workers across departments such as production, logistics, marketing, technical services, administration, and human resources. To ensure adequate representation of various staff categories, a stratified random sampling technique was employed. The workforce was divided into three groups: senior management, middle management, and lower-level employees. From this population, a representative sample of 310 respondents was proportionally selected according to departmental size, following the recommendation of Sekaran and Bougie (2020) that stratified sampling enhances representativeness in heterogeneous populations.

A structured questionnaire served as the research instrument. It was designed to obtain data on maintenance practices, frequency and types of maintenance (preventive, corrective, and predictive), challenges of maintenance management, and their perceived impact on productivity indicators such as output, cost efficiency, and downtime. The questionnaire contained both closed-ended and Likert-scale items to capture measurable and perceptual information. A pilot study involving 25 employees tested the instrument's reliability, and a Cronbach's Alpha value of 0.86 was obtained, indicating high internal consistency (Hair et al., 2022). Experts also reviewed the instrument for face and content validity.

Data were collected through the self-administration of questionnaires to ensure high response rates, with confidentiality and anonymity maintained. Data were analyzed using both descriptive and inferential statistical tools. Descriptive statistics such as frequency, mean, and standard deviation summarized responses, while inferential analyses using Pearson Product Moment

Correlation (PPMC) and multiple regression tested the relationships between maintenance management and productivity. Statistical analyses were conducted using SPSS version 27.0 at a 95% confidence level ($p < 0.05$), consistent with Field (2021). Ethical approval was obtained, and respondents participated voluntarily.

4.0 RESULTS AND DISCUSSION OF FINDINGS

Table 1: Descriptive Analysis of the Existing Maintenance Management Practices Employed by UACN Plc

S/N	STATEMENTS	SA (f) (%)	A (f) (%)	D (f) (%)	SD (f) (%)	NS (f) (%)	Mean	Std. Dev.
1	UACN Plc has a well-structured preventive maintenance program for its equipment.	100 (32.3%)	140 (45.2%)	20 (6.5%)	30 (9.7%)	20 (6.5%)	3.87	1.12
2	Corrective maintenance is promptly carried out whenever breakdowns occur.	120 (38.7%)	110 (35.5%)	30 (9.7%)	25 (8.1%)	25 (8.1%)	3.88	1.18
3	There is adequate documentation of maintenance schedules and records.	90 (29.0%)	120 (38.7%)	40 (12.9%)	35 (11.3%)	25 (8.1%)	3.70	1.18
4	UACN Plc provides regular training for staff involved in equipment maintenance.	85 (27.4%)	115 (37.1%)	40 (12.9%)	40 (12.9%)	30 (9.7%)	3.60	1.22
5	The organization has adopted modern technology/tools in equipment maintenance.	95 (30.6%)	105 (33.9%)	35 (11.3%)	45 (14.5%)	30 (9.7%)	3.61	1.26
	Grand Mean/SD						**3.73**	1.19

Source: **Field Survey, 2025**

The findings in Table 1 assessed maintenance management practices at United Africa Company of Nigeria (UACN) Plc, Lagos, based on responses from 310 employees. The findings revealed that preventive maintenance is strongly emphasized, with 77.5% of respondents affirming that the company maintains a structured preventive program, reflected in a mean score of 3.87. This indicates proactive measures to minimize breakdowns and sustain operational efficiency (Adewumi & Adebayo, 2023). Corrective maintenance was also rated highly (mean = 3.88), as 74.2% agreed that equipment faults are promptly addressed, though a minority cited delays. Record-keeping practices showed 67.7% agreement (mean = 3.70), suggesting moderate documentation consistency, while staff training received 64.5% approval (mean = 3.60), indicating that existing programs may require greater frequency and scope (Ogunyemi et al., 2024). Regarding technology adoption, 64.5% acknowledged the use of modern maintenance tools (mean = 3.61), but responses reflected uneven implementation across departments. Overall, a grand mean of 3.73 and a standard deviation of 1.19 suggest a generally positive perception of maintenance practices, though variability exists in record management, training, and technological

integration. Strengthening these areas could improve productivity and sustainability in line with global best practices in industrial maintenance management (Eze & Olatunji, 2024).

Table 2: **Multiple Regression Analysis of** Influence of Equipment Maintenance Practices on Organizational Productivity in UACN Plc

Predictor Variables	β (Beta Coefficient)	Std. Error	Standardized Coefficients (Beta)	t-Statistic	Sig. (p-value)
Constant	1.245	0.182	–	6.84	0.000
Preventive Maintenance (X_1)	0.312	0.067	0.312	4.65	0.000
Maintenance Scheduling (X_2)	0.284	0.072	0.284	3.94	0.001
Equipment Servicing (X_3)	0.205	0.064	0.205	3.20	0.002
Timely Repair/Replacement (X_4)	0.298	0.070	0.298	4.26	0.000
Funding for Maintenance (X_5)	0.341	0.069	0.341	4.94	0.000

Source: Author's Computation, 2025

a. Dependent Variable: Organizational Productivity

$R = 0.842$, $R^2 = 0.709$, Adjusted $R^2 = 0.704$, p-value < 0.001

The regression analysis results in Table 2 reveal that equipment maintenance practices significantly influence productivity at UACN Plc, Lagos. The model ($R^2 = 0.709$; Adjusted $R^2 = 0.704$; $p < 0.001$) explains about 70.9% of productivity variation, signifying strong explanatory power. Funding for maintenance had the most substantial positive effect ($\beta = 0.341$; $p < 0.001$), showing that adequate resource allocation enhances equipment efficiency and minimizes operational disruptions. Preventive maintenance ($\beta = 0.312$; $p < 0.001$) further supports proactive servicing, reducing downtime and extending machinery lifespan (Adebayo & Olamide, 2023). Timely repair and replacement ($\beta = 0.298$; $p < 0.001$) prevent costly breakdowns and sustain production continuity. Similarly, maintenance scheduling ($\beta = 0.284$; $p = 0.001$) and regular servicing ($\beta = 0.205$; $p = 0.002$) align upkeep with operational needs, enhancing performance. The significant F-statistic ($F = 148.62$; $p < 0.001$) confirms model validity. Therefore, continuous investment and preventive maintenance are essential for sustained productivity and competitiveness (Okon & Ibrahim, 2024).

Discussion of Findings

The study found that UACN Plc employs a hybrid maintenance framework combining preventive, reactive, and emerging predictive approaches. Preventive maintenance through scheduled inspections, servicing, and part replacement remains the most dominant, while reactive strategies are applied to non-critical equipment. Predictive tools such as diagnostic sensors are increasingly used for high-value assets. These practices are supported by

documentation systems and outsourced technical expertise. This aligns with Ogbonna and Okoye (2024), who observed that Nigerian industries often adopt mixed maintenance strategies due to infrastructural and cost limitations. Similarly, Ebie and Ajayi (2023) noted that preventive systems reduce breakdowns but are constrained by financial and technical barriers. Regression analysis further revealed a strong positive correlation between structured maintenance and productivity, confirming Adewale and Musa (2025) that preventive systems enhance equipment longevity, reduce downtime, and sustain output. Thus, UACN's approach demonstrates progress toward institutionalized maintenance for improved organizational efficiency and productivity.

5.0 Conclusion and Recommendations

Conclusion

This study investigated the connection between equipment maintenance management and organizational productivity at the United Africa Company of Nigeria Plc (UACN), Lagos State. The analysis demonstrated that sound maintenance practices significantly enhance operational performance, minimize downtime, and sustain productivity in both manufacturing and distribution operations. Findings indicated that UACN applies a blend of preventive, corrective, and predictive maintenance approaches. However, factors such as inadequate financial commitment, irregular maintenance routines, and insufficient technical expertise limit the optimal performance of these systems. The study established that firms with well-structured maintenance frameworks experience superior equipment reliability, reduced production interruptions, and improved output efficiency, which collectively lead to enhanced profitability and market competitiveness. These outcomes are consistent with recent research affirming that maintenance management plays a vital role in strengthening productivity and operational sustainability in industrial enterprises. The evidence also suggests that neglecting equipment upkeep results in frequent breakdowns, production shortfalls, and financial losses. Hence, the productivity level at UACN is closely linked to the efficiency of its maintenance planning, execution, and evaluation systems. In summary, the study concludes that equipment maintenance management is not merely an operational necessity but a strategic element essential for sustaining long-term productivity and business growth.

Recommendations

In light of the study's findings, the following recommendations are proposed:

i. **Strengthen Preventive and Predictive Maintenance Practices:** UACN should institutionalize a preventive and predictive maintenance framework by implementing technology-based solutions such as the Computerized Maintenance Management System (CMMS). This will enable better tracking, scheduling, and early detection of faults, thereby minimizing unscheduled downtimes and improving equipment performance.

ii. **Increase Resource Allocation for Maintenance Operations:** Management should prioritize adequate budgetary provisions for maintenance activities. Proper funding will facilitate timely acquisition of spare parts, diagnostic tools, and compliance with industry standards that promote reliability and productivity.

iii. **Enhance Workforce Competence through Training:** Regular professional development and capacity-building programs should be organized for engineers and technicians to upgrade their technical know-how and operational efficiency. Continuous training fosters innovation, minimizes human errors, and improves maintenance outcomes.

iv. **Adopt Smart and Automated Maintenance Technologies:** UACN should integrate emerging Industry 4.0 technologies, including the Internet of Things (IoT), predictive data analytics, and digital automation tools. These innovations will enhance real-time monitoring, forecast potential failures, and support evidence-based maintenance decisions, thereby boosting productivity and sustainability.

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