Optimizing the Impact of Materials Quality Management and Master Production Schedule on Organizational Effectiveness of Aqual-Lina Table Water, Yenegoa, Bayelsa State.

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Abstract
This study examined the optimization of organisational effectiveness using Materials Quality Management and Master Production Schedule. The primary aim was to investigate how materials quality management and master production schedule influence the organisational effectiveness of Aqual-Lina Table Water, Yenagoa, Bayelsa State. The study adopted the cross-sectional survey-research design, using data primarily collected from management staff of Aqual-Lina Table Water. A census sampling method was adopted, with the entire population of 22 management staff being captured as the sample size. The data were cross-examined using linear regression techniques. Analysis outcomes showed that both independent variables (materials quality management and master production schedule) individually, significantly and positively affect the organisational effectiveness of Aqual-Lina Table Water. The study concluded that both materials quality management and master production schedule are pivotal in driving the organizational effectiveness of the company. It was recommended that Aqual-Lina Table Water should invest in advanced inventory management software and implement a robust production scheduling system in order to further improve the firm's performance.

Keywords: *Materials Requirement Planning; Materials Quality Management; Master Production Schedule; Small Businesses; and Organisational Effectiveness.*

a. Introduction

b. Background to the Study

According to Solomon (2024), every organisation spends a significant percentage of its financial resources on purchasing commodities. Materials can often cost more than half of the total cost of production. Managing such a major investment necessitates extensive planning and management in order to prevent waste, which always has an impact on organizational efficiency and profitability (Kamalu 2023). Those who work in the manufacturing industry understand that materials are the company's lifeblood and heart. As a result, managers in a manufacturing organization will continue to struggle to maintain performance if the necessary materials are understocked, overstocked, or badly planned in any manner. Lee and Banjoko represent the year 2021. Ammar et al. (2021) noted that manufacturers face the challenge of meeting customer expectations for quicker delivery than production timelines allow. Effective material planning is essential for administrative

efficiency, enabling enterprises to control procurement, plan production, and meet customer demands cost-effectively.

Material Requirement Planning (MRP) is an inventory and production scheduling system commonly used in manufacturing, primarily implemented through software but also feasible manually (LaForge & Sturr, 2020). It serves as a computerized method for ordering and scheduling in fabrication and manufacturing industries (Blood, 2020). Raw material requirements (components and parts required to manufacture a product) are generated using a variety of approaches, including a master production schedule, materials quality management, bill of materials, supplier lead time, sales orders, market demand, and predictions. Furthermore, it will identify material shortages if they exist and will recommend ordering or building as necessary, based on the data gathered. According to Lee and Banjoko (2021), the MRP system is employed simultaneously to accomplish three basic objectives.

The goals include ensuring materials are available for production and finished goods for delivery to avoid shortages, minimizing inventory and waste per company philosophy, and aligning manufacturing and purchasing with delivery schedules, lead times, and sales, all aimed at enhancing organizational efficiency.

Manufacturing businesses in Nigeria employ MRP, and it plays an essential role in management operations as well as the overall success, failure, and achievement of the company's goals and objectives that have been created throughout the organisation. Performance is the ultimate outcome or conclusion; it is the pinnacle of everything. According to Adewumi & Daniel (2022), MRP is a production planning and inventory control system used in Nigeria's manufacturing and fabrication industries. It integrates production schedules, inventory data, and bill of materials to determine purchase and shipping schedules for components based on market demand, adopting a borrowed planning approach. Thus, MRP is used by production companies in Nigeria to determine production cost, standardization of products and timely delivery of products by analyzing the Master Production Scheduling (MOP), Materials Quality Management (MQM), Bill of Materials (BOM), supplier lead time, production cost forecasting, market demand forecasting, which can be effectively measured or evaluated by management key performance indices such as: achievement of set target, product quality, targeted profit, effec tive service delivery and production cost-effectiveness.

c. Statement of the Problem

Small-scale businesses such as Aqual-Lina table water play a crucial aspect in the Nigerian economy. They enable employment generation, economic growth, innovation and flexibility, as well as entrepreneurial development (Egwuatu, 2021). Ammar et al, (2021) opined that most small businesses in Nigeria have witnessed set-backs due to inadequate MRP. This no doubt affects organizational effectiveness and needless to say, th e economy in general. As a result, many stakeholders in small scale businesses in Nigeria are confused as to the outcome of these businesses, thereby affecting investment in such businesses

Aqual-Lina Table Water in Yenagoa, Bayelsa State, a small scale manufacturing company, has at one point or the other faced the challenge of adequate materials requirement planning, which is crucial for ensuring the consistent production of high-quality table water. Specifically, the lack of robust master production schedule (MPS) and inadequate materials quality management (MQM) practices may be hindering the organization’s ability to meet customer demands, leading to decreased organisational effectiveness. As a result of this

problem, this study sought to investigate the impact of materials requirement planning, with particular emphasis on materials
production schedule and materials quality management, on the organisational effectiveness of Aqual-Lina Table Water in Yenagoa, Bayelsa State.

d. Objectives of the Study

The primary objective of this study was to investigate the impact of materials quality management and master production schedule on the organizational effectiveness of Aqual-Lina Table Water, Yenagoa, Bayelsa State. The study was guided by the following specific objectives:

i) to determine if materials quality management has any significant impact on the organizational effectiveness of Aqual-Lina Table Water, Yenagoa, Bayelsa State.
ii) to ascertain if master production schedule has any significant impact on the organizational effectiveness of Aqual-Lina Table Water, Yenagoa, Bayelsa State.

e. Research Questions

i. Does master production schedule have any significant impact on the organizational effectiveness of Aqual-Lina Table Water, Yenagoa, Bayelsa State?
ii. Does materials quality management have any significant impact on the organizational effectiveness of Aqual-Lina Table Water, Yenagoa, Bayelsa State?

f. Hypotheses of the Study

In line with the objectives of the study, the null hypotheses to be tested are:

Ho_1**:** Materials quality management does not have any significant impact on the organizational effectiveness of Aqual-Lina Table Water, Yenagoa, Bayelsa State.

Ho_2**:** Master production schedule does not have any significant impact on the organizational effectiveness of Aqual-Lina Table Water, Yenagoa, Bayelsa State.

g. Scope and Limitations of the Study

The study is centred on master production schedule and materials quality management and organisational effectiveness. Study target is Aqual-Lina bottling water company located in Yenagoa, Bayelsa State, Nigeria. Study population was restricted to the management staff of the Aqual-Lina bottling water company. The study location was restricted to just a manufacturing firm (Aqual-Lina bottling water company located in Yenagoa, Bayelsa State, Nigeria). Although the study is limited to a single company, the results can be reasonably generalized and contextualized to other similar small-scale businesses in Nigeria.

a. Literature Review

b. Conceptual Review

i. Organizational Effectiveness

Organizational effectiveness is a widely discussed yet often ambiguous concept, with various models and approaches developed to assess a corporation's efficiency and success. Rodrigues and Madgaonkar (2014) emphasized that different models employ varied criteria, reflecting diverse schools of thought on what constitutes effectiveness. The term is typically linked to achieving organizational goals through structured processes, irrespective of the methods or pace involved. According to Mohannad (2019), clarity in expectations and quality control of resources are essential for overall efficacy. When employees lack clear directives, efforts may fall short of achieving desired outcomes, underlining the importance of well-defined goals and efficient management strategies. .

Effectiveness is increasingly regarded as a key measure of success. Morrison (2023) argued that while the term "organizational effectiveness" may seem like a business cliché, it has become a significant benchmark, prompting even academic institutions to offer certification programs on its implementation. Yamoah (2013) described an effective organization as one that operates like a well-oiled machine, achieving its goals without wasting time or resources. Similarly, Dhoopar, Sihag, and Gupta (2023) asserted that effectiveness goes beyond performance, encompassing an organization's ability to deliver value while meeting its objectives. CEOs can enhance this by engaging employees and fostering better communication within management, ultimately driving productivity and performance.

Production planning and materials management play a critical role in organizational effectiveness. According to Vincent et al. (2018), effective production planning reduces inventory expenses while improving customer satisfaction, while Ogohi (2019) observed that effective materials management boosts production, profitability, and overall effic iency. Mohannad (2019) also highlighted that long-term performance is directly proportional to an organization's effectiveness, reinforcing the need for well-structured operations and strategic planning. These insights highlight the interconnectedness of operational planning and resource management in driving success across diverse industries.

In Nigerian manufacturing firms, organizational effectiveness is pivotal for improving productivity, profitability, and competitiveness in a challenging business env ironment. Ian and Samson (2022) identified issues such as erratic power supply, fluctuating exchange rates, and poor infrastructure as major obstacles to efficiency. To address these challenges, firms must optimize supply chains, modernize production processes, and adopt advanced technologies. Leadership and employee engagement also play crucial roles in overcoming external barriers. Strong leadership fosters innovation and problem-solving, while investments in workforce training and a positive organizational culture enhance productivity and employee retention. Collectively, these strategies enable Nigerian manufacturing firms to meet market demands, minimize costs, and maintain a competitive edge.

ii. Materials Quality Management

Materials quality management comprises reviewing and maintaining material quality in order to meet client demands while staying on track with a production schedule and keeping costs low. Material quality management, which encompasses all materials-related procedures, is a critical business activity that raises the value of a finished product. Inventory control manager, materials manager, buyer/planner, expediter, and inventory analyst are some common materials management positions (Ammar et al., 2021).

Quality materials management is a vital business function that ensures the continuous flow of materials from suppliers to manufacturers and, eventually, to customers (Adeeyemi and Daniel, 2022). Ensuring that the required materials are available at the right time, in the correct quantity, and at an appropriate cost requires thorough planning, procurement, and management. Thus, materials management, a subset of supply chain management, is responsible for managing a company's or organization's material requirements (Ammar et al., 2021). These requirements include managing and controlling material flow while also considering issues such as quality, availability, pricing, demand, and delivery dates. Material managers are responsible for determining material needs, planning restocking, monitoring raw materials, work in progress, and finished goods, and communicating this information to procurement and the supply chain.

Materials management strives to balance competing objectives such as ensuring material availability, keeping inventory prices low, and providing optimal customer satisfaction. Without a doubt, these help the organization's overall performance by enhancing material and product quality, assuring timely delivery, optimising inventory levels, and ensuring supply chain efficiency (Ammar et al., 2021).

Materials Quality Management (MQM) is vital for manufacturing firms in Nigeria as it ensures that the raw materials used in production meet required standards, thereby enhancing the quality
of the final products. Given the challenges of inconsistent material supply, inadequate local sourcing, and the high cost of imported inputs, Nigerian manufacturers must implement stringent quality control measures. This includes regular inspection, testing of materials, and compliance with international standards to maintain competitiveness in both domestic and export markets. Ensuring the quality of materials reduces the risk of defects, rework and customer dissatisfaction, which are costly in terms of time and resources (Unam, 2022). Furthermore, Nigerian manufacturing firms face pressure to adhere to regulatory standards and certifications, such as those set by the Standards Organisation of Nigeria (SON) and the international bodies like ISO. By integrating MQM practices with these regulatory frameworks, firms can improve product consistency, build customer trust, and access broader markets. In a competitive and challenging business environment, investing in materials quality management helps Nigerian manufacturers maintain operational efficiency, reduce waste, and enhance their reputation, thereby contributing to long-term growth and sustainability (LaForge and Sturr, 2020).

iii. Master Production Schedule

Jain (2019) states that a master production schedule specifies the timing, quantity, and type of products to be produced. It combines finished goods BOM data with inventory information to create an MRP for raw material procurement, identifying the necessary materials. According to Ikon and Nwankwo (2016), the master production schedule serves as the cornerstone for all sales and manufacturing communication. As a result of the MPS, sales can make promises that manufacturing can keep. A master production schedule may be quickly adjusted to reflect changes in supply and demand. Umoh et al. (2023) argued that "master schedule" and "master production schedule" are distinct. Unlike the master schedule, which is a planning chart, the master production schedule, based on the build timeline, drives material requirements planning and helps manufacturers plan product quantities for specific periods. It requires the initiative to decide what needs to be made and what supplies to purchase, therefore driving the manufacturing process. When would you construct a master production schedule? The normal production window is from three to two years. For each product, factors such as starting inventory, expected orders, planned orders, production needs to balance supply and demand, and safety stock requirements are considered. Umoh et al. (2023) also noted that APS, a part of ERP systems for manufacturing, includes master production scheduling. APS evaluates the master production schedule to optimize production based on available stock and capacity, reducing production flow control time and improving organizational efficiency.

The master production schedule (MPS) is crucial for manufacturing firms in Nigeria, as it provides a clear plan for what products need to be produced, in what quantities, and by when, ensuring efficient use of resources. Nigerian manufacturers often deal with challenges such as irregular power supply, fluctuating material costs, and supply chain

disruptions, which can affect production. An effective MPS allows firms to better forecast demand, align production with available resources, and minimize downtime caused by external factors. This helps manufacturing firms optimize inventory levels, avoid overproduction or stock shortages, and ensure timely delivery to customers (Jonsson and Kjellsdotter, 2015). Additionally, the MPS supports Nigerian manufacture rs in managing their workforce and machinery efficiently. By having a well-structured production schedule, firms can allocate labor and equipment appropriately, reducing bottlenecks and maximizing outputs. This is particularly important in Nigeria's competitive manufacturing sectors, where firms need to maintain productivity while managing cost. An accurate and flexible MPS helps manufacturers respond to market demand
changes quickly, improving customer satisfaction and enabling them to remain competitive in both local international markets (Ghobbar and Friend, 2009).

c. Theoretical Framework

2.1.1 Resource Based View (RBV) Theory

The Resource Based View Theory according to Barney et al., 2021; Sabourin, 2020 and Kero & Bogale, 2023, was propounded by Wernerfelt in 1984, Barney in 1991, and Peteraf in 1993. The theory suggests that organizational resources, like materials quality management and master production scheduling, form the basis of competitive advantage. VRIN resources - valuable, rare, inimitable, and non-substitutable - drive sustained competitive advantage, and organizational effectiveness relies on their efficient utilization and management (Sabourin, 2020). This theory suggests that Aqual-Lina's organisational effectiveness depends on the effective utilization of its master production schedule and materials quality management resources, aligning with the VRIN criteria. Master production scheduling and materials quality management are crucial resources for Aqual-Lina Table Water Compan y, and managing them effectively can enhance competitive advantage and organizational effectiveness. According to the resource-based view theory, organizations must leverage their resources to create economic value that surpasses competitors, using strategies that are difficult for rivals to replicate. These resources can be either tangible or intangible (Kero & Bogale, 2023). Hence, the relevance of this theory to Aqual-Lina Table Water Company.

d. Empirical Review

Solomon (2024) conducted a study at the Municipal Hospital Tarkwa in Ghana's Western Region to evaluate the influence of effective inventory management on organisational performance. The research aimed to achieve two main objectives: to determine the current state of inventory management techniques in businesses and to identify the barriers organisations face when implementing these practices. Data were collected using questionnaires, and both descriptive and causal research methods were employed. The survey included 200 participants, and the analysis was carried out using the STATA 13 statistical tool. The results, presented through descriptive statistics and frequency distributions, used probit regression to analyze the relationship between variables. Findings showed stakeholder satisfaction with the care provided and the hospital's use of various inventory management techniques, including activity-based costing, just-in-time, ERP, distribution requirement planning, economic order quantity, material requirements planning, and materials resource planning. Effective inventory management was found to have a substantial impact on organisational performance, particularly on the quality of service delivery. The study concluded that organisations could benefit significantly from implementing reliable inventory management systems to streamline processes and improve

efficiency.

James et al. (2024) studied the relationships between Master Production Scheduling (MPS), Total Quality Management (TQM), Business Processes (BP), and Blood Transfusion Sustainability (BTS) in Ugandan blood banks. Data was gathered from 213 respondents via a self-administered questionnaire and simple random sampling, with variables assessed using a five-point Likert scale. Findings highlighted a beneficial relationship between MPS and BTS, mediated through a serial model involving TQM and BP. Maximum likelihood estimation was employed to develop the measurement model. Despite limitations in establishing causal relationships due to the cross-sectional study design, the authors proposed a theoretical framework linking MPS and BTS via TQM and BP, addressing gaps in existing literature and emphasizing the need for sustainable blood transfusion practices.

Kamalu et al. (2023) focused on the supply chain performance of multinational FMCG companies in Port Harcourt, specifically examining material requirement planning. The correlational research surveyed ten top international FMCG firms headquartered in Port Harcourt. Using a census sampling approach, fifty questionnaires were distributed to each company's top executives, yielding 43 usable responses. Pearson Product Moment Correlation was applied to test hypotheses linking material requirement planning with supply chain performance. The study identified a strong correlation, emphasizing the importance of regularly optimizing material requirement schedules to enhance supply chain operations. Recommendations included periodic reviews of MSRP schedules by multinational FMCG managers to sustain and improve performance.

Umoh et al. (2023) explored the link between production planning and corporate productivity performance within Nigeria's manufacturing sector. The study employed cost reduction, increased equity capital, and growth as proxies for corporate productivity. Eighty industrial firms listed on the Nigerian Stock Exchange participated, with 262 questionnaires collected alongside five years of financial statements. The results showed that production planning has a significant effect on operational efficiency, equity capital growth, and sector development. To rejuvenate Nigeria's manufacturing industry, the study recommended reassessing production planning principles and implementation strategies.

Estefania et al. (2022) explored the digitalization of the Master Production Schedule (MPS) process within manufacturing SMEs to align with Industry 4.0. The research modeled existing MPS processes of SMEs, identifying the need for greater agility and reliability in input data. Employing the Delphi-Régnier technique, 13 experts from various roles contributed insights into process actions, tools, and challenges. The proposed MPS 4.0 design integrated Industry 4.0 technologies and optimization methodologies to enhance decision-making and production flow data processing. While the study's expert selection posed challenges, findings underscored digital transformation's potential to reduce costs, improve productivity, and shorten lead times for SMEs.

Ian and Samson (2022) examined the impact of material requirement planning on the operational efficiency of Kenyan manufacturing firms. Their descriptive investigation involved ten East African manufacturing companies, using a questionnaire-based approach to collect data. Descriptive statistics revealed that elementary scheduling, inventory control, capacity demand planning, and demand forecasting significantly enhanced operational performance. Recommendations included adopting inventory record accuracy methods such as cycle counting to improve transaction cycles and reduce errors in inventory

operations.

Ammar et al. (2021) investigated the role of Industry 4.0 technologies in enhancing material quality management and production organization systems. Smart materials, factories, logistics, warehouses, and supply chains were identified as critical components that improve inventory and material waste management. Digital solutions, including predictive analysis, enable early detection and resolution of industrial issues, facilitating cost savings and operational efficiency. The study emphasized the transformative potential of integrating advanced Industry 4.0 technologies into organizational processes.

Egwuatu (2021) studied material management and its influence on organisational productivity within the South-East Nigerian brewery industry. Objectives included exploring the relationship between material planning strategies and productivity and assessing the influence of material control. Using a descriptive survey design, 328 participants were sampled, and reliability was ensured through test-retest and Cronbach Alpha techniques. Findings indicated that strategic
material planning and material control significantly enhance productivity in the brewery sector. Recommendations involved legislative frameworks to promote material control systems and investments in staff training and R&D for sustained productivity.

Vincent et al. (2018) studied the impact of production planning on organizational effectiveness in Nigeria's beverage industry, using Chi-squared analysis. The study found significant effects on inventory cost reduction, customer satisfaction, and sales volume, with effective materials requirement planning (MRP) improving alignment with customer demands and operational efficiency.

Ikon and Nwankwo (2016) analyzed production planning and profitability in Nigerian manufacturing firms, focusing on Flour Mill of Nigeria Plc, Honeywell Flour Mill Plc, and Dangote Flour Mill Plc. Their findings highlighted challenges like inventory shortages, outdated technology, and poor demand forecasting, showing that effective production planning boosts profitability and recommending the adoption of updated technologies to address inefficiencies..
Johnson and Kjellsdotter (2015) investigated enhanced master production scheduling's potential to improve performance. Their findings underscored the value of structured planning frameworks in achieving organizational goals through improved resource allocation and scheduling.

3.0 Methodology

3.1 Research Design

The study adopted the cross-sectional survey research design method improving the usage of a questionnaire for data collection to determine the effects of materials quality management and master production schedule on organizational effectiveness.

3.2 Population, Sample Size and Sampling Technique

The management staff of Aqua-Lina Table Water, Yenagoa, Bayelsa State (totaling twenty-two in number) served as population size for the study. This population has hands-on experience with the company's production processes, inventory management and supply chain operations, making them ideal candidates to provide valuable insights into the company's materials requirements planning processes. The census sampling technique

was used to determine the sample size for this study. The number of management staff (22) served as the population and sample size for the study

3.3 Data Source and Data Analysis

The study employed the primary data collection approach. The data originated from questionnaires distributed to all management of Aqua-Lina Table Water in Yenagoa, Bayelsa State. Reliability tests conducted on the questionnaire yielded a Cronbach's Alpha score of 0.922. The data obtained for the study were studied using the linear regression method.

3.4 Model Specification

The resource based view theory was utilised for the study. The theory suggests that the materials quality management and master production schedule have a consequential relationship with the organisational effectiveness of Aqua-Lina Table Water.

The simple linear regression model was used to test both null hypotheses (**Ho_1 and Ho_2**) by determining the relationship of the respective independent variables with the dependent variable as shown below:

$OE = f(MQM \text{ and } MPS)$ ..... *(1)*

$OE = X_{01} + X_1 MQM + et$ ..... *(2)*

$OE = X_{02} + X_2 MPS + et$ .....*(3)*

Where OE = organizational effectiveness, X_{01}, X_{02} = intercepts, X_1, X_2 = coefficients of the independent variables, MQM = materials quality management, MPS = master production schedule and et = error term.

The apriori expectations are $X_1, X_2 > 0$

4.0 Data Analysis, Findings and Discussion.

The data obtained from the retrieved questionnaires is herein analyzed in this section via the linear regression analytical method using the SPSS 23 statistical software.

With regards to the null hypothesis one; materials quality management does not have any significantly impact the organizational effectiveness of Aqua-Lina Table Water, Yenagoa, Bayelsa State, the findings was compiled into Table 4.1

Table 4.1 Simple Linear Regression Result1

Variable	Beta(β)	t-Stat.	P-value	Remark	R^2	Adjusted R^2	F-ratio	Durbin-Watson
Constant		3.407	0.003	Significant				
MQM	0.807	6.106	0.000	Significant	0.651	0.633	37.279	2.582

a. Dependent Variable: Organizational Effectiveness

b. Predictors (Constant) Material Quality Management

Source: Researcher's Compilation, 2024

The coefficient of determination R^2 (0.651) signifies that 65.1% of the variation in organisational performance can be accounted for by materials quality management. The

adjusted R^2 value of 0.633 indicates a strong fit of the model, even after accounting for the number of predictors. This suggests that the model is well-adjusted and provides a reliable measure of the relationship between the variables. The Durbin-Watson test indicates the presence of autocorrelation in the residuals, with a value of 2.582. A number within the range of 1.5 to 2.5 often suggests the absence of any notable autocorrelation problem. The F-statistics have a value of 37.279, indicating a strong statistical significance. The associated p-value is 0.000, which is lower than the predetermined threshold of significance of 0.05 ($p<0.05$). The analysis had a β value of .807, which corresponded to a t-value of 6.106. This further reinforces the evidence that the variables that were regressed are both significant and demonstrate a positive correlation. This study confirmed that the independent variable, which is materials quality management, has a statistically significant positive impact on the organisational effectiveness of Aqua-Lina Table Water in Yenagoa, Bayelsa State.

This study aligns with the research conducted by Solomon (2024) and Egwuatu (2021), which demonstrated that effective management of materials requirements has a positive and significant impact on the organisational effectiveness of an organisation. Therefore, the null hypothesis of this study is disproven, while the alternative hypothesis, which asserts that materials demand management has a substantial impact on the organisational effectiveness of Aqua-Lina Table Water in Yenagoa, is supported.

With regards to the null hypothesis two; master production schedule does not have any significantly impact the organizational effectiveness of Aqua-Lina Table Water, Yenagoa, Bayelsa State, the findings was compiled into Table 4.2

Table 4.2 Simple Linear Regression Result2

Variable	Beta(β)	t-Stat.	P-value	Remark	R^2	Adjusted R^2	F-ratio	Durbin-Watson
Constant		3.147	0.005	Significant				
BDV	0.684	4.191	0.000	Significant	0.468	0.441	17.567	1.695

5. Dependent Variable: Organizational Effectiveness
6. Predictors (Constant), Master Production Schedule

Source: Researcher's Compilation, 2024

The coefficient of determination R^2 has a value of 0.468, indicating that 46.8% of the variation in organisational effectiveness can be accounted for by the master production schedule. The modified R^2 score of 0.441 takes into consideration the number of predictors in the model, providing a measure of how well the model fits the data. The Durbin Watson test indicates the presence of autocorrelation in the residuals, with a value of 1.695. A number of 2 typically suggests the absence of any noteworthy autocorrelation problem. The F-statistics exhibit a value of 17.567, accompanied with a p-value of 0.000, which is lower than the significance level of
0.05 ($p<0.05$). This finding further confirms the significance of the regressed variables and their favourable impact. The analysis had a β value of 0.684 and a t-value of 4.191. This study confirmed that the independent variable, which is the master production schedule, has a statistically significant positive impact on the organisational effectiveness of Aqua-Lina Table Water in Yenagoa, Bayelsa State.

This study aligns with the findings of James et al (2024), Estefania et al (2022), Ammar et al (2021), and Ikon and Nwankwo (2016), which demonstrate that the master production schedule has a favourable and significant impact on organisational performance. Therefore, the null hypothesis of this study is disproven, while the alternative hypothesis, which suggests that the master production plan has a major impact on the organisational efficacy of Aqua-Lina Table Water in Yenagoa, is accepted.

4.1 Business Implication of Findings

The findings of the study highlight critical business implications for Aqua-Lina Table Water. The significant impact of materials requirement management (MRM) and the master production schedule (MPS) on organizational effectiveness underscores the need for strategic focus on these processes. Effective MRM ensures optimal inventory levels and supply chain continuity, minimizing operational disruptions and reducing costs associated with overstocking or stockouts. Similarly, a well-aligned MPS allows the company to respond flexibly to market demand while maximizing resource utilization, leading to improved production efficiency and customer satisfaction. These outcomes directly influence the company's competitive advantage, profitability, and long-term sustainability. Therefore, prioritizing the enhancement of MRM and MPS through technology adoption, staff training, and stakeholder collaboration is essential for achieving operational excellence and maintaining a strong market position.

5.0 Conclusion and Recommendation

5.1. Conclusion

The study concludes that materials requirement management (MRM) and the master production schedule (MPS) significantly impact the organizational effectiveness of Aqua-Lina Table Water, Yenagoa. The findings reveal that effective MRM enhances the company's ability to manage inventory levels, forecast demand, and address supply chain disruptions, leading to improved efficiency and operational performance. Similarly, the MPS plays a crucial role in aligning production activities with market demand and resource availability, ensuring optimal resource utilization and responsiveness to customer needs. Both components are pivotal in driving the organizational effectiveness of the company.

5.2 Recommendations

Based on these findings, it is recommended that Aqua-Lina Table Water invests in advanced inventory management software that supports real-time tracking of materials to enhance MRM. This software will enable accurate and timely decision-making regarding inventory levels, demand forecasting, and supply chain management. Additionally, regular training programs should be introduced to equip staff with the necessary skills to effectively use modern inventory management technologies and apply best practices in MRM. For the MPS, the company should implement a robust system that is regularly reviewed and updated to accommodate changes in customer orders, production capacity, and supply chain conditions. Engaging key stakeholders, including production managers, sales teams, and suppliers, in the scheduling process will ensure the MPS is realistic, flexible, and aligned with organizational goals. By focusing on MRM and MPS, Aqua-Lina Table Water can enhance its operational efficiency, ensure customer satisfaction, and achieve sustainable growth.

5.3 Contribution to Knowledge and Future Research

By highlighting the specific benefits and practical recommendations for materials requirement management and master production scheduling, the research provides

actionable insights that can help SMEs improve their efficiency and competitiveness. This contribution is particularly valuable for businesses in developing regions, where resources for extensive operational research might be limited, yet the need for effective production planning is critical for growth and sustainability. Future research could explore a comparative analysis of MRM and MPS and their effects on organisation effectiveness across various industries, such as healthcare, food and beverages, oil and gas etc.

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