Title

ASSESSMENT OF THE EFFECTS OF SUPPLY CHAIN MANAGEMENT ON OPERATION EFFICIENCY OF PUBLIC HOSPITALS IN MALAWI.

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ABSTRACT

This study examines the effects of supply chain management practices on operational efficiency in public and private hospitals in Malawi, with a specific focus on Queen Elizabeth Central Hospital. It investigates how supplier relationship management, inventory control practices, and quality control measures influence overall operational performance. The study is underpinned by the Systems Theory and the Supply Chain Operations Reference (SCOR) Model, applying a positivist research philosophy and an explanatory research design. Quantitative data were collected from health professionals, procurement officers, stores personnel, and administrators using structured questionnaires. The data were analyzed using descriptive and inferential statistics, including regression analysis and this contributes empirical evidence to healthcare management literature.

The findings reveal that supplier relationship management, inventory control practices, and quality control measures all have a significant positive effect on operational efficiency. Strong supplier relationships enhance timely delivery of medical supplies, reduce stockouts, and support cost- effective procurement. Effective inventory control improves accuracy, reduces wastage, and promotes optimal utilization of resources. Quality control practices ensure adherence to standards, contributing to improved service delivery and patient outcomes. Together, these dimensions demonstrate substantial explanatory power, indicating that hospital operational efficiency depends on the robustness of supply chain processes.

The study recommends that the Ministry of Health and hospital management strengthen supplier engagement frameworks, introduce digital inventory management systems, and enforce regular quality audits across all supply chain stages. It also suggests capacity-building initiatives for supply chain officers to ensure consistent application of best practices that enhance operational efficiency in Malawi's healthcare sector.

Keywords: Supplier relationship, Inventory Control and Quality Control Measures.

INTRODUCTION

Globally, public hospitals are increasingly leveraging supply chain management practices to enhance operational efficiency and respond to rising healthcare demands and constrained resources. In developed countries such as the United States, the United Kingdom, and Germany, public healthcare systems have adopted integrated supply chain strategies including centralized procurement, digital inventory systems, and vendor managed inventory to minimize costs and streamline service deliver *Kermani and Reandi (2023).* For example, the UK's National Health Service implemented the Supply Chain Coordination Limited initiative to centralize procurement and achieve cost savings while improving supply reliability. Similarly, hospitals in Sweden have adopted lean supply chain principles to reduce waste and improve process efficiency, leading to shorter patient wait times and improved service quality. In contrast, developing nations face unique challenges such as funding constraints, fragmented logistics systems, and inadequate information infrastructure. However, countries like India and Brazil are making progress by investing in hospital supply chain digitization and public-private partnerships to improve accessibility and reduce operational bottlenecks *AFDB (2024).* These global practices underscore the critical role of SCM in enhancing the responsiveness,

cost-efficiency, and quality of public hospital operations *Mwencha and Rosen (2022).*

In Africa, public hospitals face significant challenges in achieving operational efficiency, largely due to fragmented supply chains, limited financial resources, and weak infrastructure. However, there is a growing recognition of the importance of strengthening supply chain management systems to improve healthcare delivery. In countries like Rwanda and Ethiopia, government-led initiatives have improved procurement transparency and inventory tracking through the adoption of Health Commodity Management Information Systems, resulting in better stock control and reduced medicine shortages *Ummah (2022).* South Africa has made notable progress by introducing the Central Chronic Medicine Dispensing and Distribution program, which decentralizes distribution points and enhances last-mile delivery efficiency for chronic medications *Habib et al. (2022).* Despite these advancements, many public hospitals across the continent still struggle with delayed supplier payments, poor forecasting, and under-trained procurement personnel, which contribute to inefficiencies and service delivery gaps *Kaupa and Naude (2021).* Regional efforts, such as those led by the African Medical Supplies Platforms are helping to centralize and digitalize procurement processes across multiple countries, offering hope for more coordinated and efficient healthcare supply chains in the future. These examples highlight both the ongoing challenges and emerging strategies being implemented to boost operational efficiency in African public hospitals through improved SCM practices.

In Malawi, public hospitals, including central referral facilities like Kamuzu Central Hospital, are expected to operate efficiently to ensure the delivery of essential health services to the population. Efficient hospital operations are crucial in achieving universal health coverage, improving patient outcomes, and supporting national economic development through a healthier, more productive workforce UNICEF (2020, 2020). Ideally, supply chain management systems in these hospitals should ensure the continuous availability of medicines, medical supplies, and equipment, thereby minimizing service disruptions and enhancing the quality of care *Kermani and Reandi (2023).* A well-functioning health supply chain also reduces waste, controls costs, and contributes to more sustainable health financing key priorities in *Malawi's Health Sector Strategic Plan II (2017–2022).* As the backbone of public health service delivery, the efficiency of public hospitals directly influences the country's ability to meet health-related development goals and reduce the economic burden of disease *Mchenga et al. (2021).*

Background of the Study

This section focuses on historical background, theoretical Background, conceptual Background, and contextual Background.

Historical Background

Efficient supply chain management (SCM) is increasingly recognized as a key determinant of operational efficiency in public healthcare systems, particularly in resource-constrained settings like Malawi. Public hospitals such as Kamuzu Central Hospital (KCH) continue to face significant challenges related to stock-outs of essential medicines, delays in procurement, and inadequate inventory control, all of which hinder the timely delivery of health services and compromise patient care *Khuluza et al. (2022).* Although the Government of

Malawi has implemented health sector reforms aimed at improving logistics and medical supply chains through initiatives like the *Health Sector Strategic Plan III (2023–2030)*, critical inefficiencies persist, especially in procurement planning, supplier coordination, and last-mile delivery *Chandani et al., (2023).* While previous reports have acknowledged these systemic weaknesses, empirical studies exploring how SCM practices directly influence operational efficiency at the hospital level remain scarce. As a result, the specific link between SCM and performance outcomes in public hospitals is not well understood, limiting the potential for evidence-based policy improvements *Mchenga et al. (2021).* This study, therefore, seeks to assess the impact of supply chain management on the operational efficiency of public hospitals in Malawi, using Kamuzu Central Hospital as a case study.

Numerous recent studies have focused on supply chain management within the manufacturing sector, often overlooking the health sector. For instance, research supply chain practices are related to production efficiency, inventory control, and cost optimization in industrial contexts. These studies provide valuable insights for manufacturing systems but fall short of addressing the complexities of supply chains in healthcare, which are more service-oriented and patient-centered *Adebiyi et al. (2021); Kanyepe, Musasa, and Wilbert 2025; Lee (2021); Naseem and Yang (2021); Saryatmo and Sukhotu (2021).* Furthermore, out of the few studies in the health sector, many have combined analysis of both private and public hospitals, potentially obscuring the distinct operational challenges faced by each. For example, health supply chains without disaggregating differences in procurement processes, funding structures, and resource allocations that exist between public and private institutions *Kaupa and Naude (2021); Mane, Mohanty, and Tomar (2022); Papanicolas I et al. (2022); Ummah (2022); Wahab, Ahmed, and Uzir (2023).* To make matters worse, the majority of these studies have been conducted outside of Malawi, focusing on health systems in countries such as Uganda, Rwanda, Ghana and Tanzania which are relevant to operate under different policy, economic, and infrastructural contexts *Ayam (2024); Mwencha and Rosen (2022); Sama (2022); Uwamahoro et al. (2024).*

Conceptual Framework

The study is guided by the Supply Chain Management framework, which emphasizes the relationship between supplier coordination, inventory control, and quality assurance in improving organizational performance.

RESEARCH OBJECTIVE

General Objective study

To determine the influence of supply chain management practices on the operational efficiency of Kamuzu Central Hospital.

Specific Objectives of the study

This study was guided by the following specific objectives:

- To determine the effect of supplier relationships on the operational efficiency of Kamuzu Central Hospital.
- To determine the role of inventory control practices in enhancing operational efficiency at Kamuzu Central Hospital.
- To determine the impact of quality control measures within the supply chain on the hospital's operational performance at Kamuzu Central Hospital.

LITERATURE REVIEW

Theoretical review

The Resource Based View (RBV) theory, first formalized by Jay Barney in 1991 at The Ohio State University, argues that an organization's internal resources and capabilities are the primary determinants of its performance and competitive advantage. According to *Barney et al., (1991),* firms that possess resources that are valuable, rare, inimitable, and non-substitutable (VRIN) can achieve superior operational outcomes. In the context of public hospitals, such as Kamuzu Central Hospital in Malawi, supply chain components including inventory systems, supplier relationships, and quality control measure can be understood as strategic resources. When these are managed effectively, they can improve responsiveness, reduce costs, and minimize disruptions, thereby enhancing overall operational efficiency. The RBV theory thus provides a robust framework for analyzing how internally controlled elements of the hospital supply chain contribute to better healthcare delivery outcomes, particularly in resource-constrained environments.

RESEARCH METHODOLOGY

Research Design

The study adopted a mixed-methods research design, combining both quantitative and qualitative approaches. The quantitative approach enabled the researcher to collect measurable data through structured questionnaires, while the qualitative approach provided deeper insights through interviews. This design was appropriate because it allowed triangulation of findings and enhanced the reliability and validity of the results. By integrating both approaches, the researcher was able to capture statistical trends as well as contextual explanations regarding supply chain management practices at Kamuzu Central Hospital.

Research Setting

The study was conducted at Kamuzu Central Hospital (KCH) in Lilongwe District, Malawi. KCH is one of the major public referral hospitals in the country and serves a large population from the central region. The hospital was selected because it operates under government procurement systems and faces operational challenges related to supply chain management, making it an appropriate case for the study.

Target Population

The target population comprised staff members involved in supply chain-related activities, including procurement officers, stores personnel, logistics staff, and administrative officers. These individuals were selected because they are directly involved in supplier management, inventory control, and quality monitoring processes within the hospital.

Sample Size and Sampling Technique

A total of 40 respondents participated in the study. The researcher used purposive sampling to select participants who had direct knowledge of supply chain processes. This ensured that the data collected was relevant and reliable.

Data Collection Methods

Primary data were collected using structured questionnaires and interviews. Questionnaires were administered to staff members to gather quantitative data on

supplier relationships, inventory systems, and quality control practices. Interviews were conducted to obtain qualitative insights into operational challenges, procurement delays, and stock management issues.

Data Analysis & Interpretation

Response Rate

This research study included the gender of the respondents to provide an insight into patterns among gender categories.

44 out of 45 questionnaires were returned and deemed valid, yielding a response rate of 97.8%. This high response rate strengthens the credibility of the results and reduces non-response bias.

Key Findings

- Supplier Relationship Management Significantly Influences Efficiency, the study found that effective supplier coordination improves timely delivery of medical supplies and reduces procurement delays. Weak communication and delayed payments to suppliers contribute to operational disruptions. Strong partnerships therefore enhance service reliability and reduce shortages.

- Ineffective Inventory Systems Lead to Stock-Outs, the research revealed that inadequate inventory monitoring systems result in frequent stock-outs of essential medicines and supplies. Manual tracking systems limit visibility and forecasting accuracy. Strengthening inventory systems would significantly reduce service interruptions.

- Quality Control Mechanisms Affect Service Reliability, **t**he findings show that weak quality inspection processes compromise operational performance. When supplies are not properly inspected or monitored, inconsistencies occur. Improved quality assurance procedures enhance efficiency and accountability.

- Integrated Supply Chain Practices Improve Overall Performance, the study established that operational efficiency improves when supplier management, inventory control, and quality assurance systems function together. Fragmented processes reduce performance, while coordinated systems enhance hospital productivity and service delivery.

RECOMMENDATIONS OF THE STUDY

Recommendations to Kamuzu Central Hospital

Based on the findings, Kamuzu Central Hospital should continue strengthening its collaborative relationship with key medical suppliers and the Central Medical Stores Trust (CMST), as this has shown to be an important factor in maintaining a steady flow of essential medicines and supplies. The study findings indicate that despite challenges in the broader supply chain, the hospital has made progress in fostering communication, timely follow-ups, and coordination with suppliers to reduce prolonged stockout periods. Building on these positive practices will help sustain reliability in procurement processes, improve responsiveness when shortages arise, and support overall operational efficiency. Maintaining and further enhancing this collaborative approach is essential for ensuring consistent availability of medical commodities and uninterrupted service delivery.

Furthermore, in terms of inventory control, the hospital should strengthen internal stock monitoring practices through accurate record-keeping, routine stock audits, and adoption of digital tools where possible. The study showed that inventory inconsistencies directly affect the availability of essential medical supplies. By improving documentation and monitoring, the hospital can prevent stockouts, reduce losses, and ensure that procurement decisions are informed by accurate data.

In addition, Kamuzu Central Hospital should establish a dedicated internal quality assurance team responsible for verifying all incoming supplies and monitoring storage conditions across departments. The study indicates that inadequate quality oversight increases the risk of receiving substandard or unsafe medical products. A strengthened internal quality monitoring system will enhance accountability, reduce errors, and contribute to improved operational performance within the hospital.

Recommendation to the Ministry of Health

The Ministry of Health is advised to strengthen hospital supply chain standardization in line with the *Public Procurement and Disposal of Public Assets Act (2017).* Section 19 of the Act mandates standardized procurement procedures across public institutions, emphasizing transparency, competitive bidding, and uniform procurement guidelines to reduce inconsistencies in supplier selection and contract management. By enforcing these provisions across public hospitals, the MoH can promote harmonized procurement practices, minimize duplication, and enhance efficiency in the acquisition of medical supplies. This standardization is further aligned with the *National Health Sector Strategic Plan III (HSSP III, 2023–2030),* which under Objective 1 of Service Delivery emphasizes harmonized supply chain systems to improve equitable access to quality healthcare services nationwide.

The Ministry of Health should accelerate the adoption and full integration of digital health logistics systems, particularly electronic Logistics Management Information Systems (eLMIS), as advocated in *the HSSP III (2023–2030).* The health commodities management reforms outlined in the strategy (pp. 11–12) highlight the importance of real-time data visibility to support inventory standardization, timely replenishment, and reduction of stockouts across health facilities. These reforms are reinforced by Section 38 of the *Public Finance Management Act (2016),* which requires accountability in public asset management, including accurate inventory control and reporting. Implementing interoperable digital logistics systems will therefore address fragmented inventory practices in hospitals while strengthening transparency and data-driven decision- making.

To improve supplier reliability and service quality, the Ministry of Health should institutionalize supplier performance monitoring mechanisms guided by Section 32 of the *Public Procurement and Disposal of Public Assets Act (2017).* This section emphasizes supplier performance evaluation through scorecards and the application of penalties for non-compliance, directly supporting accountability in the delivery of medical supplies. Additionally, Section 66 of the *Public Finance Management Act (2016)* enforces financial oversight in procurement processes, aligning supplier management with quality assurance standards and service-level agreements. By operationalizing these legal provisions, the MoH can strengthen supplier accountability, improve value for money, and ensure consistent availability of quality medical commodities across public

health facilities in Malawi.

CONCLUSIONS OF THE STUDY

The study successfully achieved its main objective of assessing the effects of supply chain management on the operational efficiency of Kamuzu Central Hospital. The findings demonstrated that the three key supply chain components supplier relationship manageme nt, inventory control practices, and quality control measures significantly influence the hospital's operational performance. The study confirmed that these practices collectively contribute to improved service delivery, reduced delays, and enhanced overall efficiency within the hospital.

The results further revealed that each of the three objectives had a meaningful and significant impact on operational efficiency. Effective supplier relationship management, through timely communication and reliable deliveries, minimized stockouts and improved workflow. Strong inventory control practices, including monitoring of stock levels and proper storage, ensured continuous availability of essential supplies and reduced wastage. Additionally, robust quality control measures ensured that medical supplies met required standards, thereby safeguarding patient safety and improving service outcomes. Together, these practices demonstrated that strengthening supply chain systems is essential for maintaining smooth healthcare operations at Kamuzu Central Hospital.

The findings of the study align with the theoretical framework that guided the research, particularly the principles of the Systems Theory. The theory emphasizes that an organization functions effectively when all its subsystems work cohesively toward a common goal. In this study, the supply chain components acted as interdependent subsystems whose effectiveness directly influenced the hospital's overall performance. The positive relationship between supply chain practices and operational efficiency reinforces the theory's assertion that coordinated, well- managed systems lead to improved organizational outcomes.

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