

Effect of Supplier Selection on the Performance of the Medical Supply Chain at the Medical Stores Department, Dar es Salaam, Tanzania

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ABSTRACT

The provision of standardized and effective healthcare services is often hindered by challenges in the procurement and availability of medical supplies, undermining the goals of the National Health Policy and National Health Plan. Despite the government's prioritization of medical supplies, stockouts continue to be a persistent problem in many public healthcare organizations, impacting service delivery. This study investigates the effect of supplier selection practices on the performance of the medical supply chain at the Medical Stores Department (MSD) in Dar es Salaam, Tanzania. The study is grounded on the Principal-Agency Theory and focuses on the relationship between the MSD and its suppliers. The study is cross-sectional, mixed-methods. The study population was determined to be employees who work at MSD consisting of 270 staff members and 150 employees from various departments were randomly selected through stratified random sampling. A structured questionnaire was used to gather data which were analyzed quantitatively using descriptive statistics and regression analysis. The results showed that a good supplier selection process had a positive impact on the performance of the medical supply chain. Supplier Qantas higher support diagnostic and supply critical benefits, frequent and continuous keeping the highest level from the resources. The analysis suggested a strong relationship between supply chain performance and supplier reliability, delivery timeliness, and cost-effectiveness. The research finds that the decision of selecting their supplier is at the core of securing high-quality medical supplies that get passed down the healthcare delivery pipeline. The study suggests that MSD should focus more on developing and establishing long-term collaboration relationships with more stable and reliable suppliers through frequent communication, performance measurement and assessment, and feedback systems to facilitate the improvement of the entire supply chain performance.

Keywords: Medical Stores Department, Medical Supply Chain, Performance, Supplier Selection, Tanzania

I. INTRODUCTION

The procurement process is crucial in supporting healthcare delivery around the world, including the functioning of the medical supply chain. The main activities involved in the procurement process include purchase, management of inputs, demand management, selection and contracting, relationship management, and operational delivery (Omoga, 2021). Procurement in the healthcare industry is the process of purchasing medical goods, services, and supplies used throughout the supply chain while managing sourcing, delivery, and utilization as cost-effectively as possible. This process ensures that people and health care providers continue to receive the medical supplies they need, improving health care and outcomes.

The National Health Service (NHS) in the UK represents a significant improvement over the pre-NHS healthcare system, as it provides universal, publicly funded health care to residents of the United Kingdom. This led to unequal access to medical care, where many people were unable to afford treatment (Bastani, 2019). The NHS was established with the purpose of improving a fragmented and unequal healthcare system, which impacted PPGs (pharmaceutical procurement groups) in charge of drug management (e.g. managing drug usage and selecting suppliers based on quality and cost-efficiency) (Bastani, 2019).

In the US, procurement is a state-managed agency and operates with the Department of Health and Human Services (HHS). The HHS administers various programs, including the 340B Drug Pricing Program that enables certain healthcare entities to buy drugs significantly below market cost. This program serves to increase access to a range of vital medications in economically disadvantaged communities to advance public health outcomes (Chana, 2021). That

said, these developments in the U.S. highlight the essential role that streamlined procurement plays in the distribution of crucial healthcare stocks to at-risk demographics.

Significant challenges such as a shortage of medical supplies and inefficient procurement practices have been highlighted in African developing countries such as Kenya. They include the business procurement system in which the procurement system is poorly handled and not maintained by the government through the process of selecting a supplier, where the processing of procurement is not evaluated as needed and very limited in the infrastructure of health (Ogo & Moronge, 2017) Chegugu and Yusuf (2017) confirmed that the ante in Nigeria's medical supplies crisis, particularly at level-five hospitals, is poor tendering procedures. The same is true in Uganda, where procurement problems go beyond procurement law and include challenges with tendering processes, award suppliers and the structure of procurement units (Omoga, 2021). These abuse cases relate to the need of enhancing supplier choice to improve procurement.

In Tanzania, the government has made healthcare for all citizens a priority. The first goal is that medical supplies should be available and accessible, which can be achieved by selecting the appropriate suppliers, having a strong infrastructure, and having the appropriate workforce (Kagaruki, 2019). One of the key approaches to realize this vision is the National Medicine Policy, which advocates for the need for a stable reliable supply of quality medicines that are cost effective and accessible (Mbwasi, 2022). To this end, the government established a national critical drug supply system and established distribution facilities at the central, regional, and district levels. Centralization of the supply chain system aims to guarantee that the medical supply is available and economical for government and non-governmental health facilities authorized by the government (Malinganya, 2021).

Because of those challenges the aim of the study was to explore the effect of supplier selection on performance of the medical supply chain at MSD (Medical Stores Department) the principal institution responsible for managing medical supplies in Tanzania, hence is described how supplier selection can influence the availability, cost and quality of medical supplies at MSD hence performance efficiency of healthcare delivery system in Tanzania.

1.1 Statement of the Problem

Government hospitals need a reliable ordering process, appropriate storage, and proper distribution systems so that the supply of medical supplies can be maintained (Israel et al., 2019). Tanzania has established initiatives including road network development, a regulatory framework, and capacity building programs to enable a strong medical supply chain. Nevertheless, Tanzania (and many developing countries) is still struggling to maintain formidable supply chain (Kagaruki, 2019).

Research by Mashasi et al. Data for 2018–2020 from the MSD showed that an average of 18% of medical supplies received by they did not meet required quality standards, which caused both waste and patient safety risks (2021). Such practices for selecting suppliers poetically delayed the delivery of medical supplies. Kuwawenaruwa et al. According to a national survey by Kagaruki et al. (2020), 45% of reported stockouts lasting >7 days for essential medicines over the past three months in Tanzania were attributable to supplier-related issues. The shortage of medicines is a significant concern as only around 40% of essential medicines are available at a time (Mbwasi, 2022), making it challenging for the healthcare system to provide appropriate treatment to patients and compromising the efficacy of healthcare services (World Bank, 2023).

Although previous researchers (Kagaruki, 2019; Mashasi et al., 2021; Mbwasi, 2022) have identified supply chain challenges in MSD, there is still limited research into how supplier selection in the medical supply chain affects MSD performance specifically. As a result, this area of research is still undeveloped, and there are no means for policymakers and healthcare managers to adopt appropriate strategies to enhance supply chain performance. This gap is addressed in our study which investigates the influence of supplier selection on MSD's medical supply chain performance with respect to availability, cost and quality of medical supplies in Tanzania.

1.2 Research Objective

To examine effect of supplier selection on the performance of medical supply chain at the Medical Stores Department, Dar es Salaam, Tanzania.

II. LITERATURE REVIEW

2.1 Theoretical Framework: Principal-Agency Theory

Principal:-agency theory is a strong theoretical framework and Initial Development of Principal-Agent Theory made by Michael C. Jensen and William H. Meckling in the 1970s. They put forth the idea in their seminal 1976 article, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." Since then, the theory has evolved and solidified as one of the key tenets in understanding organizational structures, corporate governance, and decision making processes (Kjos et al., 2018). The government, as the employer (the principal), delegates, and decentralizes,

independent procurement responsibilities and decision-making powers to its agencies and authorities, as agents, in accordance with the authority vested in them by employment contracts. These agents plan the procurement of these goods and manage the availability and distribution of this type of life-saving products to enhance public services, in line with the restricted capacity and function of the organization. Periodic fluidization of these relationships can only serve to strengthen the bonds and put the conflict of interest regimes within service as local governance adapts to its volumetric design objectives which are inherently shaped by temporal and substantive continuity contexts.

In the absence of significant conflicts of interest, sources of optimality in the design of service delivery between principal and agent between the principal and the agent, given that the organization must be useful and service delivery must be public are similar to Eisenhardt (2019). However, the cleaning schedule below serves as a temporal nexus point and continuity between the principal as urban management and owners as agents in the case where contracts are not permitted to resolve at the time of the decision for mutual benefit. It is expected that these representatives will operate in line with the established protocols and rules, avoid conflicts of interest and enhance the efficiency and service of the organization itself.

This is similar to the study by Eisenhardt (2019) who examined the dynamics of agency relationships in organizations. He highlighted the role of vested interests and information asymmetry in the quality of service delivery. This study highlights the importance of Principal-Agent Theory in addressing these issues, specifically within the context of healthcare procurement, where streamlined decision-making is vital to the procurement of necessary medical supplies. The findings of Douglaire Eisenhardt underline the importance of establishing strong governance structures and monitoring mechanisms to align incentives and reduce agency problems (Eisenhardt, 2019).

By analyzing the structure of incentives and monitoring mechanisms, the study provides insights on improving both efficiency and accountability in healthcare procurement which in turn drive organizational performance (Kjos et al. 2018). In healthcare systems, principals who are governments or healthcare organizations intend to supply medicine and medical supplies for public health. They passed it on to the procurement agents – the incidental purchasing department or the outside suppliers. The principal-agency theory assists in understanding how the choices and actions of these brokers or agents can impact the performance of medicine/medical supply chain. Principal-agency theory highlights that information asymmetries between principals and agents can lead to sub-optimal decision-making. In healthcare procurement, limited access to information about market dynamics, supplier reliability, or product quality can lead to inefficiencies in sourcing essential medical resources, affecting their availability within healthcare facilities.

2.2 Empirical Literature Review

Meanwhile, Obinda (2021) department's supplier selection process, which in turn affects the selection of the best supplier to fulfill both anticipated and unforeseen needs. The communication between procurement staff when choosing suppliers and between procurement and user departments when it comes to product quality control determines how effective the procurement department is in public organizations (Obinda, 2021).

On the other hand, Nsikan (2022) there is a substantial and positive association between supply chain performance and economically sustainable supplier selection, although there is a modest correlation between socially sustainable supplier selection and performance. The study by Israel *et al.*, (2019) revealed that medical supply under centralized procurement system improves the quality and cost effectiveness towards health services delivery. However, bureaucratic procedures as well as poor selection supplier result into untimely delivery and inadequate quantities of medical supplies. The study further revealed that reliable on-time delivery is crucial for ensuring a smooth and efficient supply chain. Delays or inconsistent delivery times can disrupt production schedules, lead to stockouts, and ultimately impact the company's ability to meet customer demand.

Nzyoka (2020) observed that most private hospitals in Kenya have policies to ensure that medical devices are supplied effectively and on time and also are used correctly to ensure the safety of the patient. The policies adopted by private hospitals promote both procurement and utilization of medical equipment, a scenario that is contrary to public hospitals. The policies are keys in limiting wrong use of medical devices since there is evidence that patients are sometimes harmed or die because devices are not used correctly. For effective processes of procurements and utilization of medical devices at the private hospitals, there tend to be series of discussion the clinicians and nurses involved in the day to day use of such devices. Nevertheless, it was established that poor selection of the supplier affected timely delivery of the products.

Meanwhile, the study by Chagalima *et al* (2021) examined the role of supplier selection and supplier monitoring in public procurement efficiency in terms of cost reduction in Tanzania. Design/methodology/approach – A structured questionnaire was used to collect cross-sectional survey data from 179 public procuring entities in Tanzania. Structural equation modelling (SEM) was used to analyse the collected data. Findings – The findings revealed that supplier selection and supplier monitoring are positive and significant predictors of public procurement efficiency in terms of cost reduction. Research limitations/implications – This study was conducted in Tanzanian public procurement contexts, so generalisations should be made with caution. Also, this study collected cross-sectional data; other studies may

consider longitudinal data. Practical implications – This study provides procurement practitioners with insights into selecting the proper suppliers and embracing supplier monitoring to achieve procurement efficiency in terms of cost reduction. Originality/value – This study examines the effects of supplier selection and supplier monitoring on procurement cost reduction as a measure of public procurement efficiency in the Tanzanian context. Consequently, it provides empirical evidence of supplier management practices in the public procurement context.

2.3 Conceptual Framework

The independent and dependent variables showing the link between them served as the study's compass. Figure 1 illustrates the conceptual framework in this regard: -

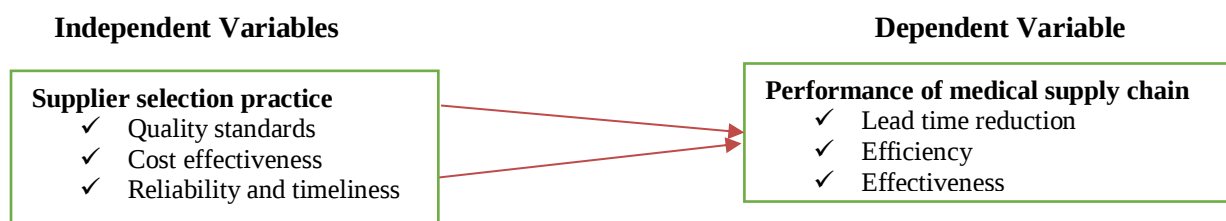


Figure 1

Conceptual Framework

Source: Researcher's Own Construction (2024)

Figure 1 shows conceptual framework whereas performance of medical supply chain as dependent variable is determined by supplier selection practice. Supplier selection is a critical process for businesses to ensure they engage with reliable and high-quality suppliers who can meet their needs effectively. Supplier selection procedure was measured by quality standards, cost effectiveness and reliability and timeliness (Mbwasii, 2022).

III. METHODOLOGY

3.1 Research Design

The study used cross sectional research design. This design was used to investigate the relationship between variables and is particularly useful when studying phenomena that cannot be manipulated experimentally. Thus, this research design allowed researcher to gather data on procurement practices and medicine availability at the same time, providing a snapshot of the current situation.

3.2 Research Approach

Quantitative approach was adopted for the study and this because through using quantitative approach it provided the researcher with a broader view of how supplier selection affect the performance of medical supply chain at MSD. Quantitative data gives an overview in larger scales and allowed for generalizing in bigger populations.

3.3 Study Area

This study was conducted at MSD Dar Es Salaam region, Tanzania. MSD is main stakeholder for medicine Supply hence one of the reason behind for selection of MSD. Responsible for promoting the accessibility of medicines and medical products, the MSD has an important role in the healthcare system. Therefore, the effective supply of these products is critical to the proper use of healthcare institutions.

3.4 Study Population

Study Population: The groups of people designated to participate in a research study. It includes the specific group of interest from which the researcher intends to draw conclusions and make generalizations. Selection of study population is one of the critical components of research design since it influences the validity and generalizability of results of the study (Creswell, 2014). The population of this study is the staff of MSD is 270 of staff.

3.5 Sample and Sampling Procedures

3.5.1 Sample Size

Sample is defined as the subset of the population under study where the researcher is unable to study the whole population. A sample is a small part of the individuals or objects from the population under study (Alvi, 2016). The study used the sample of 161 respondents from different departments. Since the population of staff working at MSD

which is 270, Yamane (1967) formula is described with a confidence level of 95% and margin of error of 5% (1-0.05), the formula is expressed as hereunder;

$$n = N / [1 + N (e)^2]$$

Where: n= is number of sample (required)

N = Total population (270) and

e = Error tolerance (level) or margin of error (0.05)

$$270 / (1 + 270(0.05)^2) = 270 / 1.675 = 161$$

Therefore, the sample size of this study was 161 respondents

Table 1

Sample Size Distribution, Population and Sampling Techniques

S/N	Respondents	Population	Sample size	Percentage of sample size	Sampling techniques
1	Senior staff	15	9	5.6	Purposive
2	Operational staff	255	152	94.4	Stratified
Total		270	161	100	

3.5.2 Sampling Procedures

According to Bryman and Bell (2015), a sampling methodology is a way to choose a subset of the population to represent the entire population. The study employed proportional stratified sampling for the quantitative data. This process was applied in the hiring of operational personnel. The study precisely defined the population of interest in order to pick responders from the population. All the people in the population were listed in detail by the researcher. In addition, the study gave each person on the list a distinct identity based on how many responders the researcher wanted in the sample. People on the list were chosen at random for the study. Through the use of random number tables, the researcher made sure that every person had an equal chance of getting chosen. Using the selected random approach, the researcher chose a preset number of respondents at random from the list. This involves utilizing a computer program, drawing names out of a hat, or any other objective technique.

The sample size was established for qualitative data based on the saturation point of the data. This component of the study selected respondents who are senior staff members using a purposive sample approach. The researcher used purposeful sampling, to decide what should be included in the items of inquiry (Creswell & Creswell, 2017).

3.6 Data Collection Techniques

A questionnaire is a formulated written set of questions to which respondents record their answers, usually within rather closely defined alternatives (Bergh, 2015). The study distributed questionnaire to all 161 respondents including both senior staff (9 respondents) and operational staff (152 respondents). The questionnaire was used due to its less cost and large coverage in respect of the scattered respondents. The questionnaire was designed in order answer the intended research questions, thus achieve goals of the research. The researcher used simple and likert scale questionnaires and was administered to staff. This was done by physical way whereas the researcher visited the offices of the respondents for data collection process.

3.7 Data Analysis

Since this study is quantitative in nature, thus descriptive analysis was used mean and standard deviation. In the same trail, multiple linear regression analysis was used to establish the relationship between independent variables and dependent variable.

3.8 Validity and Reliability of the Data

3.8.1 Validity of Data

The extent to which a measure's results accurately represent the variable it is intended to measure, according to Cohen *et al.* (2014). This allowed for easier updates and modifications to the study tools that increased validity. By seeking an expert, the researcher also recognized places where tools for study may need revisions. Such adjustments contributed to the increasing research validity through refining the datasets. Further enhancing the validity of the findings can be accomplished by having those consulted as experts early and regularly throughout the research process, as they will be in a position to make needed adjustments as they arise.

3.8.2 Reliability of Data

The capacity of an instrument to consistently ensure the phenomenon it is designed to measure is known as reliability (Bergh, 2015). To check the reliability of the scale from each variable, the internal consistency of the variables (items) was evaluated using the Cronbach's Alpha. The Cronbach's Alpha reliability indicator presupposes that all items

and questions are equally reliable. The required value for each indicator must be larger than or equal to 0.7. The cutoff criterion was based on the alpha coefficient's minimal value, which is 0.7.

Table 2

Reliability Statistics

Variables	Cronbach's Alpha
Quality standards	0.981
Cost effectiveness	0.987
Reliability and timeliness	0.987
Performance of medical supply chain	0.982

For Quality Standards, an alpha value of 0.981 is indicative of high consistency among the items that comprise this factor; therefore, these items reliably measure quality within the context of the medical supply chain. Conversely, for cost effectiveness (0.987), the alpha related to measures of reliability of cost effectiveness is even higher. This implies that the respondents probably understand the items and respond to them in the same way, confirming their validity. In its own right, as with cost effectiveness, this factor demonstrates great internal consistency (0.987). In other words, the questions to test reliability and timeliness in the medical supply chain were consistent across participants. Regarding, medical supply chain performance, the alpha of this construct (0.982) demonstrates a good degree of reliability in measuring performance in the medical supply chains.

All variables in the study had high Cronbach's Alpha values, which implies that each item group is a good measure of its respective construct. This is important in research because it increases our confidence in the results obtained from these measures. The high reliability means that if you were to take the same survey repeatedly with similar conditions, you would receive similar results and thus promote the strength of conclusions from this data.

3.9 Ethical Consideration

In order to ensure ethical consideration, respondents were fully informed about the nature and purpose of the research and provide voluntary consent to participate. In addition to that, the researcher ensured consent is given without coercion. On the other hand, the researcher aimed to maximize benefits and minimize any risks or harms to respondents. This includes physical, psychological, social, economic, or legal harm. Furthermore, the respondents' data remained confidential and private. In that regard, the researcher safeguarded to protect personally identifiable information.

IV. FINDINGS & DISCUSSION

4.1 Demographic Profile of Respondents

Demographic profile of respondents included level of education as well as working experience to determine effects of procurement practices on the performance of medical supply chain in Tanzania. Level of Education: Certificate (7.4%): Employees with a certificate-level education may have a more limited understanding of the complexities of the medical supply chain and procurement practices. They may require more training and supervision to ensure effective decision-making. Diploma (11.8%): Although employees with diploma-level education are likely to have a solid understanding of the part of the supply chain involved in medical supply, this typically only enables them to comprehend the broad steps in the academic process; the more discerning and well-informed knowledge needed for higher-level decisions has not been achieved. Degree (64.0%): Most of the employees hold a degree, indicating a relatively well-educated workforce that ought to grasp and apply more sophisticated procurement and supply chain management practices.

Postgraduate (16.8%): More likely to have a more inquiring background in both the theoretical and practical aspects of supply chain management, and therefore may help develop or implement more sophisticated procurement strategies. With 64% of employees educated at degree-level (degree: 64% and postgraduate: 16.8%), this indicates the organization has the ability to develop and execute increasingly sophisticated procurement strategies and supply chain management practices. Work Experience: < 1yr (9.3%): Employees in this bracket may not have a full understanding of the organization's procurement processes and the pain points in the medical supply chain. They might need a lot of training and mentoring. 1-5 years (23.6%): Employees with 1-5 years of experience are likely more familiar with the day-to-day operations and can provide valuable insights, but may still lack the long-term perspective and strategic thinking required for optimizing the supply chain. Also 6-10 years (49.1%): The largest group of employees has 6-10 years of experience, which suggests a relatively experienced workforce that can contribute to the improvement of procurement practices and supply chain performance.

About 11 years and above (18.0%): Employees with 11 or more years of experience can provide valuable institutional knowledge and leadership in optimizing the medical supply chain. Their expertise can be leveraged to develop and implement effective procurement strategies. The relatively experienced workforce, with the majority (49.1%) having 6-10 years of experience, can contribute to the continuous improvement of procurement processes and the overall performance of the medical supply chain.

Table 3 Background information of the respondents

S/n	Level of education	Frequency (F)	Percentage (%)
1	Certificate	12	7.4
2	Diploma	19	11.8
3	Degree	103	64.0
4	Postgraduate	27	16.8
	Total	161	100.0
	Working experience		
5	Less than a year	15	9.3
6	1-5 years	38	23.6
7	6-10years	79	49.1
8	11 years and above	29	18.0
	Total	161	100.0

4.2 Descriptive Statistics of the Effects of Supplier Selection Practice on the Performance of Medical Supply Chain at MSD

The first objective of the study sought to examine the effects of supplier selection practice on the performance of medical supply chain at MSD. To achieve this specific objective one, about 161 respondents participated in the study and findings were gathered through questionnaire and interview while quantitative data were presented in table. The findings are interpreted basing on the Mean Score Range of 5.0-4.50 interpreted as "strong agree"; 4.49-3.50 interpreted as "Agree"; 3.49-2.50 interpreted as "Moderate"; 2.49-1.50 interpreted as "disagree"; and 1.49-1.00 interpreted as "strong disagree".

The supplier selection process occurs well to make sure which suppliers fulfill quality requirements. The mean and standard deviation for this item were 4.18 and 1.053 respectively, suggesting that on average, respondents agreed that the process of supplier selection serves to ensure that the supplier will meet the quality standard set. This indicates that the organization exercises a rigorous process of choosing suppliers that guarantees that acquired medical supplies meet all the required standards. Similarly in the same trail the key informants were asking regarding as one why the supplier selection process is in place to make certain that supplier meets the quality level. The key informants had unanimous perspective regarding the supplier selection process.

Editable database system for high-quality supplies is essential for healthcare organizations and it grooms safe an effective patient care. Specifically, the selection of suppliers is a critical task in ensuring the efficiency of supply chain in MSD (Malinganya, 2021). It entails assessing and selecting suppliers who can continually satisfy the organization's needs for quality, cost, delivery, and service. An adequate supplier qualification process is crucial to ensure that the department receives medical products and services that are safe and effective.

Note: The department regularly performs quality checks for medical supplies from the suppliers. The means for this item is 4.09, standard deviation 1.123 which means that professional respondents agree that the organization periodically carries out quality checks to the medical supplies received. By regularly performing quality checks on incoming supplies, you can ensure that the suppliers are continuously meeting the required standards and address any issues or defects beforehand.

The supplier selection process properly evaluates the cost-effectiveness of medical supplies. For this item, the mean was 3.34, and the standard deviation was 1.478, suggesting that responses were more varied for this item than the previous two. Supplier Selection Process Choosing the right supplier involves looking specifically at what suppliers can be relied upon to deliver on time. The average score for this item (Mean = 3.52, SD = 1.270) also supports that the supplier selection process considers the reliability of suppliers considering their on time delivery. All suppliers always arrive on time for the delivery of medical supplies. The item itself has a mean 4.09 and a standard deviation of 1.141 which implies that there was a general consensus that suppliers delivered medical supplies on time according to the schedule agreed upon by both parties.

Table 4*Effect of Supplier Selection Practice*

Statement	Mean	Std. Dev.
The supplier selection process effectively ensures that suppliers meet the required quality standards	4.18	1.053
The department regularly conducts quality checks on medical supplies received from suppliers.	4.09	1.123
The supplier selection process effectively considers the cost-effectiveness of medical supplies	3.34	1.478
The supplier selection process considers the reliability of suppliers in terms of on-time delivery.	3.52	1.270
Suppliers consistently deliver medical supplies on time as per the agreed-upon schedule.	4.09	1.141

N=161

4.3 Performance of Medical Supply Chain at Medical Store Department, Dar es Salaam

The performance of the medical supply chain at the MSD in Dar es Salaam was assessed based on several key performance indicators, including timeliness, cost-effectiveness, quality, reliability, procurement efficiency, and inventory management. The findings based on the responses from the participants are as follows:

Mean STD deviation Medical supply delivery on time 4.14 1.067 People agreed that medical supplies were delivered on time As delays in receiving medical supplies can interrupt medical services, a positive overall performance of the medical supply chain largely depends on the punctual arrival of medical goods.

The efficiency of the medical supply chain was scored with an average of 3.88 and standard deviation of 1.214. This means that respondents apparently considered the supply chain as relatively cost efficient. Broader analysis of the responses shows that costs are generally well-managed, although the respondents point to some variability and rate this question lower than others, suggesting that there may be occasions where inefficiencies or problems could be tackled to achieve consistently cost-effective solutions.

As for the quality of medical supplies which rated the highest with a mean of 4.32 and a standard deviation of 0.987. Thus, the MSD strongly focuses on manufacturing quality medical supplies, as it has become extremely important for patient safety and delivery of healthcare services. It is essential for the department to have a spirit of quality in order to ensure that the healthcare service provided is a reliable one.

Respondents scored a mean of 3.92 (standard deviation: 1.158) for the efficiency of the procurement process. While the procurement process was seen to be, in general, effective, it was not quite as effective as the supply chain timeliness and quality aspects. It would seem that procurement processes work most of the time, but that there are always some opportunities to be had for efficiency, either by avoiding delays or some process.

The supply chain reliability was graded with a mean of 4.08 and a standard deviation of 1.112. This indicates that respondents largely agreed that suppliers were reliable in delivering on time and that the medical supply chain was operating smoothly.” That is an encouraging sign of the general reliability of the supply chain.

Stock management practices: The inventory management practices had a mean of 3.79 and a standard deviation of 1.347. A majority of respondents agreed that MSD had good inventory management, but have a higher variance compared to other indicators. This indicates that in general, it is good but possibly causing unnecessary stockouts or rather overstocking, and there is room for improvement in the supply chain optimization sense.

Table 5*Performance of Medical Supply Chain at Medical Store Department, Dar es Salaam*

S/n	Indicator	Mean	Std. Dev.
1	Timeliness of Delivery	4.14	1.067
2	Cost-Effectiveness	3.88	1.214
3	Quality of Medical Supplies	4.32	0.987
4	Efficiency of Procurement Process	3.92	1.158
5	Supply Chain Reliability	4.08	1.112
6	Inventory Management	3.79	1.347

N=161

4.3 Multiple Linear Regression Analysis

4.3.1 Model Summary

In the provided table, there is information about the model summary for a particular statistical model.

Table 6

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.942 ^a	.888	.885	.234

a. Predictors: (Constant), Quality standards, Cost effectiveness, Reliability and Timeliness

The table here summarizes the results of a regression fitting that adjusts and tabulates how well some predictors explained the variability in one dependent variable. It consists of four predictors: Quality Standards, Cost Effectiveness, Reliability, and Timeliness. The statistics displayed in the table above are key to understanding at which level the model is developing

The R Square value suggests that close to 88.8% of the variation in the dependent variable can be explained by the independent variables considered in the model. This suggests that the model has a strong explanatory power, as we already know that R Square value = 1.

As mentioned with regard to R Square, the latter can be misleading, as it tends to increase just by including additional predictors, even if not relevant; the Adjusted R Square factored in the number of predictors relative to the number of observations (0.885). A 0.885 Adjusted R Square tells that about 88.5% variance is explained by this model even after adjusting the number of predictors, which should further give confidence on model robustness.

Standard Error of the Estimate (0.234): This statistic gives an estimate of the average distance that the observed points fall from the regression line. Because a lower standard error signifies a better fit between predicted values and actual data points, the standard error of 0.234 indicates relatively accurate predictions within this model.

Why Such Findings Matter: Good R square and Adjusted R square indicates that if separate parties could work together to ensure that Quality standards, Cost effectiveness, Reliability and Timeliness play a role in the decision-making process, they could gain insight about their dependent variable (unspecified in query) and proper prediction making.

4.3.2 Analysis of Variance (ANOVA)

This table presents ANOVA showing the relationship between independent variables and dependent variable.

Table 7

Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.409	3	13.803	251.347	.000 ^b
	Residual	5.217	157	.055		
	Total	46.626	160			

a. Dependent: Performance of medical supply chain

b. Predictors: (Constant), Quality standards, Cost effectiveness, Reliability and Timeliness

Table 1: An Analysis of Variance (ANOVA) test (Source: DG5: Multivariate Data Analysis II (231) 1060302022 6 Weeks / 24 Sessions / 72 Credits) It analyses the dependent variable which is Performance of medical, supply chains with respect to independent variables (predictors) quality standards, cost effectiveness, reliability and timeliness.

The first, the portion labelled "Sum of Squares", tells us how we can partition the total amount of variation in the data into two pieces. 41.409 is the regression value that indicates the change in variation in the performance of the medical supply chain explained by predictors (quality standards, cost effectiveness, reliability, and timeliness). It tells you how much the overall variance in performance can be explained by these factors. Residual value 5.217 is unexplained variance or error term in data, comprising difference between values {observed with actual values predicted by the model. This is random variation or something not captured by the predictors. This Total value of 46.626 is the total variability in the performance data, being the sum of the explained and unexplained variances.

In respect to the Degrees of Freedom (df), we have a df regression (which is 3) according to the predictor variable (such as quality standards, cost effectiveness, and time lines). The residual degrees of freedom is 57 (total count of observations minus number of predictors). There are a total of 60 degrees of freedom, which is equal to the number of observation minus one. Mean Square are calculated by dividing the sum of squares by degrees of freedom. For Average Square of Regression, it is $41.409 / 3 = 13.803$. For Residual, hence Mean square is $5.217 / 57 = 0.0916$.

The F-Statistic is a ratio of the regression mean square to the mean square for residuals. The F-value is $13.803/0.0916 \approx 150.347$. The resulting F-value is used to test the null hypothesis that all groups have similar means. A high F-statistic indicates that at least one of the predictors has a significant effect on dependent variable. This is not necessarily the p-value associated with the F-statistic .000, meaning the probability that these results could happen through random chance under the null hypothesis is almost zero. The generally acceptable level for finding statistically significant p-values is below 0.05, indicating that the observed differences in payment performance would be unlikely to have occurred due to random variation.

The high F-statistic and low p-value means that there exist significant differences in the performance of the medical supply chain based on at least one of the predictors namely quality standards, cost effectiveness, reliability, and timeliness. This may indicate that differences or enhancements in any of these factors could result in great variations in medical supply chain performance. But improving these factors will have positively impacts on better performance in the health-care supply chain. The key drivers of medical supply chain efficiency and effectiveness for healthcare logistics stakeholders should be aimed at rationalizing. Opportunities for improvement in these areas include the ability to ensure high quality standards, reduce costs even further, become more reliable, and provide better timeliness in deliverables. The overall model is significant but more insight can be provided in identifying the factor(s)—whether quality standards, cost effectiveness, reliability, or timeliness—perform the most significant job in their differences in medical supply chain performance. Table 3 summarizes the ANOVA analysis results showing that operational factors: i.e., quality standards, cost effectiveness, reliability and timeliness are statistically significant in influencing the medical supply chains performance. These factors must be considered for-supply chain logistics systems to reach their desired level of functioning.

4.3.3 Coefficient

In the analysis of the coefficients shown in Table 7, we can draw important insights about the factors influencing the performance of the medical supply chain. The dependent variable in this model is the “Performance of medical supply chain,” which is impacted by three independent variables: Quality standards, Cost effectiveness, and Reliability and timeliness.

Table 8
Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.109	.175		.624	.534
	Quality standards	.216	.103	.201	2.095	.039
	Cost effectiveness	.207	.093	.188	2.229	.028
	Reliability and timeliness	.608	.063	.603	9.671	.000

a. Dependent Variable: Performance of medical supply chain

The unstandardised coefficients (B) show how much the performance variable changes for a one-unit change in the independent variable, with all other variables held constant. Q: For Quality standards the coefficient of .216 means that a one-unit (deviation) increase in quality standards is associated with a .216 point bump in performance. Likewise the coefficient for Cost effectiveness is .207, which indicates that efficiency improvement contributes positively to performance of the firm too. Nonetheless, the strongest driver is Reliability and timeliness, with a coefficient of .608. This means that all improvements in reliability and timeliness lead to sizeable increases in supply chain performance.

The standardized coefficients (Beta) can thus be used to compare the effect of the different independent variables on performance in relative terms. Reliability and timeliness stands out in this case with the highest Beta value of .603, indicating that it has the most significant impact on supply chain performance. Quality standard and Beta value = .201, and Cost effectiveness has Beta .188. These standardization values confirm that although all three factors contribute to enhancing medical supply chain performance, it is the reliability and timeliness which impact most.

(Sig.) statistical significance (Sig.) values show how likely it is that the observed relationships are not a matter of random chance. A Sig. value less than .05 is an indication of compelling evidence that the association is statistically significant. A significance or sig. value of .000, which makes it very important; it means it should be the first priority of initiatives to improve the performance of the supply chain. The sof.p also reports statistical significance with an alpha (α) level and a significance (Sig.) value of 0.039. While this differs from the value of 0.028, it remains meaningful, albeit slightly above the threshold.

As a final point, the analysis teaches that all three, Quality standards; Cost effectiveness; and Reliability and timeliness, lead to improvement of performance of medical supply chains. Nonetheless, both unstandardized and

standardized coefficients indicate that Reliability and timeliness are the most impactful variables. Healthcare logistics companies can benefit most from improved reliability and timeliness, as we observed that these dimensions provide the most substantial opportunities for increased performance. However, Quality standards and Cost effectiveness, though significant, carry lesser implications than the pivotal impact of Reliability and Timeliness.

4.4 Discussion

This study sought to assess the impact of supplier selection practice on the medical supply chain performance at MSD. In conducting this particular objective one 161 respondents were involved in the study, collected data through questionnaire and interview while quantitative data were tabled. Hence, based on the Mean Score Range 5.0-4.50 interpreted as "strong agree"; 4.49-3.50 interpreted as "Agree"; 3.49-2.50 interpreted as "Moderate"; 2.49-1.50 Interpret 1.48-1.1 as "disagree"; and 1.49-1.00: "strong disagree".

The process of selecting suppliers provides assurance that suppliers meet the necessary quality standards. The average for this item was 4.18 with a standard deviation of 1.053 suggesting respondents meant to say "agree" that the supplier selection process is approaching or enabling the organisation to maintain that suppliers meet or exceed the required quality standards. This places the organization in a state of selection that is highly vigorous, with the opportunity for the medical supplies to be as high-quality as possible to adhere to those industry standards. According to as how supplier selection process working effectively, the question was asked to the key informants in the same trail. Results showed that the key informants had the same perspectives regarding supplier selection process.

Ensuring that supplies are high quality is vital to ensuring that healthcare organizations deliver safe and effective patient care. The supplier selection procedure is imperative to supply management in this model in that respect. This includes assessing and selecting suppliers who can consistently fulfill the organization's needs for quality, cost, delivery, and service. It is important to ensure that the suppliers must fulfil the required quality standards to ensure the safety and efficiency of medical products and services of the department. Nsikan (2022) supports this study results that one of the important steps in the supplier selection process is to establish criteria for evaluating potential suppliers. These criteria generally relate to quality standards, pricing, delivery capabilities, financial stability, reputation, compliance with regulations, and ethical practices. By establishing these criteria in advance, organizations can make certain that only providers that fulfill their specified needs are taken into account.

Medical supplies received from suppliers undergo quality checks on the regular basis by the department. The Mean is 4.09 and Transform is 1.123 for this item, which shows that most of the respondents accepted that Organization frequently checks the quality of medical supplies received. With regular quality check on incoming supplies, we are able to ensure that suppliers continue to meet the standards and all the defects are noted at the initial stage itself. It makes sure that the quality and safety of the medical supplies that are used in the organization. It is critical to protect the health and well-being of patients that the medical supplies be of high quality.

The use of substandard or counterfeit medical supplies can have a major impact on patient outcomes. Hospital, for example, Delivering syringes with low quality causes breakage during use resulting in patient infections and/or other complications. The medical field is one with a lot of regulations, and healthcare facilities are required to follow national standards set by regulatory bodies. Quality checks in regular intervals help ensure that the medical supplies adhere to these standards and regulations in general. Neglecting to do so can lead to legal issues and damage to the healthcare facility's reputation and standing.

This is consistent with the studies by Obinda (2021) which emphasizes that a quality medical supply component is crucial for successful treatment outcomes. If the quality of drugs is not up to the mark, they may not serve as effectively in treating patients' ailments. Regularly checking the quality of medical supplies upon receipt from suppliers is vital for patient safety, regulatory compliance, effective treatment, cost-effectiveness, supplier accountability, and reputation management.

The process of supplier selection is good taking the cost-effective medical supplies. There is a certain amount of variability in how respondents felt about this item with a mean of 3.34 and a standard deviation of 1.478, although the mean was above 3 however likely showing that most respondents accepted this item slightly. Respondents are less convinced that the supplier selection process shows consideration of the cost-effectiveness of the medical supplies as the mean value is lower. You will be sure to work with trusted, reliable providers, but you also want to compare costs and ensure that you are getting the best options available. Embed decision making on cost-effectiveness of medical supplies in supplier selection it will help the organization optimize its spending.

In the respective trail, direct influence of availability and affordability of medical supplies on public health outcome is observed. This would ensure uninterrupted supply of essential medicines and equipment to healthcare facilities throughout Tanzania through choosing affordable suppliers. Though cost might be a priority, there is no room for compromise with the quality of medical supplies. The product safety and efficacy require suppliers to go through high-level quality checks. This is supported by Nzyoka (2020) where the supplier selection process typically includes a competitive bidding process where multiple suppliers submit proposals. This competition lowers prices and makes suppliers provide the most cost-effective solution. All medical supplies chosen go through a meticulous selection

process for their quality and reliability. By choosing reliable, high-quality suppliers, they minimise the risk of product defects or failures that can incur additional costs in the future.

On-time Delivery: The reliability of suppliers in terms of on-time delivery is part of the supplier selection process. This item had a mean of 3.52 and standard deviation of 1.270 at the 95% confidence interval which indicates that respondents agreed suppliers are selected based on on-time delivery and reliability. Medical services cannot be interrupted in order to maintain continuity of care; hence, the timely and reliable supply of medical supplies is critical for health care organizations. Adding supplier reliability into the selection process ensures that the organization is able to receive the necessary supplies when they are needed. The delivery of medical supplies, pharmaceuticals, and equipment should be timely to provide healthcare providers with access to necessary resources for effective patient treatment. Late deliveries lead to stockouts, which can jeopardize patient care and even health outcomes. When a supplier does not deliver medical supplies within the stipulated timeline, healthcare facilities enjoy stock outs of goods they are supplied with by the Tanzania MSD. This disrupts the operational efficiency of its healthcare facilities, leading to delayed deliveries. If you have a department like a hospital that cannot receive a vital part of medical equipment and it is delayed, the patient can be affected by having to postpone a scheduled surgery and the healthcare provider will back up his work.

They connected the finding of the study with the work of Israel et al. (2019), they put that reliable on time delivery is very important for a smooth and efficient supply chain (GrosZncle, 2019). Example: You are a manufacturer that depends on just-in-time deliveries from your suppliers. Every late delivery carries a hidden cost of fast shipping, production standstill and penalties, if any. Choosing trustworthy suppliers reduces the risk of these hidden costs and contributes to better cost management. Stable shipment times allow for improved inventory planning and forecasting. This enables the company to maintain adequate stock levels and discard excess inventory and avoid stockouts.

About 10 training scale : Suppliers deliver medical supplies on time according to the agreed schedule. The mean was 4.09 with a standard deviation of 1.141 which indicates that participants mostly agreed that suppliers consistently deliver medical supplies on time according to an agreed-upon schedule. The delivery of medical supplies must be on time at all times in order for healthcare operations to run smoothly; delays or missed deliveries can severely impact patient care and the overall effectiveness of the organization. This high mean value suggests that the suppliers for the organization were generally performing well in terms of delivery performance. But delayed deliveries can severely affect patient care by creating shortages of lifesaving supplies needed for treatments and procedures. You are used to data until October 2023. On-time supply deliveries ensure that medical facilities run smoothly. Healthy supply chains enhance quality: When goods arrive on time, providers can concentrate on care rather than being distracted by scarcity or delays.

Findings from the study are connected with the study of Obinda (2021) suppliers were establishing collaborative long-term relationships with their health care and provider customers. That way, everyone communicates better, has aligned expectations, and commits to reliable delivery. To accurately predict demand and maintain appropriate stock levels, suppliers have implemented sophisticated inventory management systems and forecasting models. This allows them to deliver orders on time. Suppliers employed sophisticated logistics and transportation networks to provide timely delivery of medical supplies. Examples include strategic placement of warehouses, the most efficient route planning, and the use of express shipping when warranted.

V. CONCLUSIONS & IMPLICATIONS

5.1 Conclusion

The study reveals that supplier selection practice plays significant role on the performance of medical supply. In that regard supplier selection practice" is associated with a 0.216-unit increase in the "Performance of medical supply chain", or a 0.201-standard-deviation increase, holding all other variables constant. Maintaining high-quality supplies is crucial for healthcare organizations to provide safe and effective patient care. In that regard, the supplier selection process is a critical aspect of supply chain management in the MSD. It involves evaluating and choosing suppliers who can consistently meet the organization's requirements for quality, cost, delivery, and service. Ensuring that suppliers meet the required quality standards is essential to guarantee the safety and efficacy of medical products and services provided by the department.

5.2 Implications

The government should establish strict guidelines for supplier selection practices in the medical supply chain. This includes setting clear evaluation criteria, such as quality of products, reliability, and cost-effectiveness. Additionally, the government should promote transparency and accountability in the procurement process by regularly auditing and monitoring supplier performance. This will help to ensure that taxpayer funds are being used effectively and efficiently to meet the healthcare needs of the population. The MSD should prioritize building long-term relationships with reliable suppliers. This can be achieved through regular communication and collaboration, as well as



by providing feedback on product quality and delivery performance. Through fostering strong relationships with suppliers, the MSD can help to ensure a stable and secure supply of medical supplies, even in times of crisis or shortage. Furthermore, the MSD should invest in training and development programs for procurement personnel. This will help to ensure that staff have the necessary skills and knowledge to effectively manage supplier relationships, negotiate contracts, and make informed purchasing decisions. Through investing in human capital, the MSD can improve the overall performance of the medical supply chain and better meet the needs of healthcare providers and patients.

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