

EFFECTS OF VENDOR-MANAGED INVENTORY ON THE PERFORMANCE OF PUBLIC HEALTH INSTITUTIONS IN NAIROBI CITY COUNTY KENYA

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Abstract: The functioning of Kenya's public health system has long caused the country's citizens much anxiety. Health is a prerequisite for better social development, less poverty, and the accomplishment of the social pillar goal of Kenya Vision 2030. In Kenya, it is anticipated that a decentralized health system would increase service delivery efficiency, encourage innovation across the board, enhance access to and equality of available services, and encourage accountability and transparency in service provision. The Kenya Health Policy 2014- 2030 offers direction to the health sector in defining and describing the necessary actions in accomplishing the government's health objectives. The policy is in line with Kenya's Constitution and global responsibilities to health. As a comprehensive platform for managing the success of immunization programs, the inventory optimization systems in public hospitals enable managers at all levels to manage stock and keep an eye on the supply chain. Therefore, this study sought to investigate the effect of vendor-managed inventory on the performance of public health institutions in Nairobi City County Kenya. The study utilized descriptive research design. The study population consisted of 180 county staff consisting of the county pharmacist, sub county pharmacist, pharmacist in charge and hospital administrators. The respondents were picked using purposive sampling and simple random sampling. Primary data was gathered by utilization of questionnaires which were tested for reliability and validity. The study employed both descriptive and inferential statistics for analysis of quantitative data. Descriptive statistics consisted of mean, mode median and standard deviations. While inferential statistics consisted of regression and correlation analysis with the assistance of SPSS to analyse the data. The study found the vendor-managed inventory had a positive significant effect on the performance of public health institutions in Nairobi City County Kenya. The study concludes that vendor managed inventory goal is to reduce inventory-related costs for both parties. When suppliers manage inventory, stock is replenished only when necessary, which reduces overstock and costs for the retailer. The study recommends that the hospitals should openly share information with the vendor to build confidence that it is able to fulfill customer needs and every order that comes through.

Keywords: Vendor-managed inventory, Organizational Performance.

1. INTRODUCTION

The global community has come to understand how crucial it is to the attainment of key global health objectives for medical supply firms to be strengthened as a whole. starting with the broad health goals of the Millennium Development Goals (MDG) and ending with the more targeted goals of the several distinct global health initiatives. In order to achieve universal health coverage, access to critical medications has been regarded as a key component of a functioning healthcare system (Kenya Healthcare Federation, 2016).

At its second national health sector strategic plan, the Kenyan government acknowledged that the lack of vital medications and other medical supplies, especially at government-run hospitals, had a substantial impact on the current poor quality of healthcare services. Continuous shortages of necessary medications and medical supplies plague public health institutions (MOPHS, 2018). The Kenyan government has committed substantial financial resources to the Ministry of Health for the purpose of funding the provision of necessary medications. Medicines make up the majority of public health sector expenses in poor countries, accounting for 8 to 12% of recurrent health budgets; as a result, prudent inventory management of medicines or health commodities is required (SIHFW 2010).

Transparency International (TI) (2011) recognized that the majority of Kenya's public hospitals suffer from a severe lack of medications and other vital supplies. Despite several stop-gap measures being put in place over time, the issues still exist. In public health facilities, the majority of patients get the proper prescription after a consultation, after which they must buy the medications from pharmacists scattered around the facility at exorbitant costs. Patients are required to purchase needles, syringes, and gloves from private pharmacies or clinics nearby the public facility if the doctor prescribes an injection (TI 2011). In Kenya's rural regions, it is especially challenging to have enough access to functional healthcare systems. High rates of morbidity and death from malaria, diarrhea, and HIV/AIDS are the consequence of health facilities being underutilized, which is attributed in part to a lack of a reliable medicine supply. (Mungu, 2013).

Yi-Hui (2015) asserts that a strong inventory system of optimization is essential to the effective operation of public health. It reduces susceptibility to basic essential medicine shortages, which might lead to significant gaps in inventory management, monitoring, and assessment and a deficient public health system. This is comparatively brought on by subpar public health inventory management systems, a lack of ABC Analysis, and First-In-First-Out procedures.

Inventory performance is an indicator of how successfully and efficiently inventory is utilized and supplied. Comparing actual dollars on hand with anticipated cost of goods sold is the aim of inventory performance measures. The strongest measure of a facility's total operational success, according to many Lean practitioners, is inventory performance, according to Masudin and Dewi (2018). Shajema (2018) argues that since previous month's consumption is unrelated to how much inventory would be utilized the next month, inventory performance is always assessed based on anticipated demand as opposed to past use. In other words, the demand component of inventory performance has to be foresighted.

In a global economy, inventory management is a key strategic component for boosting competitiveness that is competitive and dynamic (Roman, Parlina, & Veronika, 2013). Inventory control in retail establishments has changed from being a mostly passive and cost-cutting activity to becoming a crucial success element for company competitiveness (Spillin, McGinnis, & Liu, 2013). Accordingly, a consensus was beginning to form on the need for retail establishments to deal with inventory difficulties in addition to financial and commercial issues (Tuttle & Heap, 2015). The effectiveness of inventory systems was often correlated with delivery service, inventory cost, and capital investment. Manufacturing was likely the most conducive to understanding inventory management given that there was a tangible movement of goods. Customers expected faster delivery times and more accurate services, and this sector probably comprehended inventory management the easiest. A major contributor to the economy is inventory management in retail establishments, and as a consequence, many economies have already achieved a significant level of market inventory. Inventory management is essential for providing additional value, as successful retail stores throughout the globe have long understood (Spillin et al., 2013).

Yi-Hui (2015) aver that health care in the UK is a decentralized issue, with England, Northern Ireland, Scotland, and Wales separately having distinct publicly financed healthcare systems, financed by and answerable to independent governments and parliaments. The goal of public health is to enhance the quality of life by preventing and treating illnesses, especially mental illnesses. This is accomplished by keeping an eye on instances and health indicators, as well as by promoting healthy habits. Promoting hand washing, breastfeeding, and administering immunizations are examples of common public health programs. precise projections of vaccine inventories and needs estimation, sufficient stock ordering that adheres to delivery schedules, in compliance with cold chain capacity through an optimized inventory system, and adequate stock ordering that complies with delivery schedules are all necessary for effective vaccine management. This ensures that essential medicines are accessible for emergency situations.

According to Sainathan and Greenbelt (2019), healthcare in Rwanda has traditionally been of low quality, but recent decades have witnessed significant improvements. One of the best health systems in Africa, Rwanda's universal healthcare program, is now in operation. The achievement was made possible by inventory management systems, which made it possible to estimate vaccination demand accurately. The precision of this projection relies on the degree of implementation—national, district, or local service delivery—as well as the estimating horizon—month, year, or multi-year. The quality of the data

utilized and the Programme Manager's familiarity with particular programming circumstances both had an impact on the estimation's accuracy.

Barasa, Simiyu, and Iravo (2015) aver that performance is the aptitude of an organization to effectively and efficiently use its own resources to achieve its goals. Depending on the objective for which they are set, organizational objectives might differ. If objective performance measurements are available, use them; if not, use subjective performance measures instead since there aren't any reliable objective performance measures accessible. The fundamental goal of companies is to lower the expenses of inventory management since doing so would improve an organization's overall performance. This study examined how inventory management techniques affect consumer goods manufacturing enterprises in Kenya relating to the ideal production, efficacy, production targets, on-time delivery, and quality (Dess & Robinson, 2014).

The organizational performance of any particular corporate company determines its likelihood of success, which depends on its capacity to successfully implement strategies that are connected to the achievement of institutional goals (Randeree & Al Youha, 2009). The actual output as compared to the equivalent expected outputs may be thought of as an essential component of organizational success (Tomal & Jones, 2015). Performance is defined precisely as the level at which a business, as a social system equipped with a variety of material resources, intangible resources, and skills, has the capability to realize both short-term and long-term goals. According to Javier's (2002) theory, an organization's performance is roughly similar to the economy, efficiency, and effectiveness with which its planned social activities are carried out.

Wisner & Leong (2011) describe inventory management as successfully managing the entry and exit of units from an existing inventory. This process often requires regulating the transfer of units so as to avoid the inventory from increasing too much or dropping too extensively and endangering the capacity of the organization to operate. Agus & Noor (2010) avows that reducing costs associated with the inventory is another goal of good inventory management, both in terms of the overall cost of the items included and the tax burden generated by the inventory's aggregate value.

Dryden et al. (2012) assert that in preserving accurate records of completed items that are prepared for transportation is an essential component of inventory management. This often involves deducting the newest shipments of finished products to customers from the inventory totals in addition to recording the production of recently finished products. Inventory management procedures are important because they allow sales representatives to get information regarding what is readily accessible and prepared for shipment at any time quickly.

Organizations employ various actions and processes to manage their inventories of completed goods, semi-finished goods, and raw materials. When these actions are carried out properly, the company is able to reduce waste, expenses, and improve income (Zer and Wei, 2016). Just-in-Time (JIT), Materials Requirement Planning (MRP), Vendor Managed Inventory (VMI), and barcoding are a few of the concepts included in this group. Even individuals who operate in this field do not like thinking about inventory management in great detail. That's why it's good to implement best practises that simplify inventory management.

Vendor Managed Inventory (VMI) is a term used to refer to a method of managing inventory and the supply chain in which the seller is liable for determining when and how much inventory needs to be refilled. It is commonly known that adopting VMI has benefits for the downstream member, who is often a large retailer. The primary benefits of VMI were decreased expenses and improved customer service for either one or both of the participants (Lee, 2015).

The health sector system in Kenya is heterogeneous. Governments at the national, County, and local levels as well as the profit-driven private sector, which includes religious organizations, pharmacy shops, pharmacists, and conventional healers, as well as community healthcare professionals, all offer health services. The official and informal health sectors are both included in Kenya. The official framework consists of that portion of the healthcare industry that comes under the purview of the Ministry of Health and must comply with the law by submitting reports to the Ministry of Health via the Health Information Systems Department. Traditional practitioners are included in the informal/unofficial framework since the Ministry of Health has no authority over their business practices (Sudhinaraset, Ingram, Lofthouse & Montagu, 2013).

2. STATEMENT OF THE PROBLEM

Expanding access to medical products requires a strong supply chain, and inventory management procedures must be effective, flexible, and have high levels of financial integrity (Yadav, 2015). Kenya is one of several Low- and Middle-Income Countries (LMICs) with supply chains that confront many constraints that are impeding the development of Universal Health Care (UHC) (Kariuki et al., 2015). The Kenyan public health sector is currently dealing with a number of issues, the majority of which disrupt service delivery to the the general public. These issues include strikes and go-slows,

shortages of infrastructure and equipment, a shortage of human resources, and others (Agbozo, Owusu, & Atakorah, 2017). As stated by Caillier (2010), devoid of excellent inventory management procedures, the health systems cannot operate effectively and efficiently. For any company to accomplish this, more expenses must be paid to ensure good standards.

Mungu (2013) claims that contrary to procurement in other sectors, inventory management in hospitals is designed to preserve a suitable stock level of medication in general and vital medicine that allows for appropriate service that effects human life. Public procurement in the health sector is allegedly governed by the public procurement and disposal Act 2005 and Regulations 2006. Emergencies offer health risks that develop quickly, are out of a person's or community's control, and, if untreated, are either potentially fatal or will permanently affect a person's or a community's health. Inventory management is the foundation of the pharmaceutical system, and inadequate management leads to wastage of financial resources, shortages of vital pharmaceuticals, and average accessibility to drugs, all of which will quicken the expiration and deadline for high-quality healthcare. Despite the warnings, most public hospitals routinely refuse patients owing to a lack of necessary medications and infrastructure. Sadly, in most companies in the health sector in poor nations, supply chain management is not given a primary position in overall strategy (USAID, 2012).

There has been several research on the relationship between inventory control and business success. According to Akintonye (2014), inventory management helped German service companies operate better. Lapede (2010) and Mehra (2014) are also found that manufacturing and service companies were more productive when they used technology for inventory management. Gakuru (2012) avers that ordering system frustrations are the biggest obstacle to the use of the inventory model. Lack of computers to monitor inventory levels and ignorance of the best methods for putting the models into action were other issues highlighted as being restrictive. The effectiveness of supermarkets was impacted by computerized inventory management, according to Kithaka (2012).

The studies mentioned above focused on automated inventory management and model-based inventories. The context of the study is also different with little evidence on studies conducted in the public health sector, to fill in the gaps this study looked at the effects of effect of vendor-managed inventory on the performance of public health institutions in Nairobi City County Kenya.

3. LITERATURE REVIEW

Theoretical Literature Review

The study uses the application control theory which was postulated by Ortega and Lin (2004). The theory's proponent wanted to lessen inventory variance, lessen demand amplification, and improve ordering procedures (Sourirajan & Ramachandran, 2008). Bijulal, Venkateswaran, and Hemachandra (2011) stress out that the utilization of control theory has a significant role in dealing with demand fluctuations. Other firms may have concerns about inventory management in a variable demand environment. Parameters for process reordering, including when and how much to reorder in an irregular demand environment, are provided by the theory. Demand unpredictability is obviously susceptible to intervals and might result in substantial effort being spent upon procurement as there is no established lead time between demand and the degree of reordering. Customers' needs in this circumstance may also call for sophisticated procurement methods that put theory into action and strong management support (Minner & Transchel, 2010). In order to comprehend how lean inventory techniques affect the effectiveness of the supply chain, it is crucial to grasp the theory.

Empirical Literature Review

Atnafu, Balda and Liu (2018) investigated on Vendor-Managed Inventory and firms competitiveness together with organization performance of SMEs in Ethiopia. The target group of interest was the 188 SMEs in the manufacturing sector. It was found that firm competitiveness is enhanced through increased level of inventory management. Further, it was discovered that inventory management has a direct and favorable effect on an organization's performance. The research came to the conclusion that the inventory control system and new stock reordering system had a favorable and substantial impact on business performance.

Agu, Ozioma and Nnate (2016) investigated on Vendor-Managed Inventory and firms performance in the manufacturing sector. The target group of interest was 285 employees working in the selected firms. The study intended to revealing the impact of Vendor-Managed Inventory and inventory control on firm performance. It was discovered that Vendor-Managed Inventory influences performance of any business organization. Further, it was found that inventory as an asset in any firms is vital and implementation of inventory systems ensures effectiveness in the performance of the organization. The research revealed that Vendor-Managed Inventory influence organization performance.

Musau *et al* (2017) focused on Vendor-Managed Inventory and organization performance among firms in the textile sector in Kenya. The target group of interest was the 196 employees working in the procurement departments in the selected companies. Inventory management was discovered via the application of convergent parallel mixed approaches to have a favorable and considerable impact on organizational performance. Further, the study indicated that textile firms have adopted Vendor-Managed Inventory and have implemented clear mechanisms to ensure smooth and free flow of raw materials and finished goods. It was found that adoption and implementation of inventory management practices ensures efficiency in stock control. In addition the study revealed a positive impact of inventory system and demand forecasting systems on organization performance.

Owuor and Noor (2019) focused on the impact of Vendor-Managed Inventory on service delivery in the public health institutions in Kenya. Through descriptive survey design, the study revealed that service delivery in the health institutions is positively influenced through Vendor-Managed Inventory and accuracy of inventory records. Findings revealed that service delivery in the healthcare industry as well as pharmacies has greatly improved as a result of adoption of inventory management. This study further indicated that proper adoption and implementation of inventory management is concerned with taking the correct product, in the required quantity, at the right price and from the right seller at the right time.

4. RESEARCH METHODOLOGY

The study utilized descriptive research design. The study population consisted of 180 county staff consisting of the county pharmacist, sub county pharmacist, pharmacist in charge and hospital administrators. The respondents were picked using purposive sampling and simple random sampling. Primary data was gathered by utilization of questionnaires which were tested for reliability and validity. The study employed both descriptive and inferential statistics for analysis of quantitative data. Descriptive statistics consisted of mean, mode median and standard deviations. While inferential statistics consisted of regression and correlation analysis with the assistance of SPSS to analyse the data.

5. FINDINGS

The descriptive statistics results of vendor-managed inventory are presented in Table 1.

Table 1: Vendor-managed Inventory

Statements	M	SD
The hospital employs systems for vender-managed inventory.	4.08	0.92
The hospital partners with its vendors to modernize its systems.	4.05	0.95
The hospital makes use of automated stock monitoring	4.30	0.70
The hospital makes sure there are enough stock levels to save expenses associated with stock outs.	4.55	0.45
The stock management system in the hospital minimizes the total holding cost	4.15	0.85
The hospital makes certain there is a functional stock management system to shorten lead cycles for efficient waste reduction.	4.56	0.44
The hospital practices vender managed inventory systems.	4.01	0.99

The results as presented in Table 1 shows that the respondents strongly agreed on the statements that; the hospital makes certain there is a functional stock management system to shorten lead cycles for efficient waste reduction (M=4.56, SD=0.44), the hospital makes sure there are enough stock levels to save expenses associated with stock outs (M=4.56, SD=0.44) and that the hospital makes sure there are enough stock levels to save expenses associated with stock outs (M=4.55, SD=0.45). This finding is supported by Atnafu, Balda and Liu (2018) who investigated on vendor-managed inventory and firms' competitiveness together with organization performance of SMEs in Ethiopia and found that firm competitiveness is enhanced through increased level of inventory management.

The respondents agreed on the statements that; the hospital makes use of automated stock monitoring (M=4.30, SD=0.70), the stock management system in the hospital minimizes the total holding cost (M=4.15, SD=0.85), the hospital employs systems for vender-managed inventory (M=4.08, SD=0.92), the hospital partners with its vendors to modernize its systems (M=4.05, SD=0.95) and the hospital practices vender managed inventory systems (M=4.01, SD=0.99). This finding is in agreement with the study of Agu, Ozioma and Nnate (2016) which investigated on vendor-managed inventory and firm's performance in the manufacturing sector and discovered that vendor-managed inventory influences performance of any business organization.

Results of Inferential Analysis**Table 2: Correlation Analysis**

		Vendor-managed inventory	Performance
Vendor-managed inventory	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	120	
Performance	Pearson Correlation	.643	1
	Sig. (2-tailed)	.000	
	N	120	120

The findings displayed in Table 2 indicate that the Pearson r value for vendor-managed inventory amounted to 0.643. Consequently, it can be inferred that all the correlation coefficients are statistically significant at a significance level of 0.01 for a two-tailed test. Moreover, considering that all correlation coefficient values are positive, it is evident that there is a positive linear correlation between the variable pairs.

Results of Regression Analysis**Table 3: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.836 ^a	.805	.801	.454

Table 3 presents the findings, indicating that the value of adjusted R square, which signifies the degree to which the performance of hospital institutions was impacted by the vendor-managed inventory, is 0.801 (80.1%). Consequently, the remaining percentage (19.1%) represents the influence of unexplored variables.

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.683	.127		5.378	.000
	Vendor managed inventory	0.830	.231	0.066	3.593	.001

The information presented in Table 4 demonstrates that the constant value of 0.683 represents the point at which the dependent variable changes while the independent variable remains constant. The regression coefficient of 0.830 signifies the extent to which the performance of public health institutions in Nairobi City County, Kenya, is affected by a one-unit change in vendor managed inventory.

The formulated regression equation is as stated;

$$\text{Performance} = 0.683 + 0.830 (\text{vendor-managed inventory})$$

The research concluded that the influence of vendor-managed inventory on the performance of public health institutions in Nairobi City County Kenya was both positive and significant, as indicated by the t-value ($t = 3.593$, $p < 0.05$).

6. CONCLUSIONS

The study concludes that the objective of vendor managed inventory is to decrease inventory-related expenses for both parties. By allowing suppliers to manage inventory, stock is replenished only when necessary, resulting in reduced overstock and costs for the retailer. Additionally, it enhances efficiency for the vendor by establishing a more predictable business pattern. Vendor managed inventory operates through establishing a strong communication system between the seller and the buyer. The initial step involves both parties setting success metrics and agreeing on partnership terms and conditions. Afterwards, the vendor starts shipping products to the retailer. Throughout the process, the retailer shares current inventory data with the vendor to enable monitoring of stock levels and purchasing trends.

7. RECOMMENDATIONS

According to the study, it is suggested that hospitals should establish transparent communication channels with vendors in order to foster trust and assurance that their requirements and customer needs can be met efficiently. Furthermore, it is advocated that regular updates regarding seasonal demands should be shared with vendors to enable them to adequately plan and manage the increased influx of products, ensuring that they never face shortages in any particular stock keeping unit. The institutions should ensure timely communication with vendors regarding any sudden shifts in demand, informing them promptly when demand changes its course. It is wise to negotiate fees in advance with suppliers as it aligns with sound business practices, and this principle applies to working relationships with vendors as well. In order to gain a clearer perspective on what a mutually beneficial supplier relationship entails, it is important to establish precise goals for hospitals, enabling a more effective evaluation of whether the vendor is fulfilling their obligations satisfactorily.

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