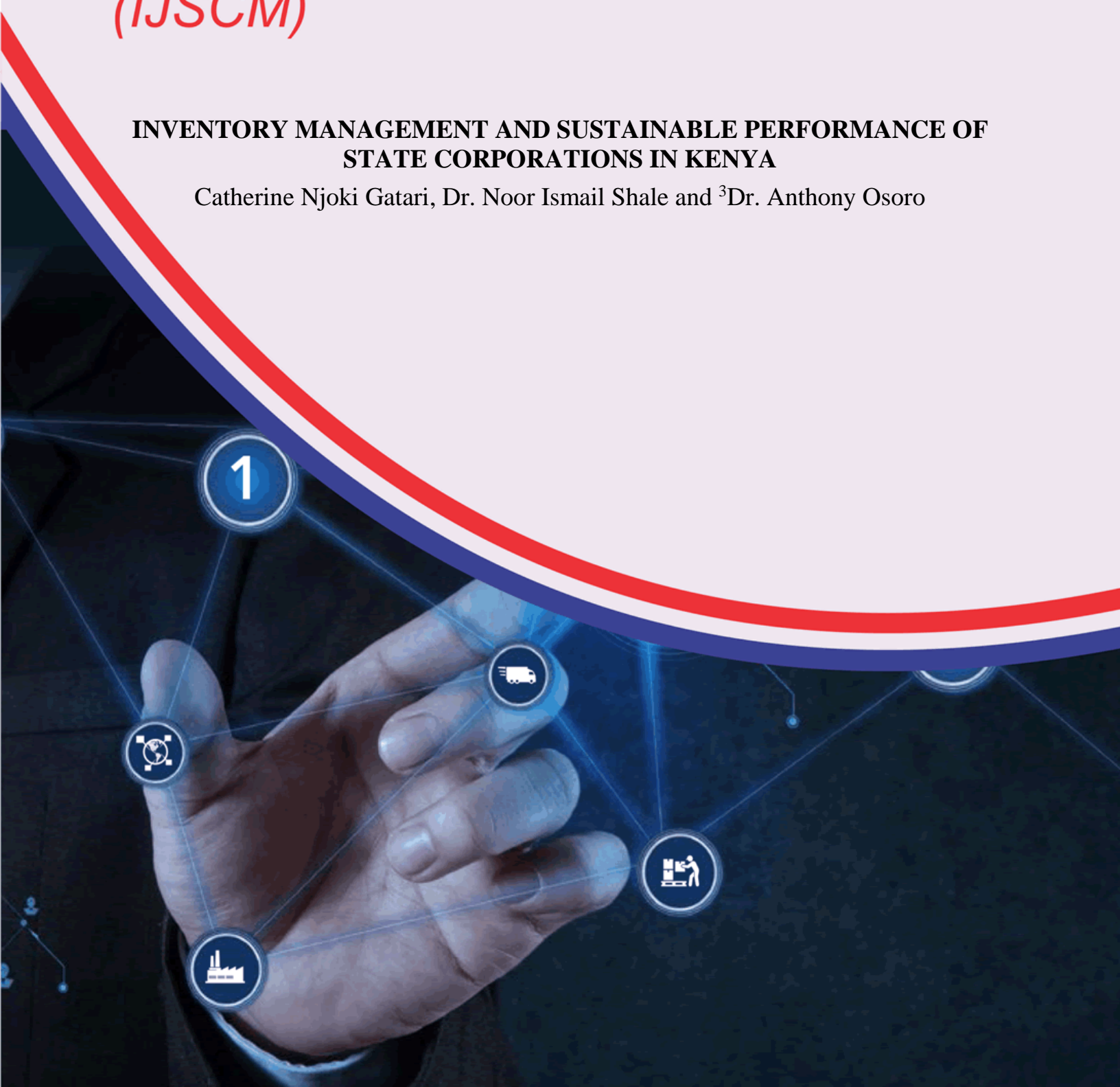# International Journal of
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INVENTORY MANAGEMENT AND SUSTAINABLE PERFORMANCE OF STATE CORPORATIONS IN KENYA

Catherine Njoki Gatari, Dr. Noor Ismail Shale and [3]Dr. Anthony Osoro

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INVENTORY MANAGEMENT AND SUSTAINABLE PERFORMANCE OF STATE CORPORATIONS IN KENYA

[1*]Catherine Njoki Gatari

Ph.D. Candidate, School of Business and Entrepreneurship, Jomo Kenyatta University of Agriculture and Technology, Kenya.

*Corresponding Author's Email:
njokicathygatari@gmail.com

[2]Dr. Noor Ismail Shale

Lecturer, School of Business and Entrepreneurship, Jomo Kenyatta University Agriculture and Technology, Kenya

[3]Dr. Anthony Osoro

Lecturer, School of Business and Entrepreneurship, Jomo Kenyatta University Agriculture and Technology, Kenya

Abstract

Purpose: The purpose of this study was to examine the effect of inventory management on sustainable performance of state corporations in Kenya.

Methodology: The descriptive research design was applied in carrying out the study. The respondents of the study included the heads of finance and procurement department in all 187 state corporations in Kenya. Census was used in this study where the head of procurement department and the head of finance in each state corporation that resulted to 374 study respondents. This study used a questionnaire as the main research tool to collect primary data. Descriptive analysis and inferential analysis was carried out which was made possible through the use of Statistical Package for Social Sciences (SPSS) version 26.

Findings: Inventory management significantly affected the sustainability of state corporations in Kenya at $p<0.05$. This shows that upholding inventory management would be essential in steering the sustainable performance of the state corporations. The regression model established that the R value was 0.633 while the R^2 was 0.401 which indicated that the variability of the inventory management on the sustainable performance of the state corporations in Kenya could be explained by up to 40.1% of the model and the P-value was $0.000<0.05$. This implies that the model was fit to determine the relationship between the inventory management and sustainable performance and therein make conclusions and recommendations.

Unique contribution to theory, practice and policy: While the existing inventory management theory used in this study was validated, the study recommends that the accounting as well as procurement officer in each state procuring entity need to ensure that all proper stock levels are kept as per the regulation through proper verification and processing of all requirements, adhering to prescribed stock policies in the Regulation and ensuring that they duly consider safety stock and lead time when replenishing to ensure appropriate stock levels are kept at all time. The study recommended that public procuring entities policy makers need to establish a policy framework to expedite effective adoption of best inventory management systems to facilitate sustainable performance.

Keywords: *Inventory Management, Public Procurement Regulation, Public Procurement Regulatory Bodies, Sustainable Performance, State Corporations.*

INTRODUCTION

The concept of Inventory Management is regarded as a framework used by organizations in monitoring inventory levels in relation to amount ordered, lead time, storage costs and when to replenish stock (Hussein & Makori, 2018). It involves keeping record and maintaining inventory level, predicting future orders, and deciding on when and how to store inventory (Mulandi & Ismail, 2019). Organizations keep inventories for the following reasons: to meet customers' requirements and demands; to ensure uninterrupted flow of production, to prevent stock outs and to meet anticipated customer demands. Inventory management models and techniques facilitate an organization control and uphold required inventory levels in order to accomplish essential operational performance (Karani & Osoro, 2020). Inventory management should be geared towards achieving customer requirements in the proper quality and optimum quantity derivered at the required time. For an organization to meet requirements of customer there is need to ensuring avoiding shortages of inventory and monitoring costs of inventory (Jepchirchir & Noor, 2019). It is also important to have accurate demand forecasting techniques to maintain required stock levels. Inventory records are very critical in ensuring proper monitoring of stock in store so as to maintain appropriate stock levels. Careful inventory management needs assessing the costs of upholding appropriate levels of stock so as to minimize inventory costs (Hussein & Makori, 2018).

Maintaining ideal stock levels decreases the cost incurred due to disruptions in business operations due to shortages of inventory, minimizes replenishment costs, and guards against changes in products prices (Lemayian & Moronge, 2018). Inventory management necessitates a suitable way of deciding what to order, amount to order and the appropriate time to place an order and ways in which all items in stock can be tracked to ensure no issues of inventory shortages and overstocking (Mkonu & Gichana, 2019). Decisions relating to inventory are dependent on inventory in stock, forecasted demand information, lead time and inventory related costs. According to Mulandi and Ismail (2019). the absence of suitable inventory control systems in government entities will make it difficult for analysis of expenditures on a macro-economic level. The latitude of stock level control activities ensure monitoring the reordering lead time, reordering of products and materials, reverse logistics management activities to ensure returned product are re-used, refurbished, recycled or remanufactured to obtain their maximum value and effective planning for demand, controlling inventory storage costs, disposal planning and asset management, stock taking, proper utilization of available storage space, stock assessment, price determination and total quality improvement (Mukopi & Iravo, 2019). With a proper controlling and monitoring of these requirements, it is possible to achieve an ideal stock level, which is a continuous process as the market needs keeps on changing (Obura, 2018).

The Public Procurement and Assets Disposal Regulation upholds inventory management as one of the roles that procurement managers in state offices and the state corporations should uphold to enhance the effectiveness of the procurement process (Ofula, Ngugi & Mburu, 2016). The Regulation recognizes inventory management as a process that ensures proper control of the

material flow in the state corporations, thus enhancing their effectiveness and ability to successfully meet their mandates. The PPAD Regulation provides guidelines on procurements record keeping, opening of tenders, tender evaluations, procurement methods, inventory control and assets management and disposal of assets among others (Nyongesa & Osoro, 2019). According to Chalton (2018), state corporations in Kenya frequently run out of stock due to keeping inappropriate stock levels, a situation that affects their effectiveness and ability to meet their mandates. To a large extent this greatly affects the sustainable performance of states corporations.

Problem Statement

Globally there has been increasing pressure on all public procuring entities to enhance sustainable performance of their operations. Bilala and Odari (2021), indicated that there has been little reporting on sustainable performance by public procuring entities compared to those in private entities. This is despite the government's efforts to salvage them time to time through financing and introducing public procurement regulation guidelines that are required to be followed to enhance sustainable performance. Some of the state corporations have experienced cases of misappropriation, with over 90% of these misappropriations revolving around procurement and inventory management (Mkonu & Gichana, 2019). This raises a question on whether inventory management as an aspect of compliance with the PPAD Regulation; could be one of the missing factors leading to the continued decline in sustainable performance among the state corporations. The existing evidence in other contexts shows that inventory management is a significant aspect that positively and significantly influences sustainable performance. Karani & Osoro (2020), contend that inventory management stands to be one of the critical aspects of procurement that plays an integral role in enhancing the effectiveness of the processes and ability of organizations to meet the customer needs through availability of the right inventory and at the right time. This is however yet to be proved in a Kenyan context, and particular among the state corporations. Therefore, the objective of this study was to examine the effect of inventory management on sustainable performance of state corporations in Kenya

Objective of the Study

To examine the effect of inventory management on sustainable performance of state corporations in Kenya.

Research Hypothesis

H_o: There is no significant effect of inventory management on sustainable performance of state corporations in Kenya.

LITERATURE REVIEW

Inventory Control Theory

Inventory Control Theory was considered to be relevant for this study in order to understand the effect of inventory management on sustainable performance of state corporations hence it gives

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theoretical background of this study. According to Jepchirchir and Noor, (2019). inventory management theory was developed to analyze ways a procuring entity can attain competitive edge by planning and controlling all the processes involved in developing a product such as designing, acquiring, value addition, transportation, warehousing, and distribution and return logistics. For the large organizations they apply different stock control models, systems and mathematical formulas to assist in improving the manufacturing and warehousing of products and to assist in inventory cost minimization (Ofula *et al.,* 2016). At the same time small organizations apply ideas from different inventory control systems and philosophies to control their manufacturing and warehousing founded on their needs to meet customers' requirements and to minimize cost. It's the responsibility of the head of procurement function to ensure inventory costs in terms of storage, shortage, ordering, purchase and disposal costs are minimized to increase revenue and to meet customer requirements (Zappone, 2014).

According to Chalton (2018), resources skills and capabilities of the organization are a package of the organization's assets. The entity is obliged to develop internal company processes, laws and policies that direct how resources required should be acquired, stored and managed when carrying out internal organizational activities (Muhalia, Ngugi & Moronge, 2021). These procedures are necessary in inventory sourcing and control decisions. In the same way, it is important to have a well-managed information system to make it easy for on time sharing of information related to inventory between the firm and its stakeholders both internal and external (Ofula *et al.,* 2016). It is important to avoid overstocking to reduce storage costs and under stoking to reduce shortage cost. Zappone (2014), further explains that overstocking is as a result of poor inventory management, inaccurate demand forecasting and inappropriate inventory control techniques, systems and models. Under stocking frequently interferes with production activities and leads to failure to meet customer requirements (Mukopi & Iravo, 2019). Each organization is special from other organizations in regards to the unique resources and capabilities it has which requires effective planning and controlling of those resources. It indicates that appropriate management of inventory in executing procurement function improves on sustainable procurement effectiveness and efficiency (Nsikan, Etimb & Imec, 2020).

Several studies on inventory management indicates that proper inventory management system can help an organization in proper storage of stocks and easy access to materials in a warehouse, reduction of obsolete stock and general reduction of all inventory related costs (Mulandi & Ismail, 2019). Proper inventory planning and control is known as one of the most important aspect of an organization that needs capacity and competence to improve overall performance of an organization. Equally private and public organizations have been making good utilizing IT systems in an effort to improve inventory management (Karani & Osoro, 2020). Different approaches of stock control applied in various procurement processes can enhance visibility and routine efficacy without bias to supplier's competition (Namusonge, Mukulu & Kirima, 2016). Inventory planning and control has various advantages which are: improvement in contract compliance, reducing on the procurement expenditures, better participation of staff, and reduced handling costs.

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Inventory planning and control has various advantages which are: improvement in contract compliance, reducing on the procurement expenditures, better participation of staff, and reduced handling costs (King'oo & Muli, 2019). Inventory management deals with ensuring that appropriate stock levels are kept, balancing between inventories related costs and ensuring meeting customer requirement as and when required (Mukopi & Iravo, 2019). Inventory grouping is an element of inventory management with benefits of inventory planning and control, procurement, warehousing of inventory, material handling, material identification and accounting inventory kept in an organization (Ofula *et al.,* 2016). According to Obura (2018), Current inventory models, philosophies and systems and models enable an organization to effectively monitor inventory in store to avoid overstocking and under stocking (Muhalia, Ngugi & Moronge, 2021).

Jepchirchir and Noor (2019), carried out a study on the effects of inventory optimization on performance of government ministries in Kenya. The research adapted a case study research design. The study found out that inventory management policy, staff competencies and use of automated record management had an important outcome on inventory management. The study also indicated that efficiency of inventory management can be influenced by proper inventory planning, control and warehousing management (Mukopi & Iravo, 2019). For further research, the study identified gaps on the other factors affecting Inventory Management. The study recommended that further research should be done on the forecasting of inventory management, storage space and storage equipment with a view of enhancing the excellence of the practices (Mulandi & Ismail, 2019). Karani and Osoro (2020), carried out research on the determinants of Inventory Management Practices on Service Delivery in Trans Nzoia County Level Four County Hospital, Kenya. The finding of the study indicates that inventory control helps organization achieve improvement in strategic organizational performance. It suggested that optimum resource be allocated and frequently reviewed to match with the changing market environment so as to improve procurement performance (Obura, 2018). The study also found out that proper inventory management system can help an organization in proper storage of stocks and easy access to materials in a warehouse, reduction of obsolete stock and general reduction of all inventory related costs.

Conceptual Framework

The aim of using the conceptual framework was to offer a clear image of the association between dependent and independent variables. It illustrates how dependent and independent variables are related. Inventory management was the independent variable while sustainable performance of State Corporation was the dependent variable.
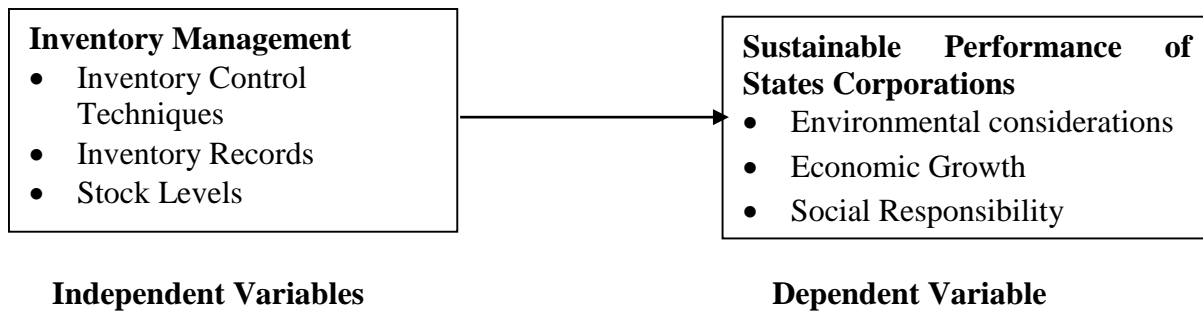

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┌─────────────────────────────┐          ┌─────────────────────────────┐
│ Inventory Management        │          │ Sustainable Performance of  │
│  • Inventory Control        │          │ States Corporations         │
│    Techniques               │   ───▶   │  • Environmental            │
│  • Inventory Records        │          │    considerations           │
│  • Stock Levels             │          │  • Economic Growth          │
│                             │          │  • Social Responsibility    │
└─────────────────────────────┘          └─────────────────────────────┘
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Independent Variables   **Dependent Variable**

Figure 1: Conceptual Framework

Research Gaps

It is apparent that effect of inventory management on sustainable performance of state organizations is analytically significant since quality improvement, revenue growth, return on investment, customer satisfaction, social and environmental performance is paramount in any public organization worldwide (Gatobu, 2020). Despite the role of procurement in public sector, the number of researches that have explored the effect of inventory management on sustainable performance is still insignificant (Mulandi & Ismail, 2019). From the examination of the written and published information on inventory management and sustainable performance of states corporations, the research recognizes that there is a call for a study to be carried out in this field in Kenya. Literature obtainable signify that, studies available are mostly done on developed countries and not focusing more developing states such as in Africa (Ongeri & Osoro, 2021). Available studies indicate that very little had been documented about the relationship between inventory management and sustainable performance regionally (Kipruto & Shale, 2019). According to Gitari and Kabare (2019), inventory management guidelines in state organizations in Kenya are not aligned to sustainable performance in spite of various measures made by the government to improve on sustainable performance. This greatly affects carrying out of activities related to inventory management since most of the procurement functions are not in tandem with the procurement procedures legal framework thus affecting sustainable performance. State organizations in Kenya are established to operate in commercial affairs therefore complying with public procurement policies (Ondigi, & Muturi, 2019).

A study by Nyaboke and Muturi (2020), found lack of public procurement law observance is a main obstacle to development of a business. The study linked non-compliance of public procurement regulation guidelines relating to inventory management. However, available studies that have tried to address the effect of inventory management on organizational performance in Kenya but never analyzed this area fully especially linking it to sustainable performance and that there are still gaps that they recommended further studies to be carried out on the effect of inventory management guidelines on sustainable performance of State Corporation in Kenya

(Nyaga & Mwangangi, 2019). This study has clearly addressed the recommended knowledge gap by bridging it with new knowledge on the effect of inventory management on sustainable performance of state corporations in Kenya and proposing recommendations on ways to improve compliance with various guidelines relating to inventory management so as to improve sustainable performance of state corporations.

METHODOLOGY

The descriptive research design was used in the study. Since it describes the uniqueness of a specific target group or person and also it gives sufficient provision for prevention against possibility of unfairness and ensuring the reliability of the data, the descriptive study design helped fulfil the study's objective (Kothari, 2019). The 187 state corporations that are registered in Kenya were the study's target population. In all 187 state corporations in Kenya, the finance and procurement managers made up the sampling frame. The study used census to survey all 187 state corporations. The study purposefully chose the heads of the finance and procurement in each of Kenya's state corporations as the unit of observation. This resulted to 374 respondents. Primary data, which was gathered utilizing research questionnaires as the data collection tool, served as the study's primary data source. Both structured and semi-structured questions were included in the research questionnaire. Drop and pick as well as online method was applied to administer the research questionnaire to the respondents. The study collected both qualitative and quantitative data with the aid of the Statistical Package for Social Sciences (SPSS) Version 26. Content analysis was used as tool to analyse qualitative data. The analysed data was displayed using tables, graphs, pie charts, and histograms. The results of the study were tested at significance level of 5%.

RESULTS AND DISCUSSIONS

Descriptive Analysis of Inventory Management

The main aspects used to assess inventory management were: inventory control techniques, inventory records and disposal of assets. The respondents were requested to show their level of agreement or disagreement with given statements based on various aspects. A five-points Likert's scale was used where 1 was strongly disagree, 2 was disagree, 3 was neutral, 4 was agree and 5 was strongly agree and the findings are as shown in Table 1.

The purpose of the study was to determine the degree to which the respondents agreed with the given statement regarding the impact of inventory management practices on the sustainable performance of state corporations. The mean and standard deviation of the data in table 1 on the entity has an effective inventory management system that helps achieve accurate demand forecasting were 3.04 and 1.10, respectively. According to table 1, which summarizes the findings, "The entity has effective inventory control techniques and mechanisms in place." The findings' mean and standard deviation were 3.48 and 1.17, respectively. On the statement "The entity has automated inventory control procedures to ensure appropriate stock levels are kept " the respondents were requested the level at which they agreed or disagreed with the statement. The

results agreed with the findings Karani and Osoro (2020), who indicated that while the modern word is turning to technology as far as inventory management is concerned, this has not been the case when it comes to the state corporations that leads to lack of efficiency and appropriateness in the management of inventory and the entire supply chain process.

The study sought to determine how much the respondents agreed with the assertion that inventory records a measure of inventory management on sustainable performance of state corporations. On the statement "The entity has a working inventory records management unit that ensures accurate inventory records " the respondents were asked to rate how much they agreed or disagreed with it. The mean and standard deviation of the results were 3.37 and 1.10, respectively. The findings showed that the mean and standard deviation for the finding " The entity has an up-to-date asset register which ensures proper inventory records management " were 3.12 and 1.17, respectively. As shown in table 1, when the respondents were asked to rate how much they agreed with the statement "The entity regularly carries out stock/asset inspection and audits to keep track of inventory," the results showed a mean and standard deviation of 3.02 and 0.92, respectively. The results are consistent with those of Mulandi and Ismail (2019), who discovered that inventory management in state businesses was ineffective despite being an important factor that determined the the sustainable performance of the corporations.

The study sought to determine the degree to which the respondents agreed with the given statement regarding stock levels, a metric for inventory control that affects the sustainable performance of state corporations. The mean and standard deviation of the findings for the statement " The entity ensures that the right stock levels are kept" were 3.88 and 1.04, respectively. The findings showed that the mean and standard deviation for the finding " The entity has a policy on appropriate stock levels " were 3.33 and 1.14, respectively. The respondents were also asked to indicate their level of agreement to the statement 'The entity considers lead time to ensure the safety stock kept is sufficient'. The findings had the mean and the standard deviation of 2.75 and 1.37 respectively. These findings are in tandem with the findings of Mukopi and Iravo (2019), who observed that through lack of effective inventory management systems and monitoring of satisfaction and effectiveness of the supply chain process thus affecting firm's sustainable performance.

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Table 1: Descriptive Statistics on Inventory Management

Statement	N	Mean	Std. Dev.
The entity has an effective inventory management system that helps achieve accurate demand forecasting	304	3.04	1.10
The entity has effective inventory control techniques and mechanisms in place	304	3.48	1.17
The entity has automated inventory control procedures to ensure appropriate stock levels are kept	304	2.79	1.48
The entity has a working inventory records management unit that ensures accurate inventory records	304	3.37	1.10
The entity has an up-to-date asset register which ensures proper inventory records management	304	3.12	1.17
The entity regularly carries out stock/asset inspection and audits to keep track of inventory	304	3.02	0.92
The entity ensures that the right stock levels are kept	304	3.88	1.04
The entity has a policy on appropriate stock levels	304	3.33	1.14
The entity considers lead time to ensure the safety stock kept is sufficient	304	2.75	1.37

Key: SD= Strongly Disagree, D= Disagree, U= Uncertain, A= Agree, SA= Strongly Agree

Test of Hypothesis

The study sought to test for the hypothesis in order to ascertain the effect of each of inventory management on sustainable performance of state corporations.

H_o: There is no significant effect of inventory management on sustainable performance of state corporations in Kenya.

The study's objective was to determine how inventory management affected the sustainable performance of Kenyan state corporations. The purpose of the study was to statistically determine how inventory management—an independent variable—affects the sustainability of state corporation in Kenya (dependent variable). The regression coefficients, model summary and the ANOVA test were used to accomplish this. This made it possible for the researcher to decide whether to accept the null hypothesis or not. The model equation used for the study variable was of the form; **$Y = \beta_0 + \beta_4 X_4$.**

Model Summary on Inventory Management

The model summary results provided in table 2 shows the R value of 0.633 and R^2 of 0.401, indicating that up to 40.1% of the model could account for the variability of inventory management on the sustainable performance of the state corporations in Kenya. This suggests that the model was suitable to ascertain the correlation between the two variables and draw findings and suggestions as a result. The results agree with that of Mulandi and Ismail (2019), who established

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that implementation of proper inventory management practices facilitates sustainable performance of states corporations.

Table 2: Model Summary on Inventory Management

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.633[a]	.401	.399	.56607

a. Predictors: (Constant), Inventory Management
b. Dependent Variable: Sustainable Performance of State Corporations

Analysis of Variance (ANOVA) Test on Inventory Management

Table 3 displays the ANOVA results. The findings indicated that the model was significant since the F-calculated for the variable was 201.974, which is higher than the F-critical value, and the mean was 64.720. The model was significant, which was further demonstrated by the P-value of 0.000<0.05

Table 3: Analysis of Variance (ANOVA) Test on Inventory Management

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	64.720	1	64.720	202.25	.000[b]
1	Residual	96.772	302	.320		
	Total	161.492	303			

a. Dependent Variable: Sustainable Performance of State Corporations
b. Predictors: (Constant), Inventory Management

Regression Coefficients on Inventory Management

Table 4: Regression Coefficients on Inventory Management

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.499	.142		10.530	.000
	Inventory Management	.580	.041	.633	14.212	.000

a. Dependent Variable: Sustainable Performance of State Corporations

Results of the regression coefficient are displayed in Table 4. The model's coefficient β and variable coefficients were found to be 1.499 and 0.580, respectively, making the model equation $Y = 1.499 + 0.580X_4$ from the data. This suggests that a unit change in inventory management

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could result to up to 58% change in the sustainable performance of the state corporations in Kenya. The findings further demonstrated that the P-value for the variable was 0.000<0.05, indicating that inventory management had a significant effect on sustainable performance of Kenya's state corporations. The alternative hypothesis, that inventory management has a positive effect on the sustainable performance of state corporations in Kenya, was accepted in place of the null hypothesis at a significance level of 0.000. These findings are consistent with those of Hussein and Makori (2018), who suggested that good inventory management techniques have a positive impact on the long-term sustainability of state enterprises in Kenya.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The study finally established that inventory management positively and significantly affect the sustainable performance of the state corporations in Kenya. Inventory management through adoption of effective inventory control techniques and keeping the right inventory records were recognized to be essential in management the inventory but they were not effectively upheld in the state corporations. It is also concluded that low uptake of technology as a far as inventory management is concerned was low among the state corporations and this could affect their efficiency in managing the inventory. It can also be concluded that through proper regulation of the PPAD by the relevant authorities, the management of inventory towards enhancing the sustainable performance of the corporations is enhanced. Proper management of inventory involves maintaining optimum levels of inventory because overstocking may lead to increase holding costs, leads to tying finances in capital and increase the risk of loss, damages and spoilage.

Recommendations

On the inventory management, it can be inferred that it is the duty of the policy makers, public procurement regulation enforcers, the government and the management of the state corporations to ensure that the inventory policies are properly adhered to so as to save on inventory costs and ensure inventory control efficiency. In addition, the public procurement regulatory bodies should ensure that they continue providing easy access to inventory management guidelines and policies, regarding to lead time, stock levels, inventory systems and models and ensuring proper tracking of the inventory in all the state corporations. This would be possible by ensuring that there are appropriate inventory records and having a well framed way of deposing assets. The management need to ensure that effective inventory management systems, techniques and models are in place achieves accurate demand forecasting so as to keep appropriate stock levels. The study also recommends the need to have automated inventory procedures and an effective inventory record management unit to ensure that the procuring entity has up to date inventory records. There is need to ensure keeping track of inventory in stock through regular stock taking, asset inspection and inventory auditing. The study further recommends that the government of Kenya should enforce inventory management policies to ensure achievement of sustainable performance of all public procuring entities.

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