

EFFECT OF INVENTORY MANAGEMENT CONTROLS ON PROJECT PERFORMANCE OF SELECTED CONSTRUCTION COMPANIES IN NAIROBI CITY COUNTY, KENYA

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Abstract: Proper inventory management has a significant effect on project performance. Construction companies play a major role in setting up and completing projects that contribute to the overall growth of an economy. Over the past years, the construction companies in Nairobi have been experiencing performance-related challenges in their projects. At times, inventory costs run beyond the estimates, which eventually results in losses for the firms. Some of the large construction companies have many projects with fixed prices based on the contracts, and they sometimes bear the risk of cost overruns. The companies sometimes experience interrupted operations because the inventory runs out of stock. However, most of them have insufficient inventory management approaches. It leads to a delay in finishing projects, and they incur more costs than their estimates during budgeting. This study investigated the effect of inventory management controls on project performance of selected construction companies in Nairobi City County, Kenya. The target population included three construction companies in Nairobi; Seyani Bros Ltd, Intex Ltd and Epc Builders Ltd. 686 employees were drawn from Seyani Bros Ltd, Intex Ltd and Epc Builders Ltd specifically working in procurement, finance and warehouse departments. A sample size of 206 was obtained through stratified random sampling technique. Using self-administered questionnaires, primary data was obtained and used to establish the sample size. Multiple regression analysis was utilized for inferential data analysis to establish relations between dependent and independent variables. The study found that inventory management controls significantly and positively impact the project performance of the selected construction companies in Nairobi County. The study concluded that through inventory management controls the construction firms may regulate inventory levels by keeping the right amount of each product in stock, monitoring their purchase orders, and maintaining a working supply chain. The study recommended that the construction companies should embrace inventory management controls specifically; warehouse security measures, minimal double handling of materials, stock taking, inspection of materials and accounting controls.

Keywords: Inventory Management Control, Project Performance.

1. INTRODUCTION

Project performance is a significant challenge that construction companies grapple with as they strive to meet the needs of their clients (Rivera, Nguyen & Kashiwagi, 2017). Projects are reported to have become more prominent and complex, making them difficult to manage (Soni, Pitroda, & Bhavshar, 2016). Establishing a proper balance between inventory management and the completion of projects is quite difficult (Osuzugbo, 2019). It is estimated that between 60 to 70 percent

of the overall funds of a business entity, especially within manufacturing and construction, are held up in current assets, with inventory accounting for the biggest portion (Mulandi & Ismail, 2019).

Construction companies across the world suffer from poor performance in the projects that they undertake (Mowery, 2016). According to CMS International Construction Survey (2017), the performance of construction projects in UK as at 2016 show a decline in profitability from 7 percent in 2014 to 5 percent in 2016. Further the projects that were completed in time and according to the budget were 45 percent. In the USA, it was reported that most construction companies had a failure and bankruptcy rate of 75 percent meaning that few of them succeed. A study by Kashiwagi (2013) identified the management of inventory as the biggest source of projects failure. Further the previous research show that 38 percent of the players within the construction sector see the issue of poor records on materials used as the main problem. A global construction survey (2015) indicated that globally, only 50 percent of the construction companies use a project management system with 32 percent of those using it having failed to integrate it with other systems starting from procurement systems, inventory management system and accounting systems.

In Malaysia, construction companies have existed for over 10 years, and all have the objective of profit maximization (Gitau, 2016). The companies do not focus on the amount of every item that the firms should hold in their stocks (Seboru, Mulwa, Kyalo, & Rambo, 2016). It has greatly affected the production, sales, and reduction of the project performance (Mowery, 2016). The companies are mandated to have a highly organized inventory management system due to the rapid change in the environment of projects. A rapid increase in competition affects the performance of projects (Robert, Lyria & Mbogo, 2019).

In Africa, the construction sector has not been without challenges just like in other countries of the world (Bamgbade, Mohammed & Nawi, 2016). The problems facing the construction companies are significant and more complex. In South Africa, the construction sector has been struggling with challenges and problems such as poor performance of projects (Sibiya, Aigbavboa & Thwala, 2014). Scarce resources and lack of transparency in systems of procurement and labor are some of the challenges (Construction Industry and Development Board, 2015). The construction sector in Nigeria comprises 22 percent foreign companies and 78 percent local companies, and while construction companies like Costain West Africa plc and Reynolds construction company, most of them are not able to operate on a large scale as they face the challenge of poor management of inventory and other resources (Osuzugbo, 2019). This often leads to poor performance.

In Kenya, inventory is estimated to contribute up to 56 percent of the sales and turnover of a firm per year; hence it plays a significant role (Robert, Lyria & Mbogo, 2019). With the surge in competition among the firms in Kenya, stakeholders have come up with the best techniques for measuring and managing the available scarce resources so that wastes can be eliminated (Mulandi & Ismail, 2019). Gitau (2016) states that firms with a high capability of managing inventory properly have a good chance of becoming competitive and ultimately improving their project performance.

Inventory management practices involve control and overseeing of the ordering, storage and also the use of items that are linked to production function of an organization either in a direct or indirect way (Lakshmi & Ranganath, 2016). It is also inclusive of the direction of all the activities that have the main purpose of getting inventory in the right quantity and time (Ondari & Gekara, 2013). The inventory management system a company uses has a direct or indirect effect on the profits (Mowery, 2016). Good inventory management is broad and covers the areas of finance, procurement along with selling hence for it to be effective the three areas must be harmonized (Balcik, Bozkir & Kundakciglu, 2016). Inventories are all the goods that a company holds so as to enhance its process of production (Pandey, 2017). If an organization does not manage its inventory properly, then it will not achieve its targeted profits and the customers will not be satisfied (Muller, 2019). Inventory management has major goals of providing inventories that are required to sustain various operations at a minimum cost (Gallino, Moreno & Stamatopoulos, 2017).

Proper inventory control requires an organization to undertake to stock and use appropriate stock valuation methods to avoid the wrong estimation of profits (Kotabo, 2012). Inventory management aims to ensure a proper balance between the shortage and excesses in the stock of materials (Laugero, 2018). Chen et al. (2015) assert that the performance of any business entity, therefore, is primarily determined by the inventory management practices put in place. In the recent past, the construction industry has faced numerous challenges as the stakeholders strive to manage inventory and it has greatly affected the performance of most of the construction companies (Ondari & Gekara, 2013). There have been incidences of overstocking materials that have expired or even outdated, stock taking theft, under stocking, and even experiencing delays in delivery (Kimani, 2016).

STATEMENT OF THE PROBLEM

Construction companies in Nairobi experience so many challenges, as they manage their inventories (Kairu, 2015). At times the costs of inventory run beyond the estimates and this eventually results in losses for the firms. Some of the large construction companies have many projects that have fixed prices based on the contracts, and they at times bear the risk of cost overruns. At times the companies experience interrupted operations because the inventory runs out of stock (Jagongo&Makori, 2015). Kairu (2015) found out that, they are forced to budget for more stock, and as a result the project takes longer than the estimated time. It definitely necessitates the management to incur more costs.

Gitau (2016) asserts that the major aim of the construction companies is to maximize profits. The financial performance of the companies is very crucial in determining whether it is able to meet its goals. The construction companies seem to focus more on acquiring more projects, since the industry is becoming more competitive, and they concentrate less on coming up with proper inventory management procedures (Bamgbade, Mohammed & Nawi, 2016). It is because of inadequate systems in place that there is a lot of inventory theft and this affects the overall performance of companies. Kimani, (2016) claims that the management is forced to procure more items for completion of a project.

There are a lot of shortcomings in the inventory control management that are employed by the construction companies (Jagongo&Makori, 2015). Ondari and Gekara (2013), claim that the companies are yet to lay the procedures to ensure that they maximize the profits of the organisation. The management needs to ensure that the approach they decide to employ suits the organisations, failure to do it, the profit margins will definitely decrease continually. Construction companies in Nairobi have been characterised by poor project performance with up to 40 percent of the projects being rendered incomplete (National Construction Authority, 2016). The key challenges arise from poor inventory management practices for instance shortage of materials used in construction, high costs arising mostly from poor budgeting and poor management of the projects (Osoro, 2016). Construction Companies in Nairobi just like many construction companies have grappled with inventory management challenges like wastages and huge costs.

2. LITERATURE REVIEW

Theoretical Literature Review

Lean theory was advanced in 1988 by John Krafcik and further explained by James Womack and Jones Daniel in 1996 through the concept of lean thinking. It first originated from the Toyota production system in Japan and initially applied to the manufacturing sector. Across the years however, the lean concept has been embraced in other sectors including the construction industry. The goal of the lean theory and concept is to ensure the processes in an organization are both effective and efficient with an ultimate aim of improving the project performance.

According to Lewin (2012), the lean theory in its application aims at ensuring that an organization eliminates wastages by making sure that the materials to be used are available in the right place, time and quantities, this not only ensures uninterrupted processes but also serves to get rid of wastages that are common in the production processes. In the end these processes are supposed to save money while ensuring that the customers are getting the right experience from using the products. In the field of inventory management, lean concept is helpful as it helps in ensuring that the right amounts of inventories are maintained to eliminate wastages.

The theory was of great significance to the current study in comprehending the connection between practices in inventory managing and the project performance of selected Construction companies in Nairobi. Some of the inventory managing systems that the current study examine will include; JIT, MRP and the EOQ. By examining how the application of these systems can help in improving the project performance, lean theory will provide a greater understanding on how these systems can be employed effectively to improve on the project performance.

Empirical Literature Review

Obollah, Waiganjo and Wachiuri (2015) made an assessment on practices in inventory managing and project performance of health institutions focusing on Kenyatta National Hospital. The approaches management of inventory that were examined were inclusive of; inventory shrinkage, inventory turnover, accuracy of inventory records as well as the inventory investments. A descriptive study was utilized and regression as a tool for analysing. The outcome revealed that ensuring the accuracy of inventory records and inventory investment had an affirmative influence whereas inventory shrinkage had a contrary link with performance.

Kotabo (2019) affirms that there are many systems that are effective in management of stock, both automatic and also manual. They are the most basic approaches that the systems are usually based. According to Nyanga (2019), the cost of proper inventory management should be monitored closely to have a stock that consists of the required materials. There is need to guarantee that there is stock taking to guarantee that the physical stock is kept in track, and also to ensure there is accuracy in the stock available.

Bawa, Asamoh and Kisi (2018) while analysing how inventory management techniques affect the outcomes of programs focused on Ghana's manufacturing companies, secondary data was utilized and focused on 14 listed firms through the period 2007 to 2016. Operating cash flows and profitability were utilized as the main measures of performance of the firms. Inventory management practices examined included; inventory budgets, inventory period, management efficiency and inventory conversion period. Findings depicted an inverse connection between inventory managing practises and project performance of the manufacturing companies in Ghana.

Mulandi and Ismail (2019) evaluated the impact of practises in inventory managing on the performance of the Kenyan state corporations. Thirty-three corporations were targeted with a census being adopted. Data was gathered via questionnaires with the analysis being done using regression. The inventory management practices examined included efficiency of the procurement processes as well as planning. The outcome revealed a positive linkage between the inventory practices and performance of commercial state corporations.

Maalim (2017) assessed the relationship between effectual inventory practices and the performance of business outlets in Mandera, Kenya. Inventory practices identified were; online delivery, proper staff skills and effective documentation systems. A descriptive research design was employed and descriptive statistics were used to evaluate the link between effective inventory management and performance. On the documentation issue, 77 percent of the participants agreed that effective documentation was an effective practice of inventory management. Further, 93 percent of the participants affirmed that improvement on the management of inventory leads to customer satisfaction.

3. RESEARCH METHODOLOGY

This study utilized a descriptive research design. The target population included three construction companies in Nairobi; Seyani Bros Ltd, Intex Ltd and EpcO Builders Ltd. 686 employees were drawn from Seyani Bros Ltd, Intex Ltd and EpcO Builders Ltd specifically working in procurement, finance and warehouse departments. A sample size of 206 was obtained through stratified random sampling technique. Using self-administered questionnaires, primary data was obtained and used to establish the sample size. Multiple regression analysis was utilized for inferential data analysis to establish relations between dependent and independent variables.

4. FINDINGS

The descriptive statistics on inventory management controls are discussed in Table 1.

Table 1: Descriptive Statistics on Inventory Management Controls

Statement	Mean	Standard deviation
There is adequate control of materials in the company	4.2179	.47393
There are adequate warehouse security measures put in place	4.1154	.42582
The company minimizes the double handling of materials in the warehouse	4.0256	.42562
Stock taking is undertaken periodically to check the quantity of inventory and materials to be used	4.0128	.37774
There is a continuous comparisons between the actual cost of inventory and the budgeted cost of inventory to avoid wastages	3.9359	.40579
Materials are inspected by an inspection officer upon receipt at the warehouse	3.8590	.50257
There are clear controls on the way purchase of raw materials are done including ensuring the requisition forms are filled as well as the local purchase orders	3.7179	.64259
There are adequate accounting controls that ensure that the inventory expenses incurred are expensed in accordance with the accounting standards	3.9615	.52080
Average Scores	3.9808	.4719

The findings in Table 1 shows that Most participants agreed that there were adequate inventory management controls in their respective companies, as shown by the mean of 4.2179 and SD of .47393. Most participants also agreed that adequate warehouse security measures were put in place based on the mean of 4.1154 and SD of .42582. Further, the participants

stated that their respective construction companies minimize the double handling of materials in the warehouse, as shown by the mean of 4.0256 and SD of .42562. As part of the inventory management controls, Most participants stated that stock-taking is undertaken periodically to check the quantity of inventory and materials used. This is indicated by the mean of 4.0128 and SD of .37774.

The participants also indicated that as part of inventory management controls, there is a continuous comparison between the actual cost of inventory and the budgeted cost of inventory to avoid wastages. This is clearly indicated by the mean of 3.9359 and SD of .40579. It was also indicated by the participants that the materials are inspected by an inspection officer upon receipt at the warehouse as shown by the mean of 3.8590 and SD of .50257. moreover, most participants stated that their respective construction companies had clear controls on the way purchase of raw materials are done including ensuring that the requisition forms are filled as well as the local purchase orders. This is shown by the mean of 3.7170 and SD of .64259. Finally, the participants stated that there were adequate accountings controls that ensure that the inventory expenses incurred are expensed in accordance with the accounting standards. This is shown by the mean of 3.9615 with SD of .5208.

The average mean of responses on various aspects of inventory management controls was found to be 3.9808, with an SD of .4719. The mean clearly shows that Most participants agreed on various components of inventory management controls, including; inspection, warehouse security measures, controls on the purchase of materials, stock taking, budgeting, and accounting controls. The SD is below 1, which shows that there were fewer variations in terms of the responses given. Previous studies have also established the importance of inventory management controls in project performance. Lakshmi and Ranganath (2016) observed that a company could achieve some outstanding performance only if it has efficient storage of materials. Laugero (2018) also stated that inventory Storage is fundamental; hence the warehouse security should be enhanced by the firm to avert damages to materials while ensuring proper storage pending their usage.

On the issue of stock taking, Jagongo and Makori (2015) observed that inventory control can be done through the introduction of measures that will prevent companies from incurring losses that are unnecessary in various departments hence Stock taking can be done at the end of every other month so as to keep up to date records of the stocks that are available. Bawa, Asamoah and Kissi (2018) while examining the impact of inventory management on the performance of the firms centred on the listed manufacturing firms in Ghana established that inventory budgets help in inventory management and helps in enhancing performance. Orga and Mbah (2017) sought to determine how inventory management practices affect the organisational performance of departmental stores in South East of Nigeria. The findings established that materials inspection is a significant and effective inventory management practice and has a bearing on the organisational performance in the long run by way of eliminating wastages.

Results of Inferential Statistics

Table 2: Correlation analysis

		Project Performance	Inventory Management Controls
Project Performance	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	141	
Inventory Management Controls	Pearson Correlation	.356**	1
	Sig. (2-tailed)	.002	
	N	141	141

According to Chris (2008), a correlation test helps in showing the nature of correlation between the independent and the dependent variables. A correlation coefficient of .8 or -.8 which is equal to 64 percent in terms of the coefficient of determination shows a strong correlation. From the findings in Table 2, inventory management controls had a weak correlation with project performance.

Results of Regression Analysis

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Sig. F Change
1	.748 ^a	.559	.540	.000

The findings in Table 3 show that the correlation coefficient (R) is .748. Before adjustment the coefficient of determination (R²) is .559 which becomes .540 after adjustment. Based on the findings it can be inferred that 54% of the changes in project performance are explained by inventory management controls.

Table 4: Analysis of Variance

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	2.619	1	2.619	174.60	.000 ^b
Residual	2.067	139	.015		
Total	4.686	140			

ANOVA analyzes the differences in statistics of the mean in various groups that make up a population. The results in Table 4 illustrate that the p value is .000 an indicator that the inventory management controls had a significant effect on the project performance of construction companies in Nairobi.

Table 5: Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	1.058	.349		3.032	.003	.362	1.754
1 Inventory management controls	.126	.062	.171	2.034	.046	.003	.250

From the findings in Table 5, a unit increase in inventory management controls improves the project's performance by .126 times, holding other factors constant. The increase is significant given that the p-value is .046. This implies that inventory management controls have a significant and positive effect on the project performance of construction companies. The findings are consistent with the findings reviewed in past studies. A study by Lakshmi and Ranganath (2016) established that inventory management controls significantly affect performance. Nyanga (2019) asserts that control of materials is one of the policy procedures that is used in managing materials, and they include; period, continuous, spot, and any other control reinforced by the management to carry out all those activities that are aimed at ensuring that there is an effective way of managing materials. Kotabo (2019) suggested that Increasing the security of the warehouses and limiting access to them minimizes inventory theft.

5. CONCLUSIONS

The study concluded that inventory managing controls has a significant and positive effect on the project performance of the construction companies. Through inventory management controls the construction firms may regulate inventory levels by keeping the right amount of each product in stock, monitoring their purchase orders, and maintaining a working supply chain.

6. RECOMMENDATIONS

The study recommended that the construction companies should embrace inventory management controls specifically; warehouse security measures, minimal double handling of materials, stock taking, inspection of materials and accounting controls. A proper management of these inventory control processes can help in eliminating wastages and stock shortages hence ensuring that projects are completed in a timely manner.

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