

FACTORS AFFECTING IMPLEMENTATION OF INVENTORY CONTROL SYSTEMS IN MANUFACTURING INDUSTRIES IN KENYA.

A CASE STUDY OF EAST AFRICAN PACKAGING INDUSTRIES LIMITED

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CITATION: Birchogo, M. J & Ochiri, G (2015). Factors Affecting Implementation Of Inventory Control Systems In Manufacturing Industries In Kenya. A Case Study Of East African Packaging Industries Limited. *International Journal of Human Resource and Procurement*, 4 (4), 1-12.

ABSTRACT

Inventory control System is typically a key aspect of almost every manufacturing and/or distribution operation business. Despite the relentless effort research has shown that the promotion of inventory control system among Kenyan companies has not been very effective in terms of implementation. Organizations are therefore turning to using modern technology to overcome such challenges. Implementing inventory control system faces numerous implementation challenges. The objective of the study will be to determine if Cost, technical capacity, organization culture, and availability of ICT systems are the factors affecting implementation of inventory control systems in manufacturing industries in Kenya. The study used a descriptive survey research design and data was collected through the use of the questionnaires. Five point likert scales was used to collect data. Collected data will be analyzed using SPSS software version 22.0. The study findings will then be presented in frequency tables and charts. The study concluded that improved anticipation of future developments in manufacturing firms in Kenya will improve their successful implementation of control systems and new technologies are promising to save costs and thus improving the successful implementation of control systems.

Keywords: *inventory control system, implementation, manufacturing and inventory.*

INTRODUCTION

Modern inventory control systems are almost exclusively based on barcode technology (CheckMate, 2009). Though barcodes were initially developed to automate the process of grocery store checkout, their ability to encode a wide variety of alphabetic and numeric symbols makes them ideal for encoding merchandise for inventory applications. Inventory control systems work in real-time using wireless technology to transmit information to a central computer system as transactions occur (Rehg, 2009). According to Evans (2008), inventory control systems are employed in a wide variety of applications, but they all revolve around tracking delivery of goods to customers. Inventory control is crucial in retail stores, especially those with a large number or variety of merchandise items for sale. Inventory control is also used in warehouses to track orders and shipments, and for automated order processing. Other important applications of inventory control systems are in manufacturing, shipping, and receiving (Heron, 2009).

A company may sustain competitive advantage by employing appropriate inventory control systems. According to Rajeev, (2008) there is increasing need for business enterprises to embrace effective inventory management practices as a strategy to improve their competitiveness. Similarly Sushma & Phubesh, (2007) in their study of 23 Indian consumer electronics industry firms established that business inventory management policies had a role to play in their profitability performance. According to Ogbadu, (2009) profit is an index for measuring performance. Manufacturing operational performance is a combination of practices; hence several performance measures can be used efficiently. According to Vastag & Whybark, (2005) the most typical measures of operational performance are rejects and scrap, reworking, labour and machine productivity, product quality, inventory levels and turnover, unit manufacturing cost, manufacturing cycle time, delivery speed and reliability. Since improving productivity has been a matter of interest to both government and scholars, the task that lies ahead is to promote inventory control systems more widely, get more manufacturing industries to implement it and expand the concept to departments other than just the production line and to industries other than manufacturing (Webster's, 2012). Experts have been involved to conduct workshop and practice-oriented seminars on inventory control systems (Lockard & Robert, 2010). This is expected to assist the country to sustain her productivity growth and enable the more effective use of capital (Rehg, 2009). Nigerian survey revealed that 31% of inventory control system applicants experienced productivity improvement. 31% of the companies surveyed claimed a decrease in customer complaints, as compared with 25% who claimed a decrease in defects. This indicates that customers are satisfied not only with the better product quality, but also with the company's ability to cater to their changing needs in a timely manner (Herko, 2009).

The study on manufacturing Companies in Kenya was carried out in Nairobi, where the population of interest consisted of large and medium manufacturing firms. Out of a total of 75

firms visited, 73% accepted to be interviewed with the respondents being the CEOs, purchasing managers, management accountants, materials managers and logistic managers (KIPPRA, 2010). Data analyzed contained 54.5% local firms, 18.2% foreign firms and 27.3% joint ownership. Further, 63.6% of the firms were from medium category and the rest from large firm's category. Further analysis showed that 32.7% of firms were listed in Nairobi stock exchange and the sample selected considered the populations existing in each category and accessibility of the relevant information required for the research (KIPPRA, 2010). Interestingly, 49% of the firms had specific departments that performed materials functions while 71% of the organizations with sales turnover of Ksh 5.1 billion and above had specific departments dealing with material functions. Activities performed were mainly; purchasing, receiving materials, inventory control; materials and purchasing research; materials planning and control. The results indicate that 64% of the firms were using inventory control system (KARI, 2009).

Manufacturing Industry in Kenya

Kenya's manufacturing sector is among the key productive sectors identified for economic growth and development because of its immense potential for wealth, employment creation and poverty alleviation (KIRDI, 2008). In addition, the sector will continue to provide impetus towards achievement of Millennium Development Goals (MDGs) both in the medium and long term goal particularly one on Eradication of extreme Poverty and hunger and goal eight on Global Partnerships for Development (KARI, 2009). The sector is expected to play a key role in the growth of the Kenyan economy. The overall goal of the sector is to increase its contribution to Gross Domestic Product (GDP) by at least 10 per cent per annum. In addition the sector is expected to register a growth of 10 per cent in the medium term period; (2008-2012) this is to be driven largely by local, regional and global markets (KIRDI, 2008)

Manufacturing sector makes an important contribution to the Kenyan economy and currently employs 254,000 people, which represents 13 per cent of total employment with an additional 1.4 million people employed in the informal side of the industry. The sector is mainly agro-based and characterized by relatively low value addition, employment, and capacity utilization and export volumes partly due to weak linkages to other sectors (KIPPRA, 2010).

Statement of the Problem

Inventory control is found in every step of the SCM hence becoming typically a key aspect of almost every manufacturing and/or distribution operation business. The ultimate success of these businesses is often dependent on its ability to provide customers with the right goods, at the right place, at the right time (Herko, 2009). It also ensures proper relationship between sales and inventory can be maintained, and provides the organizations in the manufacturing sector with information needed to take markdowns by identifying low-selling merchandise (Aviv, 2007).

East African Packaging Industries uses traditionally Kanban systems to control the amount of stock held on the production line. The manufacturing processes become “slicker and quicker” due to the part or stock only being delivered to the line as it is needed. Inventory control systems employed have resulted to high cost of supplying inventory; cost arising from holding inventory and insufficient inventory are frequently experienced (Hogan, 2010). East African Packaging Industries has not integrated inventory management with modern information technology which has resulted to reduced quality and increased turnaround time. It is unable to handle big orders which has resulted to increased lead time, increased inventory and warehouse space investments. There have been attempts to implement modern inventory control systems like JIT which have met resistance from staff (Herko, 2009).

Despite the relentless effort research has shown that the promotion of inventory control system among Kenyan companies has not been very effective in terms of implementation (KIPPR, 2010). In today’s highly competitive business environment in Kenya, organizations are striving to achieve effectiveness, cost efficiencies and economies of scale. Most of these organizations hold inventory so as to meet their customers’ needs. However, managing these inventories in order to achieve their objectives has posed a great challenge to the firms (Lockard and Robert, 2010). Many firms have not yet established how much to invest in inventories and the right inventory levels to hold so as satisfy customers (KIPPR, 2010). Organizations are therefore turning to using modern technology to overcome such challenges. Implementing inventory control system faces numerous implementation challenges. This study therefore needs to address global standardization, government regulations, and cost in implementation of inventory control system (Hogan, 2010).

LITERATURE REVIEW

According to Nichols (2008), success implementation of inventory control system encompasses a combination of five factors which are; timely and accurate data, appropriate inventory control models, accurate forecasting, meaningful objectives, and implementation. All the factors are equally important because each depends on all of the others. Without data and forecasting there is nothing to feed into the model. Without objectives there is no way to measure success or failure. Without implementation inventory control system is merely theoretical (Berg, 2009).

Timely and accurate data is the first factor in successful implementation of inventory control system. Timely and accurate data about demand, available supply, existing stock, and plant or warehouse capacity is the beginning of the process by which business reality becomes transformed into the figures and abstracted models necessary for forecasting and decision-making (Herko, 2009). Humanity succeeds on the strength of our ability to translate the infinitely various details of the world of phenomena into models that are both simple enough to hold in the

mind and accurate enough to be a sound basis for advantageous decisions in a particular context (Stephen and Stuart, 2007).

Models; in the inventory control world, simple and effective models have been available for more than fifty years. The last fifty years have also seen the permeation of business by the computer: a machine which has replaced the often makeshift, haphazard, or cumbersome inventories of the past with database systems that are reliable, centralized, and easy-to-use (Lockard, 2010). One of the surprises of the last half-century has been the success of this world-changing technology that not only matched but exceeded most of the hype in its attendance, replacing file cabinets, punch-cards, and human memory with a plastic box on top of a desk (Berg, 2009). Computers- The computer has also helped greatly enhance forecasting power. Inventory control can be defined as the maintenance of the most efficient, least expensive buffer between demand and supply (Kies, 2005).

The more one knows about future demand and future supply, the less safety stock one has to hold. An inventory controller who knew exactly what would be available when, and exactly what would be in demand when, could get by with minimal stock (Herko, 2009). But the accurate data upon which forecasting depends means something, as we have said before, only in a certain context. To know what to do with data one must know what one wishes to accomplish: the goal or objective. This objective, or system of objectives, is our fourth factor (Aviv, 2007). Most stock-holding businesses describe their objective in terms of two figures: service level, which is the percentage of customer orders that can be met directly from the business' own stock, without backordering - and the cost of holding stock. Service level is to be maximized and the cost of holding stock is to be minimized. Both are objective figures that directly index the business' efficiency and profit - hence they are so valuable. (Nichols, 2008). With vague, unobjective, or mistaken goals it is easy for a manager to believe that stock control is improving when it is actually falling apart. Having precise objectives also gives employees and managers the valuable psychological advantage of being self-directed actors capable of exactly measuring their performance. Just-in-Time is not an exception because in the Just-in-Time methodology goals are actually even more methodic and objective than in most traditional systems (Stephen and Stuart, 2007). Managerial and physical ability- Managerial and physical ability are used to implement the decisions of inventory control System. This is the bottleneck factor without which the others are irrelevant, because it is the factor that turns theoretical inventory control into practical inventory control. It comprises everything between the making of the decision and its final, physical result, which can then be measured against set objectives (Evans, 2008).

RESEARCH METHODOLOGY

The study research design for this study was a descriptive survey research design one since it provided data from the population on the universe being studied; the researcher has no control over the research variables (Jankowicz, 2005). The target population in the study will be all staff

of East African Packaging Industries Limited which is 200; the study population category will be top management staff, middle management staff and junior staff of East African Packaging Industries Limited. A questionnaire was used to collect data. A multiple regression model will be applied to analyze the relationship between the various variables.

RESULTS AND FINDINGS

Findings of the Study Variables

Inventory Control Systems

The study sought to find whether use of obsolete inventory control systems affect implementation of quality inventory management. The findings showed that 74% of the respondents agreed that use of inventory control systems affect successful implementation of inventory control systems and thus leading to improved organizational successful implementation of control systems whereas 26% of the respondents believed on contrary therefore inventory control systems doesn't affect successful implementation of inventory control systems. The findings are in collaboration with literature Ma & Tang, (2001), who argued that control Systems helps to develop quality process based reviews for process improvements that reduce process variability and aim for "zero defect". Inventory Control Systems facilitates resource integration and decision making through cross functional teams that improve efficiency and effectiveness. One way to improve operations is to set up automated inventory tracking from the time you accept merchandise at the receiving dock or factory floor to the sale of your goods.

Cost constraints

The study sought to determine whether cost constraints are necessary in successful implementation of control systems of East African Packaging Industries Limited. The results showed that 74% of the respondents agreed that cost constraints is necessary for successful implementation of control systems of East African Packaging Industries Limited while 26% of the respondents believed on contrary. This is in line with the literature by A.O. Olukunle, (2008) that inventory management will eliminate wastages on the materials used for production.

Technical Capacity

The study sought to establish whether employee technical capacity affects successful implementation of inventory control systems. According to the findings, majority of the respondent's representing 63% concurred that employee competency and skills affect successful implementation of inventory control systems while 37% of them indicated that employee competency and skills did not affect successful implementation of inventory control systems at all. This is shown by figure 4.5 below. This gives a general implication that employees should be equipped with skills and competences which are imperative tools that facilitate implementation of inventory control systems.

This is supported by a study by Deming, (2008) who indicated that education and training are fundamentals for the successful implementation of inventory control systems; he continued to say that of inventory control systems requires employee's participation; each employee needs to learn and understand the underlying principles of inventory control systems. Employees need to have the right skills and they should be granted a platform that enables them to implement the principles of inventory control systems. They need to have the right attitude for participating in of inventory control systems implementation.

Organization culture

The study sought to find out the extent to which Extent to which Organization culture factors affect Successful implementation of Inventory Control System at East African Packaging Industries Limited. According to the findings, the respondents agreed to a very large extent that Leadership culture is a key to the success of inventory control system adoption, the respondents also agreed that to a large extent that Organizations communication culture determines the success of inventory control system implementation of the East African Packaging Industries Limited as shown by means of 4.31 and 3.98 respectively.

The study further revealed that the respondents agreed to a moderate extent that the way in which information is accepted is central to the way inventory control systems implementation affects the successful implementation of control systems of an organization as shown by a mean of 3.36 and 2.91 respectively. Management attitudes and values concerning control, management, and communication can hinder successful implementation of inventory control system as shown by a mean of 2.64 and a standard deviation of .54.

Information communication technology

The study sought to find the extent to which Information communication technology factors affect Successful implementation of Inventory Control System at East African Packaging Industries Limited. From the findings, the respondents agreed that Lack of ICT systems leads to problem during implementation of inventory control system to very large shown by a mean of 4.56 and that also they strongly agreed that the cost of packaged inventory control software depends on the scope of implementation to a very large extent as shown by a mean of 4.78 and a standard deviation of 0.97. The study further showed that the respondents agreed that Need analysis of ICT systems is important for inventory control system implementation as shown by a mean of 4.34 and a standard deviation of 0.91, also the respondents agreed that Information communication technology can be used as a filter in terms of a consumer's perception of quality to a large extent as indicated by a mean of 3.91 and a standard deviation of 0.94. The findings were in collaboration with Dimitrios, (2008) who argued that ICT always means reduced costs, reduced inventory levels, improved production predictability, increased customer service, and better quality. To reduce cycle time, manufacturers need to streamline every aspect of their operations, especially the order-to-delivery process

Regression analysis

A linear multiple regression analysis was used to test the relationship between the four independent variables (cost constraints, inventory management systems, organizational culture and information technology) and the organizational successful implementation of control systems. The researcher applied the statistical package for social sciences (SPSS) to code, enter and compute the measurements of the multiple regressions for the study.

Coefficient of determination explains the extent to which changes in the successful implementation of control systems of manufacturing firms can be explained by the change in the independent variables (cost constraints, inventory management systems, organizational culture and information technology).

Table 4. 1 Model Summary

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate	Change Statistics	
					F Change	Sig. F Change
1	.792 ^a	.627	.597	.5224	3.567	.031

According to the findings in the table above, the value of adjusted R^2 is 0.596. This indicates that a variation of 59.7% of successful implementation of control systems of manufacturing firms is explained by the four independent variables at a confidence level of 95%. In addition, other factors that were not studied in this research contribute to 40.3% of the successful implementation of control systems of manufacturing firms. Therefore, further research should be conducted to investigate the other factors which contribute to that 37.3% of the successful implementation of inventory control systems at East African Packaging Industries Limited.

The significance value is 0.031, which is less than 0.05, thus the model is statistically significant in predicting how the independent variables (cost constraints, inventory management systems, organizational culture and information technology) affect the dependent variable (successful implementation of inventory control systems). The F critical at 5% level of significance was 2.56. The F calculated (value = 3.567) was greater than the critical value ($3.567 > 2.56$), an indication that the independent variables (cost constraints, inventory management systems, organizational culture and information technology) affect the successful implementation of inventory control systems.

Table 4. 2 ANOVA^a

Model		Sum of Squares	df	F	Sig.
1	Regression	50.120	4	3.567	.031 ^b
	Residual	3.048	49		
	Total	53.168	53		

After regression the equation;

$Y = 0.254 + 0.242X_1 + 0.432X_2 + 0.091X_3 + 0.043X_4 + \varepsilon$ will be achieved

Where Y is the dependent variable (successful implementation of control systems of manufacturing firms) X_1 is the Cost Constraints, X_2 is inventory management systems, X_3 is organizational culture, X_4 is the Information communication technology.

Taking all independent variables constant at zero, the successful implementation of control systems at East African Packaging Industries Limited will be will be 0.254. The data findings also showed that taking all other independent variables at zero, a unit increase in inventory management systems will lead to a 0.432 increase in the successful implementation of control systems at East African Packaging Industries Limited; a unit increase in cost constraints will lead to a 0.242 increase in the successful implementation of control systems at the East African Packaging Industries Limited; a unit increase in the organizational culture will lead to a 0.091 increase in the successful implementation of control systems of the East African Packaging Industries Limited while a unit increase in the Information communication technology will lead to a 0.043 increase in the successful implementation of control systems of the East African Packaging Industries Limited. Therefore inventory management systems contribute more to the successful implementation of control systems at the East African Packaging Industries Limited. At 5% level of significance and 95% level of confidence; cost constraints showed a 0.024 level of significant; inventory management systems showed a 0.017 level of significant; organizational culture showed a 0.027 level of significant and Information communication technology showed a 0.035 level of significant.

Table 4. 3 Multiple Regression

Model	Unstandardized		Standardized	t	Sig.
	Coefficients				
	B	Std. Error	Beta		
(Constant)	.254	.472		.141	.031
Cost constraints	.242	.183	.241	.567	.024
Inventory control systems	.432	.341	.493	.374	.017
Organizational culture	.091	.137	.106	.643	.027
Information communication technology	.043	.110	.068	.243	.035

Conclusion

The study concluded that cost constraints are necessary for implementation of inventory management for successful implementation of control systems of manufacturing firms. The study

concluded that holding stocks and ordering costs may increase the successful implementation of control systems of an organization. Cost constraints helps in preparing employees towards managing the inventory ideology and equips organization with sufficient resources and that inventory cost constraints helps in achieving profitability objective.

The study concluded that improved anticipation of future developments in manufacturing firms in Kenya will improve their successful implementation of control systems and new technologies are promising to save costs and thus improving the successful implementation of control systems at East African Packaging Industries Limited. The study further concluded that IT is a competitive tool in the organization for organization for realizing its corporate competitive strategy. The study concluded that information sharing and a channels relationship affect the successful implementation of control systems of the manufacturing firms and enhances production.

Recommendation

The study recommended that manufacturing firms should minimize the cost of production (which includes materials, labour and service costs) to attain their optimum successful implementation of control systems level. The costs involved in inventory-production that are incurred by a manufacturing company are categorized under holding stocks and ordering costs. Cost constraints is necessary for implementation of inventory management for successful implementation of control systems of manufacturing firms because inventory cost constraints eliminates wastages on the materials used for production, the study further recommended that holding stocks and ordering costs may increase the successful implementation of control systems of an organization and helps in preparing employees towards managing the inventory ideology. Cost constraints also equip organization with sufficient resources and that inventory cost constraints helps in achieving profitability objective if they costs are maintained optimally. The study recommended that use of obsolete inventory control systems influence negatively implementation of quality inventory management in manufacturing firms in Kenya.

The study recommended that improved anticipation of future developments in manufacturing firms in Kenya will improve their successful implementation of control systems. The study further recommended that there should be unified data, information sharing and channels relationships and use of IT as a competitive tool in the manufacturing firms for realizing their corporate competitive strategy.

Suggestion further Study

The objective of the study was to investigate the role of effective inventory management on successful implementation of control systems of manufacturing firms in Kenya. It recommends that a similar research should be conducted with an aim at investigating the impact of inventory

management on the successful implementation of control systems of manufacturing firms in Kenya.

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