

# **ROLE OF VENDOR MANAGED INVENTORY ON SUPPLY CHAIN PERFORMANCE IN MILK PROCESSING FIRMS IN KENYA: A CASE OF NEW KENYA COOPERATIVE CREAMERIES**

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## **ABSTRACT**

The past 15-20 years have seen an increase in research focusing on operational issues relating to supply chain management. Most of the research has been related to multi-echelon inventory models. These ideas were first implemented in the retail and manufacturing industries. The general objective of this study was to examine the role of vendor managed inventory on supply chain performance in milk processing firms in Kenya. The study was built upon the theories of resource based view theory, E- technology perspective, supply chain operations theory and transaction cost economics theory. The specific objectives of the study were to determine how ICT systems, top management support, lead time and supplier demand affects chain performance in Kenya. The study target population was 500 respondents. The sample size of the study was 50 respondents. A descriptive research design was used in the study. Primary data was collected using a questionnaire. A pilot study was conducted to pretest the validity and reliability of instruments for data collection. The raw information was analyzed to yield qualitative and quantitative data with help

of SPSS version 20 and Excel at 5% level of significance and 95% confidence level. The study also established that a unit increase in ICT systems would lead to an increase in the supply chain performance of the new KCC by a factors of 0.231 thus the study concludes that ICT systems had a positive effect on supply chain performance, a unit increase in top management support would lead to an increase in supply chain performance of the new KCC by factors of 0.257, a unit increase in lead time would lead to an increase in supply chain performance of the new KCC by a factor of 0.246, a unit increase in supplier demand would lead to an increase in supply chain performance of the new KCC by a factors of 0.286. The study recommends that the management of New KCC should show full commitment in the entire supply chain. The organization need to adopt the use of ICT systems, effective top management support and accommodate supplier demand efficiently for improved supply chain performance.

**Key Words:** *ICT systems, top management support, lead time, supplier demand*

## **INTRODUCTION**

In the earlier years, Inventory Management was treated as a cost center, since Purchasing Department was spending money on inventory while Stores was holding huge stock of inventory, blocking money and space, Ramakrishna (2005). Service companies' worldwide has been working out various strategies to face the challenges and to cut down manufacturing costs to remain competitive (Blomqvist, 2006). Supply chain management is the process of efficiently integrating suppliers ,manufacturers ,warehouses and stores so that merchandise is produced and distributed in right quantities ,to the right locations ,and at the right time in order to minimize system wide costs while satisfying service-level requirements. The past 15-20 years have seen an increase in research focusing on operational issues relating to supply chain management. Multi echelon inventory Management refers to the management of

inventory and coordination of distribution processes in more than one level of the supply chain network. These ideas were first implemented in the retail and manufacturing industries (Silver, 2008). Rajeev (2008) highlight that the identification of specific customer service needs and the response to those needs by using available resources in order to satisfy those customer requirements remain a priority number-one for all the successful business organizations in general and manufacturing industries in particular. In America, inventory contributes to almost sixty percent 60% of the annual turnover in the manufacturing firms. Those firms that can generate a given level of profit with a lower level of investment in inventory will generate higher cash flows and better return on invested capital. Thirdly, higher levels of inventory tend to lead to more problems with write-offs of slow, excess and obsolete inventories (SLOBs), which can hammer a company's profit line, especially in today's environment of rapid product lifecycles (Ramakrishma, 2005). According to the Supply chain digest (Gilmore, 2007), the data analysis on inventory show continued upward pressure on inventory levels, with average inventories across all industry sectors up by 2.1% in 2006.

Inventory plays a big part in service firms as it account for about 56% of the annual turnover. Kenyan firms are faced with a lot of competition in the current markets. This has led to the need for coming up with better method of managing and measuring how resources are utilized by various jobs or products, and therefore be able to eliminate any wastage in the value chain. Otieno (2011) explains that companies which are able to manage their long term business relationship by crafting mutually beneficial supply chains normally have high global volume, regular and standardized (predictable) demand, supply requirements and low switching costs. This reinforces long term business relationship and brand building. New Kenya Cooperative Creameries is a public firm in Kenya. The New KCC is an integral part of the Kenyan Manufacturing sector with an outstanding reputation as the largest dairy company in Africa and the oldest in East and Central Africa, having been founded in 1925 by European farmers. New KCC has also developed export channels for its products especially in the East African Community (EAC) and Common Market for Eastern and Southern Africa (COMESA). Over the years, its production capacity has grown and it presently has creameries, over 9 cooling and collection centers and 6 sales depots. New KCC's vision is to be the preferred dairy of international standing, providing high quality products. New KCC's focus has always been on quality. The company's distribution system ensures that its products are available in small shops all over the country. The firm controls about 38.2% of all milk produce in Kenya and as such inventory management is of paramount importance in this firm to maintain its profitability.

## **STATEMENT OF THE PROBLEM AND CONCEPTUALIZATION**

In majority of manufacturing industries, inventory constitutes some significant part of current assets. Effective management of inventory can lead to a reduction in cost, resulting in a significant saving. A potential 6% saving on total cost through effective inventory management is achievable (Bell & Sturkhart, 2007). Today, it is commonly accepted that the cost of holding stock to a business is between 4% and 10% on top of the stock's value (PPOA, 2005). In 2012 New KCC was affected by poor inventory management related cases

leading to low performance (KAM, 2013). This caused erratic deliveries in these firms, late deliveries and inflexibility hence affecting customer satisfaction with in their downstream chain (KAM, 2013). Unavailability of integrated inventory management has affected supply chain performance at New KCC hence reduced profits in the downstream chain hence leading to loss of chain profits (Otieno, 2011). There are few local studies done on establishing the role of effective inventory management in enhancing performance of commercial firms in Kenya. There are studies done on the adoption of inventory management systems by the public sector in the developed world. Thus the need to validate these in the context of the developing countries and in specific the firming sector in the developing countries since the implementation of inventory management systems will adversely affect positively performance in terms of increasing the effective and efficiency of inventory management in the private sector. Thus the study focused on how vendor managed enhances supply chain performance of firms in Kenya. This study therefore sought to establish the role of vendor managed inventory in enhancing supply chain performance in Kenya.

### **SPECIFIC OBJECTIVES OF THE STUDY**

1. Determine how ICT systems affect supply chain performance in Kenya.
2. Assess how top management support affects supply chain performance in Kenya
3. Investigate how lead time affects supply chain performance in Kenya.
4. Establish how supplier demand affects supply chain performance in Kenya.

The study focused on independent variables such as ICT systems, management support, lead time and supplier demands and how they affected supply chain performance. The study had the following conceptual framework:

### **MATERIALS AND METHODS**

A descriptive research design was used in this study. Orodho & Kombo, (2002) argues that this choice of this design was appropriate for this study since it utilizes a questionnaire as a tool of data collection and helps to establish the Role of vendor managed Inventory on supply chain Performance of new Kenya Cooperative Creameries Ltd. The target population of this study comprised of the general staff of New KCC headquarters which are 500. Thus Role of vendor managed Inventory on supply chain Performance of the new KCC and its application are relevant at this level prompting the choice of the population. A list that contains the number of all staff was sourced from the human resource department. This was used as a sampling frame to identify every single element in the target population. The samples size of this study was 50 respondents. Since the population is highly homogeneous, a 10% proportion was used to select all respondents from the headquarters branch. The technique gives more accurate results when most of the variation in the population is within group (Orodho and Kombo, 2002). The researcher used questionnaire as the research instrument. This is because of their simplicity in the administration and scoring of items as well as data analysis (Gronhaug, 2005). The study utilized quantitative and qualitative questionnaire that was developed for generating information on key variables of interest from the targeted respondents in this study. The research undertook desk review of existing information about

the study areas and collect qualitative data through in-depth interview from respondents who are conversant with the subject through various interactions or experiences.

Primary data was collected using a questionnaire covering the role of vendor managed inventory on supply chain performance in Kenya. The questionnaire contained both structured and unstructured questions. The open-ended questions was used to limit the respondents to given variables in which the researcher is interested, while unstructured questions was used in order to give the respondents room to express their views in a more pragmatic manner Kothari (2003). A pilot test was conducted using questionnaires administered to the staff. This will constitute 10% of the respondents. The pilot test was undertaken to pretest data collection instrument for validity and reliability. According to Sekeran (2003), a pilot study is necessary for testing the reliability of data collection instruments.

The study conducted factor analysis to select a subset of variables from a larger set based on the original variables with the highest correlations with, the principal component factors. Reliability analysis was conducted using Cronbach's alpha to determine whether the data gathered on each variable had a significant relationship with the role of vendor managed inventory on supply chain performance In Kenya. To measure the reliability of the gathered data, Cronbach's alpha was applied. Cronbach's alpha is a coefficient of internal consistency. The research will adopt content validity which refers to the extent to which a measuring instrument provides adequate coverage of the topic under study. The content validity was achieved by subjecting the data collection instruments to an evaluation group of supply chains experts who provided their comments and relevance of each item of the instruments and the experts indicate whether the item is relevant or not.. The content validity formula by Amin (2005) was used to in line with other previous studies (Cull, Deigurc-kunt & Morduch, 2007; Lefort & Urzua, 2008; The formula is; Content Validity Index = (No. of judges declaring item valid) / (Total no. of items). It is recommended that instruments used in research should have CVI of about 0.78 or higher and three or more experts could be considered evidence of good content validity (Amin, 2005). Once the questionnaires are received they were coded and edited for completeness and consistency. Quantitative data was analyzed by employing descriptive statistics and inferential analysis using statistical package for social science (SPSS). This technique gives simple summaries about the sample data and present quantitative descriptions in a manageable form, Gupta (2004).

The hypothesis testing was done at 5% level of significance and SPSS version 20 and excel was used for this purpose. The data was then presented using frequency distribution tables, bar charts and pie charts for easier understanding. Supply Chain Performance in Kenya was regressed against four variables of the role of cost reduction, technology, lead time and supplier demand. The equation was expressed as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon,$$

Where: Y is Supply chain performance in Kenya,  $\beta_0$  is the constant (coefficient of intercept), X1 represents ICT systems, X2 the Top management support, X3 is the Lead time while X4

represents Supplier demand.  $\epsilon$  is the error term and  $\beta_1, \dots, \beta_4$  represents the regression coefficient of four variables.

## **RESEARCH RESULTS AND DISCUSSIONS**

The study targeted a sample size of 50 respondents from which 45 filled in and returned the questionnaires making a response rate of 90%. This response rate was satisfactory to make conclusions for the study. The response rate was representative. According to Mugenda and Mugenda (2003), a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. Based on the assertion, the response rate was considered to excellent.

### **ICT Systems**

The study sought to establish whether ICT systems affects supply chain performance at New KCC and from the research findings, majority of the respondents (93.3%) agreed that ICT Systems affects supply chain performance at New KCC. 93.3%. Majority of the respondents agreed that ICT systems helps to develop quality process based reviews for process improvements in supply chain. The findings concurred with the findings by Avanti's and Loukis (2009) who advocate that the use of ICT has direct implications for firms. ICT helps in areas such as information gathering and dissemination, inventory control and quality control.

### **Top Management Support**

The study which sought to establish whether top management support affects inventory management at New KCC, from the research findings, found out that majority of the respondents as shown by 86.7% agreed that top management affect inventory management as well the performance at New KCC. Top management support affected the performance at New KCC to a great extent. Collaborative relationships with supplier for or innovative supply chain performance, top level management train employees on the use of quality statistical and control tools. Top management is willing to take accountability for inventory management and delivery time lines. the findings concurs with the study findings by Juran and Gryna (2008) that top management must communicate inventory management to the entire organization to create awareness, interest, desire and action.

### **Lead Time**

The study sought to establish the extent to which respondents agreed with the below statements relating to relating to effects of lead time on supplier performance at New KCC, from the research findings, majority of the respondents agreed that, favorable and well-known time, strong inventory management enhances supply performance at New KCC.

### **Supplier Demands**

The study sought to establish the extent to which respondents agreed with the below statements relating to Supplier Demands on supply performance at New KCC, from the research findings majority of the respondents agreed that, Information sharing enhances

supply performance at New KCC. The study also established that by concentrating on establishing and developing long term relationships these costs can be offset, with both parties actively looking to avoid any unnecessary costs which may arise from re-tendering, re-negotiating or being forced to exit an existing contract early. The findings were in line with the findings by Kimberly and Evanisko (2001) that Better relationships and increased interaction will lead to less incidents or issues of poor performance, which in turn lead to lower costs for managing the relationship and reduced costs through failures.

**REGRESSION ANALYSIS**

Multiple regression analysis is a statistical process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. The study conducted a multiple linear regression analysis to determine the relationship between independent variables and the dependent variable.

**Table 1: Model summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.919	.844	0.772	.32561

Adjusted R squared is coefficient of determination which tell us the variation in the dependent variable due to changes in the independent variable. From the findings in the above table the value of adjusted R squared was 0.772 an indication that there was variation of 77.2percent on supply chain performance of the new KCC due to changes in ICT systems, top management support, lead time and supplier demand at 95 percent confidence interval. this shows that 77.2 percent changes in supply chain performance of the new KCC could be accounted to ICT systems, top management support, lead time and supplier demand. R is the correlation coefficient which shows the relationship between the study variables, from the findings shown in the table above is notable that there exists strong positive relationship between the study variables as shown by 0.919.

**Table 2: Analysis of Variance**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.388	4	.347	3.071	.01 <sup>b</sup>
Residual	4.52	40	.113		
Total	5.908	44			

From the ANOVA statistics, the study established the regression model had a significance level of 0.01% which is an indication that the data was ideal for making a conclusion on the population parameters as the value of significance (p-value) was less than 5%. The calculated value was greater than the critical value (3.071>1.997) an indication that ICT systems, top management support, lead time and supplier demand all influenced supply chain performance

of the new KCC. The significance value was less than 0.05 indicating that the model was significant. Critical value =1.997

**Table 3: Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
(Constant)	1.431	.628		2.279	.001
ICT systems	.231	.228	.213	1.013	.003
Top management support	.257	.101	.227	2.545	.001
Lead time	.246	.114	.246	2.509	.002
Supplier demand	.286	.099	.225	2.485	.000

The established regression equation was:

$$Y = 1.431 + 0.231X_1 + 0.257 X_2 + 0.246 X_3 + 0.286 X_4$$

## CONCLUSIONS

From the study findings, the study revealed that ICT systems information is the foundations of making right and effective decisions thus the study conclude that adoption of ICT systems had a positive effect on supply chain performance of the new KCC. The study revealed that top management are in the fore front to initiate a culture of quality in the organization processes therefore the study concludes that top management support had positive effects on supply chain performance of the new KCC.

The study established that lead time enables the organization to effectively control production and supply changes thus the study concludes that lead time had a positive effects on supply chain performance of the new KCC. The study also revealed that ensuring supplier demands enhances organizational development thus the study concludes that enhancing supplier demand resulted to a positive effect on supply chain performance of the new KCC.

## RECOMMENDATIONS

The study recommends that the management of New KCC should show full commitment full commitment in the entire supply chain; this will serve as a motivation to the personnel in the lower levels of management and thus increasing the supply chain performance. The organization need to adopt the use of ICT systems as adoption of ICT was found to facilitate effective management, by enhancing decision making , lowering production cost as well as quality production.

The management of New KCC should considers establishing strategic relationships with suppliers as meeting supplier demand enhanced timeliness in supply operations which led to increased performance. To enhance lead time the study recommends that the all the personnel involved in the supply chain should have a clear understanding of managing dynamics in the supply chain terms of rational and irrational factors.



## **LIMITATIONS OF THE STUDY**

The organizations confidentiality policy restricted most of the respondents from answering some the questionnaires since it was considered to be against the organization confidentiality policy to expose the organization confidential matters. The suspicion normally associated with any kind of a research study. This would be solved by assuring the respondent of utmost confidentiality and disclosing the academic purpose and intention of the study. Other challenges may include some of the respondents not filling or completing the questionnaire or some issues being misunderstood, inadequate responses to questions and unexpected occurrences like respondents proceeding on leave before completing the questionnaire. This would be mitigated through constant reminder to the respondents during the period they will be having the questionnaire. The researcher presented an introduction letter obtained from the university to the organization management and this may help to avoid suspicion and enable the organization management to disclose much of the information sought by the study.

## **SCOPE FOR FURTHER RESEARCH**

The study sought to examine the role of vendor managed inventory on supply chain performance in Kenya case of New Kenya Cooperative Creameries. The study variables (ICT systems, top management support, lead time and supplier demand) only accounted for 77.2 percent changes in supply chain performance of the new KCC, the study recommends that other factors accounting for 22.8% need to be established and their effects assessed as well. A study should also be undertaken to establish the role of vendor managed inventory in relation to financial performance of private firms.

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