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Aligning Supply Chain through Inventory Ownership Analysis and Performance of Manufacturing Firms in Kenya

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Abstract

Purpose: The purpose of this study was to establish the influence of roe played by alignment of supply chain through inventory ownership analysis on the performance of manufacturing firms in Kenya.

Methodology: Descriptive and cross-sectional research designs were adopted in this study. The population of the large sized registered members as per the directory is 461. This study employed Cochran's formula to sample 160 large manufacturing firms from the total population. A structured questionnaire was used to collect data, which was analysed both qualitatively and quantitatively. This study adopted a descriptive data analysis and inferential data analysis. The analyzed data was presented using tables, graphs and pie charts.

Results: The findings of the study revealed that the relationship between inventory ownership analysis and performance was significant at 5% level of significance. The findings of the study revealed that majority of the firms had not effectively posited inventory ownership analysis through, embracing the analysis of acquisition related costs, maintenance related costs, majority had no analysis of salvage related costs. The p-value was 0.000 which indicated that the null hypothesis failed to be accepted at 5% level of significance hence inventory ownership analysis have a significant influence on performance of manufacturing firms in Kenya. The study concluded that through adoption of inventory ownership analysis, the operational costs were reduced as well as the reduction of lead time.

Unique contribution to theory, practice and policy: While the existing transaction cost theory used in this study was validated, the study recommends that the policy makers and management of manufacturing firms should invest in acquisition related costs, maintenance related costs, salvage related costs since it influences performance positively. The policy makers hold a major role in determining how key sectors such as the manufacturing sector are run. The regulators and the legislators formulate policies and guidelines that guide on how manufacturing firms should carry out their operations including supply chain processes. The study also recommended that manufacturing firms policy makers should develop a policy and regulatory framework to accelerate effective implementation inventory ownership analysis to enhance their organizational performance.

Keywords: *Inventory Ownership Analysis, Supply Chain Alignment, Manufacturing Firms*

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INTRODUCTION

Supply chain alignment is the process of integrating the activities in a supply chain framework to incorporate all the main stakeholders ranging from customers, employees and the suppliers (Skipworth & Julien, 2015). The practice of determining all lifespan expenses that result from inventory ownership is known as inventory ownership analysis. These can include significant expenditures for installing, deploying, running, and maintaining the same inventory in addition to the obvious purchasing prices. Inventory ownership analysis often finds large differences between purchase price and total life cycle costs (Mokadem, 2016). According to Milligan (2012), inventory ownership analysis involves continuous delivery of materials, component or subassemblies in a supply chain is very different and much more demanding than the total cost of ownership of equipment (for example computers and printers). In these cases, inventory ownership analysis is essentially a lifecycle cost computation adding to the acquisition cost of the equipment, the expected amount of operation and maintenance costs in order to compare better different alternatives.

In especially in some industries, like information technology, where the purchasing cost can be quite cheap compared to maintenance, support, and all other expenditures occurring during the lifetime of the system, the idea of inventory ownership analysis is well developed and frequently used (Ellram, 2013). However, assessing Total cost of ownership (TCO) is still a tricky operation that necessitates both identifying hidden costs and obtaining sufficient information to quantify them. (Hines, 2015). At the same time, since more and more transactions involve both goods and services, a simultaneous evaluation of the complete package cost is required. Furthermore, inventory ownership analysis is becoming not only a purchasing tool, but also a selling one, since vendors are using it to demonstrate how their products, which are more expensive if compared to competitors, in the long-run imply a lower inventory ownership analysis (Rezaei *et al.*, 2017).

Moreover, because of supply chains complexity, today transactions do not often involve only a buyer and a seller, but also a third or even a fourth party, who can be intermediaries, service providers, end users, value added resellers, etc. (Milligan, 2012). If it is the case, inventory ownership analysis can result in different values for each of the actors involved. As a consequence, it would be of great interest being able to evaluate inventory ownership analysis, in order to help buyer doing the right choice and sellers improving their product offering (Swenson, 2014).

Inventory ownership analysis is an aspect of supply chain alignment, which is the process of integrating the activities in a supply chain framework to incorporate all the main stakeholders ranging from customers, employees and the suppliers (Melnyk, Stewart & Swink, 2014). Through inventory ownership analysis as a component of supply chain alignment, consistency and fit in strategic goals, metrics and activities between firms is enhanced through the interlinked upstream and downstream processes of supply chain. The era of privatization in many public utility sectors in Africa in response to the world bank sponsored

SAPs has created lots of challenges in coordinating and collaborating the needs of various players and actors in these sectors (Attia, 2015). According to Wanyama (2013), in the last decade there has been a dramatic shift from one dimensional supply chain to integrated network of partners in the supply chains in both private and public sector. Private sector supply chain consists of different parties that are either directly or indirectly interrelated with the aim of satisfying the needs of customers. These reforms have ensured supply chain alignment and consequently fairness and competition among suppliers of goods, works and services, thereby restoring the confidence of investors in the procurement process while at the same time ensuring that the manufacturers gets the best value for its money (Amayi, 2011).

Statement of the Problem

Continual improvement and alignment to the broader organizational goals are essential to the sustainability and overall success of the firm in a competitive environment, despite the complexity and length of supply chains for manufacturing firms. However, it is uncommon to achieve this required optimality in alignment and performance (World Bank, 2013). Inventory ownership analysis as one of the components of supply chain alignment is therefore paramount to any organization since it leads to improved product design, quality and cost consciousness, which means an improvement in the performance of a firm.

Due to a volatile operating climate and misalignment of their different supply chains, large-scale manufacturers operating in Kenya have been regularly recording stagnation and declining earnings for the previous five years. Public, professionals, and other stakeholders are increasingly complaining about how well manufacturing companies are performing (Skipworth & Julien, 2015). Several studies have shown the need for properly managed inventory and aligned supply chain processes through inventory ownership analysis in order to enhance the performance of the manufacturing industry (Kaplan & Norton, 2014; Attia, 2015; Mokadem, 2016). These studies, however, have focused on different contexts, and their findings may not be generalized to manufacturing sector in Kenya. This study therefore sought to assess the role played by inventory ownership analysis on the performance of manufacturing industry in Kenya.

Objective of the Study

The aim of this study was to examine the influence of inventory ownership analysis on performance of manufacturing firms in Kenya.

Research Hypothesis

H_O: Inventory ownership analysis has no significant relationship with performance of *manufacturing firms in Kenya*

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LITERATURE REVIEW

Transaction Cost Theory

This paper was anchored on transaction cost theory. Transaction cost theory tries to explain how companies compete cost-wise and why companies expand or source out activities to the external environment (Bharadwaj & Matsuno, 2012). Transaction cost theory supposes that a company will try to minimize the cost of exchange with the environment and the bureaucratic cost of exchange within the company. This may entail minimizing acquisition related costs (Carr & Smeltzer, 2012).

Transaction cost theory is one of the key motivator of supply chain alignment in any organization. The transaction cost economics focuses on the organization of transactions that occur whenever a good or service is transferred from a provider (seller) to a user (buyer) across separate interface. The theory sees sellers and buyers as different possible forms of organizing and coordinating economic transactions (Wever, Wognum & Omta, 2010).

When external transaction costs are higher than the company's internal costs then the company will grow because the company is able to perform its activities more cheaply than if the activities were performed in the market place (Luzzini, Caniato, Ronchi & Spina, 2012). This means keeping the maintenance and acquisition related costs at a minimum. According to Gonzalez-Benito and Spring (2010) transaction cost arises every time a product or service is being transferred from one stage to another where new sets of capabilities are needed to make the products or services. Here acquisition and salvage costs may arise.

Companies will therefore look at the inventory ownership analysis of the entire process. Based on this theory, Fredikind (2014) argues that supply chain alignment lowers the cost of inventory ownership through looking at the total costs involved. Chae, Yen and Sheu (2015) says that transaction costs relating to procurement are those costs that enterprises incur in trying to acquire inventory and the overall procurement costs involved. This theory supports the variable inventory ownership analysis by linking the values of acquisition, maintenance and salvage costs to essential metrics that can be managed to ensure achievement and effective supply chain alignment.

Empirical Literature

The total cost of ownership (TCO) is a methodology developed to determine the total cost of ownership of a product or service provided by a particular supplier, through a complete investigation of the different cost items which composed the real cost of buying from a specific supplier (Hines, 2015). According to Ellram (2013), TCO is a methodology used in leading companies in worldwide supply chains. It entails looking at acquisition, maintenance and salvage related costs.

TCO aims to determine the true cost of buying a particular good or service from a particular supplier, accounting for it all costs associated with the purchasing activity (Carr & Ittner,

2012), using the monetary quantification of all financial and non-financial attributes. The TCO approach considers acquisition costs such as purchase price, installation costs, transportation costs and commissioning costs (Srivastava et al., 2017). Under maintenance costs it considers costs such as staff training costs, insurance costs, quality upkeep costs, downtime caused by failures and lastly under salvage costs it considers costs such as salvage value and replacement costs.

Purchasing costs can be as high as 80% of the total production costs (Dumond & Siferd, 2013). Consequently, it seems vital for companies to be able to track and control this large cost pool, as it represents a large portion of the total manufacturing costs. TCO seeks to do exactly this by requiring firms to consider the activities they undertake that cause the firms to incur costs. According to Cliff and Siferd (2013), the increased emphasis on quality and supply base rationalization raises the importance of using TCO and as a result. Swenson (2014) argues that TCO is one of the more important instruments in creating and supporting a more strategic focus on purchasing and supply management.

Conceptual Framework

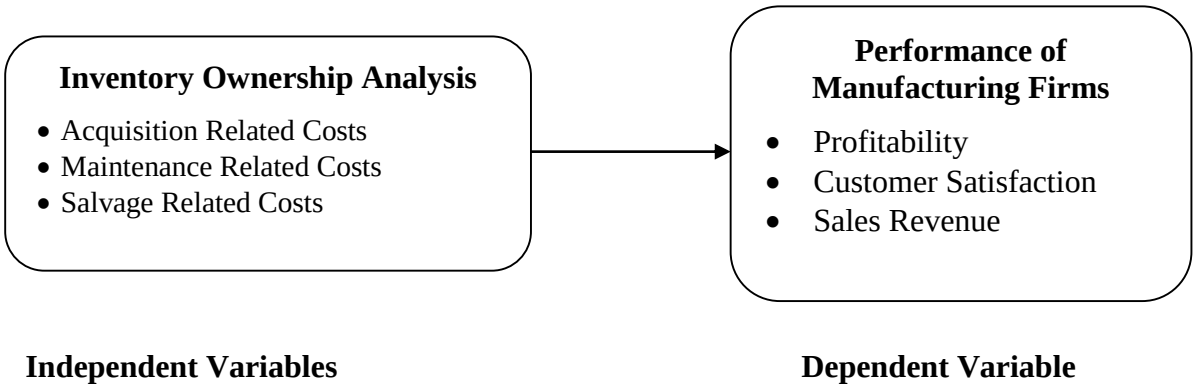

Figure 1: Conceptual Framework

Research Gaps

Although there have been numerous studies in the field of supply chain management alignment promotion all over the world researchers have focused on addressing one fundamental research question; how collaborative and coordinative issues in supply chains can be promoted. Some studies have attempted to identify critical alignment factors and emerging issues in supply chain management area, and demonstrated how to improve intervention effectiveness, increase particular relational behaviours like elimination of transactional trading, how inventory ownership analysis promotes supply chain alignment, and how various predictive variables can prevent misalignment (Baier, Hartman & Moser, 2012).

Other studies have concentrated on the construction industry and the medical supply chains and the few studies in manufacturing firms have looked into the relationship between supply chain alignment factors and organizational performance or effects of a single variable such as information sharing on the alignment of value chains. In addition, only a few studies in supply chain alignment in the value chains have been carried in Kenya and these studies are inclined more towards effects supply chain management practices on performance of firms. Most of these studies are also either case studies of certain firms or regions leaving a research gaps (Attia, 2015). This study has clearly addressed the recommended knowledge gap by bridging it with new knowledge on the influence of role played by alignment of supply chain through inventory ownership analysis on the performance of manufacturing firms in Kenya and suggesting recommendations on ways to implement inventory ownership analysis so as to improve performance of manufacturing firms.

METHODOLOGY

The study used descriptive and cross-sectional research designs. Descriptive research design enabled collection and analysis of quantitative and qualitative data, while giving the study an ability to intensively answer the research questions. Cross-sectional research design was on the other hand used to establish the relationship between the study variables. The study targeted large manufacturing firms in Kenya. There are 461 large manufacturing firms in Kenya according to KAM (2020). The unit of observation is selected because they are the ones involved in execution of the firms' supply chain management practices and thus stands high chances of providing reliable information on influence of supply chain alignment on performance of manufacturing firms in Kenya. Using Cochran (1977) formula, a sample size of 160 respondents was obtained from the 461 firms. The respondents were picked through stratified random sampling, where the 12 sub-sectors of the manufacturing firms were the strata. A proportionate number was picked from each of the stratum and the respondents picked randomly. The research utilized a structured questionnaire to collect data. The collected data was analysed with the aid of the Statistical Package for Social Sciences (SPSS) Version 26. This study adopted a descriptive data analysis and inferential data analysis. Descriptive data analysis was adopted for this study because descriptive analysis was used to describe the basic features of the data in a study. The analyzed data was presented using tables, graphs and pie charts.

RESULTS AND DISCUSSIONS

Descriptive Results on Inventory Ownership Analysis

The study sought to assess the relationship between inventory ownership analysis and performance of manufacturing firms in Kenya. The main aspects of inventory ownership analysis focused on the study were: acquisition related costs, maintenance costs, and salvage related costs. The results as shown in Table 1 revealed that majority of the respondent (3.76) agreed that their respective organizations had a framework for reducing the costs of acquiring

inventory. The results were varied as shown by a Standard deviation of 0.84. Further results indicated there were limits set on the levels of acquisition costs for the companies' inventory as evidenced by a mean of 3.54 and a standard deviation of 0.99. The results further indicated that most of the companies had put measures to ensure any additional cost of acquiring inventory is justifiable as evidenced by a mean of 3.76 and a standard deviation of 0.84. According to Semchenkova, Chulkova, and Lukasheva (2019), putting the appropriate measures for controlling inventory ownership costs is essential for marinating a proper flow of inventory and reducing costs. The findings imply that the maintenance of inventory is a cost that most of the companies incurred and felt the urge of minimizing this cost as a way of ensuring minimal costs of owning inventory. Tinkham et al. (2018) alludes that the inventory maintenance is essential for organizational performance but it is essential to minimize the costs of maintaining the inventory in order to reduce the entire cost of owning inventory.

The findings imply that inventory ownership has been upheld by most of the surveyed manufacturing firms and this could be a significant driver to their performance. The findings are in line with those by Dobos and Vörösmarty (2019) who found out that through enhanced means of reducing the costs of inventory ownership, companies are able to save on the costs of operation and this significantly contributes to firm performance and competitiveness.

Table 1: Descriptive Results on Inventory Ownership Analysis

Statement	N	Mean	Std. Dev.
The organization has a framework for reducing the costs of acquiring inventory	127	3.76	0.87
There are limits set on the levels of acquisition costs for the company's inventory	127	3.54	0.99
The company has put measures to ensure any additional cost of acquiring inventory is justifiable	127	3.76	0.84
There are significant costs incurred in maintaining inventory in our company	127	3.81	0.89
The company has put measures to control and minimize the inventory maintenance costs	127	3.69	0.94
Audits are carried out to establish which inventory should be maintained and those that should be disposed	127	3.97	0.80
The company has at times incurred costs on recouping its inventory	127	3.83	0.81
There have been strategies by the company to minimize the costs of salvaging inventory	127	3.83	0.92
Measures have been taken to reduce incidences where the company is at risk of losing inventory	127	4.09	0.88

Correlation Analysis

Correlation analysis was used to determine both the significance and degree of association of the variables and predict the level of variation in the dependent variable caused by the independent variables. Table 3 shows the findings. The correlation analysis to determine the association between inventory ownership analysis and performance of manufacturing firms in Kenya, Pearson correlation coefficient computed and tested at 5% significance level. The

results indicate that there was a positive relationship and strong relation as shown by Pearson correlation coefficient of 0.642 between Inventory Ownership Analysis and performance of manufacturing firms in Kenya. In addition, the researcher found the relationship to be statistically significant at 5% level (p=0.000, <0.05).

Table 3: Summary of Pearson's Correlations

		Performance
Performance		1
Inventory Ownership Analysis	Pearson Correlation	.642
	Sig. (2-tailed)	.000

Hypotheses Testing

H_{O2}: *Inventory ownership analysis has no significant relationship with performance of manufacturing firms in Kenya*

The objective of the study was to examine the relationship between inventory ownership analysis and performance of manufacturing firms in Kenya. The linear regression model analysis was carried out to establish the relationship between inventory ownership analysis and performance of manufacturing firms in Kenya and the output included the model summary, the ANOVA results and the regression coefficients. The model summary results are as shown in Table 5. As the findings portray, the R^2 for the variable was 0.412. This implies that inventory ownership analysis influences up to 41.2% variation of the performance of manufacturing firms in Kenya.

The ANOVA results are as shown in Table 5. As the results portray, the F-statistics for the model was 87.594 at a significant level of 0.000<0.05. This implies that inventory ownership analysis significantly influences the performance of manufacturing firms in Kenya.

The regression coefficients on the other hand are as shown in Table 4. As the results portray, the Beta coefficient for inventory ownership analysis was 0.657. This implies that a unit change in inventory ownership analysis would lead up to 65.7% increase in the performance of manufacturing firms in Kenya. The p-value was 0.000 which is less than the standard p-value of 0.05. This means that there is a significant influence of inventory ownership analysis on the performance of manufacturing firms hence the rejection of the null hypothesis that there is not significant influence of inventory ownership analysis on the performance of manufacturing firms in Kenya. The findings are in line with those by Lambert and Pagh (2014), who indicate that inventory ownership analysis is critical in enabling the company to establish how much inventory it owns; thus they are able to strategies for their management of the inventory for enhanced performance.

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Table 4: Hypothesis Testing

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.642[a]	.412	.407	.52326

a. Predictors: (Constant), Inventory Ownership Analysis

ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.983	1	23.983	87.594	.000[b]
	Residual	34.225	125	.274		
	Total	58.208	126			

a. Dependent Variable: Performance of Manufacturing Firms
b. Predictors: (Constant), Inventory Ownership Analysis

Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.089	.244		4.459	.000
	Inventory Ownership Analysis	.657	.070	.642	9.359	.000

a. Dependent Variable: Performance of Manufacturing Firms

Conclusion and Recommendations

The study sought to determine the relationship inventory ownership analysis on performance of manufacturing firms in Kenya. The study also concluded that inventory ownership analysis has a significant relationship with performance of manufacturing firms in Kenya. The sub-constructs of inventory ownership analysis namely acquisition related costs, maintenance related costs, salvage related costs influence performance positively. Inventory ownership analysis recommends that understanding and trading-off the various costs related to sourcing decisions is all the more relevant given the increased emphasis firms operating in business markets are placing on value-based market offerings, both from the supplier and the customer point of view.

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