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## Influence of Buyer-Supplier Collaboration on Supply Chain Efficiency in Manufacturing Firms in Nakuru County, Kenya

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### **Abstract:**

*The present study therefore sought to establish the Influence of buyer-supplier collaboration on supply chain efficiency in manufacturing firms in Nakuru County, Kenya. The study was guided by Transaction Cost Theory and Systems Theory. The study employed a descriptive research design using quantitative approaches. The target population comprised 2 procurement staff in each of the 34 manufacturing firms in Nakuru County thus totaling 68 procurement staff. The study used a closed-ended questionnaire in collecting primary data that were piloted to ensure their validity and reliability. The collected data was summarized and analyzed with the aid of SPSS using both descriptive and inferential statistics and then presented in tables. It was found that service improvement, buyer-supplier collaboration and operational flexibility had a positive significant influence on and supply chain efficiency. The R<sup>2</sup> value implies that 55.5% of the variations in supply chain efficiency can be explained by the variations in independent variables. The study concluded enhance buyer-supplier relationship that help enhance operational flexibility. It is thus hoped that the findings will help enhanced organizational performance of the said firms by cost reduction, enhanced service quality, increased flexibility, enhanced cooperation between suppliers and buyers, reduced times and reduction in wastages.*

**Keywords:** Buyer-supplier collaboration, supply chain efficiency third party logistics

### **1. Introduction**

Supply chain collaboration aims to leverage the capabilities and knowledge of key suppliers under market uncertainty (Cao & Zhang, 2011). Despite this, according to Vangen and Huxham (2011) most collaborative situations tend to fail or fall short of expectations, as the rationale behind the collaborative efforts is often misguided. Collaborative relationships are best suited where customer faces high risk; the product supplied is technically complex leading to high switching costs; supply of new product/service and new supplier may be required; where supply market for the product is fast changing; in terms of technology and legislation or supply market is restricted. A collaborative environment requires mutual trust and inter-firm dependency, both formal and informal communication, strong commitment towards same goals, inter-organizational capability and the management creating a network culture (Adhaya, 2013). The underlying objective of these long-term relationships is delivery of substantial benefits and advantages to the involved supply chain partners. Buyer-supplier collaboration is important in bringing about adaptation, trust and commitment between buyers and suppliers and this eventually leads to continuance of relationships. These were the findings of a study done by Mugarura (2010) which examined effect of buyer-supplier collaboration on relationship continuity in manufacturing firms in Kampala. Dimensions used were incentive alignment, joint decision making and information sharing in relation to adaptation, commitment, trust and relationship continuity most of which were found to have a positive and significant relationship. The study did not however examine how business continuity brought about by collaborative buyer-supplier relationship, would mean to a firm's performance. Furthermore, local studies such as those by Kamau (2013) on buyer-supplier relations and organizational performance among large manufacturing organizations in Nairobi-Kenya found that buyer-supplier collaboration had assisted these manufacturing organizations in enhancing their performance. Their study identified five variables which result to successful buyer supplier relationships were identified and they include: Trust, communication, commitment, cooperation and mutual goals. The study concluded that most large manufacturing companies in Kenya have been embracing buyer-supplier relationships for more than ten years. They conclude that buyer-supplier relationships have assisted these companies to enhance the performance of their organizations. It can therefore be implied that buyer-supplier collaboration plays some role in the relationship between third party logistics providers and supply chain efficiency in the said firms.

### 1.1. Statement of the Problem

Studies have shown that buyer supplier collaboration reduces operational cost from 44% to 36% (Wambua, 2017; Ngonela *et al.*, 2014). They also report that buyer supplier collaboration can help improve service quality as well. However, the management of the complex network of supply chain parties which forces firms to find ways of efficiently managing challenge to the organizations in monitoring and measuring the performance to ensure efficient and effective supply chain performance. While there have been numerous studies that have attempted to address buyer supplier collaboration and their effect on performance, very few if any studies have focused on supply chain efficiency. Furthermore, there is little or no evidence in literature linking buyer-supplier collaboration and operational flexibility to supply chain efficiency in the local manufacturing context. The present study will therefore seek to fill this knowledge gap.

### 1.2. Objectives of the study

To establish the influence of buyer-supplier collaboration on supply chain efficiency in manufacturing firms in Nakuru County, Kenya.

## 2. Literature Review

### 2.1. Theoretical Review

In this section the theories in which the study is anchored on in relation to the influence of third-party logistics and supply chain efficiency in manufacturing firms in Nakuru County, Kenya. The theories include Transaction Cost Theory, Systems Theory, Resource Based View and Stakeholder Theory. The transaction cost theory was proposed by Ronald Coase in 1937. The theory uses transaction as the unit of analysis and divides transaction costs into production and coordination costs. According to the theory, transaction costs arise at contracting (drafting, negotiation and safeguarding) or at implementation (mal-adoption, haggling and establishment, operational and bonding costs). Decision makers must weigh and compare the costs associated with executing a transaction within their firms (in-house) and outsourcing. The theory suggests that transaction costs related to make or buy decision impact the choice between the firm and the market. The theory helps in deciding whether to perform activity in-house or outsource from third party. According to the theory, there are five determinants of transaction costs, namely transaction frequency, asset specificity, uncertainty, bounded rationality, and opportunistic behavior (Yazdanparast, Manuj & Swartz, 2010).

Systems theory proposed by Ludwig Von Bertalanffy in the 1950s describes the interrelatedness of all parts of an organization and how one change in one area can affect multiple other parts. According to Walker and Brammer (2009), organizations act as systems interacting with their environment. Any Equilibrium is constantly changing as the organization adapts to its changing environment. The foundation of systems theory is that all the components of an organization are interrelated, and that changing one variable might impact many others (Johnson, Kast & Rosenzweig, 1964). Organizations are viewed as open systems, continually interacting with their environment. They are in a state of dynamic equilibrium as they adapt to environmental changes. According to Kast & Rosenzweig (1972) the relationship between the environment and organizational structure is especially important. Organizations are open systems and depend on their environment for support. The relationship between an organization and its environment is characterized by a two-way flow of information and energy (Chikere & Nwoka, 2015).

### 2.2. Empirical Review

According to Vishal *et al.*, (2013) on third party logistical obstacles in manufacturing industries revealed that, third party logistics (3PL) provider's plays vital role in cost reduction, productivity, profits as well as the improvement of the service quality of their customers and thus become important part of supply chain management. Successful logistics outsourcing can provide significant benefits, both, to industries and 3PLs providers. The outsourcing of logistics activities, manufacturing industries can save on capital investments, and, reduce financial risks. The objectives and concerns related to 3PL logistics outsourcing are cost reduction, improvement of delivery time, achieving quality service, risk assessment, concentration on core competencies, increasing flexibility and concerns are loss of control, dependence on service provider, losing direct customer contact. Similarly, Njambi and Katuse (2013), in their comparative study on how using third party logistics can deliver distribution efficiency and its contribution to competitive advantage for organizations, 3PLs can be seen as strategic players in a supply chain management as opposed to mere vendors of a given organization. The study adopted a descriptive research design with a sampling frame of 50 companies. Primary data collection method was used through mail questionnaire. Their study addresses key issues related to 3PL, why organizations decide to outsource, advantages and disadvantages of third-party logistics, their impact on distribution efficiency in the Fast-Moving Consumer Goods Companies in Kenya. Their findings showed that the use of 3PL is effective in enhancing delivery of products to the customers premise. Moreover, organizations have a high chance of minimizing costs while maximizing their revenue from the use of third-party logistics. Further, 3PLs has the potential of improving customer performance in meeting consumer needs.

Furthermore, according to Wambua (2017), outsourcing of non-core activities to Third Party Logistics providers (3PL) is one of the ways of ensuring efficient and effective performance of companies' supply chain management by controlling logistics cost, risk, delivery lead-times and sustaining quality to achieve the desired level of service to satisfy their customers. Their study sought to establish the influence of outsourcing 3PL providers on the performance of food and beverages manufacturing companies in Kenya. The study adopted cross-sectional survey design using both quantitative and qualitative approaches. The target population of this study was 197 registered food and beverages manufacturing companies in Kenya as per Kenya Association of Manufacturers (KAM) Directory 2015. The study found out

that cost, service quality, lead-time and risk assessment were significant predictors in the performance of food and beverages manufacturing companies in Kenya.

According to Njagi (2017), in the past large manufacturing organizations found it beneficial to vertically integrate supplier functions and distribution activities to maximize production and logistical control. However, modern companies rely heavily on outsourced services and suppliers that contribute to the production process in one or more ways. The study set to identify the effect of outsourcing to 3PL providers on firm performance by manufacturing firms in Nairobi. The study's sample, whose target population was manufacturing firms based in Nairobi and its environs, was generated using cluster sampling. A descriptive research design was adopted and a self-administered questionnaire was used to collect data. All the studies four components of logistics outsourcing had a positive effect on firm performance. Finally, according to Katana and Gichure (2017), in their study on the influence of third-party logistics providers on supply chain performance in Kenya, 3PL services had improved supplier's performance. The target population was 278 staff at East African Breweries Limited and the data was collected using a questionnaire. Respondents were asked if freight forwarding affected supply chain performance in East Africa breweries with 87% indicated yes while 9% indicated no and 5% were not sure. Respondents were asked if transportation services affected supply chain performance in East Africa breweries and 91% indicated yes while 9% indicated no.

### 3. Methodology

A survey design was employed. The method is preferred as it permits gathering of data from the respondents in natural settings (Mugenda & Mugenda, 2010). The target population for this study comprised procurement staff in the 34 manufacturing firms registered with KAM in Nakuru County, Kenya. The questionnaire was piloted at BrookBond Tea Estate, Kericho County, Kenya to evaluate its validity and reliability of the instruments and was done on 12 respondents who did not form part of the sample. To increase validity of the instruments, the researcher sought expert judgment and guidance from the University supervisor, who provided insights which were relevant in ensuring content, construct and face validity of the instruments. The reliability of the questionnaires was determined through the Cronbach alpha method. Fraenkel and Wallen (2006) have recommended that reliability test which produces Cronbach alpha ( $\alpha$ ) values of greater than 0.70 is sufficient in making the questionnaires reliable. The findings of the reliability test produced alpha ( $\alpha$ ) values of greater than 0.70. In this study, primary data was sourced from the answers the participants during the survey process. In this study a seemingly suitable method to collect the primary data is the questionnaire survey. Before embarking on data collection, permission to collect data was sought from the National Council for Science, Technology and Innovation (NACOSTI). The researcher also sought clearance from both the university and the relevant manufacturing firms. The data collected from the questionnaires was analyzed using both descriptive (means and standard deviations) and inferential statistics (correlation and regression) with Statistical Package for Social Sciences (SPSS). The results of the survey were presented in tables. Before embarking on inferential analysis, the study conducted various diagnostic tests including tests for normality, multicollinearity, homoscedacity and autocorrelation. For the purpose of analyzing the relationships of each of the independent variable on the dependent variable, the study used the p-values to test both the influence of each variable and the overall effect of the independent variables on the dependent variable using the proposed functional relationship as shown in equation (1):

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon \dots \dots \dots (1)$$

Where:  $Y$  = Supply Chain Efficiency,  $X_1$  = Buyer-Supplier Collaboration,  $\beta_0, \beta_1$  = Beta Coefficients,  $\varepsilon$  = Error Term

### 4. Results and Discussion

#### 4.1. Response Rate

Out of 68 questionnaires that were issued, 61 of them were filled and returned. Of the returned questionnaires, 2 were incorrectly filled and thus were not used in the final analysis. Therefore, 59 were correctly filled and hence were used for analysis representing a response rate of 86.8%. Previous studies reviewed in literature indicate that getting a high response rate from a small random sample is considered preferable to a low response rate from a large sample and thus is an important element in proving the statistical significance of the responses. Therefore, the response rate was considered sufficient to enable further analysis.

#### 4.2. Demographic Information

The study then sought to establish the age groups of the respondents in the study. The findings indicate that a majority of the respondents were of the age groups 31 – 40 years (32.2%) and 41 – 50 years (32.2%), while the least age group was below 21 years (1.7%). This was attributed to the professionalization of the procurement sector that has seen a younger workforce joining the procurement industry. The study found that majority of the respondents (40.7%) had a degree level qualification. Further, 78% of the respondents had either a bachelors or masters degree. This trend was attributed to the professionalization of the procurement sector that has compelled most procurement staff to seek higher educational qualifications. In terms of working experience, most of the respondents (42.4%) had over 10 years working experience. Cumulatively, more than 67% had more than 5 years of experience while only 11.9% had less than 1 year working experience. The study attributed this trend to the fact that the public and private sector in the past decade have stagnated in creating new job opportunities for new entrants.

#### 4.3. Descriptive Statistics of the Study Variables

The researcher sought to establish the influence of third-party logistics on supply chain efficiency in manufacturing firms in Nakuru County, Kenya. The selected factors were service improvement, buyer-supplier collaboration and procurement flexibility. The dependent variable for the study was supply chain efficiency.

	SD	D	N	A	SA	Mean	Std Dev
We have a high level of trust existing between our firm and our suppliers	0%	8.5%	15.3%	45.8%	30.5%	3.98	.900
Our firm maintains open communication between our firm and our suppliers	0%	6.8%	20.3%	52.5%	20.3%	3.86	.819
The roles and responsibilities between us and our suppliers on procurement issues are clear	1.7%	5.1%	25.4%	37.3%	30.5%	3.90	.959
There exists an environment of mutual information sharing between our firm and our suppliers	0%	5.1%	13.6%	42.4%	39%	4.15	.847
There is a level of commitment between our firm and suppliers which has made the procurement more efficient	1.7%	3.4%	22%	44.1%	28.8%	3.95	.899
Our firm maintains long-term relationships with our suppliers which has enhanced consistency	0%	5.1%	13.6%	49.2%	32.2%	4.08	.816

Table 1: Buyer-Supplier Collaboration and Supply Chain Efficiency

From Table 1, majority of the respondents 76.3% agreed that they had a high level of trust existing between their firm and their suppliers while 8.5% disagreed. 72.8% agreed that their firm maintains good and open communication between the firm and suppliers while 6.8% disagreed. 67.8% agreed that the roles and responsibilities between their firm and suppliers on procurement issues are clear while 6.8% disagreed. 81.4% agreed that there exists an environment of mutual information sharing between their firm and their suppliers while only 5.1% disagreed. 72.9% agreed that there was a level of commitment between their firm and suppliers which had made the procurement more efficient while 5.1% disagreed. Finally, 81.4% agreed that their firm maintains long-term relationships with their suppliers which had enhanced consistency while 5.1% disagreed. From the findings on Table 2, it was established that majority of the respondents agreed that they had a high level of trust existing between their firm and their suppliers (3.98), that their firm maintains good and open communication between the firm and suppliers (3.86), that the roles and responsibilities between their firm and suppliers on procurement issues are clear (3.90), that there exists an environment of mutual information sharing between their firm and their suppliers (4.15), that there was a level of commitment between their firm and suppliers which had made the procurement more efficient (3.95) and that their firm maintains long-term relationships with their suppliers which had enhanced consistency (4.06). Since all the standard deviations were less than 1.00, the study concluded that there was convergence in responses.

	SD	D	N	A	SA	Mean	Std Dev
Our firm offers timely deliveries of requisitions out of its efficient procurement process	1.7%	0%	10.2%	55.9%	32.2%	4.17	.746
There are minimal complaints on the procurement process due to its efficiency	1.7%	1.7%	15.3%	61%	20.3%	3.97	.765
Wastages and damages have been reduced due to the efficiency of the procurement process	0%	6.8%	23.7%	47.5%	22%	3.85	.847
The efficiency of the procurement process has led to cost reduction in our firm.	1.7%	6.8%	22%	49.2%	20.3%	3.80	.906
Our procurement system achieves value for money	3.4%	5.1%	20.3%	32.2%	39%	3.98	1.058
Our firm also provides adequate and continuous training on procurement operations	1.7%	6.8%	18.6%	44.1%	28.8%	3.92	.952

Table 2: Measurement of Supply Chain Efficiency

From the findings presented in Table 2, 88.1% agreed that their firm offered timely deliveries of requisitions out of its efficient procurement process while 1.7% disagreed. 81.3% agreed that there were minimal complaints on the procurement process due to its efficiency while 3.4% disagreed. 69.5% agreed that wastages and damages had been

reduced due to the efficiency of the procurement process while 6.8% disagreed. 69.5% agreed that the efficiency of the procurement process had led to cost reduction in their firm while 8.5% disagreed. 71.2% agreed that procurement system achieves value for money while 8.5% disagreed. Finally, 72.9% agreed that their firm provided adequate and continuous training on procurement operations while 8.5% disagreed. Furthermore, from the findings, majority of the respondents agreed that their firm offered timely deliveries of requisitions out of its efficient procurement process (4.17), that they were minimal complaints on the procurement process due to its efficiency (3.97), that wastages and damages had been reduced due to the efficiency of the procurement process (3.85), that the efficiency of the procurement process had led to cost reduction in their firm (3.80), that the procurement system achieves value for money (3.98) and that they provided adequate and continuous training on procurement operations (3.92). Since most of the standard deviations were close to 1.00, the study concluded that there was convergence in responses amongst the respondents.

#### 4.4. Diagnostic Tests

Before embarking on inferential analysis, the study conducted various diagnostic tests including tests for normality, multicollinearity, homoscedasticity and autocorrelation. The findings are the test are presented in Table 3, Table 4 and Table 5.

	Kolmogorov-Smirnov			Shapiro_Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SBR	.130	59	.014	.964	59	.079

Table 3: Test of Normality

In the present study normal distribution of data was tested by use of Shapiro Wilk Test. If the p-value is less than the chosen alpha level, then the null hypothesis is rejected. If the p-value is greater than the chosen alpha level, then the null hypothesis is not rejected and thus normally distributed. From the findings, using Shapiro-Wilk test since there are only 59 elements, the p-value is 0.079. In this case, we fail to reject the null hypothesis and conclude that the data comes from a normal distribution.

Statistic	df	Stats Value	P-value
Chi-squared	3	3.732409	.411298

Table 4: Heteroscedasticity Test

Heteroscedasticity was tested using Breuch-Pagan test with the null hypothesis that the error variances are all equal. The findings are presented in Table 4. The general rule of thumb is that homoscedasticity will be evident when the value of "Prob > Chi-squared" is greater than 0.05. From the findings, then we fail to reject the null hypothesis and conclude that the error variances are all equal.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.745 <sup>a</sup>	.555	.531	.39555	2.351

Table 5: Autocorrelation Test

a. Predictors: (Constant), service improvement, buyer-supplier collaboration, operational flexibility

In this study, Durbin-Watson statistic is used to detect the presence of autocorrelation and the rule of thumb is that test statistic values in the range of 1.5 and 2.5 are relatively normal. The findings of the autocorrelation test are presented in Table 5. From the findings, the Durbin-Watson statistic was 2.351 which is between the acceptable ranges and thus it can be concluded that there was absence of autocorrelation in the data.

#### 4.5. Regression Analysis

The section presents and discusses findings resulting from the regression analysis involving service improvement, buyer-supplier collaboration and operational flexibility. The dependent variable was supply chain efficiency in manufacturing firms. The findings are presented in table 6 and 7.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.745 <sup>a</sup>	.555	.531	.39555

Table 6: Model Summary

a. Predictors: (Constant), Service Improvement, Buyer-Supplier Collaboration, Operational Flexibility

The R<sup>2</sup> value of 0.555 presented in Table 6 implies that 55.5% of the variations in supply chain efficiency can be explained by the variations in independent variables. This therefore means that other factors not studied in this study contribute 44.5% of supply chain efficiency.

	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	SE	B		
Constant	1.020	.384		2.654	.010
Buyer-Supplier Collaboration	.370	.115	.390	3.211	.002

Table 7: Regression Coefficients

a. Dependent Variable: Supply Chain Efficiency

From the model presented in table 7, holding the independent variable constant, supply chain efficiency would increase by 1.020. It was established that a unit increase in buyer-supplier collaboration would cause an increase in supply chain efficiency by a factor of 0.370. From the findings on Table 7, it was established that buyer-supplier collaboration had a significant influence on supply chain efficiency. The un-standardized beta coefficients were then used to obtain the relationship of the independent variables and the dependent variable and model was formulated as shown in equation (2)

$$Y = 1.020 + 0.370X_1 \dots \dots \dots (2)$$

Where Y = Supply Chain Efficiency,

X<sub>1</sub> = Buyer-Supplier Collaboration,

#### 4.6. Hypotheses Testing

For purposes of this study, hypothesis was carried at 5% significance level using t-test and p-values. The study undertook to test the validity of the first hypothesis of the study which stated that Buyer-supplier collaboration has no significant influence on supply chain efficiency in manufacturing firms in Nakuru County, Kenya. Since  $t = 3.211$ ,  $p < .05$ , we reject the null hypothesis and conclude that buyer-supplier collaboration has significant influence on supply chain efficiency in manufacturing in firms. Various studies have reported similar findings on the relationship between buyer-supplier collaboration and different performance measures. For example, Hassan, Habib and Khalid (2014) concluded that by ensuring timely supplier payment, information sharing and being friends with suppliers, buyers can easily make their profits reach the sky.

## 5. Conclusion

Based on the findings of the study, the researcher has drawn several conclusions that are presented in this section following the order of the objectives of the study. It was concluded that there was a strong and positive relationship between service improvement and supply chain efficiency and thus the study concluded that there was a very strong and positive correlation between buyer-supplier collaboration and supply chain efficiency and therefore, the study concluded that buyer-supplier collaboration has significant influence on supply chain efficiency. The researcher has proposed pertinent recommendations. Firstly, the study recommends that manufacturing firms enhance their buyer-supplier collaboration in areas such as information sharing, trust, and responsiveness. Further, the firms should invest in long-term relationships with suppliers to enhance supply chain efficiency.

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