# Effect of Early Supplier Involvement on Supply Chain Performance in Moi Teaching and Referral Hospital in Kenya

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***Abstract:***

***Purpose:*** *The main aim of this study was to investigate the effects the of early supplier involvement on supply chain performance in Moi Teaching and Referral Hospital in Kenya.*

***Material/method:*** *This study adopted a correlational research design. It targeted 100 employees who include Chief Procurement officer, Assistant Chief Procurement officer, Accountant, Procurement officers and storekeepers. A census technique was employed. The instruments for data collection were questionnaires. Cronbach's Alpha coefficient was used determine the reliability of the research instrument and results ranged from 0.945 -0.747 was above recommended 0.7. The collected data were coded and analysed using descriptive and inferential statistics.*

***Conclusion:*** *The regression results indicated that earlier supplier involvement had significant and positive effect on supply chain performance. Thus, increasing supplier involvement has an incremental effect on supply chain performance.*

***Recommendations:*** *The study recommended that the hospital needs to involve suppliers early before contract award, raise awareness among suppliers on the quality of items to be supplied and to co-design activity on the product with their suppliers.*

***Keywords:*** *Early Supplier Involvement, Hospital, Supply Chain Performance*

***Paper Type:*** *Research Article*

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## 1. Introduction

Due to changed market conditions, worldwide companies are driven to first prioritize on cost and cycle-time reduction, quality improvement and focus on core activities (van Weele, 2010). In order to remain competitive in a competitive business environment, many companies in the world have resorted to cost-cutting, lay-offs, restructuring, and increased productivity measures to manage expenses and to increase profits. Senior executives in many organizations have realized that on average, 50% or more of an organization's operating budget is spent on purchased goods and services (Pattni, 2006). Therefore, the decisions made by purchasing professionals can help to determine the financial viability of the organization (Ball, 2005). Strategies exist in different levels in an organization and are the direction and scope of an organization over the long-term, which achieves advantages in a dynamic environment through its configuration of resources and competences with the aim of fulfilling stakeholder expectations (Johnson *et al.,* 2008). The competitive market conditions have led to a shift in companies' strategy thinking. As such, Strategic sourcing is key for successful global supply chain management. As the core challenge of supply chain management is the removal of barriers between the organization and its suppliers and customers in order to maintain customer service excellence, financial position improvement, and operational costs optimization, strategic sourcing emerges as an important factor to support and integrate the suppliers into the supply chain intelligently. It promotes cross-functional, intra-organisational and inter-organizational integration (Chen et al., 2014) considering short- and long-term orientation. Precisely, a purchasing team needs to ensure proper use of funds and resources while defining the correct supply source of the business to achieve forecasted results. Additionally, it is expected that purchasing executives will assimilate market innovations, extend market communication and ensure supplier reliability.

There was massive corruption in public procurement among developing countries and more specifically African countries (Rudolf & Carter, 2013). Kwong (2012) shows that the biggest avenue for corruption in African transactions were through procurement. This was mostly in terms of bribes to win tenders, kickbacks, cost inflations, single sourcing, nepotism, tribalism and many more vices in the procurement process. Based on this, it was resolved that these countries adopt transparency and accountability in their public procurement procedures. This could only be possible with the adoption of public procurement legal frameworks (World Bank, 2012). In Kenya, all public procurements must follow a standard sequence of actions as specified in the Public Procurement and Asset Disposal Act, 2015. Non-adherence to standardized procurement processes leads to wastage of resources, ultimately impacting the service delivery capacity of the institution and wasting public resources (Ngunyi, 2014).

However, the challenge of demand for quality service and upcoming competitions for most of the firms has realized the need for quality service delivery and efficiency. Past investigations done around this area recognized poor condition of health care services in the greater part of public health care institutions including majority of the health facilities in Kenya due to poor supply chain performance. While there has been an endeavour to enhance the circumstance, it appears very little has been accomplished in raising the supply chain performance in public health facilities and this is intensified by restricted data on the components that distress the supply chain performance in the public health sector in Kenya. These difficulties distressing public hospitals have prompted question amongst administration and operations staff. Early supplier

involvement of health facilities is a standout amongst the most basic variables for their prosperity. Early supplier involvement plays a key role in ensuring that this is achieved, therefore there is a need for firms to ensure that they don't only source but source strategically. Previous studies of early supplier involvement in various organizations have identified several benefits of early supplier involvement like outsourcing enables the company to concentrate its key resources and capacity on building and expanding its core competencies, internal integration and information sharing, supplier evaluation, sourcing flexibility and trust in supply chain members. Furthermore, through supplier development and relationship management, there will be an overall reduction on the organizational cost hence better performance. This study has been done in other sectors of the economy and state corporations; however, none has been done in a hospital set up in Kenya, therefore in light of this, this study sought to investigate the influence of early supplier involvement on supply chain performance in Moi Teaching and Referral Hospital in Kenya. Thus, the study hypothesized that;

***$H_1$:*** *Early supplier involvement increases supply chain performance in Moi Teaching and Referral Hospital in Kenya*

## 2. Literature and Theoretical Review

The study was anchored on Resource dependence theory. Resource dependence theory (RDT) promoted by Pfeffer and Salancikin (1978), is the study of how the exterior resources of organizations affects the performance of the organization. Resource-based theory argues that the strategy of an organization needs to be based on the resources it owns for it to have a better position in the competitive market. It offers a vital framework to gain sustainable competitive advantage through developing and obtaining strategic resources that meet criteria rareness, valuable, non-imitable and non-substitutable.

The resource-dependency theory has been used to explain how purchasing and supplier involvement enhances a firm's unique capabilities and thus positively affects firm performance (Carr and Pearson, 2002), and how technologies can be an inimitable resource that has a significant impact on manufacturing, information flow, and performance (Tan *et al.,* 2010). Kim (2009) used this theory to examine the causal linkages among supply chain management practices, competition capability, the level of supply chain integration, and firm performance. Dobrzykowski *et al.* (2010) explained a firm's successful sourcing decisions by resource-based view which provides an internal view of the firm considering its core competencies. Lao et al. (2010) developed the concept of supply flexibility by recognizing the role of resources in supply flexibility. On the other had network theory also helps to explain why firms lacking certain competitive capabilities will seek and promote collaborative relationships with supply chain partners to secure those capabilities (Oh and Rhee, 2008).

Early supplier involvement refers to a form of vertical collaboration between supply chain partners in which the manufacturer involves the supplier at an early stage of the product development process (Mikkola and Skjott-Larsen, 2006; Van Weele, 2010). Many purchasing organizations view coordination with critical suppliers through ESI as an important contributor to product, process and supply chain structure development and a cost reduction measure (Millson & Wilemon, 2002). Also, adopting ESI practices may offer additional benefits to the organization such as management of supply risk in

new product development and the upstream supply chain (Zsidisin and Smith, 2005). For a supplier, participation may be embedded in the existing partnership or alliance with the manufacturer, or a way of securing business (Leenders *et al,* 2002).

Early supplier involvement (ESI) is believed to be of high importance because decisions that are made in the design phase have a major effect on product quality, cycle time, and costs. It is thus vital for organizations to bring the right expertise in the design phase and leverage the skills of suppliers to reduce development costs. According to literature, there are several reasons to involve suppliers early; suppliers can identify potential problems early on in the process involving suppliers at an early stage can improve the communication between the supplier and the buyer (McIvor & Humphreys, 2004; Petersen, Handfield, & Ragatz, 2003), early involvement will increase suppliers perceived contribution and when facing technology uncertainty (Ragatz, Handfield, & Petersen, 2002), buyers can benefit from suppliers' information and expertise (Petersen *et al.,* 2003).

For achievement of effective organizational positioning through early supplier involvement, the organization should ensure that supplier visits are often undertaken by a cross-functional team that include a senior member of purchasing and experts on quality and production engineering. Each member of the team is able to evaluate the supplier from a specialist point of view thus ensuring shared responsibility for a decision to approve, improve or reject a supplier (Lysons & Farrington, 2006). Also, specification development through consultation with users to determine their needs and also use of open and generic specification especially when there is trademarks or brand names.

This enables the supplier to understand the exact requirements needed for the final product without defects thus ensuring that it fulfils the expectations of the target customer (Souquieres, 2003). By this, the final product is more acceptable in the marketplace hence a better competitive position of the organization. Supplier integration can, therefore, help tyre manufacturing firms to achieve product performance improvements, which eventually contribute to a competitive advantage and better positioning to an organization due to increased acceptability of their tyre products by customers.

## 3. Materials and Methodology

The correlation research design was applied in the study. The design was appropriate because the research attempted to find a causal effect relationship between early supplier involvement and supply chain performance. The target population were 100 respondents comprising of finance, procurement and stores departments. The respondents comprised of chief procurement officer, assistant chief procurement officer, accountant, procurement officers and storekeepers. The study employed a census sampling method where all the units under investigation are covered. A total of 79 questionnaires out of the 100 were returned, which gives a response rate of approximately 79 percent. This response rate is above average. Even though the percentage rate of response was above average, the number of distributed questionnaires may have implications on the validity of the statistical analysis. The writer did however decide to continue with the analysis because the theoretical part of the project was already done. Data was collected from the MTRH employees through structured questionnaires. The questionnaires contained close-ended questions with the

quantitative section of the instrument utilizing both a nominal and a Likert-type scale format.

## 4. Findings and Discussion

### *4.1. Reliability and Validity Tests*

Cronbach's Coefficient Alpha was used to determine the reliability of the research instrument using SPSS V. 23 program. A reliability coefficient of 0.7 and above was assumed to reflect the internal reliability of the instruments (Fraenkel & Wallen, 2000). The study results illustrates that the scales were reliable as their reliability values exceeded the prescribed threshold of 0.7. Factor analysis was employed to the constructs of supply chain development practices and supply chain performance. The results were compared with Kaiser-Meyer-Olkin measure of 0.5 which is considered to be the threshold (Hair et al., 2010).

***Table 1:*** *Reliability and Validity Tests*

| | Loadings | KMO (Bartlett's Test) | CV |
|---|---|---|---|
| Supply Chain Performance (α=0.89 | | 0.911(χ2=26.06**) | 50.471 |
| Our suppliers present high quality levels | 0.63 | | |
| Our suppliers present high service levels | 0.61 | | |
| Our suppliers deliver product/service on-time | 0.59 | | |
| Our suppliers respond quickly to our petition | 0.57 | | |
| Our suppliers have low price/cost of products/services | 0.57 | | |
| Our suppliers have enough flexibility to respond to unexpected demand changes | 0.52 | | |
| Our suppliers deliver the correct quantity of products | 0.85 | | |
| Our suppliers are willing to adjust products/services to meet changing need | 0.78 | | |
| The hospital has short order to deliver cycle time | 0.73 | | |
| early Supplier Involvement (α=0.747) | | 0.86(χ2=46.36**) | 49.11 |
| Our hospital involves suppliers early before contract award | 0.8 | | |
| During the product development stage, there is a high level of involvement from our suppliers | 0.88 | | |
| We have regular Sites visits to the supplier's premises | 0.55 | | |
| Our hospital conducts ESI for those suppliers who supply strategic items | 0.57 | | |
| We involve suppliers in Quality of items to be supplied | 0.69 | | |
| We involve supplier in product design. | 0.64 | | |
| Our suppliers have an active role in product design specifications | 0.76 | | |
| Co-design activity on our product with our suppliers is a major priority for us. | 0.68 | | |

***Source:*** *Research Data (2021)*

*4.2. Sample Characteristic*

The demographic characteristics sought from the respondents included; the gender, age, education and the experience of the respondents in supply chain. The demographic information or characteristics concerning the unit under investigation gives the researcher a glimpse into other factors other than the main factors which are or might be acting as confounders in a given phenomenon and which might determine the direction of the relationship between the main factors under investigation. The findings on the demographic characteristics were presented in Table 2. The findings show that 96% of the workforce in MTRH is below 40 years of age. These findings show that MTRH has employed staff with diverse education and professional qualification levels and chances of conflict due to misinterpretation of information and of directives were unavoidable. Cumulatively, over 89% of the employees have worked for less than 9 years which is comparable with the age of majority of the employees, aged below 40 years. On the other hand, there is diversity in terms of employment hence the expectation is that there are different levels of understanding of the subject matter.

***Table 2:*** *Demographic Information*

| | | Frequency | Percent |
|---|---|---|---|
| **Gender** | Male | 45 | 57 |
| | Female | 34 | 43 |
| | Total | 79 | 100 |
| **Age** | Below 30 | 53 | 67.1 |
| | 31-40 | 23 | 29.1 |
| | 41-50 | 3 | 3.8 |
| | Total | 79 | 100 |
| **Education** | Phd | 3 | 3.8 |
| | Masters | 13 | 16.5 |
| | Bachelor | 34 | 43 |
| | Diploma | 29 | 36.7 |
| | Total | 79 | 100 |
| **Experience in Supply Chain** | Less than 3yrs | 19 | 24.1 |
| | Between 4-6yrs | 29 | 36.7 |
| | Between 7-9yrs | 23 | 29.1 |
| | 10yrs and above | 8 | 10.1 |
| | Total | 79 | 100 |

***Source:*** *Research Data (2021)*

*4.3. Univariate analysis*

The study used means, standard deviation and Pearson Correlation for univariate analysis. Findings showed that the mean response regarding supply chain performance was 4.02 (SD = 0.780) indicating considerable level of supply chain performance at MTRH. Despite suppliers delivering the correct quantity of goods, willingness to adjust products/services to meet changing needs and short order to deliver cycle time, there are gaps identified in terms of quality and service levels, delivery time, prices/ cost and flexibility of the suppliers. Further, the mean response was 3.65 (SD = 1.013). Generally, the mean response was 3.65 (SD = 0.637) for supplier involvement indicting a moderate involvement of suppliers in MTRH. Consequently, a correlation analysis of

the independent factors and the dependent factor (competitive advantage) was conducted and the findings were summarized and presented in Table 3.

The findings in Table 3 show that supplier development has a positive and significant relationship with supply chain performance, *r*= 0.712, *p*=0.000. This means that there is a probability of 0.712 that supply chain performance would increase given an increase in supplier development. Furthermore, the findings show that Supplier Relationship Management has a positive and significant relationship with supply chain performance, r= 0.621, *p*=0.000 meaning that there is a 0.621 probability that supply chain performance will increase with increase in Supplier Relationship Management between the suppliers and MTRH. In addition, contract management has a positive and significant relationship with supply chain performance, r= 0.771, *p*=0.000 indicating that there is a probability of 0.771 that supply chain performance would increase with increase in contract management. Finally, Supplier Involvement has a positive and significant relationship with supply chain performance, r= 0.693, *p*=0.000 showing that there is a 0.693 probability that supply chain performance would be enhanced with increase in Supplier Involvement in the supply chain processes of MTRH. There are also significant inter-factor relationships that point to the fact that they are mutually dependent. These findings show that the various strategic sourcing elements complement each other for the benefit of increasing the level of supply chain performance at MTRH.

***Table 3:*** *Univariate analysis*

| | | Mean | SD | Supply chain performance | Earlier Supplier Involvement |
|---|---|---|---|---|---|
| Supply chain performance | R | 4.02 | 0.78 | 1 | |
| Earlier Supplier Involvement | R | 3.65 | 0.637 | .693** | 1 |

** Correlation is significant at the 0.01 level (2-tailed).
*r* is the Pearson's Product Moment Correlation Coefficient

*4.4. Analytic model*

The study was analysed using both descriptive and inferential statistics. Descriptive statistics included frequencies, measures of central tendencies (mean, median or mode) and measures of dispersion (standard deviation, range and variance). Further, both Pearson's correlations and regression analyses as forms of inferential statistics were used. Correlations were used to test for significant relationship between variables and multiple regression to check the extent to which the dependent variables were predicted by the independent variables and this helped to test the hypotheses. The multiple regression models were used to estimate the causal relationships between stock beta and other chosen variables is as indicated below:

$Y_i = \beta_0 + \beta_1 X_{1i} + \varepsilon_i$

Where:

$Y_i$= Supply chain performance (dependent variable)
$\beta_1$= are regression coefficients
$X_{1i}$= Early Supplier Involvement
$\varepsilon_i$ = error term

*4.5. Multivariate analysis (hypothesis Testing)*

The study regression analysis in to assess the effect of the independent variables on the dependent factor (supply chain performance) and test the underlying research hypothesis. First the model summary and the analysis of variance which is used in assessing model fit were assessed and findings were presented in Table 4. The findings in Table 4 on the model summary show that all the predictors explain 68.2% of the variation in supply chain performance ($R$ = 0.826, $R$-squared = 0.682, Adjusted $R$-squared = 0.664). The coefficient of determination explains the extent to which changes in the response variable can be explained by the change in the explanatory variables or the percentage of variation in the dependent variable that is explained by all the independent variable. ANOVA results in Table 4 show that the model fit was good as illustrated by overall test of significance with F (4, 74) value of 39.607 with $p < 0.001$. Thus, the model was fit to predict supply chain performance based on earlier supplier involvement factors.

***Table 4:*** *Regression Model*

| | **Unstandardized Coefficients** | | **Standardized Coefficients** | | |
|---|---|---|---|---|---|
| | **B** | **Std. Error** | **Beta** | **t** | **Sig.** |
| (Constant) | 0.639 | 0.263 | | 2.43 | 0.018 |
| Supplier Involvement | 0.205 | 0.088 | 0.226 | 2.334 | 0.022 |
| **Model Summary statistics** | | | | | |
| R | 0.826 | | | | |
| R Square | 0.682 | | | | |
| Adjusted R Square | 0.664 | | | | |
| **Good of fit statistics** | | | | | |
| ANOVA (F stat) | 39.607 | | | | |
| ANOAV (F prob) | 0.000 | | | | |

Dependent Variable: Supply Chain Performance

The findings in Table 4 show that supplier involvement has a positive and significant effect on supply chain performance, $\beta_4$= 0.226, $p$ = 0.022. This means that with each unit increase in supplier involvement in supply chain processes, supply chain performance would increase by 0.226 units. Hence hypothesis 1 was accepted. Based on the result MTRH involved its suppliers which improved the hospital supply chain performance. Hence supply involvement in before contract award, during the product development stage, Quality of items to be supplied and product design improves hospital supply chain performance. Also practicing supply involvement activities such regular sites visits to the supplier's premises, conducting ESI for those suppliers who supply strategic items, having an active role in product design specifications and Co-designing activity on hospital product with our suppliers is a major priority for us will likely improve supply chain performance. In line with these findings, Millson & Wilemon, (2002), view supplier involvement as an important contributor to product, process and supply chain structure development and the reduction of costs. Similarly, Zsidisin and Smith, (2005) alluded that supplier involvement offers additional benefits

to organizations in the management of supply risk in new product development and improving the overall supply chain performance.

## 5. Conclusion and Recommendations

The findings show that increasing supplier involvement has an incremental effect on supply chain performance. The reason for this is that site visits are made to the supplier's premises. Besides that, it is the hospital's top priority to co-design activity on the product with their suppliers. Consequently, potential problems can be identified early on in the process thereby improving communication between the hospital and its suppliers. The challenge however is there is no optimal involvement of suppliers in quality of items to be supplied, product design specifications and the involvement of suppliers before contract award. However, there are gaps in terms of whether MTRH involves suppliers early before contract award, if during the product development stage, there is a high level of involvement from their suppliers, if the hospital conducts ESI for those suppliers who supply strategic, whether there is involvement of suppliers in quality of items to be supplied, suppliers involvement in product design, if suppliers are actively involved in product design specifications and whether it is the major priority of MTRH to co-design activity on the product with their suppliers.

Based on the findings of the study, the hospitals should ensure that supplier visits are often undertaken by a cross-functional team that include a senior member of purchasing and experts on quality and production. Each member of the team is able to evaluate the supplier from a specialist point of view thus ensuring shared responsibility for a decision to approve, improve or reject a supplier (Lysons & Farrington, 2006). Moreover, the hospital needs to involve suppliers early before contract award, raise awareness among suppliers on the quality of items to be supplied and to co-design activity on the product with their suppliers.

This study focuses on Moi Teaching and Referral Hospital in Eldoret only. However, there is need to increase the scope to cover other referral hospitals in Kenya so as to confirm the findings of this study and also to add more knowledge.

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# APPENDICES

## APPENDIX I: QUESTIONNAIRE

**Instructions**

Please tick (√) or fill in the blanks and respond to all items.

**Section A: Early Supplier Involvement**

Please tick the number that best describes your opinion about Early Supplier Involvement. The numbers represent the following responses strongly agree (5); Agree (4); Disagree (3); Strongly Disagree (2); not at all (1)

| | SA | A | D | SD |
|---|---|---|---|---|
| Our institution involves suppliers early before contract award | | | | |
| During the product development stage, there is a high level of involvement from our suppliers | | | | |
| We have regular Sites visits to the supplier's premises | | | | |
| Our institution conducts ESI for those suppliers who supply strategic items | | | | |
| We involve suppliers in Quality of items to be supplied | | | | |
| We involve supplier in product design. | | | | |
| Our suppliers have an active role in product design specifications | | | | |
| Co-design activity on our product with our suppliers is a major priority for us. | | | | |

**Section B: Supply Chain performance**

The following are the statements on supply chain performance. Please tick the response that matches your opinion. **Key: 5**= (SA) Strongly Agree, **4**= (A) Agree, **2** = (D) Disagree, **1**= (SD) Strongly Disagree.

| | SA | A | N | D | SD |
|---|---|---|---|---|---|
| Our suppliers present high quality levels | | | | | |
| Our suppliers present high service levels | | | | | |
| Our suppliers deliver product/service on-time | | | | | |
| Our suppliers respond quickly to our petition | | | | | |
| Our suppliers have low price/cost of product/service | | | | | |
| Our suppliers have enough flexibility to respond to unexpected demand changes | | | | | |
| Our suppliers deliver the correct quantity of product | | | | | |
| Our suppliers are willing to adjust product /services to meet changing need | | | | | |
| The hospital has short order to deliver cycle time | | | | | |

**Thank you**