

# **EFFECT OF SUPPLIER EVALUATIONS ON PRODUCT DEVELOPMENT AMONG CONSTRUCTION COMPANIES LISTED IN THE NAIROBI SECURITIES EXCHANGE**

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## **ABSTRACT**

Evaluating suppliers can be challenging, costly, inefficient, and inconsistent. From an analytics perspective, many approaches are inadequate and unable to provide the insight needed to drive better decision making and performance improvement. They tend to provide after-the fact results rather than identifying root causes of performance issues, without which, improvements are difficult to drive. Understanding supplier performance can both prevent problems and facilitate performance improvement. The purpose of this study was to establish the effect of supplier evaluations on product development of construction companies listed in the Nairobi Securities Exchange. The study adopted a descriptive design. The population of study was 172 employees comprising of senior managers, middle level managers and support staff working in the construction companies listed in the Nairobi Securities Exchange. This research study used a stratified random sampling method to select 30% of the targeted respondents giving a sample size of 69 respondents. The study used primary data for this study and collected using questionnaires. The quantitative data in this research was analyzed by descriptive statistics using statistical package for social sciences (SPSS V 21.0) while content analysis was used for the qualitative data. In addition, a multivariate regression model was applied to determine the relative importance of each of the four variables with respect to product

development. The study found out that product assessment affected product development to a very great extent mainly through quality level/ quality management policy, environmental, ethics and occupational health and safety policies. Capacity assessment affected product development to a very great extent through aspects such as financial capability and technical capability. The study found out that information assessment affected product development to a great extent. The study concluded that information assessment had the greatest effect on the product developments among construction companies, followed by product assessment, then capacity assessment while delivery assessment had the least effect to the product developments among construction companies. The study recommends that checks and measures be put in place through the Quality assurance department to ensure that product quality in terms of density and other specifications are upheld before supply. The study also recommended that companies should clearly indicate the criteria they use to determine the capacity of the suppliers whether its financial capability, technical capability, human resource or process control capability as this helps the company know whether the supplier can guarantee sustained continuity of supply.

**Key Words:** *supplier evaluations, product development, construction companies, Nairobi Securities Exchange*

## **INTRODUCTION**

Purchasing and suppliers are of major strategic importance to most companies today. This is because a substantial amount of the resources used by a company are made available through its suppliers. Purchases from suppliers account for more than half of total costs for most companies and in some industries, such as electronics, telecommunications, construction, and automotive, this portion is normally substantially higher (Gadde & Håkansson 2010). Suppliers are important to buying firms not only in financial terms. To an increasing extent they provide customers with new technology. Supplier performance thus considerably impacts on the efficiency and effectiveness of the customer firm and is of vital importance.

Industrial markets worldwide are in a phase of radical change. Their structural transformation is characterized by overcapacity and globalization, as well as shorter innovation and product life cycles. The wide-spread application of internet technologies within the framework of the procurement process, whether as a global source of information or for networking with external partners, poses new challenges: the reorganization and optimization of existing structures and processes is often inevitable. The growing intensity of international competition forces enterprises to reduce their vertical range of manufacture and to concentrate exclusively on their core capabilities. At the same time, the reduction of the manufacturing depth leads to an increase of the proportion of purchased parts and consequently increases the dependency on suppliers (Maron & Bruckner, 2008). Therefore, the success of a company is determined to a greater degree by the abilities of its suppliers.

In procurement, the activity, which in a sense underlies the realization of all other objectives of a good purchase decision, is the selection and evaluation of the supplier. Even when a buyer may have done his homework in identifying the right product to meet his needs, the achievement of the buyer's objective will ultimately depend on how well his selection of the supplier has been. The buyers must ensure that the supplier is able to provide goods, which conform to the buyer's standards and specifications (O'Toole & Donaldson, 2012). If the supplier ultimately ships goods, which do not meet the buyer's requirements, all his other objectives will also not be realized. Thus, the importance of selecting a dependable and reliable supplier is self-evident. It is in this context that supplier assessment and evaluation has received great attention in procurement management globally. The procurement task has become more complex and the need for sourcing of reliable and dependable suppliers has become more important than even before. The search for an acceptable supplier can be greatly assisted by adopting a systematic approach to supplier appraisal and evaluation.

Selection and management of the right supplier is the key to obtaining the desired level of quality, on time, and at the right price; the necessary level of technical support; and the desired level of service. Supplier evaluation is central to the work of all buyers, and is probably the most important function in the purchasing process (Erridge, 2011). It is becoming increasingly difficult to ignore the fact that, effective and efficient supplier performance ensures appropriate

product development business success, value creation, customer satisfaction, buffer and sustainable competitive advantage. Businesses are operating under duress, complex unfriendly and uncertain atmosphere that is capable of swift outbreak of both controllable and uncontrollable detrimental risk. Eventually business operations are hit the most which may lead to temporal disruption or wind-up.

Measuring the performance of suppliers is vital to ensuring a well-functioning supply chain in developing countries. Kannan and Tan (2006) observed that for most African countries, the supply chain is full of waste and hidden cost drivers and supply management is fraught with risks as companies deal with increasing numbers of offshore suppliers. Measuring and understanding supplier performance is critical to ensure a well-functioning supply chain and to a company's competitive position.

In the Kenyan context, Kitheka et al (2013) observed that companies who evaluate their suppliers find that they have better visibility into supplier performance, uncover and remove hidden cost drivers, reduce risk, increase competitive advantage by reducing order cycle times and inventory, gain insight on how to best leverage their supply base, and align practices between themselves and their suppliers. Companies pursuing supplier assessment commonly see over a 20% improvement in supplier performance metrics (e.g., on-time delivery, quality, and cost).

Ndegwa (2012) also indicated that during the past decades there has been an increasing trend to outsource some of the production of the final product to some suppliers. The outsourcing of the production rate has been increasing and due to that there has been also developing an increasing need to evaluate the suppliers from many different aspects using different analytical methods. The supplier evaluation is a field which has increased its importance over the years as they provide valuable information about the suppliers and help the customers to perform supplier management.

According to Njoroge (2007), price has been traditionally considered as the single most important factor in evaluating and monitoring suppliers. Changes in competitive priorities have also seen other dimensions of performance, including quality, delivery and flexibility become increasingly important. Consequently, in order to maintain effective partnerships, the buyer must continuously monitor supplier performance across multiple dimensions and provide feedback for improvement. These dimensions may be both tangible (e.g. operational performance) and intangible (e.g. relationship status), and should provide timely information to suppliers which both communicate buyer expectations and, where necessary, enables corrective action to be undertaken.

It is therefore very clear that the purchasing organizations are not active in supplier quality management where it is necessary to input resources to assist their suppliers, yet, many were keen to get the suppliers to do more, presumably for the same cost. Munei (2009) established that

the benefits that accrue from supplier evaluation and quality management include reduced lead times, increased responsiveness to customers orders and enquiries, customer loyalty, increased profitability, reduced opportunity cost from lost sales and effective communication between the organization suppliers as well as customers.

## **STATEMENT OF THE PROBLEM**

Evaluating suppliers can be challenging, costly, inefficient, and inconsistent. From an analytics perspective, many approaches such as scorecards and rule-based approach are inadequate and unable to provide the insight needed to drive better decision making and performance improvement. These approaches tend to provide after-the fact results rather than identifying root causes of performance issues, without which, improvements are difficult to drive. Understanding supplier performance can both prevent problems and facilitate performance improvement. Companies pursuing supplier assessment on average see a 26% improvement in supplier Performance metrics (e.g., on-time delivery, quality, and cost). Besides, specific requirements of choosing suppliers vary between the different business fields (Weele, 2005).

The ability of a company to design in quality during new product and process design becomes highly dependent on their capacity to involve their suppliers in a responsive and timely fashion in the design process itself; this can include involvement of key suppliers at the product definition stage with end customers. With approximately 50% of cycle time residing in the hands of a company's suppliers, its market responsiveness is dependent upon its ability to successfully deploy a supply chain management system. Suppliers can critically affect cycle time in purchased material lead-time and product development (Erridge, 2011).

Almost 50% of the firms globally do not engage in formal supplier evaluation process (Simpson *et al.*, 2011). Supplier evaluation practices undertaken by most firms is an ineffective mechanisms in improving buyer-supplier relationships performance in which its success largely depends on how suppliers show their level of commitment to the buying firm in sustaining a collaborative long term relationships (Porter, 2009) and Poor supplier performance affects the overall supply chain.

Businesses in Kenya are operating under duress, complex unfriendly and uncertain atmosphere that is capable of swift outbreak of both controllable and uncontrollable detrimental risk. Eventually business operations are hit the most which may lead to temporal disruption or wind-up. Most of the companies in the construction an allied sector are bogged with a problem of costly imports of raw material (Njoroge, 2007). The local suppliers have capacity issues thus a huge reliance of imports which require longer lead (delivery times) leading in some case to huge shock holding costs to ensure continuous flow of materials for manufacture thus negatively affecting their product development. Most of the companies have not utilized a fully structured supplier evaluation system or other guidelines to assess their suppliers. Buying firm realizes the cost of monitoring supplier tends to be high relative to inability to understand what the supplier

is actually doing (Kitheka et al, 2013). With the elevation of the current global sourcing trend, it is more difficult for the companies to conduct frequent on-site supplier evaluations. So these companies need to develop an effective process for the evaluation of suppliers as a part of their SCM processes. This study therefore sought to fill this gap by establishing the effect of supplier evaluations on product development of construction companies listed in the Nairobi Securities Exchange.

## **GENERAL OBJECTIVE**

The main objective of this study was to establish the effect of supplier evaluations on product development of construction companies listed in the Nairobi Securities Exchange.

## **SPECIFIC OBJECTIVES**

1. To determine the effect of product assessment on product development of construction companies listed in the Nairobi Securities Exchange
2. To establish the effect in capacity assessment on product development of construction companies listed in the Nairobi Securities Exchange
3. To examine the effect of information assessment on product development of construction companies listed in the Nairobi Securities Exchange
4. To assess the effect of delivery assessment on product development of construction companies listed in the Nairobi Securities Exchange

## **THEORETICAL REVIEW**

According to Araz (2007), a theory is a set of assumptions, propositions, or accepted facts that attempts to provide a plausible or rational explanation of cause-and-effect (causal) relationships among a group of observed phenomenon. A theoretical framework on the other hand is a group of related ideas that provides guidance to a research project or business endeavor. In this section, the focus is on various theories pertaining to supplier evaluations as a key construct.

### **Rough Set Theory**

Rough set methodology and theory utilizes set theory to help filter and focus the set of acceptable suppliers and factors in their evaluation. Rough set theory, proposed by Pawlak (1982), is a mathematical approach to vagueness and ambiguity. The method classifies objects into similarity classes (clusters) containing objects that are indiscernible with respect to previous occurrences and knowledge. These similarity classes are next employed to determine hidden patterns within the data. Thus, applications of rough set theory have seen significant application in data mining approaches. Approximation vagueness is usually defined by precise values of lower and upper approximations. Lower approximations describe the domain objects which definitely belong to the subset of interest. Upper approximations describe objects which may possibly belong to the subset of interest. The difference between the upper and the lower approximations constitutes a boundary region for the vague set. Hence, rough set theory

expresses vagueness by employing a boundary region of a set. If the boundary region of a set is empty it means that the set is crisp, otherwise the set is rough.

Given that strategic decisions in organizations need to incorporate tangible and intangible as well as into any analysis that seeks to identify and select critical supply chain partners, more advanced techniques can provide insights. One such toolset integrates grey system theory and rough set theory methodologies (Munei, 2009). Grey system theory is a generalized form of fuzzy approaches and mathematics. Rough set methodology and theory utilizes set theory to help filter and focus the set of acceptable suppliers and factors in their evaluation. Together these two techniques provide complementary avenues to rank or select preferred organizational suppliers, based concurrently on management/expert opinion and previous supplier performance and decisions.

### **Grey System Theory**

Grey system theory can be used to solve uncertainty problems in cases with discrete data and incomplete information (Deng, 1989). The major advantage is that it can generate satisfactory outcomes using a relatively small amount of data or with great variability in factors (Li et al, 2009). Grey system theory provides an approach for analysis and modeling of systems with limited and incomplete information, and which may exhibit random uncertainty. Grey system theory has many successful applications, in areas such as economics, agriculture, medicine, geography, earthquakes, industry, etc. In recent years, grey system theory has been an effective methodology that deals with uncertain and indeterminate problems.

Within Grey System theory we can apply grey relational analysis (GRA). GRA is an effective method for analyzing uncertain relations between one main factor and other related factors in a given system (Weele, 2005). A major advantage of the GRA method is its use of historical data, simplified calculations in a logical structured framework that can be used to analyze various relationships among the discrete data sets. Thus, decisions in multiple attribute situations are relatively straightforward to determine.

### **Resource Based Theory**

RBV approach has made valuable contributions to understanding business phenomena for years and have been considered in operations and supply chain studies more recently (Erridge, 2011). RBV, views the firm as a set of valuable and rare resources and assets that can enable the firm to achieve competitive advantage, and long-term superior performance. RBV identifies and explains the conditions suitable for a firm to manage an economic exchange internally, and the conditions under which it should manage an economic exchange externally. RBV is important to the study of supplier selection/ evaluation/ development, as superior performance achieved in supply chain activities relative to competitors, would explain how these activities can be supported by suppliers and how supplier selection/evaluation/development can contribute to the supply chain core competences.

The dominant view for corporate strategy development in the 2005s focused on the external environment, or the industry structure of firms (Bruno, 2010). Porter's external environment (*i.e.*, the industry) consisted of five 'forces', of which the customer was one. The remaining forces were the supplier, the potential new entrant, the substitute product or service, and, finally, the rivalry among firms in the industry. With the industry structure fully analysed and understood, firms will then be able to optimally position a business in the industry so that maximum profitability will be achieved. The positioning results in either low-cost strategy or differentiation strategy, either of which could be pursued with a narrow or a broad focus. However, such an external analysis is of little value if the company fails to recognize or does not possess strategic resources to compete in its industry. This became a source of dissatisfaction among strategic thinkers, which led to renewed interest in older writings by David Ricardo, Joseph Schumpeter, and Edith Penrose. The new focus is to look at internal resources or capabilities when developing the strategy.

Within the resource-based theory, the firm is viewed as a chain of resources that is not freely bought and sold in a spot market (Barney, 2009). If these firm-specific resources yield capabilities that are durable, not transparent, not transferrable, and not replicable, these capabilities may be potent sources of sustained competitive advantage. These resources have been labelled, variously, as distinctive competence; core competence, firm-specific competence, and organisational capital and have sometimes been equated with capabilities. The matching process between an organisation's internal resources and the opportunities, as well as risks created by its external environment, is the heart of the strategy process (Erridge, 2011). Fundamental to our conception is customer's outsourcing need, which is a proxy of external environment. Matching suppliers' resources level and outsourcing needs should result in a more permanent, secure relationship with their customers. Therefore, we will review the prominent literature in manufacturer (customer)-supplier relationship that serves as a springboard for developing the stages of outsourcing needs.

### **Supplier Evaluation Models**

There are four common supplier evaluation models being used for supplier selection. They include the categorical model, the weighted-point model, the cost ratio model, and the dimensional analysis model. The categorical model divides the suppliers' performance into different categories. When buyers use this model, they are able to monitor the performance of suppliers in different product categories. It is very simple and can be implemented with inexpensive technology. However, it requires very experienced buyers with good memory and personal judgment (Humphreys et al., 2008).

The weighted-point model is the most basic of all supplier analysis methods. Buyers normally introduce small variations while using this model. It is popular due to its simplicity, flexibility and effectiveness in decision-making processes. The key for successful application of this model includes adequate estimation of weights in performance variables and a good understanding of



common performance levels in the industry. While using this method, the input for estimating the weights should come from the members of cross functional teams, not just from the buyers or the purchasing department (Humphreys et al., 2008).

The cost ratio model is complex and less used by buyers. It stresses issues with high influence on a buyer's operation costs (Kemp, 2011). Two cost components, the supplier's selling price and the buyer's internal operating cost (including quality, delivery and other service elements), are the basis for making decisions. To determine the total cost of a purchase, a buyer must know the company's own internal operating cost and obtain accurate information about suppliers' prices first, and then convert the internal cost into a cost ratio with respect to the total value of the purchase. The buyer selects the supplier with the lowest adjusted cost after adjusting the selling price with the internal cost ratio or picks the supplier who meets the established cost standard (Humphreys et al., 2008).

## **EMPIRICAL REVIEW**

A considerable number of conceptual and empirical articles on supplier selection have appeared (an exhaustive review was done by Weber et al (2010). Humphreys et al (2008) indicated that research studies have revealed that supplier involvement in the design process is not widely practiced. Their study discussed the lack of an appropriate customer-supplier interface to assess the suitability of suppliers with reference to design criteria. The paper proposed a mechanism for evaluating supplier involvement during product development. The assessment tool included four types of indices to measure supplier involvement in design, namely: satisfaction index, flexibility index, risk index, and confidence index. These indices measure the extent to which both the customer requirements and the supplier capabilities match or mismatch and therefore reflect the potential or risk of signing a project contract. Analysis within a multinational telecommunications company indicated that the selection methodology assists in reducing the product development timeframe since it automates the evaluation process and provides the procurement team with a flexible and responsive tool for assessing prospective suppliers.

Datta (2008) highlights the importance of suppliers or vendors as he calls it stating that vendor cooperation in a firm is important as they can recommend changes in materials or parts which maybe acceptable and this may lead to substantial reduction in production costs. The supplier's production line is in reality an adjunct to the manufactures production line, which permits blending of production processes and often can be suitably integrated. Providing suppliers with clear, concise quality, performance and reliability requirements can thus, very often, develop buyer-supplier understanding, cooperation and action. To have it operating as such under a vendor-vendee cooperation programme, the purchasing department can bring about an integrated production effort, and in the ultimate analysis purchasing profits come from such mutual understanding, and subsequent cooperation and actions with this is implemented with closest possible team works and sincerity.

According to Lyson (2006) suppliers should concentrate on quality issues first- especially the ability to meet customers order requirements – followed by continuously improvement and innovation efforts. Importantly, while not completely ignoring pricing issues, suppliers may want to place less emphasis' on the price when attempting to secure and retain customers.

Bruno (2010) did a study on the importance of selection and evaluation of the supplier in purchasing management. The paper demonstrates how important purchasing management is today because the profit potential of effective management of the purchasing and supply activities is enormous compared with other practical management alternatives. The procurement process has many major tasks. One of the most crucial is the selection of the right supplier. The right supplier provides the right quality of materials, on time, at the right price, and the right level of service. Any purchasing is only as good as the sources (suppliers) that it buys from. Purchasing managers can choose different purchasing and sourcing strategies, which help them to make the best decision. In today's global market, more and more companies become dependant on suppliers from abroad. The motives for buying abroad can range from quality to cost. In the implementation of international procurement, purchasing has to engage in the customary tasks of the supplier's identification, evaluation and selection. The evaluation of actual and potential sources is a continuing process in the purchase department and must be done at least once a year.

According to Mohammed (2013), it is becoming increasingly difficult in recent times to ignore the importance of supplier evaluation and selection assessment with renewed interest in risk and turbulent business environmental uncertainties. Basic emphasis should be placed on supply chain performance improvement and monitoring mechanism when evaluating the available and potential supply source. Based on the conceptual model from the perspective of agency theory view, the moderating role of catastrophic risk and environmental uncertainty would be examine against the effect of antecedent variable such as supplier evaluation, geographic location, cultural fit and supplier capabilities in achieving superior supplier performance. Supplier handling buyer inventory is demonstrated to buyer incurring low operational cost and risk associated to stock management. It is evident that previous researches have examined the relationship between demand and supply risk within the context of relationship quality. Specific study on catastrophic risk, environmental uncertainties formal supplier evaluation, geographic location, supplier capabilities and supplier performance improvement is limited, albeit unavailable in the context of Nigerian manufacturing SME, which the present study conceptualizes on. In this paper we argue that, formal supplier evaluation, cultural fit, R&D intensity, communication quality impact on supplier performance and in turn is moderated by catastrophic risk and environmental uncertainties. Anecdotal points of reference to our claims were adequately delineated relative to factors influencing supplier performance outcomes.

Simpson et al. (2011) found that about half of the purchasing managers in a survey of 299 US firms used formal supplier evaluation systems. Purchasing Magazine, in a large survey with

purchasing managers across the US, showed that 61 % of the companies used formal performance measurement systems in relation to their suppliers. Pearson (2011) compared small and large firms in the electronics industry in a national survey with regard to the utilization of supplier evaluation programs. The study showed that large companies were more involved in formal reviews than were small firms. Of the large firms 58% made a formal review every year, or more frequently, while the corresponding figure for small companies was 33%.

In a study of supplier evaluation processes, Kim, Frederiksberg and Herning (2012) sought to illuminate how supplier evaluation practices are linked to supplier performance improvements. Specifically, the paper investigates how performance information travelling between the evaluating buyer and the evaluated suppliers is shaped and reshaped in the evaluation process. The paper relied on a multiple, longitudinal case research methodology. The two cases showed two companies' efforts in designing, implementing, and using supplier evaluation in order to improve supplier performance. The findings showed how the dynamics of representing, reducing, amplifying, dampening, and directing shape and reshape supplier evaluation information. In both companies, evaluation practices were defined, redefined, and re-directed by the involved actors' perception and decision making, as well as organisational structures, IT systems, and available data sources.

Kitheka et al. (2013) conducted a survey on the effect of supplier quality management on organizational performance: a survey of supermarkets in Kakamega Town. The study employed a descriptive survey design and the study population was the procurement managers of the supermarkets. Data was collected using structured questionnaires which were administered by the studys through a drop and pick technique and it was descriptively analyzed. The study also explored the potential integration of supplier quality management practices into an organization's operations, focusing on the currently available applications. The study recommended that suppliers should maintain reliable records, errors to be identified early, supermarkets to decentralize their management structures, suppliers should conform to specifications and that senior level management should be fully committed especially in supplier development programmes so as to overcome the challenges faced in supplier quality management. Finally, suggestions for further research were given.

## **RESEARCH METHODOLOGY**

The research design that was employed in this study was descriptive survey method. The population of study was 172 respondents comprising of senior managers, middle level managers and support staff working in the construction companies listed in the Nairobi Securities Exchange. Stratified random sampling was used basing the strata on the various management levels. This was then put on a sampling frame and from this the sub samples were chosen at random. According to Mugenda and Mugenda (2003), in order to obtain reliable information and for generalization to take place, a sample of 30% of the target population was sufficient and so

40% was considered to be even better. The study therefore selected 69 respondents from procurement staff in construction companies listed in the Nairobi Securities Exchange.

Both qualitative and quantitative data was collected focusing on the effect of supplier evaluations on product development of construction companies listed in the Nairobi Securities Exchange using the semi-structured questionnaire with open and closed ended questions. The data was analysed by use of descriptive statistics (mean score and percentages) and inferential statistics multiple regression. Data were coded and thereafter analyzed using Statistical Package for Social Sciences (SPSS) program version 21 and presented using tables and pie charts to give a clear picture of the research findings at a glance. Conceptual content analysis was used to analyze data that was qualitative nature or aspect of the data collected from the open ended questions. In addition, a multivariate regression model was applied to determine the relative importance of each of the four variables with respect to product development. The model specification is as follows;

$$Y=\alpha+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\varepsilon$$

Where; Y= Product development; X<sub>1</sub>= Product assessment; X<sub>2</sub>= Capacity Assessment; X<sub>3</sub>= Information assessment; X<sub>4</sub>= Delivery assessment; ε= error term; β=coefficient of determination; α= constant

## **RESEARCH FINDINGS**

### **Product Assessment**

The study found out that product assessment affected product development to a very great extent mainly through quality level/ quality management policy, environmental, ethics and occupational health and safety policies. These findings are in line with Humphreys et al. (2008) arguments that adequate standard procedures of quality can define which supplier best meets high requirements. The supplier quality system should include both internal and external controls of the organization, from employee management to supplier management. They are also in line with Shahadat (2003) who says that the global suppliers' very competitive low product prices and their increasing levels of quality have led textile/apparel companies to think that it is significantly cost-effective to partially or totally manufacture textile/apparel goods overseas.

Price competitiveness also affected product development to a great extent. It was also indicated that the company conduct product assessment through quality level, frequent lab tests, capacity, environmental aspects, qualitative analysis, testing the quality of received raw material in line with specified quality parameters, sample analysis and quality assurance check and that the companies had quality assurance and control department to conduct the assessment with the main aim of ensuring that the products they made were of the highest quality and that customer complaints about the product were resolved. Kwai et al. (2006) contend that supply quality is the source for imbalance in proportion of the inputs into their organization's products, processes and

services. The ability of suppliers to influence customer satisfaction also makes measuring supplier quality essential to longer-term market success.

### **Capacity Assessment**

The study deduced that capacity assessment affected product development to a very great extent through aspects such as financial capability and technical capability. Human resource also affected product development to a great extent. These findings are in line with Erridge (2011) view it is necessary to know whether the supplier can guarantee sustained continuity of supply. The systematic gathering of supplier performance data enables the buyer negotiate strict agreements and about improving reject rates, reducing total lead time and contributing to cost reduction.

### **Information Assessment**

On the issue of information assessment, the study found out that information assessment affected product development to a great extent. These findings correlate with Dyer (2010) views that the economic resource of a firm is centered on inter organizational quality communication, it is an important area for the development of buyer-supplier relationship performance. Because it mitigate possible erratic loss or damages relative to quality, services or performance akin an improved quality, time, responsiveness and relational competence. Aspects such as willingness to share sensitive information and communication system affected product development to a great extent. In addition, willingness to participate in new product development and willingness to participate value analyses to a moderate extent affected product development. These findings are in line with Pauraj et al. (2008) who argue that structured interpersonal interactions determine the extent to which individuals are treated in relation to executing procedures and determination of the possible outcomes in a relationship. Therefore the feeling that one party is communicated and treated fairly by the other will results to buyer as well as supplier performance improvement. Thus, interorganisational communication is susceptible to firm's competitive survival and enhances quality, flexibility and responsiveness which in turn improved supplier performance. The findings further correlates with Mohrel et al.(2010) that some scholars put forward the idea that communication facilitates the transfer of information and knowledge between the exchange parties due to suppliers willingness to implement customer relationship strategy.

### **Delivery Assessment**

The study further established that delivery assessment affected product development to a great extent. It was evident that aspects such as on-time delivery/ Delivery schedules, Inquiry reaction time/ response time, flexibility of solutions and shipment efficiency also affected product development to a great extent. The findings correlate with Duclos et al., (2010) who points out that even suppliers with a proven track record, sometimes do fail to keep delivery promises and do not always meet the quality requirements due to many reasons. Some may be attributed to the

supplier's negligence, but in many cases this may be due to situations beyond their control but in all this the buyer should ensure that the reputation and goodwill of his company remains at optimum with the suppliers. Findings also correlate with Neely (2009) who concludes that it is important that suppliers of organizations deliver with speed meaning that they need to make the product or deliver the service quickly, deliver reliably; that is deliver the item when promised, they should be able to cope with change meaning that the company should have the ability to respond to increases and decreases in demand, it should be flexible and able to introduce or offer a wide variety of products to its customers an important element of this ability to offer different products is the time required for a company to develop a new product and convert its process to offer the new product.

### **Product Development**

It was deduced from the findings that for the last five years, number of new products launched, cycle times, number of existing products improved and product innovation have improved. It was pointed out that gathering as much information as possible from end users and using it to improve or coming up with new products, conducting market research and resource mobilization, acquiring more modern machinery and training on more modern and efficient technique of manufacturing cables and enhancing participation of all employees through involvement in product development could be used by the company to improve in product development. It was emphasized that investing in research would play a very big role whereby the company would improve on their existing skills and knowledge and that creation and financing of a research and development department would improve product development. Benchmarking, being up to date with market information on new trends, investing in new product development systems, having a documented procedure that specifies the process of improving product development, stakeholders to be involved and that ensures resources are availed for product development and testing were proposed as ways that would improve product development.

### **Multicollinearity Test**

A situation in which there is a high degree of association between independent variables is said to be a problem of multicollinearity. This problem was solved by ensuring that there was a large enough sample as multicollinearity is not known to exist in large samples. Multicollinearity can also be solved by deleting one of the highly correlated variables. Heteroscedasticity means that previous error terms are influencing other error terms and this violates the statistical assumption that the error terms have a constant variance.

**Table 1: Summary of Collinearity Statistics**

| Model |                        | Collinearity Statistics |       |
|-------|------------------------|-------------------------|-------|
|       |                        | Tolerance               | VIF   |
| 1     | Product assessment     | .937                    | 1.068 |
|       | Capacity assessment    | .873                    | 1.145 |
|       | Information assessment | .864                    | 1.157 |
|       | Delivery assessment    | .910                    | 1.099 |

The Variance inflation factor (VIF) was checked in all the analysis and it ranged from above 1 to 4 which is not a cause of concern according to Myers (1990) who indicated that a VIF greater than 10 is a cause of concern.

### **REGRESSION ANALYSIS**

**Table 2: Model Summary**

| Model | R     | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------|----------|-------------------|----------------------------|
| 1     | 0.809 | 0.654    | 0.609             | 0.195                      |

Table 2 is a model fit which establish how fit the model equation fits the data. The adjusted R<sup>2</sup> was used to establish the predictive power of the study model and it was found to be 0.609 implying that 60.9% of the variations in among construction companies listed in the Nairobi Securities Exchange are explained by product assessment, capacity assessment, information assessment and delivery assessment leaving 39.1% percent unexplained. Therefore, further studies should be done to establish the other factors (39.1%) affecting product developments among construction companies listed in the NSE.

**Table 3: ANOVA results**

| Model |            | Sum of Squares | df | Mean Square | F      | Sig.   |
|-------|------------|----------------|----|-------------|--------|--------|
| 1     | Regression | 3.041          | 4  | 0.760       | 23.699 | 0.0049 |
|       | Residual   | 1.604          | 50 | 0.032       |        |        |
|       | Total      | 4.645          | 54 |             |        |        |

The probability value of 0.0049 indicates that the regression relationship was highly significant in predicting how product assessment, capacity assessment, information assessment, delivery assessment affected product developments among construction companies listed in the Nairobi Securities Exchange. The F calculated at 5 percent level of significance was 23.699 since F calculated is greater than the F critical (value = 2.5252), this shows that the overall model was significant.

**Table 4: Coefficients of Determination**

| Model |                        | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig.   |
|-------|------------------------|-----------------------------|------------|---------------------------|-------|--------|
|       |                        | B                           | Std. Error | Beta                      |       |        |
| 1     | (Constant)             | 1.351                       | 0.432      |                           | 3.127 | .00338 |
|       | Product assessment     | 0.722                       | 0.196      | 0.146                     | 3.684 | .00071 |
|       | Capacity assessment    | 0.663                       | 0.113      | 0.126                     | 5.867 | .00086 |
|       | Information assessment | 0.873                       | 0.148      | 0.045                     | 5.899 | .00084 |
|       | Delivery assessment    | 0.511                       | 0.162      | 0.142                     | 3.154 | 0.0031 |

The established model for the study was:

$$Y = 1.351 + 0.722 X_1 + 0.663 X_2 + 0.873 X_3 + 0.511 X_4$$

The regression equation above has established that taking all factors into account (product assessment, capacity assessment, information assessment and delivery assessment) constant at zero product developments among construction companies was 1.351. The findings presented also show that taking all other independent variables at zero, a unit increase in the product assessment would lead to a 0.722 increase in the scores of product developments and a unit increase in the scores of capacity assessment would lead to a 0.663 increase in the scores of product developments among construction companies. Further, the findings shows that a unit increases in the scores of information assessment would lead to a 0.873 increase in the scores of co product developments among construction companies. The study also found that a unit increase in the scores of delivery assessment would lead to a 0.511 increase in the scores of product developments among construction companies. Overall, information assessment had the greatest effect on the product developments among construction companies, followed by product assessment, then capacity assessment while delivery assessment had the least effect to the product developments among construction companies. All the variables were significant ( $p < 0.05$ ).

## CONCLUSIONS

The study concludes that product assessment affects product development of a company to a very great extent through aspects such as quality level/ quality management policy, environmental, ethics and occupational health, safety policies, price competitiveness and quantity analysis/ production capacity. Thus in analyzing effects of supplier evaluations on product development among construction companies, great emphasis needs to be placed on these aspects as they greatly influence product development and that the company conducted product assessment through quality level, frequent lab tests, capacity, environmental aspects and qualitative analysis. The study concluded that capacity assessment affected product development to a very great extent and that financial capability, technical capability, human resource and process control capability were aspects that affected product development. On the topic of



information assessment, it was evident that information assessment affected product development in a company to a great extent. The study further deduced that willingness to share sensitive information, communication system, willingness to participate in new product development and willingness to participate value analyses were aspects that affected product development.

The study also concluded that delivery assessment affected product development to a great extent. It was evident that aspects of delivery assessment such as on-time delivery/ Delivery schedules, Inquiry reaction time/ response time, shipment efficiency, order cycle time and flexibility of solutions affected product development. The study finally concludes that information assessment had the greatest effect on the product developments among construction companies, followed by product assessment, then capacity assessment while delivery assessment had the least effect to the product developments among construction companies.

## **RECOMMENDATIONS**

Based on the conclusion, it was evident that quality level/ quality management policy as an aspect of product assessment affected product development. Therefore, it's important that checks and measures are put in place through the Quality assurance department to ensure that product quality in terms of density and other specifications are upheld before supply since supply quality is the source for imbalance in proportion of the inputs into the company's products, processes and services.

On the topic of capacity assessment, companies should clearly indicate the criteria they use to determine the capacity of the suppliers whether its financial capability, technical capability, human resource or process control capability as this helps the company know whether the supplier can guarantee sustained continuity of supply. The study further recommends that the company should restructure their communication systems in a manner that will facilitate easy and convenient way of sharing information and exchange of ideas since this greatly affected product development. The company should come up with strategies of handling sensitive information in a manner that will encourage people to open up and share information.

From the conclusion, delivery assessment affected product development to a great extent through aspects such as on-time delivery/ delivery schedules, inquiry reaction time/ response time, shipment efficiency, order cycle time and flexibility of solutions and all this aspects are guided by suppliers negligence in one way or another. The company should come up with strategies to determine supplier's negligence with the aim of curbing delivery faults that can affect product development.

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