

# An Assessment of the Role of Information Sharing Practice on Performance of Steel Manufacturing Companies in Kenya

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## Abstract

The purpose of this paper was to assess the role of information sharing practice on performance of Steel Manufacturing Companies in Kenya which are the key contributors to the economic development of the country. The descriptive research design was used in the formulation of knowledge on the role of information sharing practice on performance of Steel manufacturing Companies in Kenya and provided solutions to areas that needed improvement. The target population was 258 steel manufacturing companies in Kenya of which 32 were purposively selected. Data was collected using structured questionnaires and oral interviews for an in-depth understanding. Analytical research method was used to analyze secondary data and ex-post facto research design was used to report things the way they are. Both quantitative and qualitative research techniques were used during data presentation using inferential statistics to draw conclusions from the nominal measurement scale. Using regression analysis, the study revealed that information sharing practice statistically significantly predicted the performance of Steel Manufacturing Companies in Kenya,  $F(1, 242) = 35.874, p < .05, R^2 = .129$ . The analysis further revealed that there is a significant and a moderate positive correlation between Information sharing practice and the performance of Steel Manufacturing companies in Kenya ( $r = 0.359, p < 0.01$ ). The study recommends that the Steel manufacturing companies in Kenya to incorporate Information sharing practice in their business operations for them to realize improved performance.

**Keywords:** Information sharing practice, Steel Manufacturing Companies in Kenya, Supply chain performance

## 1.0 Introduction

With globalization, there has been an increasing interdependence across national and geographical boundaries of people. The intensity of competition has increased tremendously and there has been growing demands for flexible and cost efficient systems that can support customer differentiation. There are increasingly complex consumer demands, changing global regulatory regimes and increased concerns over products safety and security. Import restrictions have been put on the companies that fail to manage sustainably its supply chain and with the emergence of new types of inter-organizational relationships. Companies in most cases have been confronted with the challenge of having to plan and monitor their material and information flows continuously and efficiently from the point of procurement, through production, and up to marketing.

Information sharing has been shown to offer a central enabler of effective supply chain management (Mentzer, 2004, Moberg *et al.* 2002). Information sharing refers to the access to private data between trading partners thus enabling them to monitor the progress of products and orders as they pass through various processes in the supply chain (Simatupang & Sridharan, 2002). The sharing of information such as inventory levels, forecasting data and sales trends enables the companies to reduce cycle times, fulfill orders more quickly, cut out millions of dollars in excess inventory and improve forecast accuracy.

Information flow in any supply chain helps to coordinate the physical flows and the interdependencies amongst the organizations in the supply chain (Shah, 2009). The extent of information sharing in a supply chain is expanding and even the possibility of sharing information among competitors has been discussed (Lee & Whang 2000). Sharma and Bhagwat (2006) argue that the flow of information in an organization is the blood life of any business operating unit irrespective of its size.

Supply chain partners can achieve the benefits of sharing of information through the integration of their systems. Information integration refers to sharing of pertinent information among the members that could influence the actions and performance of the other supply chain members in a supply chain (Lee & Whang, 2001). Information provides the visibility needed to make decisions that improve the Company overall supply chain performance (Chopra & Meindl, 2015). Information sharing between the buyer and vendor in the supply chain has been considered as useful strategies to reduce the bullwhip and to improve supply chain performance (Lee *et al.*, 2004). Quality of information sharing encompasses the accuracy, timeliness, adequacy and the credibility of the information shared (Moberg *et al.*, 2002).

Lau and Lee (2000) asserts that creating an environment for controlled sharing of business data and processes improves information sharing effectiveness among trading partners. However, there is the reluctance

on the part of organizations in the supply chain to share information with each other. Information is generally viewed as providing an advantage over competitors and organizations resist sharing with their partners (Vokurka & Lummus, 2000) due to the fear of giving away competitive and sensitive information such as inventory levels, production schedules.

Supply Chain Management relies heavily on information technology to optimize information and products flows among the processes and business partners within the supply chain. Information communication technologies can have a considerable part to play in a competitive strategy. The appropriate use of information systems and information technology can lower the administrative costs of the organization. There are a number of new emerging technologies available to connect the members of a supply chain to support information sharing. These Information Communication technologies have contributed to the evolving of e-business and e-commerce. Information technology such as Enterprise Resource Planning (ERP) systems allow information to be shared seamlessly between members of a supply chain. Information Technologies can also act as a tool to differentiate a product in terms of quality of service and responsiveness to the customer requirements.

Steel Manufacturing Companies have become more responsive to customers in order to ensure their supply chain operate with the absolute minimum of stock-out events, with prompt response to market fluctuations while at the same time carrying minimal buffer stocks. The Steel industry globally has many players that make business coordination in this industry very difficult since in most cases steel producers and consumers depend on intermediaries to help in buying and selling materials (Goodwin *et al.*, 2000). The Steel industry is a high capital intensive and their products have relative long life-cycles, which means that low cost production is a prerequisite for any of this companies to become a market winner and they can not rely on increased prices to ensure their profitability (Standard & Poor's, 2007).

Manufacturing companies in developing countries in which Kenya is also included are now increasingly integrating Information sharing practices in their business operations to ensure that they also compete favorably in the dynamic global market. Kenyan steel manufacturing companies have been exposed to global competition with the liberalization of the East African regional markets that were key importers of the Kenyan Steel products. The steel manufacturing companies from developed countries like China, Korea, Japan, USA and Russia have ensured that they compete in terms of cost, quality, technology, customer satisfaction and other competitive strategies as they pursue to achieve competitive advantage over the Kenyan Steel products. They are also able to adjust to complex consumer demands and global regulatory systems that require the organizations to operate in sustainable manner. Apart from stiff competition from these companies, Kenyan Steel manufacturing Companies faces the challenges of high cost of raw materials, poor transport network, high taxation, price volatility and high cost of energy that hinder them to compete favorably (KAM, 2012). With considerable empirical research on supply chain management as well as models aimed at solving problems experienced by business firms, managers in most organizations are trying to implement the important supply chain management concepts to ensure that they achieve the combined benefits of improved cost, flexibility, dependability and quality (Hayes *et al.*, 2005).

Although a number of studies have been done on the concept and context of information sharing, there is limited information within the context of Steel Manufacturing industry in Kenya. These studies didn't explore the contributions of information sharing practice on performance of steel manufacturing companies in Kenya and this research aimed to fill this gap.

## 2.0 Literature review

### 2.1 Supply Chain Management Theory

Supply chain has its roots in Porter's (1985) value chain, which is the set of processes a firm uses to create value for its customers. Although originally described as a chain, supply chain can nowadays be defined as the network of organizations that are involved through upstream and downstream linkages in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer (Christopher, 2005). The chain involves two or more legally separated organizations that are linked together by material, information or financial flows and includes the ultimate customer. The objectives of the supply chain are to provide service to customers, achieve low operating costs and minimize the assets in the chain (Skjøtt - Larsen *et al.*, 2007). Many companies are now looking at securing cost, quality, technology and other competitive advantages as strategies to pursue in a globally competitive environment and to achieve this many manufacturers are focusing on their supply chain management practices.

Supply chain management is an important multi-disciplinary topic in modern business management and research. It enhances organizational productivity and profitability through a revolutionary philosophy to managing the business with sustained competitiveness (Gunasekaran *et al.*, 2004). Supply chain management emphasizes the overall and long-time benefit of all parties in the supply chain through co-operation and information sharing (Yu *et al.*, 2001). Simchi-Levi *et al.* (2009), define SCM as a set of approaches used to efficiently integrate suppliers, manufacturers, warehouses and stores so that products are produced and distributed at the right quantities, to the right locations, and at the right time in order to minimize system-wide

costs while satisfying service-level requirements.

Supply chain management aims at linking each element of the manufacturing and supply processes from raw materials acquisition, processing of goods and up to the final end users of the product. It focuses on how firms utilize their suppliers' processes, technology and capability to enhance competitive advantage. Supply Chain Management has the objective of governing all parts of the supply chain as a unit, instead of single organizational elements, in order to achieve increased competitiveness (Stadtler & Kilger, 2008). Since satisfying customer needs is the central purpose of any business (Doyle & Stern, 2006), this framework reflects the notion that customer focus in terms of satisfying needs and providing timely service is a key driving force of effective supply chain management. It seeks improve performance through better use of internal and external capabilities in order to create a seamlessly coordinated supply chain, thus elevating inter-company competition to inter-supply chain competition (Lummus *et al.*, 2003).

## 2.2 The Agile Supply Chain Theory

The market environment has become more dynamic and turbulent; companies need to adopt new supply chain strategy for them to remain competitive. Supply chain management is now moving away from traditional processes to agile capability of competitive bases of speed, flexibility, innovation proactivity, quality, and profitability through the integration of reconfigurable resources and best practices in a knowledge-rich environment to provide customer-driven products and services in a fast changing market environment (Yusuf *et al.*, 2004). Agility is a business-wide capability that embraces organizational structures, information systems, logistics processes and in particular, mindsets (Christopher, 2000). Lee (2004) argues that supply chain agility aims at responding quickly to short-term changes in demand or supply and ensure that the company handles external disruptions smoothly. Christopher (2000) identified four characters of agile supply chain that included sensitivity, virtuality, process integration and network based. Process integration means collaborative working between buyers and suppliers, joint product development, common systems and shared information.

Agile supply chain is market sensitive and needs the supply chain members to be able to read and respond to the market demand. The supply chain members should show the willingness to create an environment in which information can flow freely in both directions in the chain for them to achieve a more agile supplier base. Christopher (2000) argues that leveraging supplier relations allows companies to create agile supply chains by reducing lead time between organizations. The leverage of respective strengths and competencies of network partners assists to achieve greater responsiveness to market needs (Christopher, 2000). Krajewski *et al.* (2009) asserts that efficient supply chain has the qualities of make to stock, low capacity cushion, low inventory investment, short lead time, emphasis low process with consistent quality and on time delivery while for responsive supply chain include assemble to order with emphasis on product variety operational strategy, high capacity cushion, just as needed inventory to enable fast delivery time, shorten lead time and emphasis on fast delivery time, customization, and flexibility. It is through information sharing and collaboration that the company as a whole will have responsibility in assisting its external suppliers to improve quality, delivery time and service performance. This requires real time market feedback on actual customer requirements without making forecasts based upon past sales or shipments.

The use of information technology has helped the organizations to capture data on demand through Efficient Customer Response (ECR) from point –of –sale or the point of use hence increasing the responsiveness in process industries. ECR is designed to integrate and rationalize product assortment, promotion, new product development and replenishment across the supply chain hence increasing emphasis on key areas such as EDI, cross- docking and continuous replenishment (Harrison & Van Hoek, 2008). Implementing e-business to streamline business processes provide windows into operations, integrating the supply chain, increase customer services and streamline distribution (Rao 2002). Porter (2008) opine that the adoption of IT will change the competitive environment in three ways, namely through changing the structure of the industry, changing the rules of competition, and giving businesses new methods by which to gain competitive advantage over the competition.

Information technology help to communicate between upstream and downstream partners hence creating a virtual supply chain that is information based rather than inventory. Virtual supply chain ensures information is shared among partners thereby forming a process alignment through collaboration that is linked together as a network. Electronic Data Interchange (EDI) and the internet have made it possible for partners in the supply chain to share the same data rather than waiting for that extended chain to transmit data from one step to another. The company that are market driven can easily realize agility by investing in product research and modern information technology that enables it to react quickly to the fluctuations in product demand and sourcing problems.

## 2.3 Supply Chain Integration Theory

Integration is a process of interaction and collaboration in which companies in a supply chain work together in a

cooperative manner to achieve mutually acceptable outcomes (Pagell, 2004). Kim and Narasimhan (2002) asserts that supply chain integration links an organization with its customers, suppliers and other channel members by integrating their relationships, activities functions, processes and locations. According to Lambert (2004), successful supply chain management requires cross-functional integration of key business processes within the company and across the network of companies that consist of the supply chain. Organizations must integrate their operations with trading partners in order to sustain competitive advantage for the whole supply chain (Lambert & Cooper, 2000). Power (2005) asserts that integration involves the cooperation, collaboration, information sharing, trust, partnerships, shared technology and a fundamental shift away from managing individual functional processes to managing integrated chains of processes. Kwon and Suh (2004) consider supply chain integration to be a strategic tool that aims to reduce costs and thus increase customer and shareholder value. Supply chain integration is a good approach for improving business performance in a highly competitive market (Narasimhan, Jayaram, & Carter, 2001). Frohlich and Westbrook (2001) assert that the highest levels of integration with both suppliers and customers have the highest correlation with high levels of an organization's performance.

The major challenge in supply chain integration is to coordinate activities across the supply chain so that the enterprise can improve performance by reducing costs, increasing service levels, reducing the bullwhip effect, better utilization of resources and effectively responding to changes in the market place (Simchi-Levi et al., 2009). Chopra and Meindl (2015) argues that supply chain coordination occurs when all the different stages of supply chain work toward the objective of maximizing total supply chain profitability rather than each stage devoting itself to its own profitability.

### **3.0 Research Methodology**

#### **3.1 Research Design**

Descriptive survey design was adopted in conducting this study. Creswell (2013) asserts that a descriptive research design is used when data are collected to describe persons, organizations, settings or phenomena. The design also has enough provision for protection of bias and maximized reliability (Kothari, 2012). It was appropriate for this study because it allowed the collection of information for independent and dependent variables using interview and questionnaires (Orodho, 2009). The descriptive approach was appropriate for this study not only in validating finding but also in the formulation of knowledge and providing solutions to the problems. The researcher used this approach since it involves data collection, measurement, classification, analysis, comparison and interpretation to provide report summary such as measures of central tendency and correlation between variables.

The research design also enabled the study to combine both quantitative and qualitative research approaches in assessing the contributions of Information Sharing practice on performance of Steel Manufacturing Companies in Kenya. The mixed research design that consist both qualitative and quantitative approaches allows researcher to collect information from the people on their habits, opinions, attitudes and any other educational or social issues (Namusonge, 2010). Quantitative approach strives for precision by focusing on items that can be counted into predetermined categories and subjected to statistical analysis (Simiyu, 2012). Mugenda and Mugenda, (2008) asserts that qualitative methods can be used to gain more in depth information that may be difficult to convey quantitatively. The qualitative data were obtained by interviewing the procurement managers while quantitative data were obtained by administering the questionnaire to members of procurement department, Information Technology department, marketing department and production department.

#### **3.2 Target Population**

Population is defined as the entire group of people or things of interest that the researcher wishes to investigate (Sekaran & Bougie, 2010). The population of this study was all registered steel manufacturing companies in the republic of Kenya. Kenya has 258 registered steel products manufacturers (Africainvestor, 2011). The target population of this study were all employees working in the 32 Steel manufacturing companies in Kenya

#### **3.3 Sample and Sampling Technique**

The purposive sampling technique was used to identify and select eligible Steel manufacturing companies and the departments to be included in the study. Purposive sampling allows the researcher to use cases that have the required information with respect to the objectives of his or her study (Mugenda & Mugenda, 2008). Out of 258 registered steel manufacturing companies in Kenya, the researcher purposively sampled 32 companies for the study based on the theoretical assumption that the distribution is assumed to be normally distributed with a sample size of a above 30 objects The sample size was determined using Cochran (1977) sampling frame for large population number.  $Sample\ Size = z^2pq/e^2 = (1.96)^2(0.5)(0.5)/(0.05)^2 = 384$  where  $z = 1.96$ ,  $p = 0.5$ ,  $q = 0.5$  and  $e = 0.05$ . The sample size to participate in this research was to be 384 respondents and each company was to contribute 12 respondents in the study as shown in the table 3.1. The sample size selected depends on what

researcher wants to know, the purpose of the study, what is at stake, and what can be done with available time and resources (Paton, 2002). Simple random sampling was used to select participants from each department in the company. The sample size of 384 is more than the generally recommended sample size of 100 cases for statistical data analysis (Alreck *et al.*, 2004).

### 3.4 Data Collection Methods

This study used the questionnaires and interview guides in collecting the primary data while secondary data were obtained from journals, textbooks, Internet and Kenya association of Manufacturer magazines. Face to face in-depth interview was conducted to collect information from the Procurement Managers that helped to get a complete and detailed understanding of the contributions of Information sharing practice on the performance of Steel manufacturing companies in Kenya. Mugenda & Mugenda (2008) asserts that questionnaire is designed to address specific objective, research question or test hypothesis. This study used questionnaire because of its ability to collect large amount of information in a reasonably quick space of time and also is made the analysis is data simpler based on the research objective of the study. In addition, all questions were standardized and anonymity of the respondent was quarantined for the purpose of increasing the response rate. This mix of sources allowed for additional cross-checking of the findings for the purpose of evaluating the internal consistency and to increase reliability.

### 3.5 Validity and Reliability

Validity is the criteria for how effective the design is in employing methods of measurement that captures the data for the purpose of addressing the research questions. To ensure the results of the study reflect similar outcomes elsewhere and be generalized to other populations or situations, the researcher used triangulation to enhance the external validity of the research instrument. This research used interviews and questionnaire as primary data and research journals, textbooks and other public documents as secondary data. By combining data sources and methods triangulation opens the way for more credible interpretations (Decrop, 2004). Content and criterion related validity was achieved by consultations with supervisors and experts in instrument development. Views and comments from these stakeholders were used to upgrade the instrument. The use of supervisors and experts opinion enhanced content and criterion related validity.

The reliability of an instrument refers to its ability to produce consistent and stable measurements. The goal of reliability is to minimize the errors and biases in a study (Yin, 2013). To ensure the reliability of the instrument Cronbach's Alpha was used to test the reliability of the proposed constructs. Known for its stability and flexibility, Cronbach's alpha is a function of internal consistency or interrelatedness of items (Tavakol & Dennick, 2011). The alpha can take any value from zero (no internal consistency) to one (complete internal consistency).

### 3.6 Data Processing and Analysis

The researcher examined all the questionnaires for completeness and consistency and then categorized all the items before coding. The collected data was analyzed using SPSS version 20 (Statistical Package for Social Science) as the researcher obtained data using a standard questionnaire. Quantitative technique was used to code qualitative data. Trochim (2004) asserts that qualitative data can be coded quantitatively without detracting from the qualitative information. Descriptive statistics was used to examine the characteristics of the population. It enabled the researcher to meaningfully describe a distribution of scores using statistics that is depends on the type of variables in the study and the scale of measurement. Mugenda and Mugenda (2008) assert that descriptive statistics enable the researcher to describe distribution of scores. Variable aggregation for different variables was undertaken in facilitation of further statistical analysis. The researcher applied "Collapsing Response" method in analyzing responses from a Likert scale measurement. This is done by adding the 'strongly agree' responses with the 'agree' responses and also adding the 'disagree' responses with 'strongly disagree' (Gwavuya, 2011).

The correlation analysis was carried out between the variables of the study using Pearson correlation coefficient. This was to test whether there existed interdependency between Information sharing practice and performance of steel manufacturing companies in Kenya while regression analysis is used to shows the percentage of the total variation of the dependent variable that can be explained by the independent variables and was assessed using the coefficient of determination ( $R^2$ ) which is used for judging the explanatory power of the linear regression of dependent variable on independent variables.  $R^2$  is a measure of the goodness of fit of the regression line to the observed sample values of dependent and independent variables. The  $R^2$  can range from 0.0 to 1.0, with 1.0 showing a perfect fit that indicates that each point is on the line (Carver *et al.*, 2012). In this study the regression model was as follows;

$$Y = \beta_0 + \beta_1 x_1 + \varepsilon \quad (\text{Ott \& Longnecker, 2010})$$

Where;

Y = Represents the dependent variable; Performance of Steel Manufacturing Company

$B_0$  = Constant of the Model

$\beta_1$  is the regression coefficient

$\epsilon$  = Random Error of the Model

$X_1$  = Information Sharing practice

#### 4.0 Research Findings

The regression analysis revealed the relationship between the dependent variable performance of steel manufacturing companies in Kenya and independent variable which is information sharing practice. The coefficient of determination  $R^2$  and correlation coefficient  $r$  shows the degree of association between Information sharing practice and the performance of steel manufacturing companies in Kenya where  $R = 0.359$  and  $R^2 = 0.129$  as shown in table 4.1. This is an indication that there is a moderate linear relationship between Information sharing practice and the performance of Steel manufacturing companies in Kenya. The independent variable information sharing practice only explains 12.9% of the variability of the performance of Steel Manufacturing Companies in Kenya.

Table 4.1: Model Summary for Information Sharing practice

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.359 <sup>a</sup>	.129	.126	.81417

a. Predictors: (Constant), Information Sharing Practice  $X_1$

From the Table 4.2, ANOVA test reveals that the variable information sharing practice statistically significantly predicts the performance of Steel Manufacturing Companies in Kenya,  $F(1, 242) = 35.874$ ,  $p < .05$ ,  $R^2 = .129$ .

Table 4.2: ANOVA<sup>a</sup> (F-Test) Analysis for Information Sharing practice

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.780	1	23.780	35.874	.000 <sup>b</sup>
	Residual	160.416	242	.663		
	Total	184.197	243			

a. Dependent Variable: Performance of Steel Manufacturing Companies in Kenya

b. Predictors: (Constant), IS Practice  $X_1$

Table 4.3 shows the linear regression model for information sharing practice,  $Y = \beta_0 + \beta_1 X_1 + \epsilon$  Where; Y = Performance of Steel Manufacturing Company in Kenya;  $\beta_0$ ,  $\beta_1$ ,  $\alpha$  = Coefficient of Performance of Steel manufacturing company equation;  $X_1$  = Information sharing practice is  $Y = 2.421 + 0.332X_1 + \epsilon$ .

Table 4.3: Coefficients<sup>a</sup> for Information Sharing practice

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients		
1	(Constant)	2.421	.197		12.299	.000
	IS Practice $X_1$	.332	.055	.359	5.990	.000

a. Dependent Variable: Performance of Steel Manufacturing Companies in Kenya

The findings concurs with previous research by Lee *et al.*, (2004) which revealed that information sharing provides a unifying focus for the efforts of chain members to create better performance. Frohlich and Westbrook (2001) found out that higher degree of information sharing and close relationship with suppliers and customers can reduce manufacturing, delivery and procurement lead-times.

#### Conclusion

The study revealed that information sharing practice contributes significantly to the performance of Steel manufacturing companies in Kenya. Regression analysis results supports the finding with  $F(1, 242) = 35.874$ ,  $p < .05$ ,  $R^2 = .129$ . Correlation analysis results shows that there is a significant and a moderate positive correlation between Information Sharing (IS) practice and the performance of Steel Manufacturing companies in Kenya ( $r = 0.359$ ,  $p < 0.01$ ). The findings from descriptive analysis indicates that majority of the respondents, 82.4% agreed that information sharing Practice contributes to the performance of Steel Manufacturing Companies in Kenya.

Managers for Steel manufacturing companies in Kenya should encourage the information sharing with their supply chain members and this can only be realized when they accept to link the company's information systems with their clients. Through linkage of information systems, the company can share the production, delivery schedules and performance metrics of the company across the company's supply chain and they can track the order fulfilment and shipment status of the company across supply chain. This will ensure that the company gets timely, reliable quality information from supply chain members that will assist the company in quick decision making that will ensure improved visibility and an enhanced responsiveness to the customer

needs

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