International Journal of Innovative Scientific & Engineering Technologies Research 3(4):1-14, Oct.-Dec. 2015

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Dynamics of Supply Chain Management in the Kenyan Construction Industry: A Case Study of National Irrigation Board

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ABSTRACT

Effective supply chain management (SCM) has become a potentially valuable way of securing competitive advantage and improving organizational performance since competition is no longer between organizations, but among supply chains Prior studies carried out indicate that over 50% of construction projects in Kenya were failing by not meeting their cost projections, time schedules or quality demands leading to negative economic and social impacts. If the issue of construction project failures is not treated with the seriousness it deserves and its continuance halted, it will be difficult for Kenya to achieve project performance success. Construction project failures in Kenya are evident throughout the country and continue to draw great concern to all stakeholders as a result of consequent economic and social impacts. This study sought to assess the influence of SCM Practices entrenchment and their impacts on construction projects performance in Kenya.

This research study adopts cross-sectional survey research design. A qualitative descriptive survey questionnaire was then developed aimed at collecting information from respondents on their attitude and opinions on SCM practices andperformance. The questionnaire was served on a population of 65 National Irrigation Board (NIB) listed construction firm's management staff and 10 NIB engineers overseeing their projects. Out of 65 questionnaires distributed to NIB listed firms, fifty four responses were received, giving a response rate of 83.1%. All the NIB engineers returned their responses. The study established that where SCM practices were more entrenched, the firms were performing better. It was recommended that construction firms should focus significantly on improving their degree of SCM best practices implementation to boost project success.

Key words: Supply chain management practices, construction project performance

INTRODUCTION

There were many cases of construction project failures in Kenya with most construction projects failing to meet their cost projections, time schedules and quality demands. This trend was undermining the Kenyan growth and development and achievement of the Kenyan vision 2030 was at risk. Previous studies had tried to address construction project failures in Kenya through improved project planning (Muchungu 2012), resource management (masu 2006)and variations control (Gichunge 2000) but construction project failures were still high. Effective implementation of SCM practices has been proved to improve performance in the manufacturing industry. SCM best practices improve the flow of materials in one direction, the flow of money in the other direction and the flow of information in both directions. The

degree of SCM practices implementation determines the "dynamics" of Supply chain system (SCS). In a dynamic SCM system the entire SCS is visualized and SCM best practices applied to maximize strengths and efficiency at every level of the Supply chain process (close 2014).This leads to cost reduction, quality and prompt delivery of products (Niemeyer & Rawadi 2011). These are the same benefits aspired for in the construction industry. Achievements offered by SCM practices are therefore capable of improving construction project performance and has the potential of reducing construction project failures in Kenya. But the extent to which SCM practices had been embraced in the Kenyan construction industry was not known or understood. Furthermore the impacts of SCM practices on project performance in Kenya have never been verified. This study intended to assess the degree of SCM practices implementation in Kenya and their impacts on construction projects performance.

Despite numerous studies that show contribution and relevance of SCM best practices in manufacturing industry, little has been done to assess the degree of entrenchment or analyze the impacts of SCM best practices on Construction projects in Kenya. Studies carried out indicate that over 50% of construction projects in Kenya were failing by not meeting their cost projections, time schedules or quality demands. If the issue of construction project failures is not treated with the seriousness it deserves and its continuance halted, it will be difficult for Kenya to achieve any meaningful growth and development and achievement anticipated in vision 2030 may not be realized.

Objective of the Study

The specific objectives of this study are:

i. To determine the degree of SCM practices implementation by NIB listed contractors.
ii. To determine the impacts of SCM practices on NIB construction projects undertaken by their listed contractors.

LITERATURE REVIEW

Theoretical Review

SCM in construction include principal contractors, sub-contractors, suppliers, and distributors. The network of suppliers in the construction sector can be extremely complex where on large projects the number of suppliers can go to hundreds Dainty et al (2001). Tucker et al. (2001) confirms that the main role of SCM in projects is directing operations to link successive operating stages through product flow; information and funds and transforming these operating stages into a single cohesive unit by coordinating and controlling internal actions within these stages. The upstream of construction SCM is in relation to the position of a main contractor consisting of the activities and tasks leading to preparation of the production on site involving construction clients and design team. Akintoye et al. (2000) considers downstream of project that consists of activities and tasks in the delivery of construction product involving construction suppliers, subcontractors, and specialist contractors in relation to the main contractor, to be the weaker link that needs to be improved if the full potential of SCM is to be realized. A case study in Small and medium enterprises (SMEs) in the construction industry, carried out by Dainty et al. (2001) revealed that there has been tremendous integration in the upstream of construction and it is the downstream that now has significant supply chain problems that need to be solved. The downstream involves actual construction activities on site that includes sourcing of materials, scheduling and quality controls of construction works. In order to achieve a competitive advantage, supply chains need this downstream of construction project to be managed appropriately (Bode and Isack 2011).

The set of practices that developed organizations implement to effectively manage the functioning of their supply chain and help them succeed are known as supply chain management best practices (Li, Nathan, Nathan, & Rao, 2006). Roth and Martin, (2000), have stated that effective implementation of SCM practices in any industry achieves expected benefits and leads to success with Suhong et al, (2006) maintaining that effective implementation of (SCM) best practices has the potential of reducing failures and improving organizational performance. Laugen et al. (2005) points to SCM practices as having made the Japanese companies so successful. Itis clear from the literature that SCM practices are instrumental in

the control of material flow, information flow and financial flow; Factors that lead to improved delivery of products while maximizing quality of the products and services and minimizing costs.

Supply Chain Management System

The supply chain system (SCS) is made up of the flow of materials in one direction, the flow of money in the other direction and the flow of information in both directions (Rai et al, 2006).The philosophy behind supply chain management is that by visualizing the entire SCS and applying SCM practices, those involved can maximize strengths and efficiencies at each level of the process to create a highly competitive, customer-driven SCM system that is able to respond immediately to changes in supply and demand (close, 2014). Lee et al. (1997) illustrates the importance of SCS visibility by stating that any, "distorted information from one end of a supply chain to the other can lead to tremendous inefficiencies: excessive inventory investment, poor customer service, lost revenues, misguided capacity plans, ineffective transportation, and missed production schedules". This study assessed the status of the construction SCS (System dynamics) in Kenya and how it relates to project performance.

According to Lee et al. (2007), information sharing within business units, across supply chain partners such as suppliers and other strategic alliances is essential to perform three major linkages: supplier linkage, internal linkage and customer linkage. In particular, this integration through effective and efficient information flow will eventually lead the firm and total supply chain to better performance (Palsson and Johansson, 2009). Past studies (Du, 2007; Gunasekaran and Ngai, 2004; Kim and Narasimhan, 2002) reported positive relationships between the level of information flow integration and performance. Coyle et al. (1996) states that today's business competition has changed the characteristic of supply chain management, where information sharing becomes the most important characteristic to achieve supply chain success.

Aron et al (2004) asserts that to measure information flow over the supply chain give a valuable information on what to improve. Beamon (1999) states that performance measures of information flow is output that includes production and delivery schedules, performance metrics, collaboration with supply chain members, sharing sales data with partners, visible inventory data, order fulfillment and shipment tracking. A high level of information sharing within the supply chain management improves supply chain success and contributes to firm's project performance. Increasing the level of integration and information sharing among the members of a construction supply chain is therefore a necessary component for a successful project delivery.

According to Rai et al. (2006), financial flow integration is defined as the extent to which exchange of financial resources between a firm and its supply chain partners is driven by workflow events. This includes all activities required to facilitate the flow of funds across the supply chain, including invoicing customers, paying suppliers and internal transfers (Johnson and Mena, 2008).This implies that effective flow of funds across the supply chain improves cash conversion cycle or cash-to-cash cycle through reduced days-in-inventory, shortened days-in-receivables and prolonged days-in-payables (Tsai, 2008).Eventually, the financial flow optimization (Comellia et al. 2008) will make possible shareholders satisfaction and the supply chain working improvement. Effective and efficient management of financial flow integration is therefore essential to improve the supply chain performance.

Rai et al. (2006) defines physical flow integration as the extent to which a firm uses global optimization with its supply chain partners to manage the flow of materials and finished goods from the point of origin (ultimate supplier), to the point of destination (ultimate customer). This implies that suppliers can be integrated with the internal processes of their customers in an effort to improve quality and reduce costs (Koufteros, 2005). Quesada et al. (2008) augments that in the long run this enables companies to gain order winning capabilities and better customer services. As such physical flow integration makes a significant contribution to the firms performance (Zailani and Rajagopal, 2005) and finally to the total supply chain members. Muchungu, (2012) found in his study on material flows in Swedish construction that the value-added time of those flows is 0.3% to 0.6% of the total flow time. Various studies show a cost reduction potential varying from 10% to 17% of the material costs (i.e. purchasing price) by means

of improved logistics . Physical flow integration therefore improves the productivity of firms through reduction in production cost, effective just-in-time inventory management and improved supplier management.

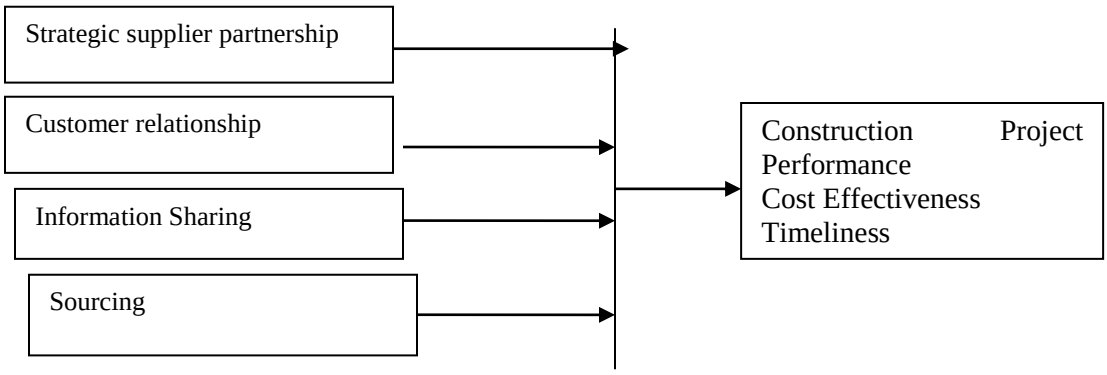
Supply Chain management Practices and Project Performance

The short-term objectives of SCM are primarily to increase productivity and reduce inventory and cycle time, while long-term objectives are to increase market share and profits for all members of the supply chain (Zhang, 2001). Financial metrics have served as a tool for comparing organizations and evaluating an organization's behavior over time. Any organizational initiative, including supply chain management, should ultimately lead to enhanced organizational performance. A number of prior studies have measured organizational performance using both financial and market criteria, including return on investment (ROI), market share, profit margin on sales, the growth of ROI, the growth of sales, the growth of market share, and overall competitive position (Takim, 2005) In line with the above literature, the same items will be adopted to measure organizational performance in this study.

SCM practice is expected to increase an organization's market share, return on investment , and improve overall competitive position (Singh, 2009) For example, strategic supplier partnership has been reported to yield organization-specific benefits in terms of financial performance (Sezen, 2008). Advanced design and logistic links with suppliers are related to better-performing plants. Customer relation practices have also been shown to lead to significant improvement in organizational performance. The higher level of information sharing is associated with the lower total cost, the higher-order fulfillment rate and the shorter-order cycle time. SCM practices impact overall organizational performance and led to achieving of competitive advantage of an organization (Ranjan, 2012). They are expected to improve an organization's competitive advantage through price/cost, quality, delivery dependability, time to market, and product innovation. Prior studies have indicated that the various components of SCM practices (such as strategic supplier partnership) have an impact on various aspects of competitive advantage (such as price/cost). For example, strategic supplier partnership can improve supplier performance, reduce time to market and increase the level of customer responsiveness and satisfaction (Proverbs & Gameson, 2008) Information sharing leads to high levels of supply chain integration by enabling organizations to make dependable delivery and introduce products to the market quickly. Information sharing and information quality contribute positively to customer satisfaction and partnership quality.

Conceptual framework

The researcher conceptualized in the study that construction projects can succeed with effective implementation of SCM practices. According to McCormack et al. (2008), companies with higher SCM practices influence firm performance.



Independent variables **Dependent variable**

Source: Author (2015)

RESEARCH METHODOLOGY

This research study adopts cross-sectional survey research design. As noted by Saunders *et al.*(2007) cross-sectional survey research design study establishes causal relationships between variables. This study sought to establish the causal relationship between Supply Chain management practices and project performance. This study sought to establish 'how' the various aspects of supply chain management influence the performance of construction projects. Descriptive statistics involves organization, summarization, and display of data. The research design helped in collection of quantitative data to answer to research question or test hypothesis. Statistical analysis provided the basis for establishing the probabilistic causation between the research variables, testing of the research hypothesis, and making of conclusions.

The study population was 199 construction firms listed in the NIB register of contractors in the year 2013. The sample of the study was drawn from all the 199 contractors. The respondents included construction managers, senior to middle level supply chain managers and NIB project engineers supervising them.Their hands on experience made them the most suitable targets for the study. The stratified random sampling was used to select 65 contractors based on the group they belonged. The researcher used both primary Questionnaires and secondary data comprising published documents and government publications. The questionnaire contained closed ended questions. The questionnaire was used because it helped in collecting a large volume of data, easy to be administered, save time and enabled collection of quantitative data for the study. The questionnaires were Self-administered to the respondents.

Data Analysis

Before processing the responses, the collected data was prepared for statistical analysis. Validation and checking was done after the questionnaires are received from the field. Responses were checked for clarity, legibility, relevance and appropriateness. Moreover, the questionnaires were edited for completeness and consistency. Coding was done on the basis of the locale of the respondents. Quantitative data was analyzed using descriptive and inferential statistics. Descriptive statistics included percentages, frequencies, means, and standard deviations while inferential statistics regression analysis was done to establish the relationship between supply chain management practices and performance of construction project. Based on the objectives, this study made use of multiple regression analysis which helped to generate a weighted estimation equation that was used to predict values (Cooper & Schindler, 2003) for dependent variable from the values for several independent variables. The study sought to predict performance of construction project due to dynamic of supply chain management practices. It also sought to predict the moderating effect of supply chain management systems on the relationship between supply chain management practices and construction project performance for the National Irrigation Board Inferential analysis examined the relationship between supply chain management practices and project performance of National Irrigation Board through the use of multivariate analysis.. Results of quantitative data analysis were presented using charts and tables.

$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$, Where;

Y = Construction Project Performance

X_1= Strategic supplier partnership; X_2= Customer relationship; X_3= Information Sharing

X_4= Sourcing; β_1, β_2, β_3, β_4, β_5 and β_6 = Beta coefficients and ε = Error term

RESULTS

Implementation of SCM Practices

The study respondents were requested to indicate the extent to which implementation of SCM Practices affect the construction project performance at National Irrigation Board. From the findings as shown in Table 1, majority of the respondents indicate that long-term relationships, working with certified suppliers, prudent supplier selection and few supplier policies affect the project performance at National

Irrigation Board to a great extent as indicated by a mean of 3.80, 3.76, 3.74 and 3.74 supported by standard deviation of 1.01, 0.95, 0.97 and 0.97. Most of the respondents indicated that supplier involvement in product development; good interaction and internal integration affect the construction project performance at National Irrigation Board to a great extent as indicated by a mean of 3.65, 3.44 and 3.43 with standard deviation of 0.91, 0.72 and 0.81. The respondents indicated that trust and commitment with partners, strategic purchasing, supply network coordination, external integration, logistics integration and effective communication affect the construction project performance at National Irrigation Board to a moderate extent as indicated by a mean of 3.15, 3.14, 3.11, 3.09, 2.91 and 2.48 supported by standard deviation of 0.59, 0.68, 0.69, 0.55, 0.51 and 0.58.

Table 1: Implementation of SCM Practices

	Very great extent	Great extent	Moderate extent	Little extent	No extent	Mean	Standard deviation
Effective Communication	1	7	18	19	9	2.48	.58
Supply network coordination	0	15	31	7	1	3.11	.69
Strategic purchasing	1	14	31	8	0	3.14	.68
Logistics integration	1	9	36	0	8	2.91	.51
External integration	0	13	34	6	1	3.09	.55
Trust and commitment with partners	0	14	34	6	0	3.15	.59
Internal integration	1	30	15	7	1	3.43	.81
Good interaction	6	23	18	3	4	3.44	.72
Few supplier policy	8	33	7	3	3	3.74	.97
Supplier involvement in product development	13	22	6	13	0	3.65	.91
Prudent supplier selection	12	24	10	8	0	3.74	.97
Working with certified suppliers	12	24	11	7	0	3.76	.95
Long-term relationships	14	23	10	6	1	3.80	1.01

Supply chain system integration

Results presented in Table 2 shows that, majority of the respondents indicated that suppliers and logistics partners deliver products and materials just in time thus affect the construction project performance at National Irrigation Board to a great extent as indicated by a mean of 4.01 with standard deviation of 1.27. Most of the respondents indicated that inventory holdings are minimized across the supply chain, distribution networks are configured to minimize total supply chain-wide inventory costs and supply chain wide inventory is jointly managed with suppliers and logistics partners therefore affects the construction project performance at National Irrigation Board to a great extent as indicated by a mean of 3.33, 3.12 and 3.11 with standard deviation of 0.73, 0.62 and 0.60. This is in line with Wegelius-Lehtonen (1995), who stated that physical flow integration therefore improves the productivity of firms through reduction in production cost, effective just-in-time inventory management and improved supplier management.

Table 2: Supply chain system integration

Statement on Supply chain system integration	Very great extent	Great extent	Moderate extent	Little extent	No extent	Mean	Standard deviation
Supply chain wide inventory is jointly managed with suppliers and logistics partners	0	13	34	7	0	3.11	.60
Distribution networks are configured to minimize total supply chain-wide inventory costs.	0	14	33	7	0	3.12	.62
Inventory holdings are minimized across the supply chain.	1	23	23	7	0	3.33	.73
Suppliers and logistics partners deliver products and materials just in time.	24	13	12	5	0	4.03	1.27

Financial Flow integration

Table 3: Financial Flow integration

Financial Flow integration	Very great extent	Great extent	Moderate extent	Little extent	No extent	Mean	Standard deviation
Account receivables processes are automatically triggered when invoice the customers	0	10	34	20	1	3.00	.58
use activity based costing for key supply Chain processes (e.g. inventory, storage, transportation)	1	32	22	9	1	3.48	.66
Capital efficiency, working and fixed, is maximized across the supply chain.	23	22	13	6	1	4.00	.89
Account payable processes are automatically triggered when receive supplies from suppliers.	36	23	0	6	0	4.44	.90

Table 3 shows respondents' response on the extent to which financial flow integration affects the construction project performance at National Irrigation Board. From the findings, most of the respondents indicated that having account payable processes that are automatically triggered when supplies are received from suppliers, capital efficiency and work being maximized across the supply chain, use of activity based costing for key supply Chain processes and account receivables processes being automatically triggered when customers are invoiced affects the construction project performance at National Irrigation Board to a great extent as indicated by a mean of 4.44, 4.00, 3.48 and 3.00 supported by standard deviation of .90, 0.89, 0.66 and 0.58. This implies that effective and efficient management of financial flow integration is therefore essential to improve the supply chain performance. This is in line with Johnson and Mena (2008), who stated that effective flow of funds across the supply chain improves cash conversion cycle or cash-to-cash cycle through reduced days-in-inventory, shortened days-in-receivables and prolonged days-in-payables.

Information flow integration

The study further sought to establish the extent to which information flow integration affects the construction project performance at National Irrigation Board. Data was analyzed using a likert scale where 1=Very great extent, 2=great extent, 3=moderately extent, 4= little extent and 5= no extent. Data was presented in mean and standard deviation. The results were presented on Table 4.6. From the findings, majority of the respondents indicated that performance metrics being shared across the supply chain, order fulfillment and shipment status being tracked at each step across the supply chain, inventory data being visible and the downstream partners sharing their actual sales data affects the construction project performance at National Irrigation Board to a great extent as indicated by a mean of 4.57, 4.37, 4.35 and 4.31 with standard deviation of 0.60, 0.89, 0.70 and 0.86. Most of the respondents indicated that production and delivery schedules are shared across the supply chain and supply chain members collaborate in arriving at demand forecasts affecting the construction project performance at National Irrigation Board to a moderate extent as indicated by a mean of 4.11 and 3.85 with standard deviation of 0.88 and 0.53

Table 4: Information flow integration

Statement on Information flow integration	Very great extent	Great extent	Moderate extent	Little extent	No extent	Mean	Standard deviation
Supply chain members collaborate in arriving at demand forecasts.	22	21	6	15	1	3.85	.53
Production and delivery schedules are shared across the supply chain.	30	15	10	10	0	4.11	.88
Inventory data are visible at all steps across the supply chain.	35	15	10	5	0	4.35	.70
Our downstream partners (e.g. distributors, wholesalers, retailers) share their actual sales data with us.	38	16	9	2	0	4.31	.86
Order fulfillment and shipment status are tracked at each step across the supply chain	40	17	3	5	0	4.37	.89
Performance metrics are shared across the supply chain	43	18	4	0	0	4.57	.60

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Trust integration

The study went further to investigate the extent to which trust integration affects the construction project performance at National Irrigation Board. From the findings, majority of the respondents indicated that trust and good will being leveled with the have the same significance as formal contracts affects the construction project performance at National Irrigation Board to a very great extent as indicated by a mean of 4.19 with standard deviation of 0.77. Most of the respondents indicated that information about procedures and cost structures being shared and long-term relationship with strategic partners affects the construction project performance at National Irrigation Board to a great extent as indicated by a mean of 3.80 and 3.35 with standard deviation of 0.63 and 0.68. Most of the respondents indicated that not making any demands that can hurt the relationship affects the construction project performance at National Irrigation Board to a moderate extent as indicated by a mean of 3.19 with standard deviation of 0.68. This is in line with Khalfan (2007),who declares that trust is a major requirement for successful SCM in construction supply chains but is however, negatively affected by many factors in construction projects such as lack of honest communications and reliability and the problems in the delivery of the project.

Table 5: Trust integration

Statements on Trust integration	Very great extent	Great extent	Moderate extent	Little extent	No extent	Mean	Standard deviation
Sharing of Information on procedures and cost structures	1	14	21	18	11	3.80	0.63
Make demands that cannot hurt the relationship.	0	19	33	12	1	3.19	.68
Long-term relationships with Strategic partners.	1	15	40	8	1	3.35	.68
Trust and good will have the same, or greater, Significance as formal contracts.	23	26	13	2	1	4.19	.77

Relationship between SCM Practices and project performance

The study sought to establish the influence of SCMP on project performance in construction

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.54(a)	.292	.253	0.29	1.615	5	.215	5.751	.002(a)

a Predictors: (Constant) Strategic supplier partnership, X_2= Customer relationship, $X_{3=}$ information sharing , $X_{4=}$ Sourcing = Error Term

Dependent: Construction Project Performance

The model column of multiple models was reduced to a single regression by SPSS command and with a model indicating 1 implied that the there was one linear model being used to determine the influence of SCMP on project performance in construction. R is the square root of R-Squared. R is the correlation between the observed and predicted values of dependent variable. This implies that there was association of 0.54 between Supply chain management practices and Construction project performance. R-Squared is the proportion of the variance in the dependent variable of construction project performance that was

explained by variations in the Strategic supplier partnership, Customer relationship, information sharing and Sourcing**.** This implied that there was a variance of 29.2% between variables in general.
Adjusted R^2=253, is the coefficient of determination which indicates how construction project performance varies with variation in strategic supplier partnership, customer relationship, and information sharing and sourcing**.** The study established that there existed a significance positive variation between supply chain management and construction project performance as r= 0. 253, P=0.01 < 0.05.

Table 7: ANOVA (b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.642	1	.537	4.871	0.001(a)
	Residual	18.497	53	.349		
	Total	19.034	54			

a Predictors: (Constant) Strategic supplier partnership, X_2= Customer relationship, X_3= information sharing , X_4= Sourcing = Error Term
Dependent: Construction Project Performance

The study established that there existed a significant goodness of fit between variable as F=4.871, P=0.001< 0.05. The strength of variation of the predictor values of strategic supplier partnership, customer relationship, and information sharing and sourcing had a significant construction project performance as 95% confidence level.

Table 8: Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.000	.467		4.120	0.01
	Strategic supplier partnership	0.838	.635	0.615	2.034	0.02
	Customer relationship	0.449	426	0.012	2.313	0.01
	Information Sharing	0. 278	.322	.145	2.906	0.03
	Sourcing	0.167	.231	.159	2.769	0.002

a Predictors: (Constant) Strategic supplier partnership, X_2= Customer relationship, X_3= Information Sharing , X_4= Sourcing = Error Term
Dependent: Construction Project Performance

$Y = 3.000 + 0.838X_1 + 0.449X_2 + 0.278X_3 + 0.167X_4$

From the above regression model, it was found that construction project performance in would be at 3.000 holding, strategic supplier partnership, customer relationship, information sharing, sourcing constant at zero (0). The study established that there existed a significant positive relationship between strategic supplier partnership and construction project performance as r=0.838, t=2.034, P= 0.02<0.05.
The study established that a unit increase in customer relationship would significantly result into increase in Construction project performance as r=0.449, t=2.313, P=0.03<0.05. The study found that information sharing had significant positive impact on Construction project performance as r= 0.168, t=2.906, P= 0.03<0.05. The study found that increased in Sourcing had a significant positive impact of construction project performance as r=0.167, t=2.769, P= 0.002<0.05.

SUMMARY OF FINDINGS

The study established that long-term relationships, working with certified suppliers, prudent supplier selection and few supplier policies, supplier involvement in product development, good interaction and internal, trust and commitment with partners, strategic purchasing, supply network coordination, external integration, logistics integration and effective communication affect the construction project performance at National Irrigation Board. The study revealed that suppliers and logistics partners delivering products and materials just in time, minimizing inventory holdings across the supply chain, configuring distribution networks to minimize total supply chain-wide inventory costs and jointly managing supply chain wide inventory with suppliers and logistics partners affects the construction project performance at National Irrigation Board. The study established that having account payable processes that are automatically triggered when supplies are received from suppliers, capital efficiency and work being maximized across the supply chain, use of activity based costing for key supply Chain processes andaccount receivables processes being automatically triggered when customers are invoiced affects the construction project performance at National Irrigation Board.

The study revealed that there exist a positive relationship between financial flow integration and construction Project Performance. The study also indicated that that a unit increase in information flow integration would lead to a unit increase in increase in construction project performance. The study found that performance metrics being shared across the supply chain, order fulfillment and shipment status being tracked at each step across the supply chain, inventory data being visible and the downstream partners sharing their actual sales data, production and delivery schedules are shared across the supply chain and supply chain members collaborate in arriving at demand forecasts affecting the construction project performance at National Irrigation Board. The study established that having trust and good will, sharing information about procedures and cost structures and long-term relationship with strategic partners affects the construction project performance at National Irrigation Board. The study established that there existed a positive relationship between physical flow integration, financial flow integration, information flow integration and trust and Project Performance in construction industry.

CONCLUSIONS

The study concluded that SCM best practices have a positive impact on construction project performance and that improved implementation of SCM best practices by Kenyan construction firms can lead to improved construction project performance and reduce construction project failures in the industry. Physical flow integration improves the productivity of firms through reduction in production cost, effective just-in-time inventory management and improved supplier management. The study concludes that effective and efficient management of financial flow integration is therefore essential to improve the supply chain performance. Effective flow of funds across the supply chain improves cash conversion cycle or cash-to-cash cycle through reduced days-in-inventory, shortened days-in-receivables and prolonged days-in-payables. Trust is a major requirement for successful SCM in construction supply chains but is however, negatively affected by many factors in construction projects such as lack of honest communications and reliability and the problems in the delivery of the project.

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