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Influence of Supply Chain Management Systems on Construction Project Performance in National Irrigation Board in Kenya

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ABSTRACT
Construction project failures in Kenya are evident throughout the country and continue to draw great as 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. Supply chain management (SCM) system has been recognized as having made most manufacturing companies' successful. Achievements offered by SCM system are therefore capable of reducing construction project failures in Kenya. This study sought to assess the degree of SCM system entrenchment and their impacts on construction projects performance in Kenya. A qualitative descriptive survey questionnaire was then developed aimed at collecting information from respondents on their attitude and opinions on SCM systems and projects performance. The study established that where SCM systems were more entrenched, the firms were performing better. The study revealed that there existed a positive relationship between physical flow integration, financial flow integration, information flow integration and trust and Project Performance in construction industry. It was recommended that construction firms should focus significantly on improving their degree of SCM best practices implementation to boost project success. This study provides the stakeholders with a point of reference in establishing a value-sequenced transformational roadmap for mitigating actions against construction project failures in Kenya.
Keywords: Supply chain management system, physical flow integration, financial flow integration, information flow integration and trust, and 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 system 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 system 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.

Main Objective

i. To determine the degree of SCM system adoption by NIB listed contractors.
ii. To determine the impacts of SCM systems on NIB construction projects undertaken by their listed contractors.

LITERATURE REVIEW

Theoretical framework

The research adopted Kombo and Tromp (2006) view of a theoretical framework as an idea that accounts for or explains a phenomena and attempts to clarify why things are the way they are based on theories. This study adopted optimization theory described by Joydeep (1968) as the art, science or mathematics of choosing the best among a given set of finite or infinite alternatives in any subject cutting through the boundaries of mathematics, economics, engineering, or natural sciences. Joydeep (1968) traced the beginning of the modern methods of optimization to the growth of the Calculus of Variations in 1696 when Johann Bernoulli proposed the famous Brachistochrone problem (figure 2.3) which sought to measure the curve along which a particle moving from one point to another in a vertical plane does so in minimum time.

Maturity modelling, more specifically, process maturity modelling, has its genesis in the software manufacturing industry (Finnemore &Sarshar, (2000) and is based on an adaptation of Deming‘s concept of process improvement. Paulk et al. (1995) upholds that the underlying premise of process maturity modelling is that the quality of a product is directly related to the quality of the process used to develop that product. According to McCormack et al. (2008), companies with higher SCM maturity are more profitable or have better SCM performance than firms with lower SCM maturity. Other studies indicate connections between supply chain performance and financial success (Christensen, Germain, &Birou, 2007).

Supply chain 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). 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.

Information Flow

Information flow has been defined as the extent to which information is shared between a firm and its supply chain partners (Rai et al. 2006). 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.

Instead of suffering from scarcity of data, the challenge for companies is to achieve good quality information (Wagner, 2002) and to decide which data can be utilized in decision making to improve supply chain performance and which data can be ignored. Lee et al. (1997) declares that information flow paths can impose delays, limitations, and constraints that may reduce the effectiveness of the supply chain. Aron C. 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.

Financial flow

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.

Physical flow

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 (Zelbstetal., 2009). Jarnbring (1994) 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. Physical flow integration therefore improves the productivity of firms through reduction in production cost, effective just-in-time inventory management and improved supplier management.

Trust

Khalfan et al. (2007) 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. Most studies point to ways of measuring trust in a dynamic supply chain as: shared goals; having experience of working together; solving problems together; rewarding culture on trusted behaviors; fair working and reasonable behaviors in work environment.

Construction project performance metrics

Cost is defined as the degree to which the general conditions promote the completion of a project within the estimated budget (Bubashait and Almohawis, 1994). Cost is not confined to the tender sum only but it is the overall cost that a project incurs from inception to completion, so it includes any costs that arise from variations and modification during construction period and the cost created by the legal claims, such as litigation and arbitration. Time is the duration for completing the project. It is scheduled to enable the building to be used by a date determined by the client's future plans (Hatush and Skitmore, 1997). From

Naoum (1994) and Chan (1997), time can be measured in terms of construction time, speed of construction and time overrun. Construction Times the absolute time that is calculated as the number of days/weeks from start on site to practical completion of the project. Construction time = Practical Completion Date –Project Commencement Date. Time variation is measured by the percentage of increase or decrease in the estimated project in days/weeks, discounting the effect of Extension of Time (EOT) granted by the client.

Quality is another basic criterion that is heavily referred to by previous researchers. However, the assessment of quality is rather subjective. In the construction industry, quality is defined as the totality of features required by a product or services to satisfy a given need; fitness for purpose (Parfitt and Sanvido, 1993). Nowadays, quality is the guarantee of the products that convince the customers or the end-users to purchase or use. Specification is one of the criteria that were advocated by Songer et al. (1996)and Wateridge (1995). They defined it as the workmanship guidelines provided to contractors by clients or client's representative at the commencement of project execution. The measure of technical specification is to what extent the technical requirements specified can be achieved. Actually, technical specification is provided to ensure that construction projects are built to good standard and by proper procedure.

RESEARCH DESIGN AND 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 system and project performance. This study sought to establish 'how' the various aspects of supply chain management systems influence the performance of construction projects. There were 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 based was adopted based on the size of the construction companies on all the 199 registered contractors was followed by stratified sampling based size features value limit and class where a sample size of 65 companies was selected.

Table 1 Sampling table

Category (strata)	Value limits (ksh.)	Strata	Strata size(nc)	Sample Size
A B	Up to Ksh 250,000,000 and above	Large	16	5
C -E	Up to Ksh 50,000,000- Up to Ksh 150,000,000	Medium	130	42
F -H	Up to Ksh 5,000,000- Ksh 20,000,000	Small	53	18
TOTAL (N)			199	65

Source: Research data (2015)

Research instruments

The survey instruments developed in this study consists of a questionnaire with three main sections. The researcher used both primary Questionnaires and secondary data comprising published documents and government publications. The questionnaires were Self-administered to the respondents. To establish the validity of the research instrument the study sought the opinions of experts in the field of study especially the study's supervisors and lecturers in the school. In this study a threshold of 0.70 was used to establish the reliability of the data collection instrument.

Out of the 65 targeted respondents 54 respondents responded to the questionnaires. This represented a 83% response rate which was considered sufficient for analysis and reporting basing on a recommendation by Mugenda and Mugenda (2003) who advocates a response rate of 50%, 60% of 70% as sufficient for research purposes.The reliability results for physical flow and supply chain management maturity had 0.8158 and 0.8385 cronbach value which was $0.9 > \alpha \geq 0.8$ hence internal consistency good while Financial Flow integration, Information flow integration and Trust integration had Cronbach values 0.7194, 0.7614 and 0.7785 meeting the criterion $0.8 > \alpha \geq 0.7$ making the internal consistency of the instrument acceptable .

Data Analysis

Before processing the responses, responses were checked for clarity, legibility, relevance and appropriateness. 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 included factors analysis and regression analysis. Inferential analysis examined the relationship between supply chain management systems and project performance of National Irrigation Board through the use of multivariate analysis. Furthermore, testing for correlations and selection of supply chain management practices through communality loading. The research sought to test hypothesis at 95% level of confidence in order to provide for drawing conclusions.

$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$

Y= Dependent variable- Construction Project Performance. α = Constant, β= Coefficient of the supply chain Integrations, $X_{1=}$ Physical Flow Integration, $X_{2=}$ Financial Flow Integration, $X_{3=}$ Information Flow Integration, $X_{4=}$ Trust and ε = Error term

RESULTS ANALYSIS AND DISCUSSION

Supply chain system integration

Table2: Supply chain system integration

Supply chain system integration	Mean	Standard deviation
Supply chain wide inventory is jointly managed with suppliers and logistics partners	3.11	.60
Distribution networks are configured to minimize total supply chain-wide inventory costs.	3.12	.62
Inventory holdings are minimized across the supply chain.	3.33	.73
Suppliers and logistics partners deliver products and materials just in time.	4.03	1.27

Results presented 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.

Financial Flow integration

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 receive 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

Table 3: Financial Flow integration

	Mean	Standard deviation
Account receivables processes are automatically triggered when invoice the customers	3.00	.58
use activity based costing or key supply Chain processes (e.g. inventory, storage, transportation)	3.48	.66
Capital efficiency, working and fixed, is maximized across the supply chain.	4.00	.89
Account payable processes are automatically triggered when **receive** supplies from suppliers.	4.44	.90

Information flow integration

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

	Mean	Standard deviation
Supply chain members collaborate in arriving at demand forecasts.	3.85	.53
Production and delivery schedules are shared across the supply chain.	4.11	.88
Inventory data are visible at all steps across the supply chain.	4.35	.70
Our downstream partners (e.g. distributors, wholesalers, retailers) share their actual sales data with us.	4.31	.86
Order fulfillment and shipment status are tracked at each step across the supply chain	4.37	.89
Performance metrics are shared across the supply chain	4.57	.60

Trust integration

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

	Mean	Standard deviation
Information about procedures and cost structures are shared.	3.80	0.63
not make any demands that can hurt the relationship.	3.19	.68
Long-term relationships with Strategic partners.	3.35	.68
Trust and good will have the same, or greater, Significance as formal contracts.	4.19	.77

Regression Analysis

Model Summary of Regression Analysis

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	.78(a)	.6084	.587	0.12	1.741	6	.207	8.191	.001(a)

a Predictors: (Constant) physical flow integration, financial flow integration, information flow integration and trust
Dependent: Construction Project Performance

Adjusted R^2 is called the coefficient of determination which indicates how Construction Project Performance varied with variation in physical flow integration, financial flow integration, information flow integration and trust. From the table 4.13, the value of adjusted R^2 was 0.6084. This implied that, there was a variation of 60.8. % of Construction Project Performance varied with variation in supply chain system and which was statistically significant as r=0.6084, P= 0.001 < 0.05.

Table 7: ANOVA (b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.364	18	.298	1.307	0.02(a)
	Residual	10.152	47	.216		
	Total	10.516	65			

Predictors: (Constant) a Predictors: (Constant) physical flow integration, financial flow integration, information flow integration and trust
Dependent: Construction Project Performance

The study established that there existed a significant goodness of fit between variables as F-test (F=1.6569, P=0.01< 0.05). The calculated F=1.6569 far exceeds the F-critical of 1.307. This implied that the level of variation between independence and dependent variable was significant at 95% confidence level. This indicated that the model formed between Supply chain systems physical flow integration, financial flow integration, information flow integration and trust and Construction Project Performance was a good fit for the data. The strength of variation of the predictor values contruction project performance was significant at P= 0.02<0.05.

Regression Coefficients (a)

Table 8: Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.768	.275		3.640	0.01
	Physical flow integration	0.883	.205	0.857	2.931	0.03
	Financial flow integration	0.717	.146	0.629	2.803	0.01
	Information flow integration	0.868	.120	0.751	1.906	0.02
	Trust Integration	0.791	.390	0.729	1.672	0.01

a. Predictors: (Constant): Physical flow integration, financial flow integration, information flow integration and trust

b. Dependent: Dependent: Construction Project Performance

$Y = 5.768+ 0.883X_1+0.717X_2+0.868X_3 +0.791X_4 + e$

From the regression model, it was found that Construction Project Performance would be at 5.768 holding physical flow integration, financial flow integration, information flow integration and trust constant at Zero. The findings in Table 8 indicated that a unit increase in Physical flow integration would lead to a significance positive increase in construction project performance as r=0.883, P= 0.003<0.05. Thus increase in physical flow integration would lead to increase in project cost effective, quality, completion timeliness and.The study found that a unit increase in financial flow integration would lead to increase in Construction Project Performance as r =0.717, P< 0.02. This implied 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 as r =0.868, P< 0.02). This clearly indicated that information flow integration plays a critical role in improving performance of Construction project performance. The regression results further indicated that increase in trust among the stakeholders would lead to increase in construction project performance as r =0.791, P< 0.01.

Summary of the study

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 receive 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. 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 systems have a positive impact on construction project performance and that improved implementation of SCM systems 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. The study recommends that companies focusing on improving their project performance should focus significantly on improving their degree of SCM systems implementation to boost project success given the significant positive relationship between SCM systems and project performance.

REFERENCES

Akintoye, A., McIntosh, G. and Fitzgerald, E. (2000). A Survey of Supply Chain Collaboration and Management in the UK Construction Industry, European Journal of Purchasing and Supply Management, 6 (3-4),159-168

Ali, H.Z., Imran, M., Hussain, R., Ahmed, Z., Malik, A., (2010a). Structural determination of abutilins A and B, new flavonoids from Abutilon pakistanicum, by 1D and 2D NMR spectroscopy. Mag. Res. Chem. 48, 159-163.

Alvarado UY, Kotzab H. (2001) Supply chain management: the integration of logistics in marketing. Industrial Marketing Management;183–98.

Benedikte T.T. and Borgstrom J.E. (2006), The Strategy and Tactics of Pricing,4th ed. New Jersey: Pearson Education

Bello, D. C. and Gilliland, D. I. (1997). The effects of output controls, process controls, and flexibility on export channel performance. Journal of Marketing, 61, 22.

Blanchard, A. (2007), “Relationship management in the management of PFI/PPP projects in the UK,” International Journal of Project Management, 25 (3), 232-240.

Blaxter L Hughes C and Tight M (2001) How to Research. 2nd Ed. Buckingham: Open University Press

Bode A. G. F. and Isack, F. (2011) Re-engineering through pre-assembly: client expectations and drivers. Building Research & Information, 31(2), 146-60

Carr, A. S. and Pearson, J. N. (1999). Strategically managed buyer-seller relationships and performance outcomes. Journal of Operations Management, No 17, pp. 497-519.

Carr, A. S. and Smeltzer, L. R., (1999). The relationship of strategic purchasing to supply chain management. European Journal of Purchasing and Supply Management, 5, 43–51.

Chen I.J, Paulraj A. (2004).Towards a theoryof supplychain management: the constructs and measurements. Journal of Operations Management; 22(2),119–50.

Choge, W.J., Muturi, R. N., and Birou, L. (2014), “Variance vs average: supply chain lead-time as a predictor of financial performance”, Supply Chain Management: an International Journal, 12,(5), 349-357

Christensen W.J, Germain R.N, Birou L, (2007) "Variance vs average: supply chain lead-time as a predictor of financial performance", Supply Chain Management: An International Journal, 12 (5),349 - 357

Close M. (2014). The Changing Labyrinth of Software Pricing. Communications of the ACM, 50 (7), 19--23

Collins, F.S. (2003).Research on strategic human resource. Academy of Management Journal.46(6),40–751.

Coyle,p.,Doney, P. M., & Cannon, J. P. (1996). An examination of the nature of trust in buyer-seller relationships. Journal of Marketing 61(2), 35-51.

Creswell, J. W. (2003). Qualitative, quantitative, and mixed methods approaches (2nd Ed.). Thousand Oaks, CA: Sage.

Dainty, A. R. J., Briscoe, G. H. and Millett, S. J. (2001) Subcontractor perspectives on supply chain alliances. Construction Management and Economics, 19, 841-8

Donald, K.andDelno,L.(2006). Proposal and thesis writing, Pauline’s publications Africa.

Donlon JP. (1996) Maximizing value in the supply chain. Chief executive 1996; 117:54–63.

Eccles, R. G. and Pyburn, P. J. (1992). Creating a comprehensive system to measure performance. Management Accounting (USA). October, 41–44. 154

Fawcett, D. T&. Clinnton. (1996). Unresolved issues in measurement validity: An autobiographical overview. Psychological Assessment, 8, 363–368

Fellows, R. & Liu, A. (2003). Research methods for construction, 3rd ed, Chichester, Wiley-Blackwell

Finnemore, M. and Sarshar, M. (2000), Linking Construction Process Improvement to Business Benefit , Bizarre Fruit 2000 Conference, University of Salford, pp. 94-106.

Fraser H. J., Collings M. P., McCoustra M. R. S., Williams D. A., 2002, MNRAS, 327, 1165

Ford, J. D. and Schellenberg, D. A. (1982). Conceptual issues of linkage in the assessment of organizational performance. Academy of Management Review, 7, 49–58

Gichunge, H. (2000). Risk Management in The Building Industry in Kenya. Unpublished PhD. Thesis. University of Nairobi

Gillham B. (2000) Case Study Research Methods: Continuum Research Methods Real world research, - Bloomsbury Academic

Gunasekaran, A., Kobu, R. (2007). A framework for supply chain performance measurement, International Journal of Production Economics, 87(3), 333

Gwaya, D.K,Kiyondi, D. &Oyugi ,L.A. (2014). The Effect Of Dividend Policy On Financial Performance Of Firms Listed In The Nairobi Securities Exchange (NSE). Proceedings of 1st JKUAT-SHRD Research Conference.

Khalfan, M., McDermott, P. and Swan, W. (2007) , “Building trust in construction projects,” Supply Chain Management: An International Journal , 12 (6), 385-391.

Kiefer,A.W,Novak,R.A.(1998),’An empirical analysis of warehouse management systems in the context of supply chain implementation, ‘Transport journal spring pp.18-27

Klimko, S. (2003), “An overview in to the concept of partnering,” International Journal of Project Management, 21 (1),71-76.

Kombo, D. K. and Tromp, D. L. A. (2006). Proposal and Thesis Writing: An Introduction. Nairobi: Pauline’s Publications Africa

Kotabe, M., Martin, X. and Domoto, H. (2003). Gaining from vertical partnerships: knowledge transfer, relationship duration, and supplier performance improvement in the U.S. and Japanese automotive industries. Strategic Management Journal, 24, 293–316.

Kumar, N. (1996). The power of trust in manufacturer–retailer relationships. Harvard Business Review, November–December, 92–106.

Kurien, G. P. & Qureshi, M. N. (2011). "Study of Performance Measurement Practices in Supply Chain Management," International Journal of Business Management and Social Sciences, 2(4), 19-34.

Laugen, T.,Simatupang, T. M., &Sridharan, R. (2005). The collaboration index: A measure for supply chain collaboration. International Journal of Logistics Management, 35(1), 44-62

Lee, C.W., Kwon, I.-W.G. and Severance, D. (2007), ‘‘Relationship between supply chain performance and degree of linkage among supplier, internal integration, and customer’’, Supply Chain Management: An International Journal, 12 (6),444-52.

Lockamy A. and McCormack K., 2004. Linking SCOR planning practices to supply chain performance: An exploratory study. International Journal of Operations & Production Management, 24(12), 1192–1218

Lopes de Sousa Jabbour, A.B, Alves Filho, A.G., Noronha Viana, A.B., ChiappettaJabbour, C.J. (2011), Factors affecting the adoption of supply chain managementpractices: Evidence from the Brazilian electro-electronic sector, IIMB ManagementReview, No: 23, 208-222.

Mast, F.W. (2005). Mental images: Always present, never there. Brain and Behavioral Sciences, 28, 769-770.

Morris, J. (2006) *The National Reassurance Policing programme: A ten-site evaluation.* Home Office Research Findings 273. London: Home Office

Muchungu, P. K.(2012). The contribution of human factors in the performance of construction projects in Kenya. Unpublished Phd. Thesis. University of Nairobi.

Olawale, C.E. (2010), “Causation or covariation: an empirical re-examination of the link between TQM and financial performance”, Journal of operations management, 22, 291-311

Petrovic-Lazarevic, S., Sohal, A. and Baihaiqi, I. (2007), Supply chain management performance the Australian manufacturing industry, Computer and Industrial Engineering, 43(1-2), 97-109.

Pfeffer, Jeffrey and Gerald R, Salancik (1978): the external control of organizations: a resource dependence perspective. New York: Harper & Row.

Proverbs, D. &Gameson, R. (2008) Case study research. IN KNIGHT, A. & RUDDOCK, L. (Eds.) Advanced research methods in the built environment. Chichester, Wiley -Blackwell

Quesada, G., Rachamadugu, R., Gonzalez, M. and Martinez, J.L. (2008), ‘‘Linking order winning and external supply chain integration strategies’’, Supply Chain Management: An International Journal, 13(4), 296-303.

Rai, A., Patnayakuni, R. and Seth, N. (2006), ‘‘Firm performance impacts of digitally enabled supply chain integration capabilities’’, MIS Quarterly, 30 (2), 225-46.

Ranjan,A., (2012). “Implications of Performance Measurement Approaches on Supply Chain Performance,” National Conference on Emerging Challenges for Sustainable Business, pp. 1731-1760.

Robb, D. J., Xie, B.,&Arthanari, T. (2008). Supply chainandoperationspractice and performance in Chinese furniture manufacturing.International Journal of ProductionEconomics, 112, 683-699.

Roth, C. and Martin, H.R. (2000) Information Rules: A Strategic Guide to the Network Economy. Boston: Harvard Business School Press

Roth, D.M. and Martin, T. L. (2000), “Supply chain metrics”, The international journal of logistics management , 12(1), 1 -19.

Saunders MNK, (2009). 'The management of post-merger cultural integration: Implications from the hotel industry'. *Service Industries Journal*, 29 (10), 1359-1375.

Sezen, F.C.A., (2008). Integration of human research management and competitive priorities of manufacturing strategy. International Journal of Operations and Production Management 20 (5), 610–628

Simchi-Minh, S. M., Barker, R. and Naim, M. M. (2003) Identifying supply chain solutions in the UK house building sector. European Journal of Purchasing & Supply Management, 7, 49-59

Singh R. (2009). Delays and Cost Overruns in Infrastructure Projects: An Enquiry into Extents, Causes and Remedies

Smyth, H. (2004), “Relationship management in the management of PFI/PPP projects in the UK,” International Journal of Project Management, 2(3), 232-240.

Speh, R. and Freese , L.N. (2003), “The link Between Supply Chain and Financial Performance”, Supply Chain Management Review , 7(6), 40-47.

Suhong Lia, Bhanu Ragu-Nathanb, T.S. Ragu-Nathanb, S. SubbaRaob (2004): The impact of supply chain management practices on competitive advantage and organizational performance – the international journal of management science. pp. 107 -124

Takim R. (2005) A framework for successful construction project performance Ph.D. thesis, Ethos e-theses online service, British library.

Tan KC, Lyman SB, Wisner JD. (2000) Supply chain management: a strategic perspective. International Journal of Operations and Production Management 2002; 22(6), 614–31.

Tucker, W. B., J. W. Weatherly, D. T. Eppler, L. D. Farmer, and D. L.Bentley (2001), Evidence for rapid thinning of sea ice in the western Arctic Ocean at the end of the 1980s, Geophys. Res. Lett., 28, 2851–2854.

Wagner, R., (2002). Reconfiguring the supply chain to implement postponed manufacturing. International Journal of Logistics Management 9(1), 95–110

Yin, R. (2003). Case Study Research: Design and Methods. 3rd ed. London: Sage.

Zailani, F., Rajagopal, E., (2005). Managing supplier involvement in new product development: a portfolio approach. European Journal of Purchasing and Supply Management 6(1), 49–57

Zhang, QY(2001). Technologyinfusion enabled value chainflexibility: a learning and capability-based perspective.Doctoral dissertation, Universityof Toledo, Toledo, OH.

Eisinga, R.; Te Grotenhuis, M.; Pelzer, B. (2013). "The reliability of a two-item scale: Pearson, Cronbach or Spearman-Brown?". *International Journal of Public Health* 58 (4): 637–642