Effects Of Material Management Techniques On Construction Project Success: Perspective Of Material Managers In Northern Region Of Ghana

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Abstract: Construction materials management process is key to the success of a construction project; however, globally, the problem of material management is a critical issue in the construction industry; especially in the developing economies of which Ghana is no exception. This study sought to identify and assess the material management techniques required for construction firms in the Tamale Metropolis of Ghana. Using empirical data obtained from administering questionnaires to 96 material management personnel in Tamale Metropolis. The data was analyzed using descriptive and inferential statistics such as factor analysis, and Pearson product moment correlation coefficient. The study adopted descriptive quantitative survey approach. Using empirical data obtained from ninety-six administered questionnaires of material managers in Tamale Metropolis; the data was analyzed using descriptive and inferential statistics such as factor analysis, and Pearson product moment correlation coefficient. The study indicated that firms often employed store keepers and security personnel on site; list of materials in project that includes for example (material name, material number and unit price), and provide clear specifications to suppliers. However, they seldom use ICT; and rarely offer training for their workers. The study further revealed that planning and monitoring of material schedule; establishing good business relations with suppliers; the use of security measures on site; use of information communication technology; and also use of competent workers as well as effective training of workers is significant for effective material management on construction site, and has direct effect on construction project delivery success. The study therefore concluded that the more the number of the material management approach adopted on a project, the higher the project delivery success. It was recommended that construction companies should make use of more than one material management technique on construction projects so as to achieve maximum project delivery success.

Index Terms: Techniques, effective, material, management, project success.

1 Introduction

The construction industry plays an important role in the economy and the activities of the industry are vital to the achievement of national socio-economic development goals such as shelter, infrastructure and employment. Shen and Tam (2002) indicated that the construction industry plays an important role in meeting the needs of society and enhancing quality of life. Construction has been an important player in many countries economy, especially developing countries. The sector currently accounts for more than 11% of global GDP (Betts *et al*., 2011). The construction industry is becoming increasingly competitive and materials management is now considered to be one of the frontiers for cost reduction to improve profitability and productivity, as construction materials constitute a major cost component in any construction project. The total cost of installed materials (or value of materials) may be 50% or more of the total cost (Stukhart, 1995), even though the factory cost may be a minor part of the total, probably less than 20-30%. This is because the item must be stored, transported, and re-stored before it is put in place or "consumed" at the site. The total cost of materials includes, in addition to the manufacturer's selling cost, the cost of procurement (cost of placing, processing and paying the material, physical distribution, the distributor's cost, and the transportation of the materials), and the site-handling costs (cost of receiving, storage, issuing, and disposal) (Haddad, 2006). The efficient procurement and handling of material represent a key role in the successful completion of any project. It is important for the contractor to consider that, there may be significant difference in the date that the material was requested or date when the purchase order was made and the time at which the material will be delivered. These delays can occur if the contractor needs a large quantity of materials which the supplier is not able to produce at the time or by any other factors beyond his control. The contractor should always consider that procurement of materials is a potential cause for delay (Haddad, 2006). Ballot (1971 as cited in Haddad, 2006), defined materials as the physical materials that are purchased and used to produce the final product and does not suggest that materials are the final product. In other words, materials are the parts used to produce the final product. Poor planning and control of materials, lack of materials when needed, poor identification of materials, re-handling and inadequate storage cause losses in labour productivity and overall delays that can indirectly increase total project costs. Effective management of construction materials techniques can reduce these costs and contribute significantly to the success of the project (htt\\www.shodhganga.infliben). However, achieving success in project implementation process is the major function of materials management. Modern techniques of efficient Material Management (MM) were developed in USA during Second World War which helped them to make a spectacular progress in improving their productivity. Over the last few years increased awareness in different areas of material management had been found, many hospitals adopted these management techniques to provide efficient patient care, of which the construction industry is not an exception (Kulkarni 2010). Nevertheless, according to Nwachukwu *et al*. (2010), the rate at which building construction projects fail, or are abandoned (some even under construction) is largely dependent on effective application of materials management techniques in developing economies. He further indicated that failure or abandonment of construction projects in developing economies may be attributable to inefficient material management practices on construction projects sites. Stukhart (1995), defines material management as the activities involved to plan, control, purchase, expedite, transport, store, and issue in order to achieve an efficient flow of materials and that the required materials are bought in the required quantities, at the required time, with the required quality and at an acceptable price. According to Ebole (2005), materials management is the planning and controlling of all necessary efforts to make certain that the right quality and quantity of materials are

appropriately specified on time, are obtained at a reasonable cost and are available when needed. Dobler and Burt (2009) stated that material management is designed to improve the activities related to the flow of materials. They added that material management should coordinate purchasing, inventory control, receiving, warehousing, materials handling, planning, and transportation. Materials management involves an integrated coordination of all material related functions. These functions can be carried out efficiently only when sufficient emphasis is placed on early project planning, use of qualified personnel, adequate personnel training and proper communication amongst those involved in the process (Keitany & Mutwol, 2014). According to Ebole (2005), the essential and desired site materials management characteristics of right quality, right quantity, right time and reasonable cost are evidently scarce on construction projects as it is characterized by emergency purchases of materials, inadequate storage, material shortages and sometimes condemnation of materials and works by consultants. Past research has revealed that effective material management techniques contribute to construction project success with respect to delivery time, project cost, quality, and safety (Ademeso & Windapo, 2012; Keitany & Mutwol, 2014; Sundararaja & Shanmugapriya, 2014). Therefore, it is believed that effective implementation of effective materials management techniques could go a long way to enhance project success in the Ghanaian construction industry. It is against this background that this study is conducted to identify and assess the effect of effective materials management practices on construction project success to enhance the industry's development and the economy at large.

2. Research Justification

Anecdotal evidence indicates that the essential and desired site materials characteristics (materials attribute) of right quality, right quantity, right time and reasonable cost are evidently scarce on construction project sites particularly, in the Northern Region. According to Association of Building and Civil Engineering Contractors of Ghana (2015), Transport difficulties, improper handling of construction materials on site, misuse of specification, lack of proper work plan, inappropriate materials delivery and excessive paperwork, all adversely affect materials management practices on most sites in the Northern Region. Similarly an interview conducted with Architectural and Engineering Service Limited Northern Region (2016), revealed that, most construction project sites in the Northern region are characterized by emergency purchases of materials, inadequate storage, double handling of materials, material shortages, theft and sometimes condemnation of materials and works by consultants. All these problems have associations with poor materials management practices used on project sites. Although, effective management of materials can lead to a reduction in cost, enhance project delivery time, enhance quality and reduces health and safety problems on site resulting in a significant saving, yet effective materials management techniques have not received a lot of attention on most project sites in the Northern region of Ghana. Additionally, it is found that there is a significant relationship between effective materials management practices and project delivery success hence, this project is aimed at examining the effect of effective materials management practices on construction project delivery success; as it focuses on effective materials management techniques, safety management and quality management practices on sites. The aforementioned arguments underscore the objectives of this paper.

3. Research Design

The study made use of both quantitative and qualitative research tools. Thus, survey design was used because the study sought to examine the effect of material management technique on construction project delivery success; hence, quantitative survey approach using structured questionnaire was deemed appropriate. The qualitative aspect of the design took the form of description of the analyzed data to make more meaning. The population for the study comprised material managers of construction firms in the Tamale Metropolis of Ghana currently registered with the Association of Building and Civil Engineering Contractors of Ghana (ABCECG). The main reason for using this category of people is that their activities directly or indirectly have a bearing on material management techniques practices in their various firms.

3.1 Purpose of the Research

The purpose of this study is to examine the effect of materials management techniques on construction project delivery success. The specific objective is: To evaluate the effect of the identified materials management techniques on construction project delivery success. The study is significant for the following reasons. Construction firms would be aware of the efficient materials management practices to be adopted to ensure project success. Findings from the study will help the stakeholders to develop policies and practices that could improve material management on sites. The study will serve as a reference material for other researchers.

3.2 Method of Data Analysis

The data was analyzed using descriptive statistics which include mean, standard deviation, frequency and percentages. This was done with the aid of Statistical Software SPSS (Statistical Package for Social Sciences). In addition descriptive statistics, Factor Analysis and Pearson's product moment correlation coefficient (PMCC) were used (Keitanye & Mutwol, 2014; Ademeso & Windapo, 2012)

3.3 Factor Analysis

The method seeks to collapse various variables into a few dimensions of interrelated attributes called principal components. The Eigenvalue determines the principal components, which are orthogonally varimax, and are rotated to obtain more evenly distributed factor loadings within the components. The factor analytical approach was adopted to group the interrelated factors of the 15 factors identified from literature into components.

3.4 Correlation Technique

The major statistical measure of the association was the correlation coefficient. Correlation analysis is primarily concerned with finding out whether an association exists between the dependent variable (project success) and the independents variables (material management techniques) and determining its magnitude and direction (Saunders et al., 2007; Hair et al., 2006).

4 Critical Success Factors for Materials Management on Construction Site

Factor analysis was used to establish the underlying interrelations existing among the many variables identified from literature and materials managers. This makes it possible to reduce the variables to a more meaningful framework to support effective management and policy decisions (Amoah, Ahadzie & Dansoh, 2012). The rotated component matrix of the significant factors is presented in Table 4.1. In the preliminary analysis, the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy which measures the degree to which variables are measuring a common concept, achieved a high of 0.815. Furthermore, Bartlett's test of sphericity, which tests the hypothesis that the variables are collinear, was significant at the $p < 0.01$ level (see Table 4.1). Hence, PCA was found to be a suitable data reduction technique. PCA was conducted and five (5) components were extracted using Kaiser's criterion, which retains only those components whose variance is greater than 1.0. A Varimax rotation was applied to the components to ensure the components were uncorrelated. Observation of the correlation matrix of the significant factors indicate that they all have significant correlation at the 5% level, indicating that there would be no need to eliminate any of the variables for the principal component analysis. These five (5) components explained almost 84.64% of the variation in the data (see Table 4.2). Table 4.3 shows the extracted components and the variables most strongly correlated to each one. With respect to component 1, providing a list of materials in project that includes for example (material name, material number and unit price) and recording/inventory of materials during construction emerged highest with a factor loading of (0.917). This is followed by adequate pre-construction survey on material (0.901), providing material cards at site store that contain for example (input-output balance) (0.865), providing materials purchase order including for example (order number-material description- required quantity-price) (0.747), as well as planning the access rout and site lay out before delivering materials to site (0.727) follow in that order. The combined effect of the above variables on construction materials management is 42.33%. With respect to component 2, Table 4.3 shows that good business relationship (open and mutual trust) with suppliers emerged highest with a factor loading of (0.924). This is followed by prompt payment to suppliers (0.912), offering closer and long term working relations with supplies (0.828), and providing clear specification to suppliers (0.689) follow in that order. The combined effect of the variables on construction material management is 16.97%. Table 4.3 further indicates that, employment of security personnel on site emerged highest in component 3 with a factor loading of (0.871). This is followed by employment of store keeper (0.778); and providing lighting systems at vintage points (0.768) follow in that order. The combined effect of the above variables on construction material management is 10.77%. Table 4.3 shows that use of skilled and experienced workers emerged highest in component 4 with a factor loading of (0.910); this was followed by training of workers (0.838). The combined effect of the variables on construction materials management is 7.75%. Table 4.3 indicates that using basic technology like mobile telephony or laptop or internet for knowing the new materials and their prices and for tracking materials in the opinion of the respondents should be the 5th most significant factor for construction materials management with a factor loading of (0.858). The effect of the above variable on construction materials management is 6.81%. Given that most of the variables in factor 1 are directly linked to adequate planning and monitoring material schedule, the researcher decided to name this factor as planning and monitoring materials schedule-related factor. A cursory look at factor 2 shows that the variables are linked to good business relations, hence, the researcher named it good contractor/supplier relations -factor. Similarly, the variables in factor 3 are directly linked to security; therefore, this factor is labelled provision of adequate security-related factor. The variables in factor 4 are directly linked to the use of competent workers/training, the researcher labelled this component as competent manpower or training-related factor. The 5th factor is labelled adoption of information communication technology (ICT). The results therefore reveal that the significant factors for construction materials management in the Tamale Metropolis of Ghana could be categorized into five (5) main themes; namely: adequate planning and monitoring of materials schedule-related factor, good contractor or supplier relations-factor, adequate security-related, manpower or training-related factor, and adoption of ICT. This finding corroborates with the studies reported by authors such as (Ebole, 2005; Haddad, 2006; Donyavi & Flanagan, 2009; Maccord, 2010; Imbeah, 2012; Ademeso & Windapo, 2012) in similar studies.

Table 4.1: *KMO and Bartlett's Test*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.815
Bartlett's Test of Sphericity	Approx. Chi-Square	1.745E3
	Df	105
	Sig.	.000

Table 4.2 *Total Variance Explained*

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.350	42.331	42.331	3.652	24.347	24.347
2	2.546	16.974	59.305	3.564	23.757	48.104
3	1.616	10.772	70.077	2.249	14.993	63.097
4	1.162	7.749	77.825	2.060	13.735	76.832
5	1.022	6.812	84.637	1.171	7.806	84.637
6	.619	4.125	88.762			
7	.461	3.076	91.839			
8	.353	2.355	94.194			
9	.258	1.721	95.915			
10	.189	1.261	97.176			
11	.135	.899	98.076			
12	.132	.881	98.957			
13	.073	.488	99.445			
14	.047	.312	99.757			
15	.037	.243	100.000			

Extraction Method: Principal Component Analysis.

Table 4.3: *Principal Component Analysis of Construction Material Management Technique*

Item	Factor loadings 1	2	3	4	5
Planning & Monitoring Material Schedule					
Providing a list of materials in project and recording/inventory of materials during construction					
Adequate pre-construction survey on material	0.917				
Providing material cards at site store	0.901				
that contain for example (input-output	0.865				
balance).					
Providing materials purchase order including	0.747				
for example (order number-material description-	0.727				
required quantity-price).					
Planning the access route and site lay out before		0.924			
delivering materials to site		0.912			
Good Contractor/Supplier Relations		0.828			
Good business relationship (open and mutual trust)		0.689			
Prompt payment to suppliers					
Offering Closer and long term working relationship with suppliers	0.871				
Providing clear specification to suppliers				0.778	
Provision of Adequate Security			0.768		
Employment of security personnel on site					
Employment of store keeper					
Providing lighting systems at vintage points	0.910				
Use of Competent Manpower /Training			0.838		
Skilled and experienced workers					
Training of workers					
Use of ICT					
Using basic technology like mobile telephony or			0.858		
laptop or internet for knowing the new materials					
and their prices and for tracking materials					

4.3.1 Application of Material Management Techniques on Construction Sites

The responses of the materials managers on the level of practice of the material management techniques to project success delivery were compared, and the results showed no significant difference at 5% significance level. The responses of the groups (small, medium and large) were therefore combined. The mean value of respondents who evaluated the level of practice of the various techniques from “rarely” to “very often” are shown in Table 4.4,4.5,4.6,4.7, and 4.8, 4.9. Table 4.4 indicates that provision of adequate security had the highest mean (3.92) while the use of competent manpower or training had the lowest mean (2.70). Provision of adequate security (mean = 3.92, std = 0.50) rank first followed by planning and monitoring material schedule on site (mean = 3.53, std = 0.52); Good contractor or supplier relations (mean = 3.39, std = 0.62), Use of ICT (mean = 2.75, std = 0.54), and Use of competent manpower or training (mean = 2.70, std = 0.56) in that order. Table 4.5 shows that with regard to provision of adequate security category, employment of store keeper (mean = 4.68), followed by employment of security personnel on site (mean = 4.62), while providing lighting systems at vintage points had a mean of (2.45). Table 4.6 shows that on planning and monitoring material schedule category, providing a list of materials in project that includes for example (material name, material number and unit price) and recording or inventory of materials during construction emerged highest with a mean of (4.64). This is followed by providing materials purchase order including for example (order number-material description- required quantity-price) (mean = 3.74), adequate pre-construction survey on material (mean = 3.46), providing material cards at site store that contain for example (input-output balance) (mean = 2.94), while planning the access route and site lay out before delivering materials to site had a mean of (2.89). Table 4.7 indicates that the use of basic information communication technology (ICT) like mobile telephony or laptop or internet for knowing the new materials and their prices and for tracking materials had a mean value of (2.75). Table 4.8 shows that regarding good contractor supplier relations category, providing clear specification to suppliers emerged highest with a mean of (4.28). This is followed by offering closer and long term working relations with suppliers (3.86); good business relationship (open and mutual trust) with suppliers had a mean of (2.84), while prompt payment to suppliers had a mean of (2.58). Table 4.9 indicates that with respect to manpower or training, the use of skilled and experienced workers emerged highest with a mean of (3.42); while training of workers had a mean of (1.98).

Table 4.4: *Ranking of Application of Material Management Techniques Category Surveyed*

Category	Mean	Rank
Provision of Adequate Security	3.92	1
Planning /Monitoring material schedule on site	3.53	2
Good Contractor/Supplier Relations	3.39	3
The Use of ICT	2.75	4
Manpower/Training	2.70	5

Table 4.5: *Ranking of Application of MM Techniques in the Provision of Adequate Security Category*

MM Techniques	Mean	Rank
Employment of storekeeper	4.68	1
Employment of security personnel	4.62	2
Provision of lighting system	2.45	3

Table 4.6: *Ranking of Application of MM Techniques in the Planning or Monitoring Materials Schedule Category*

Material Management Techniques	Mean	Rank
Providing a list of materials in project	4.64	1
Providing material order	3.74	2
Adequate pre-construction market survey	3.46	3
Providing material Card at site	2.94	4
Planning the access rout and site layout before delivery of material to site	2.89	5

Table 4.7: *Application of MM Techniques in the Use of ICT Category*

Material Management Technique	Mean	Rank
Use of ICT	2.75	1

Table 4.8: *Ranking of Application of MM Techniques in the Contractor or Supplier Relations Category*

Material Management Techniques	Mean	Rank
Providing clear specifications to suppliers	4.28	1
Good business relations with suppliers	3.86	2
Offering closer and long term relations with suppliers	2.84	3
Prompt Payment to suppliers	2.58	4

Table 4.9: *Ranking of Application of MM Techniques in the Manpower or Training Category*

Material Management Techniques	Mean	Rank
Use of Skilled & Experienced workers	3.42	1
Training of workers	1.98	2

Table 4.10: *Overall Ranking of Application of MM Techniques Surveyed*

Material Management Techniques	Mean Rank	SD	
Employment of storekeeper	4.68 Often	0.46	
Providing a list of materials in project site	4.64	0.54	,,
Employment of security personnel	4.62	0.46 ,,	
Providing clear specification	4.28	0.52	,,
Offering closer long term relations with suppliers	3.86	0.52 Occasionally	
Providing material order		0.55 ,,	
Adequate preconstruction market survey	,,	0.58	
Use of skilled and experienced workers	,,	0.56	
Providing material card at site store	2.94 Seldom	0.48	
Planning the access rout & site layout before delivery material	2.89 ,,		0.50
Good business relations	2.84	0.62	
Use of ICT	,,		
Prompt payment to suppliers	2.75		0.56
Provision of lighting system	,, 2.58		0.54
Training of workers	,, 2.45		0.60
	,, 1.98 Rarely		0.50

Table 4.11: *Effect of the Material Management Techniques on Project Delivery Success*

Effect	Mean	SD
Improvement in labour productivity	4.24	0.55
Improvement in project schedule	3.88	0.54
Better relations with suppliers	3.84	0.50
Improved cooperation and communication	3.82	0.48
Reduces the overall cost of materials	3.78	0.42
Increased profitability	3.75	0.54
Improved the quality of the project	3.72	0.56
Reduces accidents rates on site	3.65	0.52

4.5 Effect of the Identified Material Management Techniques on Construction Project Delivery Success

The respondents were given propositions on the effect of the material management approach identified on their project delivery success and asked to indicate their level of agreement. Their responses are presented in Table 4.10. The respondents pointed out that the material management techniques identified are important factors for construction project success. From Table 4.10, the various descriptive statistics on the effects of the identified material management approach on construction project success were performed. The effect with the highest mean was improvement in labour productivity (4.24), implying that the respondents strongly agree that improved productivity was an effect of material management approach on construction project delivery. This was followed by improvement in project schedule (3.88), better relations with suppliers (3.84), improved cooperation and communication (3.82), reduces the overall cost of materials (3.78), Increased profitability (3.75), improved the quality of the project (3.72), and reduces accidents rates on site (3.65) in that order. The mean of all the responses exceeded the mid-point (3). Impliedly, the respondents “Agree” with those effects. All the responses were with lower standard deviations. This implies that the responses were not varied and thus were significant. The study therefore deduced that the identified materials management approach have effect on construction project delivery.

5. Summary of Findings

- The study revealed that, the benefits of material management approach which have strong positive effect on construction project delivery success in terms of project schedule, overall cost of materials, quality of the project and reduction of accidents rates on site will elude most of the firms since material management techniques is not properly practice.
- The study also revealed that, the use of information communication technology **(**ICT) for example mobile telephony, laptop or internet for knowing the new materials and their prices and for tracking materials is missing on most site, therefore causing delay in materials ordering and supply and further frustrating the materials management characteristics of right quality, right quantity, right time and reasonable cost.

7. Recommendations

- For materials management characteristics to achieve on site materials managers should be encouraged to use computerized construction materials management systems to save effort, time and cost, and to achieve more accurate results.
- Materials managers should acquire the requisite knowledge, skills and ability to implement effective materials management techniques on sites, top management of contracting firms can put in incentives for their staff members to attend training courses or in-service training in construction materials management and its applications.

8. Conclusion

The study has confirm that effective materials management techniques on construction site are important for project success and since there is a significant link between it and the recommendations thus, materials managers of construction firms should be more concerned about planning and monitoring of material schedule, establishing good business relations with suppliers, the use of security measures on site use of information communication technology, and also the use of competent workers as well as effective training of workers, to enhance their materials management and ultimately improve their project delivery success.

9. References

[1] Shen, L. Y. & Tam, W. Y. V. (2002). Implementation of environmental management in the Hong Kong construction industry. International Journal of Project Management, 20, (7), 535-543s

[2] Stukhart, G. (1995). Construction Materials Management. New York: Marcel Dekker Inc.

[3] Haddad, A. E. A. EL-Q. (2006). A Construction Materials Management System for Gaza Strip Building Contractors. A Thesis Submitted in partial fulfillment of the Requirements for the Degree of Master of Science in Construction Management.

[4] htt\\www.shodhganga.infliben, introduction materials (access on November 9, 2016)

[5] R. Nicole, "The Last Word on Decision Theory," J. Computer Vision, submitted for publication. (Pending publication)

[6] Ifeanyi D. Nwachukwu and Elechi F. Asawalam Stukhart, G. (1995). Laboratory evaluation of freshly prepared juice from garlic (Allium sativum L.) Liliaceae as protectants against the maize weevil, Sitophilus zeamais (Motsch.) [Coleoptera: Curculionidae] Construction Materials Management. New York: Marcel Dekker Inc.

[7] Ebole, A. J. (2005). Materials management on construction projects: A Case study of concreting works on sites in Nairobi. A Research Project Presented As Part of the Fulfillment for The Award of the Degree of Master of Arts In Construction Management of The Department Of Real Estate And Construction Management of The University Of Nairobi**.**

[8] Dobler, D. W. & Burt, D. N. (2009). Purchasing and Supply Management: Text and Cases, McGraw-Hill Series in Management, the McGraw-Hill Companies Inc, USA.

[9] Keitany, J .P. & Mutwol, L. (2012, 2014). An Investigation of the Effect of Interdepartmental Coordination between Material Related Departments on Organizational Performance: A Survey of Eldoret Water and Sanitation Company Limited (Eldowas) Kenya. International Journal of Science and Research (IJSR). 3(5) 319-7064.

[10] Ademeso, O. S. & Windapo, A. O. (2012). Relationship between Material Management Approach and Scheduled Project Completion Time. University of Lagos, Akoka-Nigeria.

[11] Association of Building and Civil Engineering Contractors of Ghana (ABCECG) (2015), Tamale Northern Region of Ghana.

[12] Architectural and Engineering Service Limited Northern Region (2016)

[13] Naoum, S. G. (2007). Dissertation Research and Writing for Construction Students. Oxford: Butterworth-Heinemann.

[14] Haddad, A. E. A. EL-Q. (2006). A Construction Materials Management System for Gaza Strip Building Contractors. A Thesis Submitted in partial fulfillment of the Requirements for the Degree of Master of Science in Construction Management.

[15] Kothari, C.R. (2004). Research Methodology, (2nd ed.). New Delhi: New Age International Limited Publishers.

[16] Keitany, J .P. & Mutwol, L. (2012, 2014). An Investigation of the Effect of Interdepartmental Coordination between Material Related Departments on Organizational Performance: A Survey of Eldoret Water and Sanitation Company Limited (Eldowas) Kenya. International Journal of Science and Research (IJSR). 3(5) 319-7064.

[17] Pallant, J. (2005). SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS.

[18] Saunders, M., Lewis, P. & Thornhill, A. (2007). Research Methods for Business Students, (4th ed.). Prentice Hall.

[19] Amoah, P., Ahadzie, D. K., & Dansoh, A. (2012)**.** The factors affecting construction performance in Ghana: the perspective of small-scale building contractors. The Ghana Surveyor Journal.