THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

Influence of Sub-Contractor Selection and Sub-Contract Relationship on Performance of the Main Contractor in a Construction Project: A Survey of Contractors and Subcontractors in Kenya, Kenya

Felix Quentin Biketi

Teaching Assistant, School of Engineering and Technology,
Murang'a University of Technology, Kenya

Weldon Tonui

Tutorial Fellow, School of Engineering and Technology
Murang'a University of Technology, Kenya

Wilson Kariuki

System Administrator, ICT Directorate, Murang'a University of Technology, Kenya

Abstract

Development ventures include numerous gatherings, specifically contractual workers, specialists, customers, providers, subcontractors and other task parties. Notwithstanding, an undertaking, may set aside a long opportunity to execute, attributable to it being intricate regarding the size and the cost concurred, measure of work that is associated with it and generally more tightly directions. Internationally, there is an incredible assorted variety in execution of temporary workers in the conveyance of development extends inside the predetermined time, cost and quality parameters. A few examinations have been done in Kenya to explore factors that impact convenience of task consummation and connections among time and cost exhibitions of a development venture. Be that as it may, inquire about investigations on the connection among temporary workers and subcontractor in undertaking conveyance were not found in the writing survey. Henceforth the point of the examination is to explore the impact of sub-contractual workers determination and sub contract relationship on the execution of the principle temporary worker in a development venture. The targets of the investigation are: to look at the components utilized by contractual workers in the determination of reasonable subcontractors; to distinguish factors that reason clashes between the temporary workers and subcontractors; to decide the connection among temporary workers and subcontractors; in regard of lawful contracts and efficiency enhancement; and to build up a compelling strategy for choosing subcontractors, taking care of contractual worker subcontractor issues, upgrading lawful contracts and enhancing profitability on location. A cross-sectional research configuration was received comprising of examination of a survey controlled to 50 No. dynamic temporary workers and their subcontractors chosen by method for stratified irregular examining from contractual workers enlisted with the National development Authority of Kenya under classes: NCA1, NCA2, NCA3, NCA4, NCA5 and NCA6. The analyst presumes that the vital variables used to choose reasonable subcontractors include: adherence to time plan, adherence to the agreement terms, duty to costs, great notoriety of subcontractors, pledge to quality and claim to fame to particular sort of work. The investigation additionally uncover that the critical components that reason interface issues include: allotting a few attempts to another subcontractor without making unique subcontractor mindful, temporary worker's money related issues, deferral to advance installments to subcontractors, non-adherence of the two contractual workers and subcontractors to the states of the agreement and absence of development quality work. The examination prescribes that temporary workers should choose subcontractors as per their experience, abilities, assets and notoriety. The subcontractors, should total their deals with time, cling to all agreement terms and conditions and to guarantee the best nature of work.

Keywords: Contractors, subcontractors, efficient relationship factor that cause conflicts between the contractors and subcontractor in Kenya

1. Introduction

Development industry is such a perplexing and testing segment (Daniel and Bolivar 2010), inferable from the specialized advances, the more tightly directions and the requirement for compelling administration of assets for aggressive edge. This industry is essential and it includes crude materials, apparatus, back, innovation and above all, human asset. As indicated by (Sheffrin 2003), Construction industry assumes the primary job in the monetary advancement of the country. It likewise specifically has profound impacts on different businesses. Development ventures include numerous gatherings to be specific the contractual workers, experts, customers, providers, subcontractors and

other undertaking parties. As per Andriaanse (2007) development ventures vary from some other undertakings contracts. Development venture contracts engaged with, may set aside a long opportunity to execute, it is mind boggling, the size and the cost concurred and the measure of work that is associated with, typically change as the undertaking continues. The contractual workers more often than not sublet the attempts to the subcontractors to change the dangers. Subcontractors normally are authority in the execution of a particular employment, providing labor, hardware, devices, and plans (Colin and John 1994). They in charge of the execution of part of the workmanship, going about as operators of the creation arrangement of the contracting organization. Subcontractors assume a critical job in development industry. The connection between the temporary worker and subcontractors is one of the keys to any effective development venture. As indicated by Colin and John (1994), 90% of development work is finished by the subcontractor in numerous development ventures, which implies that just 10% of the development work is physically left to the fundamental contractual worker to execute. These measurements demonstrates that there is requirement for appropriate connection between the fundamental temporary worker and subcontractor in the venture for compelling conveyance of the development venture. The steady directions by the administration, change of government and land tussles has significantly affected on the monetary, social, social, common and political privileges of people, organizations and organizations engaged with development exercises. This has straightforwardly influenced the development business. There is additionally a great deal of building controls that have been instituted by the administration and they have turned out to be intense driving the building proprietors to tail them previously, amid and after development to be sheltered. These controls were sanctioned by the legislature because of the constant death toll through building falls in numerous parts of the nation for instance the crumple of a working in Embakasi and in Huruma region which guaranteed in excess of 40 lives. Ayedun et al (2011) attempt to give the reasons for building disappointment and crumple, for example, unapproved fabricating, poor workmanship, absence of appropriate supervision by the temporary worker, non-adherence to determinations from specialist. The administration has constrained the building proprietors to end their structures under development to guarantee that they hold fast to the controls to stay away from the danger of their activities being wrecked by the legislature.

2. Conceptual Framework

Research work has previously been done on the factors that are used by the Main Contractors in the selection of the suitable subcontractors. It has also shown that the factors used for the selection of the suitable subcontractors may include the quality of production, efficiency, employment of qualified members, reputation of the company, accessibility to the company, completion of the work on time etc. (Arslan et al, 2008). When this factors are considered the main contractor will be sure of having a most qualified subcontractor for the job. This will minimize the conflicts that usually arise due to improper selection of the subcontractor for the job. For efficient relation between the contractor and subcontractors several factors should be put into consideration during the selection of the suitable subcontractor such as; cost, quality, time and adequacy. This is according to (Arslan, 2008) Web-Based Subcontractor Evaluation System (WEBSES). This factors that are used to select the suitable contractor can then be broaden as follows: Subcontractor's Background, Work Achievement and Progress, General Obligation, Communication, Quality, Organization Structure, Participation in Tendering Stage, Contractual Relation, Financial Strength, Past Experience

Figure 1

3. Research Methodology

3.1. Introduction

The methodology used included data about the examination structure, populace, test estimate, information accumulation, poll plan, survey content, instrument legitimacy, pilot consider, and the strategy for information preparing and investigation. The survey was the fundamental way to deal with gather the information and points of view of the respondents. The motivation behind this exploration was to find answers to inquiries through the utilization of logical techniques. The principle motivation behind this examination was to think about the connection between the primary contractual workers and their subcontractors in Kenya in issues identified with choice of subcontractors, interface issues,

legitimate contracts, and wellbeing and profitability enhancement. Kallet (2004) clarified that, the techniques area ought to depict what was done to answer the examination question, portray how it was done, legitimize the exploration plan, and clarify how the outcomes were investigated. What's more it was fundamental in this area to portray the materials utilized in the examination, clarify how the materials were set up for the investigation, depict the exploration convention, and clarify how estimations were made and what figuring were performed, and which measurable tests were done to break down the information

3.2. Research Design

The research design that was used in this study was cross-sectional research design which entailed collection of data on more than one case at a single point of time so as to collect a body of data in connection with more than one variable which was then looked at to detect patterns of connection. By strategically choosing extreme sites, researcher was able to establish the common and differentiating factors that lay behind the good relationship between the contractors and subcontractors. The study was therefore designed to gather numerical data from contractors and subcontractors of sampled projects and it was generalized across in order to explain the factors that influence of sub-contractor selection and subcontract relationships on the performance of the main Contractor in a construction project.

3.3. Population Sample and Sampling

3.3.1. Population

The target population is the contractors that are categorized under NCA 1-6 classes classified under the building construction, operating in Nairobi County. These categories were considered in this study as the aim of this research was to study on the influence of sub-contractor selection and subcontract relationships on the performance of the main Contractor in a construction project. The small categories was neglected due to the low practical and administrative experience of their companies in construction works and the low experience of their subcontractors. Based on this list of registered contractors, the size of population for the NCA 1-6 categories was 67 companies.

3.3.2. Sampling Size

There are several approaches to determine the sample size. These includes using a census for small populations, imitating the size of similar studies, using published tables, and applying formulas to calculate a sample size. Fellows and Liu (2015) showed that, three types of sampling can be conducted during the research study; a systematic sampling, stratified sampling, and the cluster sampling.

The stratified sampling was used in this study after the sample size determination. Fellows and Liu (2015) showed that, having determined the strata, sampling occurs most commonly by considering the relative importance of each stratum in population and using such weighting to divide this population. To determine the sample size for each population of contractors and subcontractors, (Mugenda & Mugenda, 2003) equation was used, which can be calculated from this formula:

$$nf = \frac{n}{1 + \frac{n}{N}}$$

The definitions of all variable can be defined as the following:

n: sample size (if the target population is less than 10,000)

N: Total population (67 contractors and 140 subcontractors)

$$[n = \frac{S^2}{V^2}]$$

V: Standard error of sample population equal 0.05 for the confidence level 95%, t = 1.96.

Standard error of sample population

S²: Standard error variance of population elements, S²= P (1-P); maximum at P= 0.5

The sample size for the contractors' and subcontractors' population can be calculated from the previous equations as follows:

$$n = \frac{S^2}{V^2} = \frac{(0.5)^2}{(0.05)^2} = 100$$

$$n \text{ contractors} = n = \frac{100}{1 + \frac{100}{67}} = 40 \text{ contractors}$$

$$n \text{ subcontractors} = n = \frac{100}{1 + \frac{100}{140}} = 58 \text{ subcontractors}$$

Although the calculated sample size for contractors was 40, the questionnaire was distributed to 50 contractors to overcome the risk of not responding from the respondents and to reflect higher reliability and benefits for the study. For the same reason, 70 questionnaires was distributed for the subcontractors.

Population Category	Total Population	Calculated Sample Size	Questionnaires Distributed	Number of Respondents	Response Rate
Contractors	67	40	50	42	84%
Subcontractors	140	58	70	55	79%

Table 1: Sample Size of the Study Population

According to Mugenda and Mugenda (2003), a response rate of 50.0% is adequate for analysis and reporting for descriptive/survey studies; a response rate of rate of 60.0% is good and a rate of 70.0% and over is excellent. Basing on this assertion, the response rate at 84% and 79% were considered to be excellent to give a valid outcome of the relationship between the contractors and their subcontractors.

3.4. Data Collection

3.4.1. Sources of Data

Combined methods comprising a variety of data collection methods was employed. These methods were necessary as they enabled cross checking of data, continuously analysing data and identify recurring issues. The methods that was used in the data collection process included: A pre coded check list/guidelines, Writing material; pens, pencils, writing pads, sketch pads, Data storage devices; audio tapes, flash disks, Measuring tape, Laptop, scanner, printer, photocopy, computer software, camera/photography, Descriptive Statistics (Frequency Distribution & Cross Tabulation), multiple linear regression analysis on SPSS 17.0, MS Excel for data maintenances and Archival Information. Data was sourced from contractors and further from text books and the internet.

3.4.2. Types of Data to Collect

In this study, primary data was collected.

3.4.2.1. Primary Data

The data was collected using a questionnaire approach, that was used to collect the factual, perceptive and attitudes of the respondents. The questionnaire approach was used as a quantitative approach to gain insights and to understand the relationship between contractors and their subcontractors in Kenya. From the questionnaire approach, the researcher was able to obtain both, qualitative data which is related to the perspectives and attitudes of the respondents in addition to the quantitative data which presented the facts and actual cases in the works. Both the quantitative and qualitative approaches were essential to the development and continuous improvement of the construction industry.

3.4.3. Instrument for Data Collection

The questionnaire was chosen to be the method of collecting data in this research, since the questionnaire was a fast and easy method of collecting data and was more accurate when starting processing and analyzing these data. The questionnaire was developed entirely and categorized so that every study objective can be addressed, by ensuring that the specific questions are addressing each objective. It was latter on divided into six (6) sections, of which it was capturing specific aspects of this study. Likert – type statements was used that was anchored on a five – point scale ranging from least important (1) to very important (5) that was used to capture the specific indicators for each objective. For example, Andy and Lockett (2003) used a five point scale and they were able to obtain the mean and standard deviations for each indicator. The questionnaire is shown in Appendix 1.

3.4.4. Reliability Test(s) for Data Collection Instrument

According to (Kothari, 2004), reliability of an instrument can only be assessed by asking questions such as who collected the data, the sources of the data and whether proper methods were used. Reliability therefore refers to the extent unto which the experiment, test, or any measuring procedure will be able to yield the same result on repeated trials. Reliability thus indicates how the instrument is its stable and consistent (Sekran, 2000). When the administration of the instrument is repeated and it shows consistent results, the instrument is termed as reliable (Carmines & Zellar, 1979). The reliability of the data collected from the case studies was concerned with consistency that is the probability of obtaining the same if the study was conducted again. This enhanced the reliability of the results of the subjective judgements.

The instrument consistency was assessed focusing on an inter-item correlation or internal consistency. The assumption used in this internal consistency was that items were slightly different measures of the same concept (Nunnally, 1978) and therefore the inter-correlation between these items were high. In this regard, Cronbach's coefficient alpha was used to measure of internal consistency. Internal consistency of the questionnaire was measured by a scouting sample, which Consisted of ten questionnaires through measuring the correlation coefficients between each paragraph in one field and the whole field. The correlation coefficients and p-values was calculated for the paragraphs of "the factors used for selection of suitable subcontractors". If was found that the all p-values were less than 0.05 or 0.01, and the correlation coefficients was significant at $\alpha = 0.01$ ($p\text{-value} < 0.01$) or $\alpha = 0.05$ ($0.01 < p\text{-value} < 0.05$), meaning that the paragraphs are consistent and valid to measure what they were set for. Even though the development in this study were measured related on previous validated measurement items and strongly based on the literature, they were to be modified so that they suit the Kenya.

3.4.5. Validity Test (S) for Data Collection Instrument

Instrument validation of this research was done in several ways which included content analysis where each item of the instrument tested were analyzed carefully and checked so as to ensure that it is able to convey the necessary message. Burns and Grove (1993) defined the validity of an instrument as a determination of the extent to which the instrument actually reflects the abstract construct being examined. As recommended by Field (2005), all predictor

variables must be quantitative or categorical and the outcome variable must be quantitative, continuous or unbound. In this study, both the predictor variables and the outcome variable, construction practices were quantitative. This means that the type of variables did not violate the requirements of regression analysis in this regard.

Validity has a number of different aspects and assessment approaches. The researcher used two methods to evaluate instrument validity:

- Content validity
- Statistical validity.

3.4.5.1. Content Validity of the Questionnaire

The amended questionnaire was reviewed by the supervisor and other experts in the relationship between main contractors and subcontractors to evaluate the procedure of questions and the method of analyzing the results. After agreeing that the questionnaire is valid and suitable enough to measure the purpose that the questionnaire designed for then it was used to collect the data.

3.4.5.2. Statistical Validity of the Questionnaire

Statistically, to ensure the validity of the questionnaire the test used was structure validity test that was used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. This test was used to measure the correlation coefficient between one field and all the fields of the questionnaire that have the same level of similar scale.

3.5. Data analysis and Presentation

Data was continuously analysed during the study using i). Descriptive statistics; (measures of central tendency e.g. mean and frequency tables), ii). Correlations; (Spearman) and iii). Thematic analysis. It involved editing, coding, analysing and final interpretation of this data. This ensured that the necessary data was tied up and any arising issue dealt with promptly and some of the data flowed through. The final data was then presented in tables, figures, and pie charts and discussed.

3.6. Pilot Study

It was customary practice that the questionnaire should be piloted to measure its validity and reliability and test the collected data. The pilot study provided a trial run for the questionnaire, which involved testing the wordings of questions, clarifying ambiguous questions, and testing the techniques that was used to collect data (Naoum, 1998). A pilot study for the questionnaire was conducted by distributing the prepared questionnaire to a number of experts having experience in the same field of the research to have their opinions. The piloting process was conducted through contractors, subcontractors and consultants. The contractors were selected precisely based on their technical and managerial capabilities to be sure that they added value to the questionnaire.

The subcontractors with long experience in implementing subcontracts of construction works were also selected. Finally consultants were selected who had good experience in the field of supervising construction projects.

The three (contractors and subcontractors and consultants) were asked to review the questionnaire and verify the validity of the questionnaire topics and its relevance to the research objective and gave their advice. Important comments and suggestions were collected and evaluated carefully. All the suggested comments and modifications were discussed with the study's supervisor before taking them into consideration. At the end of this process, some minor changes, modifications and additions were introduced to the questions and the final questionnaire constructed.

3.7. Ethical Considerations

The participants were informed through an introductory letter about the purpose of the study beforehand. The study was undertaken taking into consideration the ethical concerns. The major ethical issues that were addressed by the study included informed consent, privacy and confidentiality, as well as anonymity and researcher's responsibility as outlined by Ritchie & Lewis (2003). Under informed consent, the respondents were provided with adequate information about the study. They were informed about the purpose of the study, the benefits of the study to them and the construction industry as a whole. This information was a basis for the selected participants to make an informed decision to participate in the study.

4. Results and Discussion

4.1. Introduction

In chapter three study methodologies were discussed. In this chapter the data collected from the questionnaire will be analyzed and discussed relating to the factors that influence of sub-contractor selection and subcontract relationships on the performance of the main Contractor in a construction project.

In section one it presented the company and subcontractors profile and all necessary information related to the respondents. In section two of the questionnaire, it was designed to achieve the first objective that intended to critically identify and rank the most common factors used by contractors in the selection of suitable subcontractors in Kenya.

4.2. General Information about the Main Contractors

In this section five (5) questions are included for the study that ask about the classification of the construction Company, Years of Experience of the construction company, location of the construction company, position of the respondent and Years of Experience of the respondent. The information sort in this section was to know how reliable the information to be given in section two of the questionnaire will be.

4.2.1. Classification Category of the Contractors

In Figure 2 it shows the percentage and number of contractors' categorization in accordance to the classification of NCA. It shows that 33.04% from the companies sample are NCA 1, 22.32% are NCA 2, 15.18% are NCA 3 and 29.46% are in others. The response rate of the contractors was 84 % (42 out of 50). According to Mugenda and Mugenda (2003), a response rate of 50.0% is adequate for analysis and reporting for descriptive/survey studies; a response rate of rate of 60.0% is good and a rate of 70.0% and over is excellent. Basing on this assertion, the response rate at 84% was considered to be excellent to give a valid outcome of the relationship between the contractors and their subcontractors. This commendable response rate was made a reality after the researcher made personal calls and visits to remind the respondents to fill-in and return the questionnaires.

Figure 2: The Surveyed Contractors as Classified by NCA

4.2.2. Years of Experience of the Company

In Figure 3 it categorizes the respondents' in respect to their experience to the construction company. From the figure below it shows that 35.71% of the sample have experience that is less than 5 Years, 26.79% have experience that is between 5-10 years, 14.29% have experience that is between 11-15 years and 23.21% have experience that is more than 15 years. From the percentage response it shows that 60% of the respondents from these companies have experience less than 11 years, which depicts reliable results that would enable the researcher to relay on the response to draw the conclusion for the study on relationship between the contractors and their subcontractors in Kenya.

Figure 3: Years of Experience of the Responding Contractors' Companies

2.3. Location of the Construction Company

In the Figure 4 it demonstrates the respondents in terms of their location. It is shown that 25.44% are from Kenya South and North, 18.42% are from Kenya CBD, 35.09% are from the Eastlands and Westlands and 21.05% are from other locations. The researcher intended to find out the information from different parts Kenya Country which will enable the researcher to draw a conclusive conclusion that affects the entire Kenya which is the region of this study.

Figure 4: Location of the Responding Construction Companies

4.2.4. Position of the Person Filling the Questionnaire

In the Figure 5 it demonstrates the actual position of the person who is filling the questionnaire. From the figure it can be seen that 32.46% are "Project manager" and 41.23% are the "Engineer", and 12.28% are the "Site Agent", and 14.04% are "Others". The person filling the questionnaire was relevant to be included so that the response to be obtained will cut across all the personnel's involved in construction that will give their views in regards to the relationship of contractors and their subcontractors without being bias.

Figure 5: Position of the Responding Contractors

4.2.5. Years of Experience of the Person Filling the Questionnaire

In the Figure 6 below shows the percentage and number of respondents in accordance to the years of experience of the persons who is filling the questionnaire. From the figure it shows that 34.19% from the sample has experience less than 5 years, and 17.95% has Experience between 5-10 years, and 28.21% has Experience between 11-15 years, and 19.66% has experience more than 15 years. The information to be obtained in section two of the questionnaire depended a lot on the experience of those filling the questionnaire. More experience directly will increase the reliability of the information obtained for analysis.

Figure 6: Experience of the Responding Contractors

4.3. General Information about the Responding Subcontractors

4.3.1. Specialty of Subcontractor

Figure 7 shows the number and percentage of subcontractors respondents according to specialty of subcontractor. It is shown that 16.96% from the sample (subcontractors) work in "Shuttering", 11.61% from the sample (subcontractors) work in "Building", 13.39% from the sample (sub-conductors) work in "Plastering", 13.39% from the sample (subcontractors) work in "Painting", 19.64% from the sample (subcontractors) work in "Mechanical" and 25% from the sample (subcontractors) work in "Electrical". This information was relevant so that the researcher could draw into conclusion that the information given cuts across all the subcontractors from the different trades.

Figure 7: Specialties of the Responding Subcontractors

4.3.2. Location of Subcontractors' Company

Figure 8 shows the number and percentage of subcontractors' respondents according to their location. It is shown that 21.0 % (12) from Kenya South and North, 61 % (35) from Kenya CBD, 11.0% (6) from the Eastlands & Westlands and 7.0 % (4) from the Kenya South. This information also was intended to find out the information from different parts Kenya Country which will enable the researcher to draw a conclusive conclusion about the relationship between contractors and their subcontractors that affects the entire Kenya which is the region of this study

Figure 8: Location of the Responding Subcontractors

4.3.3. Years of Experience of the Subcontractor

Figure 9 shows the number and percentage of subcontractors respondents according to their years of experience. It is shown that 39.29% from the responding subcontractors has experience of less than 5 years, 18.75% from the responding subcontractors has experience between 5-10 years, and 20.54% from the responding subcontractors has experience between 11-15 years, and 21.43% from the responding subcontractors has experience more than 15 years. The information to be obtained in section two of the questionnaire depended a lot on the experience of the subcontractors filling the questionnaire. More experience directly will increase the reliability of the information obtained for analysis.

Figure 9: Factors Used For Selection of Suitable Subcontractors

This part will show the results of the responding contractors and subcontractors regarding 12 groups of factors (total 48 factors) used by contractors for selection of suitable subcontractors as follows:

- Group 1) Factors related to subcontractor's background
- Group 2) Factors related to work achievement and progress
- Group 3) Factors related to general obligation
- Group 4) Factors related to the communication
- Group 5) Factors related to the Quality
- Group 6) Factors related to the resources
- Group 7) Factors related to the organization structure
- Group 8) Factors related to the participation in tendering stage
- Group 9) Factors related to the contractual relation
- Group 10) Factors related to the financial strength
- Group 11) Factors related to the past experience

4.4.1. Factors Related to Subcontractor's Background

Table 2 shows the opinion of respondents about the factors related to subcontractor's background according to relative importance index ranked from high to low.

Factors	Both Contractors and Subcontractors		Contractors		Subcontractors	
	RII	Rank	RII	Rank	RII	Rank
Reputation of the subcontractor	0.913	1	0.878	2	0.948	1
Specialty in certain type of work	0.896	2	0.884	1	0.908	2
Number of years in business	0.815	3	0.818	3	0.811	5
Type of work implemented by the subcontractor	0.812	4	0.772	4	0.852	3
Long- term relationship with the Main Contractor	0.792	5	0.759	5	0.825	4
Use of advanced construction technology by the Sub Contractor	0.704	6	0.664	6	0.744	6
All factors	0.823		0.792		0.854	

Table 2: Rank and RII of Factors Related to Subcontractor's Background

Table 2 demonstrates that, "Reputation of the subcontractor" was ranked in the first position by both the contractors and subcontractors with RII of (0.913). The responding contractors ranked this factor in the second position with RII of (0.878) while the subcontractors ranked it in the first position with RII of (0.948). This emphasizes that, this is the most important factor used by contractors for selection of suitable subcontractors in Kenya. The obtained results agree with (Haksever *et al*, 2001) and (Arslan *et al*, 2008) who asserts that contractors prioritizes reputation when selecting their subcontractors.

From the same table, it is shown that, the use of advanced construction technology by the Subcontractor" was ranked in the last position by both contractors and subcontractors with RII of (0.704). Also, each of them separately ranked it in the last position with RII of (0.664) and (0.744) respectively. This does not agree with (Shash, 1998) and (Ko *et al*, 2007) who specifically emphasized that, the subcontractors should use advance technology in executing construction

projects and this should also be used by the contractors in the selection of suitable subcontractors. This contradiction in results can be attributed to the fact that the size of construction projects in Kenya at the time of data collection was relatively small and thus did not require advanced technology.

4.4.1.1. Spearman Rank Correlation Coefficient

Spearman rank correlation coefficient (ρ Rho) is a non-parametric test for measuring the difference in ranking between target groups (main contractors and subcontractors).

For calculation of (rho), the following simple formula is applied:

$$\rho = 1 - \frac{6 \sum d_i^2}{N(N-1)} \quad (\text{Naoum 1998})$$

Where,

d_i = the difference in ranking between each pair of factors.

N = number of factors.

For the group of factors related to *subcontractor's background*, the correlation coefficient equals to 0.771 with P-value (Sig.) = 0.000. The P-value is less than the level of significance, $\alpha = 0.05$, so there is a good correlation between the contractors and subcontractors in this group.

4.4.2. Factors Related to Work Achievement and Progress

Table 3 shows the opinion of the respondents about the factors related to the work achievement and progress according to relative importance index from high to low as the following:

Factors	Both Contractors and Subcontractors		Contractors		Subcontractors	
	RII	Rank	RII	Rank	RII	Rank
Adherence of the subcontractor to the time schedule	0.930	1	0.905	1	0.954	1
Updating programme as works progress	0.774	2	0.747	2	0.800	2
Preparing a detailed plan and method of work at project start	0.757	3	0.740	3	0.773	3
All factors	0.818		0.796		0.840	

Table 3: Rank and RII of Factors Related to Work Achievement and Progress

From Table 3, it is shown that, "Adherence of the subcontractor to the time schedule" was ranked in the first position by both the contractors and subcontractors in Kenya with RII of (0.930). The contractors and subcontractors also separately ranked this factor in the first position with RII of (0.905) and (0.954), respectively. This emphasizes that, this is the most important factor used by contractors for selection of suitable subcontractors related to work achievement and progress in Kenya. The obtained results agree with (Ng et al, 2008) who found that this factor was in the first position in the group related to work achievement and progress group. Also, (Ng, et al, 2003), (Ko et al, 2007) and (Arslan et al 2008) emphasized that this factor is an important factor that must be used by contractors for selection of suitable subcontractors.

4.4.2.1. Spearman Rank Correlation Coefficient

For the group of factors related to *work achievement and progress*, the correlation coefficient equals to 1.0 with P-value (Sig.) = 0.000. The P-value is less than the level of significance, $\alpha = 0.05$, so there is total agreement between the contractors and subcontractors in this group.

4.4.3. Factors Related to General Obligation

Table 4 shows the opinion of the respondents about the factors related to the General Obligation according to relative importance index from high to low as follows.

Factors	Both Contractors and Subcontractors		Contractors		Subcontractors	
	RII	Rank	RII	Rank	RII	Rank
Compliance with regulations	0.808	1	0.778	1	0.838	1
Sufficient notice for inspection of works	0.780	2	0.730	2	0.829	2
Care to works done by others subcontractors	0.751	3	0.716	3	0.785	3
Compliance to the environmental regulations	0.655	4	0.604	4	0.706	4
All factors	0.754		0.715		0.792	

Table 4: Rank and RII of Factors Related to General Obligation

From Table 4, it is shown that, "Compliance with regulations" was ranked in the first position by both the contractors and subcontractors in Kenya with RII of (0.808). Also, both of them separately ranked it in the first position with RII of (0.778) and (0.838), respectively. This emphasizes that, this is the most important factor used by contractors for selection of suitable subcontractors in Kenya for this group, since the knowledge and compliance with regulations reduce the problem. The obtained results also agrees with (Ng et al 2008) who found out that this factor was ranked in the first position in the group that relate to general obligations.

4.4.3.1. Spearman Rank Correlation Coefficient

For the group of factors related to general obligation, the correlation coefficient equals to 1.0 with P-value (Sig.) = 0.000. The P-value is less than the level of significance, $\alpha = 0.05$, so there is total agreement between contractors and subcontractors in this group.

4.4.4. Factors Related to the Communication

Table 5 shows the opinion of the respondents about the factors related to the communication according to relative importance index from high to down as follows.

Factors	Both Contractors and subcontractors		Contractors		Subcontractors	
	RII	Rank	RII	Rank	RII	Rank
Regular and effective communication with main contractor	0.856	1	0.863	2	0.848	1
Willingness to discuss with main contractor before construction	0.840	2	0.864	1	0.815	2
Coordination with project beneficiaries and other subcontractors	0.729	3	0.727	3	0.730	3
All factors	0.807		0.819		0.795	

Table 5: Rank and RII of Factors Related to the Communication

From Table 5, it is shown that, "Regular and effective communication with main contractor" was ranked in the first position by both the contractors and subcontractors in Kenya with RII of (0.856). The responding contractors ranked this factor in the second position with RII of (0.863) while the subcontractors ranked it in the first position with RII of (0.848). This emphasizes that, this is the most important factor used by contractors for selection of suitable subcontractors in this group, because the regular communications indicates the attention of the subcontractors to the project because this will give him more chance to get works from the main contractors. The obtained results agreed with (Ng et al, 2008) who found that, this factor was in the first position in the group related to the communication group.

4.4.4.1. Spearman rank correlation coefficient

For the group of factors related to communication, the correlation coefficient equals to 0.5 with P-value (Sig.) = 0.000, which is less than the level of significance, $\alpha = 0.05$, so there is a significant relationship between contractors and subcontractors in this group.

4.4.5. Factors Related to the Quality

Table 6 shows the opinion of the respondents about the factors related to the quality according to relative importance index from high to low as follows:

Factors	Both Contractors and Subcontractors		Contractors		Subcontractors	
	RII	Rank	RII	Rank	RII	Rank
Commitment to do remedial works	0.895	1	0.887	1	0.903	3
Commitment to quality standards	0.897	2	0.850	3	0.944	1
Labor monitoring mechanism	0.887	3	0.846	2	0.927	2
Mechanism for monitoring preparation works	0.853	4	0.845	4	0.861	6
Material and equipment monitoring mechanism	0.837	5	0.800	5	0.874	4
Mechanism for remedial works	0.809	6	0.757	6	0.860	5
Quality of shop drawings and as built drawings	0.708	7	0.722	7	0.694	7
All factors	0.839		0.811		0.867	

Table 6: Rank and RII of Factors Related to the Quality

From Table 6, it is shown that, "Commitment to do remedial works" was ranked in the first position by both the contractors and subcontractors with RII of (0.895). The responding contractors ranked this factor in the first position with RII of (0.887) while the subcontractors ranked it in the third position with RII of (0.903). This emphasizes that, this is the most important factor used by contractors for selection of suitable subcontractors in this group, because this commitment ensures smooth relationship and produces high quality of works. The obtained results agree with Ng et al (2008) who found that this factor is an important factor that must be used by contractors for selection of suitable subcontractors. Finally, it is shown that, "Quality of shop drawings and as-built drawings" was ranked in the last position by both of the contractors and subcontractors with RII of (0.708). Also, each of them separately ranked it in the third position with RII of (0.722) and (0.694), respectively. The obtained results agree with (Ng et al 2008) who found that this factor was in the last position in the group related to the quality. The low importance of this factor is justified since the subcontractors are generally not requested to submit any drawings.

4.4.5.1. Spearman Rank Correlation Coefficient

For the group of quality related factors, the correlation coefficient equals to 0.75 with P-value (Sig.) = 0.000. The P-value is less than the level of significance, $\alpha = 0.05$, so there is a good agreement between the contractors and subcontractors in this group.

4.4.6. Factors Related to the Resources

Table 7 shows the opinion of the respondents about the factors related to the resources according to relative importance index from high to low as the follows:

Factors	Both Contractors and Subcontractors		Contractors		Subcontractors	
	RII	Rank	RII	Rank	RII	Rank
Existence of sufficient equipment and machinery	0.890	1	0.905	1	0.874	1
Ability to provide the necessary equipment	0.886	2	0.904	1	0.868	2
Number of qualified craftsmen and laborers	0.858	3	0.855	2	0.860	4
Ability to supply sufficient materials	0.854	4	0.838	3	0.870	3
Capacity of existing resources	0.834	5	0.821	4	0.847	5
All factors	0.865		0.863		0.867	

Table 7: Rank and RII of Factors Related to the Resources

From Table 7, it is shown that, "Ability to provide the necessary equipment" was ranked in the first position by both the contractors and subcontractors in Kenya with RII of (0.890). Also, contractors and subcontractors separately ranked this in the first position with RII of (0.905) and (0.874), respectively. This emphasizes that, this factor is the most important used by contractors for selection of suitable subcontractors in respect to the resources group, since it guarantees the ability to complete the works on time. The obtained results agreed with (Shash, 1998), (Ng et al 2003) and

(Arslan et al, 2008) who emphasized that adequacy of equipment and machinery is an important factor that must be used by contractors for selection of suitable subcontractors.

4.4.6.1. Spearman Rank Correlation Coefficient

For the group of factors related resources, the correlation coefficient equals to 0.70 with P-value (Sig.) = 0.000. The P-value is less than the level of significance, $\alpha = 0.05$, so there is a good agreement between the contractors and subcontractors in this group.

4.4.7. Factors Related to the Organization Structure

Table 8: shows the opinion of the respondents about the factors related to the organization structure according to relative importance index from high to low as the follows:

Factors	Both contractors and subcontractors		Contractors		Subcontractors	
	RII	Rank	RII	Rank	RII	Rank
Number of experienced site supervisory staff	0.805	1	0.803	1	0.807	1
Existence of proper organization structure	0.671	2	0.646	3	0.696	2
Extent of training provided to the work force	0.642	3	0.671	2	0.612	3
All factors	0.704		0.708		0.699	

Table 8: Rank and RII of Factors Related to the Organization Structure

From Table 8, it is shown that, "Number of experienced site supervisory staff" was ranked in the first position by both the contractors and subcontractors with RII of (0.805). Also, each of them separately ranked it in the first position with RII of (0.803) and (0.807), respectively. This emphasizes that, this is the most important factor used by contractors for selection of suitable subcontractors related to the organization structure group, since the existence of experienced staff is important to achieve the require quality and completion of the project on time. The obtained results agree with (PCICB, 2003), (Ng et al, 2003) and (Arslan et al, 2008) who emphasized that "Number of experienced site supervisory staff" is an important factor that must be used by contractors for selection of suitable subcontractors.

4.4.7.1. Spearman Rank Correlation Coefficient

For the group of factors related organization structure, the correlation coefficient equals to 0.50 with P-value (Sig.) = 0.000. The P-value is less than the level of significance, $\alpha = 0.05$, so there is a significant relationship between the contractors and subcontractors in this group.

4.4.8. Factors related to the Participation in Tendering Stage

Table 9 shows the opinion of the respondents about the factors related to the participation in tendering stage according to relative index from high to low as the follows:

Factors	Both contractors and subcontractors		Contractors		Subcontractors	
	RII	Rank	RII	Rank	RII	Rank
Commitment to the provided prices after awarding	0.922	1	0.930	1	0.913	1
Providing adequate information to main contractor	0.822	2	0.785	4	0.859	2
Price reduction / discounts offered	0.810	3	0.805	2	0.814	3
Involvement / participation in previous tendering	0.802	4	0.801	3	0.802	4
Bringing out innovative ideas	0.719	5	0.716	5	0.722	5
All factors	0.826		0.804		0.847	

Table 9: Rank and RII of Factors Related to the Participation in Tendering Stage

From Table 9, it is shown that, "Commitment to the provided prices after awarding" was ranked in the first position by both the contractors and subcontractors with RII of (0.922). Also, each of them separately ranked it in the first position with RII of (0.930) and (0.913), respectively. This emphasizes that, this is the most important factor used by contractors for selection of suitable subcontractors related to the participation in tendering stage group, because the main

contractor submits his tender based on the prices of the subcontractors so they have to show commitment to their prices after awarding in order to select them to implement the works.

4.4.8.1. Spearman Rank Correlation Coefficient:

For the group of factors related participation in tendering stage, the correlation coefficient equals to 0.70 with P-value (Sig.) = 0.000. The P-value is less than the level of significance, $\alpha = 0.05$, so there is a good agreement between the contractors and subcontractors in this group.

4.4.9. Factors Related to the Contractual Relation

Table 10 shows the opinion of the respondents about the factors related to the contractual relation according to relative index from high to low as the follows.

Factors	Both Contractors and Subcontractors		Contractors		Subcontractors	
	RII	Rank	RII	Rank	RII	Rank
Adherence of the subcontractor to subcontract requirements	0.950	1	0.945	1	0.955	1
Not partnering the works with another subcontractor	0.830	2	0.820	3	0.839	2
Performance during defect liability period	0.801	3	0.825	2	0.776	3
All factors	0.863		0.865		0.860	

Table 10: Rank and RII of Factors Related to the Contractual Relation

From Table 10, it is shown that, "Adherence of the subcontractor to subcontract requirements" was ranked in the first position by both the contractors and subcontractors with RII of (0.950). Also, each of them separately ranked it in the first position with RII of (0.945) and (0.955) respectively. This emphasizes that, this is the most important factor used by contractors for selection of suitable subcontractors related to the contractual relation group, because the adherence to the subcontract requirements will ensure achieving the works with the required quality and within the specified time. The obtained results agreed with (Ko, et al, 2007) and (Arslan et al, 2008) who emphasized that this factor is an important factor that must be used by contractors for selection of suitable subcontractors.

4.4.9.1. Spearman Rank Correlation Coefficient

For the group of factors related contractual relation, the correlation coefficient equals to 0.50 With P-value (Sig.) = 0.000. The P-value is less than the level of significance, $\alpha = 0.05$, so there is a significant relationship between the contractors and subcontractors in this group.

4.4.10. Factors Related to the Financial Strength

Table 11 shows the opinion of the respondents about the factors related to the financial strength according to relative index from high to low as the follows:

Factors	Both Contractors And Subcontractors		Contractors		Subcontractors	
	RII	Rank	RII	Rank	RII	Rank
Ability to undertake the size of work	0.831	1	0.819	1	0.842	1
Prompt payment to laborers	0.812	2	0.811	3	0.813	2
Financial background	0.809	3	0.813	2	0.804	3
All factors	0.816		0.810		0.822	

Table 11: Rank and RII of Factors Related to the Financial Strength

From Table 11, it is shown that, "Ability to undertake the size of work" was ranked in the first position by both the contractors and subcontractors with RII of (0.831). Also, each of them separately ranked it in the first position with RII of (0.819) and (0.842), respectively. This emphasizes that, this is the most important factor used by contractors for selection of suitable subcontractors related to the financial strength relation group, because the high financial strength enables the subcontractor to implement large works without any obstacle. The obtained results agreed with (Ng et al 2008) who found that this factor was in the first position in the group related to the financial strength group. Also, (Shash, 1998), (Haksever et al, 2001), (PCICB, 2003) and (Ng et al, 2003) emphasized that "Financial strength of subcontractor" is an important factor that must be used by contractors for selection of suitable subcontractors.

4.4.10.1. Spearman Rank Correlation Coefficient:

For the group of factors related financial strength, the correlation coefficient equals to 0.50 With P-value (Sig.) = 0.000. The P-value is less than the level of significance, $\alpha = 0.05$, so there is a significant relationship between the contractors and subcontractors in this group.

4.4.11. Factors Related to the Past Experience

Table 12 shows the opinion of the respondents about the factors related to the past experience according to relative importance index from high to low as the follows:

Factors	Both Contractors and Subcontractors		Contractors		Subcontractors	
	RII	Rank	RII	Rank	RII	Rank
Implementing similar previous projects	0.856	1	0.882	1	0.829	1
Size of previous projects implemented by the subcontractor	0.776	2	0.786	2	0.766	2
Number of projects implemented by the subcontractor	0.751	3	0.750	3	0.751	3
All factors	0.796		0.809		0.782	

Table 12: Rank and RII of Factors Related to the Past Experience

From Table 12, it is shown that, "Implementing similar previous projects" was ranked in the first position by both the contractors and subcontractors with RII of (0.856). Also, each of them separately ranked it in the first position with RII of (0.882) and (0.829), respectively. This emphasizes that, this is the most important factor used by contractors for selection of suitable subcontractors related to the past experience group, because implementing similar previous projects enables the subcontractor to work smoothly and complete the works on time to achieve the best quality. The obtained results agreed with (Shash, 1998), (Ng et al 2003) and (Ng et al 2008) who found that, this factor was in the first position in the group related to the past experience. (Haksever et al, 2001), (PCICB, 2003) and (Arslan et al, 2008) emphasized that this factor is an important factor that must be used by contractors for selection of subcontractors.

4.4.11.1. Spearman Rank Correlation Coefficient

For the group of factors related past experience, the correlation coefficient equals to 1.0 with P-value (Sig.) = 0.000. The P-value is less than the level of significance, $\alpha = 0.05$, so there is a total agreement between the contractors and subcontractors in this group.

5. Conclusions and Recommendations

5.1. Introduction

This chapter includes the conclusions and recommendations that would help in improving relationship between contractors and subcontractors. The first objective of this study was to identify and categorize the most common factors used by contractors in the selection of suitable subcontractors in Kenya. The second objective was to highlight the common factor that causes conflicts between the contractors and subcontractor in Kenya, and to identify the most common problems and their relative importance. The third objective was to investigate the contractor-subcontractor relationship with respect to legal contracts, safety issues and productivity improvement. The fourth objective was to propose recommendations to improve the contractor- subcontractor relationship in Kenya with respect to legal contracts and productivity improvement.

5.2. Conclusions on the Objective

In this section the study revealed that the most factor that cause interface between the contractors and their subcontractors is assigning part of the work to the new subcontractor without informing the original subcontractor. This shows that the contractor undermines the work done the subcontractor leading to the interface and nun commitment to the subcontractor to execute their work as expected due to the fear of losing another part of the work to another subcontractor.

The contractor's financial problem was established as the second factor that leads to interface between the contractors and their subcontractors. After the subcontractor has done the work it is the part of the contractor to pay the subcontractor as agreed during the initial part of the contract. When the subcontractor is not paid as agreed then the interface will arise lead to delays and the project will not be implemented as expect.

The third factor is non adherence to the condition of contract by both the contractor and the subcontractors. When one party does not play their part as accordance to the condition of contract then misunderstanding will cause the project to delay or even terminated due to mistrust of the other party who is not willing to play their role as accordance to the conditions of contract.

Fourthly the study also reveal that delay of contract progress payments leads to the interface between the contractors and their subcontractors. Subcontractor require to pay for labour, plants and material after being paid by the contractors. When this payment is not made on time then the subcontractor will not be able to obtain this resources which leads to interface.

5.3. Recommendations

5.3.1. Recommendations to Contractors

Contractors are recommended to consider the skills and past experience of the subcontractor. The contractor should also consider the subcontractor's capabilities and reputation to make certain that the subcontractor is able to complete the work and achieve the best quality.

Contractors are also recommended to supervise the subcontractor's works each day and solve any problems instantly before it goes out of hand. Contractors should issue the financial payments to the subcontractor on a timely basis and avoid late payment, since this builds a good reputation of the contractor and enable the subcontractor to cover his expenses, which results in completing the works on time without delay.

Contractors are recommended to provide and store the required materials early for the subcontractor to enhance smooth flow of the works and prevent the shortage of materials. They also need to discuss the works with the subcontractor to set the plans and identify responsibilities before starting the works. Contractors need to supply samples of the materials and prepare the shop-drawings early for approval by the supervisor. They also need to coordinate among all the subcontractors in the project in order to prevent scheduling conflict. Contractors are recommended to use written contracts that identify responsibilities and keep the rights of all parties.

5.3.2. Recommendations to Subcontractors

The Subcontractors are recommended to ensure that they employ sufficient number of qualified technical staff who have appropriate experience of the specific project. The subcontractors are also advised to prepare all required materials and equipment needed for the project in order to be able them to adhere to subcontract requirements and time schedule. Subcontractors are also recommended to ensure that they propose suitable and reasonable prices that ensure that acceptable margin of profit acquired by them, and also ensure that they adhere to their prices that they quoted during bidding, after awarding and implement the works, without unnecessary requesting any changes of prices. The Subcontractors are recommended to ensure that they establish and keep good reputation in their relationship with the main contractor, so that they can be considered during future selection of the future projects. Subcontractors are also recommended to ensure that they adhere to quality standards through using experienced labors, good materials, supervision of materials and labors, implementing the engineer's instructions and doing the remedial works. Subcontractors are highly recommended to ensure they use the modern techniques for management of their labors forces and materials and hence to improve the productivity.

5.3.3. Recommendations to Owners

The owners are recommended to consider the current financial situation of the contractor and not awarding the contract to financially-weak contractors who can't pay for the subcontractors on time and hence can't complete the project on time. The owners are also recommended to issue the financial payments for the contractor on time so that he can cover the payments for the subcontractors who in turn can purchase the required materials and pay for the labors and complete the works without delay.

The owners are recommended to make his instructions to the subcontractor through the main contractor, i.e. without ignoring the main contractor. The owners are recommended to issue an advance payment to the main contractor especially in large projects to enable him to purchase and store the required materials and avoid the lack of materials in Kenya due to closure.

5.3.4. Recommendations to Consultants

Consultants should consider the following factors:

The consultant should impose on the main contractor to employing a specialized safety officer and submit a detailed safety program and follow-up the implementation of the program. The consultant should follow-up the contractor's works on site on daily basis and give instructions whenever necessary to rectify the defects and assure the quality of works.

The consultant is recommended to expedite the process of approving the materials samples provided by the main contractor to enable him to purchase and store the materials. The consultant is recommended to expedite the process of approving the shop drawings provided by the main contractor to enable him to start the works based on approved drawings.

The consultant is recommended to expedite reviewing and approving the financial requests of the main contractor and advising the owner to issue the payment. The consultant should determine the responsibilities of safety and security for all involved parties in the contract.

5.4. Further Recommended Studies

The study has several limitations that creates some room for further research in the future. First, the current study depends on cross sectional data that the researcher collected limited at one point that is in Kenya, which does not give the correct representation for the entire country. On this basis similar research should be conducted for the entire country to give appropriate reflection for the entire country.

Secondly this research is limited in terms of the sample size used. For future studies this sample size should be enlarged so as to give proper representation of the relationship between the contractors and their subcontractors.

Thirdly, future research studies should consider putting into test other mediating bodies such as NCA. This body could also enhance the relationship between the contractors and subcontractors to ensure productivity during constructions project. Further to this, future research studies should consider controlling the firm age and size to test the extent of moderating effect of technological innovation. Although there may not be sufficient samples to do analysis in the research, this is still a potential topic that should be considered.

Fourthly there should be proper establishment of a system to classify the subcontractors similar to the classification of the main contractors in Kenya and Kenya as a whole.

6. References

- i. AGC, (Associated General Contractors of America)(1998), standard form of agreement between contractor and subcontractor, Associated. Alexandria, Virginia: General Contractors of America. Retrieved from www.mallenconstruction.com/images/_4_SUBCONTRACT_No._655.doc
- ii. Al-Hammad, A. (1993). Factors affecting the relationship between contractors and their sub-contractors in Saudi Arabia: About 70% of contract work is subcontracted in Saudi Arabia, this paper highlights literature search and pilot interview findings. *Building Research and Information*, 21(5), 269-273.
- iii. Arditi, D., & Chotibhongs, R. (2005). Issues in subcontracting practice. *Journal of Construction Engineering and Management*, 131(8), 866-876.
- iv. Arslan, G., Kivrak, S., Birgonul, M. T., & Dikmen, I. (2008). Improving sub-contractor selection process in construction projects: Web-based sub-contractor evaluation system (WEBSES). *Automation in Construction*, 17(4), 480-488.
- v. Ayedun, C. A., Durodola, O. D., & Akinjare, O. A. (2011). An empirical ascertainment of the causes of building failure and collapse in Nigeria. *Mediterranean Journal of Social Sciences*, 3(1), 313-322.
- vi. Boyce, J., & Shelley, B. (Eds.). (2003). *Natural Assets: Democratizing Ownership of Nature*. Island Press.
- vii. Burns, N., & Grove, S. K. (2001). *The practice of nursing research: WB Saunders Company*.
- viii. Chiang, Y. H. (2009). Subcontracting and its ramifications: A survey of the building industry in Hong Kong. *International Journal of Project Management*, 27(1), 80-88.
- ix. Egan, J. (1998). *Rethinking construction: The report of the construction task force to the deputy prime minister on the scope for improving the quality and efficiency of UK construction*. London: Department of the Environment, Transport and the Region,
- x. Enshassi, A., Arain, F., & Tayeh, B. (2012). Major causes of problems between contractors and subcontractors in the Gaza Strip. *Journal of Financial Management of Property and Construction*, 17(1), 92-112.
- xi. Enshassi, A., Mohamed, S., Mustafa, Z. A., & Mayer, P. E. (2007). Factors affecting labour productivity in building projects in the Gaza Strip. *Journal of civil engineering and management*, 13(4), 245-254.
- xii. Fellows, R. F., & Liu, A. M. (2015). *Research methods for construction*. John Wiley & Sons.
- xiii. Fulenwider, M., Helmes, P., Mojtahedzadeh, M., & MacDonald, R. (2004). Operational labor productivity model. In *22nd International Conference of the System Dynamics Society*, Oxford, England.
- xiv. Haksever, A. M., Demir, I. H., & Giran, O. (2001). Assessing the benefits of long-term relationships between contractors and subcontractors in the UK. *International Journal for Construction Marketing*, 3(1), 1-10.
- xv. Haseman, B. (2006). A manifesto for performative research. *Media International Australia incorporating Culture and Policy*, 118(1), 98-106.
- xvi. Heffner, C. (2004). Variables, validity, and reliability. *Research Methods*. Retrieved from <http://allpsych.com/researchmethods/validityreliability.html>.
- xvii. Hinze, J., & Tracey, A. (1994). The contractor-subcontractor relationship: the subcontractor's view. *Journal of Construction Engineering and Management*, 120(2), 274-287.
- xviii. Hsieh, T. Y. (1998). Impact of subcontracting on site productivity: lessons learned in Taiwan. *Journal of construction engineering and management*, 124(2), 91-100.
- xix. Huang, R. Y., Huang, C. T., Lin, H., & Ku, W. H. (2008). Factor analysis of interface problems among construction parties-A case study of MRT. *Journal of Marine Science and Technology*, 16(1), 52-63.
- xx. Israel, G. (2008). D (2003). Determining sample size, Department of agriculture, Institution of food and agricultural science, Florida. University of Florida, Retrieved from, www.edis.ifas.ufl.edu,
- xxi. Hinze, J., & Tracey, A. (1994). The contractor-subcontractor relationship: the subcontractor's view. *Journal of Construction Engineering and Management*, 120(2), 274-287.
- xxii. Proctor Jr, J. R. (1996). Golden rule of contractor-subcontractor relations. *Practice Periodical on Structural Design and Construction*, 1(1), 12-14.
- xxiii. Kallet, R. H. (2004). How to write the methods section of a research paper. *Respiratory care*, 49(10), 1229-1232.

- xxiv. Kale, S., & Arditi, D. (2001). General contractors' relationships with subcontractors: a strategic asset. *Construction Management and Economics*, 19(5), 541-549.
- xxv. Ko, C. H., Cheng, M. Y., & Wu, T. K. (2007). Evaluating sub-contractors performance using EFNIM. *Automation in Construction*, 16(4), 525-530.
- xxvi. Kumaraswamy, M. M., & Matthews, J. D. (2000). Improved subcontractor selection employing partnering principles. *Journal of management in engineering*, 16(3), 47-57.
- xxvii. Latham, M. (1994). *Constructing the team: Joint review of procurement and contractual arrangements in the UK construction industry*. Department of the Environment, UK.
- xxviii. Mbatha, C. M. (1986). *Building contract performance: a case study of government projects in Kenya*.
- xxix. Moore, C. C., Mosley, D. C., & Slagle, M. (1992). *Partnering: guidelines for win-win project management*. Project Management Institute.
- xxx. Moser, C. A., & Kalton, G. (2017). *Survey methods in social investigation*. Routledge.
- xxxi. Mugenda, A. (2003). *Research methods Quantitative and qualitative approaches by Mugenda*. Nairobi, Kenya.
- xxxii. Naoum, S. (2012). *Dissertation research and writing for construction students*. Routledge.
- xxxiii. Ng, S. T. T., & Luu, C. D. T. (2008). Modeling subcontractor registration decisions through case-based reasoning approach. *Automation in Construction*, 17(7), 873-881.
- xxxiv. Ng, T. S., Skitmore, M., & Chung, W. F. (2003). Ten basic factors to identify suitable subcontractors for construction projects. In *Proceedings of the CIB TG 23 International Conference on Professionalism in Construction: Culture of High Performance* (pp. 1-8). CIB-International Council for Research and Innovation in Building and Construction.
- xxxv. Ng, S. T., Luu, C. D., & Chu, A. W. (2008). Delineating criteria for subcontractor's registration considering divergence in skill base and scales. *International Journal of Project Management*, 26(4), 448-456.
- xxxvi. Othman, M. R. (2007). *Forging main and subcontractor relationship for successful projects*.
- xxxvii. Passia Yearbook, D. (2006). *Jerusalem: Palestinian Academic Society for the Study of International Affairs*, 2006.
- xxxviii. Polit, D. F., & Hungler, B. P. (1985). *Essentials of nursing research: Methods and applications*. Lippincott Williams & Wilkins.
- xxxix. Seppala, C. R. (1996). *Introduction to the FIDIC Conditions of Subcontract for Works of Civil Engineering Construction*. FIDIC.
- xl. Sugii, T. (1998). *Labor productivity*, NLI Research Institute.
- xli. Sambasivan, M., & Soon, Y. W. (2007). Causes and effects of delays in Malaysian construction industry. *International Journal of project management*, 25(5), 517-526.
- xl. Shash, A. A. (1998). Bidding practices of subcontractors in Colorado. *Journal of Construction Engineering and Management*, 124(3), 219-225.
- xl. Talukhaba, A. A. (1988). *Time and cost performance of construction projects*. Unpublished MA Thesis, Department of Building Economics and Management, Nairobi: University of Nairobi.
- xl. Wilson, J. M., & Koehn, E. E. (2000). Safety management: problems encountered and recommended solutions. *Journal of construction engineering and management*, 126(1), 77-79.
- xl. World Bank Group. (2014). *World development indicators 2014*. World Bank Publications.
- xl. Wong, F., & So, L. (2002). Restriction of the multi-layers subcontracting practice in Hong Kong-Is it an effective tool to improve safety performance of the construction industry. In *Triennial Conference CIB W* (Vol. 99).
- xl. Yang, J. B., & Ou, S. F. (2008). Using structural equation modeling to analyze relationships among key causes of delay in construction. *Canadian Journal of Civil Engineering*, 35(4), 321-332.