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Factors for Efficient Relationship between Contractors and Subcontractors in Project Implementation in Nairobi Kenya

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----------ABSTRACT----------
Construction is a complex and challenging activity owing to the technical advances, tighter regulations and need for effective management of resources for competitive edge. The projects under the industry involve many parties namely the contractors, consultants, clients, suppliers, subcontractors and other project parties.. Studies carried in Kenya have established relationship between; hiring skilled manpower and timely completion of projects, skilled manpower and quality project output, timely release of funds and project completion and supervision style and quality projects. However, none of the studies have considered the relationship between contractors and subcontractor in project delivery which is the area of interest in this study.Further, the government enactment of stiff policies and regulations to enhance quality project delivery and mutual relationship between contractors and subcontractors has not borne fruition as government continue witnessing an alarming stalled or poor quality projects. The objective of the study isto identify and categorize the most common factors used by general contractors in the selection of suitable subcontractors for project implementation in Nairobi area.Themultiple comparative case study design and a population of 70 firms were used. The response rate of the study was 81.5%.The results revealed that, "Compliance with regulations" was ranked in the first position by both the contractors and subcontractors with RII of (0.808). Also, each 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 general contractors for selection of suitable subcontractors in this group, since the knowledge and compliance with regulations reduce the problem. The study recommends the contractor selects the subcontractors according to their experience, capabilities, resources and reputation. Thestudy may help various relevant government agencies in policy formulation.

Keywords*: contractors and subcontractors, factors for selecting subcontractors*

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I. INTRODUCTION

Construction projects involve many parties namely the contractors, consultants, clients, suppliers, subcontractors and other project parties. According to (Andriaanse, 2007) construction projects differ from any other projects contracts. Construction project contracts involved in, may take a long time to execute, it is complex, the size and the price agreed and the amount of work that is involved in, usually change as the project proceeds. The contractors usually sublet the works to the subcontractors to transform the risks. Subcontractors usually are specialist in the execution of a specific job, supplying manpower, equipment, tools, and designs(Colin & John, 1994).They responsible for the execution of part of the workmanship, acting as agents of the production system of the contracting company. Subcontractors play a significant role in construction industry. The relationship between the general contractor and subcontractors is one of the keys to any successful construction project.According to (Colin & John, 1994) ninety percent of construction work is done by the subcontractor in many construction projects, which means that only ten percent of the construction work is physically left to contractor to execute. According to these data it indicates that there is need for proper relationship between the contractors and subcontractors in Nairobi area for effective delivery of the construction project.The constant regulations by the government, change of government and land tussles has greatly impacted on the Nairobi economic, social, cultural, civil and political rights.All this has directly affected the construction industry in Nairobi area.There is a lot of building regulations that have been put into place by the government and they have become tough forcing the building owners to follow them before, during and after construction to be safe. This regulations was enacted by the government due to the continuous loss of life through building collapsing around Nairobi such as in Nyamakina area, Embakasi and the recent collapsing of building in Huruma area which claimed more than 40 lives. (Ayedun et al, 2011) try to give the causes of building failure and collapse such as

unapproved building, poor workmanship, lack of proper supervision by the contractor, non-adherence to specifications from engineer. The governmenthas forced the building owners to halt their buildings under construction to ensure that they adhere to the regulation to avoid the risk of their projects being demolished by the government.

Statement of the problem

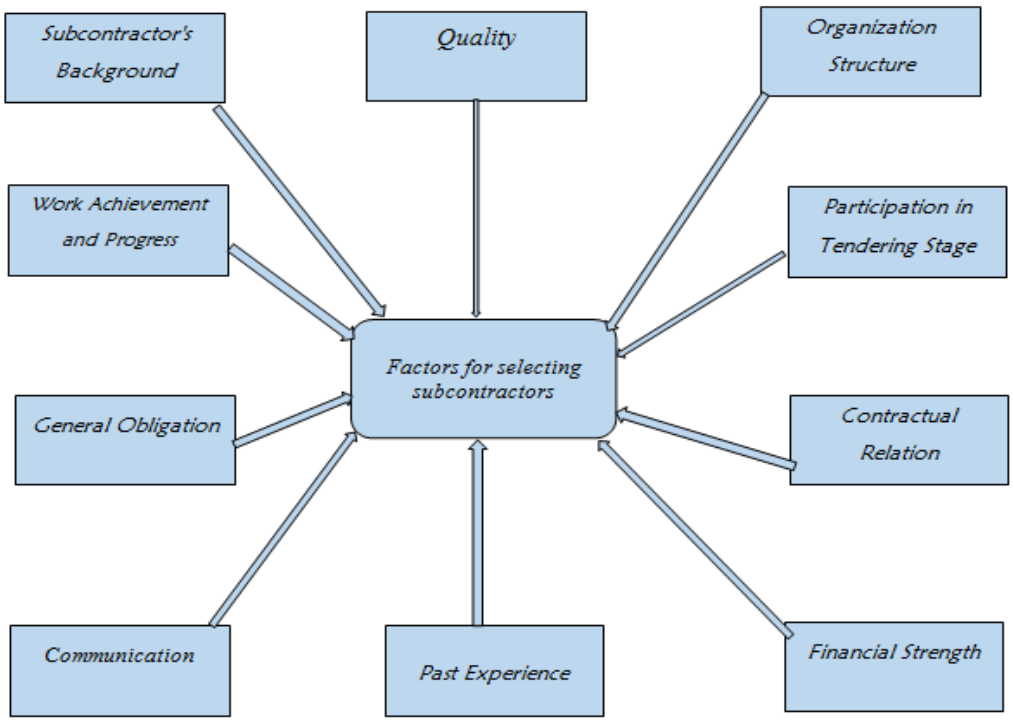
Construction is a complex and challenging activity owing to the technical advances, tighter regulations and need for effective management of resources for competitive edge. The projects under the industry involve many parties namely the contractors, consultants, clients, suppliers, subcontractors and other project parties. Studies carried in Kenya have established relationship between; hiring skilled manpower and timely completion of projects, skilled manpower and quality project output, timely release of funds and project completion and supervision style and quality projects. However, none of the studies have considered the relationship between contractors and subcontractor in project delivery which is the area of interest in this study. Further, the government enactment of stiff policies and regulations to enhance quality project delivery and mutual relationship between contractors and subcontractors has not borne fruition as government continue witnessing an alarming stalled or poor quality projects.

General Objective of the Study

To identify and categorize the most common factors used by general contractors in the selection of suitable subcontractors for project implementation in Nairobi area.

II. CONCEPTUAL FRAMEWORK

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 contactor include the following;Subcontractor's Background**,** Work Achievement and Progress**,** General Obligation**,** Communication**,** Quality**,** Organization Structure**,** Participation in Tendering Stage**,** Contractual Relation**,** Financial Strengthand Past Experience



III. RESEARCH METHODOLOGY

3.1 Introduction:

The methodology used included information about the research design, population, sample size, data collection, questionnaire design, questionnaire content, instrument validity, pilot study, and the method of data processing and analysis. The questionnaire wasthe main approach to collect the data and perspectives of the respondents.

The purpose of this research was to discover answers to questions through the application of scientific procedures. The main purpose of this research was to study the relationship between the main contractors and their subcontractors in Nairobi area in issues related to selection of subcontractors, interface problems, legal contracts, safety and productivity improvement. (Kallet, 2004) explained that, the methods section should describe what was done to answer the research question, describe how it was done, justify the experimental design, and explain how the results were analyzed. In addition, to this section it was necessary to describe the materials to be used in the study, explain how the materials were prepared for the study, describe the research protocol, and explain how measurements were made and what calculations were performed, and which statistical tests were done to analyze the data.

3.2 Research Design:

The research design that was used in this study was multiple comparative case study 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. The multiple cases was both successful and unsuccessful. By strategically choosing extreme sites, it wasable 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 used to select the suitable subcontractors.

3.3 Study Area:

This research was conducted in Nairobi Kenya. The geographical area of Nairobi covered in the study was obtained from the Nation Business Directory (2015), National Construction Authority (2015), Kenya Industrial Research Institute (KIRDI), and the Yellow Pages of the Telephone Directory (2015). This research area was chosenby the researcher because it enabled the researcher to gather enough data within reasonable time and also it was essential for obtaining respondents from NCA 1 to NCA 4as according to the categories under listed for construction firms in Kenya, which was a major key for this research. Most previous studies on construction industry have been focusing on small firms classifying them under NCA 4 to NCA 7. The study area chosen (Nairobi), conveniently met the requirements of the study since most of this construction firms under listed are majorly found here.

3.4 Population and Sampling size of the Study

3.4.1 Population

Two populations was targeted in this research. The first population was those contractors that are categorized under NCA 1-4 classes classified under the building construction. These categories was considered in this study as the aim of this research was to study the relationship between the general contractors and their subcontractors in Nairobi area regarding issues related to selection of suitable subcontractor. 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 1-4 categories was 67 companies.

The second population included the subcontractors in the various types of work fields like; shuttering, building, plastering, tiling, painting, mechanical, electrical, aluminum, carpentry and ironmongery. Unfortunately, majority of subcontractors are not registered thus it was difficult to determine their number in Nairobi area during the research.However, after discussion with some main contractors from different classification categories about the number of their subcontractors, the number of Subcontractors is estimated to be 140.

3.4.2 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 & Liu, 1997) 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 & Liu, 1997) 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, (Kish, 1965) equation was used, which can be calculated from this formula:

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

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

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

n: sample size from finite population.

N: Total population (67 contractors and 140 subcontractors)

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, S^2= 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 contractors = $n = \frac{100}{1+\frac{100}{67}}$ = 40 contractors

n subcontractors = $n = \frac{100}{1+\frac{100}{140}}$ = 58 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 3.1: Sample Size and response rate of the study population

For the first population of contractors, the selected sample represented all classification categories of the contractors. (Moser& Kalton 1971) showed that a response rate of less than 30% is likely to produce results subject to non-response bias. Based on this, the obtained response rates of 84% and 79% are reasonable and will reflect good results and outputs.
For the second population of subcontractors, the selected sample represented all specialties of works such as shuttering, building, plastering, tiling, painting, mechanic, and electrical, aluminum, carpentry and ironmongery.

3.5 Data Collection

3.5.1 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 wasused 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.

3.5.2 Types of data to collect

In this study, both primary and secondary data were collected.

3.5.2.1 Primary data

The data was collected through face to face interviews using a questionnaire approach, that wasused to collect the factual, perceptive and attitudes of the respondents.The unit of analysis and observation wasused in a construction project. The questionnaire approach wasused as a quantitative approach to gain insights and to understand the relationship between contractors and their subcontractors in Nairobi area. From the questionnaire approach, the researcher wasable 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.

3.5.2.2 Secondary data

This data wascollected through literature a review which wassourced from text books, publications, from records kept by the stakeholders and the internet.

3.5.3 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.Interviewing wasaimed at supplementing data from the documentary sources and, consequently, selection of theinterview participants wasbased on the data gaps established in the documentary search. About 75% of

thedocumentary search wascompleted before the interview questionnaires are prepared and potential interviewees identified.
The data collection tool for the qualitative data wasa pre-structured case outline, whereby field notes (from documents and interviews) wascoded and entered in the appropriate thematic category as the fieldwork proceeded. Both qualitative and quantitative data wasobtained. The qualitative data comprise the relevant clauses, sentences and paragraphs copied from the documents and transcriptions of the statements made by interviewees.
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.

3.5.4 Reliability Test(s) for Data Collection Instrument:
According to Kothari (2004), he stresses that 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). For the study of these research, stability was not assessed because it was not possible to administer the second instrument to the same study respondents.
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-value < 0.01) or $\alpha = 0.05$ ($0.01 <$ p-value < 0.05), meaning that the paragraphs are consistent and valid tomeasure 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 Nairobi area.

3.5.5 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 practicies were quantitative. This means that the type of variables did not violet 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:
a.Content validity
b.Statistical validity.

3.5.5.1 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.

3.5.5.2 Statistical Validity of the Questionnaire
Statistically, to ensure the validity of the questionnaire; Two statistical tests were applied. The first test was criterion-related validity test (Pearson test), which was used to measure the correlation coefficient between each item in the field and the whole field. The second 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.

3.6 Data analysis and presentation

Data wascontinuously analysed during the study using Descriptive statistics; measures of central tendency e.g. mean and frequency tables**,** Correlations; Spearman and Pearson, Thematic analysis. It involved editing, coding, analysing and final interpretation of this data. This ensured that the necessary data wastied up and any arising issue dealt with promptly and some of the data flowed through.The final data wasthen presented in narratives, tables, figures, and pie charts.

3.7 Pilot study

It was customary practice that the survey instrument 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 wasused to collect data (Naoum, 1998). A pilot study for the questionnaire wasconducted 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 wasconducted through contractors, subcontractors and consultants. The contractors wasselected 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 wasselected who had good experience in the field of supervising construction project.

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 was collected and evaluated carefully. All the suggested comments and modifications wasdiscussed with the study's supervisor before taking them into consideration. At the end of this process, some minor changes, modifications and additions was introduced to the questions and the final questionnaire constructed.

3.8 Ethical considerations

The participants will be informed through an introductory letter about the purpose of the study beforehand. The study will be undertaken taking into consideration the ethical concerns. The major ethical issues that will be 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 will be provided with adequate information about the study. They will be informed about the purpose of the study, the benefits of the study to them and the construction industry as a whole. This information will be a basis for the selected participants to make an informed decision to participate in the study.

IV. DATA ANALYSIS AND DISCUSSION

4.1 Introduction:

In chapter three study methodology was discussed. . In this chapter the data collected from the questionnaire will be analyzed and discussed relating to the relationship between the contractors and subcontractors. 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 intend to critically identify and rank the most common factors used by general contractors in the selection of suitable subcontractors in Nairobi Area.

4.2General 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.

4.2.1 Classification Category of the contractors

In Figure 4.1 it shows the percentage andnumber 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.

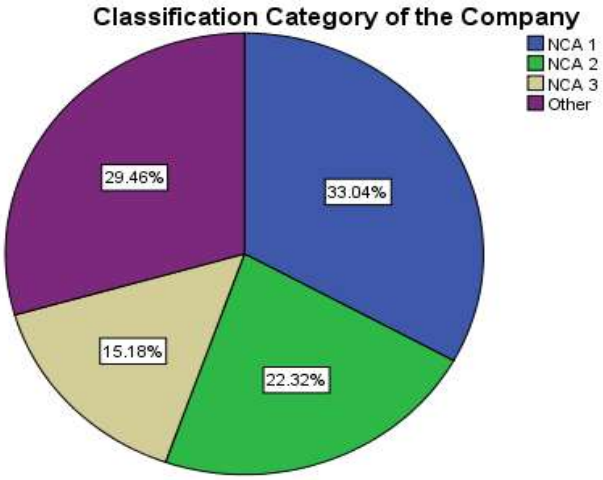


Figure 4.1: The surveyed contractors as classified by PCU

4.2.2 Years of Experience of the Company

In Figure 4.2 it categorizes the respondents'in respect to their experience to the construction company. From the figure belowit 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.

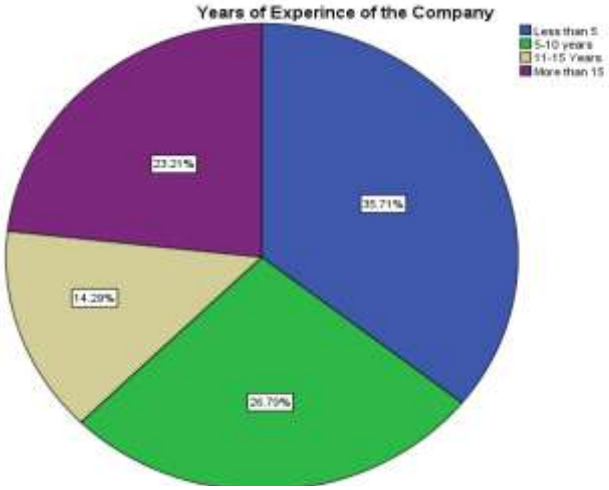


Figure 4.2: Years of experience of the responding contractors' companies

4.2.3 Location of the construction company

In the Figure 4.3 it demonstrates the respondents in terms of their location. It is shown that 25.44% are from Nairobi South and North, 18.42% are from Nairobi CBD, 35.09% are from the Eastlands and Westlands and 21.05% are from other locations.

Figure 4.3: Location of the responding construction companies

4.2.4 Position of the person filling the questionnaire

In the Figure 4.4 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".

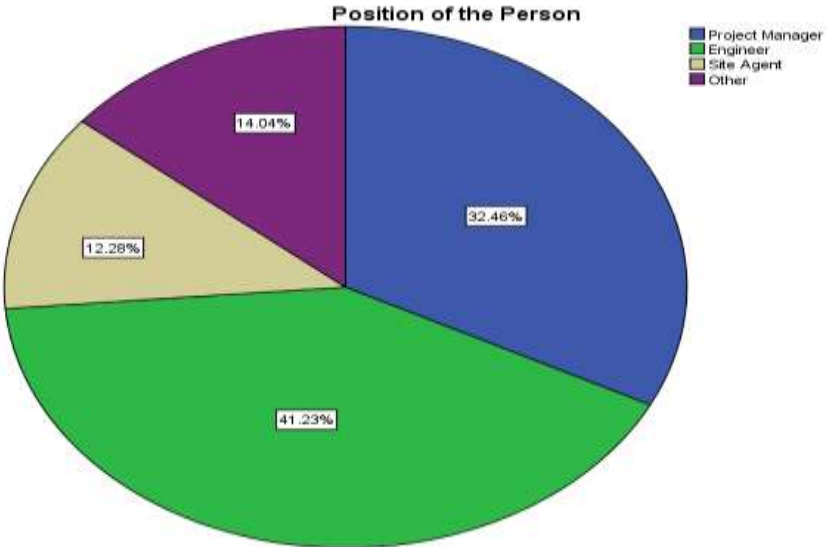


Figure 4.4: Position of the responding contractors

4.2.5 Years of Experience of the person filling the questionnaire

In the Figure 4.5 below shows the percentageand 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.

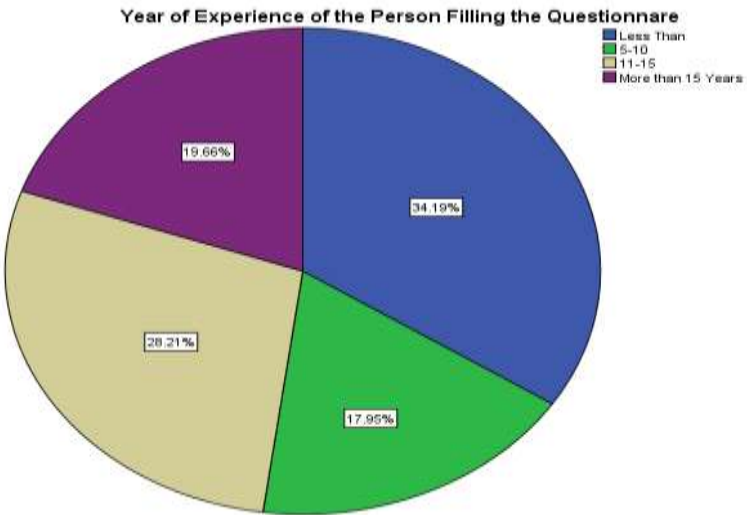


Figure 4.5: Experience of the responding contractors

4.3 General Information about the responding subcontractors

4.3.1 Specialty of Subcontractor

Figure 4.6 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".

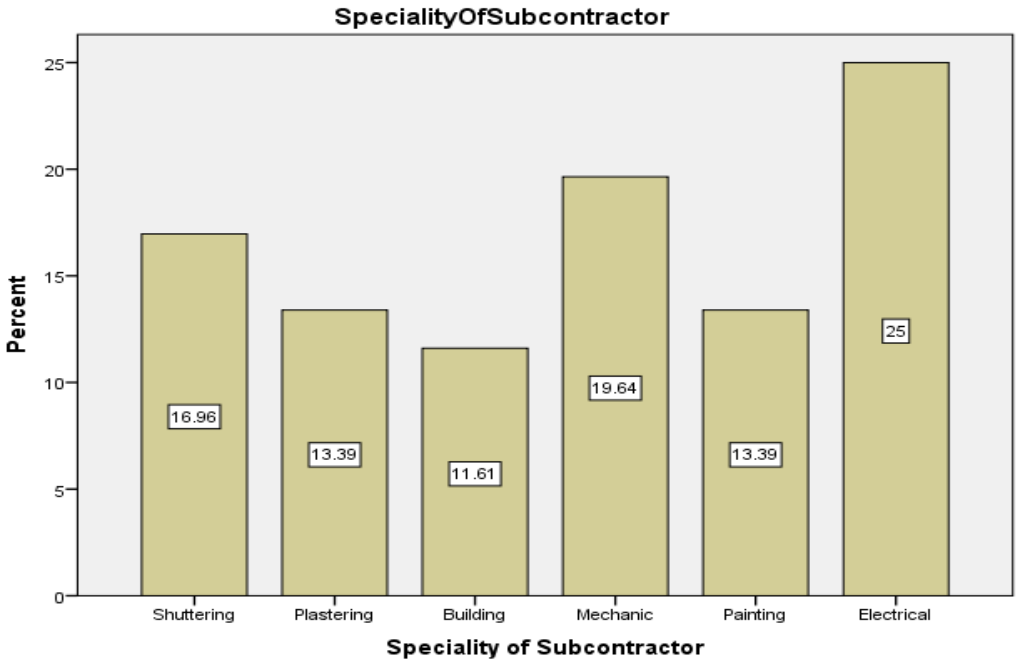


Figure 4.6: Specialty of the responding subcontractors

4.3.2 Location of subcontractors' Company

Figure 4.7 shows the number and percentage of subcontractors' respondents according to their location. It is shown that 21.0 % (12) from Nairobi South and North, 61 % (35) from Nairobi CBD, 11.0% (6) from the Eastlands & Westlands and 7.0 % (4) from the Nairobi South.

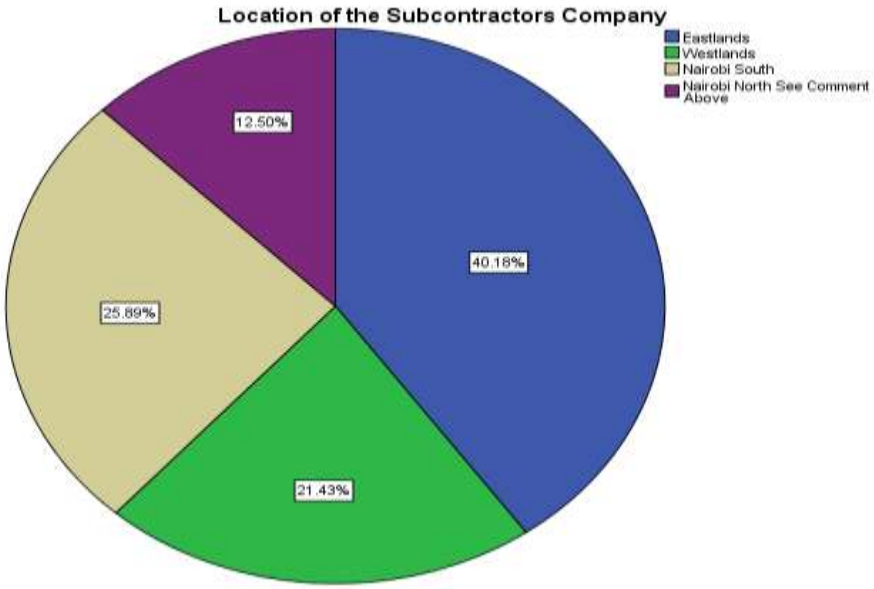


Figure 4.7: Location of the responding subcontractors

4.3.3 Years of experience of the subcontractor

Figure 4.8 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.

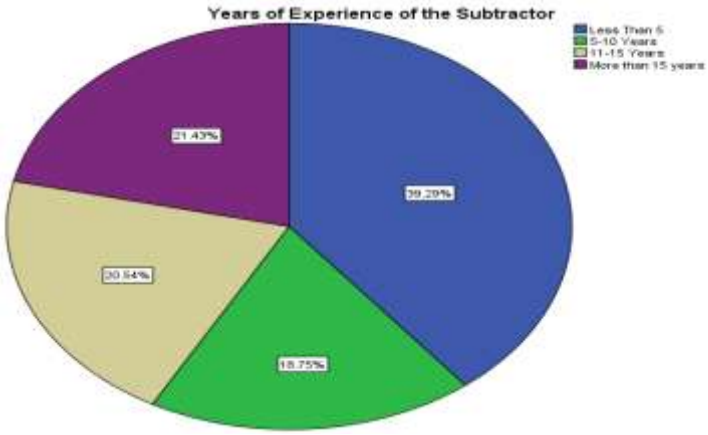


Figure 4.8: Years of experience of the responding subcontractors

4.3.4 Staff of the Sub contractor

Figure 4.9 shows the number and percentage of subcontractors according to number of staff. It is shown that 36.34% from the responding subcontractors have staff less than 5 persons, and 32.46% of them have staff between 5-10 persons, and 18.42% have staff between 11-15 persons, while 12.28% have staff less more than 15 persons.

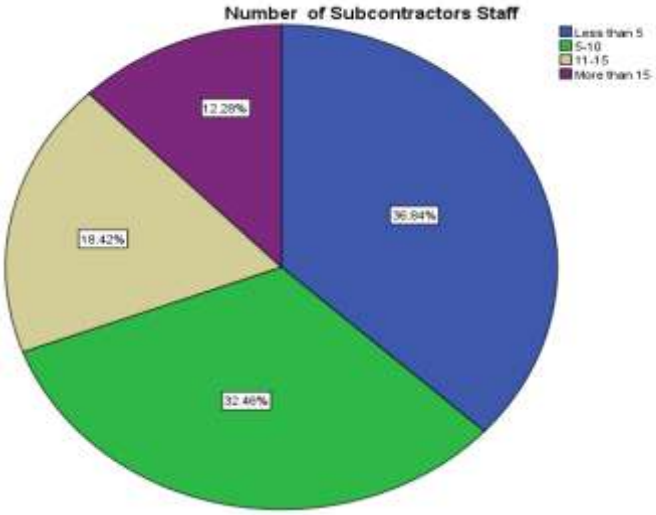


Figure 4.9: Number of staff of the responding subcontractor

4.4 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 general 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 4.1 shows the opinion of respondents about the factors related to subcontractor's background according to relative importance index ranked from high to low.

Table 4.1: Rank and RII of factors related to subcontractor's background

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 4.1 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 general contractors for selection of suitable subcontractors. The obtained results agree with (Haksever et al 2001) and (Arslan et al 2008) who asserts that general contractors prioritizes reputation when selecting subcontractors.
Finally, it is shown that, "Use of advanced construction technology by the Subcontractor" was ranked in the last position by both of the contractors and subcontractors with RII of (0704). Also, each of them separately ranked it in the last position with RII of (0.664) and (0.744) respectively. However, the obtained results do not agreed with (Shash, 1998) and (Ko et al 2007) who emphasized that, "The use of advanced construction technology by the subcontractor" is an important factor that must be used by general contractors for selection of suitable subcontractors. This contradiction in results can be attributed to the fact that the size of construction projects in Nairobi Area is relatively small and thus does not require advanced technology.

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:

$$\rho = 1 - \frac{6\sum_2 di2}{N(N-1)} \quad , \quad \text{(Naoum 1998)}$$

Where, di = 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 4.2 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:

Table 4.2: Rank and RII of factors related to work achievement and progress

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	

From Table 4.2, it is shown that, "Adherence of the subcontractor to the time schedule" was ranked in the first position by both the contractors and subcontractors with RII of (0.930). Also, each of them separately ranked it in the first position with RII of (0.905) and (0.954), respectively. This emphasizes that, this is the most important factor used by general contractors for selection of suitable subcontractors related to work achievement and progress. 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, (Chung 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 general contractors for selection of suitable subcontractors.

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 4.3 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.

Table 4.3: Rank and RII of factors related to General Obligation

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	

From Table 4.3, it is shown that, "Compliance with regulations" was ranked in the first position by both the contractors and subcontractors with RII of (0.808). Also, each 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 general contractors for selection of suitable subcontractors in this group, since the knowledge and compliance with regulations reduce the problem. The obtained results agreed with (Ng et al 2008) who found that this factor was in the first position in the group related to general obligations.

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

Table 4.4: Rank and RII of factors related to the Communication

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	

From Table 4.4, it is shown that, "Regular and effective communication with main contractor" was ranked in the first position by both the contractors and subcontractors 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 general 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.
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, α=0.05, so there is a significant relationship between contractors and subcontractors in this group.

4.4.5 Factors related to the quality

Table 4.6 shows the opinion of the respondents about the factors related to the quality according to relative importance index from high to low as follows:

Table 4.6: Rank and RII of factors related to the Quality

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 asbuilt drawings	0.708	7	0.722	7	0.694	7
All factors	0.839		0.811		0.867	

From Table 4.6, 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 general 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 general 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.

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, α = 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 4.7 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:

Table 4.7: Rank and RII of factors related to the Resources

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	

From Table 4.7, it is shown that, "Ability to provide the necessary equipment" was ranked in the first position by both the contractors and subcontractors with RII of (0.890). Also, each of them separately ranked it in the first position with RII of (0.905) and (0.874), respectively. This emphasizes that, this is the most important

factor used by general contractors for selection of suitable subcontractors related to the resources group, since it guarantees the ability to complete the works on time. The obtained results agreed with (Shash, 1998), (Chung 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 general contractors for selection of suitable subcontractors.

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 4.8: 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:

Table 4.8: Rank and RII of factors related to the Organization Structure

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	

From Table 4.8, 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 general 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), (Chung 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 general contractors for selection of suitable subcontractors.

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 4.9 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:

Table 4.9: Rank and RII of factors related to the Participation in Tendering Stage

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	

From Table 4.9, 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 general 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.

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 4.10 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.

Table 4.10: Rank and RII of factors related to the Contractual Relation

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	

From Table 4.10, 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 general 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 general contractors for selection of suitable subcontractors.

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 4.11 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:

Table 4.11: Rank and RII of factors related to the Financial Strength

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	

From Table 4.11, 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 general 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

(Chung et al 2003) emphasized that "Financial strength of subcontractor" is an important factor that must be used by general contractors for selection of suitable subcontractors.

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 4.12 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:

Table 4.12: Rank and RII of factors related to the Past Experience

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	

From Table 4.12, 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 general 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), (Chung 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.

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.

4.7 Hypotheses Testing

4.7.1 Hypotheses related to Main Contractor

Hypothesis 1: H0: There are no significant differences in the opinions of main contractors according to classification category of the company, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$ To test the hypothesis, the one way ANOVA test was used. The results illustrated in Table 4.37 show that the p-value is greater than 0.05 and the value of F test is less than the value of critical value which is equal 3.17, so the null hypothesis can't be rejected (H0 is accepted), which means that there are no significant differences in the opinions of main contractors according to classification category of the company, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$.

Table 4.37: One way ANOVA test for differences in opinions of main contractors according to classification category

Field		Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
Factors used by general contractors for selection of suitable Sub Contractors	Between Groups	0.10019	2	0.050195	0.539	0.579
	Within Groups	4.980436	54	0.09223		
	Total	5.080626	56	0.090725		
Factors leading to the contractorsubcontractor interface problems	Between Groups	0.14601	2	0.073005	0.849	0.428
	Within Groups	4.62199	54	0.085592		
	Total	4.768	56	0.085142		

The critical value of F at df "2.54" and significance level 0.05 equal 3.17

1) **Hypothesis 2** contractors according to years of experience of the company, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$

To test the hypothesis, the one way ANOVA test was used. The result illustrated in Table 4.38 show that the p-value is greater than 0.05 and the value of F test is less than the value of critical value which is equal 2.78, so the null hypothesis can't be rejected (H0 is accepted), which means that there are no significant differences in the opinions of main contractors according to years of experience of the company, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$.

Table 4.38: One way ANOVA test for differences in opinions of main contractors according to years of experience of the company

Field		**Sum of Squares**	**df**	**Mean Square**	**F value**	**Sig.(P-Value)**
Factors used by general contractors for selection of suitable Sub Contractors	Between Groups	0.148893	3	0.049631	0.533	0.661
	Within Groups	4.931806	53	0.093053		
	Total	5.080699	56			

The critical value of F at df "3,53" and significance level 0.05 equal 2.78

2) **Hypothesis 3** contractors according the position of the person filling the questionnaire, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$

To test the hypothesis, the one way ANOVA test was used. The result illustrated in table 4.39 show that the p-value is greater than 0.05 and the value of F test is less than the value of critical value which is equal 2.78, so the null hypothesis can't be rejected (H0 is accepted), which means that there are no significant differences in the opinions of main contractors according to the position of the person filling the questionnaire, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$.

Table 4.39: One way ANOVA test for differences in opinions of main contractors according to the position of the person filling the questionnaire

Field		Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
Factors used by general contractors for selection of suitable Sub Contractors	Between Groups	0.186736	3	0.062245	0.674	0.572
	Within Groups	4.893963	53	0.092339		
	Total	5.080699	56			

The critical value of F at df "3,53" and significance level 0.05 equal 2.78

3) **Hypothesis 4** contractors according to the years of experience of the person filling the questionnaire, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$

To test the hypothesis, the one way ANOVA test was used. The result illustrated in Table 4.40 show that the p-value is greater than 0.05 and the value of F test is less than the value of critical value which is equal 2.78, so the null hypothesis can't be rejected (H0 is accepted), which means that there are no significant differences in the opinions of main contractors according to the years of experience of the person filling the questionnaire, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$.

Table 4.40: One way ANOVA test for differences in opinions of main contractors according to the years of experience of the person filling the questionnaire

Field		**Sum of Squares**	**df**	**Mean Square**	**F value**	**Sig.(P-Value)**
Factors used by general contractors for selection of suitable subcontractors	Between Groups	0.579041	3	0.193014	2.272	0.091
	Within Groups	4.501658	53	0.084937		
	Total	5.080699	56			

The critical value of F at df "3,53" and significance level 0.05 equal 3.37

4.7.2 Hypotheses related to Subcontractor

1) **Hypothesis 5:** H0: There are no significant differences in the opinions of subcontractors according to the specialty of the person filling the questionnaire, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$

To test the hypothesis, the one way ANOVA test was used. The result illustrated in Table 4.41 show that the p-value is greater than 0.05 and the value of F test is less than the value of critical value which is equal 2.09, so the null hypothesis can't be rejected (H0 is accepted), which means that there are no significant differences in the

opinions of subcontractors according to the specialty of the person filling the questionnaire, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$.

Table 4.41: One way ANOVA test for differences in opinions of subcontractors according to the specialty of the person filling the questionnaire

Field		Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
Factors used by general contractors for selection of suitable subcontractors	Between Groups	1.247639	9	0.138627	0.806	0.613
	Within Groups	8.080501	47	0.171926		
	Total	9.32814	56			

Critical value of F at df "9, 47" and significance level 0.05 equal 2.09

2) **Hypothesis 6:** H0: There are no significant differences in the opinions of subcontractors according to the years of experience of the person filling the questionnaire, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$

To test the hypothesis, the one way ANOVA test was used. The result illustrated in Table 4.41 show that the p-value is greater than 0.05 and the value of F test is less than the value of critical value which is equal 3.17, so the null hypothesis can't be rejected (H0 is accepted), which means that there are no significant differences in the opinions of subcontractors according to the years of experience of the person filling the questionnaire, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$.

Table 4.42: One way ANOVA test for differences in opinions of subcontractors according to the years of experience of the person filling the questionnaire

Field		Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
Factors used by general contractors for selection of suitable subcontractors	Between Groups	0.472379	2	0.23619	1.440	0.246
	Within Groups	8.855761	54	0.163996		
	Total	9.32814	56			

Critical value of F at df "2, 54" and significance level 0.05 equal 3.17

3) **Hypothesis 7:** H0: There are no significant differences in the opinions of subcontractors according to the staff number of the person filling the questionnaire, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$

To test the hypothesis, the one way ANOVA test was used. The result illustrated in Table 4.41 show that the p-value is greater than 0.05 and the value of F test is less than the value of critical value which is equal 2.78, so the null hypothesis can't be rejected

(H0 is accepted), which means that there are no significant differences in the opinions of subcontractors according to the staff number of the person filling the questionnaire, regarding the factors used for selection of suitable subcontractors and factors causing interface problems at significance level $\alpha = 0.05$.

Table 4.43: One way ANOVA test for differences in opinions of subcontractors according to the staff number of the person filling the questionnaire

Field		Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
Factors used by general contractors for selection of suitable subcontractors	Between Groups	0.423889	3	0.141296	0.841	0.477
	Within Groups	8.904251	53	0.168005		
	Total	9.32814	56			

Critical value of F at df "3,53" and significance level 0.05 equal 2.78

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter includes the conclusions and recommendations that would help in improving relationship between contractors and subcontractors. The objective of this study was to identify and categorize the most common factors used by general contractors in the selection of suitable subcontractors in Nairobi Area.

5.2 Conclusions

Table 5.1 shows the rank of the most important ten factors used by general contractors in the selection of suitable subcontractors in Nairobi Area according to the point of view of contractors, subcontractors and both of them.

Rank	Both contractors and subcontractors	Contractors	Subcontractors
1	Adherence of the subcontractor to subcontract requirements	Adherence of the subcontractor to subcontract requirements	Adherence of the subcontractor to subcontract requirements
2	Adherence of the subcontractor to the time schedule	Commitment to the provided prices after awarding	Reputation of the subcontractor
3	Commitment to the provided prices after awarding	Adherence of the subcontractor to the time schedule	Adherence of the subcontractor to the time schedule. Commitment to quality standards.
4	Reputation of the subcontractor	Existence of sufficient equipment and machinery	Labor monitoring mechanism
5	Specialty in certain type of work. Commitment to do remedial works.	Ability to provide the necessary equipment	Commitment to the provided prices after awarding
6	Commitment to quality standards	Commitment to do remedial works	Specialty in certain type of work
7	Existence of sufficient equipment and machinery	Implementing similar previous projects. Specialty in certain type of work.	Commitment to do remedial works
8	Labor monitoring mechanism	Reputation of the subcontractor	Existence of sufficient equipment and machinery
9	Ability to provide the necessary equipment	Willingness to discuss with main contractor before construction	Material and equipment monitoring mechanism
10	Number of qualified craftsmen and laborers	Regular and effective communication with main contractor	Ability to supply sufficient materials

Table 5.1: Most important ten factors used for selection of subcontractors

5.3. Recommendations to Contractors

The main Contractors are recommended to consider the skills and past experience of the subcontractor are the factor to be considered during their selection. The main contractor should also consider the capabilities and reputation of the subcontractor to make certain that the subcontractor selected is capable of completing the work and achieve the best quality. The main contractors are also advised to supervise the subcontractor's works each day and solve any problems instantly.

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 alsorecommended 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 thefuture 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.

5.4 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 Nairobi area, 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 Nairobi and Kenya as a whole.

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