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إدارة التشييد

Development of a multi-criteria awarding system for construction contractors in Gaza strip

إعداد نظام متعدد المعايير في ترسية العطاءات على مقاولي التشييد في قطاع غزة

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والله ولي التوفيق ،،،

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بسم الله الرحمن الرحيم

﴿وَأَنزَلَ اللَّهُ عَلَيْكَ الْكِتَابَ وَالْحِكْمَةَ وَعَلَّمَكَ مَا لَمْ تَكُن تَعْلَمُ

وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا﴾

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صدق الله العظيم

DEDICATION

To my mother, my sister and brothers, my wife and my children, for their unlimited

and

generous support

To all of my colleagues for their help support

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ABSTRACT

Selection of the best contractor to implement a project on time, within a reasonable price and with an acceptable level of quality is a key factor for the project success.

Generally, contractor failure can only be seen after the contractor has failed to perform on the project.

This research has been conducted through literature review of the topics related to contractor selection process, followed by a field survey. Fifty seven managers, experts, and engineers were asked to fill a questionnaire that covers topics related to the selection of contractors and to the awarding methods practiced in Gaza Strip. Three case studies about projects awarded to the lowest bid price were analyzed and their impacts on the project implementation were explored .

This research aims to investigate the current practice of the contractors selection methods and the awarding system for the construction projects, specifically the lowest bid method. The criteria used in the evaluation and selection of contractors were explored and identified in details from many countries.

The results of this study guide to determinate 10 main criteria for contractor's selection and suitable for the local construction sector , the results also guide to the identification of 38 sub criteria, the weights and impact of this factors on the contractor selection were also defined.

The results indicated that the financial evaluation of the bid has been ranked in the first position with weight equal 40.10%, the remaining 9 classes are all related to technical criteria with a total weight of 59.90%.

The finding of this study indicated that 65% of the local implementing agencies and owners in Gaza strip agreed to use a multi criteria awarding system, while 35% of them still prefer to use the low bid price method for contractors selection.

The results, also, indicated the existence of many problems in the local construction sectors, the dominant part of respondents (90%) confirmed that the current awarding method i.e. "the lowest bid price" is considered one of the major problems of the construction sector .

A new selection and awarding method is proposed. This method considers multi-criteria for the selection of contractor which cover : financial, technical, managerial, and safety factors, in addition to the past performance of the contractor . The contractor classification method presented in this research should be considered as preliminary and subject to further modification and developments.

The results of this study recommended that there is a need to develop and modify the current low-bid awarding system and to set up a new awarding system that set a balance between technical and financial criteria. Necessary actions are needed from local concerned authorities to adopt this new system by legislative changes

ملخص البحث

إن اختيار المقاول الأفضل بغرض تنفيذ المشروع ضمن الفترة المحددة وبسعر مناسب وكذلك بمستوى مقبول من جودة العمل هو بالتأكيد المفتاح الأساسي لنجاح المشروع، ولكن عادة ما يتبين فشل المقاول في التنفيذ في مرحلة متأخرة من المشروع وبالتالي يكون ذلك مكلفا لجميع أطراف المشروع ويحتاج لوقت طويل للتصحيح، مما يجعل الحل الأنسب لهذه " المشكلة " إن صح التعبير هو الحذر المبكر وذلك عبر اختيار المقاول الأفضل منذ البداية.

اعتمد البحث على مراجعة الدراسات السابقة في المواضيع المتعلقة باختيار المقاولين وإحالة العطاء عليهم، يتبع ذلك بحث ميداني حيث تم التوجه إلى 57 شخصاً من المدراء و الخبراء والمهندسين من أصحاب العلاقة المباشرة باختيار المقاولين في قطاع غزة، كما تم إنجاز 3 حالات دراسية عن مشاريع تم إحالتها على أقل الأسعار واستعراض أثر ذلك على سير العمل في هذه المشاريع.

تم إنجاز هذا البحث بغرض التعرف على الطرق المختلفة في اختيار المقاولين وإحالة العطاء عليهم بما فيها نظام الإحالة على أقل الأسعار. تم استعراض ودراسة الأسس و العوامل المستخدمة في تقييم و اختيار المقاولين في العديد من الدول عبر العالم

من مخرجات الدراسة التوصل إلى تحديد عدد 10 عوامل رئيسية مناسبة لواقعنا المحلي ومن ثم تم تجزئتها إلى 38 عامل فرعي كما تم تحديد أوزان ودرجة الأهمية لكل منها وتحديد اثر كل عامل من هذه العوامل على عملية التقييم والاختيار.

توصلت الرسالة إلى أن العامل المالي قد حصل على 40.10% من درجات التقييم وباقي العوامل التسعة الأخرى هي عوامل فنية وحصلت على 59.90% مما يؤكد أهمية العوامل الفنية في عملية تقييم المقاولين.

من النتائج التي توصل إليها البحث أن 65% من المؤسسات المحلية والجهات المالكة وافقت على اعتماد نظام متعدد المعايير في اختيار المقاول ، فيما لازال 35% منهم يفضل نظام الإحالة على أقل الأسعار المقدمة.

أظهرت نتائج الدراسة وجود العديد من المشاكل في قطاع الإنشاءات وقد قرر 90% من المشاركين في البحث الميداني بان نظام إحالة العطاءات المستخدم حاليا أي بمعنى أخر إن نظام الإحالة على اقل الأسعار هو من ابرز مشاكل قطاع الإنشاءات المحلي.

المخرج الرئيسي لهذا البحث هو اقتراح نظام إحالة يعتمد على عوامل متعددة في اختيار المقاولين تغطي الجوانب المالية، الفنية، الإدارية ، وكذلك السجلات السابقة لأداء المقاول، مع العلم أن هذا النظام المقترح يعتبر فكرة أولية وبحاجة للتطوير.

إن أهم التوصيات التي قدمها هذا البحث هي ضرورة إعداد نظام جديد لإحالة العطاء على المقاولين في قطاع غزة بحيث يوازن بين العوامل الفنية والعوامل المالية وكذلك ضرورة توفير الغطاء القانوني الذي يساعد على تطبيق هذا النظام.

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LIST OF ABBREVIATIONS

ABV	Average Bid Value
AHP	Analytical Hierachy Process
CA	Cluster Analysis
CSP	contractor selection process
DMs	Decision Makers
DoB	degree of belief
ER	Evidential Reasoning
FT	Fuzzy Set
JCP	Job Creation Program
LCB	Local Competitive Bidding
KFW	Kerditanstalt Fur Wiederaufdau
MAA	Multi Attribute Analysis
MAUT	Multi Attribute Utilities Techniques
MCDM	Multi-Criteria Decision Models
MDA	Multivariate Discriminant Analysis
MDB	Main distribution boards
MOG	Municipality of Gaza
MOH	Ministry of Health
MR	Multiple Regression
NGOs	Non- Governmental Organizations
PCU	Palestinian Contractors Union
PECDAR	Palestinian Economic Council for Construction and Development
PERT	Program Evaluation and Review Technique
PMU	Project Management Unit
PSC	Project-Specific Criteria
UNRWA	United Nation Relief and Works Agency for Palestinian Refugees
USAID	United State Aide for International Development

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CHAPTER 1: INTRODUCTION

The purpose of this chapter is to introduce the research contained. The concept of contractors selection is briefly discussed. The statement of the problem and the purpose of this research are outlined.

1.1 Background

The local procurement in general , and particularly in the Gaza strip, suffers from myriad problems. The aggressive competition and low prices may be considered as the main causes of these problems. The construction industry and awarding authorities, have begun to explore ways to improve the process of selecting general contractors. It is important for the concerning authorities or agencies to improve the lowest bid award contracting method by considering other factors in the evaluation process, other than the lowest bid.

Competitive bidding, where the project is awarded to the lowest bidder, is a basic part of the construction industry. This method of project delivery is designed to promote healthy competition in an attempt to ensure the lowest price for the project. While private owners may chose to award contracts in any way, many public agencies are required by law to award the project to the lowest bidder, (Moore 1985).

Public construction procurement, the process by which contractors are chosen for public construction projects, has traditionally been based on selecting the lowest bidder. This process, although designed with good intentions, has several shortcomings. Public construction procurement based on the lowest price reflects values regarding public administration held by the society such as transparency, fairness, ease of contract administration (efficiency), and competitive bidding. Public funds require a degree of openness to allow as many bidders as possible to both "fairly" distribute public monies and also to create a competitive environment where the public receives a good product for the money spent. In addition, construction procurement has historically been based on sealed bidding where the lowest responsible bidder is awarded the contract. This has simplified the awarding process and helped to protect agencies from bid protests in the courts.

The lowest bidder method has created a number of problems. Rules designed to protect the public from corruption have made it difficult for innovation in selecting construction delivery systems. The low bid process makes selection based exclusively on price, not on qualitative factors such as past performance or construction schedule, these non-price factors might allow awarding authorities to screen out the minority of contractors that have a poor track record with clients and reward those contractors that produce excellent products or who have an exemplary record of professionalism during the construction process (Runde and Sunayama 1999).

1.2 Research problem

A ‘good ’ contractor is expected to complete a project on time, within budgeted cost, and to the client ’s desired level of quality. Unfortunately, this is not always the case. A number of earlier research and case studies have highlighted that clients ' total satisfaction (comprising time, cost and quality performance measures) is difficult to achieve (Ward et al 1991; Kometa et al 1995; Chinyio et al 1998; Soetanto et al 1999).

Despite this situation, the search for suitable procurement routes to try and improve clients “overall” levels of satisfaction have constantly attracted much attention, from both industry and the academic world (Skitmore and Marsden; 1988 ; Chinyio et al 1998; Latham 1994; Egan 1998).

Bidding or bid submission, for construction contracts is the important step in the construction industry and for the construction company. This first step to be taken in order to be awarded the contract is the participation in a competitive bid (Murphy et al 2001).

Evaluating contractors and selecting the best bidders requires a sophisticated knowledge and experience to ensure that selected contractor is capable of executing the project according to owner's requirement (Alsugair 1999).

The selection of contractors often encounters problems, such as the selection of inappropriate contractors, difficulty in the management of contractor and out-of control of quality, time, budget, and safety. (Holt et al. 1994).

Due to lowest bid contracts award, the following problems have arise in the last few years (Jesen and Donald, 2001):-

1- Low profit margins in high-risk industry.
2- Reduction of trained craftspeople in the subcontracting area.
3- Performance issues.
4- Dispute issues.

The competitive bidding process in Gaza Strip is the toughest of its kind in the construction industry than in other sectors. It is more closely a pure competition. The most dominant way of awarding contracts in Gaza strip is the lowest bid method.

1.3 Research objectives

The aim of this research is to study various methods of contractors selection and contracts awarding , as well as to investigate the impact of choosing contractors, based solely on the lowest bid price, on the local construction industry in Gaza Strip, and to propose a new multi-criteria selection system that consider technical factors in addition to the financial factors.

This will be achieved through investigating the local contracts awarding practices to determine the current procedures and to investigate the affects associated with the lowest bid award on project implementation.

To achieve the study goal , it can be divided into the following objectives :

1. To review the different methods of contractors selection and contract awarding systems .
2. To investigate the contractor selection criteria and to identify a suitable criteria which can be used in Gaza strip
3. To identify the importance of these selection criteria through assigning weights to all criteria, and evaluate the impact of every criteria to the contractor's selection
4. To study the impact of the low-bid system on the project implementation through investigating a practical case studies, about construction projects that have been awarded to local contractors in Gaza Strip, using this bidding system .
5. To develop and propose a multi-criteria awarding system for contractors selection in Gaza Strip.

1.4 Scope

The principal scope of this research is to develop an approach for selection criteria to be used in evaluation and awarding of contracting bids. This approach will focus in considering other factors in addition to the contractors' prices.

1.5 Methodology

The research goal is achieved through the following stages :

Stage 1 : Literature review

To review relevant literature in order to identify the major topics related to the selection of contractors in the construction sector and develop a thorough understanding of previous work in this field. The output of this stage is the basis for preparing the questionnaire used in the next stage .

Stage 2 : The main study

This stage will be structured into three sub stages as follows:

- ◊ **The Pilot study:**

The literature review will be followed by a pilot study which will take the form of structured interview(s) with experts in the filed of biddings and awarding who have commissioned and experienced the awarding process in governmental and non governmental agencies in Gaza Strip. An interview questionnaire will be used for this pilot study in order to evaluate the appropriateness of the main study questionnaire.

- ◊ **Field survey work:**

The pilot study should prepare the ground for designing the main study questionnaire. It is intended to adopt the quantitative data collection approach.

Survey of the local practice of awarding system in Gaza Strip will be made. A questionnaire will be conducted and analyzed as well as interviewing contractor's managers and owner's representatives. Statistical analysis for questionnaires will be done by using Statistical Package for the Social Science (SPSS).

◊ **Case studies:**

It is also intended to conduct **case studies** on previous construction projects in building and infrastructure sectors that were awarded to the lowest price bids by governmental and non governmental agencies, to study the impact of their awarding decision on project implementation.

Stage 3: Development of multi-criteria system for contractors awarding process

In this stage, using the information collected in the previous stages, a 'multi- criteria awarding system' for the selection of contractors in Gaza Strip will be developed that goes beyond the traditional minimum bid price. This system will be verified using some sample projects awarded to the lowest price and collect information about the other bids to determine the "best" bid based on the proposed selection method.

1.6 Organization of the research

This thesis consists of six chapters as follow :

Chapter 1 present a general introduction to the subject matter of the thesis

Chapter 2 present a literature review for topics related to contractors selection and to innovative awarding methods.

In chapter 3, the questionnaire design, pilot study, and method of analysis are presented

Chapter 4 present the results achieved , their analysis & discussion.

Chapter 5 presents the results of "three case studies" for previous construction projects that were awarded to the lowest bid price. Problems encountered in this cases are outlined and discussed in detail

Chapter 6 presents conclusions and recommendations for further studies.

CHAPTER 2: LITERATURE REVIEW

The objective of this chapter is to briefly describe the contractor selection methods used by public sector institutions in different countries. The criteria used in contractors selection process are elaborated , then the awarding systems are described in brief , this can help to draw some conclusions about which of these methods would seem most likely to be used by awarding authorities in Gaza strip.

2.1 Construction Procurement

Public construction procurement, the process by which contractors are chosen for public construction projects, has traditionally been based on selecting the lowest bidder. This process, although designed with good intentions, has several shortcomings. The construction industry and awarding authorities (those who commission and award projects), have begun to explore ways to improve the process of selecting general contractors (Runde and Sunayama 1999).

Awarding a contract is the approach an owner follows to choose a contractor that provide works under specific criteria. A project can be procured using different procurement methods ranging from single source: direct hiring, negotiation, restrictive bid, to open competition procurement (Beard et al. 2001).

An owner may select a contractor through competitive bidding, such as the lowest-bidder system and the non-lowest-bidder system. Procurement type is a critical decision because it defines the method to select the key player in the project, which is the construction firm that is expected to deliver the project. This decision greatly impacts the performance because if the construction firm is not qualified to achieve the project goals, serious problems may arise during and after construction (Runde and Sunayama 1999).

2.2 Review of selection methods

The review of the existing literature indicates that numerous studies have developed selection methods to help in procuring the appropriate contractor. Different systems with evaluation criteria have been developed to assist owners during the contractor selection process. The main advantages of these methods and evaluation systems is that they provide

a systematic and objective procurement approach that takes into consideration numerous factors other than the price of the bid.

There are three main concepts are generated for selection of contractor "cost, time, and quality". So the selection of contractor is the most difficult decision taken by the client, because the inappropriateness of the selected contractor leads to substandard work, delays, disputes, or even bankruptcy. Using a multi-criteria approach for evaluating contractors with respect to their economic and technological aspects, quality standards, past performance, and other tangible and intangible characteristics may help solving this problem (Skitmore 1999).

Hatush and Skitmore (1997) found that all clients use a `similar' set of criteria for contractor selection, but that the way clients quantify these criteria can be very different in practice. In these previous works, a contractor's bid amount appears to be the most dominant and important criterion (Holt et al., 1993, 1994; Hatush and Skitmore, 1997).

The following four weaknesses were found in contractor selection practice: (i) lack of a universal approach, (ii) long-term confidence attributed to results of prequalification, (iii) reliance on tender sum in decision making and (iv) inherent subjectivity of the process (Holt et al., 1993, 1995). Holt et al. (1994) classified the contractor selection process into three stages: (i) prequalification, (ii) contractor evaluation and (iii) final selection. For each stage, three types of scores were proposed (P1, P2 and P3, respectively). P1 scores represent the general organizational attributes of a contractor and also provide insight of specific contractor weakness. A Multiattribute Analysis (MAA) technique was used to combine P2 scores (representing the scores of project-specific criteria) and P3 scores (representing bid amount) into a simple index. This index was determined by assigning a 40% weighting to the P2 scores and a 60% weighting to the P3 scores (sensitivity analysis revealed these percentages to the best discriminate among contractors).

Holt et al. (1995) provided example application of Multiattribute Analysis to the evaluation of construction bidders. They developed a method to evaluate contractor prequalification criteria and provided guidelines for practitioners, highlighting areas to address when evaluating a contractor based on a particular criterion. Holt et al. (1996) applied cluster

analysis as a means of reducing a large number of potential bidders, to identify only those suitable to tender for a particular project .

Hatush and Skitmore (1997) applied Program Evaluation and Review Technique (PERT) to assess and evaluate contractor data against client goals (time, cost and quality). Hatush and Skitmore (1998) used Multi Attribute Utilities Techniques (MAUT) to select the best contractor based on a mixture of qualitative and quantitative criteria. In a recent study, Holt (1998) reviewed the use of different Contractor Selection Process (CSP) methods and the following were identified as having been applied in this context: bespoke approaches, MAA, MAUT, cluster analysis, multiple regression, fuzzy set theory and multivariate discriminate analysis.

However, choosing a contractor based solely on the lowest bid price is one of the major causes of project delivery problems. One of disadvantages of using the lowest bid as a principal discriminating criterion is that some contractors (e.g. facing a shortage of work) may enter unrealistically low bid prices, simply to try and maintain cash flow. Therefore, as Hatush and Skitmore (1997) indicated, financial and technical criteria must be considered in order to assess the potential of contractors finishing projects on time; and to assess whether contractors have the necessary resources to complete any contract awarded to them .

Recently, a number of innovative approaches have been put forward designed to achieve the selection of "good " contractors (Holt 1998). Some of these methods have aimed to provide a quantitative indication of contractors ' potential cost or quality performance using univariate or multivariate statistical methods. For example, the prediction of contractors ' cost/time (combined)performance was attempted by Herbsman (1995). Others have used multivariate statistical methods i.e. one or more dependent variables and several independent variables (Tam and Harris 1996; Chinyio et al 1998).

In a univariate selection method, emphasis is placed on the investigation of a contractor's particular ability; such as the prediction of cost, time or quality performance. Almost every previous study in this field has cited different performance assessment methods as being the "most effective" for selection of a "good" contractor (Ellis and Herbsman 1990; Herbsman 1995). However, some of these methods (in concentrating on one contractor

performance attribute) have led to the neglect of assessment of potential performance in other aspects. For instance, the evaluation of contractors managerial capabilities, technical expertise, and health and safety performance are all perfectly viable alternative assessment criteria . This has subsequently been widely recognized by industry practitioners and has led to further research using various approaches for achieving multi-criteria contractor evaluation (Holt 1998).

Contractors' capabilities to deliver a project on time, within budget and satisfactorily complying with requirements are not highly considered during the contractor selection process. Although the reasoning behind the competitive approach is to allow free market competition, this competitive approach sometimes leads to the acceptance of the lowest cost, non-competent contractor. Consequently, several owners have shifted towards the use of different procurement methods. Non-compliance with schedule is also noticed in some cases of cost-based selection. Public owners mostly use the competitive approach because it offers a more structured justified methodology. According to Kumaraswamy 1996, "the right choice of construction contractor is crucial to project success". It is noting that the shift towards procurement methods that do not only rely on cost as a basis for evaluation emerged from the increasing risks contractors had to assume due to the changing delivery methods systems. Consequently, a growing trend was to list several criteria, in addition to cost, to evaluate a certain contractor. A common issue is the decreasing emphasis on the cost criteria and growing emphasis on "value for money" approach, in addition to technical and past experience capabilities. In view of the selection systems deficiencies, several authors have suggested means to improve processes. Standardization of the selection systems should take place based on previous projects experience, while taking into consideration priorities that are specific to future projects. If implemented, standardization processes will enable construction organizations to be more flexible and coping with change, a characteristic especially for local contractors considering moving to the international level (Kumaraswamy 1996).

Others have recommended that the selection should be composed of a two-step approach: prequalification and tenders evaluation. The first stage should emphasize more on the contractor's organization capabilities such as past experience and financial health, while the second stage should evaluate more those contractor's competencies that enable him to

qualify for project-specific criteria such proposed construction method or previous expertise (Holt 1998).

In order to overcome the disadvantage of the single criterion bidding system, a number of authors such as Herbsman and Ellis , and Nguyen have developed another kind of bidding systems based on multiple attributes. The key idea of this kind of systems is that the selection process of the contractors is based on more attributes, such as bid price or cost, time, quality, managerial safety accountability, competence, and efficiency of contractors (Herbsman and Ellis, 1992; Nguyen, 1985).

Tarawneh (2004), conducted a study on contractor prequalification for public and private project through qualitative interviews with owners, directors and senior managers of major client organizations in Jordan. The findings of his work indicated that public and private clients have different views about the importance and priorities of the prequalification criteria, However, the size and experience of clients' organizations were assured when preparing the sample. The sample involves thirty respondents from major clients' organizations in Jordan. From the thirty clients twenty two are public clients and eight are privates clients. The smaller number of private clients is because of the small size of the construction market of the private sector in Jordan and the whole construction market is dominant by the public sector.

Aitah (1998) studied the bid awarding system used in Saudi Arabia. He evaluated public building construction projects, and concluded that the projects awarded to the lowest bidder have lower performance quality and schedule delays as compared to the projects which were awarded based on specific prequalification criteria.

Russel (1992) analyzed contractor failure in the US and recommended that an owner should have two means of avoiding or minimize the impact of contractor failure :

1. Analyzing the contractor qualification prior to contract award; and
2. Monitoring the contractor's performance after contract award.

Al-Ghobali (1994) surveyed the Saudi construction market and listed a number of factors against which contractors should be considered for prequalification. This included experience, financial stability, past performance, current workload, management staff,

manpower resources availability, contractor organization, familiarity with the project's geographic location, project management capabilities, quality assurance and control, previous failure to complete a contract, equipment resources, purchase expertise and material handling, safety consciousness, claim attitude, planning/ scheduling and cost control, and equipment repairing and maintenance yard facilities.

The researchers El-Sawalhi , Eaton, and Rustom (2007) considered that the pre-qualification criteria is an indirect measures of likely performance of contractors in meeting project objectives. For the pre-qualification process to be logically complete, the effect of the criteria on the predominant project objectives needs to be known.

The main and sub criteria were tested by the researchers via an e-mail questionnaire to reach consensus on which pre-qualification criteria are suitable to be adopted within the Gaza Strip and West Bank (GSWB). An explanation for each sub criteria specific meaning and the developed measurement scale was explained. Contractors in the GSWB are not allowed to participate in public construction projects unless they are pre-qualified by the National Committee of Contractors Classification (NCCC) . The result of the supports the idea that there is a strong relationship between the best contractor selection and the success of the projects. In other words, the client who selects the good contractor to execute his project would have to expect that his objectives in getting the project completed within time, cost and adequate quality level is made possible. This relationship seems to be indirect and non-linear (El-Sawalhi et al., 2007).

One of the most important features of any procurement process is the selection of the 'best' contractor to execute a project. This selection is based on evaluating an extensive array of contractor criteria. Each pre-qualification criterion is a different measure of a specific contractors potential to complete a project. Each of these criteria has a relative importance (weight) to others in deciding the overall contractor's ability. The standing list of criteria was identified and is illustrated by El-Sawalhi et al in Table 2.4

2.3 The selection methods

Some of the selection methods used in different countries during the past years are presented as follows:

2.3.1 Analytical Hierarchy Process (AHP)

The Analytical Hierarchy Process (AHP) is a decision-aiding method developed by Saaty. It aims at quantifying relative priorities for a given set of alternatives on a ratio scale, based on the judgment of the decision-maker, and stresses the importance of the intuitive judgments of a decision-maker as well as the consistency of the comparison of alternatives in the decision-making process (Saaty 1990). Since a decision-maker bases judgments on knowledge and experience, then makes decisions accordingly, the AHP approach agrees well with the behavior of a decision-maker. The strength of this approach is that it organizes tangible and intangible factors in a systematic way, and provides a structured yet relatively simple solution to the decision- making problems (Skibniewski 1992). In addition, by breaking a problem down in a logical fashion from the large, descending in gradual steps, to the smaller and smaller, one is able to connect, through simple paired comparison judgments, the small to the large (Saaty 1991).

2.3.2 Dimensional weighting method

In the dimensional weighting method , the choice selection criteria and their weights are dependent on the owner. All contractors are ranked on the basis of the criteria. A contractor's total score is calculated by summing their ranks multiplied by the weight of the respective criteria. Then, contractors are ranked on the basis of their total scores, and this rank order of the contractors is used for prequalification. The problem with this method is deciding the weight of the respective criteria, something for which the AHP does provide a methodology (Russel and Skibniewski 1988).

2.3.3 Two- step prequalification method

The two-step prequalification method is a modification of the dimensional weighting method. In the first step, screening of contractors is done on preliminary factors. They must get through this step to be eligible for the second phase of prequalification. In the

second step, the dimensional weighting technique is used for more specialized factors. This method is useful for quick removal of ineligible candidates (Holt at el 1994).

2.3.4 Dimension –wide strategy method

In dimension-wide strategy method a list of the most important prequalification criteria is developed in descending order depending on how important the criteria is. Contractors are then evaluated on these factors. If a candidate fails to meet any of the criteria, the candidate is removed from the prequalification process. The method continues until contractors are measured on all criteria (Russel and Skibniewski 1988).

2.3.5 Prequalification formula method

The prequalification formula method pre-qualify contractors on the basis of a formula that calculates the maximum capability of a contractor. The maximum capability is defined as the maximum amount of uncompleted work in progress that the contractor can have at any one time. In this method, the contractor's prequalification is dependent on the contractors maximum capability, current uncompleted work and the size of the project under consideration. If the difference between the contractor's capability and current uncompleted work is less than the project works, then the contractor is removed from the bidding process (Russel and Skibniewski 1988) .

2.3.6 The Evidential Reasoning (ER) approach

The Evidential Reasoning (ER) approach integrates both quantitative and qualitative hierarchal to solve the contractor selection problem (CSP). It compensates the fact that the owner may be presented with incomplete data and mitigates the risk factor associated inherent in the selection process (Sonmez et al. 2001). The evidential reasoning (ER) approach was developed on the basis of decision theory and uses the Dempster-Shafer theory of evidence. ER has increasingly been used in a diverse range of areas ranging from engineering, management, to safety and has been applied to different Multi-Criteria Decision Models (MCDM) problems . The ER approach uses the concept of `degree of belief (DoB)' as a preference elicitation tool. The DoB can be described as the degree of expectation that an alternative will yield an anticipated outcome on a particular criterion (The Dempster-Shafer theory uses a number between 0 and 1 to indicate the degree of belief that a body of evidence provides for a proposition). An individual's DoB depends on their knowledge of the subject and their experience. The use of the DoB can be justified by

the fact that human decision making involves ambiguity, uncertainty and imprecision. That is, individuals can convey judgments in probabilistic terms with the help of their knowledge and real life experience. Probability has long been used to deal with uncertainty and risk in decision problems (Sonmez and yang 2001).

Decision problems are usually structured in a hierarchical order . In the first level, the goal of the problem is stated. In the second level, there are several criteria, each of which has a different contribution to measuring, and helping achieve the overall goal. Then, some of these criteria may be broken down into further sub-criteria. The process (i.e. disaggregating main criteria into sub-criteria, and then sub-criteria into sub, sub-criteria) continues up to the point where DMs are able to make practical assessments (on these lower level criteria). Once the subdivision of criteria is complete, DMs evaluate each alternative based on the lowest level criteria. In order to find out how well an alternative performs across all criteria, the lowest level criteria assessments need to be first transformed to their relevant upper levels and ultimately, to the top-level goal. This requires an appropriate MCDM method. The ER approach is such a method that cannot only combine both qualitative and quantitative assessments, but can also handle uncertain and imprecise information or data (Yang 2001).

Implementation of the ER approach :

The ER approach can be described as a hierarchical evaluation process in which all decision criteria are aggregated into one (i.e. the goal of the problem). As the ER algorithm has previously been well-explained (Yang and Sen, 1994, Yang, 2001), the ER process is briefly described here in a stepwise manner :

1. Display a decision problem in a hierarchical structure;
2. Assign weights to each (main) problem criterion and also to their sub-criteria (if any);
3. Choose a method for assessing a criterion either quantitatively or qualitatively;
4. Transform assessments between a main criterion and its associated sub-criteria if they are assessed using different methods (i.e. quantitative and qualitative);
5. Evaluate each alternative based on the lowest (i.e. bottom) level criteria in the hierarchical structure;

6. Quantify qualitative assessments at the top level if necessary and determine an aggregated value for each alternative;
7. Rank alternatives based on this aggregated value and (normally) choose the highest rank.

2.3.7 Multivariate Discriminant Analysis (MDA) approach

Wong and Holt in 2003 developed a model for classifying contractors' performance into 'good' and 'poor' groups. Further, the research derived a set of most predominant Project-Specific Criteria (PSC), which best discriminate contractor performance into good and poor groups.

The research was based on a thorough critique of the literature on contractor selection, a set of 34 PSC and 68 historical data (case-studies), Multivariate Discriminant Analysis (MDA) was applied in this study. MDA is unique, in the sense that a quantitative model (i.e. a linear combination function) is developed to combine the most significant discriminant (independent) factors (i.e. PSC) for classifying contractor potential. The PSC were used as predictive variables; being combined into a linear function to classify (previously unknown) contractors into good and poor groupings. Those PSC in the linear function confirm the most powerful discriminating factors among all of those studied, for separating the cases into one of the stated classes using these multivariate measures.

The advantages of applying MDA in this context may be summarized as:

- It is a multivariate technique that can consider the entire profile (i.e. levels of measurement) of different types of variable (i.e. ratio, interval and nominal data)
- It takes into consideration multi-co linearity (close interrelationships) between independent variables, which can negatively affect most other multivariate analysis methods
- It is a straightforward function, in the sense that the derived final discriminant factors' profile is statistically significant for determining the relative contribution of each variable to the total discriminating power.

2.3.8 Cluster Analysis, (CA)

The nature of the problem under consideration in this method involves a theoretically infinite range (set) of contractors, albeit this will be a function of tendering arrangement employed. The principal task therefore, is one of reducing this original set into a series of smaller, manageable sub-sets of like character. By analyzing these sub-sets, the quality (i.e. attributes) of contractors therein may be observed and the best subset(s) identified for subsequent tender invitation if prequalification is being performed. Alternatively, the characteristics of sub-set membership would help in assigning contractors to standing lists (e.g. specific work types or, project sizes). Fundamental benefits of a CA approach are threefold :

1. Application of a limited number of previously identified controlling criteria to the entire original set, rationalizes the evaluation process but facilitates effective investigation ;
2. This negates the possibility of rejecting 'good' contractors at an early stage in the procedure. Achieving this minimizes owner resource commitment i.e. maximum yield on the cost of information collection and processing; and hence, maximum potential for achieving client satisfaction from selecting the best alternative(s).

The method takes a given number of contractors, each being described by a set of numerical attribute scores and, uses a classification algorithm to group the contractors into a number of clusters such that contractors within classes are similar and unlike those from other clusters. Two particular types of CA are suitable: jointing-tree clustering and k-means clustering.

If jointing-tree clustering is firstly applied to the original set, it establishes the most significant number of clusters inherent within it. That is, amongst the pooled contractor data, we assume no priori hypothesis with regard to number of sub-groups. The output of this initial analysis is a tree diagram known as a dendrogram. The x axis exhibits each contractor in a class by itself. As we progress upwards, the threshold regarding when to declare two or more contractors as being similar are relaxed, so more and more contractors are clustered until finally in the uppermost part of the dendrogram, all contractors are linked together (Holt1996).

2.3.9 Multiple Regression (MR)

MR is a statistical technique whereby an equation is constructed to observe and ultimately predict the effect of several independent variables upon a dependent variable. That is, an MR equation will predict a numeric outcome (designated Y*) this being a function of several independent variables Vl, Vz... Vi. For a given scenario j; represented by several dimensions; Vjj there will be an actual outcome; Y. It is from the statistical analysis of several of these scenarios from which an MR equation may be constructed. Clearly, any difference between predicted (Y*) and actual, may be formalized as Y*- Y; such difference(s) being termed residuals.

Obviously, there are essential 'musts' in respect of contractors desirous to tender, such as adequate insurance; adequate bonding capacity and financial stability. Hence, using the above MR approach then prequalification might follow the route.

Further, were contractors' past performance measures (time, cost, quality) each quantified and used as dependent variables (i.e. regressed upon separately) then three MR equations would result; with potential to predict future contractor performance in respect of each of these superlative owner objectives (Holt1998).

2.3.10 Fuzzy Set (FT)

Fuzzy sets and fuzzy logic have been used in process and system fuzzy-control, and also to decision making. And also to project selection, the financial analysis of projects, generic project control using fuzzy-control systems, project time control, and project risk analysis. Nguyen (1985), for instance, applied fuzzy sets to contractor's bid assessment. Muralidharan et al (2002) cite the work of Li et al (1997), also using fuzzy sets for supplier rating. There are several authors working in the application of fuzzy-control techniques to decision making in the selection of contractors, using more or less adequate sets of selection criteria (Russel and Skibniewski, 1988; Pack et al, 1992; Rankin et al, 1996).

When the owner’s project management maturity increases, he / she normally tends to use a more complete set of selection criteria, since he / she realizes that the cheapest bid is not normally the most economical alternative. Using fuzzy controllers in this field can allow to manage different criteria in an effective way. When the client uses a wide set of selection criteria, the main problem is that the number of rules grows exponentially with the increase in the number of criteria, reaching the order of hundreds of rules. Additionally, the client could need a controller including various “policies”: a “policy” is each of the different modes of work that the decision support system will have; for instance, this systems should

run in different ways depending on the priority objective for the owner : cost, time, and quality (Wang 1995).

Table 2.1 summarized the selection methods presented in this section:

Table 2. 1: Summary of selection methods

SN	Method of contractor's Selection	Principal Characteristics
1	The analytical hierarchy process (AHP) (Ref:Saaty1990)	A decision aiding method developed by Saaty. This approach organizes tangible and intangible factors in a systematic way by breaking a problem down in a logical fashion and provides a structured solution to the decision –making problems.
2	Dimensional weighting method (Russel and Skibniewski 1988)	In this method, contractors are ranked on the basis of the selection criteria, a contractor's total score is calculated by summing their ranks multiplied by the weight of the respective criteria. Then, contractors are ranked on the basis of their total scores.
3	Two- step prequalification method) (Holt at el 1994)	This method is a modification of the dimensional weighting method. In the first step, screening of contractors is done. They must get through this step to be eligible for the second phase of prequalification. In the second step, the dimensional weighting technique is used for more specialized factors.
4	Dimension –wide strategy method (Russel and Skibniewski 1988)	In this method a list of the most important prequalification criteria is developed in descending order, contractors are then evaluated on these factors. If a candidate fails to meet any of the criteria, the candidate is removed from the prequalification process. The method continues until contractors are measured on all criteria .
5	Prequalification formula	This method prequalifies contractors on the basis of a

SN	Method of contractor's Selection	Principal Characteristics
	method (Russel and Skibniewski 1988)	formula that calculates the maximum capability of a contractor. The contractor's prequalification is dependent on the contractors maximum capability, current uncompleted work and the size of the project under consideration. If the difference between the contractor's capability and current uncompleted work is less than the project works, then the contractor is removed from the bidding.
6	The Evidential Reasoning approach (ER) (Sonmez at el 2001)	The Evidential Reasoning (ER) approach integrates both quantitative and qualitative hierarchally to solve the contractor selection problem. ER has increasingly been used in a diverse range of areas ranging from engineering, management, to safety .Decision problems are usually structured in a hierarchical order .
7	Multivariate Discriminant Analysis (MDA) approach (Wong and Holt 2003)	This method was developed by Wong and Holt in 2003 for classifying contractors' performance into 'good' and 'poor' groups. Further, the research derived a set of most predominant PSC (project-specific criteria) , which best discriminate contractor performance into good and poor groups.
8	Cluster Analysis, (CA)) (Holt 1996)	This method involves a theoretically infinite range (set) of contractors. The principal task therefore, is one of reducing this original set into a series of smaller, manageable sub-sets of like character. By analyzing these sub-sets, the quality of contractors therein may be observed and the best subset(s) identified for subsequent tender invitation if prequalification is being performed.

SN	Method of contractor's Selection	Principal Characteristics
9	Multiple Regression (MR) (Holt 1998)	MR is a statistical technique whereby an equation is constructed to observe and ultimately predict the effect of several independent variables upon a dependent variable. Frequently the MR is an evidence of academic usage .
10	Fuzzy Set (FT) (Ref :wang 1995)	Fuzzy sets and fuzzy logic have been used in decision making, and also to project selection, using more or less adequate sets of selection criteria . Fuzzy Set is an evidence of academic usage .

2.4 Approaches to contractor selection

Criteria evaluation systems are very important in the contractor selection process. They offer an objective approach to evaluate a prospective contractor and eliminate any subjective measures. This is particularly important for public agencies, especially those who are shifting from the cost-based selection to other procurement methods. Originally, several public and governmental agencies, which use public funding, were bound to report to localities the basis on which a contract was awarded. In this case, a biding by the lowest cost criteria was efficient in eliminating any doubts regarding corruption. A major advantage of models and criteria evaluation systems is that they can easily provide justification why a particular contractor was eliminated during the selection process (Mahdi et al. 2002; Fong et al. 2000).

Another important aspect is that they allow different factors to be incorporated together to evaluate a contractor. Rather than only considering the cost of the project to the owner, other factors like contractor past experience, technical capabilities, conformity to the project requirements and several other measures can be all considered simultaneously. Furthermore, those selection systems eliminate the need to rely on the owner's level of

experience and knowledge. Even though an owner may possess the skill to select the contractor, the approach will still tend to be unmethodical, which renders it questionable. Following a systematic procedure greatly improved the evaluation process and consequently, the potential success of the project is more likely to materialize (Mahdi et al.2002; Alhazmi and McCaffer 2000).

Evaluating contractors and selecting the best bidders requires a sophisticated knowledge and experience to ensure that selected contractor is capable of executing the project according to owner's requirement (Alsugair 1999).

The aim of the prequalification process is to ensure that clients obtain a number of competitive, reasonable and easy to evaluate bids submitted by equally suitable and experienced contractors. Therefore, contractor's ability to perform a project prior the bidding process is evaluated during this process. This evaluation process allows clients and their consultants to select contractors based on the contractors' performance and reputation of delivering quality service. Qualifying and selection of a capable and adequate contractor is essential for satisfying clients via completing their projects successfully. The major objective of this prequalification is to obtain the clients perception on the priority and importance of the prequalification criteria obtained in the previous exploratory research conducted with a number of major contractors organization. It seems to be a clear need for this type of research to bridge the gap in the knowledge about the priority and importance of the prequalification criteria employed by client to qualify contractors (Tarawneh 2004).

Prequalification of contractors aims at the elimination of incompetent contractors from the bidding process. Prequalification can aid the public and private owner in achieving successful and efficient use of their funds by ensuring that it is a qualified contractor who will construct the project. Furthermore, because of the skill, capability and efficiency of a contractor, completion of a project within the estimated cost and time is more probable (Al Harbi 2001).

2.5 Criteria used for the selection process

All procurers have the same goals. All want a project more or less at a reasonable cost, to a reasonable quality, within a reasonable time and with reasonable security (Masterman, 1994, Curtis et al., 1991). The tendering system aims to achieve this goal by ensuring the simultaneous selection of an appropriate contractor to deliver the project, the mechanism for delivery, the price to pay and the legal framework. The only difference then between procurers is in the strategic choice of subsystems components. It is expected therefore that the criteria involved will be consistent across all procurers, with only the emphasis changing between procurers and projects according to the strategies employed (Russell and Skibniewski, 1988).

The use of these multiple criteria to derive a suitable procurement method will assist the client in identifying their principal goals and objectives. The difficulty of implementing the criterion is selecting the relative weights of each criterion. One person may emphasis the speed of delivery as the most important criterion, while another may emphasis cost certainty for any given project. Therefore, priority rankings for each criterion may contain the bias of the individual responsible for the ranking. This can lead to the selection criteria being bias toward a particular procurement method.

Prequalification is a screening process applied to contractors before tendering to reduce the risk of project failure most prequalification methods use some form of a weighted scoring system where the contractors are scored according to weighted criteria that are finally summed to produce a single value . All Prequalification systems have the same basic steps: develop the criteria, gather contractor data, verify data, apply contractor data to criteria, and decide withier to prequalify the contractor . The existing Prequalification models employ frameworks that vary from simple weighted scoring systems to complex mathematical formulation (Russell and skibniewski 1988)

Selection and bid evaluation procedures are currently used in many countries, and involve many different types of criterion to evaluate the overall suitability of contractors.

The review of the literature revealed the existence of various contractors' selection criteria :

1. Financial stability, managerial capability and organizational strength, technical expertise and experience of comparable construction (Merna and Smith, 1990);
2. Relevance of experience, size of firm and safety record (Moselhi and Martinelli 1990).

To this Dennis (1993) adds the criterion of previous prequalification. A review of prequalification records, he maintains, should satisfy both the engineer and the client, in that each bidder should have:

1. The financial strength to sustain the cash flows likely to arise during the project; experience of projects of a similar nature;
2. Competence and plant capacity to complete the project within the constraints imposed by the contract;
3. Technical capability (including human resources) sufficient to satisfy the requirements of the contract;
4. A complete understanding of similar project scopes and ability to absorb subsequent changes;
5. The facilities (testing, quality control, etc.) necessary to endorse assurance of quality;
6. The ability to comply in all respects with health and safety regulations.

It is necessary to collect and analyze information in order to quantify objectively the criteria for prequalification and bid evaluation. This information includes criteria that relating to :

1. The contractor's permanent place of business;
2. Adequacy of plant and equipment to do the work properly and expeditiously;
3. Suitability of financial capability to meet obligations required by the work;
4. Appropriateness of technical ability and experience;
5. Performance of work of the same general type and on a scale not less than 50% of the amount of the proposed contract;
6. The frequency of previous failures to perform contracts properly or fail to complete them on time;
7. The current position of the contractor to perform the contract well;
8. The contractor's relationship with subcontractors, or employees.

The following tables and figures illustrate a groups of main criteria and their sub criteria used for contractors selection and evaluation, these criteria were developed by many researchers in many countries:

Figure2.1 shows the 6 main criteria and 24 sub criteria developed by Hatush and Skitmore (1998) in their study, the figure indicated the importance of both criteria and sub criteria (criteria weights). Moreover, Holt (1994) proposes 5 main criteria and 21 sub criteria for the contractor prequalification in addition to their weights, as presented in Figure 2.2.

Tarawneh (2004), conducted a study on contractor prequalification for public and private project in Jordan, the output of his study is the classification of 31 criteria for contractors evaluation and prequalification with their weights and ranks, as illustrated in Table 2.2.

Alsugair (1999), developed an innovative method to select contractors in Arabia Saudi, this method identify, in addition to the criteria weights, the impact of each factor (sub-criteria) on the evaluation decision , the factor impact in this study was measured through different levels positively or negatively, finally, the score of each factor can be calculated with a defined formula related to the factor weight and to the factor impact as presented in details in Table 2.3 .

El-Sawalhi , D. Eaton, and. Rustom (2007), proposed a prequalification system based on priority weights for pre-qualification criteria used for standing list of contractors in Gaza strip and West bank . This selection is based on evaluating an extensive array of contractor criteria. Each pre-qualification criterion is a different measure of a specific contractors potential to complete a project. Each of these criteria has a relative importance (weight) to others in deciding the overall contractor's ability. Seven main criteria and thirty one sub-criteria were identified when deciding the contractor pre-qualification, these criteria were then used to establish the required weights. The contractors will be rated according to their performance to establish a standing list of contractors. Within each category, the lowest total overrun of time, cost and quality contractor will be considered the best and the contractors will be ranked accordingly as illustrated in Table 2.4..

Level 1 (GOAL)	Level 2 (MAIN CRITERIA)	Level 3 (SUB-CRITERIA)
Select the best bidder	Bid amount (0.55)	Advance payment (0.05)
		Capital bid (0.75)
		Routine maintenance (0.1)
		Major repairs (0.1)
	Financial Soundness (0.15)	Financial stability (0.3)
		Credit rating (0.2)
		Bank arrangements (0.15)
		Financial status (0.35)
	Technical Ability (0.1)	Experience (0.2)
		Plant and equipment (0.45)
		Personnel (0.3)
		Ability (0.05)
	Management Capability (0.1)	Past performance (0.4)
		Management organization (0.2)
		Exp. of tech. personnel (0.2)
		Management Knowledge (0.2)
	Health and safety records (0.05)	Safety (0.2)
		EMR (0.3)
		OSHA (0.3)
		Mngl safety accountability (0.2)
	Reputation (0.05)	Past failures (0.3)
		Length of time in business (0.1)
		Client – contractor relations (0.4)
		Other relations (0.2)

Figure 2.1: Hierarchical display of the CSP and the relative importance of criteria and sub criteria – Source : Hatush and Skitmore (1998)

(GOAL)	(MAIN CRITERIA)	(SUB-CRITERIA)
PREQUALIFICATION	Contractor's Organization (0.15)	Age (0.17)
		Size (0.15)
		Image (0.14)
		Quality Control Policy (0.18)
		Health & Safety Policy (0.19)
		Litigation Tendency (0.17)
	Financial Considerations (0.2)	Ratio Analysis Accounts (0.24)
		Bank Reference (0.26
		Credit Reference (0.24)
		Turnover History (0.26)
	Management Resources (0.22)	Qualification of Owners (0.24)
		Quality of Key Persons (0.23)
		Years with Company (0.25)
		Formal Training Regime (0.28)
	Past Experience (0.24)	Type of Projects Completed (0.32)
		Size of Projects Completed (0.36)
		National /local Experience (0.32)
	Past Performance (0.19)	Failure of a Contract (0.29)
		Overruns: time (0.22)
		Overruns: cost (0.25)
		Actual Quality Achieved (0.24)

Figure 2.2: Hierarchical display of prequalification of construction contractors problem – source: Holt et al. 1994

Table 2.2: Prequalification criteria identified by Tarawneh (2004)

Pre–qualification criteria	Total weight	Average	RII	Rank
Contractors' willingness to offer reasonable and competitive price to do the job after being qualified	138	4.60	0.92	1
Contractors' strength and financial arrangements	136	4.53	0.90	2
Contractors' previous track record and past experience in similar projects	134	4.46	0.89	3
Contractors' ability to provide high quality recommendation from satisfied clients	125	4.16	0.88	4
Contractors' competence and knowledge to do the job	131	4.36	0.87	5
Contractors' managerial capability and supervisory staff competence for the project	129	4.30	0.86	6
Contractor' ability to select competent sub-contractors from a list provided by the client	127	4.23	0.84	7
Contractors' ability to provide detailed programmed to execute the project	126	4.20	0.84	8
Contractors effectiveness and attitude to work with the client as a team	123	4.10	0.82	9
Contractors' size in relation to project size	123	4.10	0.82	9
Availability of the contractors suitable equipments	122	4.06	0.81	11
Contractors' ability to provide clear information which is easy to understand	117	3.90	0.78	12
Contractors' ability to handle the safety requirements	115	3.83	0.76	13
Contractors ability to foresee construction problems and to provide creative solutions	115	3.83	0.76	13
Contractors' ability to convey confidence and trust	113	3.76	0.75	15
Contractors' individual experience and competence	112	3.73	0.74	16
Contractors' proposal in terms of creativity and attention in details	111	3.70	0.74	17
Contractors' current work load and obligations	109	3.63	0.72	18
Clients' previous satisfactory experience with the same contractor	108	3.60	0.72	19
Contractors' individual qualification and quality in terms of attitude in dealing with the client	108	3.60	0.72	19
Contractors' ability to have regular meetings with the client	107	3.56	0.71	21
Contractors' reputation in the construction market	103	3.43	0.68	22
Contractors' interest to concentrate on the project to understand the clients business requirements	101	3.36	0.67	23
Contractors attitude to allocate and manage the project risk	100	3.33	0.66	24
Contractors' managerial communication skills	99	3.30	0.66	25
Contractors' quality assurance and control procedure in place	97	3.23	0.64	26
Contractors' long term relationship with competent sub-contractors	94	3.13	0.62	27
Contractors' specific environmental policy	91	3.03	0.60	28
Contractors' quality in dealing with the consultants	84	2.80	0.56	29
The courtesy of the contractors' employees - with the client	80	2.66	0.53	30
Contractors' convement location	73	2.43	0.48	31

Table 2.3: Classes and Factors weights and their impact to contractors selection developed by Alsugair (1999)

Class (1)	Factor (2)	Factor impact (%) (3)	Factor Weight (%) (4)	Question Type (5)	User Answer		Factor score (%) (8)
					Yes (6)	No (7)	
A: Financial evaluation	1. Lowest bid	66	3	2	X		1.98
	2. Unbalanced bid	-66	9	10		X	0
	3.Arithmetic mistakes	-33	0.75	10		X	0
	4. Financial reservation	-66	2.25	10		X	0
B: Bid understanding	1. Aware of bid document	-66	6.5	7	X		0
	2. Explain ambiguous item	-33	1.5	7		X	-0.5
	3. Response ambiguous	-66	1.5	10		X	0
	4. Solicit classified info	-66	0.5	10		X	0
C: Project location	1. Site condition	100	1.2	2	X		1.2
	2. Site location	33	0.8	2	X		0.264
D: Contractor qualification	1. Capability in accomplish	66	3	2	X		1.98
	2. Neglecting duties.	-100	0.5	10		X	0
	3. Unqualified subs	-100	0.75	10		X	0
	4. Few national manpower	-33	0.25	10	X		-0.08
	5. Recent technology	66	0.5	2	X		0.33
	6. Technical reservation	0	0	6		X	0
E: Completion bid document	1. Zakah clearance	0	0	6	X		0
	2. Required bond	-100	1.05	7	X		0
	3. Financial capability	-66	1.5	7	X		0
	4. Shortage contract offer	-100	0.3	10		X	0
	5. Unsealed pages	-66	0.15	10		X	0
F: Experience and reputation	1. Classification	-100	8.75	10		X	0
	2. Contractor's capital	-33	7	10		X	0
	3. Commitment keeping	66	8.75	2		X	0
	4. Cooperative solve. Prob.	66	7	2	X		4.62
	5. Exec. Add items free	66	3.5	2	X		2.31
G: Organization of contractor(s)	1. Inferior joint venture	-66	5	10		X	0
	2. Great % of subs.	-66	5	10		X	0
H: Alterative offer	1. Split project	33	2.25	2		X	0
	2. Better quality	100	3.75	2	X		3.75
	3. Economical way	66	2.25	2	X		1.49
	4. Shorter period with pmt.	66	2.25	2	X		1.49
	5. Shorter period, no pmt	100	2.25	2		x	0
	6. Cheaper bid with adv, pmt.	66	2.25	2	X		1.49
I: Foreign companies	1. Respect regulations	100	2.5	2	x		2.5
	2. Government routine	-33	2.5	10		x	0
Evaluation score	--	--	--	--	--	--	**22.82**

Table 2.4 : priority weights for pre-qualification criteria for standing list developed by Sawalhi , Eaton, and Rustom (2007)

Criteria		Main criteria weight (1)	Sub-criteria weight (2)	Total criteria weight (3)	Adjusted weight % (4)
Financial stability	Credit rating	0.25	0.23	0.0575	5.8
	Turnover	0.25	0.15	0.0375	3.7
	Bank arrangement	0.25	0.16	0.0400	4.0
	Liquidity	0.25	0.22	0.0550	5.5
	Debit ratio	0.25	0.08	0.0200	2.0
	Profitability	0.25	0.16	0.0400	4.0
Management and technical ability	Company organization	0.20	0.14	0.0280	2.8
	Experience of staff	0.20	0.18	0.0360	3.6
	Qualification of key staff	0.20	0.18	0.0360	3.6
	Management capability	0.20	0.18	0.0360	3.62.2
	Past Performance	0.20	0.11	0.0220	2.6
	Quality performance	0.20	0.13	0.0260	1.6
	Innovative method	0.20	0.08	0.0160	5.3
Experience	Size of project	0.19	0.28	0.0532	2.1
	Type of project	0.19	0.27	0.0513	3.2
	Number of projects	0.19	0.17	0.0323	2.7
	Length of time in business	0.19	0.14	0.0266	2.7
	Experience in the region	0.19	0.14	0.0266	4.0
Historical non-performance	Company image	0.12	0.33	0.0396	1.8
	Record of failure	0.12	0.15	0.0180	1.6
	Claims & Litigation	0.12	0.13	0.0156	1.6
	Client satisfaction	0.12	0.17	0.0204	2.0
	Skilled manpower	0.12	0.22	0.0264	2.6
Resources	Equipment	0.09	0.57	0.0558	5.1
	Number of staff	0.09	0.43	0.0387	3.9
Quality	Quality control	0.11	0.41	0.0451	4.5
	Quality Policy	0.11	0.25	0.0275	2.8
	Quality assurance	0.11	0.34	0.0374	3.7
Health and safety	Safety performance	0.05	0.49	0.0245	2.5
	Accountability	0.05	0.27	0.0135	1.3
	Injury & illness	0.05	0.24	0.0120	1.2

The assessment of contractors who have previously pre-qualified can, of course, be assisted by reference to previous prequalification records.

In total, the information used for the assessment of criteria falls into five groups:

Group 1 : General information (used mainly for administrative purposes),

Group 2 : Financial information,

Group 3 : Technical information,

Group 4 : Managerial information, and

Group 5 : Safety information.

2.6 Evaluation of Post qualification Criteria

A winning bidder must be qualified to acceptably carry out the contract. Therefore, it must be determined whether the bidder offering the lowest evaluated bid is so qualified, if bidders were pre- qualified prior to bidding, then an uncomplicated check should be made to determine that the lowest evaluated bidder still satisfies the qualifying requirements specified for prequalification.

If no prequalification was done, then it must be determined that the lowest evaluated bidder has the relevant previous experience, and financial, technical and production capability and capacity to perform the contract. This must be based on the qualifying criteria specified in the bidding documents. The Post-qualification shall verify, validate and ascertain whether the bidder with the lowest calculated bid complies with and is responsive to all the requirements for eligibility and of the bidding, using the non-discretionary "pass/fail" criteria stated in the Invitation to apply for eligibility and to bid and in the instructions to bidders (www.nadb.org).

These criteria shall consider, but shall not be limited to, the following measures:

1-Legality of documents

2- Evaluation of technical capacity

3- Evaluation of financial capability

If the bidder passes in all criteria, he shall be considered post-qualified and the concerned office/agency/corporation shall award the contract to him. If on the other hand, the bidder fails in any of the criteria, he shall be considered post disqualified and the concerned agency shall carry out the same Post-qualification process on the bidder with the second lowest calculated bid (www.nadb.org).

2.7 " Bid-Awarding" Systems

However, not every country around the world is using the lower bidder system. Several countries have developed the non-lower bidder systems to overcome the disadvantages in which the successful bidder is not the lowest one. The philosophy behind this concept is that the best bid is the most reasonable one, not the lowest one, not the highest one, but the one closest to some average (Herbsman and Ellis, 1992) .

One of the most frequently used procedures for selecting contractors is competitive bidding, where the lowest bidder is awarded the contract. To be sure, there are some modifications to this single objective decision–making procedure based on lowest bid price. For instance, in France, bid prices that one considered abnormally low by the project owner are excluded. Some countries such as Italy, Portugal , Peru, and Korea the highest and the lowest bid prices are excluded, the closest bid price to the average of the remaining ones is then selected (Topcu 2003).

This a reviews of some different bid-awarding systems applicable worldwide :

2.7.1 Lowest Bidder

In many countries, the competitive bid process is undertaken with the view to discerning the lowest reasonable bid from a range of bids. In some places, the root of this method can be traced back to the 19th century. For example, the State of New York has been using this method for the last 150 years (Herbsman and Ellis 1992). The major advantage of this method is that, in most cases, it ensures public interest in obtaining suitable quality at the most reasonable price feasible. Another advantage of this method is that it compels contractors to continually work at reducing their costs through adopting new technological and managerial techniques.

The system encourages efficiency and innovation by contractor , which (hopefully) results in a completed project of specified quality at the lowest possible price .However, competitive bidding sometimes leads to the selection of incompetent contractors, excessive claims by a contractor against an owner, disputes and litigation between parties, bid shopping, and other problems (Clough 1994).

There are two types of competitive bidding, open and closed. In open bidding , all contractors use the same proposal form that is provided with the biding documents, and the

bids are opened publicly to exclude accusations of favoritism. In closed bidding, no prescribed proposal form is used, and there is no public opening of bids. It is important to understand that not every country uses this system in the public-words sector. Many nations use a non-lowest-bidder system. France and Portugal try to disqualify what they believe are abnormally low bids. They define abnormally low as "any bid whose price appears abnormally low and consequently may cause implementation problems (Ellis and Herbsman1991).

2.7.2 Nearest to the Average of All Bids Received

Through this system, which is used in some European countries (Clough 1994), an owner tries to avoid low bidders who have not studied the contract carefully or do not have enough experience, and also avoids overestimated bids. However, the owner might not have enough information about the degree and type of experience of the successful bidder.

In this system, once the owner has received all offers, he or she performs a simple mathematical calculation to find the Average Bid Value (**ABV**): all of the participants' offers are summed and divided by the total number of bids received.

ABV = (SUM of offers / number of bids).

To award the contracts, the owner looks for the nearest offer to **ABV** and selects this bid.

2.7.3 Limited by Average Bids and the Owner's Estimate

In the system discussed previously, all bids received are summed, and the summation is divided by the number of bids received to get the **ABV(** Average Bid Value**)**. In this system, owners also use their own resources and experience to estimate the project cost

To award the bid, the owner reviews all of the participating offers and looks for the offer nearest to the average bid value but which, at the same time, does not exceed the estimated cost : **Owner's estimate > Offer of successful bidder** < or = **ABV**

The offer that satisfies these two requirements is the successful bid.

This is different from the previous system, because the successful bid is between the owner's estimate and the average bid. This method may give an owner some indication of the seriousness of the offer and of the contractor's understanding of the project documents. Another similar practice is "bracket-ing" or considering only bids that are within a certain range above and below within a certain range above and below the engineer's estimate. In this system, the lowest responsive bid within the range gets the award (Clough 1994).

2.7.4 The Danish System

This system, developed in Europe and known as the Danish system (Purshottam 1980), is a simple formula to select the most reasonable offer from the competitive bids received. It rejects the two extreme offers (highest and lowest); a new highest and lowest offer, and consequently a New Average (**NA**), thus exist. The remaining offers are considered in relation to the New Highest offer **(NH).** The New Lowest offer (**NL**) and the Average (**A**) of all of the offers are calculated. The new average (**NA**), which helps in selecting the successful bidder, is calculated as follows:

$$NA = (NL + 4A + NH) / 6$$

The offer that is ranked first above this new average is than treated as realistic and acceptable.

2.7.5 The German System

In Germany, bidding and tendering are regulated by tow books of norms produced by the **Deutsches Institut** : **DIN 1960** (General Rules for Bidding and Tendering) and **DIN 1961** (Rules for Contracting Construction Work). The principles of these rules are as follows:

Under normal circumstances, contracting should be done in separate contracts with each specialized firm (the construction firm or mason, the firm building the façade, windows, and doors, and firms specialized in plumbing, electrical work, central heating and air conditioning).The contracting should be specified item-by-item. Contracting by lump sum for public authorities (even in smaller packages) is strictly forbidden. The rules of DIN 1960 and DIN1961 are not binding for private contracting, yet in the vast majority of cases involving private contracting, these rules are applied, and in a specific chapter of the contract are declared as a binding part of the contract.

Bidding and tendering are, in general, open processes. The project will be announced publicly (throughout the European Union for larger projects).The public authority or private owner supplies the bidders with the necessary detailed plans and specifications, so the bidding is based on identical construction and the alternative must be calculated, and the alternative one submitted, with complete construction details. In normal cases, the contract has to be given to the most economical bidder. This means that the life-cycle cost of later maintenance has to be considered. It also means that the lowest bidder does not always get the contract.

In order to evaluate proposals and to judge reasonable prices, most public authorities computerize their contracting results. The agency thus obtains an overview of the current average pricing, section-by-section and item-by-item. If the bidder goes far below such price averages, he/she will be scrutinized closely about reliability financial backing, and economic potential. If there is any doubt in such a case, the bidder with the price closest to the average of the previous contract will probably be awarded the contract (DIN1960 and DIN1961).

2.7.6 A Negotiated Offer

When an owner negotiates a contract with a pre-selected contractor or group of contractors, the competitive process is eliminated entirely, and the contractor is chosen on the basis of reputation and overall qualifications to do the job. The forms of such contracts are almost limitless because they could include provisions that are best suited to the particular work involved and which are agreeable to both parties.

Negotiated contracts are normally limited to privately financed work because competitive bidding is a legal requirement for most public projects except under extraordinary or unusual application of negotiated contracts across the board in the private sector. This can only be interpreted as a sign that owners are increasingly finding that such arrangements are in their best interest (Clough, 1994)

The table 2.5 summarized the Awarding Systems presented in this section:

Table2.5 : Summary of awarding systems

SN	Awarding System	Principal Characteristics
1	lowest bidder	The major advantage of this method is that, in most cases, it ensures public interest in obtaining suitable quality at the most reasonable price feasible. This system select the lowest reasonable bid from a range of bids.
2	Nearest to the average of all bids received	In this system, once the owner has received all offers, he or she performs a simple mathematical calculation to find the average bid value (**ABV**): all of the participants' offers are summed and divided by the total number of bids received. To award the contracts, the owner looks for the nearest offer to **ABV** and selects this bid.
3	Limited by average bids and the owner's estimate	To award the bid, the owner reviews all of the participating offers and looks for the offer nearest to the average bid value but which, at the same time, does not exceed the estimated cost
4	The danish system	This system is a simple formula to select the most reasonable offer from the competitive bids received. It rejects the two extreme offers (highest and lowest). The offer that is ranked first above the "new calculated average" is than treated as realistic and acceptable.
5	The German system	In normal cases, the contract has to be given to the most economical bidder. This means that the life-cycle cost of later maintenance has to be considered. It also means that the lowest bidder does not always get the contract.
6	A negotiated offer	The contractor is chosen on the basis of reputation and overall qualifications to do the job . The competitive process is eliminated entirely in this system.. Frequently this system is limited to privately financed work

2.8 The Bid Awarding System In Gaza-Strip

The owners and implementing agencies in Gaza strip performed their bidding process more or less through similar or comparable steps, the investigation about the process used in many implementing agencies, donors, and local public institutes such as : PECDAR, UNDP, KFW, MEHE, MOH, USAID, MOLG, MOG, UNRWA, MOPWH, and others organization lead to the following finding :

1. All bidders are informed through at least one public announcements in the local newspaper, or through a private invitation in the case of limited bidding.
2. At least three classified contractors in the required class are invited to submit their bids.
3. The classification of the Palestinian Contractors Union (PCU) is required and acceptable to all agencies and owners , but some organization required additional registration (such as UNRWA), periodic qualification (such as UNDP), or pre- qualification (such as USAID and MOG) .
4. The time between invitation and bid submission is variable from 2weeks to 1 month. The date and time of opening are fixed in the advertisement and in the tender documents.
5. The offers are opened on the date announced by the envelope-opening committee. The offers are usually publicly read. All bidders that have submitted bids and their representatives shall be permitted to be present at the opening of bids.
6. All offers must be checked by the bids opening committee. A record of bid opening, identifying all the bids received, the bid prices including alternative bids if any, and the presence or absence of the requisite bid security, read out at the public opening of bids, and should be formally prepared. All discounts offered, modifications, and withdrawals should also be recorded. All members of the bid opening committee or persons responsible for bid opening should sign the record of the bid opening.
7. All offers must be evaluated by the bids evaluation committee, and then awards the contract to the lowest bidder who satisfies the contract conditions and specifications, however, this is the most frequently awarding decision unless the offer is so low that there is concern that the project will not be completed, so the second lowest bid can be selected.

8. The lowest evaluated substantially responsive bid shall be determined in accordance with the provisions of the bidding documents. As the final step, the implementing agency should always ensure that the bidder whose bid has been evaluated as the lowest evaluated substantially responsive bid has the financial and technical capability to execute the contract satisfactorily. If this is determined as positive, the contract shall be awarded to the bidder which submitted the lowest evaluated substantially responsive bid.
9. The evaluation committee may negotiate with the lowest bidder if the price is higher than the market price, in order to achieve a price deduction. But some donors regulation didn't authorized owners to negotiate the winner contractor on their financial offers.

Most of the implementing agencies owners or donors in Gaza strip are frequently assumed to use the low bid price method in bid awarding and it's rarely awarded to the second lowest price or using other alternative ways in the process of selecting contractors and awarding bids on them. According to the views got from the representatives of these institutes, awarding bids through using this way is related to different reasons differ from one institute to another and the most important justifications are:

1. Transparency guarantee in the "lowest bid price" awarding method.
2. This method is experienced before and easy to implement
3. This method is covered by law and official regulations
4. The donors' conditions to use this way and specially by the world Bank.
5. The desire of the owners to get suitable and reasonable prices.
6. Some clients perform prequalification to the contractors participating in bids, so awarding in this way is suitable according to them.
7. The owner hesitate in using alternative awarding ways because they need qualified evaluation committees with good past experience and it's not available.
8. Ignorance of the new alternative awarding methods by the most of owners staff.

CHAPTER 3: RESEARCH METHODOLOGY

This chapter introduces/presents the methodology used in this research. It provides information about the research strategy and design, , population, sample size and the pilot study of the research questionnaire. In addition, the limitations of the research survey, questionnaire validity and data analysis are presented.

3.1 Research Study

The first phase of the research included a summary about the comprehensive literature review in order to support the survey methodology. Literature on the criteria used in contractors selection process and awarding systems were reviewed . The second phase of the research focused on developing the questionnaire. This questionnaire was used to collect the required data in order to achieve the research objectives.

The third phase of the research was a pilot study. Experts, consultants and owner's engineers were contacted. The purpose of the pilot study is to prove that the questionnaire questions are clear to be answered in a way that help to achieve the target of the questionnaire. In addition, it was important to ensure that all the information received from the respondents would be useful in achieving the research objectives, the questionnaire was modified based on the results of the pilot study.

The fourth phase of the research was data collection. Fifty seven questionnaires were distributed to the research population but only fifty three were received. The fifth phase of the research was the case study, three case studies about local construction contracts awarded to the lowest price was analyzed and discussed.

The sixth phase of the research was data analysis. Statistical software (SPSS) was used to perform the required analysis. The final phase includes the conclusions and recommendations.

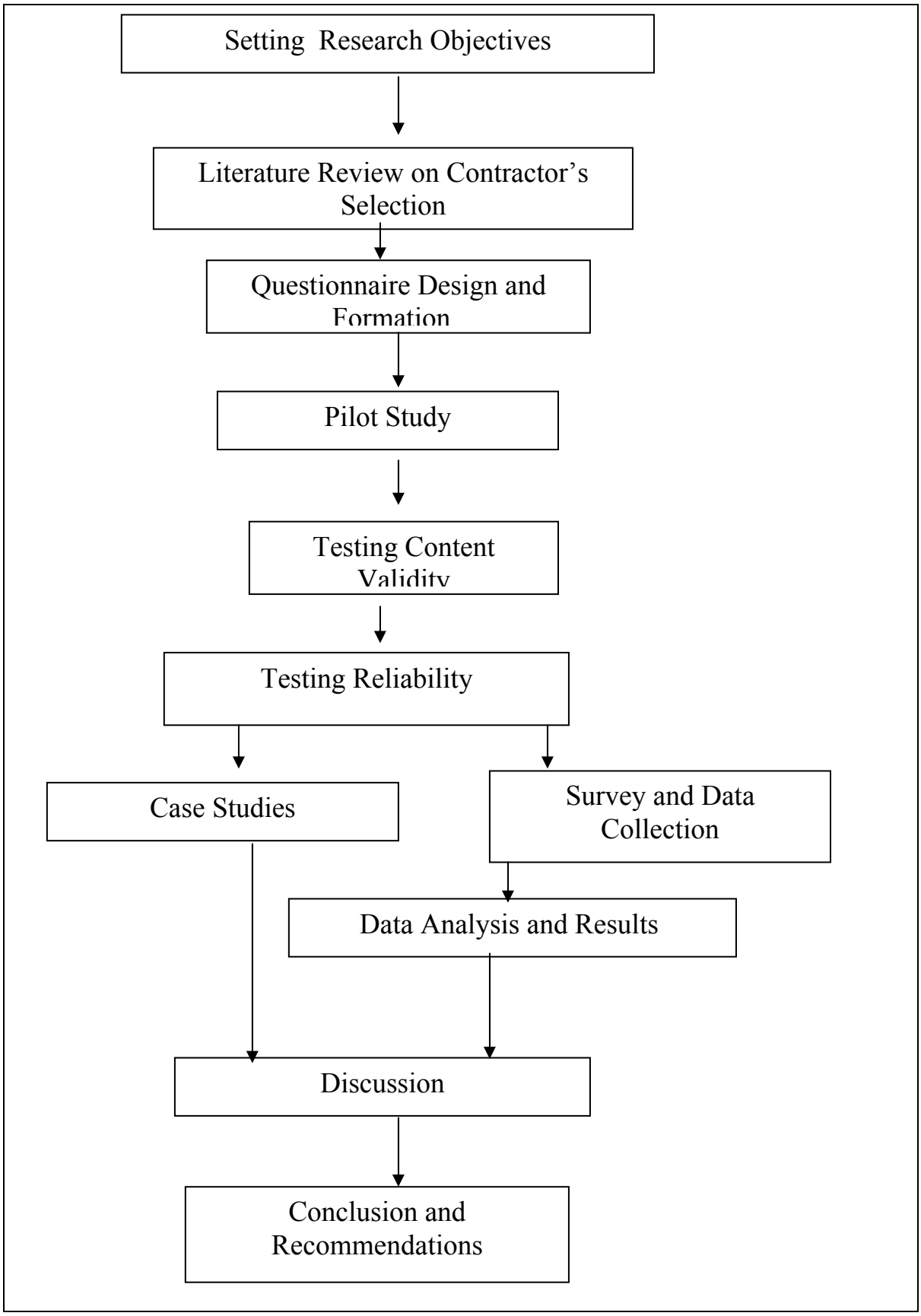

Figure 3.1 shows the methodology flow chart, which leads to achieve the research objectives.

3.2 Research strategy

In this research, the quantitative approach was selected to determine the selection of contractors, this will be achieved through investigating the local contractor's selection methods and awarding practices to determine the current procedures and to investigate the effects associated to the lowest bid price method.

3.3 Population & Sample size

The targeted population consists of experts, engineers, member of committees, and managers from diverse organizations with experience and with direct contacts in their jobs to the contractor's evaluation, awarding committees, and to supervisions and management of construction projects in Gaza strip. The population members got their experiences through their extended career in local institutions or ministries, implementing agencies, donors representatives or others international agencies which implemented hundreds of projects in Gaza strip in the past 15 years.

This research targeted, as studied population, all consultants , beneficiaries , public owners, implementing agencies and donors related to construction sector. It is worth mentioning that the researcher focused only on the consultants and owners perspective related to construction contractor's selection criteria and awarding systems. The contractors perspective was not investigated in this research .

The targeted sample, which were selected are 57. Fifty seven questionnaires were distributed, however 53 (93%) respondents returned the questionnaires, and just 51 (96%) of the received questionnaires were fully completed so they were accepted for the analysis tests, while 2 incomplete questionnaires were neglected.

Table 3.1 depicts the number and distribution of the surveyed members (engineers and experts) .

Table 3.1 Frequency and % of the sample members

organization	Frequency	Percent (%)
Public Owner	25	48
Donor	9	18
Implementing agency	9	18
Consultant	6	12
NGOs and others	2	4
Total	**51**	**100**

Table 3.1 shows that the sample size respondents number consists of 48% as public owner, 18% as donor, 18% as implementing agency (such as : PECDAR,UNDP, and KFW), 12% as consultant, and 4% as NGOs and others organization.

3.4 Research Location

The research was carried out through the Gaza Strip owners, consultants, donor's representative, implementing agencies, and others experts & engineers related to contractors evaluation .

3.5 Questionnaire Design and Contents

The questionnaire is carefully designed based on the researcher experience and ideas? extracted from the literature review, in particular from previous studies related to the subject of this research such as Tarawneh (2004), Alsugair (1999), Hatush and Skitmore(1998), Holt(1994), and Kumarswamy(1996). It is evident that the questionnaire is designed to cover the requirements of the research objectives. Issues, topics and ideas are identified and then translated into specific questions. All the information that could help in achieving the study objectives, were collected, reviewed and formalized to be suitable for the study survey. The questionnaire is discussed thoroughly with the supervisor until a final agreed upon version is reached. The researcher has used the questionnaire as a tool to collect primary data directly related to this study. The questionnaire is divided into four sections according to the study objectives:

1. **Section one :** This section contains general Information about the respondents' organizations, the type of implemented projects, the value of the implemented projects, the respondents occupation in their organizations, and their experience duration.
2. **Section two:** This section contains five questions related to the tender preparation stage. The first question is about the invitation to bid method, while the second question is about the bid evaluation committee and the bid awarding committee. The third question is about the responsibilities of the bid evaluation committee, the fourth question is about the members of bid evaluation committee, and the fifth question is about the time frame of the bid evaluation process.

3. **Section three:** This section is related to the contractor's selection stage and contains three main questions as follows:

   The first question is about identification of "Classes" weights, explicitly, the class is the main criteria used for contractor's selection

   The second question is about identification of "Factors" weights, explicitly, the factor is the sub- criteria used for contractor's selection

   The third question was about identification of the 38 factors impact in contractor's selection, specifically, the factor impact quantify the scale of evaluator's influence by the bid contents during the evaluation process, four levels of impact have been identified .These levels are : Reject the bid, negative impact, positive impact, and no effect in contractor selection .

4. **Section four**: This section is related to the contractor's awarding stage and contained seven questions about awarding decision, awarding methods, public regulations related to the awarding process, and comments from the questionnaire respondents.

The survey questionnaire was conducted to determine the point of view of the studied population sample regarding the contractor's selection and awarding system in construction . Ten pages questionnaire accompanied with a covering letter and definitions was designed and prepared to be sent to the studied population.

It is to be noted that the questionnaire is prepared in "Arabic Language" in order to avoid any misunderstanding of its topics. A copy of the English questionnaire and an Arabic version of it are attached in Annex 1 and Annex 2 respectively. As most of the studied population can not use English, a translator carried out the translation. An academic expert also reviewed the Arabic version in order to achieve accuracy as much as possible.

3.6 Pilot Study

In order to enforce the research, the used survey instrument should be piloted to measure its validity and reliability and test the collected data. The pilot study was done by distributing the prepared questionnaire to panels of experts – having experience in the same field of the research- to collect their remarks on the questionnaire. The pilot study

was done before collecting the final data of the whole sample. A pilot study provides a trial run for the questionnaire, which involves testing the wording of question, identifying ambiguous questions, testing the techniques that used to collect data and measuring the effectiveness of standard invitation to respondents (Naoum,1998). The piloting process was conducted through many interviews with the concerned specialist from different organizations and they were provided with an explanation about the inclusion of the data and the objectives of this study and had been asked to fill the questionnaire , the respondents were given the opportunity to add their suggestions about the questionnaire form and contents. All the suggested modifications and comments were discussed with the supervisor before taking into consideration.

The piloting stage served to increase the effectiveness of the questionnaire. Items that had weak reliability were either deleted or combined. At the end of this process, the agreed changes, modifications and addition were introduced as well as the final form of the questionnaire was constructed.

3.6.1 Questionnaire Content Validity

The researcher assessed the content validity and reliability of the questionnaire by two ways which are as follows:

1) **Arbitrating the questionnaire**

Distributing the questionnaire to a group of arbitrators containing three experts who have wide experience in subject of the research. The researcher has modified, deleted, and added the necessary parts of the questionnaire in response to the group's suggestions.

2) **Pilot study**

After the preliminary testing, a pilot study was conducted to evaluate the questionnaire, the researcher distributed the questionnaire to a sample of 10 persons which considered as experts in their organizations and with more than 15 years expert in the evaluation of contractor's bids, most of them are members of officials evaluation committees, project managers, donors representatives, or professional consultants. Generally speaking, it appeared that respondents had no difficulty in understanding the

items or the instructions to complete the questionnaire. Based on the comments of the experts some modifications in the text of the questionnaire are performed. The modifications are discussed with the supervisor and then the questionnaire is finalized. The researcher has tested the internal concurrence of the questionnaires by calculating the correlation coefficients between each item and the related items field.

3.6.2 Questionnaire Statistical Validity

In order to ensure the validity of the questionnaire and to be sure that the objective of each paragraph is to achieve the main aim of the questionnaire , two statistical tests should be applied :

3.6.2.1 Criterion- related Validity

Internal consistency of the questionnaire has been checked by applying this questionnaire on exploratory sample, which consisted of twelve (12) questionnaire through measuring the correlation coefficients between each section and the whole questionnaire .

Statistical Package for Social Science (SPSS) software has been used to find Pearson correlation coefficient. If significance level (P-value) for a paragraph within a group is found to be between (0.01-0.05), this means the correlation coefficient is significant at $x = 0.05$ and then the paragraph is consistent and valid to measure what is set for. On the other hand, if P-value is less than or equals 0.01, this means the correlation coefficient is significant at $x = 0.01$ and the paragraph is valid to measure its objective. The following tables show such computations :

1. Tender preparation stage

Table 3.2 clarifies the correlation coefficients between the items of the section 1 of the questionnaire (Tender preparation stage**)** and the average of the related section, coefficients denoted significance at 0.01 or 0.05 level, which means a content validity of this section of the questionnaire.

Table 3.2 : Correlation coefficients between items and their related section (section 1)

No.	Statement	Pearson correlation	Significance level
1	After the completion of design and tender documents prepared by your organization, how the invitation to bid can be done?	0.493	0.012*
2	What is the relation between the bid opening committee and the bid evaluation committee?	0.752	0.000**
3	Which best describe the responsibilities of the bid evaluation committee?	0.818	0.000**
4	A persons from outside of your organization can be a member in the bid evaluation committee	0..818	0.000**
5	What is the frame time of the bid evaluation process in your organization?	0.424	0.035*

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

2. Selection Stage / Identification of "Classes"(Main criteria) weights for contractor's selection:

Table 3.3 clarifies the correlation coefficients between the items of the section 2 of the questionnaire(Identification of classes -main criteria- weights for contractor's selection) and the average of the related section, coefficients denoted significance at 0.01 or 0.05 level, which means a content validity of this section of the questionnaire.

able 3.3 : Correlation coefficients between items and their related section (section 2)

No.	Statement	Pearson correlation	Significance level
1	Financial evaluation of the bid	0.493	0.014*
2	Bid understanding	0.603	0.002**
3	Completeness of bid document	0.762	0.000**
4	Contractor's reputation/image	0.686	0.000**
5	Past performances in similar projects	0.785	0.000**
6	Contractor site management/execution	0.742	0.000**
7	Health and safety performance	0.590	0.002**
8	Plant and equipment resources	0.545	0.006**
9	Quality of work	0.537	0.007**
10	Staff quality and experience	0.688	0.000**

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

3. Selection Stage / Identification of "Factors" (sub- criteria) weights for contractor's selection:

Table 3.4 clarifies the correlation coefficients between the items of the section 3 of the questionnaire(Identification of Factors -sub criteria - weights for contractor's selection) and the average of the related section, coefficients denoted significance at 0.01 or 0.05 level, which means a content validity of this section of the questionnaire.

Table 3.4 : Correlation coefficients between items and their related section (section 3)

Class	Factors	Pearson correlation	Significance level
Financial evaluation of the bid	Lowest bid	0.469	0.021*
	Unbalanced bid	0.405	0.049*
	Arithmetic mistakes	0.513	0.010**
	Financial reservation	0.603	0.002**
	Balance sheet for the pre 3 years	0.504	0.012*
Bid understanding	Aware of bid document	0.717	0.000**
	Explain ambiguous item	0.452	0.026*
	Response ambiguous	0.791	0.000**
	Solicit classified information	0.844	0.000**
Completeness of bid document	Required bond	0.738	0.000**
	Taxes clearance	0.862	0.000**
	Financial capability	0.563	0.003**
	Shortage contract offer	0.844	0.000**
Contractor's reputation/image	Classification of the company	0.563	0.003**
	Number of years in the business	0.407	0.043*
	Contractor capital	0.669	0.000**
	Past owner/contractor relationship	0.452	0.023*
	Cooperative in solving problems	0.500	0.011*
Past performances in similar projects	Perform past projects on Time	0.566	0.003**
	Reasonability of Cost in past project	0.566	0.005**
	Quality level in past projects	0.862	0.000**
Contractor site management /execution	Type of proposed control and monitoring procedures during implementation	0.503	0.010**
	Construction progress reporting systems	0.669	0.000**
	Provision of trained /skilled staff for the particular project	0.765	0.000**
Health and safety performance	Proposed health and safety program	0.507	0.010**
	Health and safety records on previous projects	0.427	0.033*

Class	Factors	Pearson correlation	Significance level
"Plant and equipment resources	Condition of equipment	0.822	0.000**
	Suitability of the equipment to the project size	0.906	0.000**
	Efficiency of proposed technology level to the project type	0.749	0.000**
	Availability of owned construction equipment	0.411	0.046*
Quality of work	Quality records on previous projects	0.431	0.036*
	Proposed quality control system during implementation	0.660	0.000**
	Application of the ISO system	0.466	0.029*
Staff skills and experience	Existing of staff training program	0.465	0.029*
	Ratio of staff taking training to total number of staff	0.454	0.030*
	Project managers' experiences	0.606	0.003**
	Other project staff experience	0.635	0.001**
	Past performance of the project staff	0.719	0.000**

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

4. Selection Stage / Identification of "Factors" impact in contractor's selection

Table 3.5 clarifies the correlation coefficients between the items of the section 4 of the questionnaire (Identification of Factors impact in contractor's selection) and the average of the related section, coefficients denoted significance at 0.01 or 0.05 level, which means a content validity of this section of the questionnaire.

Table 3.5 : Correlation coefficients between items and their related section (section 4)

No.	Statement	Pearson correlation	Significance level
1	Lowest bid	0.490	0.013*
2	Unbalanced bid	0.575	0.003**
3	Arithmetic mistakes	0.637	0.001*
4	Financial reservation	0.419	0.047*
5	Balance sheet for the previous 3 years	0.560	0.004**
6	Aware of bid document	0.609	0.001**
7	Explain ambiguous item	0.471	0.018*
8	Response ambiguous	0.468	0.018*
9	Solicit classified information	0.818	0.000**
10	Required bond	0.499	0.011*
11	Taxes clearance	0.441	0.027*
12	Financial capability	0.467	0.019*
13	Shortage contract offer	0.458	0.021*
14	Classification of the company	0.544	0.005**
15	Number of years in the business	0.677	0.000**
16	Contractor capital	0.603	0.001**
17	Past owner/contractor relationship	0.619	0.001**
18	Cooperative in solving problems	0.614	0.001**
19	Perform past projects on Time	0.633	0.001**
20	Reasonability of Cost in past project	0.767	0.000**
21	Quality level in past projects	0.607	0.001**
22	Type of proposed control and monitoring procedures during implementation	0.680	0.000**
23	Construction progress reporting systems	0.836	0.000**
24	Provision of trained /skilled staff for the particular project	0.740	0.000**
25	Proposed health and safety program	0.624	0.001**
26	Health and safety records on previous projects	0.637	0.001**
27	Condition of equipment	0.407	0.043**

No.	Statement	Pearson correlation	Significance level
28	Suitability of the equipment to the project size	0.504	0.012*
29	Efficiency of proposed technology level to the project type	0.400	0.048*
30	Availability of owned construction equipment	0.561	0.004**
31	Quality records on previous projects	0.434	0.030*
32	Proposed quality control system during implementation	0.464	0.020*
33	Application of the ISO system	0.610	0.001**
34	Existing of Staff training program	0.519	0.008**
35	Ratio of staff taking training to total number of staff	0.575	0.003**
36	Project managers' experiences	0.458	0.021*
37	Other project staff experience	0.519	0.008**
38	Past performance of the project staff	0.778	0.000**

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

3.6.2.2. Structure Validity:

Structure validity is the second statistical test that used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire . It measures the correlation coefficients between the field (a field is part of group and consists of many paragraphs) and the whole fields of the questionnaire that have the same level of likert scale.

3.6.3 Questionnaire Reliability

Reliability means the capacity to repeat a result, and is a measure of the instrument used in the research. A research instrument is anything that produces information, from a tape measure to a questionnaire. Reliability is generally measured by means of statistics. A reliable research instrument is one that produces the same result, within reasonable boundaries, each time it is used to measure a particular thing (test-retest

reliability). A questionnaire that produces substantially the same responses each time it is administered to a certain group of people is a reliable measuring instrument.

The researcher conducted two tests on the pilot study sample to measure the questionnaire reliability, the two test are Split-Half Coefficient and Alpha- Cronbach's Method.

3.6.3.1 Split-Half Coefficient method:

Significance levels of exploratory sample have been used to compute questionnaire reliability using Split-half model. The method randomly divides the measurement instrument into two halves. Each of the two sets of items is treated as a separate instrument form and is scored as such. The two sets of scores are correlated, and this is considered to be an estimate of the measure of reliability. Then, correcting the Pearson correlation coefficients can be done by using Spearman Brown correlation coefficient of correction.

Person correlation coefficient is calculated between the average of the questions with odd ranks and the average of the question with even ranks. The correlation coefficient is computed according to the following formula :

$$\text{Reliability coefficients Spearman Brown} = \frac{2\,r}{1 + r},$$

where **r** is Pearson coefficients.

Table 3.6 shows that the questionnaire had a highly degree of validity.

Table 3.6 : Split-Half Coefficient method

section	contents		Pearson – correlation	Spearman-Brown Coefficient	Sig. (2-Tailed)
Two	Tender preparation stage		0.5742	0.729513	0.000**
Three	Selection Stage	Identification of "Classes"(Main criteria) weights for contractor's selection	0.791322	0.791322	0.000**
		Identification of "Factors" (sub- criteria) weights for contractor's selection	0.74364	0.74364	0.000**
		Identification of "Factors" impact in contractor's selection	0.771348	0.771348	0.000**
Four	Awarding Stage		0.654875	0.655462	0.001**

**Correlation is significant at the 0.01 level (2-tailed).

3.6.3.2 Cronbach's Coefficient Alpha

Researcher has used another method to compute reliability of questionnaire where alpha coefficients value for each section and the total average of the questionnaire have been computed . The normal range of Cronbach's coefficient alpha value is between 0.0 and +1.0 where higher values reflect a higher degree of internal consistency.

Table 3.7 shows Alpha- Cronbach Coefficients, the results were ranged from 0.6917 and 0.7855, which means that there are significance and highly validity coefficients.

Table 3.7 : Reliability Cronbach's Alpha

section	contents		Cronbach's Alpha
Two	Tender preparation stage		0.7214
Three	Selection Stage	Identification of Classes (Main criteria) weights for contractor's selection	0.7154
		Identification of Factors (sub- criteria) weights for contractor's selection	0.7855
		Identification of Factors impact in contractor's selection	0.7687
Four	Awarding Stage		0.6917

3.7 Data Collection

Data was collected quantitatively by the study survey instrument which was the prepared and piloted questionnaire. Collection of data from the study population sample in the field took about twenty days. The average time for filling a questionnaire was about 40 minutes.

3.8 Data Analysis

☒ **Statistical Manipulation**:

To achieve the research goal, researcher used the Statistical Package for the Social Sciences (SPSS) for Manipulating and analyzing the data.

Statistical analysis for questionnaire was done by using SPSS as follows:

- Defining and coding of variables
- Summarizing the data on raw data sheet.
- Entering data.
- Cleaning data.

After the above-mentioned steps have been completed, the descriptive statistic method has been utilized. It either analysis is the responses in percentages, or contains actual numbers. This program was chosen because it offers flexibility in use. The analysis of data was done to rank the main criteria used in selection of contractors, sub-criteria for the selection of contractor, and factors impact on the selection of contractor.

☒ **Statistical methods are as follows:**

1- Frequencies and Percentile,
2- Half split method and Alpha- Cronbach Test for measuring reliability of the items of the questionnaires,
3- Pearson correlation coefficients for measuring validity of the items of the questionnaires,
4- spearman –Brown Coefficient for computing reliability,
5- Normal distribution Test (Kolmogrov-Smirnov),

CHAPTER 4: RESULTS, DATA ANALYSIS AND DISCUSSION

This chapter describes the results that have been obtained from a field survey of fifty one questionnaires. The questionnaires were processed by using the Statistical Package For Social Science (SPSS). All questionnaires were filled out by random selection of responded engineers and experts from different organizations in Gaza strip related to the construction sector, and specifically to contractor's selection.

The survey results are illustrated in this chapter, as well as the test results of the data distribution type. They are all concluded through four main sections as follows: General information related to the respondents, tender preparation stage, selection stage, and awarding stage.

The first section of the questionnaire contains general information such as population characteristics which describe the respondents organization, implemented projects and their value, and the respondents post and experiences. The second section focuses on the tender preparation stage: frequency of invitation to bid, relation between bid opening committee and bid evaluation committee, role of the evaluation committee , members frequency of the bid evaluation committees , and time frame of the bid evaluation process. The third section spotlights the selection stage: ranking of "Classes" (main criteria) and their weights, ranking of "Factors" (sub- criteria) and their weights**,** and identification of "Factors" impact on contractor's selection.

The fourth section points out the awarding stage: consideration of selection criteria in the bid awarding decision by the awarding committee, problems of the current local awarding methods, and role of the "public administrative regulations" to help the awarding committee.

In this chapter, the results and findings of this research are discussed in details, and compared with the results and findings of available similar studies, thereafter Statistical tests have been used in this chapter to elaborate how much research objectives are satisfied.

4.1 Normal distribution test

In order to recognize whether or not the data obtained by the questionnaire can be categorized under the normal distribution, the Normal distribution Test (Kolmogrov-Smirnov) was used to decide which type of statistical tests can be used to analyze the collected data either by the parametric tests or the non-parametric tests.

Results test as shown in Table (4.1), clarifies that the significance level calculated are greater than 0.05 (sig. > 0.05), this in turn denotes that data follows normal distribution pattern, and so parametric test must be used.

Table 4.1 : One-Sample Kolmogorov-Smirnov Test

Section	**Contents**		Kolmogorov-Smirnov Z	**Asymp. Sig. (2-tailed)**
One	General Information		0.702	0.708
Two	Tender preparation stage		0.743	0.638
Three	Selection Stage	Identification of "Classes"(Main criteria) weights for contractor's selection	0.691	0.727
		Identification of "Factors" (sub-criteria) weights for contractor's selection	0.746	0.634
		Identification of "Factors" impact in contractor's selection	0.730	0.661

4.2 Population Characteristics

The sample size of this research was selected to cover the study population of various types of project owners, donor agencies, implementing agencies, consultants and Non-Governmental Organizations (NGOs).

4.2.1 Sample size and description of respondent organization

Table 4.2 shows the type of organizations and the sample size for the study population. In addition, it shows number of valid respondents of each organization.

Table 4.2 : Frequency and percentages organization of the sample members

Organization	Frequency	Percent of Respondents(%)
Public Owner	25	48
Donor	9	18
Implementing agency	9	18
Consultant	6	12
NGOs and others	2	4.0
Total	**51**	**100**

As outlined in Table 4.2, the sample size respondents number consists of 48% as public owners, 18% as donors, 18% as implementing agencies, 12% as consultants, and 4% as NGOs and others organizations.

4.2.2 Types of implemented projects through the respondents organizations

Table 4.3 shows that 28.8% of the implemented projects is public buildings, 25.9% is water and wastewater projects, 25.1% is roads, 10.8% is housing, and 9.4% of the implemented projects is private buildings.

Table 4.3 : Types of implemented projects

Projects type	Frequency	Percent (%)
Public buildings	40	28.8
Water and Wastewater	36	25.9
Roads	35	25.1
Housing	15	10.8
Private buildings	13	9.4
Total	**139**	**100**

4.2.3 Value of implemented projects

Table 4.4 shows that 49% of the implemented projects got an average annual value exceeds 5 million dollars, 23.5% of the implemented projects value is between 1Million to 2.99Million dollars. As well 13.7% of the implemented projects value is between 3M to 4.99 M dollars, 11.8% of implemented projects value is between 0.50M to 0.99 M dollars, and 2 % of implemented projects value is less than 0.5M dollars.

Table 4.4 : Average annual value of the implemented projects

Average annual value	Frequency	Percent (%)
More than 5 M	25	49.0
1 M – 2.99M	12	23.5
3 M – 4.99 M	7	13.7
0.5M – 0.99M	6	11.8
Less than 0.5M	1	2.0
Total	**51**	**100.0**

4.2.3 Respondent's post

Table 4.5 shows that 37.3% of the respondents occupation in their organization is head of department, 25.5% of the respondents occupation is project managers, 17.6% of the respondents occupation is other positions. In addition 9.8% of the respondents occupation is supervisors, 5.9% of the respondents occupation is office engineers, and 3.9% of the respondents occupation is procurement specialists.

Table 4.5 : Respondent's occupation

Respondent's occupation	Frequency	Percent(%)
Head of Department	19	37.3
Project Manager	13	25.5
Construction Supervisor	5	9.8
Office Engineer	3	5.9
Procurement Specialist	2	3.9
Others	9	17.6
Total	**51**	**100.0**

4.2.4 Respondent's experience

Table 4.6 shows that 35.3% of the respondents experiences is more than 20 years, 25.5% of the respondents experiences is between 6 to 10 years, 21.6% of the respondents experiences is between 11 to 15 years, 13.7% of the respondents experiences is between 16 to 20 years, and 3.9% of the respondents experiences is less than 5 years.

Table 4.6 : Respondent's experience

Experience duration	Frequency	Percent(%)
More than 20 years	18	35.3
16-20 years	7	13.7
11-15 years	11	21.6
6-10 years	13	25.5
Less than 5years	2	3.9
Total	**51**	**100.0**

4.3 Tender Preparation Stage

4.3.1 Invitation to bid

Table 4.7 shows that 80.4% from the respondents stated that the invitation to bid is done by open bid through advertisement in the local newspapers, while 9.8% believes that the invitation to bid is done by a short list contains a limited number of contractors, moreover, 5.9% from the sample agree that the invitation to bid is done by prequalification of limited number of contractors, and 3.9% from the sample agree that the invitation to bid is done by other methods.

The above results show that the majority of construction project in Gaza Strip is implemented through open bid process, and frequently no pre-qualifications measures are required to participate in the bidding process, this means that contractors' ability to perform the project can be confirmed during the evaluation stage (post qualification), and this comply with the World Bank (WB) procurement guidelines. It is noted that the World Bank is considered as the administrator of the biggest group of donors which finance the largest part of the implemented projects in Gaza Strip during the last 15 years.

Table 4.7 : Invitation to bid method

Invitation to bid method	Frequency	Percent(%)
Open bid through advertisement in the local newspapers	41	80.4
Short list for limited number of contractors	5	9.8
Prequalification of limited number of contractors	3	5.9
Direct negotiation with one or many contractors	0	0.0
Other methods	2	3.9
Total	**51**	**100**

The distribution of respondents responses can be analyzed according the type of organization as presented in Table 4.7' .The results show that the majority of respondents preferred to use frequently the open bid in all categories of organization except the NGOs organization.

Table 4.7': Distribution of the participants responses according organization type :

Organization	Public Owner	Donor	Implementing agency	Consultant	NGOs and others
Open bid through advertisement in the local newspapers	22	9	6	4	0
Short list for limited number of contractors	2	0	1	1	1
Prequalification of limited number of contractors	1	0	1	1	0
Direct negotiation with one or many contractors	0	0	0	0	0
Other methods	0	0	1	0	1
Total	**25**	**9**	**9**	**6**	**2**

4.3.2 Members of the bid opening committee and the bid evaluation committee

Table 4.8 shows that 74.5% from the sample agree that it is possible to be a member in the two committees, 13.7% from the sample agree that it is impracticable to be a member in the two committees, 5.9% of the sample agree that a person can be a member in the two committees, and 3.9% of the sample agree that the head of the two committees can be the same.

The results show that a person can be member of the two committees, this confirm the nature of the client's organization which the major part of them is considered as small or medium organizations, and also reflect the influence of centralization system in the local organizations.

Table 4.8 : Members of bid opening committee and bid evaluation committee

Members of committees	Frequency	Percent(%)
It is possible to be a member in the two committees	38	74.5
It is impossible to be a member in the two committees	7	13.7
Same members in the two committees	3	5.9
The head of the two committees is the same person	2	3.9
Others	1	2.0
Total	**51**	**100**

The local organizations related to the construction sector, specially the technical department, recruit a number of employees ranged between 5 to 15 person and this confirms that these organizations are considered as small or medium in comparison to similar ones in other countries.

4.3.3 The responsibilities of the bid evaluation committee

Table 4.9 shows that, 43.1% from the sample agreed that the responsibility of the bid evaluation committee is to set up a recommendation to award the bid, 21.6% from the sample agree that the committee responsibility is to evaluate and classify the submitted bids, 9.8% from the sample agree the responsibility is to take the decision for bid awarding, and 25.5% from the sample agree that the committee responsibility is covered by the whole responds in this questions.

Table 4.9: The responsibilities of the bid evaluation committee

The responsibilities of the bid evaluation committee	Frequency	Percent(%)
Prepare a recommendation to award the bid	22	43.1
Evaluate and classify the submitted bids	11	21.6
Take the decision for bid awarding	5	9.8
All of the past	13	25.5
Total	**51**	**100**

It is noted that the responsibilities of the bid evaluation committees are covered by administration regulations and laws in addition to donors regulations, for this reason it is evident to observe a variety of responses according to the respondents opinions referred to this point. Some institutes such municipalities used the regulations of Ministry of Local Government (MOLG) as reference, others institutes such Ministry of Health (MOH) and Ministry of Education and Higher Education (MEHE) cooperate in their bids with the central bidding committee, moreover, some institutes used only the donors regulations**.**

The justification of the researcher is also confirmed by the Country Procurement Assessment Report (CPAR) prepared by the World Bank (WB) on 2004 in order to assess the procurement system in West Bank and Gaza Strip.

The conclusion of the CPAR Report (2004) includes: "The public procurement system in the WB and Gaza faces many problems, mainly because much of government procurement for capital investment is financed by donors. Donors are insisting on using sound procurement procedures in line with their own procurement guidelines, and much of the government procurement activity makes use of donor standard document formats and procedures".

4.3.4 Members of bid evaluation committee

Table 4.10 shows that 66.7% from the sample agree that a person outside of the client organization can be a member in the bid evaluation committee while 33.3% from the sample disagree on that.

Table 4.10 : Members of bid evaluation committee

A person outside of your organization can be a member of the bid evaluation committee	Frequency	Percent(%)
Yes	34	66.7
No	17	33.3
Total	**51**	**100.0**

In case that a person outside of the organization can be a member of the bid evaluation committee, Table 4.11 shows the categories of this member.

The outcome shows that 32.4% select the member to be from the donor agency, 23.5% select the member to be from the consultant, 20.6% select the member to be from the central bidding department, and 14.7% select the member to be from other organizations, and 8.8% select the member to be from the general monitoring state.

Table 4.11 : Representative of agencies in the bid evaluation committee

The representative member's agency	Frequency	Percent(%)
Representative from donor agency	11	32.4
Representative from designer/supervisor consultant	8	23.5
Representative from Central bidding department	7	20.6
Representative from General monitoring state (Financial and Administrative monitoring organization)	3	8.8
Others .	5	14.7
Total	**34**	**100**

The above results reflect the considerable number of project partners which participated in biding process due to donors regulations and the nature of the implementing agencies such as PECDAR, UNRWA, UNDP, JCP, KFW …..etc which required the local beneficiaries or clients to implement the projects through these agencies and according to their bidding conditions .

4.3.3 Frame time for the bid evaluation process

Table 4.12 shows that 66.7% from the sample agreed that time of the bid evaluation process is less than 15 days, 17.6% from the sample agree that time frame is not limited by a fixed duration, and 15.7% from the sample agree the time frame ranges from 16 days to a month. No one agreed on a time frame exceeds one month.

Table 4.12 : Frame time for the bid evaluation process

Frame time for bid evaluation	Frequency	Percent(%)
Less than 15 days	34	66.7
Not limited by a fixed duration	9	17.6
From 16 days to 1 month	8	15.7
More than 1 month	0	0.0
Total	**51**	**100.0**

Generally the donors bidding regulations or instruction required that the bid evaluation duration should be limited between 2 to 4 weeks only, for that the clients must perform this task within the limited frame time in order to receive the donor no-objection to proceed with the next step : the awarding stage , and this justifies the above responses.
Practically, the evaluation committee needs from 3 to 5 meetings to complete the evaluation of bids and submit its final recommendations, as well as the evaluation meetings frequently assembled twice a week, consequently the evaluation process can be easily completed within one month.

4.4 Selection Stage

The selection of contractors during the bidding stage require sophisticated knowledge and experience to ensure that the contractor is technically and financially capable to accomplish the project as specified in the contract condition. The main criteria “Classes” presented herein for contractors selection have been identified through the literature survey and after conducting meetings and interviews with local experts related to contractor’s selection. The outcome of this interviews led to identification of many classes (main-criteria), and after that, each criteria was analyzed to several factors (sub-criteria), the steps of this survey were illustrated as follows:

1. Level 1: Identify the classes (main-criteria) to be used for the selection of contractors on the bidding stage: 10 classes suitable for the local construction were selected.
2. Level 2: Divide each classes (main criteria) into many factors (sub-criteria), which help to make practical and quantitative method of contractor's selection on the bidding stage : 38 factors suitable for the local construction were selected.
3. Level 3: Assign weights to the 10 classes (main criteria),
4. Level 4: Assign weights to the 38 factors (sub criteria).

The respondents, in the first stage, were asked to rank the classes by assigned weights to each class i.e. rate the relative importance of the class to the other classes. The relative importance of the class to the other classes is identified by assign weight to each class, the weight of each class should be limited between 0 and 100, the total weights for the ten classes should equal 100.

In the second stage, the respondents were asked to rank the factors by assigned weights to each factor within the same class, the weight of each factor should be limited between 0 and 100 , the total weights for the factors within the same class should equal 100.

It is evident that the assigned weights for a random class or factor differ from respondent to other. Despite the large number of respondents, the achieved results were too close to others which reflect the experience of the respondents, therefore, the average weight for each class and factor was calculated by using the following formula:

Average weight (for each class) = SUM (Wci) / N, where Wci is the weight assigned by the respondent i to the concerned class, and N is the total number of respondents .

All the respondents results were filled in excel sheet , and presented in details in the Annex 3 (Table A 1 : Assigned Weights to the 10 classes).

4.4.1 Classes (main criteria) weights for contractor's selection

Table 4.13 illustrates the average weights assigned to the ten classes by the 51 respondents, and the rank of each class used in the selection of contractors during the bidding stage.

Table 4.13 shows that the weight of the financial evaluation of the bid equals 40.10 % and occupied the first rank, the weight of the completeness of bid document equals 9.62 % and occupied the second rank, and the weight of the past performances in similar projects equals 8.08 % and occupied the third rank.

In addition, the weight of the staff skills equals 7.40 % and occupied the fourth rank, the weight of the contractor's reputation/image equals 6.86 % and occupied the fifth rank, and the weight of the quality of work equals 6.70 % and occupied the sixth rank.

Also the weight of contractor site management/execution is equal 6.12 % and occupied the seventh rank, the weight of bid understanding equals 5.62 % and occupied the eighth rank, the weight of plant and equipment resources equals 5.14 % and occupied the ninth rank, and finally the weight of health and safety performance equals 4.34 % and occupied the last rank.

Table 4.13 : Average weights assigned to classes

Class(main criteria)	Average Weight	Rank
Financial evaluation of the bid	40.10	1
Completeness of bid document	9.64	2
Past performances in similar projects	8.08	3
Staff skills and experience	7.40	4
Contractor's reputation/image	6.86	5
Quality of work	6.70	6
Contractor site management/execution	6.12	7
Bid understanding	5.62	8
Plant and equipment resources	5.14	9
Health and safety performance	4.34	10
Total weights	**100**	-

The results presented in table 4.13 are discussed and analyzed in details as follow:

4.4.1.1 Financial evaluation of the bid

The results in table 4.13 illustrate that " Financial evaluation of the bid " was ranked in the first position, which means the respondents agreed on the importance of this class (main criteria), this would empower the importance of the financial abilities and capabilities of the contractor in order to execute the project successfully and without any obstacles during the implementation process. The financial ability of the contractor is considered one of the essential classes which participated in the project success. The respondents have given a high percentage to this factor and this result suits the outcome achieved in other researches.

For example Alsugair (1999) in his research, has ensured that the financial factors have got the first rank from 9 criteria with 37% weight, Hatush and Skitmore (1998) have ensured in their research that the financial factors have a percentage of 55% and got the first rank from a number of 6 criteria. Although all the above results ensure the importance of the financial factors, and in the same time, it leaves a considerable percentage to other criteria used in selecting the suitable contractor who can implement the project and it doesn't consider the financial factor as the only one in contractor's evaluation process.

4.4.1.2 Completeness of bid documents

The completeness of the bid documents is considered one of the necessary conditions to accept the contractor proposal in any bid, so the results got in this research which assign to this criteria a percentage of 9.64% and the second rank, this show the respondents concern and experience in presenting and evaluating contractors. In addition, other researches results were closed to the research result, for example, Alsugair(1999) reached to the point that this criteria has got 3% this difference can be explained according to the fact that the companies working in Saudi Arabia are much bigger and more organized than those which work in Gaza Strip. Moreover the local companies have a short experience and they're nearly new to the extent that the oldest local construction company's age is from 15 to20 years old.

4.4.1.3 Past performance in similar projects

The past performance of the contractor in the previous projects certainly influence the evaluation process, so the respondent was concerned to know the bidder last record which define the contractor experience and performance in implementing similar past projects. The respondents give 8.08% to this class and it's a very important percentage. Furthermore, Bubshait (1996) in his research concluded that the previous performance of the contractor reached a weight equal 7,80% from 16 criteria used in evaluating contractors in Saudi Arabia. Additionally, Hatush (1998) found that the previous performance has got a percentage of 4% in evaluating contractors in United Kingdom (UK). The results achieved indicated the high concerns of respondents in respect to this point.

4.4.1.4 Staff skills and experience

This criteria focuses on the staff skills and experience needed to implement the project, the contractor has to offer his demonstration of the experience of his staff because it's one of the classes that contribute in making the project successful. The experience of the project staff, could allow them to control any problems or obstacles during implementation, and it guarantees getting a considerable level of quality that go with specifications. The percentage of this criteria shows that the project beneficiaries are highly concerned with the staff skills and experience. This criteria has got the fourth rank with a percentage of 7,40 % .

In addition, several studies got closed results which strengthen the importance of this research and the respondents seriousness. A study done by Holt (1994) showed that this criteria has got a percentage of 5 % and it's closed to the previous results referred to above. Also, Tarawneh (2004) study showed that this criteria got the sixth rank from 31 criteria's of selecting contractors in Jordan. Therefore, this class is very important concerning weight and rank .

4.4.1.5 Contractor's reputation / image

The contractor's reputation and image has got a weight equal to 6.86%, this is a considerable percentage according to the respondents opinion, and it's effective when comparing between two bids. This shows that the respondents have provided a considerable advantage to the contractors of better reputation in the previous projects, which is considered logic reasoning .

Frequently, the contractor's reputation has been given priority in evaluation process. The study of Egeman (2005) showed the importance of this criteria because it has got the 3rd rank according to the clients opinion and the 10th rank according to the consultants opinion from 18 criteria used in the evaluation of the Turkish contractors. In addition, the study of Wong and Holt (2003), showed the importance of the criteria of the contractor's reputation and image since it was one of 9 criteria used in contractor evaluation in Britain.

4.4.1.6 Quality of work

It's normal for the contractor to guarantee the quality of his work because it's considered one of the critical requirements of the contract and which are defined in the technical specifications of the construction projects. Thus, respondents offered a concern for this criteria and it has got rank 6 and a weight of 6,70% from the ten evaluation classes defined in this research. Tarawneh (2004) in his study, ensures the importance of this criteria and that was through having two criteria related to the quality of evaluating the contractors in Jordan from 31 criteria used in his study, the first criteria was about the previous quality records, this criteria got rank 4 with a weight of 4.16%, and the second criteria used by Tarawneh (2004) was the proposed quality assurance and control procedure, this criteria got rank 26 with a weight of 3.13% . The total weight of the two quality criteria used by Tarawneh (2004) equal 7.29% which match the results of this research and indicated the same level of concerns and importance of the quality for the clients in Jordan and in Gaza strip, which indicated the similarity of their construction sector in reference to this point .

The study of Kumarswamy (1996) emphasized that this criteria has a big importance and it's got a percentage of 19 % form 8 criterias used in evaluating contractors in Hong Kung. This high percentage can be explained because the companies in Hong Kong are considered highly skilled and extra specialized to the extent that the system of selecting companies use accurate and tough procedures. Therefore, the contractors in Hong Kung catch a large experiences and they compete each other to achieve a high level of quality, in addition, the Hong Kung construction market is a very intensive market among the world, which explains this high consideration of the quality criteria.

4.4.1.7 Contractor's site management / execution

If the contractor has good administrative skills and notable ways in implementing the project, this will give him the chance to get better evaluation and so he can have more chance in getting the project and achieve high score during evaluation. This criteria has got the 7th rank with weight equal to 6,12 % according the respondents opinion. The study of Hatush and Skitmore (1998) showed the importance of the contractor management of the project through giving the two criteria related to contractor's management used to evaluate contractors in Brittan a total weight equal 4%. In addition, Bubshait (1996) in his comparison study about the contractor's evaluation in the Saudi Arabia and the USA has reached that this criteria has got the 5th rank for the Saudi contractors, whereas the result was the 6th rank for the American contractors from 16 criterias which was got by Russell (1988). Therefore, all the previous results show that the respondents were afraid of the contractor failure in the project performance. Thus, it was given importance and suitable weight to criterias apart from contractor in implementing and managing the project through evaluating his performance in the previous projects.

4.4.1.8 Bid Understanding

The ability of the contractor to understand the bid and to clarify some ways of execution in his bid by suggesting logical solutions and clarifying some unexplained points has received reasonable consideration in evaluating this criteria which got 5,62% and it's affective in winning the bid by the contractor. This gives advantage to the contractor's understanding of the bid and show that he has ability, experience and knowledge, which reduce the opportunities of the project failure or appearance of obstacles that prevent completing it. The study of Alsugair (1999) showed that this criteria has got 10 % from the evaluation points and this percentage reaches the double of what we reached in this research and this can explained by saying that in the Saudi construction sector, hundreds of local and foreign companies compete whereas the construction sector in Gaza-Strip include only tens of local companies and they are often known to owners. Another study of Tarawnah (2004) reached that this criteria has got the 13th rank from 31 criterias used in evaluating contractors in Jordan and with a weight of 3.83%. Another study of Yang and Wang (2003) ensured that the contractor's understanding of the bid has got 7 % of the weight of evaluating contractors in Taiwan, and the previous results referred to above strengthen the result reached in this research .

4.4.1.9 Plant and equipment resources

It's normal for the contractor to offer all the equipment and resources needed to facilitate implementation. Therefore, this class got a miniature percentage of 5,14% for two essential reasons : First, the projects in the local sector are more or less simple and small, and there is no need for complex and heavy equipment. Second, contractors can easily rent equipment from the specialized sub-contractor in this field who offered his services to all of the local contractors. In addition, Hatush and Skitmore (1998) in their research, got a percentage of 4,50 % to this criteria weight, and this result is very closed to what the researcher reach here. As well the results of Bubshait (1996) research were very closed because it got 5,8 % and this ensures the similarity between the construction sector of Saudi Arabia and Gaza-Strip concerning this point only.

The availability of equipment resource for the international contractors is a basic condition for them, they work in a very large and open market and within an oversize geographical area. Consequently, the availability of owned equipment is a need for the concurrence between contractors, then, it is evident that this factor got a small weight despite the developed working condition in such countries.

4.4.1.10 Health and Safety performance

Several researches and studies refer to the importance of this criteria related to safety and health performance in the construction projects and this criteria got the last rank (no. 10) from the evaluation criteria with a percentage of 4,34 %. The decrease of this percentage doesn't mean the non importance of this criteria but it ensures the result that was got above in previous class which says that the project's risks in Gaza are less simple than other states due to simplicity of most part of implemented projects and the intensive labors project in Gaza strip. In addition, the technology level and number of equipments used during the projects implementations in Gaza Strip are limited and not complicated. Another justification, is the considerable level of skills of labors in the local construction sectors, achieved by thousands of Palestinian labors through their long previous experience in the Israeli construction projects. As a result of knowing all the inputs by the respondents, this percentage has been reached.

Tarawneh (2004) has reached that this criteria was one of the evaluating criteria among 31 and got rank 13 with weight equal 3,83 %. Moreover, Hatush and Skitmore (1998) showed that this criteria reached 5 %, whereas Kumarswamy (1996) showed that it's

got 8 %, bearing in mind that this result is related to the projects of sewage pumping which are considered one of the difficult projects that need high health and safety measures, and this ensures the assumption reached by the researcher above.

4.4.2 Identification of "Factors" (sub-criteria) weights for contractor's selection

It is evident that the assigned weights for a random factor differ from respondent to other, although the large number of respondents, the achieved results were too close to others which reflect the professional experience of the respondents, therefore, the average weight for each factor was calculated using the following formula :

Average Weight for each factor = SUM (Wfi) / N , where Wfi is the weight assigned by the respondent i to the concerned factor, and N is the total number of respondents .

All the respondents results were filled in excel sheet, and exposed in details in the Annex 3 (Table A 2 : Assigned Weights to the 38 factors).

Table 4.14 illustrates the average weights assigned to the 38 factor used in the selection of contractors during the bidding stage according to the respondents opinions. Column 1 of table 4.14 shows the average weight of the classes , column 2 shows the fractional average weight of each factor within the same class, and column 3 shows the factor's average weight, which was calculated by multiplying the results in column 1 and 2 by each other, the results in this column represent the average weight of each factor within the whole factors. The weight associated to each factor reflects its importance in the selection of contractors during the evaluation stage.

Table 4.14 : Average Weights assigned to classes and factors

Class (Main criteria)	1 Class's Average Weight	Factors (Sub-criteria)	2 Fractional Average Weight of each factor in the class	3 3=(1 X2) Factor's Average Weight
Financial evaluation of the bid	**40.10%**	Lowest bid	*65.25*	26.16
		Unbalanced bid	*13.12*	5.26
		Arithmetic mistakes	*8.35*	3.35
		Financial reservation	*6.06*	2.43
		Balance sheet for the previous 3 years	*7.22*	2.90
Completeness of bid document	**9.64%**	Required bond	*44.40*	4.28
		Taxes clearance	*15.64*	1.51
		Financial capability	*18.86*	1.82
		Shortage contract offer	*21.10*	2.03
Past performances in similar projects	**8.08%**	Perform past projects on time	*44.70*	3.61
		Reasonability of cost in past project	*20*	1.62
		Quality level in past projects	*35.30*	2.85
Staff skills and experience	**7.40%**	Existing of Staff training	*14.79*	1.10
		Ratio of trained staff to total staff	*16.49*	1.22
		Project managers' experiences	*28.10*	2.08
		Other project staff experience	*19.58*	1.45
		Past performance of the project staff	*21.04*	1.55
Contractor's reputation/image	**6.86%**	Classification of the company	*37.51*	2.57
		Number of years in the business	*17.65*	1.21
		Contractor capital	*15.10*	1.04
		Past owner/contractor relationship	*15.51*	1.06

Class (Main criteria)	1 Class's Average Weight	Factors (Sub-criteria)	2 Fractional Average Weight of each factor in the class	3 3=(1 X2) Factor's Average Weight
		Cooperative in solving problems	*14.23*	0.98
Quality of work	**6.70%**	Quality records on previous projects	*42.66*	2.86
		Proposed quality control in implementation	*33.30*	2.23
		Application of the ISO system	*24.04*	1.61
Contractor site management /execution	**6.12%**	Type of proposed control and monitoring procedures during implementation	*34.13*	2.09
		Construction progress reporting systems	*25.60*	1.57
		Provision of trained /skilled staff for the particular project	*40.27*	2.46
Bid understanding	**5.62%**	Aware of bid document	*42.04*	2.36
		Explain ambiguous item	*21.63*	1.22
		Response ambiguous	*16.94*	0.95
		Solicit classified information	*19.39*	1.09
Plant and equipment resources	**5.14%**	Condition of equipment	*31.35*	1.61
		Suitability of equipment to the project size	*30.11*	1.55
		Efficiency of proposed technology level to the project type	*17.85*	0.92
		Availability of owned construction equipment	*20.69*	1.06

Class (Main criteria)	1 Class's Average Weight	Factors (Sub-criteria)	2 Fractional Average Weight of each factor in the class	3 3=(1 X2) Factor's Average Weight
Health and safety performance	**4.34%**	Proposed health and safety program	*50.10*	2.18
		Health and safety records on previous projects	*49.90*	2.16
Total	**100**	-	-	**100**

A detailed analysis and discussion is presented for the 38 factors used in the contractor's selection, the factors are analyzed within their classes and then compared to the results of similar available studies as follow :

4.4.2.1 Financial evaluation criteria

Table 4.15 shows that the weight of the lowest bid for the financial evaluation of the bid is equal 26.16%, the weight of the unbalanced bid equals 5.26%, the weight of the arithmetic mistakes equals 3.35%, the weight of the financial reservation equals 2.90%, and balance sheet for the previous 3 years equals 2.43%.

Table 4.15 : Financial evaluation of the bid

Class	Factors	Weight %
Financial evaluation of the bid **W=40.10%**	Lowest bid	26.16
	Unbalanced bid	5.26
	Arithmetic mistakes	3.35
	Financial reservation	2.90
	Balance sheet for the previous 3 years	2.43
Total weights		**40.10**

The class related to the financial evaluation of the bid is composed of five factors, the first factor and the most important one is the lowest bid, without price, the bid will be rejected directly, if the bid price is reasonable, there is a good chance to win the bid by the contractor, likewise, if the bid price is the lowest one, the chance to win the bid will increase to the maximum.

If the contractor submitted an unbalanced bid (The unbalanced bid mean the submission of over priced items for the first stage of the project and under priced items for the final stage, in order to get a considerable cash flow in early stage of implementation), this will affect negatively the image of the contractor's financial stability. The second factor got a considerable weight equals 5,26%, frequently, the submission of an unbalanced bid indicated the weakness of contractor's financial resources and the limitation of his cash money. The third factor is the existing of arithmetic mistakes, the respondent allocated a weight equals 5,26%, so the contractor is required to check the unit price and total item prices of his financial offer slowly in order to win the total weight of this factor.

The fourth factor is the financial reservation, the weight assigned to this factor is 2,43% and this factor represent the financial reputation of the contractor. The analysis of financial strength is usually required to indicate the likelihood of contract failure in terms of contractor capability and capacity to invests the project, in favor of that, the fifth factor related to the submission of balance sheet for the previous 3 years got 2,43 %, which match the study of Holt (1994) whereas this factor got 4,80 %.
Alsugair (1999) found that the financial reservation has got 2,25% which is very close to the results achieved by the researcher, moreover, the unplanned bid has got 9% by Alsugair (1999) and 5,26% by the researcher which indicate the importance of this factor from the point view of respondents in the two studies.

4.4.2.2 Bid understanding criteria

Table 4.16 shows that the weight of contractor understanding of all project documents equals 2.36%, the weight of the ability to explain ambiguous item equals 1.22%, the weight of the solicit classified information equals 1.09%, and the weight of the response ambiguous of the tender equals 0.95%.

Table 4.16 : Bid understanding

Class	Factors	Weight %
Bid understanding **W=5.62%**	Aware of bid documents(contractor understanding)	2.36
	Ability to Explain ambiguous item	1.22
	Solicit classified information	1.09
	Response ambiguous (Well- organized presentation)	0.95
Total weights		**5.62**

The first factor focuses on contractor's aware of bid documents, this factor got 2.36% and reflect the contractor understanding of the bid documents, the second factor is the ability to explain identified items in the bid and got 1.22%, it is frequently observed, that some contractors suggest that their own comments related to many unclear items in the bid and the accuracy of this submitted comments reproduce the level of contractor experience and comprehension referred to the bid documents.

The third factor is solicit classified information which mean fine presentation with a weight of 1.09%, and the fourth factor is submitting response to confusing items and got 0.95%. However, the results indicated the needs of competent and experienced contractor who can prove to the evaluation committee-during evaluation process- that he is capable of keeping the project implementation going without obstacles related to this factor.

The results of Alsugair (1999) study shows that the weights of the similar 4 factors are 6.5%, 1.5%, 1.5%, and 0.50% respectively, which reflect the correlation of the respondents opinions in Saudi Arabia and Gaza strip, in addition, the results indicated the similarity of the two construction sectors in this criteria.

4.4.2.3 Completeness of bid document criteria

Table 4.17 shows that the weight of required bound is equal 4.28%, the weight of the shortage contract offer equals 2.03%, the weight of the Financial capability equals 1.82%, and the weight of the taxes clearance equals 1.51%.

Table 4.17 : Completeness of bid document

Class	Factors	Weight %
Completeness of bid document **W=9.64%**	Required bond	4.28
	Shortage in contract offer	2.03
	Financial capability	1.82
	Taxes clearance	1.51
Total weights		**9.64**

The acceptance of any bid necessitate the completeness of all required documents listed in the bid invitation to indicate the responsiveness of the bidder to the project conditions. The submission of the required bond is the most important factor, if the bond is not submitted, the bid will be rejected in early stage and in most cases before starting the evaluation of bids. In case of submission of the required bond, this item will be checked in term of amount and duration validity, this factor got 1.05% according to Alsugair (1999) study and 4.28% in this research.

The second factor is the shortage in contract offer, the bidders are usually asked to submit documents and fill a number of forms related to general information, past projects, subcontractors, proposed time plan, breakdown of some of the items cost, contractors references, and other similar information, all these requirements need time and efforts from contractors to comply with these requests and submit a complete bid. In practice, more or less shortage in the submitted bids is frequently observed. This factor got 2.03 %, but, according to Alsugair(1999) study, the same factor got only 0.30% which reflect the difference in the level and organizational structure between the contractors in Saudi Arabia and Gaza strip.

Regarding the financial capability, this factor got in this study 1.82%, and 1.50% according to Alsugair(1999) study, and this indicated the importance of this item to the clients to guarantee the financial capability of the contractors and to avoid any failure due to shortage in the financial power of bidder.

The taxes clearance factor got 1.51%, but in similar studies like Alsugair study, this factor got zero, and this indicated the existence of difficulties or problems between some local

contractors and the ministry of finance related to taxes clearance, and this indicated the existence of previous disputes encountered by the respondents in previous projects related to contractor's delay in submission of their taxes clearance certificate for both income taxes and value added taxes (VAT).

It is noted that the local institutes or project owners require contractors to submit a taxes clearance certificate periodically, or before the submission of their payments. A clearance certificate is delivered by the ministry of finance (Taxes department). This certificate certifies that all taxes related to the project are already paid by the contractor, which indicates his strong and regular situation in reference to this criteria.

4.4.2.4 Contractor's reputation/image criteria

Table 4.18 shows that the weight of classification of the company equals 2.57%, the weight of number of years in the business equals 1.21%, the weight of the contractor capital equals 1.04%, the weight of the past owner/contractor relationship equals 1.06%, and the weight of cooperation in solving problems equals 0.98%.

Table 4.18 : Contractor's reputation/image

Class	Factors	Weight %
ntractor's reputation/image **W=6.86%**	assification of the company	2.57
	mber of years in the business	1.21
	st owner/contractor relationship	1.06
	ntractor capital	1.04
	operation in solving problems	0.98
Total Weights		**6.86**

The reputation of contractors has a large influence in evaluation process during the bidding stage, this criteria was composed of five factors with total weight equal 6.86%. The five factors got different levels of importance, the most important one was the classification of the contractor's company with a weight of 2.57%, and this interpretation is logic and justified, all clients prefer to work with a higher classified contractor to get the benefit of his strong experience and the more stable organization in comparison with other small

contractors. The second factor was the number of years in business with a weight of 1.21% , and 0.50% according to the study of Hatush and Skitmore (1998).

The third factor was the past owner/contractor relationship, the assigned weight was 1.04%, and 2% according to Hatush and Skitmore (1998) study, and this supports the suggestion that contractor is required to achieve the client's satisfaction and work to keep a good reputation in the construction market as a credit for future projects .

The contractor capital, and the cooperation in solving problems got 1.06 and 0.98%. However, Alsugair (1999) founded that each one of these two factors got 7%, the large difference between the results of the two studies is justified due to the high divergence of project between Saudi Arabia and Gaza strip, in reference to project amount, type, site conditions, and complexity.

4.4.2.5: Past performances criteria

Table 4.19 shows that the weight of performing past projects on time equals 3.61%, the weight of quality level in past projects equals 2.85%, and the weight of reasonability of cost in past project equals 1.62%.

Table 4.19 : Past performances in similar projects

Class	Factors	Weight %
Past performances in similar projects **W=8.08%**	Performing past projects on time	3.61
	Quality level in past projects	2.85
	Reasonability of cost in past project	1.62
Total Weights		**8.08**

The factors of this class or criteria focus on identification of past performance of bidders in previous projects in order to trace the successful completed projects in respect of project cost, quality and time, the weights of these factors were 3.61, 2.85, and 1.62%, for time, quality, and cost respectively. Moreover, the study of (Holt1994) concluded similar outputs with weights equal 4.18, 4.56 and 4.75% respectively and this is a good indication for the strong results achieved in this research. It is noted that the information about past performance habitually got from a single source: the bidders declarations, till now, there is

no local institute which documents the records of the previous construction project implemented in Gaza strip.

4.4.2.6 Contractor site management/execution criteria

Table 4.20 shows that the weight of provision of trained /skilled staff for the particular project equals 2.46% , the weight of the type of proposed control and monitoring procedures during implementation equals 1.57% , and the weight of the construction progress reporting systems equals 2.09% .

Table 4.20 : Contractor site management/execution

Class	Factors	Weight %
Contractor site management /execution **W=6.12%**	Provision of trained /skilled staff for the particular project	2.46
	Construction progress reporting systems	2.09
	Type of proposed control and monitoring procedures during implementation	1.57
Total Weights		**6.12**

The Clients prefer to work with a contractor who proved a considerable level of managerial and technical strength such as: the proposed control procedures during implementation, construction reporting systems, and provision of trained staff, frequently, clients require to know the qualifications of staff related to specific types of work, either at management or technical level. The mentioned factors got 2.09, 1.57 and 2.46% as weights according to the respondents opinion. In the study of Hatush and skitmore (1998), the management knowledge got 2.00% and according to Tarawnah (2004), the factor related to the site management and contractor staff got 4.30% which validate the results achieved by the researcher.

It is noted that the majority of technical staff working with the local contractors suffer from instable employment situation, and frequently, their jobs are temporary, for short duration, and ended just after the completion of project implementation. The discontinuity of their practical experience mean the necessity and need of this staff to participate in several

training session in order to improve their managerial and technical skills, and specially, the issues related to reporting and monitoring procedures of construction projects.

4.4.2.7: Health and safety performance criteria

Table 4.21 shows that the weight of proposed health and safety program equals 2.18%, and the weight of the health and safety records on previous projects equals 2.16% .

Table 4.21 : Health and safety performance

Class	Factors	eight %
alth and safety performance **W=4.34%**	oposed health and safety program	.18
	alth and safety records on previous projects	.16
Total Weights		**.34**

All the clients requirements ask contractors to submit their previous records in addition to their proposed program related to health and safety, the weights got for these two factors were 2,16 and 2,18% respectively. In a similar study, Hatush and skitmore (1998) found that the assigned weight of health and safety records was 5.00 %, as well as Holt (1994) achieved 2.85%, the intersection of conclusion in the three studies indicated the strengths of the research results.

Habitually, the project documents contain the required measures and procedures related to health and safety, but this information is not always taken seriously by some contractors and it is rare to find a contractor rejected due to this factor. Consequently, the weights assigned by the respondents to the safety factors indicated the client's need to engage the contractor with better safety records and who propose an efficient safety program.

In reference to health and safety records on previous projects, the unique source of such kind of information is the evaluated contractors themselves, so it is necessary to establish a public archival institute to be as official source which carries the needed information to local clients and project owners.

4.4.2.8 Plant and equipment resources criteria

Table 4.22 shows that the weight of condition of equipment equals 1.61%, the weight of the suitability of the equipment to the project size equals 1.55%, the weight of the availability of owned construction equipment equals 1.06%, and the weight of the efficiency of proposed technology level equals 0.92%.

Table 4.22 Plant and equipment resources

Class	Factors	Weight %
Plant and equipment resources **W= 5.14%**	Condition of equipment	1.61
	Suitability of equipment to the project size	1.55
	Availability of owned construction equipment	1.06
	Efficiency of proposed technology level to the project type	0.92
Total Weights		**5.14**

Regarding the suitability of equipments and sufficient resources, it is a clear evidence to evaluate these factors in details. Four factors were identified to measure the plant and equipment, the suitability of equipment, the owned equipment, and the proposed technology, the weights of these factors were 1.66, 1.55, 1.06, and 0.92% respectively, closed results were achieved by Hatush and Skitmore (1998) with a weight of 4. 5%, and this is a good indication of the similarity of clients need in kingdom of Britain and Gaza strip in reference to these factors.

The availability of equipment resource, and in particular the owned equipment, allows the company to demonstrate that it has the technical capacity to do the required project tasks easily. In addition, it enables clients to reach an informed opinion related to these factors, so the contractor is required, in each project, to demonstrate that the proposed plant and equipment is adequate to do the work properly and expeditiously in order to achieve the maximum weight related to safety factors.

4.4.2.9 Quality of work criteria

Table 4.23 shows that the weight of the quality records on previous projects equals 2.86%, the weight of the proposed quality control system during implementation equals 2.23% , and the weight of the application of the ISO system equals 1.61% .

Table 4.23 : Quality of work

Class	Factors	Weight %
Quality of work **W=6.70%**	Quality records on previous projects	2.86
	Proposed quality control system during implementation	2.23
	Application of the ISO system	1.61
Total Weights		**6.70**

Generally, most of previous researches in respect of contractor selection has been concerned with identifying criteria or factors related to the quality of work, in this research, three factors were used, the first one was the quality records in previous project, with a weight of 2.86%, and 4.16% according to Tarawnah (2004) study. The second factor was the proposed quality control system during implementation, with 2.23% , and 2.70% according to the finding of Holt (1994) study, the close results in both researches confirmed the similarity of clients requirement in respect to quality.

The third factor was the application of the ISO system, with a weight of 1.61%, this result indicated the desires of respondents to contracts a contractor who is familiar with the application of quality procedures according to the international standards. It is noted that the ISO system was achieved and obtained by few local contractors in Gaza strip through the assistance and support of international agencies related to quality control in the construction sector. The results demonstrated the tendency of respondents to avoid the problems related to quality in their projects.

Appraising the proposed quality control system is a benefit to the bidder and owner who lead on boosting overall quality in the construction industry, such concurrence between bidders could indirectly help the performance of local contractors regarding quality of work in order to obtain the maximum score of the assigned weights either in

the evaluation process and to keep records well for future relationships with other clients.

The quality is a measure of a contractor's compliance with client requirements, also the quality performance is considered vital for client satisfaction, consequently, the absence of a public archival institute related to construction projects records lead to getting information about quality records from the evaluated contractors, moreover, this is not accurate in various cases, specially, for the validity and transparency of the evaluation process. The establishment of such archival institute will be helpful to all clients related to the local construction sector.

4.4.2.10: Staff skills and experience criteria

Table 4.24 shows that the weight of the project managers' experiences equals 2.08%, the weight of the past performance of the project staff equals 1.55%, the weight of the other project staff experience equals 1.45%, the weight of the ratio of staff taking training to total number of staff equals 1.22%, and the weight of the existence of staff training program equals 1.10%.

Table 4.24 : Staff skills and experience

Class	Factors	Weight %
	Project managers' experiences	2.08
Staff skills and experience **W=7.40%**	Past performance of the project staff	1.55
	Other project staff experience	1.45
	Ratio of trained staff to total staff	1.22
	Existing of Staff training program	1.10
Total Weights		**7.40**

This criteria is usually used to trace the contractor's staff skills, such information is needed to obtain satisfaction about the Human Resource Management system (HRM) used by the contractors, five factors were used to focus this important point. The most important two factors, according to the respondents opinion, were the project manager experience and the past performance of the project staff, with weights 2.08 and 1.55%

respectively. However, the results achieved were ranged between the finding of Hatush and Skitmore (1998) study, and Holt (1994) study with a weight of 2% and 5.06% respectively.

The other three factors were the experience of other staff, ratio of trained staff to total staff, and the existence of Staff training program, the assigned weights were 1.45 , 1.22 , and 1.1% respectively, this finding is close to the finding of Holt (1994) which assigned 6.10% to the similar factors. The results achieved justified the clients concerns to predict, in early stage, the qualification of contractor's staff skills, either at management or technical level, as well as the staff training program.

It is also noteworthy that the considerable weight assigned to this criteria by the evaluators means the existence of various shortage in the experience and skills of contractor's staff really observed by the evaluators in previous project, so the contractors are required to suggest high criteria before the recruitment of their technical staff, in addition to keeping in their firms, permanently, a qualified staff and provide a periodic training system in order to develop their managerial and technical skills.

4.4.3 Impact of Factors (sub-criteria) on contractor's selection

After identifying the 38 factors involved in bid's selection, the next step is to study the impact of each factor (sub-criteria) on bid selection. The goal of this process is to reach the summation of factor's weight assigned or allocated to each bid, in other words, determine the score or achievement of each bid at the end of evaluation process in order to measure the differences between the submitted bids.

By using the standard forms (bid evaluation forms) to evaluate a contractor's bid, the evaluator is required to find the real impact of each factor, based on the information provided by the contractor in his bid. Some factors have positive impact on the bid, similarly, other factors may have negative impact on bid evaluation e.g., if the contractor submitted an un-balanced bid , or may cause the bid to be rejected e.g., if the contractor has not submitted the required bond.

Since these factors were developed for different types of owner sectors, the impact of these factors is different, depending upon the sector type and the project characteristics.

Some of the factors are not applicable in all sectors (i.e., they have no impact e.g. the existence of arithmetic mistakes, or the availability of owned equipment in a building project, whereas this factor has no impact). Other factors have either a positive or negative impact on the bid.

To accommodate these different impacts reasonably and similarly to the idea used by Alsugair (1999) in his study, four levels of impact have been identified, these levels are:

- **To reject the bid**, (Bank guarantee not submitted, or bid form not filled)
- **A negative impact**, (Bad past owner/contractor relationship, or reputation)
- **No effect, and** (Arithmetic mistake)
- **A positive impact**. (Good past owner/contractor relationship)

To get more accurate results, the levels of negative and positive impact have been further divided into high, medium, and low impact (100%, 66%, and 33% respectively), it is noted that this analysis is similar to the breakdown used by Alsugair (1999). This further detail is required to improve the preciseness of bid evaluation, because a group of factors may all have a positive or a negative impact, their degree of influence might differ. These qualitative levels have been transferred into quantitative values to be used for calculating the evaluation score allocated by each evaluators to the bidders. Each level has a percentage value, except for the reject level, because if reject is selected, the bid will be rejected regardless of the value of the other factors.

Table 4.25 shows the percentages of the factor impact on the project evaluation. According to the evaluators visions, only one impact should be chosen and allocated to each factor (only one column will be filled in table 4.25 for each factor). Table 4.25 also illustrates the score that should be assigned to each factor in reference to the level of impact, there are many probable scores but it is evident that evaluators should allocate only one score from the probable scores to each factor. It is noted that the score +1.00 correspond to the high positive impact, the score -0.66 mean the medium negative impact, the score +0.33 correspond to the low positive impact, and 0.00 correspond to "reject the bid".

Table 4.25 : Percentages of factors' impact (Alsugair 1999)

Factor Impact on contractor selection							
No effect	**Positive impact**			**Negative impact**			**Reject the bid**
	High	Medium	Low	High	Medium	Low	
-	+100 %	+66 %	+33	-100 %	-66%	-33%	**0**
Probable Score	+ 1.00	+ 0.66	+ 0.33	- 1.00	- 0.66	- 0.33	0
Assigned score	-	-	-	-	-0.66 (as example)	-	-

The behavior of individuals differs from one person to another and as well with the same person the behavior my differ from one day to another day according to the morals, ethics, work conditions, neighborhood, or other factors. Consequently, it is evident that the opinion of respondents can be impacted with different manner from factor to other during evaluation process, and this lead to justify that the results of the 51 respondents were covered the eight level of factor's impact mentioned in table 4.25.

However, when starting analyses and comparison between the results, it is require to assign the appropriate impact for each factor, so there is a need to select only one impact for each factor from the eight level of impacts defined in this research. Practically, the evaluation process is done by 3 or 4 evaluators, but in this research the respondents number is 51 i.e. 51 evaluators and then all types of impact were received in the results related to the factor's impact. To assign only one impact for each factor , the most reasonable decision was to select the impact allocated by the highest percentage of respondents, and this means assuming the opinion of the largest part of respondents who have an identical way of thinking, and then, neglect the other impacts which represent minor percentage of respondents i.e. the remaining part of respondents.

The impact and weight assigned by the interviewed respondents is explored for the 38 factors and analyzed as follow :

4.4.3.1 Class 1: Financial evaluation factors

Table 4.26 shows that 66.7% of respondents consider that the lowest bid is factor on contractor selection with high positive impact, 52% of respondents consider that the unbalanced bid is factor on contractor selection with medium negative impact, 51% of respondents consider that the arithmetic mistakes is factor on contractor selection with no effect, 40% of respondents consider that the financial reservation is factor on contractor selection with no effect, and 41.20% of respondents consider that the balance sheet for the previous 3 years is factor on contractor selection with low positive impact

Table 4.26 : Factor Impact of Class 1(Financial evaluation factors)

S.N	Factors	Factor Impact on contractor selection							
		No effect 0(%)	Positive impact			Negative impact			Reject the bid (%)
			High +100(%)	Medium +66(%)	Low +33(%)	High -100(%)	Medium -66(%)	Low -33(%)	
1	Lowest bid	5.9	66.7	19.6	3.6	0	2.0	2.0	0.0
2	Balance sheet for the previous	19.6	7.8	29.4	41.2	0	0	2.0	0.0
3	Financial reservation	40.0	2.0	22.0	16.0	2.0	2.0	11.8	4.0
4	Arithmetic mistakes	51.0	0.0	2.0	7.8	11.8	11.8	13.7	2.0
5	Unbalanced bid	4.0	2.0	6.0	2.0	14.0	52.0	18.0	2.0

The results reached in the Table 4.26 ensures the high positive impact because the bid which is presented is the lowest. This shows the way of thinking of the evaluators in the local institutions. In addition, the results showed less interest in presenting balance sheet by the contractor. This is as a result of ensuring that this factor has a low positive impact by most of the evaluators, moreover, it is noted that the arithmetic mistakes and financial reservation have no effect on choosing the contractor according to the opinion of most respondents. Concerning the presentation of unbalanced bid, 52 % of the respondents think that it has a medium negative impact, this response indicated that this

part of respondents have encountered problems on previous cases of unbalanced bids. The contractors are required to submit a balanced bid price in order to overcome any misunderstanding or negative impact of the evaluators, and then reach a positive impact which mean get a high score of the assigned weight of the financial factors. It is noted, according to the researcher experience, that the tendency of local contractors to submit un unbalanced bids is on decline during the last years.

4.4.3.2 Class 2: Bid understanding factors

Table 4.27 shows that 92.20% (31.40 , 33.30 , 27.50) of respondents consider that solicit classified information is factor on contractor selection with positive impact (high, medium, and low impact), 47.10% of respondents consider that the aware of bid document is factor on contractor selection with medium positive impact, 41.20% of respondents consider response ambiguity is factor on contractor selection with medium positive impact, and 45.10% of respondents consider that explaining ambiguous item is factor on contractor selection with medium positive impact. In addition just about 8% of respondents consider that all factors of this class have no effect on contractor selection.

Table 4.27: Factor Impact of Class 2 (Bid understanding factors)

S.N	Factors	Factor Impact on contractor selection							
		No effect 0(%)	Positive impact			Negative impact			Reject the bid (%)
			High +100(%)	Medium +66(%)	Low +33(%)	High -100(%)	Medium -66(%)	Low -33(%)	
1	Solicit classified information.	7.8	31.4	33.3	27.5	0.0	0.0	0.0	0.0
2	Aware of bid document.	11.8	21.6	47.1	19.6	0.0	0.0	0.0	0.0
3	Response ambiguous/well -organized	13.7	17.6	41.2	27.5	0.0	0.0	0.0	0.0
4	Explain ambiguous item.	7.8	9.8	45.1	37.3	0.0	0.0	0.0	0.0

The results showed that all the factors of this class, which are related to the contractor's bid understanding, have a positive impact according to 90.0% of respondents, but the views of evaluators differed in the level of influence of this impact . It was assorted as high positive impact, medium impact, and finally low positive impact.

Since the results of the 4 factors had positive impact, this shows the importance of this point and it also ensures that only a few contractors consider these factors. As a result, respondents(evaluators) will tolerate positively in evaluating such bids and specially when they go through documents that assert the contractor's understanding of all the bid's items. Thus, it's a positive indication about the contractor's experience and skills in this field.

4.4.3.3 Class 3 : Completeness of bid document factors

Table 4.28 shows that 76.5% of respondents consider that the required bond is factor on contractor selection with high positive impact, 47.10% of respondents consider that the taxes clearance is factor on contractor selection with high positive impact, 68.70% (47.10 , 19.60) of respondents consider that the financial capability is factor on contractor selection with high and medium positive impact, 31.40% of respondents consider that the shortage contract offer is factor impact on contractor selection guide to reject the bid. However, 27.5% of respondents consider that the shortage contract offer is factor on contractor selection with high negative impact, as well as 19.6% of respondents consider that this factor has a medium negative impact on contractor selection.

Table 4.28: Factor Impact of Class 3 (Completeness of bid document factors)

S.N	Factors	Factor Impact on contractor selection							
		No effect 0(%)	Positive impact			Negative impact			Reject the bid (%)
			High +100(%)	Medium +66(%)	Low +33(%)	High -100(%)	Medium -66(%)	Low -33(%)	
1	Required bond	9.8	76.5	5.9	5.9	0.0	0.0	0.0	2.0
2	Taxes clearance	15.7	47.1	19.6	13.7	0.0	0.0	3.9	0.0
3	Financial capability	7.8	35.3	33.3	13.7	5.9	2.0	2.0	0.0
4	Shortage contract offer	3.9	7.8	3.9	2.0	27.5	19.6	3.9	31.4

Completeness of bid documents is considered one of the basic conditions of accepting the bid. Therefore, all factors of this class can provide high positive impact concerning the contractor if they are completed. Meanwhile, in case the evaluators found any shortage in the bid or non compliance to one or some project requirements, this will guide to a high negative impact and may lead to rejecting the bid. As a result, the outcomes achieved above ensures this analysis and confirm the evaluator's experience and their closed opinions in reference to this class.

4.4.3.4 Class 4 : Contractor's reputation factors

Table 4.29 shows that 43.10% of respondents consider that the classification of the company is factor on contractor selection with high positive impact, 46.0% of respondents consider that the number of years in the business is factor on contractor selection with medium positive impact, 46.0% of respondents consider that cooperating in solving problems is factor on contractor selection with medium positive impact, 36.0% of respondents consider that the past owner/contractor relationship is factor on contractor selection with medium positive impact. However, 44.9% of respondents consider that contractor capital is factor on contractor selection with medium positive impact, and

between 4.0% to 10.0% of respondents consider that all factors of this class has no effect on contractor selection.

Table 4.29 Factor Impact of Class 4 (Contractor's reputation factors)

S.N	Factors	Factor Impact on contractor selection							
		No effect 0(%)	Positive impact			Negative impact			Reject the bid (%)
			High +100(%)	Medium +66(%)	Low +33(%)	High -100(%)	Medium -66(%)	Low -33(%)	
1	Classification of the company.	5.9	43.1	23.5	17.6	0.0	0.0	0.0	9.8
2	Number of years in the business	6.0	28.0	46.0	18.0	0.0	2.0	0.0	0.0
3	Cooperative in solving problems.	4.0	22.0	46.0	26.0	0.0	0.0	2.0	0.0
4	Past owner/contractor	10.0	22.0	36.0	28.0	0.0	0.0	2.0	2.0
5	Contractor capital.	6.1	14.3	44.9	32.9	0.0	0.0	2.0	0.0

It is normal for the contractor's reputation to be excellent and to have positive impact on the evaluation process. As generally known, the past impression about contractor's reputation has a fast impact from the evaluators even before the start of evaluation process, and this is precisely what the results above showed. It clarified that all factors of this class had medium and high positive impact according to the evaluators' opinion.

4.4.3.5 Class 5 : Past performances factors

Table 4.30 shows that 86.30% (39.2 , 47.10) of respondents consider that performing past projects on time is factor on contractor selection with high and medium positive impact, 78.50% (41.20 , 37.30) of respondents consider that quality level in past projects is factor on contractor selection with high and medium positive impact. Moreover, 60.80% (27.50 , 33.30) of respondents consider that reasonability of cost in past project is factor on contractor selection with medium and low positive impact, other than 22.50% of them

consider that this factor has no effect on contractor selection, and between 2.00% to 3.90% of respondents consider that the quality level in past projects factor and performing past projects on time factor has no effect on contractor selection.

Table 4.30 Factor Impact of Class 5 (Past performances factors)

S. N	Factors	Factor Impact on contractor selection							
		No effect 0(%)	Positive impact			Negative impact			Reject the bid (%)
			High +100(%)	Medium +66(%)	Low +33(%)	High -100(%)	Medium -66(%)	Low -33(%)	
1	Perform past projects on Time	3.9	39.2	47.1	7.8	2.0	0.0	0.0	0.0
2	Quality level in past projects	2.0	41.2	37.3	15.7	2.0	0.0	2.0	0.0
3	Reasonability of Cost in past project	22.5	11.8	27.5	33.3	2.0	0.0	0.0	0.0

As it is shown in Table 4.30, most of the respondents assigned positive impact on the past performance factors, but with different levels. Therefore, the positive past performance of the contractor related to the project cost, quality and time could lead to increase of the contractor's score during evaluation of the bid.

This explain the evaluator's interest in awarding the bid to a contractor of previous experience in implementing similar projects with reasonable cost, time, and within greater level of quality, so in case of not having previous similar experiences, the result would be vise versa, this means that evaluators will assign negative impact on these factors which reduces the contractor's score. As a result, the contractor chance of winning the bid becomes more difficult.

The results showed that the three factors: cost – time – quality got more or less equal importance according to the evaluators opinions and this gives more confidence in the

respondent's experience because the three factors have obtained relatively too close importance in several researchers related to construction sector.

4.4.3.6 Class 6 : Contractor site management factors

Table 4.31 shows that 98% (33.30 , 39.20 , 25.50) of respondents consider that provision of trained /skilled staff for the particular project is factor on contractor selection with high, medium, and low positive impact, 72.60% (47.10 , 25.50) of respondents consider that the type of proposed control and monitoring procedures during implementation is factor on contractor selection with medium and low positive impact, 72.50% (43.10 , 29.40) of respondents consider that the construction progress reporting is factor on contractor selection with medium and low positive impact, and 13.70% of them consider that this factor have no effect on contractor selection.

Table 4.31 Factor Impact of Class6 (Contractor site management factors)

S. N	Factors	Factor Impact on contractor selection							
		No effect 0(%)	Positive impact			Negative impact			Reject the bid (%)
			High +100(%)	Medium +66(%)	Low +33(%)	High -100(%)	Medium -66(%)	Low -33(%)	
1	Provision of trained /skilled staff for the particular project	2.0	33.3	39.2	25.5	0.0	0.0	0.0	0.0
2	Type of proposed control and monitoring procedures during implementation	9.8	15.7	47.1	25.5	0.0	2.0	0.0	0.0
3	Construction progress reporting systems	13.7	11.8	43.1	29.4	2.0	0.0	0	0

The three factors of this class had a positive impact on contractor selection according to the dominant part of respondents, this is a good indication of the importance of this factors. As

a result the factors related to contractor site management consist significant part of the technical evaluation, and could be considered by the contractors in their submitted bids

4.4.3.7 Class 7: Health and safety factors

Table 4.32 shows that 88.20% (21.60 , 37.20 , 29.40) of respondents consider that proposed health and safety program is factor on contractor selection with positive impact. However,11.80% of respondents consider that this factor has no effect on contractor selection, 90.20% (13.70 , 29.40 , 47.10) of respondents consider that the health and safety records on previous projects is factor on contractor selection with high, medium, and low positive impact, and 9.8% of them consider that this factor have no effect on contractor selection.

Table 4.32: Factor Impact of Class 7 (Health and safety factors)

S. N	Factors	Factor Impact on contractor selection							
		No effect 0(%)	Positive impact			Negative impact			Reject the bid (%)
			High +100(%)	Medium +66(%)	Low +33(%)	High 100(%)	Medium -66(%)	Low -33(%)	
1	Proposed health and safety program	11.8	21.6	37.2	29.4	0.0	0.0	0.0	0.0
2	Health and safety records on previous projects	9.8	13.7	29.4	47.1	0.0	0.0	0.0	0.0

The two factors of this class had a positive impact on contractor selection according to the dominant part of respondents, this is a good indication of the importance of this factors. As a result the factors related to health and safety consist significant part of the technical evaluation, and could be considered by the contractors in their submitted bids

4.4.3.8 Class 8 : Plant and equipment factors

Table 4.33 shows that 60.88% (27.58 , 33.30) of respondents consider that the suitability of the equipment to the project size is factor on contractor selection with medium and low positive impact, 76.50% (31.40 , 45.10) of respondents consider that the condition of equipment is factor on contractor selection with medium and low positive impact, 72.60%

(31.40 , 41.20) of respondents consider that the availability of owned construction equipment is factor on contractor selection with medium and low positive impact, other than 17.60% of them consider that this factor have no effect on contractor selection, and 76.40% of respondents consider that the efficiency of proposed technology level to the project type is factor on contractor selection with medium and low positive impact.

Table 4.33: Factor Impact of Class 8 (Plant and equipment factors)

S. N	Factors	Factor Impact on contractor selection							
		No effect 0(%)	Positive impact			Negative impact			Reject the bid (%)
			High +100(%)	Medium +66(%)	Low +33(%)	High 100(%)	Medium -66(%)	Low -33(%)	
1	Suitability of the equipment to the project size	15.7	21.6	27.58	33.3	0.0	2.0	0.0	0.0
2	Condition of equipment	7.8	13.7	31.4	45.1	2.0	0.0	0.0	0.0
3	Availability of owned construction equipment	17.6	9.8	31.4	41.2	0.0	0.0	0.0	0.0
4	Efficiency of proposed technology level	17.6	5.9	33.3	43.1	0.0	0.0	0.0	0.0

The four factors of this class had a positive impact on contractor selection according to more than 82% of respondents, this is a good indication of the importance of this factors. As a result the factors related to plant and equipment consist significant part of the technical evaluation, and could be considered by the contractors in their submitted bids.

4.4.3.9 Class 9 : Quality factors

Table 4.34 shows that 92.10% (19.60 , 49.00 , 23.50) of respondents consider that the quality records on previous projects is factor on contractor selection with positive impact, 72.50% (43.10 , 29.40) of respondents consider that the proposed quality control system during implementation is factor on contractor selection with medium and low positive impact, 77.50% (16.30 , 34.70 , 26.50) of respondents consider that the application of the ISO system is factor on contractor selection with positive impact. However, 20.40% of respondents consider that this factor have no effect on contractor selection.

Table 4.34 : Factor Impact of Class 9 (Quality factors)

S. N	Factors	Factor Impact on contractor selection							
		No effect 0(%)	Positive impact			Negative impact			Reject the bid (%)
			High +100(%)	Medium +66(%)	Low +33(%)	High -100(%)	Medium -66(%)	Low -33(%)	
1	Quality records on previous projects	7.8	19.6	49.0	23.5	0.0	0.0	0.0	0.0
2	Proposed quality control system during implementation	17.6	9.8	43.1	29.4	0.0	0.0	0.0	0.0
3	Application of the ISO system	20.4	16.3	34.7	26.5	0.0	0.0	2.0	0.0

The 3 factors of this class had a positive impact on contractor selection according to more than 79% of respondents, this is a good indication of the importance of this factors. As a result the factors related to quality consist significant part of the technical evaluation, and could be considered by the contractors in their submitted bids.

4.4.3.10 Class 10 : Staff skills and experience factors

Table 4.35 shows that 82.40% (45.10 , 7.30) of respondents consider that the project managers' experiences is factor on contractor selection with high and medium positive impact, however 7.8%of respondents consider that this factor has no effect on contractor selection.

In addition, 70.60% (23.50 , 47.10) of respondents consider that the past performance of the project staff is factor on contractor selection with high and medium positive impact, 86.30% (19.60 , 51.00 , 15.70) of respondents consider that other project staff experience is factor on contractor selection with high, medium and low positive impact, other than 11.80% of them consider that this factor has no effect on contractor selection. 23.50% of respondents consider that the ratio of staff taking training to total number of staff with no effect on contractor selection, and moreover 31.40% of respondents consider that existing of staff training program is factor with no effect on contractor selection .

Table 4.35 : Impact of Class 10 (Staff skills and experience factors)

S.N	Factors	Factor Impact on contractor selection							
		No effect 0(%)	Positive impact			Negative impact			Reject the bid (%)
			High +100(%)	Medium +66(%)	Low +33(%)	High -100(%)	Medium -66(%)	Low -33(%)	
1	Project managers' experiences	7.8	45.1	37.3	7.8	0.0	0.0	2.0	0.0
2	Past performance of the project staff	7.8	23.5	47.1	19.6	0.0	0.0	2.0	0.0
3	Other project staff experience	11.8	19.6	51.0	15.7	0.0	0.0	2.0	0.0
4	Ratio of staff taking training to total number of staff	23.5	11.8	31.4	33.3	0.0	0.0	0.0	0.0

S.N	Factors	Factor Impact on contractor selection							
		No effect 0(%)	Positive impact			Negative impact			Reject the bid (%)
			High +100(%)	Medium +66(%)	Low +33(%)	High -100(%)	Medium -66(%)	Low -33(%)	
5	Existing of Staff training program	31.4	11.8	21.6	35.3	0.0	0.0	0.0	0.0

The five factors of this class had a positive impact on contractor selection according to the dominant part of respondents, this is a good indication of the importance of this factors. As a result the factors related to contractor's staff skills and experience consist significant part of the technical evaluation, and could be considered by the contractors in their submitted bids and during project implementation.

To conclude, the results got for the ten classes ensure the importance of all factors of those classes because if it's available to the contractor and in his bid, this will lead to achieve completely positive impacts of the evaluators, and vise versa. If they aren't available, that will lead to getting negative impacts, so this asserts the importance of all related factors in evaluating the contractor's bid.

The results also affirm the evaluators interest in taking into consideration multiple factors other than cost in evaluating the contractors and classifying them. That also helps in stopping the bid price decline because using evaluation process with multi- criteria rather than cost, will encourage contractors to develop technical and managerial skills of their staff in addition to improving their own quality control, equipment, and safety measures in order to increase the final score value in such evaluation and achieve the owners satisfaction, by the way the local contractors could build structured firms. Using a contractor selection system based on multi technical criteria among time will minimize the probability of contractors who submit lowest price to win the bid, or may exclude them from bid competition.

It's worthy to mention that a few of respondents thought that these factors had no effect on evaluation process according to their opinions. It was a percentage between 2 % to 20 %

from the respondents. It's a low percentage, but it shows that there are still some views banked on evaluating the contractors according to the cost criteria only and it doesn't give any importance to other technical factors. This result doesn't mean that factors other than cost are not important, but it means that this small part of respondents might not face any significant problems when their previous bids were awarded to the lowest price. As a result, we cannot neglect these views although it represents low percentage of respondents.

4.4.4. Final score calculation

After the determination of the weights assigned to the 38 factors used in the selection of contractors and identification of the different type of the factor's impact, the evaluators can define the score or the value of each bid of the concurrent bidders, the score assigned to each factor represent the percentage of contractor compliance to the requirements related to this factor. More compliance or fulfillment to bid requirement make bidder achieve more scores.

The factor's score represents the contribution of this factor to the bid evaluation based on respondents opinion. The possible contributions are a positive impact, a negative impact, no effect, or rejecting the bid as arranged by Alsugair (1999) and similarly used by the researcher. The probable formulas for calculating the factor score for different factors, are as follow :

- Factor score $_i$ = Factor impact $_i$ x Factor weight $_i$ / In case of positive or negative impact
- Factor score = Zero / In case of no effect
- Factor score = Reject / In case of reject of bid

The evaluation score represents the decision associated to evaluate the bid. An evaluation score will be calculated for each bid. The bid that has the highest score represents the bid that should be selected. The evaluation score for a bid is calculated using the following equation:

$$\textbf{Evaluation Score} = \Sigma \textbf{ Factors Score}_i$$

(i = 1,……n , where n = the number of factors, and in this research n = 38 factors**)**

To show how the bid evaluation process was performed, Table 4.36 illustrates the results of the final score got according to the "average weighted" opinion of all respondents for every factor . The factors weights got from Table 4.14, and the factor's impact got from Table 4.26 to Table 4.35 respectively, after that, the score assigned to each factor can be calculated. The factor score of each factor is shown in column (3) and represent the multiplication of results of column(1) by the results of column(2). The final score for the bid is the summation of the 38 factor's scores, the bid has an evaluation score of 52.15 % as presented for example at the end of column(3) in Table 4.36.

The achieved score of 52.15% represent the result of evaluation of one submitted bid ,the other submitted bids are similarly evaluated according to the evaluators opinions and with different score according to their compliance to the factors used in the evaluation process, the achieved score of each bidder is proportional to his fulfillment of bid requirements referred to the 38 factors. The bidder which get the highest total score value from all bidders is then selected and considered the winner of the project.

To improve concurrence between contractors a minimum score is required to be achieved by the bidders , any bidder got less the minimum required score should routinely excluded from competition, the minimum required score me be variable (50% ,60%, or 70%) according the type or project sector and should be mentioned clearly in the bid documents.

Table 4.36 : Evaluation form (Final score of the bid)

Class (Main criteria)	Factors (Sub-criteria)	(1) Factor impact	(2) Factor weight	(3=1*2) Factor score
Financial evaluation of the bid	Lowest bid	*0.79*	26.16	20.66
	Unbalanced bid	*-0.48*	5.26	-2.52
	Arithmetic mistakes	*-0.20*	3.35	-0.67
	Financial reservation	*0.14*	2.43	0.34
	Balance sheet for the pr 3 years	*0.40*	2.90	1.16
Completeness of bid document	Required bond	*0.82*	4.28	3.51
	Taxes clearance	*0.63*	1.51	0.95
	Financial capability	*0.54*	1.82	0.98
	Shortage contract offer	*-0.31*	2.03	-0.63
Past performances in similar projects	Perform past projects on time	*0.71*	3.61	2.56
	Reasonability of cost in past project	*0.39*	1.62	0.63
	Quality level in past projects	*0.68*	2.85	1.94
Staff skills and experience	Existing of Staff training program	*0.38*	1.10	0.42
	Ratio of trained staff to total staff	*0.43*	1.22	0.52
	Project managers' experiences	*0.72*	2.08	1.50
	Other project staff experience	*0.58*	1.45	0.84
	Past performance of the project staff	*0.60*	1.55	0.93
Contractor's reputation/image	Classification of the company	*0.64*	2.57	1.64
	Number of years in the business	*0.63*	1.21	0.76
	Contractor capital	*0.54*	1.04	0.56
	Past owner/contractor relationship	*0.54*	1.06	0.57
	Cooperative in solving problems	*0.60*	0.98	0.59
Quality of work	Quality records on previous projects	*0.59*	2.86	1.69
	Proposed quality control in implementation	*0.48*	2.23	1.07
	Application of the ISO system	*0.47*	1.61	0.76

Class (Main criteria)	Factors (Sub-criteria)	(1) Factor impact	(2) Factor weight	(3=1*2) Factor score
Contractor site management /execution	Type of proposed control and monitoring procedures	*0.54*	2.09	1.13
	Construction progress reporting systems	*0.48*	1.57	0.75
	Provision of trained /skilled staff for the particular project	*0.67*	2.46	1.65
Bid understanding	Aware of bid document	*0.59*	2.36	1.39
	Explain ambiguous item	*0.52*	1.22	0.63
	Response ambiguous	*0.54*	0.95	0.51
	Solicit classified information	*0.62*	1.09	0.67
Plant and equipment resources	Condition of equipment	*0.47*	1.61	0.76
	Suitability of equipment to the project size	*0.49*	1.55	0.76
	Efficiency of proposed technology level to the project type	*0.42*	0.92	0.39
	Availability of owned construction equipment	*0.44*	1.06	0.47
Health and safety performance	Proposed health and safety program	*0.56*	2.18	1.22
	Health and safety records on previous projects	*0.49*	2.16	1.06
Total	-	-	**100**	**52.15**

Table 4.36 summarizes all the steps of the evaluation process and represent the evaluation form to each submitted bid. Table 4.36 contains the classes (main criteria) used for the evaluation of bids, the factors (sub-criteria), the weight assigned to each factor , the impact of each factor to contractor selection, and the factor score. The evaluators should determine the score of each factor according to the impact assigned to this factor. After the calculation of all factor scores, the total score is then concluded for the bid. In case of submission of 9 bids (for example) the evaluation committee should fill 9 bid forms, one independent form to each bid, and in each bid form the filled results represent the average

score of all the evaluators participated in the evaluation process. The bidder with the highest total score from all submitted bidders is then selected and considered the winner of the project.

It is noted that the "evaluation form"- Table 4.36 - document the evaluation process and awarding decision and assure the transparency of this process, in addition, it protect the rights of participated bidders to equal opportunities, and assure the serious of evaluators.

4.5 Awarding Stage

The researcher throughout the thesis investigated the contractor's selection methods. The main-criteria (Class) and sub-criteria (Factor) suitable for selection of local contractors have been selected. The weights assigned to all classes and their factors were identified, the impact of each factor on contractor's selection has been discussed and defined. In conclusion, the final score assigned to each bidder was calculated according to defined formula and as explored in the evaluation form (Table 4.36).

The final stage of the evaluation process is the awarding decision. The respondents are asked to advise the suitable awarding method and the way to bring and consider the results of the evaluation process in the awarding decision.

4.5.1 Awarding methods

Six alternatives about contractor's awarding methods are presented in this section to the respondents in order to select the more appropriate one according to the respondents opinions. Table 4.37 shows that "consider the selection criteria as qualification criteria only, and then award the bid to the lowest evaluated bid price" obtained 34.7 % of the respondents opinion, "award the bid to the highest weight after combination of the technical and financial scores" represented 32.7 % of the respondents opinion.

Furthermore, "consider the technical criteria as a qualification criteria only, and award the bid to the closest bid to project estimation" got 16.3 % of the respondents opinion, " provide score to financial and technical criteria, and award the bid to whom with the high total score" composed 14.3 % of the respondents opinion.

Also, "consider the technical criteria as a qualification criteria only, and award the bid to the second lowest evaluated bid price" obtained only 2.0 % of the respondents opinion in the bid awarding decision, and finally, "consider the technical criteria as a qualification criteria only, and award the bid to the average evaluated bid price" got 0.0 % of the respondents opinion.

Table 4.37 : Consideration of selection criteria in the bid awarding decision

S.N	Description of Considerations subject	Frequency	Percent(%)
1	To consider the selection criteria as qualification criteria only, and then award the bid to the lowest evaluated bid price	17	34.7
2	To assign weights to the technical and financial proposals, and then award the bid to the highest weight after combination of the technical and financial scores	16	32.7
3	To consider the technical criteria as a qualification criteria only, and then award the bid to the closest bid to project cost estimate	8	16.3
4	To provide score to each financial and technical criteria, and then award the bid to whom with the high total score	7	14.3
5	To consider the technical criteria as a qualification criteria only, and then award the bid to the second lowest evaluated bid price	1	2.0
6	To consider the technical criteria as a qualification criteria only, and then award the bid to the average evaluated bid price.	0	0
	Total	**49**	**100.0**

The first row of table 4.37 describes that 34.7% of the respondents (around third part of respondents) preferred to use the traditional awarding system i.e. the "lowest bid price", but they suggested to carry out a prequalification procedure. Another third part of respondents (32.70%)agreed to use the combined scoring system presented in the second row of Table 4.37, the final cumulative score of the bidder will be computed for both the technical scores and financial scores, based on identified formula, and then the bid will be awarded to the bidder whose proposal achieves the highest final cumulative score.

Furthermore, 16.30% of respondents recommended to consider the technical criteria as a qualification criteria only, and then award the bid to the closest bid to project cost estimate as mentioned in the third row of Table4.37.

In addition, 14.30% of respondents preferred to use the scoring method based on providing score to a group of identified and weighted criteria, the selection criteria is composed from financial and technical one, and then award the bid to whom with the high total score (as presented in the fourth row of Table 4.37). Finally, in the fifth row of Table 4.37, only 2% of respondents suggested considering the technical criteria as a qualification criteria only, and then award the bid to the second lowest evaluated bid price.

With reference to the results achieved in Table 4.37, we can state that the views of respondents about awarding construction bids can be classified in three main groups: and each group has more or less equal importance and each one include between 30 to 35 % of the respondents:

- ☒ The group 1 adopt the awarding method presented in the first row of Table 4.37 and represent 34.70% of respondents.
- ☒ The group 2 adopt the awarding method presented in the second row of Table 4.37 and represent 32.70% of respondents.
- ☒ The group 3 adopt the two awarding methods presented in the third and fourth row of Table 4.37 and represent 30.60% of respondents.

Each group, of the 3 groups, has more or less equal importance and each one include between 30.60 to 34.70 % of the respondents:

- The opinion of group 1 asserted the importance of considering the criteria or factors used in this research as qualification factors only, and at the end of this evaluation process, the respondents suggested to award the bid to the "lowest price" from the qualified contractors. This view is good because such qualification process helps in excluding contractors who might present very low prices.
- The opinion of group 2 considered the technical criteria in the selection of contractors, so this opinion eliminated the single effect of the price in awarding bids, this reflects relative interest considered by the evaluators to apply a new

awarding system which balances between the technical criteria and the financial ones.

- The opinion of group 3 considered the project cost estimate and also the score of financial and technical criteria, so this opinion eliminated the single effect of the price in awarding bids, this reflects relative interest considered by the evaluators to apply a new awarding system which considered the project cost estimate and then awarded the bid to the highest total score of technical and financial criteria.

4.5.2 Relation between awarding methods and construction sector problems

Table 4.38 shows that 90% of the respondents agree that the current local awarding method used in the contractor's selection is one of the major problems of construction sector, and only 10% of the respondents disagree that the current local awarding method used in the contractor's selection is one of the major problems of construction sector .

Table 4.38 : Consideration of awarding method

Do you think that the current local awarding method used in the contractor's selection is one of the major problems of construction sector	**Frequency**	**Percent(%)**
Yes	45	90.0
No	5	10.0
Total	**50**	**100.0**

The results indicated the existence of many problems in the local construction sectors, the dominant part of respondents confirmed that the current awarding method i.e. "the lowest bid price" considered as one of the major problems of the construction sector. This outcome indicated the trends and ability of construction clients and project owners to apply new awarding methods in order to overcome the encountered problems related to contractor's selection based only on consideration of financial criteria and negligence of other significant criteria.

4.5.3 Capability of current awarding methods to identify the suitable contractor

Table 4.39 shows that about 39.2% of the surveyed people stated that the methods used currently for bid awarding are rarely capable of identifying the most suitable contractor, 35.3 % of them stated that the methods used currently for bid awarding are frequently capable of identifying the most suitable contractor. More than 17.6 % of the surveyed people stated that the methods used currently for bid awarding are not capable for identifying the most suitable contractor, and 7.8 % of the surveyed peoples stated that the methods used currently for bid awarding are totally capable of identifying the most suitable contractor.

Table 4.39: Capability of the awarding methods to select the suitable contractor

Do you think that the methods used currently for bid awarding are capable of identifying the most suitable contractor	**Frequency**	**Percent(%)**
Rarely	20	39.2
Frequently	18	35.3
No	9	17.6
Yes	4	7.8
Total	**51**	**100.0**

The result got in Table 4.38, which shows that 90 % of the answers ensured that most of problems of the construction sector in Gaza strip are awarding the bids to the lowest bid, confirmed also the result of Table 4.39. The output of Table 4.39 shows that 56.8% (39.20 , 17.60) of the respondents assured that the current awarding methods are unable or rarely enable them to select the most suitable contractor, the results achieved demonstrated the importance of this research and enhance the necessity to apply a new multi-criteria awarding system in Gaza Strip.

4.5.4 Consideration of the project "cost estimate" in the awarding decision

Table 4.40 shows that about 39.2% of the surveyed people stated that the awarding committee frequently takes into consideration the project "cost estimate", 29.4 % of the surveyed people stated that the awarding committee totally takes into consideration the project "cost estimate". As well 25.5 % of the surveyed people stated that the awarding

committee don't takes into consideration the project "cost estimate", and 5.9 % of the surveyed people stated that the awarding committee rarely takes into consideration the project "cost estimate".

Table 4.40 : Consideration of project cost estimate

Do you think that the awarding committee takes into consideration the project "cost estimate"	**Frequency**	**Percent(%)**
Frequently	20	39.2
Yes	15	29.4
No	13	25.5
Rarely	3	5.9
Total	**51**	**100.0**

To ensure that there is inaccuracy in the current awarding system, the results illustrated in Table 4.40 showed that 31.40% (25.50 , 5.90) agreed that the bids awarding committees don't take or rarely take into consideration the cost estimate of the project when awarding the bids to the contractors.

4.5.5 Helpful of the "public administrative regulations" to the awarding committee

It is noted that many regulations are currently used by the public sector related to construction bidding , generally, local procurement laws and regulations are fragmented and sometimes incomprehensive.

Table 4.41 shows that 39.2 % of the surveyed people agreed that the "public administrative regulations" related to contractor's selection are totally helpful to the awarding committee to take the most suitable awarding decision, 23.5 % of the surveyed people agreed that the "public administrative regulations" related to contractor's selection are frequently helpful to the awarding committee to take the most suitable awarding decision, also 23.5% of the surveyed people agreed that the "public administrative regulations" related to contractor's selection are not helpful to the awarding committee to take the most suitable awarding decision, and 13.8 % of the surveyed people agreed that the "public administrative

regulations" related to contractor's selection are rarely helpful to the awarding committee to take the most suitable awarding decision.

Table 4.41: Helpful of administrative regulations

Do you think that the "public administrative regulations" related to contractor's selection are helpful to the awarding committee to take the most suitable awarding decision	**Frequency**	**Percent(%)**
Yes	20	39.2
Frequently	12	23.5
No	12	23.5
Rarely	7	13.8
Total	**51**	**100.0**

The results indicated that a considerable part of respondents, this part includes 37.3 % (23.50 , 13.80) of respondents, consider that the administrative regulation can not be or can rarely be a helpful factor for the awarding committee in order to take the most suitable decision, this outcome support the previous conclusions which affirmed the existence of a lot of problems related to the current lowest bid price system.

It is noted that the Country Procurement Assessment Report (CPAR) prepared by the World Bank on 2004 confirmed the research result related to this point and contains the following conclusion: "Public procurement in WB and Gaza is currently subject to two principal laws (Law No. 9 of 1998 on General Supplies, and Law No. 6 of 1999 on Procurement of Public Works). However, there are also laws still in force left over from the former British and Egyptian Mandates in respect of Local Government within Gaza which have not been consolidated or updated. Public procurement is not supervised by one central authority; instead, procurement under each of the two principal laws is supervised by a different ministry".

A brief of the articles of procurement laws No.6 and No. 9, related to this research, is presented in Annex 4.

CHAPTER 5: CASE STUDIES

Chapter (5) presents the results of three "cases studies" for previous construction projects that were awarded to the lowest bid price in Gaza strip. Projects description, summarizing of bidding, evaluation and awarding process, problems encountered in various project stages (excluding design works) are outlined and discussed in detail. The assessment of all projects' parties involved in each case study is presented. Finally, the lessons learned from the cases are presented.

5.1 Case Study (1):Rehabilitation of Al Welada Hospital

5.1.1 Introduction

This case study presents the consequence of selecting lowest responsive bidder to conduct a building construction and rehabilitation project. The contract price was less than the project budget by an 18%. The case study demonstrates the process starting from bidding, awarding, construction, contract termination and project re-tendering.

The project organization structure consisted of funding agency (Government of Italy), operating agency (PECDAR), beneficiary (Ministry of Health), Supervisor (Municipality of Gaza), technical and financial auditor (consultant) and main contractor as mentioned in the figure 5.1.

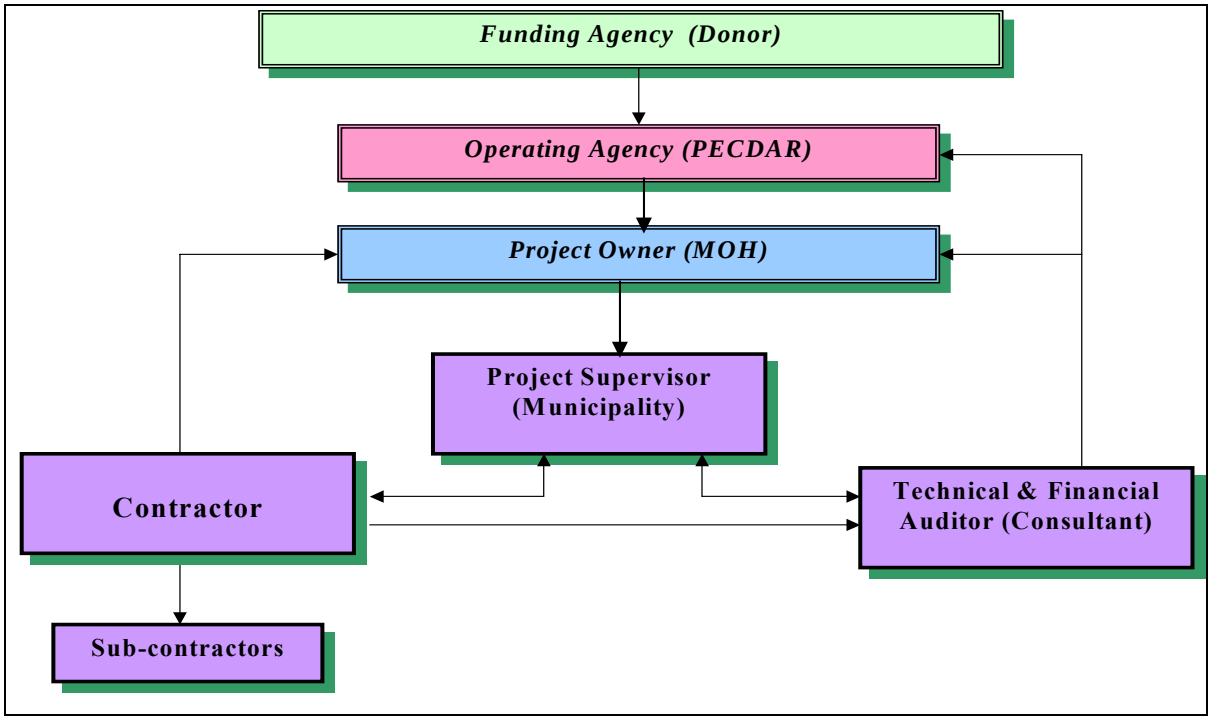

Figure 5.1: Project Organization Chart

5.1.2 Project Scope

The project scope was to rehabilitate a two-story health care building related to health sector in Gaza City (labor-delivery). The project was awarded on 31 August, 2003. Project handing over toke place on 30 June, 2005. Rehabilitation works included internal and external finishing works and electro-mechanical works. The main project outcomes can be summarized as follows:

- Fixing and painting wooden ceiling (Qarmeid cover), an area of 160 m^2.
- Masonry works, an area of 170 m^2
- Plastering works, an area of 170 m^2
- Painting works for walls, an area of 480 m^2
- Laying of marble for windows ceiling, 45 m length
- Demolishing of old ceramic tiles in the WC units, an area of 65 m^2
- Installation of new electrical main distribution boards (MDB).
- Fixing of marble steps, 20 steps in No.
- False ceiling works
- Fixing of new aluminum windows
- Rehabilitation of existing wooden doors

5.1.3 Project Data

Project Name	**Rehabilitation of Al Welada Hospital - Gaza**
Donor Name	Italian Government
Owner Name	Ministry of Health (MOH)
Supervisor	Municipality of Gaza (MoG)
Sector	Building – Health care facilities
Location	Gaza City
Located Budget / $	75, 000
Planned Duration /Days	75
Estimated Cost / $	113,681
Actual Cost / $	93,069.6
Actual Duration / Days	240

5.1.4 Project History

1- Bidding stage

The bidding process was performed by the *supervisor agency* and administrated by the *operating agency* adopting the World Bank related guidelines. The bid was opened for all building classified contractors by the Palestinian Contractors Union (PCU) from class 2 to 4. The used awarding method was Local Competitive Bidding (LCB). By this method, the winner contractor is selected based to his financial offer after passing the preliminary examination process to check and verifies the completion of tender requirements. These necessities are: registration certificates, bank's guarantees, filling of the bid form and documents) .

In this case study, no prequalification process was taken place. Five local contractors were involved in the bidding process. Three of them were classified as class 2, while the remaining were class 4. Complete bidding documents were provided including: general and private conditions, specifications, Bill of quantities and drawings. Bidding process continued for 14 days, passing though all steps: advertising, bid sell, site visit, pre-bid meeting, tender submitting and tender opening meeting. The tenders were opened and financial offers were announced through an open meeting attended by concerned parties' representative including the contractors. It can be said that the bidding process was completed according to World Bank Guidelines.

2- Evaluation stage

The evaluation stage started immediately after the bid opening date. The evaluation process conducted in the following steps:

1. Preliminary examination process. This step included checking, by Yes or No, the legibility, submitting bid security, bid completeness and substantial responsiveness of the contractor.
2. Prices corrections.
3. Price review (check of summation for BOQ items).
4. Technical advisor followed up the correction of evaluation process and results according to job creation program guidelines and conditions.

Based to the prepared bid evaluation report by project supervisor agency, revised by the program technical auditor and approved by the operating agency the table 5.1 summarized the final contractor corrected bid prices

Table 5.1: Final corrected contractors' bid prices – Case study 1

S.N	Contractor Name	Class	Preliminary examination	Tender Amount $
1	A	2	Pass	133,218.5
2	B	4	Pass	109,731
3	C	4	Pass	93,069.6
4	D	2	Pass	155,762
5	E	2	Pass	128,060.2

3- Awarding stage

According to the bid evaluation report, the tender was awarded to the lowest price contractor (Contractor C as shown in the table 5.1). The supervisor agency considered this contractor as the lowest evaluated responsive bidder. This was approved by the operating agency in parallel with the technical advisor. It should be noted that the awarded price is lower than the estimated budget by 18%. The evaluation and awarding process duration was 21 days after the bid opening date.

4- Implementation Stage

The project implementation activities started on 25 October, 2003 with planed completion date on 19 January, 2004 (Planned project duration was 75 days). However, project was implemented within 240 days, which mean 165 days delay. Many factors contributed to this encountered delay which can be summarized as follows:

1. Boarders closure and shortage of raw material in local markets
2. The delay from the beneficiary side to hand over the project site to the contractor according to the planned schedule. The site hand over was scheduled in stages due to the nature of building under rehabilitation (continuous medical services to the public during 24 hours per day).
3. The contractor was not able to continue project activities due to his unreasonable price in main project items. Based on that, the operating agency decided to terminate the contract after 200 days from staring works.
4. Re-tendering, evaluation and awarding processes toke place and new contractor was selected to complete the project remaining activities.

5.1.5 Encountered problems

Based on abovementioned circumstances, the main encountered problem was that the project was delayed 165 days, during construction phase, and moreover the project was terminated by the supervisor without completion of the whole contract items by the contractor which was considered as a "lowest evaluated responsive bidder" at the end of the evaluation process. Through detailed investigations and revision of related documents and reports, face to face interviews with project parities (operating agency, supervisor, beneficiary and contractor), the followings were the main response behind this lengthy delay:

Bidding stage:

The Bidding process as general steps followed the World Bank guidelines. Accordingly, all data were available to the competitors to prepare their offers accurately, site visits and pre-bid meeting were conducted by all project parties. However, the following problems were noted:

1. By revision of tender documents, it was found that the level of documents prepared for this project was satisfactory to execute the project on time with acceptable level of quality. But, there was no coordination between the project parties, mainly the supervisor and owner. This was reflected on the negligence of accurate cost estimate which was prepared by the beneficiary (MOH). It should be noted that this estimate was not revised or discussed by the project parties before or during the bidding process.
2. It can be said that the opening invitation of the bid to all contractors' classes had contributed to this problem. The scope of the works needed relatively higher class contractor (not lower than Class 3) with considerable past experience in maintenance and rehabilitation works.
3. Moreover, the beneficiary agency that will be responsible for project operation was not involved in bidding stage.

Evaluation stage:

1. The evaluation process was carried out by bid evaluation and awarding committee that was formed from the supervising agency. Neither the project technical auditor nor the project beneficiary was involved in any evaluation or awarding steps. It should be noted that this was due to the internal regulation of the supervising agency (Municipality of Gaza) which limited the evaluation of bids to its internal staff. This resulted in awarding the contract without detailed analysis(Breakdown) of the contractor's bidding prices and specially the electrical items.
2. As a result, a contractor was awarded with a price lower that the beneficiary's cost estimated by 18%. It should be noted that the awarding decision ignored this estimate and built his decision without considering the beneficiary cost estimate.
3. The un-analyzed BOQ priced items of the awarded contractor resulted in un- balanced contract. Items were priced correctly while other were not. Among the most illogical priced items was the rehabilitation of Main Electrical Distribution Boards (MDB) . This was not noted by the evaluation committee as no specialized electrical engineer was involved in this committee.
4. The responsibility of technical auditor or operating agency was minor in this stage. The whole evaluation activities were completed by the supervisor agency which had the entire document to do this assignment and take the suitable awarding decision.

Implementation stage:

1. As mentioned above, MDB works were not profitable items in the contract of the selected contractor. Therefore, the contractor tried to postpone this item to the end of project by various means.
2. From the supervisor side, the illogic price of MDB items was not discovered early. It was founded that the contractor loose if he implemented these works about 15,000$ (about 17% of contract price). Accordingly, the contractor refused to perform these activities considering that the existing MDBs were in good condition. This was not agreed by the supervisor and beneficiary.

3. Accordingly, the operating agency decided to terminate the project, liquidate the contractor performance guarantee and suspended the eligible contractors' payments and retention. Total amount reserved by the supervisor was about $33,244. This amount was used later to cover the new contract budget.
4. Re-tendering process was performed by the supervisor agency to complete the unfinished works in the first tender. This new bidding process was started 200 days after the initial project start date. This led to award the project to new contractor with a price of $23,858 to perform the remaining MDB activities. It should be noted that the original contractor price for these activities was only 8,197 $.
5. The operating agency (PECDAR) finalized the project without any increase over the project budget. At the end of the project the first contractor lost about $15,700 to pay the new contractor the total amount of his contract from the reserved amount mentioned above in item 3 .

5.1.6 Assessment

Owner opinion

The problem of project termination without finishing all the project items, and the project delay about 200 days was due to the selection of lowest price contractor by the supervisor's evaluation committees without taking into consideration the reasonability of contractor price and the detailed cost estimate prepared by experienced staff from the owner (MOH).

Supervisor opinion

The supervisor staff involved in project implementation stage agreed with the beneficiary opinion that lowest price contractor was not eligible to perform the works especially in the MDB items. They believed that if the bid was awarded to the second lowest price (about 5% lower that estimate), then the project could be implemented within time schedule and with satisfactory level of quality.

Contractor opinion

The contractor stated that it was his fault not to check the breakdown and offer of his electrical subcontractor related to MDB works. This was due to his short experience in the prices of electrical works.

5.1.7 Comments and lessons learned

1. Implementing of the above project within 240 days (planned duration =75 days) was a loose to all project parties and not only to the contractor.
2. Project cost estimate should be checked and agreed upon between all project parties before starting tendering stage.
3. Bid evaluation process should be a joint effort task between related project parties and including various engineering area of expertise to be able to control and evaluate all the project items in early stage before starting the implementation stage.
4. Bid evaluation should focus on the balance of items' prices and correctness of items unites prices.
5. Awarding project should be to the *lowest evaluated responsive bidder,* who has the financial and technical capabilities and present the most logical and practical offer. Factors other than financial offer should be considered in the awarding decision.

5.2 Case Study (2): Construction of sewage pumping station & pressure sewage line

5.2.1 Introduction

This case presents the consequence of selecting lowest responsive bidder to conduct an infrastructure project with a price lower than the estimated budget by an 15%. The case study demonstrates the steps from starting bidding process, awarding, construction and handing over.

The project organization structure consists of funding agency, operating agency, beneficiary (Municipality), Supervisor (Consultant) and main contractor as mentioned in the figure 5.2.

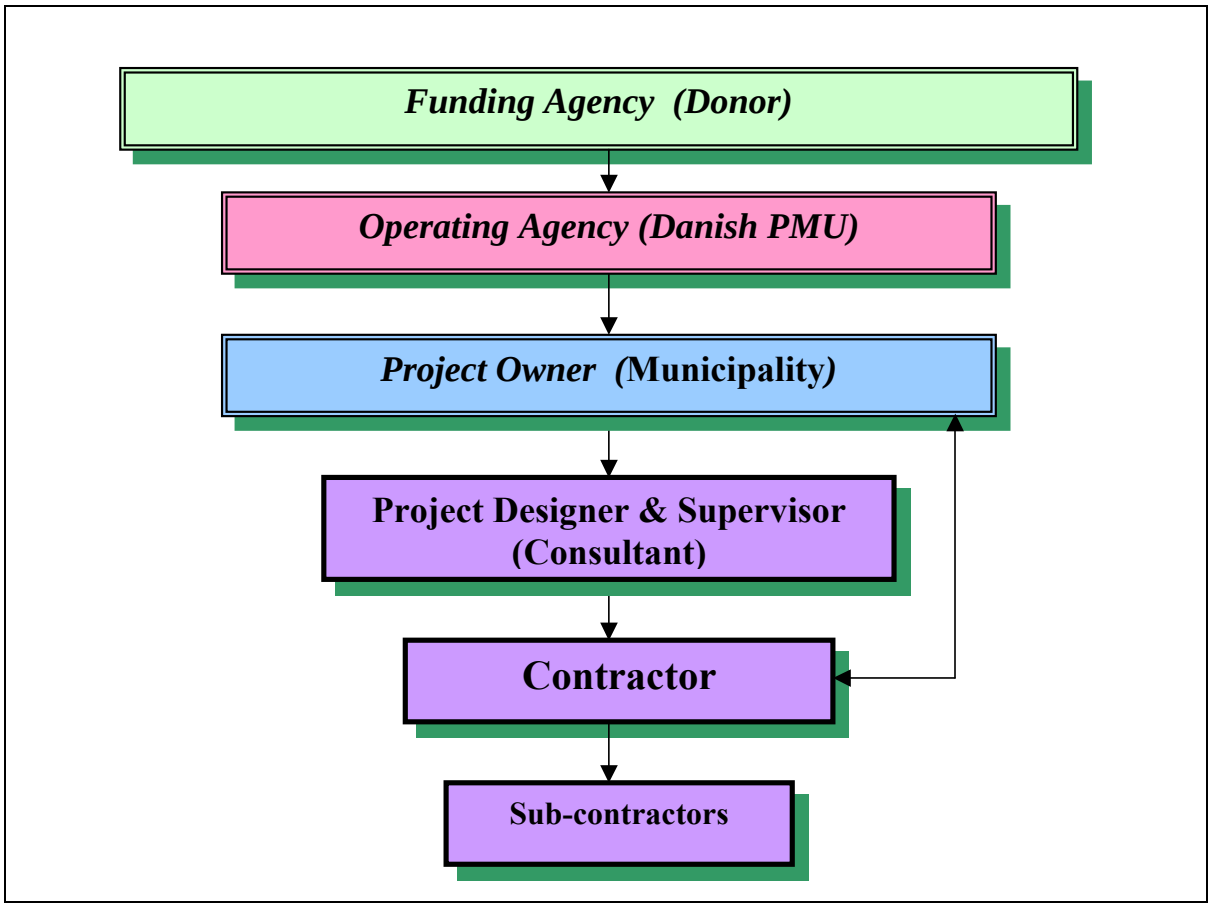

Figure 5.2 : Project Organization Chart

The project was awarded on 11 September, 2004. Project handing over toke place on 29 May, 2005. The project main activities were to construct a main sewage pumping station and its main pressure line. The project site was in the Middle Area Governorate. The project area extended from the proposed location where the pumping station should be installed to the location where the pressure line should end.

5.2.2 Project Scope

The main components of the project were:

1. One sewage pumping station which pumps the collected sewage from the study area through a pressurized line to a gravity interceptor line located in the served Municipality.
2. The gravity sewer which collects the sewer of target area by gravity to the sewage pumping station.

3. A Steel pressure line which lifts the sewage from the pumping station to a location that would make it possible for the sewage to flow through a gravity line.

5.2.3 Project Data

Project Name	Construction of sewage pumping station and pressure sewage line
Donor Name	Danish Government - SMDM Program -
Owner	Zawaida Municipality – Gaza Strip
Operating Agency	Danish Project Management Unit (PMU)
Designer & Supervisor	Local consulting firm
Sector	Infrastructure
Location	Middle Area- Gaza strip
Located Budget / $	340, 000
Planned Duration /Days	120
Estimated Cost / $	430,521
Actual Cost / $	368,143 + 63,000 as claim (Tot = 431,143)
Actual Duration / Days	230

5.2.4 Project History

1- Bidding stage

The bidding process was performed by the *beneficiary and* administrated by the *operating agency* adopting the FEDIC guidelines. The Bid was opened for all building classified contractors by the Palestinian Contractors Union (PCU) from class 1A to class 2. The used tendering method was Local Competitive Bidding (LCB).

In this case study, no prequalification process was taken place. Seven local contractors were involved in the bidding process of this project. Three of them were classified as class 1A, three were 1B, while the remaining was class 2. Complete bidding documents were provided including: general and private conditions, specifications, Bill of quantities and drawings. Bidding process continued for 21 days, passing though all its normal steps: advertising, bid sell, site visit, pre-bid meeting, tender submitting and tender opening meeting. The tenders were opened and financial offers were announced through open meeting attending by concerned parties' representative including the contractors. It can be said that the bidding process was completed usually according to FIDIC Guidelines.

2- Evaluation stage

The evaluation stage started immediately after tenders opening date. Similar process steps are followed in this case study to that implemented in Case study No. 1.

Based on the prepared bid evaluation report by project owner, table 5.2 summarizes the final contractor corrected bids' prices:

Table 5.2 : Final corrected contractors' bid prices after discount – Case Study 2-

S.N	*Contractor Name*	Class	Preliminary examination	*Amount $*
1	A	1A	Pass	381,441
2	B	2	Pass	368,143
3	C	1A	Pass	388,179
4	D	1B	Pass	390,674
5	E	1B	Pass	375,947
6	F	1B	Pass	410,228
7	G	1A	Pass	445,165

What is new in this case study was the negotiation meeting with all bidders after announcing their financial offer in order to get a discount due to exceeding project budget. The owner asked all bidders to attend a negotiation meeting in which only three bidders (A, B & E) agreed to give price discount varied from 3% to 7%. The prices mentioned in table 4.2 were after discount.

3- Awarding stage

According to the bid evaluation report (including the negotiation meeting outputs) that was prepared by the owner and approved by the operating agency, the contract was awarded to the lowest price contractor (Contractor **B** as shown in the above table) with total amount of **368,143** $. It should be noted that the awarded price is lower than the estimated budget. The evaluation and awarding process was completed within 10 days from tenders opening date.

4- Implementation Stage

The project implementation activities started on 02 October, 2004 with planed completion date on 01 February, 2005.The planned project duration was 120 calendar days. However, this project was performed within 230 days, which mean 110 days

delay. Many factors contributed to this encountered delay which can be summarized as follows:

1. Boarders' closure and shortage of raw material in local markets in some project stages.
2. Unseen conditions due to raise of groundwater level in winter season. This condition was not clearly specified in tender document or site visit. This condition delayed all earthworks, excavation and concrete works. It led to necessitate of additional time, cost and effort from the contractor
3. The unreasonable price in some project items specially the electromechanical items, mainly imported pumps and related accessories.

5.2.5 Encountered problems

Based on abovementioned circumstances, the main encountered problem was that the project was delayed 110 days. Through detailed investigations and revision of related documents and reports, site documents and related files, face to face interviews with project parities (operating agency, supervisor, owner and contractor), it can be said that the followings were the main reasons behind this delay:

Bidding stage:

1. The operating agency, which was the fund agency representative, started the tendering stage knowing that the located budget is not sufficient to cover all the project activities as designed .The operating agency did not take into consideration the cost estimate prepared by the project designer consultant. This led to looking only for the lowest price bidder without considering its qualifications or previous experiences in similar projects.
2. It can be said that the opening of bid to all contractors without prequalification for this specific project type contributed to this result. The scope of the works needed contractor with similar experiences and significant financial resources which were not the case with the selected contractor.
3. By revision of tender documents, it was found that the level of documents prepared for this project was satisfactory to execute the project on time. The only main missing item to be clearly identified was the nature of the project site, soil strata classification and water table location. The soil tests prepared by the designer consultant were not

included as a part of the tender documents. Moreover, the level of water table in the site when starting execution was above the indicated level in the tender documents.

Evaluation stage:

1. The evaluation process was performed by tenders evaluation and awarding committee which was formed from the owner and operating agencies. Neither the project designer consultant nor the supervisor consultant was involved in any steps of the tenders' evaluation. It should be noted that this was due to the internal regulation of the operating agency which limited the members of the evaluation committee to the agency/owner staff members only. This resulted in awarding the contract without details analysis of the contractor's bidding prices.
2. As a result, a contractor was awarded with a price lower than the designer's cost estimated by 15%. It should be noted that the awarding decision ignored this estimate.

Implementation stage:

1. As mentioned above, the excavation works in existing of high groundwater level was not considered realistically in the awarded contractor price. Therefore, the contractor faced many problems that required extra time and cost from project starting day.
2. From the supervisor side, a mistake in auditing contractor price was found in a later stage during construction. The tenders evaluation and awarding committee neglected to account main bill in the offer of tender of the selected contractor. The forgotten bill price included many items necessaries to complete the project and can't be canceled, the total offered price of this items were about $65,000.
3. Accordingly, the contractor asked for extra cost beyond the contact price. When the owner refused, the contractor stopped the works. Negotiations were taken between the whole project parties and all agreed to compensate the contractor in the earthworks prices and the consideration of the forgotten items which led to extra cost to the project budget equal to about $63,000.

5.2.6 Assessment

Owner opinion

The problem of project delay and extra cost resulted from non securing the availability of project budget as estimated by the project designer.

Supervisor opinion

The supervising staff involved in project implementation stage stated that the lowest price contractor was not eligible to perform the works due to his lake in experiences with similar projects. They believed that such type of project needed to be conserved only to pre-qualified contractor. In addition, the mistakes in checking contractor offered prices in evaluation stage added additional problem in this case.

Contractor opinion

No input was received from the contractor. His only comment was that he is not responsible on the incompleteness of tender documents (mainly the issue of groundwater table) and also the evaluation committee mistakes.

5.2.7 Comments and lessons learned

1. Implementing of the project within 230 days is a loose to all project parties not only the contractor considering that the planned duration was 120 days.
2. For such specific project, it is recommended to prepare a pre-qualification process to guarantee the experiences and capabilities of bidders.
3. For local circumstances regarding project funding, it is not recommended to start any tendering process without securing the whole project budget.
4. Bid evaluation process should be attended by project Consultant (Designer and supervisor) to provide more technical support.
5. Similar to the conclusion from Case Study (1), the awarding project should be to the lowest evaluated responsive bidder, who has the financial and technical capabilities and present most logical and practical offer. Factors other than financial offer should be considered in the awarding decision.

5.3 Case Study (3): Construction of new sewage pump station

5.3.1 Introduction

This case presents the consequence of selecting lowest responsive bidder to conduct an infrastructure project with a price lower than the estimated budget by an 2.5%. *But*, the estimation is lower than the average of the bidders' prices by about 12%. Only the lowest bidder had a price lower than the cost estimate. The case study demonstrates the steps from starting bidding process, awarding, construction and handing over.

The project organization structure consists of funding agency, operating agency, beneficiary (Municipality), Designer (Consultant 1), Supervisor (Consultant 2) and main contractor as mentioned in the figure 5.3.

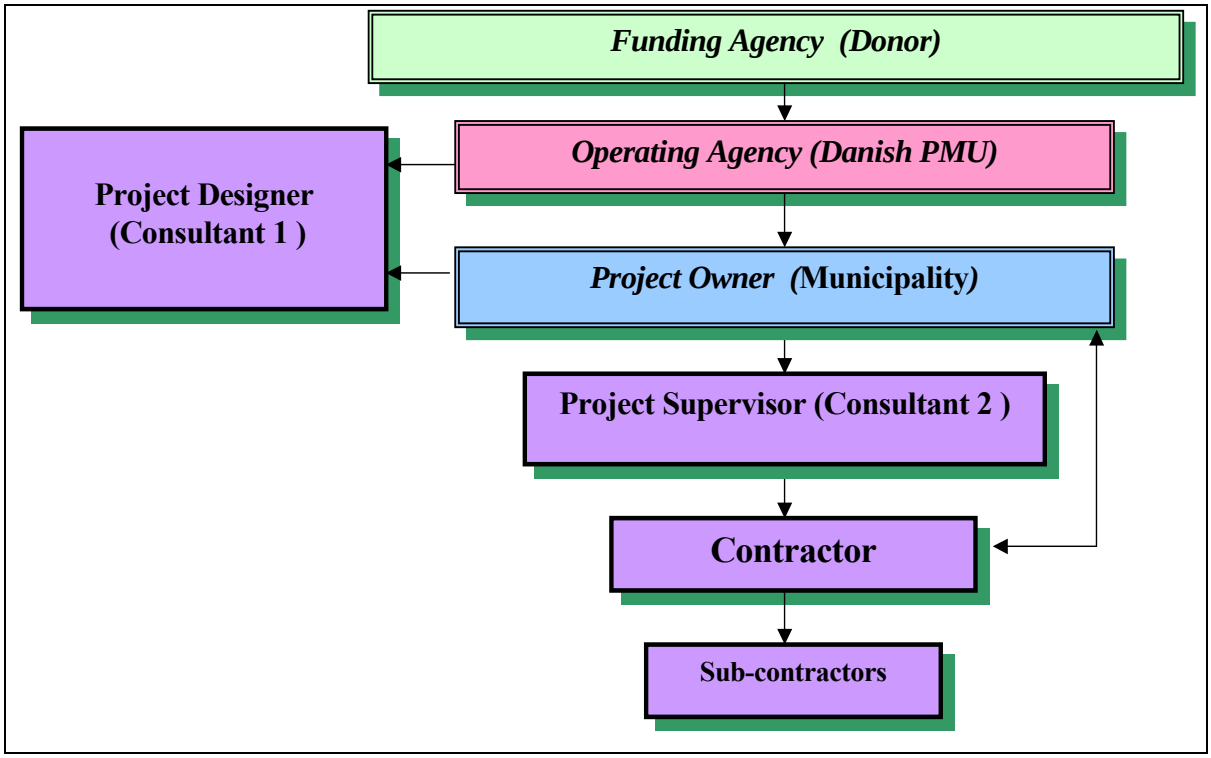

Figure 5.3 : Project Organization Chart

The project was awarded on 07 October, 2003. It started on 27 October 2003 and handed over was toke place on 30 November, 2004. The project main activities were to construct a main sewage pumping station and its main pressure line. The project site was in the Middle Area Governorate. The project area extended from the proposed location where the pumping station should be installed to the location where the pressure line should end.

5.3.2 Project Scope

The pumping station consists of the:

- Inlet chamber
- Bar screen system
- Pump wet pit (with capacity of three vertical submersible pumps) & valves chamber
- Standby generator
- Transformer, LVSC and HVSC, and switchgear rooms
- Overflow control system
- Water hammer controlling system
- Administration, guard and WC.
- Parking and landscaping

5.3.3 Project Data

Project Name	Construction of new sewage pump station
Donor Name	Danish Government - SMDM Program -
Owner	Nusirat Municipality – Gaza Strip
Operating Agency	Danish Project Management Unit (PMU)
Designer	Local consulting firm 1
Supervisor	Local consulting firm 2
Sector	Infrastructure
Location	Middle Area- Gaza strip
Located Budget / $	400,000
Planned Duration /Days	210
Estimated Cost / $	443,198 (prepared by the designer-consultant1-)
Actual Cost / $	433,333
Actual Duration / Days	397

5.3.4 Project History

1- Bidding stage

The bidding process was performed by the owner *and* administrated by the operating agency adopting the FEDIC guidelines. The Bid was opened for all building classified contractors by the Palestinian Contractors Union (PCU) from class 1A to class 1B. The used tender method was Local Competitive Bidding (LCB).

In this case study, no prequalification process toke place. Five local contractors were involved in the bidding process of this project. Three of them were classified as class 1A, while the remaining were class 1B. Complete bidding documents were provided including: general and special conditions, technical specifications, Bill of quantities and drawings. Bidding process duration was 29 days, passing though all its normal steps: advertising, bid sell, site visit, pre-bid meeting, tender submitting and tenders opening meeting. The tenders were opened and financial offers were announced through open meeting attending by concerned parties' representative including the contractors. It can be said that the bidding process was completed usually according to FIDIC Guidelines.

2- Evaluation stage

The evaluation stage started immediately after tenders opening date. Similar process steps were followed in this case study to that implemented in Case study No. 1. Based to the bid evaluation report by project owner, table 5.3 summarized the final contractor corrected bid prices:

Table 5.3: final corrected contractors' bid prices

S.N	*Contractor Name*	Class	Preliminary examination	*Amount $*
1	A	1B	Pass	433,333
2	B	1A	Pass	539,102
3	C	1A	Pass	499,622
4	D	1B	Pass	457,840
5	E	1A	Pass	487,778

3- Awarding stage

According to the bid evaluation report which was prepared by the owner and approved by the operating agency, the tender was awarded to the lowest price contractor (Contractor "A" as shown in the above table). It should be noted that the awarded price is the only lower price than the estimated budget where it is lower than the average of the bidders' prices by about 12%. The evaluation and awarding process duration was no more than 7 days from bid opening date.

4- Implementation Stage

The project implementation activities started on 27 October, 2003 with planed completion date on 26 May, 2004. Planned project duration was 210 calendar days. However, project was performed within 397 days (Hand over on 30 November, 2005), which means 187 days delay.

Many factors contributed to this encountered delay which can be summarized as follows:

1. Boarders closure for many periods during project implementation and shortage of raw material in local markets
2. The estimated construction period proposed by the project designer as stated in tender documents was unreasonable. The time frame did not considered the unique site conditions to excavate for 10m below natural ground level where dewatering process is needed starting from 7.0m depth. Moreover, the designer was not aware of the method statement for implementing project in such complicated conditions.
3. The contradiction between design data provided in the tender documents regarding the soil profile and existing water table levels in the project site and what was found during the implementation.
4. The technologies used for dewatering and protection of excavation sides in the project site resulted in a differential settlement for on going structure in the project site. This badly affected the progress of works.
5. The cost estimate provided by the project designer (Consultant 1) was to someway under-estimation for such project conditions.

5.3.5 Encountered problems

Based on above mentioned circumstances, the main encountered problem is that the project was delayed 187 days. Through detailed investigations and revision of related documents and reports, site documents and related files, face to face interviews with project parities (operating agency, owner, designer, supervisor and contractor), the followings were the main reasons behind this delay:

Bidding stage:

1. The project designer, in the opinion of the researcher and the bidders, prepared under-estimated project cost. This created many variation orders and claims from the contractor side which affected the progress of the works
2. No prequalification process was carried out for this project. In this type of project the prequalification of contractors was required.
3. By revision of tender documents, it was found that the level of documents prepared for this project was not satisfactory to execute the project on time. Many missing items should be clearly identified to the bidders before the submission of their tenders.
4. In addition, the project designer was not involved in the tendering stage due to the policy of the operating agency.

Evaluation stage:

1. The evaluation process was performed by bid evaluation and awarding committee formed from the owner and operating agencies. Neither the project designer nor the supervisor was involved in any steps. It should be noted that this was due to the internal regulation of the operating agency. This resulted in awarding the contract without analysis of the contractor's price and just comparing it with the cost estimate.
2. As a result, a contractor was awarded with a price lower than the designer's cost estimate by 2.5%. But, the designer's cost is lower than the average of the bidders' prices by about 12%, which should be a reason for the evaluation committee to reconsider the second or third price and also to ask for justifications from the project designer.

Implementation stage:

1. As mentioned above, the soil conditions during excavation works (groundwater level) was not clearly identified in the design documents. Therefore, the contractor faced many problems since the project starting day.
2. Despite the above point, the contractor did his best to commit with project technical requirements in such unique site conditions above.
3. Additionally, over design for the main structural elements were presented by the designer in the tender documents. Based on that, the contractor provided a "re-design package "for main structural works during the project implementation. This also influenced an ordinary progress of works.

5.3.6 Assessment

Owner opinion

The owner stated that he provided hiring consultancy services (design and supervision) as he recognized the nature of the site conditions and complicated implementation requirements. He stated that the delay is due to the unique natural of soil conditions and no availability of high technology in Gaza to overcome such soil conditions. For that no liquated damages were applied on the contractor.

Designer Opinion

The designer stated that the tender documents were completed and all site conditions were clearly identified to the bidders and the estimation was reasonable at the time of preparation. He reflected the problem to the method statement used in the project implementation by the contractor.

Supervisor opinion

The supervisor staff involved in project implementation stage stated that the contractor was doing his best to overcome all site obstacles. However, they stated that the unique site condition, unreasonable project duration and primary technology available in Gaza to execute the work all contribute to the project delay. In addition, the supervisor staff stated that the final project amount is approximately the same as the price of second bidder, this amount was 12% above the designer cost estimate.

Contractor opinion

The contractor stated that he provided all available technical and financial resources to resolve implementation problems. However, the change of soil type from that in tender documents and the re-design of many structural elements which was approved by project designer/supervisor were behind the delay of the project.

5.3.7 Comments and lessons learned

1. The project period and estimation should be correctly estimated by project designer and owner based on method statement prepared in design stage.
2. For such specific project, project designer and supervisor consultants should be involved strongly in tendering, evaluation and awarding stages.
3. This case study showed that project delay or failure is related to select lowest price tender, and also related to lack of experience of project parties during design, tendering and construction stages.

General comments from the three case studies

Taking into consideration the results achieved through the questionnaire survey**,** the finding obtained from the three case studies exposed in this chapter is the existence of a proportional relation between awarding bids to lowest price and the problems encountered during project implementation, the three conducted cases were awarded to lowest price contractors, the results show the existence of the common following problems:

- ☒ Considerable delay in the projects implementation.
- ☒ Existence of disputes between the project partners.
- ☒ Contractor's claims against the client specially related to financial issues
- ☒ Low level of quality in some items of the implemented projects .
- ☒ Increase of the final project cost.
- ☒ Owner satisfaction at the end of the projects implementation is less then expectation .

CHAPTER 6: CONCLUSIONS AND RECOMMENDATION

The purpose of this chapter is to present a brief summary of this research and its conclusions, as well. It introduces practical recommendations to improve contractors selection practice in Gaza Strip and to propose further studies related to this topic.

The aim of this study is to gain an understanding of the contractors selection methods and the evaluation criteria. The study objectives are to review different methods of contractors selection and alternative ways of awarding, also to investigate the contractor selection criteria and to identify a criteria that suits the local construction. An additional objective of the study is to identify the importance of the selection criteria through assigning weights to the different criteria, and evaluate the impact of every criteria on the contractor's selection. The study as well aims to carry out practical case studies in order to study the impact of low-bid system on the project implementation. Finally, the research aims to propose a multi-criteria awarding system for contractors selection in Gaza Strip.

6.1 Conclusions

The results of the literature review indicate that the new bid awarding systems used in many countries are based on a multi-criteria selection process. Generally, the criteria used by construction clients to evaluate contractors cover the following five aspects:

- ☒ General information
- ☒ Financial information
- ☒ Managerial information
- ☒ Technical information and
- ☒ Safety information.

Selection of the suitable contractor is the key to project success. The selection process needs a definite number of criteria. The focal point of this research is to identify the appropriate classes (main-criteria) for the selection of local contractors. The research results indicated the appropriateness of 10 classes for the selection of local contractors.
Table 6.1 shows the ten classes of contractor selection , their weights and ranks.

Table 6.1: weight and rank of classes

Class(main criteria)	Weight (%)	Rank
Financial evaluation of the bid	40.10	1
Completeness of bid document	9.64	2
Past performances in similar projects	8.08	3
Staff skills and experience	7.40	4
Contractor's reputation/image	6.86	5
Quality of work	6.70	6
Contractor site management/execution	6.12	7
Bid understanding	5.62	8
Plant and equipment resources	5.14	9
Health and safety performance	4.34	10
Total weights	**100**	

The results indicated that the financial evaluation of the bid has been ranked in the first position with weight equal 40.10%, the remaining 9 classes are all related to technical criteria with a total weight of 59.90%. This results demonstrated the importance of both technical and financial criteria on contractor selection.

An exploration of the 10 classes (main-criteria) was conducted in order to achieve more accuracy of the evaluation process, each class was analyzed to three, four, or five sub-criteria (Factors). In total, 38 factors (sub-criteria) were identified and considered in this research for the selection of local contractors.

The finding of this research is the description of the factor's importance by assigning weights to each factor, the weights assigned reflect the level of importance of every factor in the selection process. Table 6.2 shows the 38 factors (sub-criteria) and their weights i.e. their importance on contractor selection.

Table 6.2 : Weights of classes and factors

Class (Main criteria)	1 Class's Average Weight	Factors (Sub-criteria)	2 Fractional Weight of each factor in the class	3 3=(1 X2) Factor's Weight
Financial evaluation of the bid	**40.10%**	Lowest bid	*65.25*	26.16
		Unbalanced bid	*13.12*	5.26
		Arithmetic mistakes	*8.35*	3.35
		Financial reservation	*6.06*	2.43
		Balance sheet for the previous 3 years	*7.22*	2.90
Completeness of bid document	**9.64%**	Required bond	*44.40*	4.28
		Taxes clearance	*15.64*	1.51
		Financial capability	*18.86*	1.82
		Shortage contract offer	*21.10*	2.03
Past performances in similar projects	**8.08%**	Perform past projects on time	*44.70*	3.61
		Reasonability of cost in past project	*20*	1.62
		Quality level in past projects	*35.30*	2.85
Staff skills and experience	**7.40%**	Existing of Staff training program	*14.79*	1.10
		Ratio of trained staff to total staff	*16.49*	1.22
		Project managers' experiences	*28.10*	2.08
		Other project staff experience	*19.58*	1.45
		Past performance of the project staff	*21.04*	1.55
Contractor's reputation/image	**6.86%**	Classification of the company	*37.51*	2.57
		Number of years in the business	*17.65*	1.21
		Contractor capital	*15.10*	1.04
		Past owner/contractor relationship	*15.51*	1.06
		Cooperative in solving problems	*14.23*	0.98
Quality of work	**6.70%**	Quality records on previous projects	*42.66*	2.86
		Proposed quality control in implementation	*33.30*	2.23
		Application of the ISO system	*24.04*	1.61

Class (Main criteria)	1 Class's Average Weight	Factors (Sub-criteria)	2 Fractional Weight of each factor in the class	3 3=(1 X2) Factor's Weight
Contractor site management /execution	**6.12%**	Type of proposed control and monitoring procedures during implementation	*34.13*	2.09
		Construction progress reporting systems	*25.60*	1.57
		Provision of trained /skilled staff for the particular project	*40.27*	2.46
Bid understanding	**5.62%**	Aware of bid document	*42.04*	2.36
		Explain ambiguous item	*21.63*	1.22
		Response ambiguous	*16.94*	0.95
		Solicit classified information	*19.39*	1.09
Plant and equipment resources	**5.14%**	Condition of equipment	*31.35*	1.61
		Suitability of equipment to the project size	*30.11*	1.55
		Efficiency of proposed technology level to the project type	*17.85*	0.92
		Availability of owned construction equipment	*20.69*	1.06
Health and safety performance	**4.34%**	Proposed health and safety program	*50.10*	2.18
		Health and safety records on previous projects	*49.90*	2.16
Total	**100**	-	-	**100**

The results indicate that the weights of technical factors are ranged between 1% to 5 %, the single factor related to financial issue (lowest bid) got 26.16%. The results indicated that the highest weight is assigned to the technical factors with total value equal 73.84%. The results also indicated the necessity to use multi-criteria system for the contractor selection.

The finding of this research is the description of the factor's impact, the impact assigned to each factor, in the score calculation, was defined according to the 7 type of impact as illustrated in Table6.3

Table 6.3: Description of factor impacts

Factor Impact on contractor selection							
No effect	**Positive impact**			**Negative impact**			**Reject the bid**
	High	Medium	Low	High	Medium	Low	**0**
-	+100 %	+66 %	+33 %	-100 %	-66%	-33%	
Score	+ 1.00	+ 0.66	+ 0.33	- 1.00	- 0.66	- 0.33	0

In addition, a "Bid evaluation form" was established in order to compute the bid score of the evaluated bidders, the presented "Bid evaluation form" takes into consideration the impact assigned to each factor and the factor weight as presented in Table 6.3.

Table 6.4 : Bid evaluation form (Final score of the bid)

S.N	Factors (Sub-criteria)	(1) Factor impact	(2) Factor weight	(3=1*2) Factor score
1	Lowest bid		26.16	
2	Unbalanced bid		5.26	
3	Arithmetic mistakes		3.35	
4	Financial reservation		2.43	
5	Balance sheet for the previous 3 years		2.90	
6	Required bond		4.28	
7	Taxes clearance		1.51	
8	Financial capability		1.82	
9	Shortage contract offer		2.03	
10	Perform past projects on time		3.61	
11	Reasonability of cost in past project		1.62	
12	Quality level in past projects		2.85	

S.N	Factors (Sub-criteria)	(1) Factor impact	(2) Factor weight	(3=1*2) Factor score
13	Existing of Staff training program		1.10	
14	Ratio of trained staff to total staff		1.22	
15	Project managers' experiences		2.08	
16	Other project staff experience		1.45	
17	Past performance of the project staff		1.55	
18	Classification of the company		2.57	
19	Number of years in the business		1.21	
20	Contractor capital		1.04	
21	Past owner/contractor relationship		1.06	
22	Cooperative in solving problems		0.98	
23	Quality records on previous projects		2.86	
24	Proposed quality control in implementation		2.23	
25	Application of the ISO system		1.61	
26	Type of proposed control and monitoring procedures		2.09	
27	Construction progress reporting systems		1.57	
28	Provision of trained /skilled staff for the particular project		2.46	
29	Aware of bid document		2.36	
30	Explain ambiguous item		1.22	
31	Response ambiguous		0.95	
32	Solicit classified information		1.09	
33	Condition of equipment		1.61	
34	Suitability of equipment to the project size		1.55	
35	Efficiency of proposed technology level to the project		0.92	
36	Availability of owned construction equipment		1.06	
37	Proposed health and safety program		2.18	
38	Health and safety records on previous projects		2.16	
	-	-	**100**	

The Table 6.4 summarizes the evaluation process, the final score of the bid is determined after the calculation of the factor score for the 38 factors. The final score is calculated separately for all the submitted bids and the bidder with the higher score is the winner.

The results of the study indicated that the majority of respondents (65.30%) agreed to apply a new multi-criteria selection and awarding system for their bids. Moreover, a third part of the respondents (34.70%) still preferred using the traditional awarding system i.e. the "lowest bid price", but they suggested to carry out a prequalification procedure.

The results indicated the existence of many problems in the local construction sectors, the dominant part of respondents (90%) confirmed that the current awarding method i.e. "the lowest bid price" is considered one of the major problems of the construction sector. This outcome indicated the trends and ability of construction clients and project owners to apply new awarding methods in order to overcome the encountered problems related to contractor's selection based only on consideration of financial criteria and negligence of other significant criteria.

The results also confirm that 37.60% of the surveyed people consider that the current “public administrative regulations” related to construction bids are not helpful to awarding committees in order to take the most suitable awarding decision.

The finding obtained from the three case studies exposed in this study is the existence of a proportional relation between awarding bids to lowest price and the problems encountered during implementation, the three cases of the study were awarded to lowest price contractors, the results show the existence of the following problems:

1. Considerable delay in the project handover.
2. Disputes between the project partners.
3. Contractor's claims against the client which lead to disputes issues
4. Low level of quality in some items.
5. Increase of the final project cost.

Finally, a new evaluation and awarding system for construction projects is proposed by the researcher. The proposed system is too analogous to the selection process investigated in this study (in chapter 4) with minor modifications proposed by the researcher in order to increase the efficiency of the selection system, also the realistic comments and recommendations of the respondents were considered. The proposed evaluation and awarding system is explored in details at the end of this chapter.

6.2 Recommendations:

The following are the recommendations that were derived from results of this research:

- Currently, bid price is the most important criterion in the selection of local contractors in Gaza strip. The researcher believes that Contractors should not be selected according to the lowest price, but it should be attributed to the highest cumulative score of financial and technical scores.
- In order to achieve the aims of a construction project, contractors must be selected for implementation of construction works through a rigorous evaluation system based on evaluation criteria which should be clearly defined in the bidding documents to the contractors before the bid submission.
- Evaluation criteria can be modified from a project to another to be more suitable for the project size, type, location, and complexity.
- The ultimate aim of contractor selection should identify the "best bidder", and not the "lowest bidder", this recommendation represent the summary of the bidding law No 6, the law suggest to award the contract to the best price and not to the lowest price.

The following are more specific recommendations:

1- **New bid awarding systems**

There is a need to change the traditional system for contractor selection and awarding contracts from the "lowest price" to "multi-criteria selection" practices. This can be implemented by establishing alternative methods to select contractors based on technical and financial criteria. The local official authorities ought to make legislative changes on related statutes law, so that the awarding committees can lawfully consider not only cost but also other technical factors that are useful to predict the quality of the construction. To start with corrective actions, the bidding law No 6 need to be activated and putting executive instructions, bearing in mind that this law suggest to award the contract to the best bid and not to the lowest bid.

2- **Establishing of public institute to archive the past construction projects**

The evaluation of contractors requires information related to the past performance of contractors during the past years, such information is generally obtained from contractors only, which represent imprecise source of information. It is recommended to establish a specialized public institute responsible of recording and archiving data related to the implemented projects in Gaza Strip. The role of this institute will be helpful to all clients related to the local construction sectors, in addition, such institute will offer a firm and accurate information to the evaluation and awarding committees and all others interested organizations. It is necessary to structure this issue through an official public organization like the 'Central Bidding Committee'.

3- **Establishing a database system for construction projects**

Pre-bid qualification including past performance evaluation has the potential to cause administrative problems. In this respect, information technology (IT) will play an important role in expanding the awarding committee's capacity. Specifically, it is suggested to introduce a database system that manages all the information related to public construction in Gaza Strip. The IT solution for construction information management will bring many benefits to the clients as well as to contractors. The proposed databases system can minimize efforts and time consumed by the evaluation committees, in addition, it will be the source of accurate data for the public construction organization and other economical sectors .

4- **Special Training Programs for Evaluators**

Members of Evaluation committees and awarding committees should participate in training courses, workshops, and seminars in the topics of bid evaluation and contractor selection methodologies. This will improve their knowledge, skills and experience. However, it may be a realistic need to expect bid evaluators accomplished the bid evaluation process fairly, with equal opportunities to all bidders, with transparency procedure, and with high level of responsibility.

5-**Establishing of a permanent training center for the contractors staff**

The technical staff in the majority of contractors company suffer from instable recruitment situation and a weakness of their managerial and technical skills. So the establishment of a permanent training center under the frame of the Palestinian contractors union (PCU) can overcome this weakness and improve the staff skills of the contractors company. In addition, the training center facilitate to pass and transform the experience between contractor's staff by the exploration of problem encountered and lessons learned through the past implemented projects, such center will bring direct and indirect benefit to the construction projects and participate in building the skills of contractor's staff.

6.3 Proposed Further studies

- It is necessary to conduct a similar study to investigate contractors selection and awarding methods from construction industry stakeholders other than owners and consultants.
- The weights of evaluation criteria need to be carefully examined to set commonly acceptable standard or range. They should not be arbitrarily determined by evaluation committee .It is recommended to conduct a future study to identify the suitable criteria and their weights separately for each sector (public buildings projects, rods projects, and sewage projects).
- The relationship between a contractor selection approach and project's success factors is important to conducted and enhanced in future study.

6.4 The proposed selection and awarding system

In order to present a practical and applicable system for the selection of local contractors, it is necessary to add the confident results achieved by the research and overcome the disadvantages point , many statements are considered in this proposed system.

In this system the bidders are required to submit two separated envelopes, the first one contains the technical proposal and the second one contains the financial proposal. The financial envelopes of all bidders will be opened after the completion of the technical evaluation. A multi-stage procedure will be utilized in evaluating the proposals submitted by contractors, The Technical Proposal is evaluated on the basis of its responsiveness to the project Terms of Reference (TOR). Each responsive proposal shall be attributed a technical score (Ts) based on the fulfillment of bidder to the technical criteria.

The proposed system consists of a multi-stage procedure to be used in evaluating the submitted proposals of contractors as follow:

- Stage1: Technical evaluation

The output of this stage is determination of technical scores of the submitted bids (Ts), with evaluation of the Technical Proposal being completed prior to any Financial Proposal being opened and compared.

- Stage2: Financial evaluation

The output of this stage is determination of financial scores (Fs) of the submitted bids, but after completion of the technical evaluation of all submitted bidders which include discarding non-responsive bids when deems necessary.

- Stage3:Awarding decision

The final cumulative score (CS) of the bids proposals will be computed for both technical scores (Ts) and financial scores (Fs), based on a pre-defined formula .The bid will be awarded to the Contractor whose proposal achieves the highest final combined cumulative score of both technical and financial scores (Cs).

6.4. 1. Evaluation and comparison of proposals

The evaluation of bids should started by the technical evaluation, the selection criteria proposed to be used in this stage is 37 criteria and they are chosen from the 38 criteria (factor) identified in this research, the remaining one criteria is the bid price, the bid price will be evaluated separately in later stage.

The proposed system contains the following statements :

- The evaluation of submitted bids will be done by at least 3 evaluators
- Each evaluator will performs the evaluation separately
- The final score of the bid is the average of the evaluators scores
- To overcome probable confusion or misunderstanding in relation to the positive and negative impact on bid evaluation, the researcher decides to cancel negative impact from the evaluation, and he suggests to use positive impact only in addition to the "no effect" and "reject the bid" as a tool to evaluate the level of impact of such factor on the selection of contractors.
- To be more accurate, the proposed system considers four levels in case of positive impact and zero for the two other impact: no effect , to reject the bid, as presented in Table 6.5.

Table 6.5: Levels of impact on contractor's selection

Impact Description	Excellent positive impact	High positive impact	Medium positive impact	Low positive impact	No effect	Reject the bid
% level	100%	75%	50%	25%	-	0
Impact score	1.00	0.75	0.50	0.25	-	0.00

- The weights assigned to the selection criteria by the researcher is too close to the weights assigned by the respondents through the field investigation, the total weight of all criteria still equal to 100. The proposed assigned weights for this system are presented for each criteria in Table 6.6.

- The evaluator should assign only one awarded score to each criteria in column(b) of Table 6.6, the awarded score equals to one amount from : 1.00, 0.75, 0.50, 0.25 or 0.00 these five levels represent the factor impact on evaluation
- The evaluator should assign one of the defined impacts to each criteria (factor)
- The score of each factor is the multiplication of the factor weight by the assigned impact
- The final technical score of the bid is the total of criteria scores
- The bid with the higher score will be the winner of the bid
- The final technical score for each criteria is the multiplication of criteria weight by the awarded score : (c) = (a) x (b) as mentioned in Table 6.6
- The Financial Proposal will be opened only after the completion of the technical evaluation .

6.4. 2. Award of contract

In this Stage, after the completion of the technical evaluation, the financial proposals of all bidders will be compared. The evaluation committee will determine whether the financial proposals are complete and without computational errors.

The Financial scores of the Financial Proposals shall be computed based on the following Criteria:

The Lowest evaluated Financial Proposal (F_m) shall be given a maximum "Financial Score" (F_s) of 100 points. Then, the financial scores of the other Financial Proposals shall be computed based on the following formula:

$$\mathbf{Fs = 100 \times Fm / F}$$

In which;

F_s = Financial scores of the Financial Proposal under consideration.

F_m = Amount of lowest Financial Proposal.

F = Amount of the Financial Proposal under consideration.

Final Scoring:

The final cumulative score (CS) of the Proposals will be computed for both the technical scores (Ts) and financial scores (Fs), based on the following formula:

Cs = (Ts * 40% + Fs * 60%)/100

The Contract will be awarded to the Contractor whose proposal achieves the highest final cumulative score (Cs).

The evaluation should be documented and signed by all the evaluators according to the following forms :

- The selection form (Table 6.6), and
- The award form (Table 6.7) .

Table 6.6 : The Selection Form

Project:	Owner:
Contractor name:	Evaluator name: (min 3 Evaluators)

			(a)		(b)			(c) = (a).(b)
S.N	**Selection criteria**	**Criteria weighting (%)**	**Criteria Impact**					**Score**
			1	0.75	0.50	0.25	0	
1	Unbalanced bid	6						
2	Arithmetic mistakes	4					X	4*0=0
3	Financial reservation	3	X					3*1=3
4	Balance sheet for the previous 3 years	4						
5	Required bond	5						
6	Taxes clearance	2						
7	Financial capability	3						
8	Shortage contract offer	3						
9	Perform past projects on time	4			X			4*0.50= 2
10	Reasonability of cost in past project	3						
11	Quality level in past projects	3						
12	Existing of Staff training program	2						
13	Ratio of trained staff to total staff	2						
14	Project managers' experiences	3						
15	Other project staff experience	2						
16	Past performance of the project staff	2						
17	Classification of the company	3						
18	Number of years in the business	2						
19	Contractor capital	2						
20	Past owner/contractor relationship	3						

21	Cooperative in solving problems	1						
22	Quality records on previous projects	4						
23	Proposed quality control in implementation	4						
24	Application of the ISO system	2						
25	Type of proposed control and monitoring procedures	3						
26	Construction progress reporting systems	2						
27	Provision of trained /skilled staff for the particular project	3						
28	Aware of bid document	3						
29	Explain ambiguous item	2						
30	Response ambiguous	1						
31	Solicit classified information	1						
32	Condition of equipment	2						
33	Suitability of equipment to the project size	2						
34	Efficiency of proposed technology level to the project type	1						
35	Availability of owned construction equipment	2						
36	Proposed health and safety program	3						
37	Health and safety records on previous projects	3						
Total weighting		**100**	Total score					….

Comments : ----------

Evaluators name : ----------

Signature : ----------

Table 6.7 : The Award Form

Project:

Owner:

Date:

Price Weighting = 60%

Technical weighting = 40 %

A- Technical Scores

Weighted Score	**Evaluator 1**	**Evaluator 2**	**Evaluator 3**	Average score	Technical score
Contractor A	70%	72%	67%	69.67%	40*0.6967=27.86
Contractor B	82%	84%	86%	84%	40*0.84=33.6
Contractor C	84%	88%	87%	86.33%	40*0.8633=34.53
Contractor D	80%	84%	80%	81.33%	40*0.8133=32.53
Contractor E	74%	76%	78%	76%	40*0.76=30.40

(The filled results are for example)

B- Financial Score

Firm	Contractor **A**	Contractor **B**	Contractor **C**	Contractor **D**	Contractor **E**
Bid Price	100000	110000	120000	130000	105000
Financial weighted score	60	60*(100/110)	60*(100*120)	60*(100/130)	60*(100/105)
Financial score	60	54.54	50	46.15	57.14

(The filled results are for example)

C-Technical and financial Score

Firm	Contractor **A**	Contractor **B**	Contractor **C**	Contractor **D**	Contractor **E**
Financial weighted score	60	54.54	50	46.15	57.14
Technical weighted core	27.86	33.60	34.53	32.53	30.40
Final score	**87.86**	**88.14 The winner**	**84.53**	**78.68**	**87.54**

(The filled results are for example)

The contractor with the highest final score is the winner (combined of technical & financial score) – as example the contractor B is the winner-

Comments: ----------

---------- ----------

Evaluator: Evaluator 2 Evaluator 3

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LIST OF ANNEXES

Annex 1 : Questionnaire (ENGLISH)

Questionnaire about selection criteria and awarding system for construction contractors in Gaza Strip

Dear sir

To start ,I would like to present my appreciation and thanks to you for taking part of your time and effort to complete this questionnaire.
This questionnaire aims to study the selection criteria and awarding system for construction contractors in Gaza strip.
This is part of partial fulfillment of the requirements for degree of master of science in construction management from the Islamic University-Gaza. We are hoping that the result of this questionnaire will improve the selection of contractors in Gaza strip .

Information in the questionnaire :-
The information in the questionnaire will be used for academic research with complete commitment for absolute confidency to your information.

Contents of questionnaire
This questionnaire is divided into four sections to accomplish the aim which was put for :-

First : General Information
Second : Tender preparation stage
Third : Selection Stage
Fourth: Awarding Stage

First : General Information

1- How do you describe your organization?

Public Owner	Consultant	Donor	NGOs	Implementing agency
Others, Please Specify				

2- Types of implemented projects through your organization

Housing	Public building	Roads	Water and Wastewater	Private building
Others, Please Specify				

3- The average annual value for the implemented projects through your organization over the last five years (construction cost) / (where M=Million in $)

Less than 0.5M	0.5M – 0..99M	1 M – 2.99M	3 M – 4..99 M	More than 5 M

4- Which best describe your occupation in your organization?

Project Manager	Construction Supervisor	Head of Department	Office Engineer	Procurement Specialist
Others, Please Specify				

5- Which best describe your working experience?

Less than 5years	6-10 years	11-15 years	16-20 years	More than 20 years

<u>Second</u> : Tender preparation stage

1-After the completion of design and tender documents prepared by your organization, how the invitation to bid can be done?

□Open bid through advertisement in the local newspapers.
□Short list for limited number of contractors
□Prequalification of limited number of contractors .
□Direct negotiation with one or many contractors
□Other methods, Please Specify ……

2-What is the relation between the bid opening committee and the bid evaluation committee?

□ Same members in the two committees.
□It is possible to be a member in the two committee
□ It is impossible to be a member in the two committees.
□The president of the two committees can be the some
□ Others, Please Specify …….....

3- Which best describe the responsibilities of the bid evaluation committee?

□Evaluate and classify the submitted bids.
□Prepare a recommendation to award the bid
□Take the decision for bid awarding.
□All of the past.
□ Others, Please specify

…….....

4-A persons from outside of your organization can be a member in the bid evaluation committee:

□ Yes □ No

If the answer is **yes**, please specify :

□ Representative from designer/supervisor consultant
□ Representative from Central bidding department
□ Representative from General monitoring state (Financial and Administrative monitoring organization)
□ Representative from donor agency
□ Others, Please specify …….

5-What is the frame time of the bid evaluation process in your organization?

□Less than 15 days. □From 16 days to 1 month
□More than 1 month . □Not limited by a fixed duration

Third : Selection Stage

The selection of contractors during the bidding stage requires a sophisticated knowledge and experience to ensure that the contractor is technically and financially capable to accomplish the project as specified . The evaluation "Factors" presented herein (for contractors selection) have been identified in the literature survey .The outcome of this literature led to identification of **38 "Factors"** , which can be grouped into **10 "Classes"** .
The objective of this section is to assist in identifying the Weights of "Classes' and "Factors" and their impact of each factor in the selection of contractor's bid .

1- Identification of "Classes"(Main criteria) weights for contractor's selection:

The following table presents the Classes (group of main criteria) for contractors selection. Kindly rate the relative importance of the class to the other classes . The relative importance of the class to the other classes is identified by dividing 100% among the classes . (**Some of the "classes" may have a zero weight**) .

SN	Classes	Weight (%)
1	Financial evaluation of the bid	
2	Bid understanding	
3	Completeness of bid document	
4	Contractor's reputation/image	
5	Past performances in similar projects	
6	Contractor site management/execution	
7	Health and safety performance	
8	Plant and equipment resources	
9	Quality of work	
10	Staff skills and experience	
Total Weights		**100**

2- Identification of "Factors" (sub- criteria) weights for contractor's selection:

The following tables present the Factors for each Class used for contractors selection. Kindly rate the relative importance of the factor to the other factors . The relative importance of the factor to the other factors is identified by dividing 100% among the factors . (**Some of the "Factors" may have a zero weight**) .

Class	Factors	Weight %
Financial evaluation of the bid	Lowest bid	
	Unbalanced bid	
	Arithmetic mistakes	
	Financial reservation	
	Balance sheet for the previous 3 years	
Total Weights		100

Class	Factors	Weight %
Bid understanding	Aware of bid document	
	Explain ambiguous item	
	Response ambiguous	
	Solicit classified information	
Total Weights		100

Class	Factors	Weight %
Completeness of bid document	Required bond	
	Taxes clearance	
	Financial capability	
	Shortage contract offer	
Total Weights		100

Class	Factors	Weight %
Contractor's reputation/image	Classification of the company	
	Number of years in the business	
	Contractor capital	
	Past owner/contractor relationship	
	Cooperative in solving problems	
Total Weights		100

Class	Factors	Weight %
Past performances in similar projects	Perform past projects on **Time**	
	Reasonability of **Cost** in past project	
	Quality level in past projects	
Total Weights		100

Class	Factors	Weight %
Contractor site management /execution	Type of proposed control and monitoring procedures during implementation	
	Construction progress reporting systems	
	Provision of trained /skilled staff for the particular project	
Total Weights		100

Class	Factors	Weight %
Health and safety performance	Proposed health and safety program	
	Health and safety records on previous projects	
Total Weights		100

Class	Factors	Weight %
"Plant and equipment resources	Condition of equipment	
	Suitability of the equipment to the project size	
	Efficiency of proposed technology level to the project type	
	Availability of owned construction equipment	
Total Weights		100

Class	Factors	Weight %
Quality of work	Quality records on previous projects	
	Proposed quality control system during implementation	
	Application of the ISO system	
Total Weights		100

Class	Factors	Weight %
Staff skills and experience	Existing of Staff training program	
	Ratio of staff taking training to total number of staff	
	Project managers' experiences	
	Other project staff experience	
	Past performance of the project staff	
Total Weights		100

3- Identification of "Factors" impact in contractor's selection:

Kindly select the impact of each factor on the bid evaluation , four levels of impact have been identified . These levels are to reject the bid , a negative impact , a positive impact , and no effect . The positive impact or the negative impact can be detailed into 3 levels (Low , Medium, and High),Each level has a percentage value : 33% , 66% ,and 100% respectively . This further detail is required to improve the preciseness of bid evaluation , because through a group of factors may all have a positive or a negative impact , their degree of influence might differ . (**Please select only one columne for each factor)**

S.N	Factors	Factor Impact to contractor selection							
		No effect	Positive impact			Negative impact			Reject the bid
		0	High +100	Medium +66	Low +33	High -100	Medium -66	Low -33	
1	Lowest bid								
2	Unbalanced bid								
3	Arithmetic mistakes								

4	Financial reservation				
5	Balance sheet for the previous 3 years				
6	Aware of bid document				
7	Explain ambiguous item				
8	Response ambiguous				
9	Solicit classified information				
10	Required bond				
11	Taxes clearance				
12	Financial capability				
13	Shortage contract offer				
14	Classification of the company				
15	Number of years in the business				
16	Contractor capital				
17	Past owner/contractor relationship				
18	Cooperative in solving problems				
19	Perform past projects on **Time**				
20	Reasonability of **Cost** in past project				
21	**Quality** level in past projects				
22	Type of proposed control and monitoring procedures during implementation				
23	Construction progress reporting systems				

24	Provision of trained /skilled staff for the particular project				
25	Proposed health and safety program				
26	Health and safety records on previous projects				
27	Condition of equipment				
28	Suitability of the equipment to the project size				
29	Efficiency of proposed technology level to the project type				
30	Availability of owned construction equipment				
31	Quality records on previous projects				
32	Proposed quality control system during implementation				
33	Application of the ISO system				
34	Existing of Staff training program				
35	Ratio of staff taking training to total number of staff				
36	Project managers' experiences				
37	Other project staff experience				
38	Past performance of the project staff				

Fourth: Awarding Stage

1- After you have rated the significant level of main criteria and their sub-criteria mentioned above, please specifies how can it be taken into consideration in the bid awarding decision:

□ To consider the criteria as a qualification criteria only, and award the bid to the lowest evaluated bid price
□ To consider the criteria as a qualification criteria only, and award the bid to the second lowest evaluated bid price
□ To consider the criteria as a qualification criteria only, and award the bid to the average evaluated bid price
□ To consider the criteria as a qualification criteria only, and award the bid to the closest bid to project estimation
□ To provide grade to each main criteria, and award the bid to whom with the high total grade.
□ To assign weights to the technical and financial proposals, and award the bid to the highest weight after combination of the technical and financial scores .
□ Others method, Please Specify:

……
……

2- Do you think that the current local awarding method used in the contractor's selection is one of the major problems in the construction sector :

□ Yes □ No

Please Specify your justifications

……

3- Do you think that the methods used currently for bid awarding are capable of identifying the most suitable contractor :

□ Yes □ No
□ Frequently □ Rarely

Please give comments for your answer :

……
……

4- Do you think the awarding committee takes into consideration the project "cost estimate" prepared by the designer :

□ Yes □ No

□ Frequently □ Rarely

Please give comments for your answer : ……

……

5- Do you think that the "public administrative regulations" related to contractor's selection are helpful to the awarding committee to take the most suitable awarding decision :

□ Yes □ No

□ Frequently □ Rarely

Please give your comments: ……

……

……

6- What type of problems if any , have you experienced during the project execution caused by the contractor not being capable of carrying out the job within the contract conditions :

……

……

……

7- Kindly, add your comments or recommendations related to the selection process & awarding method for the construction contractors :

……

……

……

Thank you very much.

Annex 2 : Questionnaire (Arabic)

استبيان

حول العوامل (الرئيسية والفرعية) اللازمة لاختيار المقاولين و طريقة الترسية على مقاولي العطاءات العامة في قطاع غزة

- **الأخ الكريم/الأخت الكريمة يرجى التكرم بتعبئة هذا الاستبيان بتروي و بعناية قدر الإمكان وذلك للتعرف على كافة الآراء و وجهات النظر المتعلقة بهذا الموضوع الهام ، مع ملاحظة أن جميع المعلومات في هذا الاستبيان سوف تستخدم في أغراض البحث العلمي فقط .**
- **ونتقدم لكم بوافر الشكر على مشاركتكم في إثراء هذا البحث الذي يعتبر من متطلبات إعداد مشروع التخرج الخاص برسالة الماجستير في إدارة التشييد.**

الفئات المستهدفة :

مؤسسات القطاع العام والخاص والمنظمات الحكومية وغير الحكومية التي لها علاقة بقطاع الإنشاءات وكذلك المكاتب الهندسية والشركات الاستشارية التي تشارك في أعمال التصميم و إعداد العطاءات والأشراف الهندسي على تنفيذ المشاريع .

مقدمة :

من المعروف لجميع العاملين و المشاركين في قطاع الإنشاءات أن مرحلة المناقصة هي من أهم المراحل في عمر" المشروع"، وبشكل خاص بالنسبة للجهات المالكة للمشروع (الزبون) حيث تتطلب هذه المرحلة اختيار المقاول " الأفضل " ، وهنا تكمن الصعوبة حيث أن عملية تقييم قدرات وإمكانيات المقاولين أو الموردين الفنية والمالية من خلال المستندات والإثباتات التي تطلبها الجهة المالكة هو عملية صعبة وتحتاج إلى تحديد مجموعة من العوامل التي سيتم على أساسها اختيار وترتيب العطاءات وتحديد المقاول " الأفضل " مع الأخذ بعين الاعتبار تحقيق الشروط المتبعة في المناقصات العامة.

وبالنظر إلى واقعنا المحلي نلاحظ وجود تباين في عملية اختيار المقاولين من مؤسسة إلى أخرى من حيث الطريقة أو من حيث تحديد العوامل المستخدمة في الاختيار والتأهيل وكذلك درجة الأهمية لهذه العوامل بين مختلف المؤسسات مع العلم أن ذلك متبع غالبا في مرحلة الاختيار الأولي للمقاولين والذي يسبق مرحلة المشاركة في العطاء ، ولكن الإجراءات السائدة حاليا في عملية ترسية العطاء تعطي الاعتبار فقط لعامل الأسعار وتغفل عن باقي العوامل مما يؤدي في الكثير من الأحيان إلى اختيار غير موفق لبعض المقاولين ويتسبب ذلك في مشاكل مختلفة أثناء مرحلة "التنفيذ" أو مرحلة "الاستخدام" للمشروع يكون المتضرر الأساسي منها الزبون أو الجهة المالكة . ومن هنا تأتي أهمية هذا الاستبيان الموجه لاستدراج وجهة نظر ذوي الاختصاص والخبرة في الجهات المالكة أو المؤسسات التي تقوم بطرح وإدارة العطاءات (حكومية أو غير حكومية) أو المكاتب الاستشارية التي تشارك مع الجهات المالكة في عملية الترسية واختيار المقاولين ، ونحن نهدف هنا إلى الاستفادة من التجارب

الحقيقية و من الخبرة الطويلة التي اكتسبتها الجهات المختصة خلال السنوات الماضية في التعامل مـع المقـاولين ، وذلـك بغرض :

أ. انتقاء مجموعة من العوامل المختلفة و التي يمكن أخذها بعين الاعتبار فـي عملية اختيار المقاولين قبل عملية الترسية (بالإضافة لعامل سعر العطاء)

ب. تحديد افضل طرق الترسية التي يمكن تطبيقها على المقاولين المشاركين في العطاءات التنافسية العامة .

وذلك بما يتناسب مع واقعنا المحلي والعمل على تطبيقها و استخدامها بشكل أشمل في عمليات ترسيه العطاءات على المقاولين في المشاريع المستقبلية لتجنب المشاكل الناتجة عن استخدامنا الطريقة الوحيدة و التي تعتمد الترسية على أقل الأسعار.

أولاً : معلومات عامة :

1- ما هو الوصف المناسب للمؤسسة التي تعمل بها ؟

مؤسسة حكومية	جهة ممولة	منظمة غير حكومية	مؤسسة منفذة للمشاريع	استشاري
جهة أخرى، رجاء التوضيح				

2-حدد طبيعة المشاريع التي تم تنفيذها عبر مؤسستكم

مباني إسكان	مباني عامة	طرق	مياه ومجاري	مباني خاصة
مشاريع أخرى، رجاء التوضيح				

3- حدد المعدل السنوي لقيمة المشاريع التي نفذت عبر مؤسستكم خلال الخمس سنوات الماضية :

أقل من 0.50 مليون$	0.5 – 0.99 مليون$	1 – 2.99 مليون$	3 –4.99 مليون$	أكثر من 5مليون$

4- ما هو الوصف الأنسب لطبيعة عملك في المؤسسة التي تعمل معها ؟

مدير مشروع	مهندس مشرف	مدير دائرة	مهندس مكتب	متخصص في العطاءات
طبيعة عمل أخرى، رجاء التوضيح				

5-حدد عدد سنوات خبرتك العملية

أقل من 5 سنوات	**6 –10 سنوات**	**11 – 15 سنة**	**16 –20 سنة**	**أكثر من20 سنة**

ثانيا : مرحلة الأعداد للعطاء:

1. بعد انتهاء أعمال التصميم وإعداد وثائق العطاء من طرفكم أو من طرف الاستشاري المصمم للمشروع ، كيف تتم الدعوة للعطاء ؟

- ☐ عطاء مفتوح عبر إعلان في الجرائد المحلية
- ☐ استدعاء عدد محدد من الشركات للمشاركة في العطاء
- ☐ تأهيل مسبق لعدد محدود من الشركات
- ☐ التفاوض المباشر مع شركة أو شركات تم التعامل معها سابقا
- ☐ طرق أخرى - أذكرها -

.....

2 - ما هي العلاقة بين أعضاء لجنة فتح المظاريف ولجنة تقييم العطاءات ؟

- ☐ نفس الأعضاء في اللجنتين
- ☐ من الممكن أن يكون بعض الأعضاء مشاركين في اللجنتين
- ☐ الأعضاء مختلفين تماما في اللجنتين
- ☐ رئيس اللجنتين عادة ما يكون هو نفس الشخص
- ☐ رأي أخر (الرجاء التوضيح)

.....

3- ماهي طبيعة عمل اللجنة المكلفة بتقييم العطاءات

- ☐ تقييم وترتيب العطاءات المقدمة
- ☐ إعداد توصية لترسية العطاء
- ☐ أخذ قرار ترسيه العطاء
- ☐ جميع ما سبق
- ☐ عمل أخر، الرجاء التوضيح :

4.هل يوجد أعضاء من خارج مؤسستكم ضمن لجنة تقييم العطاءات ؟

☐ نعم ☐ لا

في حالة الإجابة **بنعم** الرجاء التحديد :

- ☐ مندوب عن المكتب الاستشاري المصمم أو المشرف
- ☐ مندوب عن لجنة العطاءات المركزية
- ☐ مندوب عن هيئة الرقابة العامة
- ☐ مندوب عن الجهة الممولة
- ☐ آخرون ، الرجاء التحديد :.....

5. ما هو الإطار الزمني لعملية تقييم العطاءات في مؤسستكم :

□ 15 يوم فأقل □من 16 يوم إلى شهر

□أكثر من شهر □ غير محدد بمدة زمنية

ثالثا : مرحلة الاختيار:

إن عملية ترتيب وتقييم و اختيار المقاولين في مرحلة العطاء تتطلب توفر مهارات وخبرة طويلة لدى أعضاء لجان التقييم وذلك بهدف ضمان التأكد من وجود كلا من القدرات المالية والقدرات الفنية لدى المقاول التي تمكنه من تنفيذ المشروع بدون تعثر . "العوامل التأهيلية" للمقاولين والموضحة في الجدول التالي تم التوصل إليها عبر مراجعة مجموعة من الدراسات السابقة في هذا المجال والتي اخترنا منها عدد **38 عامل** **(عوامل فرعية)** ، تم تجميعها ضمن **10 فئات** **(عوامل رئيسية)** هدف هذه الفقرة هو المشاركة في تحديد أوزان (أهمية) العوامل الفرعية والعوامل الرئيسية وكذلك تحديد أثر تحقق هذه العوامل من عدمه على تقييم عطاء المقاول من طرف أعضاء لجنة التقييم.

1. تحديد أوزان وأهمية الفئات (العوامل الرئيسية) في اختيار المقاولين :

الجدول التالي يوضح الفئات(العوامل الرئيسية) المستخدمة في اختيار المقاولين . الرجاء تحديد الأهمية النسبية لكل فئة بالنسبة لباقي الدرجات مع العلم أن الأهمية النسبية لكل فئة يتم بإعطائها نسبة مئوية بحيث يكون مجموع الأوزان لكافة الفئات مساويا 100(بعض من الفئات يمكن أن يكون وزنها مساويا صفر)

رقم مسلسل	الفئات (العوامل الرئيسية)	الوزن (%)
1	التقييم المالي للعطاء	
2	مدى فهم المقاول للعطاء	
3	تكامل وثائق العطاء	
4	سمعة وصورة المقاول	
5	الخبرة السابقة في المشاريع المشابهة	
6	إدارة المقاول للموقع	
7	أداء المقاول في الوقاية والسلامة	
8	التجهيزات والمعدات	
9	جودة العمل	
10	خبرة طاقم المقاول	
مجموع الأوزان		**100**

2. تحديد أوزان وأهمية العوامل الفرعية في اختيار المقاولين :

الرجاء تحديد الأهمية النسبية لكل عامل بالنسبة لباقي العوامل مع العلم أن تحديد الأهمية النسبية لكل عامل يتم بإعطائها نسبة مئوية بحيث يكون مجموع الأوزان لكافة العوامل التابعة لنفس العامل الرئيسي (الفئة) مساويا 100(بعض من العوامل الفرعية يمكن أن يكون وزنها مساويا صفر)

الفئة	العامل	الوزن%
1- التقييم المالي للعطاء	العرض المقدم هو اقل الأسعار	
	تقديم أسعار وحدات غير متوازنة	
	وجود أخطاء حسابية	
	اقتراح نظام للدفعات والمحجوزات المالية من طرف المقاول بما لا يتعارض مع شروط العطاء	
	تقديم ميزانية الشركة للسنوات الثلاثة السابقة	
مجموع أوزان العوامل		100

الفئة	العامل	الوزن%
2- مدى فهم المقاول للعطاء	إدراك وفهم لكافة وثائق العطاء	
	القدرة على توضيح البنود الغامضة	
	توضيح و إزالة الغموض	
	تقديم معلومات منظمة وواضحة الترتيب	
مجموع أوزان العوامل		

الفئة	العامل	الوزن%
3- تكامل وثائق العطاء	توفر الكفالات البنكية	
	الخلو الضريبي	
	القدرة المالية للمقاول/كشوفات بنكية /	
	نقص في بعض أجزاء العطاء(عدم تعبئة نماذج او عدم ارفاق وثائق)	
مجموع أوزان العوامل		100

الفئة	العامل	الوزن%
4- سمعة وصورة المقاول	تصنيف الشركة	
	عدد سنوات العمل في مجال المقاولات	
	رأسمال الشركة	
	العلاقة السابقة بين المقاول والمالك	
	مدى تعاون المقاول في حل المشاكل	
مجموع أوزان العوامل		100

الفئة	العامل	الوزن%
5- الخبرة السابقة في المشاريع المشابهة	مدى تنفيذ المقاول للمشاريع السابقة ضمن المدة الزمنية للمشروع وبدون تأخير	
	معقولية أسعار المقاول في المشاريع السابقة	
	درجة جودة الأعمال المنفذة من طرف المقاول في المشاريع السابقة	
مجموع أوزان العوامل		100

الفئة	العامل	الوزن%
6- إدارة المقاول للموقع	طريقة المتابعة والمراقبة المقترحة من المقاول	
	نظام إعداد التقارير المقترح من المقاول	
	قدرة المقاول على توفير طاقم مؤهل ومدرب للمشاريع ذات الخصوصية	
مجموع أوزان العوامل		100

الفئة	العامل	الوزن%
7- أداء المقاول في الوقاية والسلامة	برنامج الوقاية والسلامة المقترح من طرف المقاول	
	سجلات المقاول في مجال الوقاية والسلامة في المشاريع السابقة	
مجموع أوزان العوامل		100

الفئة	العامل	الوزن%
8-التجهيزات والمعدات	حالة المعدات المقترحة	
	ملائمة المعدات المقترحة للمشروع	
	فعالية اقتراح مستوى التكنولوجيا الملائمة للمشروع	
	إجراءات توفير المعدات (مملوكة أو مستأجرة)	
مجموع أوزان العوامل		100

الفئة	العامل	الوزن%
9- جودة العمل	سجلات الجودة في المشاريع السابقة	
	اقتراح نوعية نظام الإدارة خلال التنفيذ	
	تطبيق نظام الأيزو ISO	
مجموع أوزان العوامل		100

الفئة	العامل	الوزن%
10-خبرة طاقم المقاول	مدى توفر برنامج تدريب لطاقم المقاول	
	نسبة الطاقم المدرب إلى العدد الكلي من طاقم المقاول	
	خبرات مد راء المشاريع لدى المقاول	
	خبرة باقي طاقم المقاول	
	الأداء السابق لطاقم المشروع المقترح من المقاول	
مجموع أوزان العوامل		100

3. تحديد أثر كل عامل من العوامل في عملية تقييم العطاء :

لمعرفة درجة الأثر التي يتسبب بها كل عامل من العوامل على عملية تقييم العطاء تم تعريف 4 مستويات أساسية متباينة عن الأثر الذي سيؤثر على عملية التقييم ، وهذه المستويات هي :

- **لا اثر**
- **أثر إيجابي ويمكن تقسيمه إلى 3 مستويات : (إيجابي عالي=+100% أو إيجابي متوسط =+66% أو إيجابي منخفض =+33%)**
- **أثر سلبي ويمكن تقسيمه إلى 3 مستويات : (سلبي عالي=- 100% أو سلبي متوسط =- 66% أو سلبي منخفض =- 33%)**
- **إلغاء العطاء**

إن تفصيل المستويات الموضحة أعلاه هو ضروري لدراسة عملية التقييم بالتفصيل وبدقة عالية لكون جميع العوامل من الممكن أن يكون لها اثر سلبي أو إيجابي ولكن درجة هذا الأثر ستكون بالتأكيد مختلفة من عامل لأخر . وعليه يرجى التكرم بتحديد إجابة واحدة فقط من بين العوامل الموضحة في الجدول الثاني.

(وفي البداية نقدم لكم الجدول الأول وهو عبارة عن نموذج بسيط يحتوي على4 عوامل افتراضية يوضح كيفية الإجابة المطلوبة والتبريرات التي أدت لهذه الإجابات، وهذا سيسهل عليكم تعبئة الإجابات المناسبة بدون التباس) .

الجدول الأول : إجابات افتراضية (نموذج)

رقم	العوامل (على سبيل المثال)	أثر هذه العوامل على تقييم العطاء المقدم من المقاول						
		لا أثر (صفر)	أثر إيجابي			أثر سلبي			إلغاء العطاء
			عالي +100	متوسط +66	منخفض +33	عالي - 100	متوسط -66	منخفض -33	
x	الأخطاء الحسابية	✓							
y	عدم تعبئة صيغة العطاء								✓
z	تعاملات إيجابية سابقة للمقاول مع المالك .				✓				
w	تعاملات سلبية سابقة للمقاول مع المالك					✓			

التبريرات للإجابات الخاصة بالعوامل المذكورة في الجدول أعلاه :

X: وجود أخطاء حسابية في الجمع أو الضرب ممكن الحدوث في أي عطاء ولا يؤثر ذلك على عملية التقييم إطلاقا

Y: عدم تعبئة صيغة العطاء يؤدي لإلغاء العطاء فورا

Z: وجود علاقة إيجابية سابقة بين المقاول والمالك يدفع لجنة التقييم لأخذ تقييم إيجابي ولكن بدرجة منخفضة نسبيا

w : وجود تعاملات سلبية سابقة بين المقاول والمالك يدفع لجنة التقييم لأخذ تقييم سلبي بدرجة عالية عن المقاول وذلك كردة فعل .

الجدول الثاني : مطلوب اختيار إجابة واحدة فقط لكل عامل من العوامل

رقم الفئة	العوامل	أثر هذه العوامل على تقييم العطاء المقدم من المقاول							
		لا أثر (صفر)	أثر إيجابي			أثر سلبي			إلغاء العطاء
			عالي +100	متوسط +66	منخفض +33	عالي -100	متوسط -66	منخفض -33	
1	العرض المقدم هو اقل الأسعار								
	تقديم أسعار وحدات غير متوازنة								
	وجود أخطاء حسابية								
	اقتراح نظام للدفعات والمحجوزات المالية بما لا يتعارض مع شروط العطاء								
	تقديم ميزانية الشركة للسنوات الثلاثة السابقة								
2	إدراك وفهم لكافة وثائق العطاء								
	القدرة على توضيح البنود الغامضة								
	توضيح و إزالة الغموض								

رقم الفئة	العوامل	أثر هذه العوامل على تقييم العطاء المقدم من المقاول							
		لا أثر (صفر)	أثر إيجابي			أثر سلبي			إلغاء العطاء
			عالي +100	متوسط +66	منخفض +33	عالي -100	متوسط -66	منخفض -33	
	تقديم معلومات منظمة وواضحة الترتيب								
3	توفر الكفالات								
	الخلو الضريبي								
	القدرة المالية للمقاول/كشوفات بنكية								
	نقص في بعض أجزاء العطاء(عدم تعبئة نماذج او عدم إرفاق وثائق)								
4	تصنيف الشركة								
	عدد سنوات العمل في مجال المقاولات								
	رأسمال الشركة								
	العلاقة السابقة بين المقاول و المالك								
	مدى تعاون المقاول في حل المشاكل								
5	مدى تنفيذ المقاول للمشاريع السابقة ضمن المدة الزمنية للمشروع وبدون تأخير								
	معقولية أسعار المقاول في المشاريع السابقة								
	درجة جودة الأعمال المنفذة من طرف المقاول في المشاريع السابقة								
6	طريقة المتابعة والمراقبة								
	نظام إعداد التقارير المقترح								
	قدرة المقاول على توفير طاقم مؤهل ومدرب للمشاريع ذات الخصوصية								
7	برنامج الوقاية والسلامة المقترح								
	سجلات المقاول في مجال الوقاية								
8	حالة المعدات المقترحة								
	ملائمة المعدات المقترحة								
	فعالية اقتراح مستوى التكنولوجيا الملائمة للمشروع								
	إجراءات توفير المعدات								
9	سجلات الجودة في								

رقم الفئة	العوامل	أثر هذه العوامل على تقييم العطاء المقدم من المقاول							
		لا أثر (صفر)	أثر إيجابي			أثر سلبي			إلغاء العطاء
			عالي +100	متوسط +66	منخفض +33	عالي -100	متوسط -66	منخفض -33	
	اقتراح نوعية نظام الإدارة خلال التنفيذ								
	تطبيق نظام الأيزو ISO								
10	برنامج تدريب طاقم المقاول								
	نسبة الطاقم المدرب إلى العدد الكلي من طاقم المقاول								
	خبرات مد راء المشاريع لدى المقاول								
	خبرة باقي طاقم المقاول								
	الأداء السابق لطاقم المشروع								

رابعا : مرحلة الترسية :

1. **بعد تعاملك وتقييمك للعوامل الرئيسية والفرعية المشار إليها أعلاه ،كيف ترى بأن يتم أخذها بعين الاعتبار في قرار لجنة التقييم من ناحية ترسيه العطاء :**

- ☐ اعتبارها عوامل تأهيلية فقط ومن ثم الترسية على المقاول المؤهل صاحب أقل الأسعار المقيمة
- ☐ اعتبارها عوامل تأهيلية فقط ومن ثم الترسية على المقاول المؤهل صاحب ثاني أقل الأسعار المقيمة
- ☐ اعتبارها عوامل تأهيلية فقط ومن ثم الترسية على المقاول المؤهل صاحب متوسط الأسعار المقيمة
- ☐ اعتبارها عوامل تأهيلية فقط ومن ثم الترسية على المقاول المؤهل صاحب أقرب الأسعار للتقديرات
- ☐ إعطاء كل عامل من العوامل درجة معينة ومن ثم الترسية على المقاول صاحب أعلى درجات التقييم بغض النظر عن السعر
- ☐ عطاء وزن معين للعرض المالي ووزن للعرض الفني ومن ثم الترسية على المقاول الحاصل على أعلى تقييم بعد دمج العرضين المالي والفني وفق معادلة معينة
- ☐ اعتبار طريقة أو طرق أخرى: حددها.....

.....

2 .هل تعتقد بأن طريقة ترسيه العطاءات على أقل الأسعار المستخدمة لدينا هي من الإشكاليات الرئيسية التي يعاني منها قطاع المقاولات ؟

□ نعم □ لا

ماهي مبرراتك لذلك :.....

3.هل تعتقد بأن الطريقة المستخدمة حاليا في ترسيه العطاء على أقل الأسعار قادرة على تحديد المقـاول الأفضل و المناسب لتنفيذ المشروع

□ نعم □ عادة □ نادرا □ لا

الرجاء إعطاء مبررات لأجابتك :

.....

4. هل تعتقد بأن لجان ترسيه العطاء تأخذ بعين الاعتبار "الكلفة التقديرية" للمشروع المعدة من طرف المصمم أو المالك؟

□ نعم □ عادة □ نادرا □ لا

الرجاء إعطاء مبررات لأجابتك :

.....

5. هل تعتقد بأن "النظم واللوائح الإدارية" المتعلقة بالعطاءات العامة تساعد لجان الترسية على اتخاذ القرارات الأكثر ملائمة للمشروع؟

□ نعم □ عادة □ نادرا □ لا

الرجاء إعطاء مبررات لأجابتك :

.....

6. ماهي طبيعة المشاكل التي صادفتها خلال خبرتك المهنية في تنفيذ المشاريع والمتعلقة بعدم قدرة المقاول على تنفيذ العمل المطلوب منه بما يتوافق مع شروط العقد ؟

.....

.....

7. الرجاء التكرم بتسجيل ملاحظاتك وتوصياتك حول عملية اختيار وتأهيل المقاولين وكذلك طرق ترسية العطاءات عليهم

.....
.....
.....
.....

مع جزيل الشكر والتقدير لمجهوداتكم

Annex 3 : Summary Tables

Table A1 (Excel file)

Table A2 (Excel file)

Annex 4 : Procurement Laws

(No.6 and No.9)

قانون رقم [6] لسنة 1999م

بشأن العطاءات للأشغال الحكومية

رئيس اللجنة التنفيذية لمنظمة التحرير الفلسطينية

رئيس السلطة الوطنية الفلسطينية

بعد الاطلاع على القانون رقم [8] لسنة 1998م بشأن اللوازم العامة،

وعلى نظام مقاولات الأشغال العامة رقم [6] لسنة 1960م المعمول به في محافظات الضفة الغربية،

وعلى نظام الاشتراطات العامة للعطاءات لسنة 1953م المعمول به في محافظات غزة،

وعلى تعليمات تصنيف المقاولين الفلسطينية لسنة 1994م المعمول بها في فلسطين،

وعلى مشروع القانون المقدم من مجلس الوزراء،

وموافقة المجلس التشريعي.

أصدرنا القانون التالي:-

الفصل الأول

تعاريف

مادة [1]

في تطبيق أحكام هذا القانون يكون للكلمات والعبارات التالية المعاني المخصصة لها أدناه ما لم تدل القرينة على خلاف ذلك.

الوزارة: وزارة الأشغال العامة.

الوزير: وزير الأشغال العامة.

الدائرة: أية وزارة أو مجلس أو سلطة أو مؤسسة رسمية عامة.

المسؤول المختص: المسؤول فيما يختص بوزارته والدوائر والمؤسسات المرتبطة به ولغايات هذا القانون

تشمل عبارة المسؤول المختص:-

1- رئيس الوزراء فيما يختص برئاسة الوزراء.

2- رئيس المجلس التشريعي الفلسطيني فيما يختص بالمجلس التشريعي الفلسطيني.

3- الوزير فيما يختص بوزارته.

4- رئيس أية دائرة يمارس صلاحيات الوزير فيما يتعلق بتلك الدائرة بموجب قوانين أو أنظمة خاصة.

الوكيل: وكيل الوزارة أو مدير عام الدائرة أو من يعين ليقوم بأعماله حال غيابه.

المدير: مدير عام دائرة العطاءات المركزية.

المحافظ: المحافظ العامل في إحدى المحافظات.

دائرة العطاءات: دائرة العطاءات المركزية المشكلة وفقاً لأحكام هذا القانون.

طرق تنفيذ الأشغال والخدمات

تنفذ الأشغال والخدمات الفنية العامة بإحدى الطرق التالية:-

[1] العطاءات العامة: وهي التي تأخذ مبدأ العلانية والمساواة وحرية المنافسة وهي إما محلية أو دولية.

[2] العطاءات بطريقة استدراج العروض: وهي بتوجيه دعوات خاصة لعدد من المقاولين أو المستشارين لا يقل عددهم عن ثلاثة.

[3] التعاقد المباشر في الأحوال الخاصة أو الاستثنائية العاجلة.

[4] التنفيذ المباشر: هو التنفيذ الذي تقوم به الوزارة بمعداتها وأجهزتها.

مادة [5]

وفقاً لأحكام هذا القانون، عند طرح أي عطاء يتعلق بالأشغال أو الخدمات الفنية العامة تراعى القواعد التالية:-

[1] يكون طرح العطاء بموجب إعلان في الصحف المحلية على أن لا يتم الإعلان عن طرح أي عطاء أو إجراء أي تلزيم إلا إذا كانت المخصصات المالية متوفرة لتنفيذه أو كان هناك التزام بتوفيرها من الجهة الممولة بقرار من مجلس الوزراء.

[2] تطبيق مبدأ المنافسة وإعطاء فرص متكافئة للجهات المؤهلة للقيام بتنفيذ الأشغال أو تقديم الخدمات الفنية وبالطريقة التي تراها الجهة المختصة مناسبة مع مراعاة إعطاء مدة كافية للمقاولين والمستشارين لدراسة وثائق العطاءات وتقديم العروض التي تتناسب وطبيعة الأشغال أو الخدمات الفنية المطلوبة.

[3] التقيد عند إحالة العطاء بأفضل العروض المستوفية لشروط دعوة العطاء وأنسب الأسعار مع مراعاة درجة الجودة المطلوبة وإمكانية التنفيذ ضمن المدة المحددة ومدى قدرة المقاول أو المستشار للقيام بالعمل المطلوب حسب الشروط والمواصفات.

[4] النص في شروط العطاءات والمواصفات على استعمال المواد والمنتجات الصناعية المحلية في الأشغال ما دامت مطابقة للمواصفات المعتمدة، مع وجوب تجنب تحديد الأسماء التجارية لأية صناعة.

[5] أن تكون جميع الاتفاقيات والشروط التعاقدية باللغة العربية ويجوز أن تكون المواصفات والمخططات

والتقارير الفنية والمراسلات باللغة الإنجليزية، كما يجوز ترجمة العقود إلى اللغة الإنجليزية على أن تكون المرجعية للعقد باللغة العربية.

[6] التقيد بالقوانين والأنظمة والتعليمات المعمول بها عند وضع الشروط التعاقدية وعدم النص على الإعفاء من أي التزام مالي مفروض بموجب أي تشريع إلا بعد موافقة مجلس الوزراء على الإعفاء بصورة تسبق توقيع التعاقد.

[7] تعطى الأولوية في مشاريع الأشغال الحكومية للمقاولين المحليين، إذا توافرت فيهم الشروط المطلوبة.

[8] على الشركات الأجنبية مراعاة القوانين والأنظمة ذات العلاقة السارية في فلسطين.

الفصل الرابع

تشكيل لجان العطاءات

مادة [6]

تتشكل بمقتضى أحكام هذا القانون لجان العطاءات التالية:-

1]

يصدر مجلس الوزراء اللوائح والأنظمة اللازمة لتنفيذ أحكام هذا القانون وذلك خلال ثلاثة أشهر من تاريخ سريان القانون.

مادة [43]

يلغى نظام الاشتراطات العامة للعطاءات وتوريد الأصناف لسنة 1953م وتعديلاته المعمول به في محافظات غزة، ونظام مقاولات الأشغال العامة (1) لسنة 1953م المعول به في محافظات الضفة، وكل نص يتعارض مع أحكام هذا القانون.

مادة[44]

تبقى تعليمات المقاولين الفلسطينية لسنة 1994م سارية المفعول إلى أن تستبدل بنظام يصدر عن مجلس الوزراء.

مادة [45]

على جميع الجهات المختصة، كل فيما يخصه تنفيذ أحكام هذا القانون، ويعمل به بعد ثلاثين يوماً من تاريخ نشره في الجريدة الرسمية.

صدر بمدينة غزة في: 1999/12/28 ميلادية

الموافق : 20 من رمضان/1420 هجرية

ياسر عرفات

رئيس اللجنة التنفيذية لمنظمة التحرير الفلسطينية

رئيس السلطة الوطنية الفلسطينية

قانون رقم [9] لسنة 1998م

بشأن اللوازم العامة

رئيس اللجنة التنفيذية لمنظمة التحرير الفلسطينية

رئيس السلطة الوطنية الفلسطينية

بعد الاطلاع على نظام الاشتراطات العامة للعطاءات وتوريد الأصناف لسنة 1953 المعمول به في محافظات غزة، وعلى نظام اللوازم رقم (32) لسنة 66 المعمول به في محافظات الضفة الغربية،

وعلى مشروع القانون المقدم من مجلس الوزراء، وبناء على موافقة المجلس التشريعي.

أصدرنا القانون التالي:-

الفصل الأول

تعاريف وأحكام عامة

مادة [1]

يكون للكلمات والعبارات التالية حيثما وردت في هذا القانون المعاني المخصصة لها أدناه ما لم تدل القرينـة على خلاف ذلك.

السلطة الوطنية: السلطة الوطنية الفلسطينية.

الدائـــرة: أية وزارة، أو دائرة، أو سلطة، أو مؤسسة عامة.

الوزيـــر: وزير المالية.

الوزير الوزير فيما يختص بوزارته والدوائر والمؤسسات المرتبطة به ولغايات هذا القانون تشمل عبارة (الوزير المختص):-

المختص:

[1] رئيس الوزراء فيما يختص برئاسة الوزراء.

[2] رئيس المجلس التشريعي الفلسطيني فيما يختص بالمجلس التشريعي الفلسطيني.

[3] رئيس أية دائرة يمارس بموجب قوانين أو أنظمة خاصة صلاحيات الوزير فيما يتعلق بتلك الدائرة.

المدير العام: مدير عام دائرة اللوازم العامة أو من يعين ليقوم بأعماله حال غيابه.

وكيل الوزارة: وكيل الوزارة أو مدير عام الدائرة أو من يعين ليقوم بأعماله عند غيابه.

اللوازم: الأموال المنقولة اللازمة لأية دائرة وصيانتها والتأمين عليها والخدمات التي تحتاج إليها الدائرة.

اللوازم الخاصة: اللوازم التي يقتصر استعمالها عادة في دائرة معينة أو عدد من الدوائر التي تشكل هذه اللوازم حاجة أساسية لتحقيق أهداف الدائرة وتمكينها من القيام بأعمالها.

الخدمات الفنية: الدراسات والمواصفات والفحوص المخبرية للوازم وتطابقها مع المواصفات والشروط.

الفصل الثاني

دائرة اللوازم – سريان القانون والمسؤوليات الفنية

مادة [2]

يخضع لأحكام هذا القانون الدوائر المدرجة موازنتها ضمن قانون الموازنة العامة السنوي للسلطة الوطنية وعلى أية دائرة أخرى يقرر مجلس الوزراء تطبيق أحكام هذا القانون عليها.

خامساً: العطاءات

مادة [14]

أ] يشكل بقرار من مجلس الوزراء بناء على تنسيب الوزير والوزراء المختصين لجنة عطاءات مركزية للقيام بالمهام والصلاحيات المنصوص عليها في هذا القانون على الوجه التالي:

[1] المدير العام رئيساً

[2] مندوب عن وزارة المالية عضواً

[3] مندوب عن وزارة الاقتصاد والتجارة عضواً

[4] مندوب عن وزارة الصناعة عضواً

[5] مندوب عن وزارة الأشغال العامة عضواً

ب] تكون مدة العضوية في هذه اللجنة سنتين، وللوزير المختص تخفيض المدة أو تمديدها لمدة سنة أخرى.

ج] يعين رئيس ديوان الرقابة المالية والإدارية مندوباً في لجنة العطاءات المركزية بصفة مراقب.

د] عند طرح أي عطاء لوازم خاصة لإحدى الدوائر يشترك في لجنة العطاءات المركزية التي تنظر في العطاء عضوان من كبار موظفي الدائرة يسميهما الوزير المختص.

مادة [15]

أ] تعقد لجنة العطاءات المركزية اجتماعاتها سواء كانت لشراء لوازم ذات استعمال عام أو لوازم خاصة لإحدى الدوائر بنصابها الكامل وتتخذ قراراتها بالأكثرية.

ب] تصدق قرارات اللجنة المتعلقة بشراء لوازم ذات استعمال عام من الوزير أما القرارات المتعلقة بشراء لوازم خاصة فتصدق من الوزير المختص.

ج] تشكل بقرار من الوزير المختص لجان فرعية فنية متخصصة من الدائرة يشارك في عضويتها عضو من دائرة اللوازم العامة يعينه رئيس لجنة العطاءات المركزية لمساعدة اللجنة في الأعمال والمهام المكلفة بها بموجب أحكام هذا القانون.

مادة [16]

أ] لمجلس الوزراء بناء على تنسيب من الوزير والوزير المختص تشكيل لجنة عطاءات خاصة من وكيل الوزارة والمدير العام وثلاثة من كبار موظفي السلطة، وذلك لشراء لوازم لمشروع معين بالنظر لحجمه أو لأن حكومة أو هيئة عربية أو أجنبية تساهم في تمويله ويعين مجلس الوزراء من بين أعضائها رئيساً لها.

ب] تعقد لجنة العطاءات الخاصة اجتماعاتها بكامل نصابها وتتخذ قراراتها بالأكثرية وتصدق قرارات الـشراء الصادرة عنها من الوزير المختص والوزير وعند اختلافهما يرفع الأمر لمجلس الوزراء للبت فيه.

ج] تتقيد لجنة العطاءات الخاصة بالقواعد والشروط والإجراءات الخاصة بطرح العطاءات المقررة بموجب هذا القانون والأنظمة والتعليمات الصادرة بموجبه على أن تراعى أي شروط خاصة تضمنتها اتفاقيـات تمويـل المشروع.

مادة [17]

على الجهة المختصة بتصديق قرارات إحالة العطاءات اتخاذ القرار اللازم بشأنها خلال (15) يوماً من تاريخ تسلمها وإلا تعتبر مصدقة حكماً.

مادة [18]

أ] للجنة العطاءات المركزية أو لجنة العطاءات الخاصة الاستعانة بالخبراء والفنيين مـن مـوظفي الـسلطة، وغيرهم للإفادة من خبراتهم في دراسة العروض المطروحة عليها وعلى جميع الدوائر التعاون الكامل مع هذه اللجان في ذلك.

ب] للوزير بناء على تنسيب المدير العام منح الخبراء والفنيين وأعضاء اللجان الفنية مكافآت مالية تتناسب مع الأعمال التي يقومون بها بتكليف من لجنة العطاءات المركزية بموجب نظام خاص.

صدر بمدينة غزة بتاريخ: 1998/11/2 ميلادية

الموافق: 13/رجب/1419 هجرية

ياسر عرفات
رئيس اللجنة التنفيذية لمنظمة التحرير الفلسطينية
رئيس السلطة الوطنية الفلسطينية