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CONTRACTORS' SELECTION CRITERIA: OPINIONS OF PALESTINIAN CONSTRUCTION PROFESSIONALS

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Abstract
Bid awarding practice in Palestine suffers from a myriad of problems. The aggressive competition, as well as the selection of the lowest bidder, may be considered as the major causes of such problems. The aim of this paper is to investigate the opinions of Palestinian construction professionals concerning contractors' evaluation and selection criteria. A questionnaire survey was adopted for this study, incorporating 38 factors that are believed to be related to contractors' selection. These factors were identified through a rigorous literature review, and grouped into 10 classes. The results show that the financial evaluation of the bid is considered as the most important class, being ranked in the first position, with a weight equal to 40.10%. The remaining nine classes are all related to technical criteria, with a total weight of 59.90%. The respondents placed a very low emphasis on the health and safety criteria, indicating a substantial lack of awareness of the importance of health and safety. There needs to be a paradigm shift in selecting contractors based upon lowest price to multi-criteria selection. Such a process can be implemented by establishing alternative methods to select the contractors, based on technical and financial criteria. Local official authorities need to make legislative changes on related statutes/law, so that the awarding committees can lawfully consider the only cost, as well as technical factors that are useful to predict the quality of the construction. The findings offer local clients some assistance with reviewing their process when assessing bids received from contractors. Further, the findings also help contractors to improve their bid preparation so that their bid more closely aligns with factors considered important by the clients.

Keywords
Contractors, construction industry, Palestine, awarding, selection criteria.

INTRODUCTION

Competitive bidding, where the project is awarded to the lowest bidder, is a routine practice within the construction industry worldwide. This practice is designed to promote healthy competition and ensure the lowest contract price for the project is achieved. While private construction organization may choose a range of ways to award contracts, most public agencies are legally required to award the project to the lowest bidder (Moore 1985a, b). Indeed, public construction procurement, the process by which contractors are chosen for public construction projects, has traditionally been based on selecting the lowest bidder.

Such public construction based procurement processes reflect the values society associates with public administration, such as transparency, fairness, ease of contract administration (efficiency), and competitive bidding. Further, public funds require a degree of openness, with as many bidders as possible to "fairly" distribute public monies and 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 system has simplified the awarding process and helped to protect agencies from bid protests in the courts (Merna and Smith 1999).

However, 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 ensures that selection is based exclusively on price, not on qualitative factors, such as past performance or construction schedule (Runde and Sunayama 1999). 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. Earlier research and a number of 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). The importance of contractor selection is mostly underestimated and neglected in construction (Ng and Wan 2005). Importantly, and is reported in some countries such as Nigeria (Ogunsemiand and Aje 2006), wrong tendering practice has being a major contributor to the construction industry's inefficiency.

In the nineties, the search for suitable procurement routes to improve the clients "overall" levels of satisfaction have continued to attract much attention, from both industry and academia (Skitmore and Marsden 1988; Chinyio 1998; Latham 1994; Egan 1998). Evaluating contractors and selecting the best bidders requires sophisticated knowledge and experience to ensure that the selected contractor is capable of executing the project according to the owner's requirement (Alsugair 1999). However, the selection of contractors often encounters problems, resulting in the selection of inappropriate contractors, difficulties in the management of the contractor, and out-of control of quality, time, budget, and safety (Holt 1998).

Several problems have arisen due to lowest bid contracts being awarded (Jesen 2001), e.g. low profit margins in high-risk industry, reduction of trained craftspeople in the subcontracting area, performance issues, and dispute issues. The most common way of awarding contracts in the Gaza Strip is the lowest bid method. This paper seeks to examine bidding practices within the Palestinian construction industry, identifying key problems and their solutions. Findings from the study are anticipated to improve the Palestinian construction industry by advancing the current system of awarding contracts. The paper aims to shed some light on contractors' selection criteria as practised in Palestine, and compare it whenever possible with published studies undertaken in other parts of the world, thus making a small contribution to the existing body of knowledge.

LITERATURE REVIEW

Awarding a contract is the approach an owner follows to choose a contractor who will provide works under specific criteria. A project can be procured using different procurement methods, ranging from a single source (namely: direct hiring, negotiation, restrictive bid), to open competition procurement (Beard et al., 2001). Further, 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 by which to select the key player in the project, which is the construction firm that is expected to deliver the project. This decision greatly impacts upon 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). Eriksson and Westerberg (2011) noted that bid evaluation affects both cost and time performance.

The review of the existing literature indicates that many studies have developed various systems with different evaluation criteria to assist owners during the contractor selection in selecting the appropriate contractor (for example; Watt et al. 2010, Wang 2009, Plebankiewicz 2009, Lin et al 2008, Oe et al 2008, Sing and Tiong 2006, Waara and Brochner 2006, Mitkus and Trinkuniene 2007, Tan (2010). The main advantages of these methods and evaluation systems are that they provide a systematic and objective procurement approach that takes into consideration numerous factors, other than the price of the bid. Using a multi-criteria approach for evaluating contractors may help solve several problems with respect to their economic and technical aspects, quality standards, past performance, and other tangible and intangible characteristics (Skitmore and Marsden 1988). Soo and Oo (2010) studied the effect of information feedback in construction bidding. Their findings show that contractors adopt various strategies to enhance their chances of winning projects. For example, their experiences in past bidding competitions play a role in offering competitive bid prices. Fu et al. (2004) found that experienced bidders, who bid frequently, are more competitive than bidders who bid occasionally.

Hatush and Skitmore (1997) also found that all clients use a `similar' set of criteria for contractor selection, but that the way the clients quantify these criteria can be very different in practice. Previous studies have also shown that a contractor's bid amount appears to be the most dominant and important criterion (Holt et al. 1994, Hatush and Skitmore 1997, Holt 1998). Four weaknesses were identified in contractor selection practice: (i) the lack of a universal approach, (ii) long-term confidence attributed to results of prequalification, (iii) reliance on tender sum in decision making, and (iv) the inherent subjectivity of the process (Holt et al. 1994, 1995). Holt et al. (1995) provided an example application of Multi-attribute Analysis to the evaluation of construction bidders. In contrast, Hatush and Skitmore (1997) applied the Program Evaluation and Review Technique (PERT) to assess and evaluate contractor data against client goals (time, cost and quality). Additionally, Hatush and Skitmore (1998) used Multi Attribute Utilities Techniques (MAUT) to select the best contractor, based on a mixture of qualitative and quantitative criteria.

A number of innovative approaches have been put forward that are designed to achieve the selection of "good" contractors (Holt 1998). Some of these univariate or multivariate statistical methods have aimed to provide a quantitative indication of

contractors' potential cost or quality performance. 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 universal 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 the selection of a "good" contractor (Herbsman and Ellis 1992; Herbsman 1995).

Standardization of the selection systems should be based on previous project 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 so cope better with change, a characteristic especially relevant for local contractors considering moving to the international level (Kumaraswamy 1996). It has been recommended that the selection be composed of a two-step approach: prequalification, and tender evaluation; the first stage should emphasize the contractor's organization capabilities (such as past experience and financial health), while the second stage should evaluate those contractor's competencies that enable him to qualify for project-specific criteria (such as proposed construction method or previous expertise) (Holt 1998, Nguyen 1995).

Tarawneh's (2004) study on contractor prequalification for public and private project used qualitative interviews with owners, directors and senior managers of major client organizations in Jordan to gather the data. His findings indicated that public and private clients have different views about the importance and priorities of the prequalification criteria.

An earlier study by Jaselskis and Russell (1992) analyzed contractor failure in the US; they recommended that an owner should have two means of avoiding or minimizing the impact of contractor failure: analyzing the contractor qualification prior to contract award; and monitoring the contractor's performance after the contract was awarded. El-Sawalhi et al. (2007) considered the pre-qualification criterion to be an indirect measure of the 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. Table 1 summarizes some selection methods used.

Table 1: Summary of Developed Methods for Contractor Selection

SN	Method of Contractor's Selection	Principal Characteristics
1	The analytical hierarchy process (AHP), (Saaty1990)	This decision aiding method or 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, (Russell 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, the contractors are screened. They must get through this step to be eligible for the second phase of the prequalification. In the second step, the dimensional weighting technique is used for more specialized factors.
4	Dimension –wide strategy method, (Russell and Skibniewski 1988)	In this method a list of the most important prequalification criteria is developed in descending order of importance. The 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 method, (Russell and Skibniewski 1988)	This method prequalifies contractors on the basis of a 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 et al 2001)	The Evidential Reasoning (ER) approach integrates both quantitative and qualitative hierarchal methods to solve the contractor selection problem. ER has increasingly been used in a diverse range of areas 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 for classifying contractors' performance into 'good' and 'poor' groups. Further, the research derives a set of the most predominant PSC (project-specific criteria), which best discriminate contractor performance into good and poor groups.

Table 1: Summary of Developed Methods for Contractor Selection (Cont'd)

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

Following a systematic procedure greatly improves 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 sophisticated knowledge and experience to ensure that the selected contractor is capable of executing the project, according to the owner's requirement (Alsugair 1999). A prequalification process ensures that clients obtain a number of competitive, reasonable, and easy to evaluate bids, submitted by equally suitable and experienced contractors. The prequalification of contractors aims at the elimination of incompetent contractors from the bidding process (Tarawneh 2004). Further, prequalification can aid the public and private owner to achieve the successful and efficient use of their funds by ensuring that a qualified contractor will construct the project.

Prequalification is a screening process applied to contractors, before the 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 the contractor data, verify the data, apply the contractor data to the criteria, and decide whether to prequalify the contractor. El-Sawalhi et al. (2007) proposed a prequalification system, based on priority weights, for the prequalification criteria used for a standing list of contractors in the Gaza Strip and West Bank. This selection is based on evaluating an extensive array of contractor criteria.

Most of the implementing agencies, owners or donors in the Gaza Strip are frequently assumed to use the low bid price method in bid awarding; the contract is rarely awarded to the second lowest price, nor are alternative ways used in the process of selecting contractors and awarding bids. The reasons for this situation can be traced to the following:

- Transparency is guaranteed in the "lowest bid price" awarding method.
- This method has been used before and is easy to implement.
- This method is covered by law and official regulations.
- The donors' conditions fit this process, especially the World Bank.
- The desire of the owners to obtain suitable and reasonable prices.
- Some clients perform a prequalification on contractors participating in the bids; hence, this awarding process suits them.
- The owner hesitates in using alternative awarding processes because they need qualified evaluation committees, with good past experience, which are not available.
- Ignorance of the new alternative awarding methods by the staff representing the majority of owners.

RESEARCH METHODOLOGY

The purpose of this paper is to investigate the opinions of Palestinian construction professionals concerning contractors' evaluation and selection criteria. The questionnaire survey approach was adopted as the primary data required and the nature of the population studied could be better covered by this approach. The face-to-face deliveries of the questionnaires were used to promote the respondents' response rate, while also continuing to strengthen the researcher's personal contacts with the industry. The targeted population consisted of public sector clients and consulting firms using contractors' evaluation and selection methods. It is worth noting that the perspective of local contractors was not investigated by this study.

The questionnaire was carefully designed based on previous related studies. A pilot questionnaire, completed by industry experts, was used to measure its validity and reliability, as well as to test the collected data. The pilot study provided a trial run for the questionnaire, to test the wording of questions, to identify any ambiguous questions, to test the techniques used to collect the data, and to measure the effectiveness of the standard invitation to the respondents (Naoum 1998). The questionnaire was distributed to a sample of 10 persons considered to be experts in their organizations, and with more than 20 years experience in the evaluation of contractor bids. Most respondents were members of public sector evaluation committees, donor representatives, or professional consultants. Following the pilot study, a number of modifications were incorporated into the final version of the questionnaire.

The average experience of the respondents in procurement construction projects was approximately 20 years. A total of 57 questionnaires were distributed randomly; 53 completed questionnaires were returned, giving a response rate 93%. Fifty-one of the received questionnaires were fully completed, and so they were accepted for the analysis tests. The two incomplete questionnaires were removed from the data collection.

Internal consistency of the questionnaire was checked by applying the questionnaire on an exploratory sample; twelve (12) questionnaires were measured to identify the correlation coefficients between each section and the whole questionnaire. The Statistical Package for Social Science (SPSS) version 17 was used to analyze the data.

When the significance level (P-value) for a paragraph within a group was found to be between (0.01-0.05), the correlation coefficient was determined to be significant at x = 0.05; the paragraph was consistent and valid for measuring the data. However, when the P-value was less than or equals 0.01, the correlation coefficient was determined to be significant at x = 0.01; the paragraph was valid to measure its objective.

The half split method and Alpha-Cornbach's Test for measuring the reliability of items in the questionnaires were used, with the Pearson correlation coefficient being used to measure the validity of the items in the questionnaires. The results of these tests indicated that the questionnaire was valid and reliable. Nevertheless, to recognize whether the data obtained by the questionnaire could be categorized under the normal distribution, the Normal Distribution Test (Kolmogrov-Smirnov) was used. It also helped to determine which type of statistical test was best able to analyze the collected data, either parametric or the non-parametric tests. The results show that the significance level was greater than 0.05 (sig. > 0.05); thus, the data can be said to follow the normal distribution pattern, and so a parametric test can be used.

The main criteria "Classes" chosen for the contractor selection was identified through the literature survey, as well as a number of meetings and interviews with local experts related to contractor selection. Additionally, the literature review and the pilot study led to the identification of 38 factors (sub-criteria), which were grouped into 10 classes (main criteria). In the first stage, the respondents were asked to rank the classes by assigning weights to each class, i.e. rate the relative importance of the class to the other classes. This ranking was identified by assigning weights to each class. The weight of each class was limited to between 0 and 100; keeping in mind that the total weight for the ten classes must equal 100. In the second stage, the respondents were asked to rank the factors by assigning weights to each factor within the same class; the weight of each factor was limited to between 0 and 100; and the total weights for the factors within the same class must equal 100. The assigned weights for a random class or factor differed from respondent to respondent. The average weight for each class and factor was calculated using the following formula:

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

RESULTS AND DISCUSSION

Classes (main criteria) Weights for Contractor's Selection

Financial Evaluation of the Bid

The results in Table 2 show that 'Financial evaluation of the bid' was ranked in the first position, with an average weight 40.10%. Thus, the respondents agreed on the importance of this class (main criteria). The importance of the financial abilities and capabilities of the contractor ensure their capacity to execute the project successfully, and with few, if any, obstacles during the implementation process. This criterion was

considered a critical class, which leads to project success. Further, the result is in line with Alsugair's (1999) findings that financial factors were rated first from nine criteria, with a 37% weighting. Hatush and Skitmore (1998) also confirmed that financial factors ranked first (from six criteria), with a percentage of 55%.

Table 2: Average Weights Assigned to Classes

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

Completeness of Bid Documents

The completeness of the bid document was considered a necessary condition for acceptance of the contractor's proposal in any bid. The respondents assigned an average weight of 9.64% to this criterion, while ranking it in second position. Other researches results, for example, Alsugair (1999), had similar findings in Saudi Arabia, namely a percentage of 3%. This lower percentage can be explained by the fact that the companies working in Saudi Arabia are much bigger and more organized than those which work in the Gaza Strip (the focus of the current study).

Past Performance in Similar Projects

The past performance of the contractors in previous similar projects appears to slightly influence the evaluation process. Consequently, the respondents were interested to know the bidder's record, which identified the contractor's experience and performance in implementing similar past projects. The respondents give an average weight of 8.08% to this class; and it was ranked in the third position. Bubshait and Gobali (1996) concluded that the previous performance of the contractor reached a weight equal to 7, or 80% from the 16 criteria used in evaluating contractors in Saudi Arabia. Additionally, Hatush and Skitmore (1998) found that the previous performance obtained a percentage of 4%, when contractors were evaluated in the United Kingdom (UK). The results from the current study indicate a high level of emphasis on the contractor's past performance.

Staff Skills and Experience

This criteria focuses on the staff skills and experience needed to implement the project. Such experience allows the project staff to deal with any problems or obstacles during implementation, and it guarantees a substantial level of quality. This class has an average weight of 7.40%, is ranked fourth. A study by Holt et al. (1994)

showed that this criterion obtained an average weight of 5%, being close to the previous results (see above). Tarawneh's (2004) study also showed this criterion being ranked sixth out of a total of 31 criteria used to select contractors in Jordan. Therefore, this class is very important in relation to weight and rank.

Contractor's Reputation / Image

The contractor's reputation and image received an average weight equal to 6.86%; and was ranked fifth. The respondents saw an advantage in having knowledge of the contractor's reputation from previous projects. Frequently, the contractor's reputation was a priority in the evaluation process. Egeman and Mohamed (2005) also showed the importance of this criterion; in their study it was ranked third, according to the clients' opinions, and tenth according to the consultants from 18 criteria used by Turkish contractors. Similarly, Wong and Holt (2003) showed its importance with it being one of nine criteria used in the evaluation of British contractors.

Quality of Work

It is normal for a contractor to guarantee the quality of his work; additionally it is a critical requirement of contracts. In the current study, quality of work was ranked sixth, with an average weight of 6.70%. This result reflected the findings of Kumarswamy's (1996) study into the evaluation of contractors in Hong Kong (receiving an average weight of 19% from 8 criteria).

Contractor's Site Management/Execution

If a contractor has good administrative skills and distinguished methods when implementing a project, he will be in a better position to receive the chance to obtain an improved evaluation. Importantly, this criterion was ranked seventh, with an average weight equal to 6.12%. Similarly, the study by Hatush and Skitmore (1998) showed the importance of the contractor's management of a project through two criteria (a and b), which received a total weight equal to 4%. In addition, Bubshait's (1996) comparative study into contractor evaluation in Saudi Arabia and the USA found that the criteria was ranked fifth by the Saudi contractors, however, it was ranked sixth (out of 16) for American contractors (Russell, 1988).

Bid Understanding

The ability of the contractor to understand the bid and to clarify some ways of execution in the bid, by suggesting logical solutions and clarifying some unexplained points, received reasonable consideration, being given an average weight of 5.62%. This criterion gives advantage to the contractor's understanding of the bid and shows that he has the ability, experience and knowledge; thus, reducing the opportunities of the project failure. However, Alsugair's (1999) Jordanian study identified a weighting of 10% for the evaluation points; this percentage was almost double that reached in the current study. In his Jordanian study, Tarawnah (2004) found this criteria to be ranked thirteenth of 31 criteria, with average weight of 3.83%. In their Taiwanese study, Wang and Holt (2003) identified contractor understanding of the bid at 7 %.

Plant and Equipment Resources

The plant and equipment resources class received a miniature average weight of 5.14%. This outcome occurred for two essential reasons; first, the projects in the local sector were small, and there was no need for complex and heavy equipment. Second, the contractors could easily rent equipment from the specialized sub-contractor in this

field, who offered his services to all of the local contractors. This result was less in the research of Hatush and Skitmore (1998); they identified a percentage of 4.50% for this criteria weight. The results of Bubshait (1996) were much closer to the current findings, being 5.8%. Within Palestine, the availability of equipment resources for the international contractors is a basic requirement as they work in a very large and open market and within an oversized geographical area. Consequently, the availability of owned equipment is essential for the any agreement between contractors. Thus, despite the developed working conditions in such a country, this factor only obtained a small weight.

Health and Safety Performance

Several researchers and studies refer to the importance of the health and safety performance criteria for construction projects. This criterion was ranked last, with an average weight of 4,34%. However, the low ranking does not mean that the criterion is unimportant. The low ranking reflects the low level of interest and seriousness taken by the government and local regulators. In Tarawneh's (2004) study this criteria was ranked 13, with a weight equal to 3.83% among 31 criteria. However Hatush and Skitmore (1998) , in their study, this criterion reached 5%, whereas Kumarswamy's (1996) study found it rated at 8%. It should be noted that this result related to sewage pumping projects; these projects are considered to be most difficult, needing high health and safety measures. Singh and Tiong (2006) found a very low ranking for health and safety due to the lack of stringent statutory requirements of health and safety setup at the worksites.

Factor (sub-criteria) Weights for Contractors' Selection

The average weight for each factor was calculated using the following formula:
Average Weight for each factor = SUM (Wf*i*) / N,
where Wf*i* is the weight assigned by the respondent *i* to the concerned factor, and N is the total number of respondents.

Table 3 illustrates the average weights assigned to the 38 factors used in the selection of the contractors during the bidding stage, according to the respondents' opinions. Column 1 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 listed in column 1 and 2 by each other. The results in this column represent the average weight of each factor within the whole set of factors. The weight associated with each factor reflects its importance in the selection of the contractors during the evaluation stage.

Table 3: 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

Table 3: Average Weights Assigned to Classes and Factors (Cont'd)

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
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%**	Existance 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
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**

Sub-criteria for Financial Evaluation Class

The weight of the lowest bid for the financial evaluation of the bid was equal to 26.16% (see Table 3), while 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 the balance sheet for the previous 3 years equals 2.43%. The class related to the financial evaluation of the bid was composed of five factors. The first and most important factor was the lowest bid. If the bid price was reasonable, there was a good chance of winning the bid. Likewise, if the bid price was the lowest one, the chance of winning the bid increased to the maximum. If the contractor submitted an unbalanced bid (i.e. a submission with over priced items for the first stage of the project and under priced items for the final stage, to obtain a considerable cash flow in the early stage of implementation), this negatively affects the image of the contractor's financial stability.

The unbalanced bid factor obtained a reasonable weight when it equalled 5.26%. The submission of an unbalanced bid indicated a weakness in the contractor's financial resources and a limitation of his cash money. The third factor related to existing of arithmetic mistakes; the fourth factor to financial reservation (the weight assigned to this factor was 2.43%; this factor represents the financial reputation of the contractor. The analysis of financial strength was required to indicate the likelihood of contract failure in terms of the contractor's capability and capacity to invest in the project. The fifth factor related to the submission of the balance sheet for the previous 3 years (being rated at 2.43%, which matched the results in Holt's (1994) study). Alsugair (1999) found that financial reservation was rated at 2.25%, while the unplanned bid was 9% (1999) and 5.26% in this study which indicates the importance of this factor from the respondents' points of view in the two studies.

Sub-criteria for Completeness of Bid Document Class

In the current study, the weight of required bond was equal to 4.28% (see Table 3). The weight of the shortage contract offer equalled 2.03%; the weight of the financial capability equalled 1.82%; and the weight of the taxes clearance equalled 1.51%. The acceptance of any bid necessitates the completeness of all the required documents listed in the bid invitation; they 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 the early stages. In most cases this means before the evaluation of bids commence. The second factor was the shortage in the contract offer. Here the bidders are usually asked to submit their documents and complete a number of forms related to general information, past projects, subcontractors, proposed time plan, breakdown of some cost items, contractors' references, and other similar information. All these requirements need time and effort for the contractors to comply with the requests and submit a complete bid. In practice, there was, more or less, a shortage in the submitted bids.

The third factor, financial capability, is important to the client, as it guarantees the financial capability of the contractors and helps avoid any failure due to a shortage in the financial power of the bidder. The taxes clearance factor was weighted at only 1.51%; this indicated the existence of difficulties between local contractors and the Ministry of Finance, and indicated the existence of disputes encountered by the respondents in previous projects related to the contractor's delay in submission of their taxes clearance certificate for both income taxes and value added taxes (VAT).

The local institutes or project owners require contractors to submit a taxes clearance certificate periodically, or prior to the submission of their payments. A clearance certificate is delivered by the Ministry of Finance (Taxes Department). This certificate confirms that all taxes related to the project have been paid by the contractor. Further, it indicates his strong position in relation to this criterion.

Sub-criteria for Past Performances Class

The factors of the past performance class or criteria focus on the identification of the performance of the bidders in previous projects to trace the success of their completed projects in respect to project time, quality and cost. These factors were weighted at 3.61, 2.85, and 1.62%, respectively (Table 3). The past performances from similar projects were obtained from the bidders' declarations. Currently, no local institute is responsible for recording and maintaining documents from previous construction projects implemented in the Gaza Strip.

Sub-criteria for Staff Skills and Experience Class

The staff skills and experience class is used to obtain the contractor's ability to satisfy the clients' needs. The Human Resource Management system (HRM), used by the contractors, was assessed in relation to five factors (Table 3). The two most important factors, according to the respondents' opinions, were the project manager's experience and the past performance of the project staff, with weights of 2.08 and 1.55%, respectively. However, the results achieved ranged between 2% (Hatush and Skitmore's (1998) study), and 5.06% (Holt et al. 1995). The other three factors, the experience of other staff, the ratio of trained staff to total staff, and the existence of staff training programs, were weighted at 1.45, 1.22, and 1.1%, respectively These findings are close to the findings of Holt (1994) at 6.10%.

Sub-criteria for Contractor's Reputation/Image Class

The weight for the contractor's classification equalled 2.57%, making it the most important factor within this class. The weight for the number of years in the business equalled 1.21%, the contractor's capital equalled 1.04%, the past owner/contractor relationship equalled 1.06%, and cooperation in solving problems equalled 0.98%. The reputation of the contractors bidding for the project has a large influence on the evaluation process during the bidding stage. The criteria was weighted at 6.86%, however, the most important factor was the classification of the contractor's company, as all clients preferred to work with the higher classified contractor.

The second factor, the number of years in business, had a weight of 1.21%, while the third factor, the past owner/contractor relationship, was assigned a weight of 1.06%. The results from the study by Hatush and Skitmore (1998) were 0.50% and 2%, respectively. This finding supports the suggestion that the contractor is required to meet the client's satisfaction and to maintain a good reputation within the construction market, as a credit for future projects. The contractor capital and cooperation in solving problems received a weight of 1.04 and 0.98%, respectively. In contrast, Alsugair's (1999) found that these two factors were weighted at 7%. The large difference between the results of the two studies can be accounted for by the diverseness of the project settings, that is, Saudi Arabia (Alsugair's study) and the Gaza strip (the current study), with reference to the project's cost, type, site conditions, and complexity.

Sub-criteria for Quality of Work Class

Three factors were identified in the quality of work class (Table 3). The first factor, the quality records from previous projects, had a weight of 2.86%. The second factor, the proposed quality control system during implementation, had a weight of 2.23%. The third factor was the application of the ISO system, with a weight of 1.61%. The result indicates that the respondents tend to select a contractor who is familiar with the application of quality procedures, according to international standards. The current study, however, showed that the ISO system was achieved and obtained by only a few local contractors in the Gaza Strip. These contractors had received assistance and support from international agencies related to quality control in the construction sector. The results demonstrated the tendency of respondents to avoid potential problems related to quality in their projects.

Sub-criteria for Contractor Site Management/Execution Class

In the contractor site management/execution class, the weight of the provision of trained/skilled staff equalled 2.46%; the weight of the type of proposed control and monitoring procedures during implementation equalled 1.57%, and the weight of the construction progress reporting systems equalled 2.09% (Table 3). The study showed that clients prefer to work with a contractor who has a high proven level of managerial and technical strength. Indeed, sometimes, the client wishes to know the qualifications of the contractor's staff, related to specific types of work, either at the management or technical level.

In the study by Hatush and Skitmore (1998), management knowledge was weighted at 2.00%, however, according to Tarawnah (2004), the factor related to the site management and contractor staff received a weight 4.30%. This result validated the results achieved in the current study. In the Gaza Strip, the employment situation for the majority of technical staff working with the local contractors is unstable and, frequently, their jobs are temporary, and end after the completion of the project. The discontinuity of their practical experience means that they need to participate in training sessions in order to improve their managerial and technical skills. This is especially so when related to the reporting and monitoring procedures of construction projects.

Sub-criteria for Bid Understanding Class

The first factor focuses on the contractor's awareness of the bid documents; this factor received a weight of 2.36%, and reflects the contractor's understanding of the bid documents (Table 3). The second factor, the ability to explain the identified items in the bid, received a weight of 1.22%. The third factor, solicits classified information, received a weight of 1.09%; while the fourth factor, submitting a response to confusing items, received a weight of 0.95%. This result shows there is a need for the contractor to prove his competence and experience to the evaluation committee, during the evaluation process. Specifically, he needs to show that he is capable of keeping the project implementation going without obstacles delaying the process.

Sub-criteria for Plant and Equipment Resources Class

Four factors were identified in these sub-criteria: plant and equipment resources, the suitability of the equipment, its ownership, and the proposed technology. The weights given to these factors were 1.66, 1.55, 1.06, and 0.92%, respectively (Table 3). The availability of equipment resource and, in particular, the owned equipment, allows the

company to demonstrate that it has the technical capacity to undertake the required project tasks. In addition, it enables the client to reach an informed decision about these factors. Hence, the contractor is required, for 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.

Sub-criteria for Health and Safety Performance Class

The clients normally ask contractors to submit their proposed health and safety program as well as relevant previous records in relation to their health and safety performance. The two identified factors received a weighting of 2.16 and 2.18%, respectively (Table 3). In a similar study, Hatush and Skitmore (1998) found that the assigned weight of health and safety records was 5.00%. In his study, Holt et al. (1994) achieved a weighting of 2.85%. The findings from the two studies indicate the strength of the current research results. While, the project documents contain the required measures and procedures related to health and safety, some contractors do not always deal with this information seriously. Indeed, it is rare to find a contractor being rejected due to failing in this particular factor. Consequently, the weights assigned by the respondents to the safety factors indicate the client's need to engage the contractor with better safety records, and the need to propose an efficient safety program.

CONCLUSION

The selection of a suitable contractor is the key to project success. The aim of this study was to gain an understanding of the contractors' selection methods and their evaluation criteria for construction project on the Gaza Strip. The results show that, of the 10 classes assessed, the financial evaluation of the bid was ranked highest, in first position, with a weight equal to 40.10%. The remaining 9 classes, all related to technical criteria, received a total weighting of 59.90%. These findings demonstrate the importance of both technical and financial criteria on contractor selection. The bid price was determined to be the most important criterion in the selection of local contractors. In terms of a successful project, contractors need to be selected according to the highest cumulative score of financial and technical scores, rather than to the lowest price. Hence, there is the need for a multi-criteria system to achieve the best contractor selection for a successful project. Contractors must be selected for the implementation of the construction work through a rigorous evaluation system. Such a system needs to be based on evaluation criteria, which should be clearly defined in the bidding documents, obtained by the contractors before the bid submission., Ultimately, the aim of contractor selection should be to identify the "best bidder", which may not be the "lowest bidder".

A change is needed to the traditional contractor selection system, with a shift away from awarding contracts to the "lowest price", to "multi-criteria selection" practices. The multi-criteria selection process involves establishing alternative contractor selection methods, based on technical and financial criteria. The local official authorities need to make legislative changes on related statutes/law, so that the awarding committees can lawfully consider not only cost, but technical factors as well that are useful to predict the quality of the construction.. Once this is undertaken, the awarding committees can lawfully consider all factors, including technical factors, not just the lowest bidder. The evaluation of the contractors' past performance, however, can only be obtained

from the contractors themselves. This process does not ensure an accurate assessment of their performance. Therefore, a specialized public institute must become responsible for recording and archiving the data related to projects implemented in the Gaza Strip. The information held by the institute will assist both clients and contractors, by ensuring the probity of the selection process, and through the provision of accurate information to the evaluation and selection committees and all interested organizations. One suggestion is the establishment of the institute through an official public organization, for example, the 'Central Bidding Committee'. This alternative approach will facilitate a fair and transparent bid evaluation process, with equal opportunities to all bidders, and a high level of responsibility.

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