

ANALYSIS AND EVALUATION OF CRITERIA FOR PRE-SELECTING CONTRACTORS IN THE SAUDI ARABIAN CONSTRUCTION SECTOR

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The construction industry in Saudi Arabia is experiencing dramatic developments and expansion due to recent changes in the Kingdom's socio-economic development policies. The selection of construction contractors is an essential component in the success of projects yet there is both a lack of skilled manpower and a lack of experience in terms of managing major projects within Saudi Arabia. Thus, appropriate tools are required to select, evaluate, measure and monitor the performance of construction contractors. This paper critically analyses and evaluates current techniques for pre-selecting contractors and identifies the most appropriate techniques and criteria that could be adopted in Saudi Arabia. This has been achieved by undertaking a critical analysis of the literature and by carrying out preliminary interviews with practitioners in Saudi Arabia. The findings of this initial research have been used to establish the scope of work that will later form the basis of PhD research.

Keywords: contractor pre-selection, evaluation, model, measurement, performance.

INTRODUCTION

The Saudi Arabian construction industry has expanded sharply in recent years, mainly because of the high demand in the Saudi construction market; this has been driven by the government's strategy to re-build the Kingdom's infrastructure. These construction projects include the building of new roads, bridges, sports facilities, residential housing and government offices. The vast majority of these projects are funded by the government and can be categorized as major projects. There are also significant demands on the private construction sector and the main drivers of this demand are largely because of changes in social and economic aspects of Saudi society. These aspects include the lifestyles of Saudis who are tending to move from rural to urban areas, increases in job opportunities, and increases in annual incomes.

The government's strategy and changes in the socio-economics of Saudi society have thus created a large number of projects in the Kingdom and, as a result, this large number of public projects has attracted an equally large number of national, regional and international contractors to enter the Saudi construction industry. A key challenge, therefore, for Saudi public project owners is the contractor selection process due to the impact of the projects' success on public interest, as well as with satisfying the authorities.

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The main aim of this research is to develop a pre-selection framework for measuring and evaluating contractors' performance for public construction projects in the Kingdom of Saudi Arabia.

Developing an appropriate process for pre-selecting construction contractors in Saudi Arabia will contribute to the knowledge concerning construction management in the Kingdom. There are several drivers for this need and the main ones are the present lack of contractor selection processes for public projects, the sharp increase in the number of contractors in the Saudi construction market, and pressure from both the public and the authorities to achieve high-quality projects. The pre-selection process is an important part of monitoring a project's performance in order to avoid any future mistakes and for use in selection processes in future projects. This research approach is based on a critical analysis of the literature and an analysis of qualitative data collected from the Saudi Arabia construction industry. The literature identified several models and criteria for analysing contractor pre-selection in the construction industry; it also identified a lack of comprehensive research in the area of pre-selection processes regarding contractors' performance in the Kingdom of Saudi Arabia. Therefore, this research will fill the gap by developing a framework for the pre-selection of contractors that could be used as benchmark in Arabian Gulf countries.

CONTRACTOR PERFORMANCE

Selecting a potential contractor for a specified project is a critical component in the project management's selection and evaluation processes; careful consideration needs to be made to establish what contractor performance is to help in establishing a framework that can be used to help decision-makers in selecting the most appropriate potential contractor for a project. Xiao *et al.*, (2003: 322) defined overall contractor performance thus: "Overall contractor performance is defined to embrace construction cost, construction time, construction quality and sustainable development, the philosophy being that the achievement of one aspect of performance should not be at the expense of another."

Regarding contractor selection processes, the literature identifies several methods and techniques that can be used in such a process; the most common procedure used is based on prequalification, negotiation and open tender (Kumaraswamy 2001). However, several other methods have been explored in the literature on contractor selection and evaluation: e.g. Harp, 1990; Russel *et al.* 1992; Tam and Harris 1996; Palaneeswaran and Kumaraswamy, 2000. Tam and Harris (1996) developed a discriminate analysis model while Palaneeswaran and Kumaraswamy (2000) developed the benchmarking contractor selection practices conceptual model.

One of the methods used in the decision-making process for selecting and identifying an appropriate potential contractor, is the use of prequalification. Li *et al.* (2007) proposed a fuzzy framework to solve problems concerning construction prequalification. The proposed framework includes an analysis of decision criteria, a weights assessment and ranking orders to determine the appropriateness of contractors for a given project. Holt *et al.* (1994) introduced a structure of criteria for prequalification. These criteria were based on a contractor's organization, financial considerations, management's resources, and the contractor's past experience and performance. In terms of the contractor's organization, the researchers identified the organization's age, size, image, quality control policy, health and safety policy, and tendency to be involved in litigation. Regarding financial considerations, they

identified ratio analysis of accounts, bank references, credit references and turnover history; for management resources, they identified the qualifications of contractors, the qualifications of key personnel, years with the company, and the formal training regime. Criteria for past experience included the type and size of projects they completed and their national and local experience. In terms of past experience, they included failures to fulfil contracts, overrun times, overrun costs and actual quality of the work achieved.

Kumaraswamy (1996: 275) developed four categories of criteria and examples of indicators. The criterion category included finance, technology, personnel and experience. Kumaraswamy also developed an evaluation model using appraisal of input and assessment of output. The model included feedback, and the project's processes. The input to the proposed system was the contractor's resources and the system's output was the construction output itself.

Wong (2005) proposed a Logic Regression model that linked a client's evaluated preferences and the contractor's performance to predict the likelihood of a project failing if a client awarded a contract to a "poor" contractor. The research investigated the relationship between a client's evaluated preferences in the tender and a contractor's performance. This research was based on 48 public and private construction projects in the United Kingdom; it was validated through 20 independent cases.

The relationship between a client's decision making and a contractor's attributes was investigated by Lam *et al.* (2000) who described the relation between them as non-linear and always complicated when subjective evaluation and a decision maker's evaluation experience are incorporated. Yu *et al.* (2007) argued that "the construction industry has mainly relied on financially focused performance measurement, and studies on performance measurement system have been carried out at the project level". These researchers developed an implementation model using a practical methodology to measure and compare the performance of construction companies. They developed, based on quantitative and qualitative analysis, a set of indicators for performance measurement, using 34 Korean construction companies.

Making comparisons between international contractors has attracted researchers to identify significant differences. Xiao and Proverbs (2003: 32) argued that "International comparisons of contractor performance can provide robust benchmarks for contractors in different countries and help to identify ways towards performance improvement." They compared the performance of contractors in three countries: Japan, the UK and the USA. They used multiple regression analysis to reveal that "overall contractor performance is dependent on: their past performance on previous similar projects; their commitment towards lifetime employment; their perceived importance of time performance; their relationship with subcontractors; and the number of design variations during construction." Xiao and Proverbs (2003: 322) went further and stated: "To improve their overall performance, contractors are advised to focus on construction time, reduce delays, maintain a stable workforce and establish partnerships with their subcontractors. Clients should attempt to reduce design variations during construction."

Bassioni, Hassan and Price (2008) evaluated and analysed criteria and sub-criteria in a construction excellence model they had developed earlier in 2005 and 2004. The proposed criteria and sub-criteria for the excellence model were supported by empirical data.

In summary, the literature revealed that there is no accepted generic approach for the process of contractor selection (Wong *et al.* 2000b) that could be adopted for the selection of contractors in Saudi Arabia. However, the literature survey provided a framework that could be used as a theoretical framework to develop a technique that might more appropriate for use in Saudi Arabia.

CONTRACTOR PRE-SELECTION

The first step in contractor assessment is the pre-selection process. Ng and Chow (2004) argued that pre-selection is an essential part of the contractor selection process in order to distinguish which contractors are capable of meeting the requirements before inviting them to submit technical and fee proposals to the assigned consultants. Russel (1992) defined the prequalification process as the screening of the contractors while Ng *et al.* (1999) indicated that the pre-qualification process involves the establishment of a standard for measuring and assessing the capabilities of potential tenders. The required standard is based on a set of prequalification criteria (PQC), intended to reflect the objectives of the client and the requirements of the project (Ng *et al.*, 1999: 1554).

Ng and Skitmore (1999) indicated that the pre-qualification criteria involved measuring and judging potential contractors in accordance with a set of parameters. The challenge for the decision-maker is to find the best way of measuring and assessing the contractors' capabilities.

The pre-selection process is also important to avoid any subjective decision making and the lack of an appropriate pre-selection process may lead to a wrong decision being made based on an individual's perception. Ng *et al.* (1999: 156), by investigating decision makers' perceptions in the formulation of pre-qualification criteria, carried out research to identify whether the selection of individual prequalification criteria is affected by (1) the discipline and training of the pre-qualifiers; (2) Consultants' misinterpretation of the requirements of their clients or project; and/or (3) individual preferences. Their research indicated that there were significant differences in perception between the groups of architects, civil engineers, quantity surveyors and project managers. The most extreme variation was found between the civil engineer and quantity surveyor groups. The researchers attempted to explain that these differences were due to training and expertise: civil engineers may have focused on the technical capabilities of the contractors while the quantity surveyors focused on their financial soundness.

Differences in individuals' perceptions of pre-qualification criteria may lead to there being an inconsistent basis for the assessment of candidate contractors; this could affect the selection of tenders. One of the criteria explored as an example of subjective criteria was the perception of quality. Flanagan *et al.* (1986) stated that "The perception of quality remains subjective, and there is no recognized method of quality assessment" (Flanagan *et al.* 1986: 4).

Ng and Chow (2004) tried to devise a more objective framework for evaluating general capabilities in order to avoid any discrepancies in consultant pre-selection decisions. They argued that the general capabilities evaluation (GCE) should be classified into four main categories: technical capabilities, management capabilities, financial capabilities, and quality assurance and control.

Ng and Chow provided sub-categories for each of the four main categories. For technical capabilities, the sub-categories included previous expertise, resources, and

creative and innovative ability; management capabilities sub-categories included management, staff, service and delivery; financial capabilities included soundness of finances and professional indemnity insurance. The fourth main category concerned quality, which included quality control and insurance. The researchers argued that technical capabilities were valued almost twice as highly as the other three main categories.

RESEARCH METHOD

Qualitative data from the Saudi Arabia construction industry were needed to understand the research problem and the need for an appropriate technique for assessing contractors. Five short, semi-structured interviews were out carried with clients to explore and discuss contractor selection, performance and evaluation from the point of view of the respondents' experience and backgrounds. A qualitative approach was adopted as it provides the researcher with data and information that can be used as a basis for the research. A qualitative data method was also adopted to gather factual information, to collect statements reflecting clients' opinions, and to explore in some depth their experiences regarding contractors' performance in the Saudi construction industry (Drever 2003).

IDENTIFYING CONTRACTOR PRE-SELECTION CRITERIA IN SAUDI ARABIA

The contractor pre-selection process in Saudi mainly depends on a generic list of criteria, created by the government; this is filled in by the contractors themselves. This form fails to fulfil the requirements of the project's clients and has proved to be in effective as many contractors have failed to meet the project's requirements and have failed to meet their performance promises. The first stage of the current pre-selection process is that the contractor fills in the assessment form but experience of the Saudi construction industry has indicated that the contractors are unreliable in terms of assessing their own performance, the number of projects they have completed, or their own financial performance as an organization. There is lack of confidence regarding the contractors' evaluation of their own performance.

An analysis of the literature identified several criteria that need to be considered in developing a more appropriate framework that could be adopted in the pre-selection process in the Saudi Arabian public construction sector. Some of these criteria were explored and confirmed in the initial qualitative data. The main criteria and the sub-criteria are.

Technical Capability of the Contractor

- Previous experience on a similar type and size of project
- Appropriate qualifications and experience of technical staff
- Plant and equipment: availability, condition and suitability of the equipment
- Quality control
- Specialized knowledge of the specified project

Financial Capability of the Contractor

- Financial stability
- Positive credit rating
- Banking arrangement
- Working capital
- Current and fixed assets

- Turnover

Health and Safety Record

- OSHA incidence rate
- Management safety accountability
- Experience in handling dangerous substances
- Experience in noise control
- Safety record
- Company safety policy

Reputation

- Past project failure
- Length of time in business
- Past client relationships
- Other relationships
- Number of similar completed projects
- Reputation of the sub-contractors to be used for the project
- Percentage of previous works completed on schedule
- Relationship with suppliers
- Claims and contractual disputes

Management Ability

- Past management performance
- Qualification and experience level of project manager
- Qualification and experience of management staff
- Present workload and capability to support the new project
- Number of direct workers available for the project

Organization's Culture

- Familiarity with local working culture
- Contractor familiarity with local suppliers
- Familiarity with regulating authority
- Experience in the region
- Relationship with sub-contractors
- Contractor's familiarity with weather conditions.

The above criteria and sub-criteria will be investigated and tested in research fieldwork in the Saudi Public Sector Construction Industry to contribute to the development of an appropriate framework for pre-selecting contractors.

CONCLUSIONS

Public construction projects are at the core of the Kingdom of Saudi Arabia's development strategy due to lack of an appropriate infrastructure and the ambitions of the authorities to develop the Kingdom. This has opened up the construction market and has attracted several national, regional and international contractors to enter the Saudi market. Research on the performance of public construction contractors in Saudi Arabia is still evolving and has attracted attention from both academics and the construction industry in recent years. The main driver for this expansion in research is the needs of the market and an increase in the awareness of the importance of selecting an appropriate contractor in order to ensure a project is successful.

The literature revealed that there is no accepted generic approach for carrying out the pre-selection process that can be adopted for contractor selection in Saudi Arabia. However, the literature survey provided certain criteria and a generic framework that could be used as a base to develop an appropriate framework for Saudi Arabian construction contractors.

This research has identified six main criteria and a set of sub-criteria that can be used as a base for developing a framework for contractor selection.

The main outcomes of the initial interviews showed that the public construction sectors lack such a framework for evaluating and measuring the performance of contractors for pre-selection. It was also found that a large number of the public construction contractors are non-Saudi which raised the importance of cultural issues in assessing contractors' performance.

REFERENCES

- Al-Ghafly MA (1995) Delays in the construction of public utility project in Saudi Arabia Master thesis, CEM Dept., KFUPM. Dhahran, Saudi Arabia.1995.
- Assaf, S and Al-Hejji, S (2006) Causes of delay in large construction projects, *International Journal of Project Management*, 24, 349-357.
- Bassioni, H, Hassan, T and Price, ADF (2004) Performance measurement in construction. *Journal of management in Engineering*, 20(2), 42-50.
- Bassioni, H, Hassan, T, and Price, ADF (2005) Building a conceptual framework for measuring business performance in construction: an empirical evaluation. *Construction Management and Economics*, 23(5), 495-507.
- Bassioni, H, Hassan, T, and Price, ADF (2008) evaluation and analysis of criteria and sub-criteria of a construction excellence mode. *Engineering Construction and Architectural Management*, 15(1), 21-41.
- Chan, D. and Kumaraswamy, M (1996) An Evaluation of construction time performance in the building industry, *Building and Environment*, 31(6), 569-578.
- Chow, L and Ng, S (2006) Expectation of performance levels pertinent to consultant performance. *International Journal of Project management*, 25, 90-103.
- Drever, E (2003) Using semi-structured interviews in small-scale research: A teacher guide. Glasgow; University of Glasgow, SCRE Centre.
- Holt GD, Olomolaiye, PO and Harris, FC (1994) Evaluating prequalification criteria in construction selection. *Build Environment*, 29(4), 259-268.
- Kim, G, An, S, and Kang, K (2004) Comparison of construction models based on regression analysis, neural networks, and case-based reasoning. *Building and Environment*, 39, 1235-1242.
- Kumaraswamy, M (1996) Contractor evaluation and selection: a Hong Kong perspective. *Building and Environment*, 31(3), 273-282.
- Lam, K, Ng, S, Hu, T, Skimore, M and Cheung, O (2000) Decision Support system for contractor prequalification-artificial neural network model, *Engineering Construction architecture Management*, 7(31) 251-266.
- Li, Y, Nie, X and Chen, S (2007) Fuzzy approach to prequalifying construction contractors. *Journal of Construction Engineering and Management*, 133(1), 40-49.

- Palaneeswaran, E and Kumaraswamy, M, (2001) Recent advances and proposed improvements in contractor prequalification methodologies, *Building and Environment*, 36, 73-87.
- Topcu, Y, (2003) A decision model proposal for construction contractor selection in Turkey, 39, *Building and Environment*, 29, 469-481.
- Wong, CH (2004) Contractor Performance Prediction Model for the United Kingdom Construction Contractor: Study of Logistic Regression Approach, *Journal of Construction Engineering and Management*, 130, (5), 691-698.
- Wong, CH, Holt, DG and Harris, PT (200b) Contractor prequalification: have Latham's recommendations had an impact? *Construction Building Research. Proc. COBRA 2000 Conf.* University of Greenwich, Greenwich, UK, 379-389.
- Xiao, H and Proverbs, D (2003) Factors influencing contractor performance: an international investigation, *Journal of Engineering, Construction and Architectural Management*, 10(5), pp. 322-332.
- Yu, I, Kim, KA, Jung, Y, and Chin, S (2007) Comparable performance measurement system for construction companies, *Journal of Management in Engineering*, 23(3), 131-139.
- Ubaid, AG (1991) Factors affecting contractor performance, Master Thesis, CEM Dep., KFUPM, Dhaman, Saudi A.