



Behavioral Differences Towards Internal and External Factors in Making the Bid/No Bid Decision

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Abstract

Decision-making and subjective evaluation are two important aspects that characterizes the involvement of an organization in tender process. Moreover, selection of the right project to bid for is a principal feature of business success. The study aims to investigate the behavioral differences of Saudi construction contractors toward internal and external factors based on the process of modelling the bidding decisions. A quantitative research design is used to investigate the behavioral differences of 97 contractors recruited from construction industry of Saudi Arabia. A questionnaire was distributed among the respondents that would help in identifying the significant level of factors affecting the bid or no bid decision. The impact of internal and external factors on the bidding decisions was evaluated using one-way ANOVA analysis. The results have shown a significant and positive effect of internal and external factors on the bid or no bid decision; including job start time, work capital requirement, availability of qualified human resources, bidding methods, bidding document price, project supervision procedure and etc. The study has helped in establishing a better understanding toward the behavioral differences of contractors with respect to the bidding decisions.

Keywords: Behavioral Differences; Bid/No Bid Decision; External Factors; Internal Factors; Construction Industry.

1. Introduction

The customer tender enquiries need to be responded and handled carefully as it significantly affects the credibility and reliability of the organization. Majority of the organizations favor effective tender enquiry management. It is because of receiving customer tender enquiries that are directly proportional to bidding time. The company tends to bid more enquiries in time, when the company receives more customer tender enquiries [1]. Related to the factors affecting the company decisions, the decision of bid or no bid needs an understanding of company's assessment. Every company has different assessment values. Therefore, the study aims to focus on the behavioral differences of Saudi Construction Contractors towards internal (qualified employees, plants and equipment, qualified subcontractors, and material suppliers) and external factors (contract, company experience, project characteristics, and characteristics of client) that affect the bid or no bid decisions.

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The overall engagement of an organization in tender process and decision to bid or no bid depends on the decision-making and subjective evaluation. It is believed that pre-bid screening and analysis procedure is a strategic tool for avoiding the circumstances, where many resources are involved. In such situations, decision-making solely depends on gut feeling [2]. An effective bid or no bid decision is likely to be valuable for a company through cost reduction and improved profits and revenues. The factors that affect the bid or no bid decision tend to differ in the level of importance that is assigned to each factor for taking a specific decision [3]. A study conducted by Lowe and Parvar [4] investigated the association between factors that affect bid and no bid decision and the decision taken by the organization. The results showed that out of 21, only 8 factors possessed significant linear association with the decision to bid. Wanous et al. [5] introduced artificial neural network, which was based on the input data that has been obtained from the contractors. The data mainly concerns about the factors that affect the bid or no bid decision, relates it with the output data, and formulates a final decision.

The existence of a contractor's classification certificate is one of the main features of Saudi Arabia construction industry. The contractor classification system is responsible for helping contractors to bid for projects that are appropriate to them. The principal feature of business success is the selection of right project to bid for. In this context, the bid decision is important as it allows the contractors for evaluating their proposed projects to bid before acceptance getting committed to the bid-preparation processes. The modelling procedures depend on contractors' assessment of each factor. The model user has not been identified by the previous studies, instead those studies developed a general model for all types of contractors. The bid/no bid decisions require an understanding of the human decision-making process and require processes of reaching to this decision in logical, systematic and organized manner. At the same time, supporting the decision-maker with the relative information needed to make the decision is required. Providing contractors with such a process and methodology seems to be more important than helping them to predict the decision without any rational basis. Therefore, the decision will be based on a logical perspective that would support the contractors in accepting it. The bid/no bid decision, as it is a repetitive decision, can be routinized to effectively use company's experiences from past similar decisions. Then the likelihood of making "good" decisions can be increased

The rationales behind selecting this topic are the researcher's personal interest in generating knowledge about how contractors make decisions on issues related to their survival, how contractors practice the activities of strategic project management, and how the sharing culture can be applied within the managerial activities of a construction company. Investigating current procedure of bid/no bid decisions provided the researcher with the opportunity to gain this knowledge, as the decision proved to be one of the most critical decisions that contribute to the survival of the contractor. It is a strategic decision; it is a decision that requires a lot of information from different departments of the company, and it is an organizational decision that should be made with wide consultation. Therefore, the present study aims to investigate the behavioral differences of Saudi Construction Contractors toward internal and external factors on the process of modelling the bidding decisions. It investigates the behavioral differences based on different factors, since there is a paucity of studies accessible that examine the perceptions or attitudes of contractors toward factors of bidding process.

2. Literature Review

The contractors are continuously subjected to the external factors that influence their decision-making process. However, the association between international bidding and organizational culture in response to the economic and political risks of Malaysian international contractors is still a topic of research, regardless of the external factors. The models depicting actual bidding decision have been examined by a small number of qualitative studies. These studies mainly focus on the mark-up decision.

Oyeyipo et al. [6] assessed the factors, affecting bidding decisions among contractors for construction projects. The study included 100 contractors to assess the factors, affecting bidding decisions. The findings showed insignificant impact of competition on the bidding decisions of contractors. The reputations of contractors are important in developing technical competencies and skills in assessing the competitiveness of contractors toward bidding decisions. Another study conducted by Wibowo et al. [7] analyzed the impact of bidding strategy on project and company performance. The study collected data from 61 contractors, using questionnaire survey and interviews and a structural equation modelling partial least squares (SEM-PLS) was used to analyze the data. The findings showed that project performance is directly affected through bidding strategies; while, company performance is indirectly affected through bidding strategies. The association between company performance and bidding strategy is positively mediated through project performance.

Patel et al. [8] studied the factors affecting the contractor's bidding strategies in large scale residential construction. The data was collected through a questionnaire survey and individuals who were frequently involved in construction firms on daily basis were recruited. The sample included a total of 75 respondents that helped in identifying 49 factors under the group of contractors. Biruk et al. [9] focused on the set of tools for facilitating the main stages of competitive bidding process. The study used a linear programming model to assess contractor's bidding decision. The findings have shown that the proposed approach stimulates the real-life bidding problems, based on accessible input and construction

enterprises. The in-house procedures and managerial decision support systems are ascertained through contract attractiveness and justifiable price.

Yan et al. [10] conducted a study to evaluate the individual, organizational, and group factors that are affecting the group bidding decisions for construction projects. The data was collected through a questionnaire survey among 203 Chinese international contractors. The results of the study identified 14 critical factors that affect the group bidding decisions for construction projects. Among the 14 critical factors, team decision preference and risk perception were found to be most significant. The study results were significant as it involved the understanding of various factors related to the organizational levels. These factors needed to be highlighted during the group bidding decision making process for better outcomes. The results narrated by Yan et al. suggested important strategies for bidding groups to enhance the decision-making process.

Petruseva et al. [11] predicted bidding prices in construction industry through support vector machine. The study enrolled 54 tenders from construction firms and the predictive modelling was analyzed through DTREG software. The findings have shown that internal and external factors affect the bidding process of a construction firm. Similarly, a critical and crucial decision is made by focusing on the bidding process. A similar study was conducted by Low et al. [12], who evaluated the impact of organizational culture on international bidding decisions. A culture-decision conceptual model was formulated and was tested with the help of a questionnaire survey that was further associated with interviews. The results suggested that the organizational culture was found to influence the international bidding decisions. However, this was not a prominent factor among risk decisions.

Shi et al. [13] developed a rough sets application and enhanced general regression neural network for assessing the uncertainty and influence of complex criteria. A MIBARK algorithm was adopted to assess the attribution reduction and decision table of rough sets. The findings have shown that generalization ability and prediction accuracy was enhanced through NPSO-GRNN. An effective bidding decision was made in uncertain construction markets through proposed decision support system. Enshassi et al. [14] identified and ranked the bidding decision based on contractor's perspective. A total of 105 contractors were included in this study from Gaza Strip construction sector. The findings showed that the most critical factors affecting the bidding decision included; financial values, due data of the payments, stability of the construction industry, the financial capability of the clients, the financial capability of the contractors and the accessibility of construction raw materials. These findings tend to support the accessibility of bidding decisions in the construction industry.

Chen et al. [15] explored the relationship among risk perception, bidding decision-making, and risk propensity in the construction projects. A total of 134 contractors were included in the study. The data was collected using survey questionnaire and multivariate statistical analysis was used to analyze the collected data. The results showed that bidding decisions are negatively influenced by risk perception; while, it is positively influenced by risk propensity. Olatunji et al. [16] investigated the factors affecting the indigenous construction contractor's decision on the bidding decisions. A total of 64 engineering management employees are included from Nigerian construction industry. The findings revealed the critical factors that affect bidding decision including; subcontracted work, difficulty in obtaining finance, business capacity of partners, resource price fluctuation, and own work. The aforementioned studies have indicated the impact of internal and external factors on the bidding decisions of construction industry. These findings have ascertained a platform to assess the behavioral differences of contractors toward internal and external factors in the construction industry. The hypothesis postulated in the present study are as follows;

Ho: There is no behavioral difference between Saudi contractors depending on their characteristics.

H1: There is a behavioral difference between Saudi contractors depending on their characteristics.

3. Methodology

The customer tender enquiries need to be responded and handled carefully as it significantly affects the credibility and reliability of the organization. Majority of the organizations favor effective tender enquiry management. It is because of receiving customer tender enquiries that are directly proportional to bidding time. The company tends to bid more enquiries in time, when the company receives more customer tender enquiries (Oduoza and Xiong, 2009). Related to the factors affecting the company decisions, the decision of bid or no bid needs an understanding of company's assessment. Every company has different assessment values. Therefore, the study aims to focus on the behavioral differences of Saudi Construction Contractors towards internal (qualified employees, plants and equipment, qualified subcontractors, and material suppliers) and external factors (contract, company experience, project characteristics, and characteristics of client) that affect the bid or no bid decisions.

3.1. Research Design

A quantitative research design is used to investigate the behavioral differences of Saudi construction contractors toward the internal and external factors, affecting the bidding decision process in the Saudi construction industry. A

purposive sampling technique was used to enroll and collect data from contractors. Quantitative research design has been adopted in this study as it is an effective method for the under controlled conditions. Moreover, the research design is substantial for the studies which involve numbers. The data obtained from this research design aids in formulating importance information relating to the business decisions.

3.2. Data Collection

Survey approach has been incorporated in this study to collect data through a written questionnaire. The study targeted the construction and maintenance contractors in Saudi Arabia that include the managers and project managers. In the first step, the demographic details of all the respondents including firms' status, names, addresses, degree of classification, and specialty were recorded. A total of 97 respondents participated and were asked about the company characteristics. The respondents were told to assess the effectiveness of internal and external factors in the judgment and experience related to bid and no bid decision. This helped in identifying the importance level of factors that affect the bid or no bid decision.

3.3. Instruments

A survey questionnaire has been used to quest the behaviors of Saudi contractors toward the internal and external factors. A total of 25 factors were identified from past studies, which were included in the survey questionnaire. These factors were rated on a six-point rating scale (0 indicates less influential; 6 indicates very influential).

3.4. Data Analysis

The data was analyzed through Statistical Package for Social Sciences (SPSS). Descriptive statistics was used for analyzing the characteristics and demographics variable of the respondents. Moreover, cross-tabulation was used to indicate the percentage of each factor and its impact on the bidding process. The data structure and causal modelling were discovered using principal component analysis.

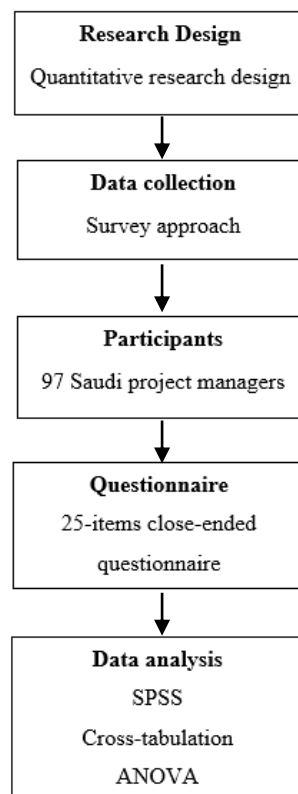


Figure 1. Framework

4. Results

The internal and external factors are rated on a rating scale (0 – 6) showing the understanding of contractors and importance of these factors in construction projects. Table 1 has illustrated the rating of internal and external factors that reveals their importance in bidding decisions. The factors affecting bidding decision include; job start time, client requirements, cost of preparing the bid, original price, availability of required cash and equipment, bidding document price, and availability of labor.

Table 1. Rating of Internal and external factors

Factors	Rating Scale						
	0	1	2	3	4	5	6
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Job start time	2 (2.06%)	5 (5.15%)	3 (3.09%)	10 (10.31%)	11 (11.34%)	43 (44.33%)	23 (24.71%)
Location of the project	4 (4.12%)	1 (1.03%)	7 (7.21%)	11 (11.34%)	14 (14.43%)	30 (30.93%)	30 (30.93%)
The responsibility of issuing the work permits	4 (4.12%)	5 (5.15%)	23 (24.71%)	20 (20.62%)	15 (15.46%)	10 (10.31%)	20 (20.62%)
Public exposure	10 (10.31%)	12 (12.37%)	7 (7.21%)	18 (18.56%)	21 (21.65%)	15 (15.46%)	14 (14.43%)
The client requirements	12 (12.90%)	2 (2.15%)	4 (4.3%)	9 (9.77%)	26 (27.95%)	32 (34.4%)	12 (12.90%)
Contract conditions	3 (3.2%)	2 (2.15%)	5 (5.3%)	14 (15.05%)	19 (20.43%)	30 (32.25%)	24 (25.80%)
The cost of preparing the bid	2 (2.15%)	5 (5.3%)	3 (3.2%)	10 (10.72%)	11 (11.8%)	43 (46.23%)	23 (24.73%)
Work capital required to start the job	10 (10.72%)	12 (12.90%)	7 (7.52%)	18 (19.35%)	21 (22.5%)	15 (16.12%)	14 (15.05%)
Original price estimated by the client	12 (12.90%)	2 (2.15%)	4 (4.3%)	9 (9.77%)	26 (27.95%)	32 (34.4%)	12 (12.90%)
Degree of difficulties in obtaining bank loan	10 (10.72%)	12 (12.90%)	7 (7.52%)	18 (19.35%)	21 (22.5%)	15 (16.12%)	14 (15.05%)
Availability of required cash	12 (12.90%)	2 (2.15%)	4 (4.3%)	9 (9.77%)	26 (27.95%)	32 (34.4%)	12 (12.90%)
Ability of doing the job	12 (12.90%)	2 (2.15%)	4 (4.3%)	9 (9.77%)	26 (27.95%)	32 (34.4%)	12 (12.90%)
Availability of required equipment	2 (2.15%)	5 (5.3%)	3 (3.2%)	10 (10.72%)	11 (11.8%)	43 (46.23%)	23 (24.73%)
Availability of qualified human resources	12 (12.90%)	2 (2.15%)	4 (4.3%)	9 (9.77%)	26 (27.95%)	32 (34.4%)	12 (12.90%)
Need for work	10 (10.72%)	12 (12.90%)	7 (7.52%)	18 (19.35%)	21 (22.5%)	15 (16.12%)	14 (15.05%)
General (office) overhead	2 (2.15%)	5 (5.3%)	3 (3.2%)	10 (10.75%)	11 (11.8%)	43 (44.75%)	23 (24.25%)
Reliability level of subcontractors	11 (11.8%)	12 (12.90%)	8 (8.92%)	20 (21.5%)	19 (20.43%)	17 (18.27%)	12 (12.90%)
Required bond capacity	12 (12.90%)	2 (2.15%)	4 (4.3%)	9 (9.77%)	26 (27.95%)	32 (34.4%)	12 (12.90%)
Bidding document price	3 (3.2%)	2 (2.15%)	5 (5.3%)	10 (10.75%)	43 (44.75%)	23 (24.25%)	13 (13.97%)
Bidding methods	2 (2.15%)	3 (3.2%)	5 (5.3%)	11 (11.8%)	10 (10.72%)	23 (24.75%)	43 (44.75%)
Availability of labour	5 (5.37%)	2 (2.15%)	6 (6.45%)	10 (10.72%)	15 (16.12%)	40 (43%)	19 (20.43%)
Size of contract in SR	12 (12.90%)	11 (11.8%)	8 (8.92%)	17 (18.27%)	20 (21.5%)	15 (16.12%)	15 (16.12%)
Location of the project	4	3 (3.2%)	5 (5.3%)	8 (8.92%)	18 (19.35%)	39 (41.93%)	20 (21.5%)
Type of equipment required	3 (3.2%)	4 (4.3%)	2 (2.15%)	11 (11.8%)	10 (10.72%)	44 (47.31%)	23 (24.73%)
The project supervision procedure	11 (11.8%)	11 (11.8%)	9 (9.77%)	16	19	17	14
Safety hazards	12 (12.90%)	2 (2.15%)	4 (4.3%)	9 (9.77%)	26 (27.95%)	32 (34.4%)	12 (12.90%)

ANOVA test has been performed for identifying the causal relation between internal and external factors in the bid/no bid decision-making process. The measurement of the significance of internal and external factors was computed through 0.05 level of significance. Table 2 has shown ANOVA findings for the internal and external factors associated with the bidding/no bidding process. The results showed significant impact of internal and external factors on bidding or no bidding decisions. In addition, the results have shown significant effects of job start time, location of the project, public exposure, client requirements, and work capital requirement, original price estimated by the client, degree of difficulties, availability of required cash, ability of doing the job, availability of required equipment, and availability of qualified human resources. Similarly, findings have shown significant effects of bidding document price, bidding methods, availability of labor, type of equipment required and the project supervision procedure on bidding process. Therefore, it has been implied that these internal and external factors play a vital role in making bid/ no bid decisions in construction projects. The view that suggests that different contractors' type have different weights of importance of the 87 factors is statistically supported. This suggests that at the stage of modelling the bid/no bid decision, the model user must be specified in terms of his/her characteristics. The most influential characteristics of the contractors that affected their assessment of the factors' weights of importance were contractor size, classification status of the contractor and the main client type.

Table 2. ANOVA test for internal and external factors

S. No	Factors	Sig.
1	Job start time	0.032
2	Location of the project	0.034
3	The responsibility of issuing the work permits	0.011
4	Public exposure	0.008
5	The client requirements	0.008
6	Contract conditions	0.008
7	The cost of preparing the bid	0.010
8	Work capital required to start the job	0.000
9	Original price estimated by the client	0.029
10	Degree of difficulties in obtaining bank loan	0.009
11	Availability of required cash	0.002
12	Ability of doing the job	0.038
13	Availability of required equipment	0.037
14	Availability of qualified human resources	0.007
15	Need for work	0.017
16	General (office) overhead	0.033
17	Reliability level of subcontractors	0.004
18	Required bond capacity	0.006
19	Bidding document price	0.001
20	Bidding methods	0.005
21	Availability of labour	0.027
22	Size of contract in SR	0.026
23	Location of the project	0.049
24	Type of equipment required	0.018
25	The project supervision procedure	0.018
26	Safety hazards	0.002

5. Discussion

The findings have shown significant behavioral differences of Saudi Contractors toward internal and external factors associated with the bidding process of the construction industry. This result indicates that the classified contractors are more appreciative of the project selection phase than the non-classified contractors. That is not surprising as they have to consider projects that would help them in the renewal stage of their classification certificate. Therefore, it can be claimed that there is direct (positive) correlation on the level of importance given to the project selection stage and respondents' organizational size. This would support the view that small and medium-size contractors are in need of a model or a decision aid to help them to become expert in making decision on the processes involved in project selection. Different contractor types respond differently concerning the evaluation of projects. This result is surprising as the previous question (on importance of project selection) identified significant variance in the responses regarding the size of the contractor's group. This result indicates that the small and medium size contractors have to ensure that the proposed project is within their capacity, so they evaluate the project before it is accepted. The non-classified contractors are more certain of their need of a decision aid. This result conflicts to some extent with their responses to this question. This may be due to whether they think they have adequate experience to make this decision, or due to a general resistance to change. The contractors involved in construction work are more certain in their responses than the contractors involved in maintenance work. That is because the bid/no bid decision for construction works could be more critical than the bid/no bid decision for maintenance works in term of project process and project development

The findings of the current study are supported by several past studies. For instance, Oyeyipo et al. [6] have shown that the most important factors are accessibility of capital and material, and financial capability of clients. Thereby, the study has recommended that reputations of clients are developed through technical competencies and abilities in the construction industry. Similarly, the competitiveness of contractors is an important indicator in successful bidding process in construction projects. Another study Biruk, Jaškowski & Czarnigowska [9] has shown the importance of behavioral differences in bidding process. The study indicated that the adoption of decision-support models and linear programming models are important for computing the bid amount and the total price among the items. These models

have been important in maximizing the cash flows of contractors in reference to the bill of quantities. Thereby, the study has recommended the use of decision-support models for modelling decisions of contractors in bidding processes.

Lim & Yazdanifard [17] have studied the influence of internal and external factors on the behavioral differences of contractors in bidding process. The results depicted that innovative ideas should be generated to expand profit for the marketers from online market. Holla et al. [18] have studied the influence of behavioral differences for 59 factors concerned with the analysis of bid selection. The study showed that the initial bid selection can eliminate the incompatible bid invitations by identifying the impact of behavioral differences among the contractors bidding selection process. This elimination can increase the valuable time for bid selection and preparation with improved chances of winning for bid proposals.

A study similar to the present study indicated that the bidding price directly influence the selection of construction firm business [11]. The study used a predictive modelling for predicting the bidding process of a construction project. The results showed that the selection of bidding process in the initial phase can be beneficial for contractors in increasing the outcomes of construction projects. However, Sandberg [19] depicted the importance of bidding process development in the case company. The study asserted that the benchmarking bidding process is sought to overcome the bidding process for best practices. The bidding process in the initial phase has been appropriate that enhance bid project management, bid competitions, and generate bids of higher quality to help the case company save resources.

Al-Alawi [20] indicated significant impact of behavioral differences of individual investors on the bidding process of construction industry. The study showed that economic and social factors were significantly affected on the decision-making process of investors in the Kingdom of Saudi Arabia. Moreover, the study has asserted that political factors and cultural factors are influential on the bidding process of investors; while, environmental factors and corporate governance influence the factors of investors negatively. On the basis of aforementioned discussion, it has been understood that internal and external factors contribute their part essentially on bidding decisions of stakeholders. These factors have emphasized a direct and significant impact of these factors on the bidding decisions. Thereby, it is important for construction industry to importantly measure the impact of these factors while bidding the projects.

6. Conclusion

The study has investigated the behavioral differences of Saudi construction contractors toward internal and external factors on the process of modelling the bidding decisions. These factors include job start time, location of the project, public exposure, client requirements, and work capital requirement, original price estimated by the client, degree of difficulties, availability of required cash, and ability of doing the job, availability of required equipment, and availability of qualified human resources. The study has established a better understanding toward the behavioral differences of contractors with respect to the bidding decisions. It is clear that internal and external factors impact behavioral differences of contractors during the bidding process. Thereby, it is important for construction industry of Saudi Arabia to consider these factors due to their direct relationship in the bidding decisions of contractors. Future studies should investigate these variables by undertaking diverse sample size or countries. Semi-structured interviews can be a vital tool for exploring perceptions and views of contractors regarding the association of internal and external factors during bidding decisions to gain in-depth understanding.

7. Conflict of Interest

The authors declare no conflict of interest.

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