

## Identifying and examining affecting factors on the decision to bid/no bid at Iranian well-established contracting firms

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### **Abstract**

Bidding is a strategic and vital stage for construction contractors. Regarding this contractors are always encounter with two important issues: first, they should decide to bid or no to bid for a project and second, they should decide the price they want to offer. Many factors are involved in such decision making. In this paper, by using a two-step questionnaire, which was initially evaluated and confirmed by experienced contractors, factors that may affect contractors' decision to bid/no bid for projects were identified and weighted by statistical indices. The research population includes first-grade contractors based on ranking developed by Iran President Deputy Strategic Planning and Control (IPDSPC) that undertake large size projects in construction, water and transportation fields. The study introduces 76 factors categorized under 11 categories and four groups. Finally, the results were adapted to Pareto's law and the most important factors were ranked and represented.

### **Keywords**

bidding, decision making, bid/no bid, Iran, Pareto's law

### **1. Introduction**

The only possible way for a contractor firm to survive and acquire its aims are winning tenders and making profit. Although in some cases, the contractors undertake projects and make profit without having to win a tender, this is not the usual application (Egemen et al, 2007).

Contractors would aware various bids in different ways. A typical way in large contractors is to receive invitations from employers. In responding such invitations and bids, they should decide whether to bid or not on a specific project (Cova *et al*, 2000). They should decide on mark-up if they like to bid. These are strategic decisions for all small to large multi-project contractors in order to achieve success (Wanous *et al*, 2000). However, it is important to know that if a contractor aims only to bid in order to get the project,

winning in this period is certainly a success and any failure means to lose organizational energy and time. Therefore, considering this issue is a proper step in gaining a strategic success.

To assist managers in making better screening decisions, numerous decision tools have been developed with the hope that managers could make better decisions in an uncertain environment. However, traditional project selection techniques tend to utilize quantitative tools, such as mathematical programming, economic models, etc. which have both practical and theoretical limitations (Ching & Ying, 2004). while bid decisions have a qualitative, mental and empirical nature shaped based on various criteria and factors such as project situation, employer, project price, work type, etc. Therefore, such models and tools are less utilized in practice. Hence, what used in unanticipated and complicated conditions as the heart of decision-making in organizations and corporations are empirical judgments by elites and managers based on their own mental criteria. So, organizing and discovering these criteria are useful due to following reasons:

- Identifying and examining such factors correctly can be a proper input for new models based on qualitative issues and elite decision-making systems. A reason of underutilization of these models is that they are not overall and have deficient inputs.
- Also, identifying affecting factors on bid contracts can help employers' mental judgments since human mindset is able simultaneously to compare a few criteria and categorizing and integrating them enlarges the circles of sides which should be observed.

Present study is an attempt to identify and examine affecting factors on a company's decision to bid/no bid at large contractors. Here, statistical tools are used and expounded below.

## **2. Previous Studies on identifying and examining affecting factors on bid decision**

Numerous studies have been conducted on bid strategies. Each study surveys a certain aim. Some of them have studied affecting factors on contractors' bid decisions. Others have developed models based on such researches. Noteworthy, the bid process is a dynamic and proactive, requiring the supplier to continually test and evaluate alternative solutions to the problems and opportunities presented in each bid (Lowe & Leiringer, 2006). In the meantime, the type and importance of these factors are differed based on the largeness or smallness of contractor, the type and aims of the company and different countries and regions. So, in various countries, researches on identifying affecting factors on contractors' bid decisions have led into relative different findings. In this section, we address to some of these researches and their results.

Flanagan and Norman (1982) identified five key factors which impact on contractors' contracting behavior: market conditions, company's work load, complexity and greatness of the project, the type of employer and the type of work. Clough (1984) also determined these factors as the major impacting parameters on bid decisions: project type, project length, company's need to work and project cash flow. In addition to these factors, construction industry need to other important factors which influence over contractors' bid decisions. In conducted researches [(Ahmad & Minkarah, 1988), (Shash & Abdul-Hadi, 1992) · (Dulaimi & Shan, 2002) · (Eastham, 1987) ,(Shash, 1993)] 31, 37, 40, 52 and 55 impacting factors on such decisions were identified respectively. For instance, Estham (1987) and Shash (1993) identified such factors as subcontractors' needs, project type and size, rivals, employer and needed manpower. Ahmed and Minkarah (1987) identified risk degree, hardness rate, work type, uncertainty in price estimation and profit rate. Also, 37 factors were identified and investigated in a thesis (Nader Husni, 1990) in Saudi Arabian construction industry. Teo *et al* (1991) recognized the rightness of contractor's price estimation, employer's credit, contractual responsibilities, work type and relations to advisors as affecting factors of such decisions. Shash (1993) who undertook a version of questionnaire developed by Ahmed and Minkarah (1988) in UK construction industry believed that five affecting factors on contractor's suggestive price include work hardness, work nature risks, existing work load, company's need to work and contractor's condition. Lower important factors were related to market condition and political issues. In the meantime, factors like rival numbers and competition level had lower importance

compared to other factors. Work type, experience, rivals, employer and contractor's power are factors which impact on contractor's confidence of winning (Ahmed and Minkarah, 1998; Shash, 1993). Both researches showed that the need to work and project location are influential on increasing contractors' motivation to take the projects. Simultaneously, Odusote & Fellows (1992) identified affecting factors on contractors' decisions to select a project. Initially, they gathered current factors in the literature. They gathered more information by using interview and questionnaire tools due to the diversity of factors. Identified factors were ranked by Spearman rank correlation coefficient. 69 factors were extracted which reduced to 42 factors via 14 interviews. The factors are outlined in table 4.2. The statistical population includes UK contractors whose working capital in the last fiscal year was over €8 million and they possessed two Estimating Departments. In their study on Syrian construction industry, Wanous *et al* (2000) achieved a model to determine bid/no bid decision. In this line, they initially identified affecting factors on such decision. The result of their efforts was 6 semi-structured interviews and 182 responds in which 37 factors were determined.

Egemen *et al* (2007) identified key determinants in two bidding contracts and their weights by field findings through 80 contracting firms in construction market at north Cyprus and Turkey. Present format in this study is a basic for a knowledge-based systemic model which guides contracting firms in reaching strategic right decisions on bid/no bid and considered profit. By identifying 83 affecting factors on contractors' bid decision, proposed framework used an argument model which enters into the heart of decision-making procedure deeply and clarifies the complicated picture drawn around these two sequential decisions. The results show that there is a separated clear difference on the attributed importance of similar key factors for both decision-making trends. One of the most remarkable findings of the research is its clear difference in contractors' styles with varied sizes to face with such decisions. Hence, the results suggest that each model should be distinguished regarding contracting decisions and considered profit among contractors with various sizes in order to show the best way to each contractor.

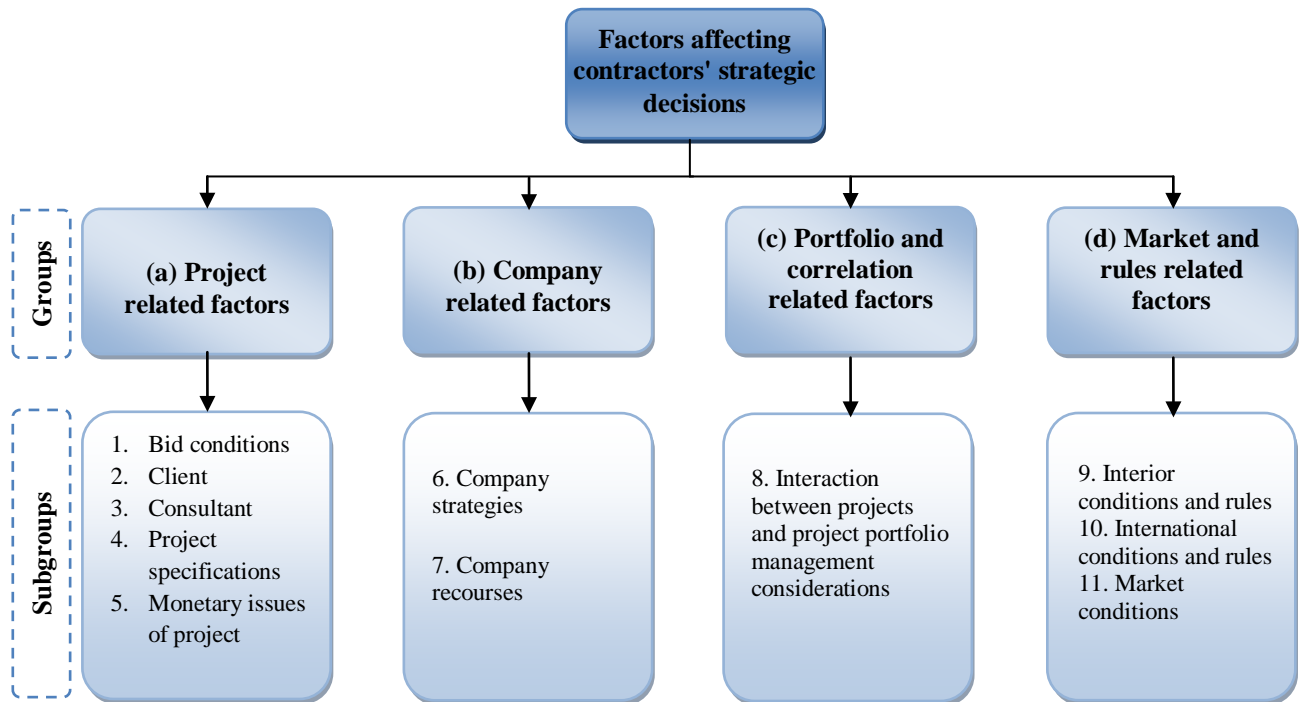
Overall, one can say that all these researches have paramount commonalities and 15 factors are common in all of them which have more importance in deciding on suggested price. They include: project investment risk, work complexity and hardness, project greatness, need to work (company's capacity), uncertainty (or the capability to estimate the costs), current workload, project profit compared to similar past projects, work safety, project forecasted return on investment rate, the existence of work in the market, project nature-based risk, project cash flow, project type and its relevance to company's operations, economical conditions and contract docs. In another research by Neville and King (1991), it was indicated that need to work and project risk have the highest impact on price edge.

### **3. Methodology**

To identify affecting factors on bi/no bid decision, initially a library and then a field study were conducted. Accordingly, these factors were extracted and evaluated from literature as mentioned in previous section. These factors are collected in questionnaire No. 1. This questionnaire consists of three sections: information on organization and company, information on organizational strategic approaches and affecting factors on bid decision gathered from literature. Totally, 111 factors were gathered. These factors were categorized in 4 major groups and 11 subgroups outlined in figure 1. The main aim of the first questionnaire was to validate and revise the questions through semi-structured interviews with elites' opinions. Gathered issues in the literature were provided in the format of questions in order to reach the aims of the research. Questions pursue two aims: firstly, to establish a thinking line for elites and regulating interview session. Finally, elites' opinions were gathered and executed in questions in order to achieve a mostly non-deficient questionnaire. Secondly, some questions were challenging and they cause well transfer of elites' opinions during exchanged questions and answers between interviewer and respondent. Questionnaire No. 1 was discussed by semi-structured interviews with 12 elites and it was revised 9 times totally.

In questionnaire No. 2 which was in fact the revised and finalized questionnaire No. 1, the number of factors decreased to 76 according to elites' opinions and reforms. The aim of the questionnaire was to achieve strategic approaches on bi participation and price suggestion as well as scoring affecting factors on contractors' bid decisions. In the preliminary part of the questionnaire, items on company, the way of facing with bids and organizational strategies were asked and in the next part, respondents were asked to score each factor from 0 as the most unimportant to 9 as the most important factor.

An important point which distinguishes this research from similar ones was factors scoring method. Since the weight of factors is relative (the weight of each factor matters when compared to the weight of another factor), considering all factors along with each other and measuring them is too vital. On the other hand, examining 76 along with each other and determining their right weight for a respondent who is facing with them for the first time is difficult and even impossible. An initiative used in this research to resolve such problem was "group score". In this line, respondents were asked to look at the factors in each subgroup shortly, give 9 to the most important factor(s) and then give lower scores to zero to other factors based on their importance. In this case, a factor is at least found in each subgroup with score 9. Thus, in each subgroup, those factors are scored whose numbers are enough to be compared correctly. Of course, the factors in both subgroups are not yet scored relative to each other. To adopt and balance factors' scores in various subgroups, respondents were asked to extract factors with score 9 in each subgroup, compare them and rescore them from 0 to 9. It is considered as group score. Finally, the score of each factor was multiplied in the score of its relevant group and divided on 9 to achieve the score of each factor. In this way, scores of all factors have a relative value to other factors.



**Figure 1: grouping affecting factors on bid decisions**

#### 4. Statistical population and sample size

Statistical population of this questionnaire consists of selected contractors from confirmed construction firms (rank 1) in construction, water and road disciplines. Among these companies, statistical population was selected by considering following limitations:

- Public and semi-public firms which were affiliated to governmental agencies were eliminated since there is huge difference between competition among such firms and private ones.

- Companies which activated only in provinces were also eliminated due to the difference in the level of selecting the projects and geographical scope.

In the meantime, some companies were semi-active or closed. They were also omitted in order to prevent their impacts on sample volume.

In the most recent ranking enounced by Iran President Deputy Strategic Planning and Control (IPDSPC) in spring 2008, the total number of these contractors is 426. The number is decreased to 245 by considering the limitation and eliminating semi-active and closed firms.

In this study the size of sample was determined using following formula:

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

Where:

n = sample size

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

N = Total population

V = Sampling standard error of sampling distribution = 0.05

S = The maximum standard deviation in the population elements (total error= 0.1 at a confidence level of 95%)

$$S^2 = P(1 - P) = 0.5 * 0.5 = 0.25$$

P = the population of population elements that belong to the defined class.

By locating figures, sample size is 71. It means that if we receive responses from 71 firms of total 245 ones, we can say that the results are plausible and we can attribute them to total statistical population.

Since this questionnaire is almost heavy, we assume that 35% of companies to which questionnaires are distributed would respond. Therefore, we should distribute questionnaires among 200 companies in order to achieve 71 responses.

## 5. Sample selection, questionnaire distribution

The sample should meet three conditions if it is going to be a proper representative (Nader Husni, 1990).

*1- Equal chance condition:* it means that every element in the population has the same chance of being selected. In order to satisfy this condition, the sample was randomly selected. To meet this condition namely to select 200 companies from 245 ones in a manner by which all companies would have equal chance, all contractors were divided into three groups based on the regions where their headquarters is located. Each group was given to a researcher and hw/she was asked to distribute questionnaires among 70 companies from total 80-85 firms. Those companies were eliminated whose respondent was not available to any reason (i.e. travel or mission). Thus, this condition was met automatically.

*2- Appropriateness condition:* it means that the selected sample should precisely reflect the characteristics of the whole population. This condition is true for contracting companies.

*3- Independence condition:* Although this is not a problem when the sample is randomly selected, but it should be emphasized that the selection of one subject is totally independent from the selection of other subject. This condition is also true due to separated nature of companies.

The questionnaire was distributed among senior managers, technical office managers, bid managers and other managers with enough experience on bids and was aware of organizational strategies.

## 6. Data collection and results

About 65% of questionnaires were delivered to respondents through personal and the remained was sent through email. Although enough explanations were mentioned in questionnaire's recipe, personal made respondent more committed to answer and made it possible to provide oral expounds on how to fill the questionnaire. Questionnaires were distributed and 75 ones were returned. 8 questionnaires were eliminated since it seemed that they are filled reluctantly and were not meet the recipe. 67 questionnaires were analyzed. It was a plausible quantity against predicted 71 questionnaires.

The results of questionnaires were gathered in an excel file and average statistical parameters, variance, standard deviation and changes ratio were used. Regarding a special method to score the questionnaire which aimed to adopt the ranks of all factors, some groups have more importance than others. A "Normalized average" criterion was used to put all factors in a similar measurement and to have a percentage-based measure. The formula to calculate this criterion was seen in equation (1).

$$\text{Normalized average} = (\text{factor average score} * 100) / \text{the group score to which the factor belongs} \quad (1)$$

Meanwhile, standard deviation statistical index which explains the concept of average standard deviation can cover the error of omitted data. Along with average, it can be a proper benchmark to distinguish the importance of factors. "Changes ratio" is the factor which considers both average and standard deviation. To make the comparison of scores simpler, a new index was used in this research. We called it "importance index" since it show the importance of factors compared to each other. It is defined as:

$$\text{IM} = \text{importance index} = \text{normalized average} / \text{changes ratio} \quad (2)$$

And

$$\text{CV} = \text{Changes ratio} = (\text{standard deviation} / \text{average}) * 100 \quad (3)$$

The results of calculation for these 76 factors are outlined and separated for each subgroup in table 1 to 11.

**Table 1: Affecting bid conditions related factors on bid/no bid decision and their scores**

Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average	Importance index
1	Contract type (DBB – EPC – DB, etc)	4.65	2.61	56.12	66.85	1.19
2	Bid type (open, limited, negotiated)	5.11	2.55	49.90	73.47	1.47
3	Bid type (one step and two steps)	2.48	2.24	90.39	35.64	0.39
4	Type of bid guarantees and their costs to participate in the bid	3.06	2.42	79.04	44.04	0.56
5	Tendering documents price	1.31	1.40	106.49	18.78	0.18
6	The costs of preparing detailed estimation and proposal	1.65	1.61	97.56	23.77	0.24
7	Existence or nonexistence of prices adjustment in the contract	4.17	2.67	63.96	60.02	0.94
8	The quality and completeness of the bid documents (drawings, specifications, etc.)*	0.00	0.00	0.00	0.00	0.00
9	Allowed duration for bid preparation (Deadline to submit proposals) being enough	4.11	1.96	47.69	59.11	1.24
10	Expire date of proposals mentioned in bid*	0.00	0.00	0.00	0.00	0.00
11	The penalty conditions for not being able to complete the project on time*	0.00	0.00	0.00	0.00	0.00
12	Time and season of tendering	1.95	1.75	89.57	28.02	0.31
13	The type of existing criteria in request for qualification docs (RFQ) in two-step bids	2.59	2.21	85.37	37.17	0.44
14	Type and number of competitors	5.01	2.36	47.06	71.96	1.53

15	Distrust to bid health and existence of rent and cross-legal factors in getting projects	5.47	2.63	48.16	78.64	1.63
16	Particular conditions of contract *	0.00	0.00	0.00	0.00	0.00
17	Forecasting the repayment of studying costs by contractors who have ranked 2 <sup>nd</sup> and 3 <sup>rd</sup> in bid (in DBB and EPC contracts)	2.53	2.01	79.60	36.39	0.46
18	Price preference and technical score importance (in DBB and EPC contracts)*	0.00	0.00	0.00	0.00	0.00
Subgroup 1 scores (bid conditions related factors)		6.96	2.16	31.06	100	3.22

\*Respondent had been asked to judge about the step that the bid docs have not been bought on the decision making time. Consequently, some factors will not have any effect on that time.

**Table 2: Affecting client related factors on bid/no bid decision and their scores**

Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average	Importance index
19	Client's characteristics (credit, reputation, open insight, honesty, technical know-how, managerial capability)	7.21	1.79	24.80	90.70	3.66
20	Cooperation background with client (or lack of it)	5.82	2.21	37.94	73.16	1.93
21	Client's financial capacity and well record in paying statements on time (decreasing the risks of capital investments)	7.53	1.52	20.25	94.69	4.68
22	The importance of the project for client	5.72	2.31	40.38	71.92	1.78
Subgroup 2 scores (client related factors)		7.95	1.44	18.14	100	5.51

**Table 3: Affecting consultant related factors on bid/no bid decision and their scores**

Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average	Importance index
23	Consultant's characteristics (credit, reputation, independence, authority, managerial capability, technical knowledge)	4.67	2.29	49.02	86.30	1.76
24	Cooperation background with consultant (or lack of it)	3.60	2.12	58.91	66.50	1.13
25	Existence or nonexistence of proper and qualified consultant for contribution (in EPC and DB contracts)	4.16	2.34	56.28	76.82	1.37
26	The possibility of changing consultant engineer during the project	2.81	2.16	76.76	52.00	0.68
Subgroup 2 scores (consultant related factors)		5.41	2.15	39.81	100	2.51

**Table 4: Affecting project specifications related factors on bid/no bid decision and their scores**

Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average	Importance index
27	Contract or project duration	4.16	2.34	56.18	64.67	1.15
28	Project location and geographical situation	5.28	2.25	42.53	82.05	1.93
29	Adequate and proper work space to execute the project (site conditions)	4.22	2.09	49.54	65.55	1.32
30	The culture of regional inhabitants	3.00	1.92	63.98	46.63	0.73
31	Project environmental issues	2.98	1.95	65.35	46.32	0.71
32	The number of challenger on project execution path	4.82	2.28	47.38	74.87	1.58
33	Project technical complexity and certain technology which should be utilized in construction	4.84	2.40	49.62	75.14	1.51
34	The rate of social and political sensitivity and its impact on project execution	4.41	2.33	52.78	68.50	1.30
35	The rate of need to special machineries and equipment and costs of their purchase or rent	4.71	2.35	49.81	73.12	1.47
36	Availability of required qualified labor within the region (especially in oversea projects)	4.44	2.13	48.03	68.98	1.44

37	The rate of need to foreign supply, procurement and purchase in the contract	4.43	2.40	54.14	68.73	1.27
38	Minimum needed technical acceptance grade (in DB and EPC contracts)	3.68	2.36	64.08	57.07	0.89
Subgroup 4 scores (project specifications related factors)		6.44	1.95	30.34	100	3.3

**Table 5: Affecting project monetary issues related factors on bid/no bid decision and their scores**

Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average	Importance index
39	Rate of project profit compared to the Amount of other profitable projects currently in progress within the market	6.23	1.72	27.63	82.64	2.98
40	Contract price or project size	6.75	2.06	30.60	89.23	2.92
41	The method of payments and its impact on cash flow and turnover	6.74	1.63	24.17	89.16	3.69
Subgroup 5 scores (project monetary issues related factors)		7.56	1.42	18.78	100	5.33

**Table 6: Affecting companies strategies related factors on bid/no bid decision and their scores**

Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average	Importance index
42	Project type and its homogeneity with predefined company's strategies, policies and vision	5.85	2.13	36.34	88.26	2.23
43	Public exposure (Project importance to acquire credit, prestige, ranking promotion, resume and future of the company and its impact on getting new markets and proper relations with project client)	5.42	2.23	21.06	81.79	1.99
44	Project share in creating a new experience for company	3.56	2.21	61.95	53.75	0.87
45	Senior managers' supports	4.99	2.13	42.64	75.33	1.77
46	A part of the work which can be outsource to contractors	3.30	2.19	66.42	49.77	0.75
Subgroup 6 scores (company's strategies related factors)		6.63	1.88	28.40	100	3.52

**Table 7: Affecting company's resources related factors on bid/no bid decision and their scores**

Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average	Importance index
47	Company's cash at the time of bidding	3.76	2.31	61.28	64.63	1.05
48	The existence of skilled and technical labor and the need to employ labor with certain specialties	4.55	2.23	48.91	78.35	1.60
49	Possessing enough number of qualified managerial staff	4.74	2.02	42.60	81.65	1.92
50	Having qualified materials and equipment suppliers	4.48	1.99	44.52	77.05	1.33
51	Having qualified subcontractors	4.05	2.13	52.49	69.74	1.33
Subgroup 7 scores (company's resources related factors)		5.81	2.13	36.57	100	2.74

**Table 8: Affecting projects' portfolio and correlation related factors on bid/no bid decision and their scores**

Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average	Importance index
52	Project geographical proximity to previous ongoing projects	4.78	2.06	43.04	77.40	1.80
53	concurrent deployment of resources (technical and managerial forces, labor, equipment, machineries)	5.06	1.99	39.40	81.88	2.08
54	Financing needed cash flow in order to inject the project via other projects of the company	3.35	2.12	63.49	54.13	0.85



55	The impact of project receivables on managing other projects of the company	3.63	1.90	52.47	58.70	1.12
56	Workload of technical office in time of price estimation	2.66	1.87	70.22	43.02	.061
57	Contractor's capacity and the need to a new project	5.41	2.06	38.05	87.60	2.30
58	Sameness of client or contractor with exiting and ongoing projects of the company	4.65	2.22	47.74	75.19	1.57
Subgroup 8 scores (projects' portfolio and correlation related factors)		6.18	1.87	30.29	100	3.3

**Table 9: Affecting interior conditions and rules related factors on bid/no bid decision and their scores**

Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average	Importance index
59	Disability in governmental laws, regulations and policies	4.67	2.27	48.65	89.19	1.83
60	Customs laws which may make problems in this project	3.78	2.17	57.42	72.04	1.25
61	The existence of some Cumbersome laws (labor laws, taking approvals and permissions, ...)	3.74	1.99	53.18	71.35	1.34
62	Government shifts (presidency elections)	3.26	2.30	70.43	62.30	0.88
63	Parliament shifts (Parliament elections)	2.02	1.86	92.01	38.61	0.42
Subgroup 9 scores (interior conditions and rules related factors)		5.25	2.18	41.60	100	2.41

**Table 10: Affecting international conditions and rules related factors on bid/no bid decision and their scores**

Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average	Importance index
64	International sanctions and their impacts on purchase, opening LC, procurements, importation and exportation of goods and machineries	4.39	2.26	51.51	78.74	1.53
65	Changes in oil global prices	2.97	2.03	68.39	53.29	0.78
66	Foreign partners to involve as a joint venture	3.69	2.14	57.91	66.31	1.15
67	Insurance laws and requirements and employing local and foreign forces (in overseas projects)	3.31	2.06	62.34	59.39	0.95
68	Customs laws on importing and exporting machineries in host country (in overseas projects)	3.70	2.25	60.88	66.45	1.09
69	Stability of political situations, monetary status and laws of host country (in overseas projects)	4.54	2.32	51.21	81.44	1.59
70	The relations between Iran and host country especially banking relations (in overseas projects)	4.48	2.25	50.34	80.39	1.60
Subgroup 10 scores (international conditions and rules related factors)		5.57	2.20	39.46	100	2.54

**Table 11: Affecting market -related factors on bid/no bid decision and their scores**

Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average	Importance index
71	Availability of project needed basic goods (i.e. cement and iron)	4.34	2.53	58.32	78.66	1.35
72	Availability of the required materials and equipment within the region	4.09	2.38	58.28	74.04	1.27
73	stability of foreign currency (exchange) rate	3.54	2.38	67.33	64.13	0.95
74	The currency by which the payments are done	3.03	2.53	83.39	54.90	0.66
75	Changes in inflation and interest rate	3.49	2.46	70.66	63.19	0.89
76	The existence of work in the market and the possibility of work existence in future	4.27	2.39	56.05	7.38	1.38
Subgroup 11 scores (market related factors)		5.52	2.40	43.47	100	2.30

## 7. Selecting the most important factors on the basis and Pareto's law and normalized average

Based on Pareto's law, in most cases, 20% of reasons have 80% impact. Here, we distinguished factors with more than 80% impact. According to Pareto's law, we expect that they form 20% of total factors. Table 2 outlines the most important factors in terms of importance.

**Table 2: the most important affecting factors on bid/no bid decision according to Pareto's law**

Row	Factor No.	Factor	Average	Standard deviation	Changes ratio	Normalized average
1	21	Client's financial capacity and well record in paying statements on time (decreasing the risks of capital investments)	7.21	1.79	20.25	94.69
2	19	Client's characteristics (credit, reputation, open insight, honesty, technical know-how, managerial capability)	7.53	1.52	24.80	90.70
3	40	Contract price or project size	6.75	2.06	30.60	89.23
4	59	Disability in governmental laws, regulations and policies	4.67	2.27	48.65	89.19
5	41	The method of payments and its impact on cash flow and turnover	6.74	1.63	24.17	89.16
6	42	Project type and its homogeneity with predefined company's strategies, policies and vision	5.85	2.13	36.34	88.26
7	57	Contactors capacity and the need to a new project	5.41	2.06	38.05	87.60
8	23	Project technical complexity and certain technology which should be utilized in construction	4.67	2.29	49.02	86.30
9	39	Adequate and proper work space to execute the project (site conditions)	6.23	1.72	27.63	82.46
10	28	Minimum needed technical acceptance grade (in DB and EPC contracts)	5.28	2.25	42.53	82.05
11	53	concurrent deployment of resources (technical and managerial forces, labor, equipment, machineries)	5.06	1.99	39.40	81.88
12	43	Public exposure (Project importance to acquire credit, prestige, ranking promotion, resume and future of the company and its impact on getting new markets and proper relations with project client)	5.42	2.23	41.06	81.79
13	49	Possessing enough number of qualified managerial staff	2.02	4.74	42.60	81.65
14	69	Stability of political situations, monetary status and laws of host country (in overseas projects)	4.54	2.32	51.21	81.44
15	70	The relations between Iran and host country especially banking relations (in overseas projects)	4.48	2.25	50.34	80.39

It is observed that the total number of factors with more than 80% impact is 15 which consists 20% of total factors. Therefore, we can say that Pareto's law is fully true.

## 8. Conclusion

In the present study, it is attempted that by using elites' collective wisdom, a suitable method was devised to identify affecting factors on bid/no bid and then, these factors and their weights and importance were identified in relation to each other for large contracting firms. In the meantime, the most important factors were introduced by using Pareto's law. Application of Pareto's law in this research can be a test to validate its findings.

By looking at conducted research, one can find that identifying such factors is the most important and fundamental step to develop models which guide contractors on appropriate and strategic decision-making. In practice, a contractor makes bid/no bid decision only after a mental and complicated rational procedure. Considering this fact, present research has clarified various affecting factors on decisions from a perspective which allows decision-maker to enter the heart of decision-making procedure profoundly. Therefore, introducing such factors can alone help the clarification of complicated drawn picture in relation with the bid decision in a project.

In the meantime, this research shows that contractor-related factor play the most important role in large contractors' decision-making. Therefore, the second conclusion is that commitments, vision, collaboration and accompany of employers or their representatives (i.e. advisor) with contractor can lead into mutual satisfaction and finally into project success.

In next research, one can investigate affecting factors on the second bid decision namely to provide proposed prices. Also, one can develop elite models to help contractors based on the findings of this research.

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