

Market and Project Selection Decisions of Construction Companies: Evidence from Turkish Contractors

Gul Polat¹, Murat Alp Arslan²

¹*Department of Civil Engineering, Istanbul Technical University, Maslak, 34469, Istanbul, Turkey*

²*Department of Civil Engineering, Istanbul Technical University, Maslak, 34469, Istanbul, Turkey*

ABSTRACT

Globalization of the world economy has made borders between the countries less important and thereby brought about unified markets. Construction industry is not different from other industries when it comes to the globalization and unification of markets. Entering into new markets and undertaking international projects promise several benefits such as increase in the business volume, profits, market share, etc. Turkish contractors have also been actively operating in international markets since the 1970s. They have completed more than 5,100 projects with a total value of USD 155 billion in 81 different countries until now. Undoubtedly, this success is highly subject to the extent to which they make sound decisions on market and project selection. This study aims to investigate the main attributes that may affect Turkish contractors' decisions on market and project selection. Review of the literature indicated that there are 57 attributes that may likely affect market and project selection decisions of contractors. These attributes were categorized into 4 main groups, namely; contractor-related attributes, country-related attributes, project-related attributes, and owner-related attributes. A questionnaire consisting of 62 questions was designed and conducted among 71 Turkish contractors in order to identify the most contributing attributes. Reliability analysis was carried out to test the internal consistency of the questionnaire and factor analysis was conducted to identify the most contributing factors. Reliability analysis results indicated that seven attributes should be deleted to increase the internal consistency of the questionnaire and factor analysis results revealed that the remaining 50 attributes could be described by 11 factors.

INTRODUCTION

Demand for construction projects has been constantly increasing all around the world due to growing populations, aging infrastructures, emerging new industries, etc. In addition to the urgent need for great construction investments, entering into the construction industry is relatively easy when compared to other industries [1-3]. Given these facts, construction industry appeals to numerous entrepreneurs, thus construction industry is getting more crowded, competitive and complex every day. While the number of construction companies has been steadily increasing, the business volume stays limited, especially in domestic markets. Therefore, construction companies constantly seek ways to enter into new markets and undertake international projects so that they can increase their sales, profits, and market share [4].

Turkish contractors are not different from their foreign counterparts when it comes to globalization. Indeed, they have been operating in foreign countries since the 1970s and they

should select the most viable markets and projects in order to survive in such a competitive business environment [5].

Market and project selection is an important part of a strategic plan of a construction company. Numerous attributes may affect market and project selection decisions of a construction company. After an extensive literature review 57 critical attributes were identified. These attributes were categorized into 4 main groups, which are; 1) contractor-related attributes (13 attributes), 2) country-related attributes (24 attributes), 3) project-related attributes (16 attributes), and 4) owner-related attributes (4 attributes). A questionnaire that consists of 62 questions was designed using information gathered from the literature review and carried out among 71 Turkish contractors in order to identify the importance levels of these attributes on their market and project selection decisions.

TURKISH CONTRACTORS IN INTERNATIONAL CONSTRUCTION MARKET

The construction industry is one of the locomotive industries in the Turkish economy. It constituted nearly 5.9% of gross domestic production (GDP) of Turkey in 2008. According to official figures, there are more than 100,000 contractors registered with the Ministry of Public Works and Settlement in Turkey. However, this number goes up to 200,000 considering unregistered companies [6].

Since the competition is intense and the business volume is limited in the domestic market, Turkish contractors operate in international markets including the Commonwealth of Independent States, Africa, the Middle East, Europe, Asia, etc. [6]. Turkish construction companies have been doing business in international markets since the 1970s. Although they were participating in small-scaled projects as subcontractors in the beginning, they are now undertaking prestigious large-scaled projects as prime contractors.

Until now, Turkish contractors have won more than 5,100 projects with a total value of USD 155 billion in 81 different countries [7]. This success brought about that Turkish contractors have ranked 2nd in 2009 in the Engineering News Record's (ENR) Top 225 International Contractors list.

RESEARCH METHODOLOGY

The research methodology of this study mainly involves 4 phases, which are:

- (1) Reviewing the literature on international construction in order to identify the attributes that may affect market and project selection decisions of construction companies,
- (2) Designing a questionnaire, which consists of 62 questions, using the information gathered from the literature review,
- (3) Carrying out the questionnaire survey among 71 Turkish contractors that predominantly operate in international construction markets,
- (4) Performing reliability analysis in order to test the internal consistency of the questionnaire and factor analysis to identify the most contributing attributes.

Research Background

Review of the relevant literature [5, 8-13] indicated that there are 57 critical attributes that may likely affect market and project selection decisions of construction companies. These attributes were categorized into 4 main groups, namely; 1) contractor-related attributes (13 attributes), 2) country-related attributes (24 attributes), 3) project-related attributes (16 attributes), and 4) owner-related attributes (4 attributes). The details of these attributes are presented in Table 1.

Questionnaire Design

Having identified the attributes that may affect market and project selection decisions, a questionnaire was designed. The questionnaire mainly consisted of two sections. The first section included 5 questions, which inquired about the context of the respondent company. These questions were meant to explore experience of the company in the construction industry, number of employees, total turnover in domestic and international markets in the last 5 years, and the regions in which they predominantly operate. The second section comprised 57 questions that inquired about the importance level of the attributes affecting market and project selection decisions using a scale of 1-10, where “1” represents the least importance and “10” represents the highest importance.

Data Analysis Methods

Reliability analysis is a method used for determining the reliability of the questionnaire. It tests the internal consistency of the questions. Cronbach’s alpha (α) is one of the most commonly used measures of scale reliability [14]. The scale can be considered to be reliable if Cronbach’s alpha value is higher than 0.60 [15]. In this study, reliability analysis was carried out using Statistical Package for the Social Sciences (SPSS).

Having conducted reliability analysis, factor analysis was carried out. Factor analysis is a method for reducing the number of parameters in a data set. It can be used to determine whether a larger number of observed variables (i.e., 57 attributes) can be explained by a smaller number of calculated variables called factors [16]. In this study, factor analysis was conducted using SPSS statistical package on the survey results, which were formerly used by Polat and Arslan (2010) [17], in order to see whether 57 attributes that may affect market and project selection decisions of Turkish contractors could be explained by fewer factors. The interpretability of the extracted factors was improved through rotation. The loading of each variable is maximized through rotation. Since these factors are independent, an orthogonal rotation was conducted. Factor loadings are the basis for imputing a label to the factors. Loadings above 0.6 are usually considered “high” and those below 0.4 “low” [14].

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Barlett’s test of sphericity were also considered when interpreting factor analysis results. The KMO static varies between 0 and 1. While a value of 0 indicates that the sum of partial correlations is large relative to the sum of correlations, a value of 1 indicates that patterns of correlations are relatively compact. Generally, values above 0.5 are considered to be acceptable. Values between 0.5 and 0.7 are mediocre, values between 0.7 and 0.8 are good, values between 0.8 and 0.9 are very good and values above 0.9 are excellent. Barlett’s measure tests the null hypothesis that the original correlation matrix is an identity matrix. If significance value of Barlett’s test is significant (sig. < 0.05), then the null hypothesis is rejected and it can be understood that factor analysis is appropriate [14].

FINDINGS AND DISCUSSION

Sample Characteristics

Questionnaires were sent to the randomly selected 100 contractors, which are registered to Turkish Contractors Association (TCA) and predominantly operate in international construction markets, and 58 contractors returned duly completed questionnaires. In addition to these 58 contractors, 13 large-scaled contractors that carry out projects in the international

construction markets were also surveyed. Out of 113 contractors, 71 returned duly completed questionnaires. This corresponds to a response rate of 63%.

Based on the survey results, 50% of the respondent contractors had more than 30 years of experience, 44% of them had more than 10 years of experience, and 6% of them had more than 5 years of experience in the construction industry. While 42% of the respondent contractors employed less than 100 workers, 34% of them employed 100-500 workers and 24% of them employed more than 500 workers. 23% of the respondent companies completed projects with a value of more than \$500 million in Turkey and 31% of the contractors completed projects, whose contract values are less than \$50 million in the last five years. 27% of the respondent companies undertook international projects worth more than \$500 million and 22% of the contractors completed projects with a value of less than \$50 million in the last 5 years. 71% of the respondent contractors operated in CIS countries, 65% in Middle East countries, 56% in African countries, 44% in Asian countries, and 38% in European countries.

Survey Results

First, Cronbach's alpha values were calculated to determine the extent to which the items (i.e., 57 attributes) in the questionnaire are related to each other using SPSS 16.0. In the country-related attributes, when 2 attributes (i.e., cultural and religious differences and experience of the contractor in the host country) were deleted, Cronbach's alpha value increases to 0.93. In the project-related attributes, the value of Cronbach's alpha goes up to 0.91 in the case that 3 attributes (i.e., profitability of the project, bidding risks, and entry mode options, availability of partnership) were deleted. In the owner-related attributes, Cronbach's alpha was lower than 0.6 when 4 attributes were included in the analysis but it became 0.73 when 2 attributes (i.e., type of the owner and financial strength of the owner) were deleted. As seen in Table 1, since all Cronbach's alpha values are greater than 0.6, the internal consistency of these attributes in the scale can be considered to be high.

Second, factor analysis was performed. Factor analysis results revealed that 13 contractor-related attributes could be explained by 2 factors that represent 57% of the total variance, 22 country-related attributes could be explained by 5 factors that represent 68% of the total variance, 13 project-related attributes could be explained by 3 factors that represent 69% of the total variance, and 2 owner-related attributes could be explained by 1 factor that explains 77% of the total variance.

Table 1. Attributes Affecting Market and Project Selection Decisions of Contractors

Attributes Affecting Market and Project Selection Decisions	Mean	Factor Loadings				
		1	2	3	4	5
Contractor-related attributes						
<i>(Cronbach's α: 0.87; KMO: 0.79; Barlett's test: 0.000)</i>						
Contractor's managerial skills	8.58	0.785				
Contractor's experience in similar projects	8.21	0.662				
Number of experienced and qualified staff in the company	8.14	0.813				
Need for balanced market portfolio	7.65	0.688				
Number of the existing projects	7.34	0.639				
Assets of the contractor	7.23	0.733				
Contractor's technology level	7.23	0.842				
Resources that the contractor possess	7.04	0.762				
Liabilities of the contractor	6.92	0.730				
Contractor's need to expand into new markets	7.77	0.658				
Relationships with key employers	7.55		0.737			

Relationships with authorities in the potential host countries	7.45	0.926				
Relationships with authorities in the host countries in which contractor has already operated	7.38	0.875				
	% of variance	35.689	21.106			
	Cumulative %	35.689	56.795			
Country-related attributes						
<i>(Cronbach's α: 0.93; KMO: 0.82; Barlett's test: 0.000)</i>						
Money transfer policies	7.96	0.746				
More work opportunities in the host country in the long term	7.46	0.745				
Banking system of the host country	7.28	0.846				
Trade agreements between the host country and Turkey	7.10	0.651				
Structural coding systems	7.03	0.608				
The government's environmental protection policy	6.61	0.620				
The government's health, safety and environment policy	6.28	0.651				
Availability of transparent and fair procurement process	8.03		0.674			
Local politics in the host country	7.89		0.817			
Functionality of the laws and regulations	7.70		0.703			
Relationships between the host country and Turkey	7.27		0.654			
Bribery	7.23		0.621			
Regime of the host country	6.76		0.701			
Privatization level in the host country	5.20		0.635			
Bureaucratic procedures	7.62		0.682			
Economical condition of the host country	7.32			0.718		
Currency used in the host country	5.73			0.638		
The host country's fiscal reserves	6.37			0.831		
Tax policy prevailing in the host country	7.62			0.752		
Fluctuations in labour and material prices	8.13			0.644		
Availability of local suppliers and/or subcontractors in the host country	6.83				0.864	
Competition level in the construction sector of the host country	8.27					0.816
Cultural and religious differences (deleted)	-					
Experience of the contractor in the host country (deleted)	-					
	% of variance	18.470	17.498	14.023	9.804	8.014
	Cumulative %	18.470	35.968	49.992	59.796	67.810
Project-related attributes						
<i>(Cronbach's α: 0.91; KMO: 0.83; Barlett's test: 0.000)</i>						
Geographical position of the project	7.59	0.733				
Mobilization and management of the facilities	7.14	0.601				
Availability of required technology	7.04	0.634				
Design complexities	7.30	0.787				
Weather conditions	6.46	0.778				
Contract type of the project	7.92		0.861			
Potential contractual disputes	8.03		0.742			
Project type	7.70		0.746			
Scope of the project	7.49		0.684			
Constructability issues	7.76		0.625			
Specific health and safety procedures that need to be followed	7.21			0.856		
Specific quality requirements of the project	7.32			0.714		

Prestige of the project	8.51			0.795
Profitability of the project (deleted)	-			
Bidding risks (deleted)	-			
Entry mode options, availability of partnership (deleted)	-			
	% of variance	25.356	22.001	21.778
	Cumulative %	25.356	47.357	69.134
Owner-related attributes				
<i>(Cronbach's α: 0.73; KMO: 0.50; Barlett's test: 0.000)</i>				
Owner's managerial skills	7.99	0.671		
Experience of the owner in construction projects	6.85	0.671		
Type of the owner (deleted)	-			
Financial strength of the owner (deleted)	-			
	% of variance	76.703		
	Cumulative %	76.703		

Contractor-related Attributes

Factor 1: Current position of contractor in the sector

This factor includes contractor's managerial skills, experience in similar projects, number of experienced and qualified staff, need for balanced market portfolio, number of the existing projects, assets of the contractors, technology level, possessed resources, liabilities of the contractor, and need to expand into new markets.

Factor 2: Relationships of contractor

This factor refers to the relationships of contractor with key employers and authorities in the host countries.

Country-related Attributes

Factor 1: Laws, Regulations and Policies Prevailing in the Host Country

This factor includes money transfer policies, more work opportunities in the host country in the long term, banking system of the host country, trade agreements between the host country and Turkey, structural coding systems, the government's environmental protection policy, and the government's health, safety and environment policy.

Factor 2: Political Issues Prevailing in the Host Country

This factor encompasses availability of transparent and fair procurement process, local politics in the host country, functionality of the laws and regulations, relationships between the host country and Turkey, bribery, regime of the host country, privatization level in the host country, and bureaucratic procedures.

Factor 3: Monetary Issues Prevailing in the Host Country

This factor refers to economical condition of the host country, currency used in the host country, the host country's fiscal reserves, tax policy prevailing in the host country, and fluctuations in labor and material prices.

Factor 4: Availability of Necessary Resources in the Host Country

This factor includes availability of local suppliers and/or subcontractors in the host country.

Factor 5: Competition Level in the Host Country

This factor signifies competition level in the construction sector of the host country.

Project-related Attributes

Factor 1: Implementation Issues

This factor includes geographical position of the project, mobilization and management of the facilities, availability of required technology, design complexities, and weather conditions.

Factor 2: Technical and Contractual Issues

This factor refers to contract type of the project, potential contractual disputes, unfamiliarity with the project type, scope of the project, and constructability issues.

Factor 3: Specific Requirements of the Project

This factor signifies specific health and safety procedures that need to be followed, specific quality requirements of the project, and prestige of the project.

Owner-related Attributes

Factor 1: Competence of the Owner

This factor refers to owner's managerial skills and experience of the owner in construction projects.

CONCLUSIONS

Operating in international construction markets is much riskier than doing business in domestic markets. Therefore, construction companies need to make rational and sound decisions before selecting the markets they consider to enter into and the projects they tend to bid for. An extensive literature review indicated that there are 57 critical attributes that may affect market and project selection decisions of construction contracting companies. These attributes were categorized into 4 main groups, namely; 1) contractor-related attributes (13 attributes), 2) country-related attributes (24 attributes), 3) project-related attributes (16 attributes), and 4) owner-related attributes (4 attributes). Using this information, a questionnaire was designed and data from 71 Turkish contractors were collected. Reliability and factor analyses were performed via SPSS statistical package on those data. The results of reliability analysis indicated that 2 country-related attributes, 3 project-related attributes, and 2 owner-related attributes should be deleted in order to improve the reliability of the scale. According to factor analysis results, the remaining 50 attributes could be described by 11 factors and those factors adequately represent their corresponding main attributes.

The findings of this study can be used to establish a framework for future studies that aim to model international expansion decisions of contractors based on the risk levels of markets and projects in question using quantitative techniques such as fuzzy logic, analytic network process, artificial neural networks, etc.

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