

Uncertain Supply Chain Management

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Which contractor selection methodology?

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CHRONICLE

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ABSTRACT

Contractor selection plays essential role on development of business industries and any selection strategy is normally involved with various factors. This paper presents an empirical investigation to determine important factors influencing contractor selection to increase profitability. The proposed model of this paper is implemented for an Iranian constructor firm named Kayson Company located in city of Tehran, Iran. The study has been accomplished among top managers who worked for this firm. Using structural equation modeling, the study determines that five factors including performance, believes, flexibility, quality, price and services influence on profitability when a contractor is to be chosen.

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1. Introduction

Industrial awareness of the requirement for judicious construction contractor selection has attracted tremendous increase. Many studies of this client procurement decision have more been expanded upon; specifically, by work accomplished in the USA and UK. Other countries are addressing the issue and procurement research abounds. Holt (1998) reported increased activity by presenting a review of contractor assessment and selection modelling methodologies including Bespoke approaches, Multi-attribute analysis, Multi-attribute utility theory. Fong and Choi (2000) examined an alternative contractor selection technique named the analytical hierarchy process (AHP) (Saaty, 1988, 1990), which would help construction clients to determine contractors with the best potential to deliver satisfactory results in a final contractor selection process, which is not primarily based on the lowest prices. Their AHP included three parts: hierarchic structure, prioritization procedure, and calculation of computations. They examined the model by a hypothetical scenario where three contractor candidates were assessed. They provided criteria for contractor selection in the model and the significance of each criterion has been reached at by executing a questionnaire survey in public firms in Hong Kong. Comparisons were built by ranking the aggregate scores of each candidate in terms of their performance against each of the criteria, and the candidate associated with the highest scores was the best contractor on this occasion.

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Jharkharia and Shankar (2007) presented a technique for the selection of a logistic service provider, which consisted of two parts: (i) preliminary screening of the available providers, and (ii) analytic network process (ANP)-based final selection (Saaty, 2004, 2005). The criteria, which were relevant in the selection of a provider, were identified and applied to they were build an ANP model. According to Cheng and Li (2004), contractor selection is one of the most important clients' activities and requires an appropriate technique to measure the effects of various factors influencing on the performance of the project. The multi-criteria decision-making (MCDM) such as AHP or ANP techniques is a common method for contractor selection.

Contractor selection is a complicated process to ensure the success of construction projects. Yawei et al. (2005) proposed a Multiple-layer Fuzzy Pattern Recognition (MFPR) method to solve contractor selection problem. They used the paired comparison method to decide relative membership degrees of qualitative criteria as well as weights of the criteria set by integrating judgments, experience and preferences of decision-makers. They applied their method for a case study for a channel construction project to show the feasibility of their method. Their findings clearly indicated that the methods could successfully harmonize various opinions and reach a group consensus.

2. The proposed study

This paper presents an empirical investigation to determine important factors influencing contractor selection to increase profitability. The proposed model of this paper is implemented for an Iranian constructor firm named Kayson Company located in city of Tehran, Iran. The study has been accomplished among top managers who work for this firm. The study first uses a Delphi technique to gather important factors influencing on profitability of firm when a contractor is to be selected. The proposed study of this paper repeats the process of Delphi technique three times and finally ends up having limited number of factors summarized in Table 1 as follows,

Table 1

The summary of factors influencing profitability during the procedure of contractor selection

Factor	Cronbach alpha	Criteria
Quality (Q)	0.95	Quality of online information
		Quality of online payments
		Quality of product
		Quality of workflow information
		Quality of ordering process
Cost (C)	0.96	Cost of product
		Transportation cost
Delivery (Del)	0.95	Amount of delay in due date
		On time delivery
Services (Serv)	0.95	Responsiveness
		Customer support
		Ability to access to information
		Online delivery service supports
Flexibility (Flex)	-	Reaction to change on demand
		Website security
Trust (Tru)	0.90	Reliability
		Assurance
		Honesty, fidelity and loyalty
		Electronic transaction
Past performance (Per)	0.85	E-business capability
Financial (Finance)	-	Financial
Equipment (Equi)	-	Production facilities
Location (Loca)	-	Location

As we can observe from Table 1, all Cronbach alphas are within acceptable limits. The study uses structural equation modeling to examine the effects of all these factors on improving profitability. Table 2 demonstrates the summary of correlations among various components of the survey.

Table 2
The summary of correlation between different components

	Flex	Tru	Per	Finance	Equi	Loca	Serv	Del	C	Q	Sale
Flex	1										
Tru	0.84	0.88									
Per	0.85	0.82	0.93								
Finance	0.5	0.42	0.45	1							
Equi	0.85	0.82	0.84	0.48	1						
Loca	0.24	0.22	0.19	0.56	0.22	1					
Serv	0.93	0.72	0.74	0.47	0.86	0.21	0.93				
Del	0.93	0.83	0.83	0.47	0.84	0.21	0.74	0.94			
C	-0.97	-0.86	-0.87	-0.48	-0.88	-0.23	-0.87	-0.85	0.98		
Q	0.86	0.86	0.87	0.45	0.87	0.2	0.78	0.75	-0.88	0.92	
Sale	0.87	0.67	0.81	0.46	0.86	0.18	0.88	0.85	-0.98	0.89	0.93

As we can observe from the results of Table 2, there are some positive and meaningful relationships among nearly all components of the survey when the level of significance is five percent. Next, we present details of the implementation of structural equation modeling.

3. The results

In this section, we present details of our findings on the effects of various factors on profitability when a supplier is chosen. Table 3 shows details of some basic statistics for the SEM implementation.

Table 3
Fit indexes of model

Index	P_value	χ^2/df	RMSEA	CFI	NFI	NNFI	GFI	IFI	RMR
Acceptable Value	< 0.05	< 5	< 0.1	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	< 0.05
Value	0.00	1.47	0.044	0.99	0.97	0.99	0.92	0.99	0.030

As we can observe from the results of Table 3, all components are within acceptable levels, which verify the overall survey. Fig. 1 demonstrates the summary of the final model.

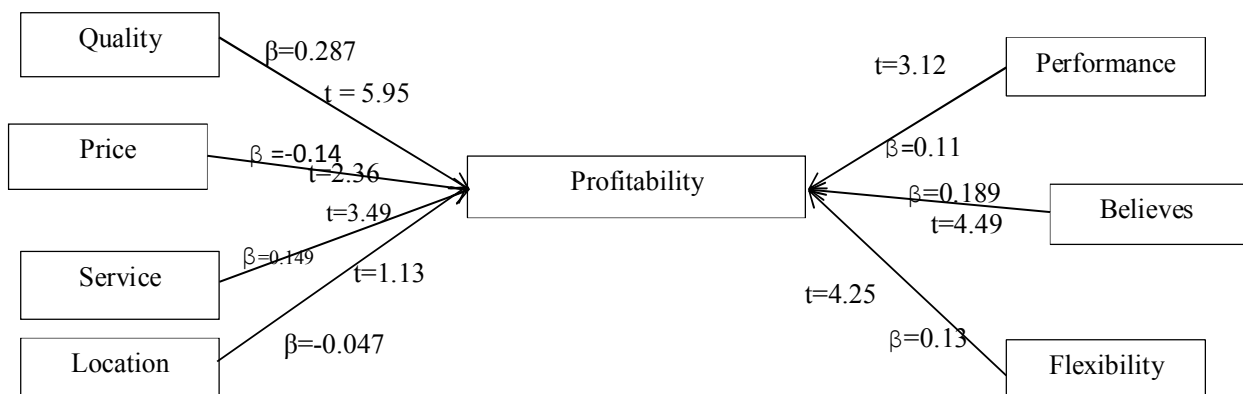


Fig. 1. The results of the implementation of structural equation modeling

4. Discussion and conclusion

As we can observe from the results of Fig. 1, the effects of quality, price, service, performance, believes and flexibility on increasing the profitability have been approved. However, the effect of location has not been confirmed. In addition, while price maintains a negative impact on profitability, other components have had positive impacts on profitability. In other words, an increase on quality helps contractors provide better services, which reduces unexpected expenditures and increases profitability. In addition, quality seems to have the highest impact compared with other influential factors followed by contractors' believes and service. The results of our study are consistent with findings reported by Hilt (1998).

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