MODELING CONSTRUCTION ORGANIZATION PERFORMANCE IN POST-CONFLICT ENVIRONMENT

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In the field of the construction industry, research work has widely focused on identifying Key performance indicators and critical success factors without assessing the impact of conflict environment factors. This study focusses on the impact of post-conflict environment factors on local construction organization performance. This paper presents a framework for improving construction organization performance in a post-conflict environment. The proposed framework consists of four stages: identify post-conflict environment impacting factors, determine critical success factors (CSFs), determine key performance indicators (KPIs), and adopt the best strategy to improve performance. Analytical hierarchy process (AHP) and multiple linear regression (MLR) modeling has been used to analyze quantitative and qualitative variables obtained from the literature and expert opinion through comprehensive literature search, meetings, and survey to determine critical success factors and to identify performance improvement strategy. The study finding suggests that twenty factors from the questioner have a critical impact on the identified five performance measures. The presented CSFs helps the organization management team to consider the impact of these factors on their firm and to formulate a competitive strategy in a post-conflict environment.

Keywords: Performance improvement framework, Critical success factors (CSFs), Key performance indicators (KPIs), Analytical hierarchy process (AHP), Multiple linear regression analysis (MLR).

1 INTRODUCTION

Environmental uncertainty and constraints have the potential to impact any organization performance (Grewal and Tansuhaj 2001). The external environment provides the organizations with the inputs which impact the internal process of an organization where the external environment impacting factors are not in direct control of organization management team (Farmer and Richman 1964, Schein 1965). The external environment is a source of constraints, opportunities, and uncertainties, which affect the organization performance with respect to its business form (Bourgeois 1980). The Cambridge Business Dictionary (2017) define the external environment as" the conditions and events outside a company that affects the way its operations." Lee and Choi (2003), and Elenkov (2002) describe organization performance the degree to which the organization attained its business objectives. Therefore, organization success and failure are profoundly impacted by the external environment.

Construction organization performance assessment and measurement have received significant attention in recent years to meet the construction industry challenges and competency. Many researchers have developed performance prediction models and methodologies to help construction organization to achieve profit and success in the market. For instance, Horta *et al.*

(2009) studied Portuguese companies to develop a framework to assess construction organization performance, Elwakil *et al.* (2009) have determined 18 CSFs for the organization performance assessment in developed and developing countries such as the USA, Canada, and Egypt. Chan and Chan (2004) has studied construction companies in Hong-Kong to develop a set of key performance indicators for the construction industry success. And, Abraham (2003) has studied top 400 U.S. companies to identify the critical success factors methodology to enhance construction organization success. However, questions can be probed that are these all performance frameworks and critical success factors applicable to a different environment? Likewise, are these identified factors have the same impact in another environment on the organizational performance, for instance, what would be the impact of these developed success strategies on organizations performance in the post-conflict environment? The post-conflict countries environment is significantly different from the developed countries or developing countries environment.

Post-conflict countries are that have suffered from the civil war or other internal conflicts which must embark for reconstruction and economic recovery, and on social and political reforms to provide the foundation for peace and democracy (Del Castillo 2001). There is a high level of uncertainty, various constraints, and some unstable opportunities in the post-conflict environment (Haughton 1998). In addition to the political and security instability, there are ubiquitous features of the post-conflict environment economies which differentiates it from the non-conflict environment. For example, some of the post-conflict environment features are as: poor infrastructure, high inflation, weak financial system, small abnormal industry sector, undermined institutions, and as well as there are: financial support from donors and the diaspora pool for the country development (Haughton 1998). Thus, all these features resulting in numerous critical factors that impact organizational success and failure. It also makes the organizational management team perceive performance indicator differently in such an environment than the non-conflict environment.

On the other hand, there is limited research has been done to model construction organization performance in a post-conflict environment. Consequently, there is an essential need to develop a framework to be able to determine (CSFs) and key performance indicators (KPIs) for construction organization and to identify performance improvement strategy in a post-conflict environment such as Afghanistan.

2   METHODOLOGY

Organization profit and success are based on the impact of many factors. Identifying and determining these critical impacting factors help organizations to concentrate on the areas of performance that needs improvement (Elwakil *et al.* 2009). From a comprehensive literature review, total twenty-nine post-conflict environment impacting factors were identified, and five performance KPIs were determined by balanced scorecard model (BSC) the survey questioner research method is applied to collect the data for this study. The survey questioners were sent to 500 construction companies which were selected randomly from the list of 20013 registered companies with The Afghanistan Investment Support-Agency (AISA) in all over the country from 2001 to August 2016. Most of these registered companies are headquartered in Afghanistan big cities, Kabul, Kandahar, Jalal-Abad, Herat, and Balkh. A total of 51 filled survey questionnaires were received from those distributed.

In this study, organization performance was analyzed using post-conflict environment impacting factors as the independent variables and using performance indicators as dependent variables to determine critical success factors and develop performance improvement strategy.

Critical success factors are important to know to improve organizational effectiveness and efficiency. Organizations must understand critical success factors and its impact on the different divisions of an organization to achieve long-term success, (Kaplan and Norton 1995). CSFs apply to any organization operating in an industry (Rockart 1979). Also, Rockart, (1979) defines the critical success factors (CSFs) as "the critical success factors are areas of performance that should receive constant and careful attention from management."

Similarly, understanding what parameter or key performance indicator (KPIs) must be monitored and gauged is crucial, since, the KPIs are general indicators of performance concentrating on output or outcome (Collin 2002). The KPI working group (2000) describes KPIs as the enabler of measurement of the construction project and organizational performance. Therefore, it is essential to know what metrics or KPIs to be selected to analyze and evaluate the impact of CSFs on it. In this study five essential KPIs were shortlisted in the survey questioner, the participants made the KPIs pairwise comparison and rated them by Likert five-degree scale, and also the participants ranked the impact of twenty-nine shortlisted post-conflict impacting factors on these indicators by the seven-degree Likert scale.

To analyze the obtained data, Analytic hierarchy process (AHP) decision-making technic is applied to weight the selected KPIs. Saaty (2008) describes the Analytic hierarchy process (AHP) a non-complicated tool for human decision making. Also, AHP is a fixable multi-criteria decision-making process which can be easily integrated with other modeling technics such as multiple linear regression, fuzzy logic, artificial neural network and others (Elwakil 2017). Consistency index (CI) and consistency ratio (CR) were calculated to verify the validity of KPIs in a pairwise comparison. The multiple linear regression (MLR) modeling technics is used to determine the impact of critical success factors on the KPIs and to develop an organizational performance prediction model. The MLR can determine that how well the impacting factors work together to predict construction organization performance (the best set of CSF) and in the same time the MLR technic makes it possible to determine which factors contribute more to predict construction organization performance (CSFs). The t-test was run to evaluate the result significance. And also, the validly of the developed model was checked through 10% of the test data.

3   ANALYSIS OF THE RESULTS

3.1   Analytical Hierarchy Process (AHP)

The AHP technic is applied to this study to determine the weights of the KPIs measures. The Table 1 presents the weights for the pairwise compared KPIs from the survey questioner. The determined KPIs measures are:

- Average cost predictability per project (R_C)
- Average time predictability per project (R_T)
- The volume of annual work growth (R_W)
- Contractor satisfaction (R_S)
- Annual growth in the number of biding projects (R_B)

The consistency analysis for this study shows that the consistency index is CI = 0.000132< 0.1 which mean there are logical consistency and reliability between the compared measures. The weighted measure is used as a coefficient of each developed model predicting factors to determine the final set of critical success factors for the construction organization performance.

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3.2 Multiple Leaner Regression Model (MLR)

Regression analysis is performed to determine CSFs and to develop a performance prediction model. The predicting factors in each model are selected according to the best subset of performance prediction model presented in the Table 1.

Table 1. Performance prediction model for each individual measure.

Weighted value of KPI measure	KPI	0.282	0.074	0.335	0.234	0.074
Discerption of impacting factors	Factor	Time predictability	Bid growth	Cost predictability	Work growth	Contractor satisfaction
Anticompetitive behavior	X1		X	X	X	
Monitory uncertainty	X2	X	X	X		X
Not being paid	X3			X		X
Lack of regulatory policy	X4		X			X
Project & warranty failure (instability)	X5	X		X	X	X
Corruption	X6			X	X	X
Theft and crime	X7	X		X	X	X
Overall security -conflict	X8		X	X		
Lack of access to finance (banking)	X9		X	X	X	
Tax-admins, the tax rate	X10		X			X
Lack of legal & judicial system	X11	X			X	
Lack of skilled & educated workforce	X12	X			X	
Lack of access to land	X13		X			
Poor-infrastructure	X14	X			X	X
Government financial aid dependency	X15		X	X	X	X
Lack of internet and technology	X16		X	X		X
Market structure & competition	X17	X	X			X
International financial support	X18		X		X	
Local expenditure of international agencies	X19	X		X	X	X
Government & nongovernment training	X20	X				X
Government invest support	X21					
Lack of construction materials availability	X22	X	X	X		X
Lack of admins technical capabilities	X23	X	X	X		X
Bureaucratic process	X24	X		X		X
International co-investment	X25	X				
Diaspora investment and tech support	X26		X			
Uncompetitive quality and price	X27	X	X			X
The rate on return on investment	X28			X		
Lack of government risk reduction policy	X29			X	X	

The t-test result for the developed model at the 0.1 significance level shows that all impacting factors are significantly predicting construction organization performance. Table 2 shows the rank of top twenty critical success factors that impact construction organization performance in a post-conflict environment.

Table 2. Rank of construction organization performance in a post-conflict environment.

Rank	Factor	Critical Success Factors (CSFs) description
1	X1	Anti-competitive behavior
2	X12	Lack of skilled & educated workforce
3	X6	Corruption
4	X20	Governmental & nongovernmental organizations support& training
5	X27	Uncompetitive quality and price
6	X11	Lack of legal & judicial system
7	X28	Rate of return on investment
8	X17	Market structure & competition
9	X2	Monitory uncertainty
10	X7	Theft and crime
11	X8	Overall security -conflict
12	X29	Lack of government risk reduction policy
13	X15	Government-financial-aid dependency
14	X9	Lack of Access to finance-banking
15	X3	Not being paid
16	X18	International financial support
17	X19	Local expenditure of international agencies
18	X5	Project failure& warranty failure because of instability
19	X24	Bureaucratic process
20	X14	Poor-Infrastructure

4   CONCLUSION

The purpose of this study was to develop a framework to assess the impact of the post-conflict environment on construction organization performance. Previous research has widely focused on developing critical success factors and success strategies for organization performance improvement without considering the impact of the environment where these organizations perform. This study evaluated the impact of external environment on organization performance and examined five performance measures which are shown in the Table 1 to determine the impact of post-conflict environment factors on these identified KPIs. The study result indicates that top twenty factors from the questioner which are shown in the Table 2 have a critical impact on the organization performance and considering these impacting factors can help to formulate a successful strategy and improve organizational performance. The finding of this study suggests that there is a significant association between construction organization performance and post-conflict environment factors. However, the study did not consider the organizational differences such as the type of construction, years of experiences, and the size of the firm. Thus, the developed framework will benefit the academic researchers and industry practitioners to analyze

and evaluate challenges and opportunities caused by different external environmental factors in the post-conflict construction industry.

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