



Assessing the Effect of Using Project Management Body of Knowledge in Improving Financial Success of EPC Projects

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ABSTRACT: In recent years, EPC has been one of the popular ways of implementing Iran's infrastructure projects. However, the completion of these projects has always been accompanied by increased costs. On the other hand, project success depends to a large extent on the proper implementation of project management. Therefore, examining the impact of applying project management standards on the financial success of EPC projects can help to identify the areas that affect the financial success of these projects. Therefore, the main purpose of the present study is to evaluate the impact of applying PMBOK to improve the financial success of EPC projects. To achieve this goal, a questionnaire based on components derived from previous studies was prepared and distributed among EPC project specialists. At this stage, the factors affecting the financial success of the EPC projects were identified and classified according to the 10 PMBOK standard 10 areas. Experts' opinions on the importance of each of the identified factors to improve the financial success of EPC projects were evaluated based on Likert's five-choice spectrum using SPSS software. One sample T-test was used to test the research hypotheses. The results show that applying the standard project management knowledge domain has a significant impact on improving the financial success of EPC projects. Factors were also prioritized by the Friedman test. The results show that cost management and quality management with an average rating of 8.20 and 8.12 had the highest impact, respectively, and communication management and range management with 2.35 and 1.95 had the least impact on improving the financial success of EPC projects.

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1- Introduction

The unexpected increase in cost is a major problem for the construction industry [1]. Any change in any of the quantitative and qualitative parameters of the project will certainly have one of its first effects on cost [2]. Therefore, according to the standard definition, the project is a set of uniquely complex and relevant activities that have a primary purpose and must be completed within a specified time and budget and according to specifications. And also from a standard perspective, a project is a temporary effort that is made to create a unique product, service, or result. Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the needs of project agents and project expectations [3]. Standards refer to parts of project management knowledge that are generally referred to as top practices for project management. Superior practices mean that many experts believe that the correct application of these skills, techniques, and tools increases the likelihood of success in a wide range of projects. Project cost management involves estimating, budgeting, and controlling costs so that the project can be completed with an approved budget [4].

Using a project management standard can be critical for project success, such as controlling costs under a pre-determined budget, predicting project liquidity, and controlling

project performance. Therefore, it can be said that the use of the standard knowledge of project management knowledge can be very effective in achieving project objectives, including the financial success of the project [5]. However, previous research shows that the application of this standard has been of interest in assessing the success of areas such as human resources and procurement, risk, and integration. On the other hand, studies have ultimately focused on two parts of the three main phases of EPC projects, and rarely can research be found that simultaneously impacts all standard areas of project management knowledge on the success of all phases of EPC projects, namely engineering, logistics, and survey construction.

Given the problems of financial success risk in EPC projects, as well as the advantages of applying project management knowledge standard, the main purpose of the present study is to investigate the effect of applying project management knowledge standard on improving the financial success of EPC projects. Prioritizing influential factors in improving EPC project financial management due to the PMBOK implementation and standard take an effective step to fill the gap between previous studies in this area.

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2- Methodology

In this study, a researcher-made questionnaire was used to collect information, which included three general sections. The first part is a questionnaire guide that explains the topic of the questionnaire and how to answer the questions. The second part of the questionnaire is about the demographic characteristics of the respondents. The third section included the main part of the questions related to the subject under study. A researcher-made questionnaire based on knowledge domains in PMBOK was prepared and distributed among experts. After data collection, data were analyzed by SPSS software. Due to the nature of the hypotheses and the type of variables, statistical tests were used in this study. Finally, SPSS software was used to analyze and apply these tests.

The target population of this study is executors, supervisors, employers, and contractors of EPC projects. Due to the lack of access to experienced EPC project professionals, an available sampling method was used for data collection. Delphi research participants range from 5 to 30 people. The sample size was 30 persons. The Snowball method was used to select the experts.

3- Results and Discussion

The Kolmogorov-Smirnov test was used to determine the normality of the data distribution. The results show that since the significant level of financial success variable of EPC projects due to PMBOK and other variables was more than 0.05, it was found that these variables have a normal distribution. Therefore, parametric statistical tests were used to investigate the research questions. Using a one-sample T-test, the hypotheses about the mean of the population according to the cut-off point were investigated. The first step in performing the statistical test is to determine H0 and H1, which must be correctly determined. To do this, we always place the claim on the community parameter in H1, and we set it to H0. Therefore, the parameters H1 and H0 are related to the acceptance and rejection of the assumptions, respectively.

Investigation of Research Hypotheses: Given the level of significance (less than 0.05), the H1 hypothesis was accepted. Therefore, PMBOK has an impact on improving the financial success of EPC projects. The results also show that besides project scope management other areas of project management have an impact on improving the financial success of EPC projects.

Factor Prioritization: Friedman's rank test was used to prioritize the factors in SPSS. According to Table 1 and according to Friedman's test results, the first to third priorities are related to project cost management variables, project quality management variables, and project time management variables with mean ratings of 8.20, 8.12, and 7.88, respectively. Also, human and organizational project management variables, project risk management, and integrated project management variables had mean scores of 7.70, 7.38, and 4.52 respectively. Priority seventh and eighth, respectively, were 4.38 and 2.52 with project logistics management and project stakeholder management. The two variables of project communication management and project management also had the lowest average ratings concerning the results and thus had the least impact on improving the financial success of EPC projects, as shown by the scores given by the respondents and the results of the Friedman test, Project cost management, project quality management, and project time management have had the greatest impact on improving the financial success of EPC projects.

4- Conclusions

The purpose of this study was to evaluate the impact of applying a standard project management knowledge base on improving the financial success of EPC projects. In this study, while explaining the necessities, we examined the factors affecting the success of EPC projects due to the application of the PMBOK standard. To achieve the overall purpose of the research, the following sub-objectives were pursued:

Table 1. Final Priority Factors Affecting the Financial Success of EPC Projects.

Rank	Variable	Mean rank
1	Project Cost Management	8.20
2	Project Quality Management	8.12
3	Project time management	7.88
4	Human and organizational project management	7.70
5	Project risk management	7.38
6	Integrated project management	4.52
7	Project Procurement Management	4.38
8	Project Stakeholder Management	2.52
9	Project communication management	2.35

Investigate the impact of applying the PMBOK standard on improving the financial success of EPC projects;

Identifying the factors contributing to improving the financial success of EPC projects and finally;

Prioritizing the identified factors.

For this purpose, factors affecting the financial success of EPC projects were first identified and classified according to the 10 standard PMBOK areas. Experts' opinions on the importance of each of the identified factors to improve the financial success of EPC projects were then evaluated. Regarding the normal distribution of data based on the Kolmogorov-Smirnov test, a one-sample parametric T-test was used to test the research hypotheses. The results showed that the application of the standard project management knowledge domain has a significant impact on improving the financial success of EPC projects. Factors were also prioritized by the Friedman test. The results show that cost management and quality management had the highest impact with an average rating of 8.20 and 8.12, respectively, and communication management and range management with 2.35 and 1.95 had the least impact on improving the financial success of EPC projects, respectively.

t management philosophies that simply balances flexibility and stability and its aims is continuous improvement and growth.

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