A Model for Managing The Risks of International Project Procurement of Iranian Companies

(Case study -Syrian Cement and Venezuelan Cement projects)

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Abstract

Despite the initial attractiveness of international projects, these projects involve high levels of challenges and risks that make it difficult for contractors to complete these projects successfully. On the other hand, most of the Iranian companies' problems in the implementation of international projects are similar, and a list of these challenges and potential risks in this type of project can be obtained using the experience of previous projects and expert opinions. Since procurement management is one of the most challenging parts of international projects, in this study, first by collecting the views of experts and examining two case studies, using Delphi rules, try to identify the factors influencing these projects. Risks were then prioritized and categorized based on the type of impact they had on the procurement area and on the project phases; the most important risks were answered and finally, a model for implementing risk management for the international project procurement department is proposed.

Keywords: Risk of Procurement, Risk Management, Risk structure, International Projects, Risk of International Projects Procurement

Introduction

Procurement in projects means doing all the things related to the purchase on Time of goods and services needed to perform all the related processes in the project [1]. The ultimate goal of purchasing and procurement management in construction projects is to provide the optimal project needs for the timely and quality completion and delivery of the project [2]. Delays in the procurement of supplies (materials, equipment, machinery, human resources) for international projects by Iranian contractors, and as a result of delays in the implementation of credible projects, caused a great deal of damage to Iranian contractors. [3] Therefore, in this study, after reviewing and analyzing the content of previous research and reviewing case studies carried out by Iranian companies, especially in Syria and Venezuela, as well as using the opinions of relevant experts, the risks and challenges of procurement of Iranian companies in international projects are identified and described, and finally, a general framework for managing these risks is provided.

Methodology

This research is of descriptive-analytical type. First, through library studies, including the study of books, articles, and dissertations, as well as Internet resources, basic information about the research topic was collected, and then the field method was used. In addition to personal observations and experiences, Delphi methods, questionnaires, and interviews were used to collect information. To rank the identified risks, the probability/impact index was used using the Likert scale, and SPSS software was used to analyze the data obtained from the Likert scale. In this study, we tried to use people who have at least a direct role in the two projects of Syrian Cement and Venezuela Cement, which constitute 34% of the expert community of this study and the rest of the selected community of experts are all people in other projects with differences cultural and geographical are involved that 66% of the statistical population of this study; the statistical population of this research is also determined by Cochran's method. Due to the dispersion of these people and the complexity of the availability of all these people, the error coefficient in Cochran's formula was

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considered 0.1. Finally, the number of experts in this study was 66. Various methods are used to calculate the reliability of the measurement tool. In this study, the "Cronbach's alpha" method was used. The acceptable coefficient in this research is 0.75. The research steps are also shown in full in "Figure 1".

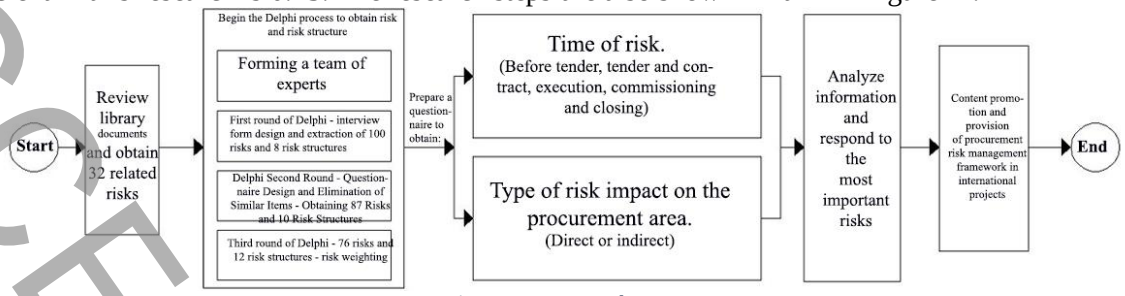

Figure 1- Research stages

Results and Discussion

After obtaining 32 known risks in previous studies and using the Delphi method in 3 rounds, finally 76 risks related to the procurement of international projects were identified by experts and categorized into a 12-item structure. In this failure structure, the 12 risks are first divided into two categories of first category and second category in order to facilitate the management by the project stakeholders. In the following to identify the importance of each risk, the probability of occurrence and severity of the impact of each risk on the Likert scale has been measured. The general framework and classification of types of procurement risks of international projects and its definitions are specified in the form of "Table 1" in three different sections: Risk structure (managerial aspect), how the risk affects (directly or indirectly with the procurement field), and time of risk occurrence (before tender, tender and contract, execution, commissioning, and termination) which is called the risk cube in this research.

Table 1- Procurement risk management framework for international projects

<table>
<tr><th>Row</th><th>Types of categories</th><th colspan="4">Description</th></tr>
<tr><td rowspan="12">1</td><td rowspan="12">Risk structure:
• First category risks:
Consists of risk structures that account for more than 70% of the risks in international projects.

• Second category risks:
Consists of risk structures that account for less than 30% of the risks in international projects.</td><td rowspan="6">First Category</td><td>1</td><td>Suppliers</td><td>Risks related to suppliers.</td></tr>
<tr><td>2</td><td>Shipping and transmission</td><td>Risks and challenges of transportation, equipment shipment</td></tr>
<tr><td>3</td><td>Providing resource</td><td>Consists of sourcing resources that are inside or outside the company and not related to suppliers, such as manpower and contractors except</td></tr>
<tr><td>4</td><td>Political</td><td>Political problems and challenges within the country, inter-country, other countries ...</td></tr>
<tr><td>5</td><td>Financial and contractual</td><td>Procurement risks that have a financial and contractual aspect.</td></tr>
<tr><td>6</td><td>Environmental</td><td>Most of the risks, such as sanctions, regulations, riots, etc.</td></tr>
<tr><td rowspan="6">Second Category</td><td>7</td><td>Cultural</td><td>Cultural problems and challenges due to differences in citizenship and language and...</td></tr>
<tr><td>8</td><td>Safety</td><td>Specific safety challenges and regulations in some countries</td></tr>
<tr><td>9</td><td>project scope</td><td>These types of risks are unique to each project.</td></tr>
<tr><td>10</td><td>Design and engineering capabilities</td><td>This risk can be considered as organizational weakness or organizational problems.</td></tr>
<tr><td>11</td><td>Commissioning and production</td><td>Challenges and important stages in industrial contracts and projects</td></tr>
<tr><td>12</td><td>Unseen risks</td><td>These risks can be considered as part of environmental risks, but their importance and impact can be so great that it pushes the project to the brink of failure. Therefore, due to their importance, they should be examined separately. These risks are usually added to the project knowledge after the project is completed.</td></tr>
<tr><td>2</td><td>Classification of risk types: (based on how they affect)
After identifying the risks, based on the impact of these</td><td colspan="4">Direct risks: These are risks that directly and indirectly affect the procurement field. In fact, these risks are directly related to supply and procurement (suppliers, resources and equipment, transportation and manpower) and affect the project in the field of procurement.</td></tr>
</table>

	risks on the project procurement area, they were divided into two categories: direct and indirect.	**Indirect risks:** These are risks that indirectly affect the procurement area, at least through an intermediary. These risks do not directly affect the procurement area. In fact, these risks are project risks that also affect the procurement field in some way.
3	**Risk time** (based on project phases)	Classify risks based on when they occur - in fact, this classification is intended to facilitate the planning and implementation of risk management. Classification based on phases: 1.before tender, 2.tender and contract, 3.execution, 4.commissioning, 5.termination.

The results obtained from data analysis by SPSS software indicate that the source of 5.3% of these risks before the tender, 14.5% at the time of the tender and contract, 71.1% at the time of execution and 9.2% at the time of start-up and completion. . Also, 53.3% of these risks have a direct impact and 46.05% of these risks have an indirect impact. Also, according to these statistics, in terms of frequency, more than 25% of the risks in the field of procurement of international industrial projects are related to the risks of the financial and contractual sectors. After qualitative analysis and prioritization of risks, risk response was performed. In this study, 13 main risks were identified. It should be noted that in each project, according to its nature, other solutions can be considered that are more appropriate than these solutions. Finally, a pattern such as "Figure 2" was introduced to control and manage the procurement risks of international projects to implement risk management in the field of procurement.

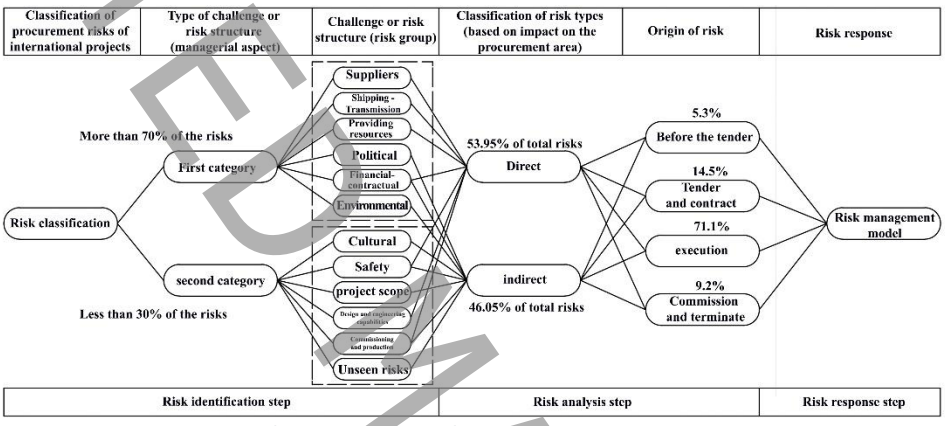

Figure 2- Pattern of implementation of procurement risks in international projects

Conclusion

In this study, according to the results obtained from 2 studied projects in Syria and Venezuela and experts, 76 risks of Iranian contractors were identified in the mentioned projects and were classified into 12 groups of risk structure according to the phases of the project. The results obtained from Delphi rounds were prioritized based on probability-impact risk index and based on their impact on the procurement area into risks with direct and indirect impact. The results show that the highest number of risks exists in the implementation phase and then the tender and contract phase, which includes more than 80% of the total identified risks. It is also observed that the implementation phase is more important than other phases of the project and the impact of direct risks on the procurement area is greater than indirect risks. In order to complete the risk management process, the most important risks were answered by experts. Finally, to implement risk management and according to the research results, a model for implementing risk management was developed and introduced. The content of this study can be used to identify the risks of international projects and help Iranian contractors to identify the risks of projects as soon as possible.

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