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Risk management model in construction projects based on time and financial resources management

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Abstract

The successful completion of construction and industrial projects in the form of budget, time and quality and getting the satisfaction of the beneficiaries of the project is the ultimate goal of project management. The current research aimed to analyze the risk management model in construction projects with the approach of managing time and financial resources. In the qualitative part, firstly, by means of thematic analysis, by using interviews with experts, a theoretical framework and a conceptual model were developed, and its reliability and validity were determined by the Delphi method, and then, the structural model of risk management of construction projects with the approach of managing time and financial resources was determined. In management issues, there are things like "managers should have a written plan regarding the maintenance of human resources", "at each stage of the work process, in order to optimally implement that process and also make businesses more profitable, managing the costs of that stage can be fruitful", "always during the process of implementing projects, issues and problems arise that require the ability of managers to solve those issues and make timely decisions in order to prevent multiple losses" showing the importance of management factors in construction projects.

Keywords: Risk management, Construction projects, Time management, Financial resources.

Modelo de gestión de riesgos en proyectos de construcción basado en la gestión del tiempo y los recursos financieros

Resumen

La realización con éxito de proyectos de construcción e industriales en forma de presupuesto, plazo y calidad y la obtención de la satisfacción de los beneficiarios del proyecto es el objetivo último de la gestión de proyectos. La presente investigación se propuso analizar el modelo de gestión de riesgos en proyectos de construcción con el enfoque de la gestión del tiempo y los recursos financieros. En la parte cualitativa, en primer lugar, mediante el análisis temático, utilizando entrevistas con expertos, se elaboraron un marco teórico y un modelo conceptual, y se determinó su fiabilidad y validez por el método Delphi, y a continuación, se determinó el modelo estructural de gestión de riesgos de los proyectos de construcción con el enfoque de la gestión del tiempo y los recursos financieros. En los temas de gestión, hay cosas como «los gerentes deben tener un plan escrito sobre el mantenimiento de los recursos humanos», «en cada etapa del proceso de trabajo, para implementar de forma óptima ese proceso y también hacer que los negocios sean más rentables, la gestión de los costes de esa etapa puede ser fructífera», «siempre durante el proceso de implementación de los proyectos, surgen cuestiones y problemas que requieren la capacidad de los gerentes para resolver esas cuestiones y tomar decisiones oportunas con el fin de evitar múltiples pérdidas» mostrando la importancia de los factores de gestión en los proyectos de construcción.

Palabras clave: Gestión de riesgos, Proyectos de construcción, Gestión del tiempo, Recursos financieros.

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I. INTRODUCTION

A complex construction project can cause risky and uncertain events that can cause delays and increase costs in projects, therefore, it provides the possibility of uncertainty in the implementation process, which leads to different types of risks and finally causes losses to the parties involved in the construction project. Risk is a condition in which there is a possibility of profit/loss, such as cost loss, injuries and delays caused by uncertainty in project implementation (Rauzana, 2016). One of the most influential risk factors is the change of order. Delays in the implementation of projects are among the risks that often occur in the implementation of construction projects, especially in developing countries. (Mahdi & Soliman, 2019) Project delays and cost overruns can damage projects (Al Amri & Marey-Pérez, 2020). The occurrence of project risk can have positive or negative effects on one of the project goals such as time, cost, safety, quality and sustainability, on the other hand, it threatens the success of the project. Dealing with high costs and overflowing project implementation time has been to prevent failure. Eliminating all project risks is not possible and requires a formal evaluation and process for risk management of various project risks. Risk management is a formal and systematic process to classify, identify and evaluate and respond to risks during the life cycle of a project to obtain the optimal amount of risk elimination or risk control. Currently, risk management has turned into an important part of project management. Risk management has a specific function to improve the efficiency of project execution, save money and improve project profitability. Theories have proven that risk management is a scientific and effective management tool to reduce risk and loss (Fu-Zhou & Hong-Yuan, 2011). The financial nature of the project is the allocation of risk. Effective risk allocation can improve the performance of the project. The rule of effective risk allocation in project finance is that most risks are allocated to participants who have high risk tolerance (Shen-fa & Xiao –Ping, 2009). By carrying out investment projects related to decision-making, managers often face the uncertainty of the future benefits of the project. Its reasons can be political, cultural, social, economic environment, resources, market conditions, technological developments and other factors. These factors are the uncertainty about the decision-making process in the project risk in the future. One of the reasons why projects face failure is that financing risks do not exist only in the traditional financing stage, but in the whole project process. In general, the financial risks of projects can be examined from three aspects, including project participants, the project itself, and the external environment. During the financing process of the project, there are three independent sources of risk that interact with each other and affect the financial risk (Chen et al., 2017). Risk identification is the first step in the process of risk management, in which the potential risks related to projects are determined (Zul qadr et al., 2016). In short, project success criteria are focused on the results of the projects and vary depending on different key companies (Wu et al., 2017). The project managers realized that the identification, analysis and evaluation of possible risks related to the projects, enable them to prepare appropriate possible plans to reduce these risks. Such preparations help the project managers to be able to successfully continue their projects with unexpected situations that occur during the contract period (Almarri & Blackwell, 2014). Nowadays, the success of any project requires the proper management of financial provision methods. However, due to the rapid change in the dynamic economic environment today and the current unfavorable economic situation of the country due to the existence of foreign sanctions and weakness in the country's financial management, the methods of financial provision are facing risks that, if not managed, will cause the failure of projects and provides irreparable economic consequences for the country and organizations. Therefore, identifying types of financial security risks and their management can be very important for organizations and cause success in financial security methods. In this research, we intend to analyze the model of risk management in construction projects by relying on the management of time and financial resources.

The theoretical framework and background

The concept of risk:

The term risk has different meanings and definitions depending on the context and the category in which it is used. According to Merriam-

Webster's dictionary, risk is defined as "possibility of loss or damage" and "a person or thing that is the cause of a risk" (Merriam-Webster, 2022). Risk is beyond the concept of danger; because the market is dealing with opportunity. Events can have positive or negative effects on companies. Positive impact events are opportunities that create value or help the company achieve its goals. Events with a negative effect are risks or hazards that destroy or prevent the creation of company value (COSO, 2017). Callahan and Solio (2017) state that risk and opportunity are inseparable. Eliminating risk acceptance is not an appropriate strategy for creating value; therefore, the company must accept the right risks and manage them in order to create and maintain the value of shareholders (Callahan & Sole au, 2017). The reason for the complexity of risk definition is the fact that risk is divided into two components: the likelihood of occurrence and its effects. To describe a risk event, it must be specified that the main concern about each event is its likelihood of occurrence or its effects. Almost all managers are looking for tools and techniques to reduce the risks and consequences of decisions to the minimum possible. In this regard, risk management is a new tool that has responded to this need in a short period of time (Saadatjoy & Rahimi, 2014).

Risk management:

Risk management attempts to identify, assess and measure risks. Then take countermeasures regarding management and not its removal (Tarantino and Saran veranda, 2011). According to ISO 31000, risk management is: "Coordinated activities to guide and control an organization with respect to risk" (International Organization for Standardization, 2018). Every organization uses two main risk management strategies. One approach is to identify risks separately and deal with each of them. Another approach is to reduce risk through diversification, which is called risk integration. In terms of the relationship between corporate value and risk management, it is not so clear why companies should manage risk; because hedging risk and implementing risk controls may be costly or limit many profitable opportunities, which reduce the value of the company (Jalilvnd et al., 2018). Despite this, many researches have been conducted regarding the necessity of implementing risk management, which shows that risk management increases the value of the company. Risk management improves performance, fosters innovation and supports the achievement of goals. (International Organization for Standardization, 2018). The lack and weakness of risk management not only affects the achievement of goals, it also causes problems in the process of planning and formulating strategies (Zou et al, 2017). Risk management enables the company to take timely actions to identify organizational values in order to achieve the company's goals (de Oliveira et al, 2017). Not paying attention to risk management in the past led to the bankruptcy of many large companies and serious damage to economies (Lam& Kawamoto, 2017); hence, enterprise risk management was introduced in the 1990s and now it has become a sign of good management (Fraser et al., 2021). Gradually, from the middle of the 20th century, risk management in developed countries was noticed by business managers and supervisory institutions; but the world of risk management has undergone a huge change since 2007 and with the start of the global financial crisis. During the aforementioned crisis, large financial institutions were on the path of bankruptcy and many banks and institutions were forced to receive financial aid from the governments. After the financial crisis, regulators and supervisors required financial institutions to increase their capital reserves and liquidity, increase transparency, limit risk appetite, and implement stricter internal controls (Lam& Kawamoto, 2017). Despite this success, many organizations are still looking for practical advice in the field of risk management implementation (Fraser et al., 2021).

Time management

Time management is the art of arranging, organizing, planning, and budgeting time to produce greater efficiency and productivity. Effective time management techniques help us to rationally organize and plan the time we spend on various activities aimed at increasing productivity and quality of life (Kulkarni, 2020). Optimum use of time plays an important role in performing specialized activities and improving the quality of work, and to the extent that a written program can be used in setting time for professional work, it can be hoped that productivity

will also increase and work will be more efficient according to organizational needs.

Financial sources

With the acceleration of economic growth, governments have focused on infrastructure investment, as a result, the share of infrastructure investment has increased from the consumption of financial costs. In this regard, government investment cannot meet its investment needs alone (Chen et al., 2017). Financial provision projects are often with heavy risk and very powerful and complex capital structures. Lenders, who accept the largest portion of financing in the form of non-payable or limited debt, are typically concerned with the risks inherent in the financing, development and execution of financing. Risk is an important element in the level of capital and financing resources (De Marco & Mangano, 2017). Project financing includes the use of informal or limited financing structure in which the debt for project financing is repaid from the cash flow generated by the project (Rajan Annamalai & Jain, 2013).

Research background

Shafiei Nikabadi et al. (2016) found that risks related to supervision, design and construction, as well as financial and credit issues among the main subgroups in terms of relative probability of occurrence with coefficients of 0.38 and 0.28 are ranked first and second, and risks related to geographic and economic accidents with importance coefficient 0.13 is in the last rank. Also, the survey output in the second stage shows a list of construction projects ranked based on the degree of risk impact on their construction performance. In an article, Zahraie et al. (2017) presented a risk analysis model based on fuzzy expert systems for managing construction projects. They reported that the presented model has the ability to be used in the analysis of risks affecting the important parameters of cost, time, quality, and safety in the implementation of construction projects. Sayegh (2008) in an article entitled risk management model in BOT projects, stated that the concern of not properly managing risks is the most important obstacle to the development of BOT projects. In this article, with a detailed review of previous studies and experiences of projects implemented in Southeast Asia, a model for BOT risk management was presented to cover the risks of all stages of a BOT project and balance the interests of all stakeholders. The proposed model, with the development of a conceptual structure based on the limited balance of interests, provides a clear tool for identifying risks from the perspective of different factors, the balanced allocation of risks, and even the development of risk response tools, in order to provide decision-makers with helping them make the project preparation process shorter and less costly. Taylan et al. (2014) in an article entitled the optimal model of risk management in the implementation of EPC projects, stated that due to the high volume of projects in organizations, choosing the right project for implementation according to resource and cost limitations is one of the most important activities of considered organizations. In choosing the right project, one should consider factors such as the feasibility and responsiveness of future projects, which all parameters and factors are uncertain and cannot be accurately measured.

Zhang et al. (2014) discussed the improvement and development of project risk management model in power plant projects in an article. After identifying common models and comparing risk management models, they tried to provide indicators for choosing the optimal model according to the conditions of the organization and power plant projects after consulting with experts and experts and then using multi-criteria decision making techniques. The problem of ranking models and choosing a model for development was solved and the PMBOK model was awarded the highest score. Finally, as a case study, the developed model was used in one of the organization's power plant projects, and the validity of the model and its results were confirmed during an interview with several experts in the field of risk management.

In this article, an attempt is made to examine all the models of risk management and compare them based on appropriate indicators, and to provide a consolidated model that can cover the needs of organizations in this sector, according to the situation of Iranian organizations. In the following, an attempt is made to implement the mentioned model in an organization.

II. Materials and Methods

The current research is of a practical developmental type in terms of its purpose and orientation. According to the research topic and the nature of the data, the present research method is qualitative. In the qualitative part, a theoretical framework and a conceptual model were developed through thematic analysis, which is an exploratory method, using interviews with experts, and its reliability and validity were determined by the Delphi method.

Findings

Qualitative analysis of research

1. Coding

In this first part, all the interviews were reviewed and after the review, the interviews related to the subject were left. Then the coding process began. In this process, taking into account the desired general concept, parts of the text of the interviews that explicitly or implicitly contained the related code were marked. According to the meaning of each part, a name was assigned to that part in the text, and an explanation was placed in that part from the relevant source. Along with the coding work, a file was prepared and the names of the codes were saved in it. In the continuation of the work and with more text coding, this file was continuously referred to and it was checked whether the specified section is related to one of the assigned names or whether a new name should be determined for it. Also, new names were added to the corresponding file during coding. After the completion of in-text coding, it was time to enter the selected sections into MaxQDA software. In this step, separate folders for each function were created in the software. Then the specified codes of each interview were entered separately in the relevant folder. Also, during this work, each interview was reviewed several times so that, if possible, new relevant parts were coded, and the coded parts that seemed unrelated were deleted. Next, manual coding was entered into the software and a list of codes appeared. In the end, 173 codes were obtained from the interviews through repeated reviews. The results obtained from the codes are presented in Table (1).

Table 1. Interview results in MaxQDA software

Identified concepts	Expert code
1. Expertise and skill of employees	E1
2. Work experiences of employees	
3. Employees' awareness of the status of the organization	
4. Motivation of managers	
5. Cost management	
6. Systemic approach	
7. Cooperation of financial institutions and... in providing financial resources	
8. Competitiveness between organizations	
9. Economic conditions	
10. Insuring projects	
11. Work culture in society	
12. Government support	
13. Competitive advantage	
14. External positioning	

15. Scheduling of activities	**E2**
16. Ability to solve problems and make decisions	
17. Commitment and responsibility of managers	
18. Work capacity of the person	
19. Organizational planning	
20. Suitability of project design	
21. Application of technology	
22. Monitoring and evaluating the performance of employees	
23. Differentiation between competitors	
24. A dream with environmental realities	
25. Creating value	
26. Social responsibility	
27. Motivation of managers	**E3**
28. Cost management	
29. Systemic approach	
30. Individual working capacity	
31. Organizational planning	
32. Suitability of project design	
33. Application of technology	
34. Monitoring and evaluating the performance of employees	
35. Monitoring and evaluating the performance of employees	
36. Organizational commitment	
37. Organizational cohesion	
38. Acquisition of financial resources	
39. Unity of purpose of employees	**E4**
40. Learning and acquiring knowledge	
41. Specialized training of employees	
42. Differentiation between competitors	
43. A dream with environmental realities	
44. Creating value	
45. Social responsibility	
46. Scheduling of activities	**E5**
47. Ability to solve problems and make decisions	
48. Commitment and responsibility of managers	
49. Individual working capacity	
50. Organizational planning	
51. Suitability of project design	
52. Application of technology	
53. Monitoring and evaluating the performance of employees	
54. Differentiation between competitors	
55. A dream with environmental realities	
56. Creating value	
57. Social responsibility	

58. Job stability	
59. Job turnover	
60. Highly educated manpower	
61. Supporting ideas	
62. Individual working capacity	
63. Organizational planning	
64. Suitability of project design	
65. Application of technology	
66. Monitoring and evaluating the performance of employees	**E6**
67. Organizational commitment	
68. Organizational cohesion	
69. Acquisition of financial resources	
70. Flexibility	
71. Differentiation between competitors	
72. A dream with environmental realities	
73. Creating value	
74. Social responsibility	
75. Decision making skills	
76. Excellence of human resources	
77. Systemic thinking	
78. Supervision of project managers	
79. Up-to-date management information	**E7**
80. Technical skills	
81. Monitoring and evaluating the performance of employees	
82. Organizational commitment	
83. Organizational cohesion	
84. Acquisition of financial resources	
85. Motivation of managers	
86. Cost management	
87. Systemic approach	
88. Differentiation between competitors	
89. A dream with surrounding realities	
90. Creating value	**E8**
91. Social responsibility	
92. Monitoring and evaluating the performance of employees	
93. Organizational commitment	
94. Organizational cohesion	
95. Acquisition of financial resources	

96. Innovation and creativity of employees 97. Competent employees 98. Mobilization of labor force 99. Individual talents 100. Empowerment 101. Monitoring and evaluating the performance of employees 102. Organizational commitment 103. Organizational cohesion 104. Acquisition of financial resources 105. Flexibility 106. Efficiency 107. Organizational values	**E9**
108. Decision making skills 109. Excellence of human resources 110. Systemic thinking 111. Supervision of project managers 112. Up-to-date management information 113. Technical skills 114. Organizational planning 115. Suitability of project design 116. Application of technology 117. Monitoring and evaluating the performance of employees 118. Organizational commitment 119. Organizational cohesion 120. Acquisition of financial resources 121. Flexibility	**E10**
122. Unity of purpose of employees 123. Learning and acquiring knowledge 124. Specialized training of employees 125. Monitoring and evaluating the performance of employees 126. Organizational commitment 127. Organizational cohesion 128. Acquisition of financial resources 129. Flexibility 130. Efficiency 131. Organizational values	**E11**
132. Proper organization of labor force 133. Maintenance of human resources 134. Recruiting specialized human resources 135. Adjustment of expenses 136. Monitoring and evaluating the performance of employees 137. Organizational commitment 138. Organizational cohesion 139. Acquisition of financial resources	**E12**

140. Job stability	
141. Job turnover	
142. Highly educated manpower	
143. Supporting ideas	
144. Individual working capacity	**E13**
145. Monitoring and evaluating the performance of employees	
146. Organizational commitment	
147. Organizational cohesion	
148. Acquisition of financial resources	
149. Management stability	
150. Delegation of authority	
151. Physical resources of the organization	
152. Timely submission of status statements	
153. Strategic partnership	
154. Timely access to resources	
155. Trust between organization members	**E14**
156. Efficiency	
157. Organizational values	
158. Monitoring and evaluating the performance of employees	
159. Organizational commitment	
160. Organizational cohesion	
161. Acquisition of financial resources	
162. Innovation and creativity of employees	
163. Competent employees	
164. Mobilization of labor force	
165. Individual talents	
166. Empowerment	
167. Monitoring and evaluating the performance of employees	E15
168. Organizational commitment	
169. Organizational cohesion	
170. Acquisition of financial resources	
171. Flexibility	
172. Efficiency	
173. Organizational values	

In this way and according to the Holstein formula, the PAO index for this research was 0.894, which shows the high reliability of the qualitative part.

2- Thematic analysis and network of themes

After the coding process, which was carried out with repeated trips between the interviews and the software, the process of determining the themes began. In the first stage, similar codes were placed next to each other to form basic themes.

During this action, the researchers found that some codes have a higher level and it is possible that they can be broken at lower levels. In this way, the codes were reviewed again and the high-level codes were broken down to the lowest possible level, and the process of determining the themes continued again. Then a name was determined for each basic subject. After identifying the basic themes, themes that are close to each other were classified in a group and formed an organizing theme (Table 2). The organizing themes together revealed the overarching themes. Now, after pointing out how to analyze

the content, we can answer the questions of the qualitative part:

The first sub-question of the research: What are the dimensions and components of risk management in construction projects with the time management approach?

The second sub-question of the research: What are the dimensions and components of risk management in construction projects with the financial resources management approach?

As mentioned above, the concepts close to each other among the codes formed the basic themes and the components of risk management in construction projects with the approach of managing time and financial resources were obtained from the texts of the codes. In total, 4 comprehensive themes were identified. The codes and abstracts extracted from the sources based on these themes are indicated in Figure 1.

Table 2. The results of extracted codes in MaxQDA

Remaining codes	Experts
Expertise and skill of employees Work experience of employees Employees' awareness of the state of the organization Specialized training of employees Innovation and creativity of employees Competent staff	**E1, E3 , E5 , E8**
Mobilization of the workforce Individual talents Empowerment Job stability job rotation	**E3,E6,E8,E5,E1**
Highly educated manpower Supporting ideas Individual working capacity	**E3,E5**
The unity of the goal of the employees learning and gaining knowledge	**E4.E8,E11**
Scheduling of activities Problem solving and decision making ability Managers' commitment and responsibility Management stability Delegation of authority	**E14,E15**
Project manager supervision Up-to-date administrative information Technical skills	**E2,E3,E6,E9**
Adjustment of expenses Decision making skills Human resources excellence Systematic thinking	**E4,E5,E6,E7,E8**
systematic approach Proper organization of labor Human resource management Recruiting specialized human resources	**E9,E10,E11**

Motivation of managers Cost management	**E12,E13,E14,E15**
Organization's physical resources Timely presentation of statuses Strategic partnership Access to resources in a timely manner	**E1,E2,E3**
Acquisition of financial resources flexibility Efficiency Organizational values	**E4,E3,E6,E7,E9**
Application of technology Monitoring and evaluating the performance of employees Organizational Commitment Organizational cohesion	**E1,E3,E5,E8**
Trust between members of the organization Organizational planning The appropriateness of the project design	**E3,E6,E8,E5,E1**
Cooperation of financial institutions and... in providing financial resources competitiveness between organizations Economic conditions Project insurance	**E3,E5**
Differentiation between competitors A dream with surrounding realities Creating value social responsibility	**E4,E8,E11**
Work culture in the community Government support Competitive Advantage Foreign positioning	**E14,E15**
Acquisition of financial resources flexibility Efficiency Organizational values	**E2,E3,E6,E9**
Application of technology Monitoring and evaluating the performance of employees Organizational Commitment Organizational cohesion	**E4,E5,E6,E7,E8**
Trust between members of the organization Organizational planning The appropriateness of the project design	**E9,E10,E11**
Cooperation of financial institutions and... in providing financial resources competitiveness between organizations Economic conditions Project insurance	**E12,E13,E14,E15**

Differentiation between competitors A dream with surrounding realities Creating value social responsibility	**E1,E2,E3**
Acquisition of financial resources flexibility Efficiency Organizational values	**E4,E3,E6,E7,E9**
Application of technology Monitoring and evaluating the performance of employees Organizational Commitment Organizational cohesion	**E1,E3,E5,E8**
Trust between members of the organization Organizational planning The appropriateness of the project design	**E3,E6,E8,E5,E1**
Cooperation of financial institutions and... in providing financial resources competitiveness between organizations Economic conditions Project insurance	**E3,E5**
Differentiation between competitors A dream with surrounding realities Creating value social responsibility	**E4.E8,E11**
Acquisition of financial resources flexibility Efficiency Organizational values	**E14,E15**

As can be seen in Table 2, 103 codes were extracted from 15 interviews.

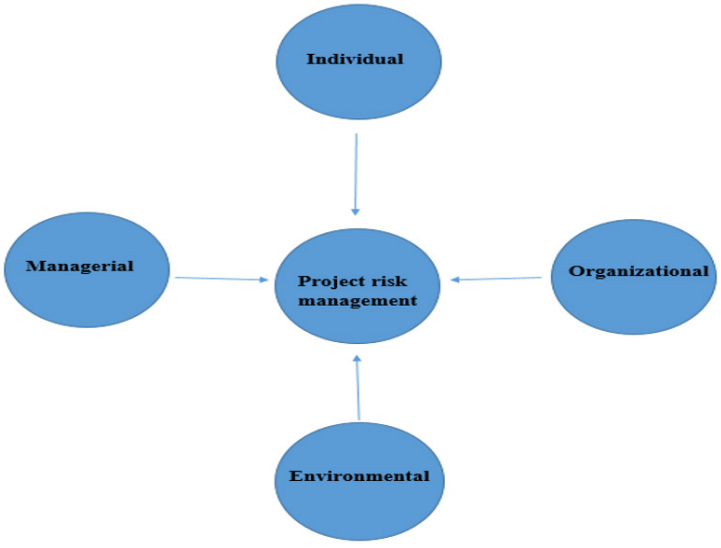

Figure 1. The network of risk management topics of construction projects

As the above table shows, the themes related to the risk management of construction projects have four individual, managerial, organizational and environmental dimensions. In this way, the management dimension with 29.5% of the theme codes related to the risk management of construction projects is considered the most important dimension of this theme. The rest of the themes are placed in the following ranks, respectively, the individual dimension (26.2%), the organizational dimension (24.6%) and the environmental dimension (19.7%). As can be seen in Table 3, the total number of coding obtained from 15 interviews used is 173 codes, of which 61 codes were selected as final and common codes.

Table 3. Themes related to the risk management of construction projects in MaxQDA software

Codes	Base theme	Comprehensive themes
Innovation and creativity of employees Competent employees Individual talents	**Talent and creativity**	**Individual**
Learning and acquiring knowledge Specialized training of employees Mobilization of the workforce Empowerment Highly educated human resources	**Training and empowerment**	
Job stability job rotation	**Occupational factors**	
Expertise and skill of employees Work experience of employees Employees' awareness of the organization's status Unity of purpose of employees Supporting ideas Individual working capacity	**Individuals skills**	
Commitment and responsibility of managers Motivation of managers	**Commitment and motivation**	**Managerial**
Scheduling of activities Delegation of authority Supervision of project managers Up-to-date management information	**Technical management and supervision**	
Technical skills Cost management Cost adjustment	**Financial Management**	
Proper organization of the workforce Human resource management Recruiting specialized human resources Human resources excellence	**Human resource management**	
Problem solving and decision making ability managerial stability Systemic approach Decision making skills Systematic thinking	**Management efficiencies**	

Strategic partnership Organizational planning The appropriateness of the project design	**Organizational strategy**	**organizational**
Trust between members of the organization Organizational Commitment Organizational cohesion Organizational values	**Organizational atmosphere**	
Timely submission of statements of status Monitoring and evaluating the performance of employees flexibility Efficiency	**Efficiency and performance**	
Physical resources of the organization Access to resources in a timely manner Application of technology Obtaining financial resources	**Organizational resources**	
Cooperating financial organizations Economic situations Organizational competitiveness	**Economic factors**	**environmental**
Competitiveness between organizations Competitive Advantage Foreign positioning Differentiation between competitors	**Competitive factors**	
Work culture in the community A dream with surrounding realities Creating value Social responsibility	**Cultural factors**	
Project insurance Government support	**Legal factors**	

The third sub-question of the research: What is the relationship between the dimensions and components of risk management in construction projects with the approach of managing time and financial resources?

According to the dimensions raised in response to the first and second sub-questions, the network of themes resulting from the qualitative section can be shown in Figure 2.

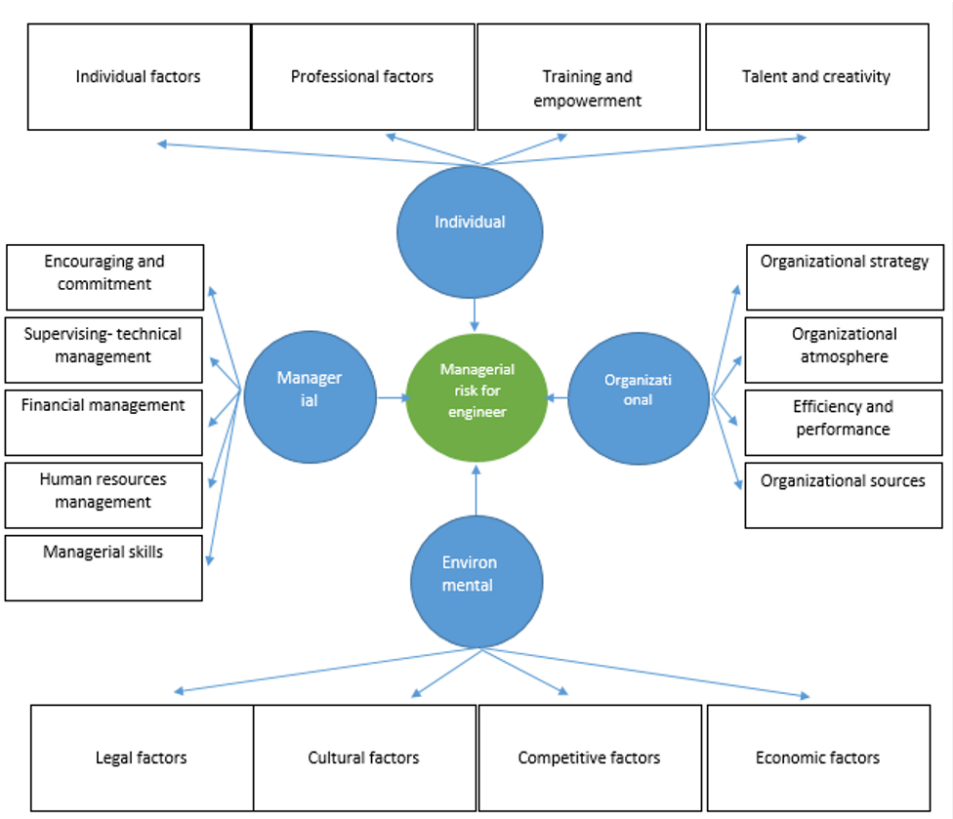

Figure 2. The network of risk management themes of construction projects with the approach of managing time and financial resources in MaxQDA software

III. CONCLUSION

In management issues and in the explanation of management factors related to construction projects, after examining and analyzing the interviews, 24 primary codes were extracted using thematic analysis method, which were finally consolidated into 18 codes. Among the points that were obtained from the experts' interviews, there are such things as "managers should have a written plan regarding the maintenance of human resources", "at every stage of the process of doing work, in order to optimally implement that process and also make businesses more profitable", "managing the costs of that stage can be fruitful", "During the process of project implementation, issues and problems always arise that require the ability of managers to solve those issues and make timely decisions, in order to avoid multiple losses", and "a manager who works in construction projects must have up-to-date information and special technical ability to prevent deviations of employees and the project" shows the importance of management factors in construction projects and the results related to it. In examining and explaining the theme of the organizational factors of construction projects, after reviewing and analyzing the interviews, 23 primary codes were extracted using the method of thematic analysis, which were finally consolidated into 15 codes. Among the points that were obtained from the experts' interviews, there are things like "The problem that can cause problems in the implementation of construction projects is the lack of timely access to the required resources. Therefore, it is very important that during the implementation of the projects, the necessary resources are available at the required time", "sometimes new technologies and technologies can be used in the implementation of the projects, this issue has a great effect on improving the quality and economy of activities", "designing construction projects is a sensitive work and the basis of all matters that must be formulated according to the conditions and facilities of the companies", "in every

activity, it is necessary that there is mutual trust and respect between all the members of the organization, this is effective in increasing the organizational commitment of the employees and the factors involved in it" and "Successful managers, at any time and in any situation, take measures to evaluate the existing situation and the performance of employees" indicates that organizational factors can be decisive for the risk of construction projects. In the investigation and explanation of the environmental factors of construction projects, after reviewing and analyzing the interviews, 18 primary codes were extracted by thematic analysis method, which were finally consolidated into 12 codes. Among the points obtained from the experts' interviews, there are things like "it is almost impossible to prevent the occurrence of risks that exist during work. Natural disasters such as floods and earthquakes as well as workplace accidents may occur during the implementation of projects, to reduce the negative effects of these accidents and disasters, companies can use the services of various insurance companies", "according to the changes in exchange rates and also, with the inflation in the country, there is a possibility of facing a lack of liquidity for all companies. Therefore, it is suggested that in order to provide liquidity in these situations, it is necessary to cooperate with financial and credit institutions and banks" and "always companies that benefit from government support can compete with other companies in bargaining power have a higher status" indicates that environmental factors are very important and vital in the risk management of construction projects.

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