

## Assessment of the risk management construction projects in Turkey into 6 categories

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### ABSTRACT

Risk management is becoming a crucial part of the management procedures used in the construction industry. The expenses or duration of the project are frequently increased as a result of these risks. This study will highlight the main dangers that Turkish building projects encounter. The six categories of risks that will be looked at in this paper are Acts of God, Physical, Financial and Economic, Design, Political and Environmental, and Construction Related. The study included a questionnaire to evaluate the risk in Turkey's building industry. The results show that design-related hazards are placed first among the risk categories that are most likely to arise in building projects. The component with the highest mean was "The negative effect of defective design on construction projects." This study is crucial because it will identify risk factors in the Turkish construction sector and evaluate the importance of each one in terms of severity and how it affects time and cost.

**Keywords:** *Risk Management; Risk Factors; Construction Industry; Design; Time and Cost.*

## **INTRODUCTION**

One of the most important management strategies for the accomplishment of big building projects is managing risks. The management processes in the construction sector now include managing risks as a critical component. Whether recognised by the participants to those agreements or not, risks in construction contracts are now a characteristic of construction projects. These risks can be recognised earlier and frequently result in a jump in project cost or duration. Any building endeavour can be acknowledged to be dependent on the efforts of three main participants: the employer, the contractor, and the engineer. The engineer or his legal representative is first among these parties and has the greatest influence on the success or failure of construction projects in terms of the quality execution and their dedication to completing the work on schedule.

Risk is defined as the possibility of suffering a loss or gain multiplied by the likelihood that it will happen. Events are referred to as certain if there is a perfect likelihood that they will occur and uncertain if there is a zero percent chance. The degree of uncertainty fluctuates considerably between these two peaks. The construction industry is dangerous, just like any other sector of the economy. The degree of risk determines the rate of achievement and execution in the building sector (Paslowski 2013). However, due to the participation of numerous

participants in the contracting process, including owners, designers, contractors, subcontractors, suppliers, etc., construction projects are seen to have higher potential risks.

Construction delays and cost overruns are brought on by risk. The construction industry makes efficient use of time with its project management life cycle. A time delay in the context of construction means that the project's progress has been postponed. It is crucial for the project to succeed. This is one of the reasons we failed, even if we didn't manage our time well. Delays in a project may have a variety of negative outcomes. You incur the risk of encountering a variety of issues when working on a construction project, some of which include astronomical prices, lost output, and lost money. The delay can result in the termination of the contract. In practically all construction projects, delays are an unavoidable problem (Alobadi & Naimi 2023).

Risk analysis and management are important components of the decision-making process in the construction sector. The construction business and its customers play a significant role in the significant number of risks posed by the nature of micro and macro settings, particularly to construction (Zavadskas et al. 2010). In contrast, the general image of the building sector is quite poor when it comes to managing risks as a result of different projects failing to reach the timelines and budget requirements.

size and status of the construction industry in Turkey is by looking at its many sectors. But manufacturing companies are not the only source of the building sector's significance. Despite not making up the majority of the country's GDP, the construction industry makes the largest and most significant contribution to creating jobs for people. One of the main factors contributing to the severity of what makes up the building business is their out-fold return on their product quality and economy (Şener, 2012).

This paper's objective is to list the important risks (6 categories) and risk response approaches in the management of start-up projects, as well as to identify the most prevalent risk factor present in these projects.

## 2 Background

There are 6 categories of risks that will be investigated in this study and they are Acts of God, Physical, Financial and economic, Design, Political and environmental, and Construction related. These 6 risk factors are Common Classifications of Construction Risk (Dosumu, 2018) as follows:

- Acts of God (Force majeure.): is a mishap or incident that arises naturally, without the involvement of humans, and which could not have been avoided by reasonable care or forethought. A

flood, an earthquake, or a storm are examples of Acts of God.

- Physical: such as Damages to equipment and Labour injuries.
- Financial and economic: The main causes of a material scarcity include late material deliveries, material degradation, and inadequate storage conditions. These elements have a strong connection to the selection and control of materials.
- Political and Environmental: Local regulations have raised prices. Environmental problems may result in high costs if they are not recognised and controlled. As an example, builders ought to be compensated for the increased costs associated with their culpability for adverse environmental effects such as air and water pollution.
- Design: Lack collaboration between engineers and contractors has a significant impact on a project's capacity to be built and constructed. The most contentious pertinent event is when the contractor is given data late, and it's noteworthy to notice that the scope of the project affects how probable delays in construction will be.
- Construction Related: The construction sector heavily relies on the

subcontracting system. Subcontractors are typically hired for nearly all of the primary components of large projects because they can obtain labour with specialised expertise to complete work without raising the contractors' overhead costs. Additionally, because construction projects are more complicated than they used to be, contractors find it challenging to accomplish a project on their own.

Risk management strategies all consist of three phases which are risk identification, risk analysis, and risk response:

- **Risk Identification:** The first, most important, and riskiest stage in any method of risk management is to determine the risk; however, the entire process of risk management must be organized, therefore the risk management strategy must be created before determining and categorizing risks and their causes. Risk identification works to categorize tasks, determine possible threats for any project, such as sources and possible effects, document features which aid in analyzing

those risks, develop suitable actions to address them, and more in order to develop a comprehension of the situations and occurrences that contribute to risks (Al-Nassafi, 2022).

- **Risk Analysis:** Risk analysis is typically thought of as the procedure that comprises an in-depth evaluation of possible dangers, categorizing them according to severity and enabling a team to select the most serious risks. The most difficult phase of risk management is risk analysis. This is done in order to ascertain whether a risk will materialise and how it will affect the project's goals. Its primary objective is to assess risk by classifying unneeded episodes, the likelihood that something undesired would occur, and the seriousness of such accidents (Gad et al. 2018).
- **Risk Response:** Once the project risks have been identified and examined, acceptable risk reduction

It is crucial to put specific actions in place for each risk identified once the project's risk assessment is complete in order to reduce any potential or current

hazards. There could be two unique elements to these actions. Initial goals could include neutralising negative effects on the work or giving priority to minimising damaging effects. Four main groupings can be made from the aforementioned reactions:

- The concept of accepting risk in a project can be categorised as either active or passive, and pertains to the willingness to assume a certain level of risk. We acknowledge and assume all the repercussions that result from constraints in both temporal and monetary resources.
- The transfer of risk pertains to the process of transferring a danger to another entity that exhibits the capacity to mitigate the associated risk. A type of transfer that can occur involves the direct transfer of the negative impacts of losses to a different entity. The primary mode of such an undertaking is insurance, which facilitates the lawful transfer of consequential events. One instance of risk transfer involves delegating a task with an uncertain outcome to a contractor, or entrusting transportation services to a shipping company.
- Reduction and risk mitigation are measures aimed at decreasing the probability of risk happening and mitigating the impact of risk. These measures may involve the establishment of inventories of resources or the offsetting of one risk against another, resulting in an overall reduction in risk. The application of risk mitigation can be incorporated during the various phases of a project, including the planning phase and organisational endeavours.
- Risk avoidance pertains to the act of either averting the likelihood of risk or eradicating risk from the entirety of the research process. In this instance, we refrain from undertaking risks that surpass the permissible threshold established by our organization (Kapliński, 2012).
- Risk Exploit: This approach tries to remove the uncertainty linked with a specific upside risk by guaranteeing that the opportunity materialises. remove any doubt regarding a certain upside risk (Mahendra, et al. 2013).

- **Risk Share:** Assigning a risk to a separate party will enable them to do everything needed to increase the likelihood of it occurring and the potential benefits if it does. Sharing chances and transferring threats are comparable in that both entail the utilisation of a third party, the threat transfer takes on the risk, and the chance to benefit recipient should be allowed to participate in any potential gains (Mahendra, et al. 2013).
- **Risk Enhance:** This response aims to alter the "magnitude" of the favourable risk. By increasing the opportunity's possibility and/or significance, the project's benefits are maximised. Actively recognising and reiterating the opportunity's trigger conditions and striving to further or strengthen the opportunity's cause (Mahendra, et al. 2013).

Numerous studies recommend using an appropriate management or monitoring system for the construction industry. According to a study, two of the most important factors that will determine whether a project is successful are the deployment of an effective monitoring system and meticulous project planning. Cost overruns usually provide a significant issue for contractors since they lower the

project's profit margin and create a number of new difficulties for all stakeholders. These problems could not be resolved in any other way than by putting in place efficient cost control systems. Therefore, it is critical to comprehend cost-cutting tactics and how their effects on budget overruns. The online poll was open to all contractors who obtained an A1 through an A5. The information was turned into numerical values by combining weighted score analysis and age analysis. The results highlight the most often used cost-control techniques and demonstrate how they can lower over-budget and overhead costs while maintaining predicted profits. It should be mentioned that these strategies can help to guarantee expected profits (Al-Ghuraibawi & Naimi 2022).

Another study examines how project management enhances precision and dependability while also helping to keep construction projects within budget and on schedule. The results demonstrated that using project management principles might significantly cut down on the amount of money, time, and effort needed to plan, carry out, and complete construction projects. Additionally, project management is crucial to prevent any financial setbacks or resource problems brought on by delays or cost overruns. Additionally, the results indicated that using modern project management techniques (such BIM technology and REVIT Software) could assist engineers and project managers in accurately forecasting the

cost and schedule of their projects, avoiding mistakes (Abdulwahhab, Naimi, & Abdullah 2022).

Finding the root causes of time delays on Iraqi construction projects is one of the main objectives of another study (Layth & Naimi 2023). There are often delays. It is essential to guarantee that the project is completed on schedule. It ranks highly among consumer requests in the building industry. The amount of time allotted for the project's completion affects both the project owner and the project contractor. Conflicts in the construction industry are primarily brought on by delays and failure to complete projects on schedule. Time lags are common and nearly always present in construction projects.

### **3 Construction Sector in Turkey**

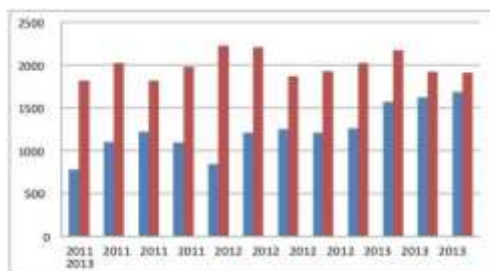
The construction industry is a significant economic activity in Turkey, both domestically and globally. The prominence of the construction industry in Turkey's economy is primarily attributed to its domestic industry, high employment rate, and its ranking as one of the busiest sectors, particularly in industrial production. Additionally, the sector's engagement in international input exchange activities further contributes to its significance in the country's economy. The construction industry has benefited from its input and is considered so vital in the creation of new business areas, resulting in job creation and national earnings

contribution. This has been particularly significant due to its connections with other industries during the transition towards recovery from the recession, as noted by Altan (2017).

With the establishment of the republic, the importance of urbanisation in Turkey has become more well-known. Investments are now being made in the transport and agricultural sectors as a result of industry and investors' neglect of these sectors. The foundation for constructive actions in this particular format has been supplied by Turkish foundations that have been established in the construction sector. The government has taken the first steps, and the construction industry has concentrated mostly on infrastructure and governmental projects. The promise of official support for private investors to engage in major and comprehensive investment undertakings has not come to pass. It is significant that technology is being used more frequently, which has increased demand for the sector and changed original production tactics both domestically in Turkey and abroad. The production sector's technological innovation and improvements to the organization's management have not been hampered by the limitations of time. From a relatively unexplored condition, the management of risks related to termination has developed through a variety of methods. It is significant that although this strategy primarily comes from outside sources, Turkey is

starting to take notice of it. The most important advancement in the area has been thought to be the introduction of improved risk management techniques (Şener, 2012: 30).

The data presented in Figure 1 depicts the amount of fixed capital investment made in the construction industry of Turkey. The highest level of private investment was recorded in the year 2012. A reduction in public investment was noted during the aforementioned year. It is observed that there has been an increase in public investment during the fourth quarter. Nevertheless, the matter of investments has not been a significant concern throughout the majority of the year 2013. Technical personnel who received specialised training have dedicated several years during the 1970s to studying the activities of the industrial sector, particularly with regards to its recent times and the private enterprise. It is noteworthy that the proliferation of factory-built structures has resulted in the advancement of prefabrication construction technology, as stated by İlhan (2008).



**Figure 1** Construction Sector Fixed Capital Investments (by year, %)

#### 4 Methodology

The survey tool is used by the author to gather the necessary data and assess the effect of various risk kinds on the performance of building projects. It was decided to target a broad range of workers with various levels of building project experience. Only closed-ended questions were used in the creation of the questionnaire because they are quick and easy to complete, reduce discrimination against those who are less literate (in self-administered questionnaires or interview questionnaires), are straightforward to code, record, and quantitatively analyse results, and are straightforward to report results. There are two key sections to the questionnaire: The respondents' demographic information is covered in the first part. Regarding their agreement with the factors chosen for this study in accordance with their relative importance, respondents are questioned in the second section. In other words, the ranking of the respondents gives us an estimate of how significant they believe the influence to be. The structured component of the survey's replies is based on a rating scale with five ordinal ratings: (0:20%, 20:40%, 40:60%, 60:80%, and more than 80%). The respondents must rate how closely their opinions match the question or statement using this scale.

Following the gathering of the data, the consistency of the results is evaluated by computing the Cronbach's



alpha coefficient to measure the dependability. Using SPSS, data analysis is done. In order to achieve the study's goals, descriptive statistics were employed as the statistical technique. They were utilized to characterise all the study variables and questions. The percentages, frequencies, averages, and standard deviation among these statistics.

## 5 Data Analysis

For analysis of data, the researcher uses appropriate statistical methods, such as the descriptive statistical method that uses frequency, percentages, mean, and standard deviation. Additionally, correlation coefficient is employed to assess the validity of the survey questionnaire, while Cronbach Alpha coefficient is utilised to assess the validity of the survey instrument's dependability.

### 4.1 Testing reliability and validity

The researcher tests the survey instrument's dependability before beginning with data analysis to address the study's objectives. For each of the ratings in the questionnaire, the researcher utilises the Cronbach Alpha Coefficient as an indicator of internal consistency and the estimated total dependability. The outcomes shown in Table 1.

**Table 1** Survey Instrument Reliability (internal consistency)

Subscales	N	Cronbach's Alpha Coefficient	honesty coefficient
Financial	3	0.740	0.860
Legal	2	0.733	0.856
Design	3	0.791	0.889
Physical	2	0.836	0.914
Management	3	0.808	0.899
Construction	3	0.770	0.877
<b>total</b>	<b>16</b>	<b>0.937</b>	<b>0.968</b>

As can be seen in Table 4.1, the total survey instrument reliability is at (0.937), demonstrating the instrument's strong reliability and consistency in achieving the study's objectives. Additionally, all subscales obtain extremely high reliability, demonstrating the effectiveness of the survey questionnaire's design and its ability to sufficiently ensure the accomplishment of the study's goals.

### 4.2 The characteristics of the study sample

According to the results, men favoured by a ratio of 51 frequencies and a percentage of 85% had the highest percentage, while women by a ratio of 15% had the lowest percentage. Table 2 in the following can help to clarify this.

**Table 2** Distribution of the sample members according to Gender

What is your gender					
		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Male	51	85.0	85.0	85.0
	Female	9	15.0	15.0	100.0
	Total	60	100.0	100.0	

The results showed that the largest percentage according to years OF Working experience was in favor of More than 10 years with a rate of 39 frequencies and a percentage of (65%), while the lowest percentage was 1-2 years with a ratio of 8.3%. This can be explained via the following Table 3.

**Table 3** Distribution of the sample members according to Experience

Your experience in construction sector					
		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	1-2 years	5	8.3	8.3	8.3
	2-5 years	8	13.3	13.3	21.7
	5-10 years	8	13.3	13.3	35.0
	More than 10 years	39	65.0	65.0	100.0
	Total	60	100.0	100.0	

The answers to the question Do you think it is vital to incorporate risk management in building projects were revealed

by the results. Was yes, at a repetition rate of 60, with a percentage of 100%. Table 4 in the following can help to clarify this.

**Table 4** Distribution of the sample members according to the importance of risk management implementation

<b>Do you think it is important to implement risk management in construction projects?</b>					
		<b>Frequency</b>	<b>Percentage</b>	<b>Valid Percentage</b>	<b>Cumulative Percentage</b>
<b>Valid</b>	<b>Yes</b>	<b>60</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

According to the findings, what role do you play in your organisation or construction project, and what percentage? was in favour of the project manager with 22 frequencies and a percentage of 36.7%, while the construction manager had the lowest percentage at 15%. Table 5 in the following can help to clarify this.

**Table 5** Distribution of the sample members according to their roles

<b>What is your role in your organization/ Construction Project?</b>					
		<b>Frequency</b>	<b>Percentage</b>	<b>Valid Percentage</b>	<b>Cumulative Percentage</b>
<b>V</b>	<b>Plan</b>	<b>9</b>	<b>15.0</b>	<b>15.0</b>	<b>15.0</b>

<b>Valid</b>	<b>Engineering</b>		<b>0</b>	<b>0</b>	
	<b>Supervisor</b>	<b>14</b>	<b>23.3</b>	<b>23.3</b>	<b>38.3</b>
	<b>Project Manager</b>	<b>22</b>	<b>36.7</b>	<b>36.7</b>	<b>75.0</b>
	<b>Construction Engineer</b>	<b>9</b>	<b>15.0</b>	<b>15.0</b>	<b>90.0</b>
	<b>Construction Manager</b>	<b>6</b>	<b>10.0</b>	<b>10.0</b>	<b>100.0</b>
	<b>Total</b>	<b>60</b>	<b>100.0</b>	<b>100.0</b>	

### 4.3 Descriptive Statistics

This section's descriptive statistics are being used to evaluate the opinions of the respondents regarding the survey questionnaire subscales. Descriptive statistical techniques were employed to achieve this, as shown in Table 6.

**Table 6** Mean and Standard Deviation for Probability of Occurring

Descriptive Statistics			Me an	Std. Deviat ion
Financia l	a1	To what extent do you think delayed payment on contract represents a risk to construction projects?	3.18	1.08
	a2	To what extent do you think unmanaged cash flow represents a risk to construction projects?	3.30	1.18
	a3	To what extent do you think that exchange rate fluctuation negatively affects construction projects?	2.80	1.23
	average		3.09	0.95
Legal	a4	To what extent do you think that delayed disputes resolutions	2.95	1.19

		represents a risk to construction projects?		
	a5	To what extent do you think that ambiguity of work legislations represents a risk to construction projects?	2.73	1.29
average			2.84	1.10
Design	a6	To what extent do you think that defective design negatively affects construction projects?	3.65	1.27
	a7	To what extent do you think that rush design negatively affects the construction projects?	3.32	1.10
	a8	To what extent do you think that inconsistencies between the bill of quantities, the	3.07	1.30

		drawings, and the requirements negatively affects the construction projects?		
average			3.34	1.03
Physical	a9	To what extent do you think that poor safety procedures lead to accidents in construction sector?	3.43	1.24
	a10	To what extent do you think that occurrence of defective materials can cause accidents in construction sector?	3.22	1.26
	average			3.33
Management	a11	To what extent do you think that changes in management ways represent a risk to construction projects?	2.78	1.09

	a12	To what extent do you think that Information unavailability represents a risk to construction projects?	3.15	1.29
	a13	To what extent do you think that Poor communication among involved parties represents a risk to construction projects?	3.33	1.14
average			3.09	1.00
Construction	a14	To what extent do you think that rush bidding represents a risk to construction projects?	3.08	1.14
	a15	To what extent do you think that undocumented change orders represent a risk to construction projects?	3.23	1.27

	<b>a16</b>	<b>Do you think design changes represent a risk to construction projects?</b>	<b>2.75</b>	<b>1.31</b>
<b>average</b>			<b>3.02</b>	<b>1.03</b>

The most frequent risk factor affecting projects is design, with an average of 3.34; it is followed by the physical, with an average of 3.33; the financial, with an average of 3.09; the management, with an average of 3.09; the structural, with an average of 3.02; and finally the legal, with an average of 2.84.

An essential component of risk management in building projects is offering solutions for construction risks. The results of the thesis reveal that there are almost 11 elements, with an average mean more than 3, which significantly affect the construction process. Table 7 lists these elements along with some suggested countermeasures for these risks.

**Table 6** Proposed Solutions

<b>Code</b>	<b>Risk Factor</b>	<b>Category</b>	<b>Mitigation Action</b>
<b>a1</b>	To what extent do you think delayed payment on contract represents a risk to construction	Financial	<ul style="list-style-type: none"> <li>Contractors must give information on the progress of their work invoices</li> </ul>

	n projects?		and any extra records. <ul style="list-style-type: none"> <li>Contractors need to communicate with their customers regularly about payments.</li> <li>A complete understanding of the obligations related to payments.</li> <li>To resolve issues promptly, open communication with the client is necessary. The contract's payment conditions should also be employed in accordance with its customary format.</li> </ul>
<b>a2</b>	To what extent do you think unmanaged	Financial	<ul style="list-style-type: none"> <li>Utilize cash flow projectio</li> </ul>

	cash flow represents a risk to construction projects?		<p>ns.</p> <ul style="list-style-type: none"> <li>Specify payment conditions in contracts.</li> <li>Encourage early repayment.</li> <li>Make your payments on time.</li> <li>Offer a variety of payment options.</li> <li>Add a late/delayed payment fee.</li> </ul>
<b>a6</b>	To what extent do you think that defective design negatively affects construction projects?	Design	<ul style="list-style-type: none"> <li>Carry out thorough field surveys.</li> <li>Keep the lines of communication open between the teams.</li> <li>Make use of cutting-edge management solutions to keep an eye on contractors and subcontr</li> </ul>

			actors
<b>a7</b>	To what extent do you think that rush design negatively affects the construction projects?	Design	<ul style="list-style-type: none"> <li>Use the most recent project tracking software</li> <li>Make sure your crew is properly trained.</li> </ul>
<b>a8</b>	To what extent do you think that inconsistencies between the bill of quantities, the drawings, and the requirements negatively affects the construction projects?	Design	<ul style="list-style-type: none"> <li>Contractors have to ensure that the risks and difficulties associated with each work item are taken into account in their unit rates, along with the cost of the materials required to finish the project.</li> <li>Principals should carefully check the bill of quantities that student quantity surveyors have created</li> </ul>

			<p>in order to reduce bill of quantities errors.</p> <ul style="list-style-type: none"> <li>To ensure that only drawings and bills of quantities signed by certified experts are accepted in all public procurements, the government should establish stricter requirements.</li> </ul>
<b>a9</b>	To what extent do you think that poor safety procedures lead to accidents in construction sector?	Physical	<ul style="list-style-type: none"> <li>Participate in Communication</li> <li>Recognize Risks</li> <li>Offer Training</li> </ul>
<b>a10</b>	To what extent do you think that occurrence of defective materials can cause accidents in	Physical	<ul style="list-style-type: none"> <li>Attention should be given to efficient maintenance.</li> </ul>

	construction sector?		
<b>a12</b>	To what extent do you think that Information unavailability represents a risk to construction projects?	Management	<ul style="list-style-type: none"> <li>The employees should examine how important it is to supply all site information on schedule.</li> <li>The management should offer the site an effective communication strategy.</li> </ul>
<b>a13</b>	To what extent do you think that Poor communication among involved parties represents a risk to construction projects?	Management	<ul style="list-style-type: none"> <li>Create a chain of command for communications.</li> <li>Decide on the best channel for communicating the message.</li> <li>When writing communications, always use a formal voice.</li> </ul>
<b>a14</b>	To what extent do you think that rush bidding	Construction	<ul style="list-style-type: none"> <li>Review the bid conditions in detail.</li> </ul>



	represents a risk to construction projects?		<ul style="list-style-type: none"> <li>• Use software for construction bidding.</li> <li>• Be mindful of proposal risks.</li> <li>• Study guidelines and plans</li> </ul>
<b>a15</b>	To what extent do you think that undocumented change orders represent a risk to construction projects?	Construction	<ul style="list-style-type: none"> <li>• Promote contractor and design team cooperation.</li> <li>• Improve collaboration between disciplines during design.</li> <li>• Ensure contract documentation is clear.</li> <li>• Reduce the risks posed by unforeseen circumstances</li> <li>• Request estimates for potential replacements and allocate the necessary amounts</li> </ul>

			as allowances.
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## 6 Conclusion and Recommendations

The main goal of this thesis is to identify, rank, and manage risks in construction projects in order to achieve project goals. To accomplish this, the researcher employed primary data gathered from a questionnaire. The Cronbach's Alpha Coefficient was used by the researcher to examine the questionnaire's internal consistency, and the results revealed that the instrument's overall reliability reached (0.937), indicating that it is quite reliable. The survey received responses from 60 people in total. In accordance with the findings, the average mean for the responses is as follows: 3.09 for financial-related risks, 2.84 for legal, 3.34 for design, 3.33 for physical, 3.09 for management, and 3.02 for construction-related risks. This may lead to the design-related risks having the highest ranking among those that are likely to arise in building projects. "The negative effect of defective design on construction projects" had the highest mean of all the factors, at (3.65).

The following point of research can be recommended for future studies:

- For some categories of construction projects, a comprehensive inquiry must be conducted.

- Future research should focus more on the connections between different risk factors and how those connections affect project risk as a whole.
- Establishing an appropriate legal framework for overseeing sustainable construction projects

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