

## **RESEARCH ON RISK MANAGEMENT OF A GY OFFICE PROJECT IN UAE**

**Alotaibi Sultan Barjas g** 

Ministry of Education, Saudi Arabia, School of Business Administration,  
Management of Science and Engineering, Hunan University, Changsha city, P.R. China  
hnewsio@126.com, sultan.o9@hotmail.com

**Wang Zhong**

School of Business Administration, Management of Science and Engineering,  
Hunan University, Changsha city, P.R. China

### **Abstract**

*This article combines the existing knowledge of risk management theory and takes the GY office building project as an example. Based on the specific conditions of the construction phase of the project, it conducts in-depth research and discussion on the construction risks. Based on the theory of risk management, the paper uses the analytic hierarchy process to analyze risk factors, and identifies and evaluates the risks of GY office building construction projects in order to obtain project risk influencing factors and risk response measures. We found that the risky indicators in the construction of the project are: safety risk, quality risk and design plan change risk. Therefore, improving the management level of relevant risk managers is an urgent problem to be solved. At the same time, it is necessary to establish sound laws and regulations, increase the punishment of illegal activities, and regulate the real estate construction industry.*

*Keywords: Risk Management, GY office building, analytic hierarchy process, risk factors, response measures*

### **INTRODUCTION**

Due to its extensive construction content and complex construction process, construction projects will inevitably face many construction risks. For this reason, there are many researches on the field of risk management research in project construction. The GY office building project

is a new project in Dubai. Its unique geological structure and independent project management determine its risk management type. Therefore, in view of the current situation in UAE real estate, it is necessary to conduct research on the risk management of real estate companies, improve the real estate risk management theory and index system, and strengthen the ability of real estate companies to resist risks. This will provide relevant opinions for the sustainable and steady development of real estate in the UAE.

Many scholars have conducted research on project risk management. In 1956, the American scholar Snider put forward the concept of risk management. The concept was supported by the American Management Association (AMA) and the American Society of Insurance Management (ASIM). In 1980, the United States established the Society for Risk Analysis (SRA), which subsequently became the focus forum for the exchange of ideas among different academic groups. The Australian scholar Anthony Mills discussed the risk allocation in the article on system risk management of construction projects in 2001 and suggested that the risk be identified early in the procurement process. British scholar David Hillson conducted a research on how to use risk decomposition structure to carry out project risk management in the paper on project management using risk decomposition structure in 2003, and proposed that risk decomposition structure can play a powerful role in project risk identification and analysis report. However, there are relatively few studies based on the UAE construction project market. Most of them are limited to only one aspect.

For this reason, we have done research on the GY office building in the United Arab Emirates as an example. First of all, we will describe the GY office building construction project in detail and analyze the project management status at the same time. Secondly, we conducted risk identification and classification of the GY office building construction projects, and conducted risk assessments on the GY office building construction projects to obtain the risk response measures for the GY office building projects. Finally, the research results are obtained, suggestions for improvement are proposed, and the possible future research directions are prospected.

## **METHODOLOGY**

The GY office building project has an important significance for the construction of Dubai. Its main function is to develop business, finance and education. The specific content is shown in Table 1. The independent organizational form and unified management of the project are expected to be carried out according to design drawings. However, due to its long construction period and many uncertainties, there are risk factors in the engineering environment, technology, and management.

Table 1. GY Office Index

Name	Number	Unit
Floor area	4500	m <sup>2</sup>
Construction area	3240	m <sup>2</sup>
Parking space	500	ea
Greening rate	28	%
SO <sub>2</sub> emission reduction indicators	10	%

As a risk identification tool, the checklist method is an effective risk identification method commonly used in work. Through field exploration of the GY office building project, summarizing the specific conditions of the risk management in the project construction, and summarizing the existing problems, the risk events of the project were obtained.

The second step of project risk management in project construction is to assess risks. There are two sub-steps in project risk assessment: risk estimation and risk assessment. We use the analytic hierarchy process to analyze and rank the risk factors of the project risk to provide support for the next risk response.

After the overall evaluation of the risk of GY office building projects, we should consider how to formulate risk response strategies and measures, reduce risks, and improve risk response mechanisms.

## ANALYSIS AND RESULTS

### GY office building project risk identification

In view of the specific conditions of the GY office building construction project, a checklist method was used to identify the risk of the project as shown in Table 2.

Table 2. Risk Project Events

Target layer	Criterion level	Indicator layer	Risk factor analysis
A	B	C	
project risk of GY office building	Economic risk	Insufficient funds	Some funds need to be borrowed
		Changes in interest rates	Adjustment of financial policy
		Rising raw material prices	Inflation

Management risk	Delay in construction period	The coordination of the parties is not uniform
	Unreasonable organizational structure	Poor project manager risk awareness
	Insufficient management system	Failure to establish a sound institutional system
	Staff mobility	Inappropriate incentive
Technical risk	Design changes	Design ignores important factors
	Construction Claim Risk	The construction workers have poor sense of responsibility and do not follow the standard construction
Natural risk	Weather condition	Hot in the summer
	Hydro-logical and geological conditions	Less water, more desert
Construction risk	Quality risk	Poor quality of raw materials, design flaws
	Security Risk	Improper equipment operation, no safety measures

### GY office building project risk assessment

After risk identification, risk assessment is the second major step in the overall risk management and management. It bears four major tasks of calculating the risk probability, evaluating the size of the risk influence factor, affecting the degree of impact, and predicting the time when the risk occurs. For the GY office building construction project, the construction process is faced with many risk factors. In the establishment of the risk evaluation index system, this article fully considers all factors and covers the entire risk scope as comprehensively as possible. Identify risk factors, identify risk assessment indicators, and finally form a risk assessment index system for three-level GY office building projects. As shown in Table 3.

Table 3. Risk Evaluation Index System of GY Office Building Project

Target layer	Criterion level	Indicator layer
A	B	C
GY Office Building Project Risk	Economic risk B1	Insufficient funds C11
		Changes in interest rates C12
		Rising raw material prices C13

Management risk	B2	Delay in construction period	C21
		Unreasonable organizational structure	C22
		Insufficient management system	C23
		Staff mobility	C24
Technical risk	B3	Design changes	C31
		Construction Claim Risk	C32
Natural risk	B4	Weather condition	C41
		Hydro-logical and geological conditions	C42
Construction risk	B5	Quality risk	C51
		Security Risk	C52
		Schedule risk	C53

Table 3...

The result of the determination between the target layer A and the criterion layer B and the weights between the criterion layer B and the factor layer A in the risk evaluation system of the GY office building project. Comprehensive use of formula 3-1, can obtain the weight of each index of each level. As shown in Table 4.

$$b_j = \sum_{k=1}^n a_k b_{kj} \quad (3-1)$$

Table 4. Weight Distribution Table

Target layer A	Criterion level B	Weights	Indicator layer C	Weights	Secondary weight
GY office building project risk	Economic risk B1	0.087	Insufficient funds C11	0.548	0.0476
			Change in interest rate C12	0.297	0.0258
			Raw material prices rise C13	0.540	0.0470
	Management risk B2	0.150	Delay in construction period C21	0.107	0.0161
			Unreasonable organizational structure C22	0.186	0.0279
			Insufficient management system C23	0.292	0.0438
			Staff turnover C24	0.413	0.0620
	Technical risk B3	0.267	Construction Claim Risk C31	0.249	0.0664
			Design Change C32	0.751	0.2005

Natural risk B4	0.048	Weather conditions C41	0.2	0.0096
		Hydrology and Geology C42	0.8	0.0384
Construction risk B5	0.447	Quality Risk C51	0.320	0.1430
		Security Risk C52	0.558	0.2494
		Progress Risk C53	0.122	0.0545

Table 4...

Combining with Table 4, it can be clearly seen that in the construction process of the GY office building project, the construction risk is the highest, followed by the technical risk. Relevant departments should first take preventive measures on these two risks, and control all aspects affecting project construction. Through project risk analysis and evaluation, we can see that the risk of this project is within acceptable range and the project can be carried out.

### GY office building project risk countermeasures

The economic risk in the GY office building project, according to the actual situation of the project construction project, can be controlled by the following measures to economic risk, the risk response strategy is as follows.

Table 5. Countermeasures for Risks Under Economic Risks

Risk type	Risk response strategy
Insufficient funds	Risk retention, risk mitigation
Changes in interest rates	Risk mitigation
Rising raw material prices	Risk mitigation

The risk management in the GY office building construction project can be controlled through the following measures according to the actual conditions of the project construction project. Specific risk control strategies are shown in Table 6.

Table 6. Control Strategies for Risks Under Management Risk

Management risk	Risk Control Strategy
Delay in construction period	Risk mitigation
Unreasonable organization	Risk mitigation
Insufficient management system	Risk mitigation
Staff mobility	Risk mitigation, risk retention

GY office building project natural risk, according to the actual situation of the project construction project, can adopt the following measures to control the natural risk, the specific risk control strategy is shown in Table 7.

Table 7. Control Strategies for Risks Under Natural Risk

Management risk	Risk Control Strategy
Weather condition	Risk transfer, risk mitigation
Hydro-logical and geological conditions	Risk transfer, risk mitigation

The technical risk in the GY office building project, according to the actual situation of the project construction project, can be controlled through the following measures to control the technology risk, the specific risk control strategy is shown in Table 8.

Table 8. Risk Control Strategies Under Technology Risk

Management risk	Risk Control Strategy
Design changes	Risk transfer, risk mitigation
Construction Claim Risk	Risk transfer, risk mitigation

In the construction risk of the GY office building construction project, according to the actual situation of the project construction project, the construction risk can be controlled through the following measures. The specific risk control strategy is shown in Table 9.

Table 9. Risk Control Strategies

Construction risk	Risk Control Strategy
Quality risk	Risk mitigation
Security Risk	Risk mitigation, risk transfer
Schedule risk	Risk mitigation, risk retention

## CONCLUSIONS AND RECOMMENDATIONS

The GY office building project is a new project in Dubai. Its unique geological structure and independent project management determine its risk management type. This article combines the existing knowledge of risk management theory, according to the specific conditions of the construction phase of the project, conducted in-depth research and discussion on the construction risks, and obtained the following conclusions:

1. In the process of risk identification, the GY office building project has the following five risks in the construction phase, namely: construction of economic risk, management risk, technical risk, natural risk and construction risk. The lack of funds, changes in interest rates, and rising raw material prices are economic risks. Management risks include delays in construction schedules, irrational organizational structures, unsound management systems, and staff turnover. Technical risks include design changes, construction claims risks, natural risk meteorological conditions, hydrology, and geology. Construction risks include quality risks, safety risks, and schedule risks.

2. After determining the various risk factors in the construction phase of the GY office building project, establish a risk assessment index system. And using the AHP method to determine the weight of the five first-level indicators and 14 second-level indicators. The weight of each indicator can well reflect its importance to the risk status, and each indicator passed the consistency test can be in good agreement with the actual situation. After the criterion level is multiplied with the weight of the indicator level to obtain the second-level weight, the risk level of the indicator layer relative to the target level is determined, and the size of the risk value of each indicator is calculated. Finally, it can be concluded that the indicators with higher risks in the project construction process are: safety risks, quality risks, and design program change risks.

3. Through the above analysis, we can see that GY office building projects still have certain risks, that is, risk management is still not perfect. In the face of the absence of risk management, this paper scrutinizes risk response strategies based on risk identification and risk assessment. Strategies include risk aversion, risk mitigation, risk transfer, and risk retention. At the same time, detailed advice on risk management organizations and risk management systems is removed.

4. During the in-depth research and evaluation of the risk of GY office building projects, the problems in the real estate construction industry have also been highlighted. For example, in order to save costs or complete the work ahead of schedule, the company secretly changes the design drawings of the previous period. And in order to increase the sales area, the company violated the regulations and increased the volume ratio. The company did not establish sound safety protection measures at the construction site, which not only increased the construction risk, but also increased the difficulty of risk management. Therefore, improving the management level of relevant risk managers is an urgent problem to be solved. At the same time, it should also establish and improve laws and regulations, increase the punishment of illegal activities, and regulate the real estate construction industry.

## WAY FORWARD

Although this article identifies the risks existing in the construction of the project and establishes an index system, the risk factors of the construction project will be more complicated in the actual construction, leading to more diverse risks. During the summary of the article, I found that there are many deficiencies in this article, mainly in:

(1) In this paper, qualitative analysis of risk indicators and quantitative analysis of indicators are few, which makes the conclusion not convincing. In the follow-up research and study, more attention will be paid to the quantitative analysis of indicators, and a more effective quantitative research model will be established to provide more reliable empirical support for the research of index evaluation systems.

(2) Due to the characteristics of the project itself, the risk factors affecting the project are numerous and constantly changing. Therefore, in the course of the study, all the risks involved in the GY office building project were not identified and evaluated, which made the study have certain limitations. In the future research, better research methods and techniques should be selected to cover all risks of the project as far as possible, and a comprehensive and detailed study of the project should be conducted.

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