



A Critical Review by Using SWOT Analysis to Identifying Risk in the Malaysian Construction Industry: Case Study Evaluation

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ABSTRACT

Risk management is one of the most important project management tools that can predict unconfirmed events and risks during the project implementation period. To obtain a high level of performance to complete the project, most project managers are keen to implement and use this tool within the project life cycle effectively [1].

To identify the potential impacts of risks, enhance positive certainty and reduce the effects of negative uncertainty, a series of risk management processes or activities are used that in turn identify, analyses and interact with project risks. When we compare the higher developed countries with other less developed countries, we find that the application of risk management is widespread and effective, in Malaysia, which is trying to be a developing country that can be affected by social, technological, economic, political and environmental risks, so the risk management in projects is not considered a fixed approach that can be adopted and that needs to be developed and continuous research [2].

During the planning and implementation phases of the project, risk management can play an important role in making critical and accurate decisions that reflect positively on the project and make the status clearer through the preparation of an integrated approach to potential risks [3]. Despite this, risk management systems and methods of treating them are sometimes well implemented in the construction industry, projects are affected by several factors such as stakeholders, agreements, laws and the project environment, which can generate potential risks and consider it a unique and important event that requires good and effective management and treatment. In this study, some previous and recent literature has been relied upon to obtain information related to risk management systems in the construction industry in Malaysia and the extent of their effectiveness and their impact on the project [1].

This study was based on previous data that were re-analyses and the risks identified by using the SWOT tool. This was applied to data related to 4 construction projects in Malaysia, and the SWOT tool was developed to clarify the causes of problems, strengths, and weaknesses in those projects and give the necessary recommendations for that.

The results reveal that there is still a big gap between the management of construction projects in Malaysia and the use of known methods of risk management, which means that there is a clear and large lack of risk management application systems in the construction industry, which requires comprehensive awareness of project departments like engineers and contractors and obligating them to implement the risk management system. also, it is possible to enact relevant laws to reduce the risk in projects, which will positively affect the Malaysian construction industry.

Keywords: Risk, Risk Management, Construction Industry, SWOT.

1. Introduction

The process of identifying, analyzing, treating and reducing risks in construction projects is called construction risk management, which leads to the achievement of the project objectives without or with minimal losses possible. To ensure the excellent and proper implementation of any project, steps must be taken to manage risks and deal with risk as an important and influential event. Therefore, in the process of construction, risk management systems cannot be ignored whatsoever. The risk management process in construction projects can provide several benefits and advantages such as (reducing cost, increasing value, achieving required objectives, reducing uncertainty, and most importantly, the reliability of shareholders). Determining the undesirable and negatively impacting events of the project (such as cost and time) is the main goal of the risk management process, through which the resulting damages can be reduced or stopped.

In general, risk management methodologies and applications are not adopted in many companies, and through long-term research, it was found that the experience and intuition are those who deal with risks in projects instead of a department specialized in that. To determine options and steps to reduce risks, certain steps are taken and sequenced during the life of the project, which is considered a risk management system [4]. These Processes are shown in (Figure 1) [5].

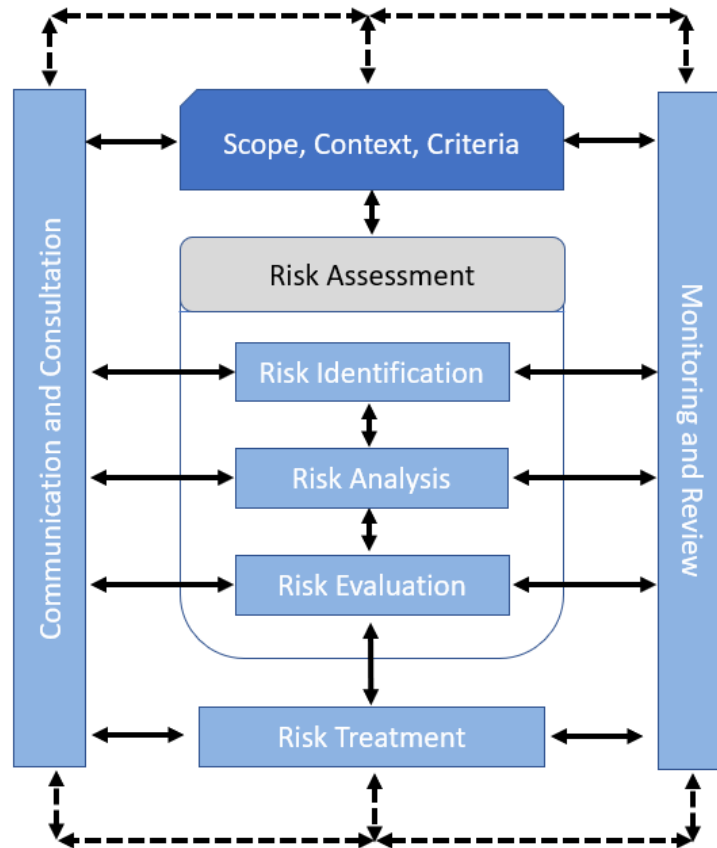


Fig. 1 Influenced Risk Management Process [5]

In Malaysia, the construction industry is one of the most important sectors that have led to the development of economic growth. On the other hand, there are many high risks faced by construction projects during the planning, start-up, implementation, control and closing stages. Sometimes the risks that occur during the implementation of construction projects can be considered higher risk than the problems that occur in the economic sector [6].

[7] Explained that the risk management practices in the Malaysian construction industry are not systematically applied by contractors, owners and consultants, this ultimately leads to the emergence of a clear weakness in the project. Previous studies have shown that many of the restrictions in construction projects have negatively affected risk management, such as (bad decisions resulting from managers, designers and implementers, as well as human errors), which negatively affected the project outputs. Because of the spread of various risks in the construction process, it required regular and systematic management of this, and it became an essential part of the success of any project. It seems clear the need for management with high experience in previous projects and following a systematic methodology to deal with any problems or risks that may affect the project. Also, the absence of a risk management department that can know or predict the occurrence of unwanted risks for all aspects of the project. Many companies follow a way to reduce expenses by not expanding in specializations and jobs, including the position of risk management engineer, but in the end, they incur high additional costs and waste valuable time as a result of a failure that may result from any risk.

Compared with other industries and fields of work, the sector most exposed to risks is the construction industry, especially companies. Designers, implementers, contractors and consultants can be considered as the main players affecting the project negatively or positively and this can reflect on the reputation, quality, time, cost and obligations.

Construction projects have several important and unique features, including (long implementation periods, financial density, complex operations, dynamic organizational structures, and legal, environmental, and social constraints) that may affect the project if it is not well managed and this is what has been observed in many projects in Malaysia [8].

[8] Referred that the initial stages of any project have a higher level of risk than the rest of the stages, due to the high level of uncertainty. When the risk is not identified and addressed in the initial stages of the project, this affects the subsequent phases and creates other risks with multiple effects, and as a

result, the proactive steps for managing risks since the start of the project become very important, especially concerning making wise and correct decisions resulting from the correct methodology and application of systems for risk management, which results in good project management as specified and does not cause harm to all partners and shareholders.

Because of its complex and unique features, the construction industry is the most challenging and dynamic in Malaysia. Although since the nineties the idea of risk management was adopted in Malaysia and started to apply, most companies did not establish departments dealing with risk management [9].

In addition to what was previously mentioned, and in the absence of sufficient data on risk management compared to the large construction industry sector in Malaysia, this study aims to find appropriate tools to identify risks and analyses the procedures used by the companies that have been selected as a case study.

2. Research Methodology

In this study, the methodologies that were used included a review of previous literature, semi-structured interviews, as well as recent research published in scientific journals, in addition to databases extracted from the Internet. Through one of the previous literature, four interviews were identified with managers of construction projects in Malaysia to obtain information and data related to risk management within those projects.

Following an experimental investigation or research to investigate a specific and realistic phenomenon is known as a case study. Sometimes, multiple and possibly individual cases may be studied, depending on the type of research and the type of required information. Researchers study cases individually for each case, then compare and find differences and similarities between them. Reliability in a qualitative study can be defined as the degree of consistency through which cases are assigned to the same class by several different observers or by the same observers but on different occasions. Comparing the analysis of the same data by multiple observers increases the reliability of the qualitative method. To ensure the reliability and accuracy of the data, the data was collected from four different projects in Kuala Lumpur. The types of persons who were interviewed were selected to obtain targeted data and who had extensive knowledge and experience and worked on the project for several years [9].

2.1 Procedures of Case Studies

(i) Protocol Design.

The first step is to create a protocol and how to gather data:

- Review the main objectives of the project and the main task of the case study.
- Completing field procedures and accessing resources and reviewing them.
- Conducting the questionnaire through interviews with the concerned persons to collect the data required in the study.
- Preparing the final report for the case study, including the answers and evaluations.

(ii) Conduct Case Studies.

In a case study, interviews are the most important source of information. Through the interviews, researchers can obtain sufficient data and important information about the project in addition to the opinions of the person being interviewed (project manager, engineer, contractor, consultant). This will be a catalyst and confirm the reliability of the previously collected data. Four interviews for multiple projects were conducted within this study and are detailed in (Table 1).

Table 1: List of Construction Projects Used as Case Studies

Project 1	Construction of one new additional block which consists of 11 stories, an auditorium, and other facilities in the Faculty of Built Environment, University of Malaya (UM), Kuala Lumpur.
Project 2	Construction of 8 storeys Complex of Institute Pengurusan Penyelidikan dan Perundingan (IPPP) and a Research Laboratory at the University of Malaya (UM), Kuala Lumpur.
Project 3	A demolition work of the existing building and new construction of Pusat Pengurusan Termaju (Parcel A) which consists of (A) 17 stories of Menara HEAMP, (B) one block of Dewan Seminar, and (C) four stories of Rumah Universiti and other related construction work at Universiti Teknologi Malaysia (UTM), Kuala Lumpur.
Project 4	Construction of additional academic blocks and hostels for Universiti Pertahanan Nasional Malaysia, Kem Sungai Besi, 57000 Kuala Lumpur.

(iii) Analyses the data extracted from the case study.

The data and results gathered through the interviews were documented along with the information available from the previous literature. Then the stage of analysis and evaluation begins through the use of one of the qualitative tools for risk management (SWOT).

2.2 SWOT Analysis in Project Management

Project managers use a strategic planning approach to help find and analyses strengths, weaknesses, opportunities, and threats in their projects. which is called SWOT analysis. SWOT analysis helps to reduce risks in the project and improve planning, and the likelihood of project success will be high. This type of analysis is used by companies to evaluate the four main aspects mentioned, and this leads to a better understanding of success and to identify areas that must be focused on to improve them, which will reflect positively on the project in general [10].

2.3 SWOT Analysis Tools for Construction Companies

By conducting a SWOT analysis, companies in the construction field can identify hidden vulnerabilities and threats that are not visible. This is a good approach for companies that are always affected by conditions that negatively affect the project, such as new competitors or a change in economic or environmental conditions, this is reflected positively on the client's point of view in terms of increasing quality and reducing time and costs [11].

[9] explained the four focus areas that make up the acronym SWOT and how they apply to project management:

- **Strengths:** These are controllable factors (internally controlled factors) through which the project's success mechanism can be determined. These factors increase the chances of success of the project such as (client interaction, team member experience, company reputation, robust project management software, detailed project management requirements, design, and financial capacity of the company).
- **Weaknesses:** These can be considered as internal factors that reduce the chances of success of the project, such as (lack of team experience, lack of clarity of vision, lack of consistent and correct methodology, lack of project funding, comprehensive resources, teamwork and consensus, wrong decisions).
- **Opportunities:** They are external factors that can be considered out of control and can support or help the project to achieve success. It is a matter of experience and a study of the current conditions that may help the project and the possibility of benefiting from it. It is possible not to benefit from it and to lose the opportunity if it is not properly exploited. Such as (trends, separate staff for new clients, customer's needs, demographics, pricing, talents, innovation, and loosening of regulations, there is no pressure from the shareholder, and knowledge of developing trends).
- **Threats:** Some external factors can harm the project if it is not properly dealt with, such as opportunities, which may be threats at present or in the future if they are not exploited, meaning that current opportunities may turn into threats in the future. There are also several other threats such as (sudden increases in costs, contractors, weather conditions, laws and legislation, the market economy, Obstacles, competition between companies, changing regulations or standards, changing technology, and weaknesses can later become a clear threat).

(Figure 2) shows the main components of the SWOT strategy [12]. (Figure 3) shows the SWOT analysis for better strategic planning.



Fig. 2 SWOT Strategy Components [12]

	Opportunities (external, positive)	Threats (external, negative)
Strengths (internal, positive)	Strength-Opportunity strategies Which of the company's strengths can be used to maximize the opportunities you identified?	Strength-Threats strategies How can you use the company's strengths to minimize the threats you identified?
Weaknesses (internal, negative)	Weakness-Opportunity strategies What action(s) can you take to minimize the company's weaknesses using the opportunities you identified?	Weakness-Threats strategies How can you minimize the company's weaknesses to avoid the threats you identified?

Fig. 3 SWOT Analysis for Better Strategic Planning [13]

3. Results and Discussions

3.1. Case Study 1 (Project 1)

The project engineer was interviewed who worked for four years on this site. This project adopted the (CPM) critical path method to determine the events and activities of the project and to show the sequence of any activities that will be implemented first, delay was the most important risk that was diagnosed in this project, and this appeared on the relationship with the contractor and the client, for rapid processing of this problem, has been conducted some transfers between employers and workers from one activity to another in an attempt to control the problems that have occurred. During the progress of project operations, an S-curve method is used for project controlling to identify budgetary and time risks. The types of S-curves that were used are (Cost versus Time S-curve, Target S-curve, Value and Percentage S-curve, and Actual S-curve).

It is very clear in this project that the project manager focused on the aspect of (project management) instead of focusing on risk management, and did not follow any effective tools for identifying, analyzing and treating the risk, as well as the SWOT strategy that was not included in the agenda of the project team as a successful way to control risks.

3.2. Case Study 2 (Project 2)

The project manager was interviewed to collect sufficient data and has more than ten years of experience in the field of construction project management. In this project, the SWOT strategy is used to identify risks directly by project management without the participation of the rest of the team members, and this poses a problem in risk management because participation in it depends on the level of the organization. And it became clear here that many other specialists should be involved in the risk management and control process.

In this project, the SWOT analysis process is going well through the weekly meetings, which examine SWOT every week, which results in quick recommendations for treatment, specifying the activities to be addressed, as well as identifying the obstacles that prevent this. A method has been adopted to control or mitigate risks through the use of risk response technology due to the presence of clear ambiguity in the likelihood of risk occurrence. With an alternative or backup plan to ensure that the project is running on the right track without wasting costs or time. Here, it seems clear the lack of a competent person who can deal with risk management and can predict the risk before it occurs. although the company follows a SWOT analysis, this is not sufficient without the presence of a competent person to deal with that.

3.3. Case Study 3 (Project 3)

This project manager has more than 17 years of experience working on construction projects. According to the project manager, the project management believes that there are more important matters in the project that need time and focus instead of spending time managing and analyzing risks. Likewise, risk management in this project, even if it is relatively few, is managed by the safety official at the site, and safety measures or risk management can be only if there is a warning or alert from the local authority or the client. Although the recommendations and principles of ISO 9000 were adopted in the project, there are no strategies or techniques for using risk management that have been applied in the project. Also, SWOT analysis is not applied in risk management and was not based on it at all during work.

The project management believes that the demolition of buildings is the only major risk to the project, so they focus on safety principles above all else. It is very clear that the risks that occur in this project are dealt with directly without any previous forecasts, which directly affects the performance of the project and thus leads to a delay in the implementation period, which the project management believes is due to design problems, but this cannot be believed in light of the absence of risk management, which was a major cause of project delay.

The project manager admitted that the risks that occurred could have been avoided if there had been a risk management department that had prior planning for every possible risk that would occur, here it became evident the need to create this department in the project to avoid risks in future, and he also explained that the cost of risk management or the establishment of this department must be borne the client and has to mention this in the contract.

3.4. Case Study 4 (Project 4)

To obtain sufficient information and data for this project, a meeting took place with the project manager. One of the risk management techniques was used by conducting continuous workshops to identify and analyses the risks that the project faces. During the initial planning phase of the project, the first workshop was held in the presence of (the client, project manager, contractor, consultant, and project engineers) through which they were able to identify the risks that may face the project in each life cycle of the project. The causes that lead to the emergence of risks have also been identified and the best solutions to reduce them or reduce their impact were identified. In the subsequent workshops, attention was given to the risks with the greatest impact, and then the risk control phase was started by using the risk response technique. Ultimately this resulted in control of overtime schedule and project costs and better use of resources.

Through continuous workshops, a risk management plan (RMP) was adopted, through which all risks were reduced and managed efficiently with results that the work team believes are good. The SWOT strategy was not used in this project.

(Table 2) shows the SWOT criteria for each project which the researcher believes directly affects the success of the projects.

Project	Strengths	Weaknesses	Opportunities	Threats
P1	<ul style="list-style-type: none"> ▪ The size and importance of the work ▪ Transportation costs ▪ Duration of construction ▪ University support ▪ Efficiency reduces expenses ▪ Experience / Skills ▪ Knowledge of Subcontractors 	<ul style="list-style-type: none"> ▪ Site surrounded by lots of existing buildings (University) ▪ Design: ▪ Not using risk management techniques 	<ul style="list-style-type: none"> ▪ Loosening of regulations ▪ There is no pressure from the shareholder ▪ Best used for CPM and S-Curve ▪ Possibilities of Working on Future Projects ▪ Knowledge of Developing Trends 	<ul style="list-style-type: none"> ▪ New regulations ▪ Environmental factors ▪ Governmental obligations ▪ Time factor ▪ Inclement Weather ▪ Economic Factors
P2	<ul style="list-style-type: none"> ▪ Transportation costs ▪ Location in Klang Valley ▪ Bumiputra's company ▪ Duration of construction progress ▪ Efficiency reduces expenses ▪ Experience / Skills ▪ Knowledge of Subcontractors 	<ul style="list-style-type: none"> ▪ The site is surrounded by lots of existing buildings ▪ The size of the site is very small ▪ Design ▪ Focus on safety only ▪ Problems bearing the cost of risk management between the client and the contractor ▪ Resistance to New Construction Methods and Technology 	<ul style="list-style-type: none"> ▪ New technology ▪ Market demand ▪ Loosening of regulations ▪ Possibilities of Working on Future Projects ▪ Knowledge of Developing Trends 	<ul style="list-style-type: none"> ▪ New regulations ▪ Environmental factors ▪ Economy ▪ Political influences ▪ Inclement Weather ▪ Economic Factors
P3	<ul style="list-style-type: none"> ▪ The size and importance of the work ▪ Transportation costs ▪ Duration of construction ▪ University support ▪ Efficiency reduces expenses ▪ Experience / Skills 	<ul style="list-style-type: none"> ▪ Site surrounded by lots of existing buildings (University) ▪ Design ▪ Lack of interest in risk management 	<ul style="list-style-type: none"> ▪ Loosening of regulations ▪ There is no pressure from the shareholder ▪ Using ISO 9000 ▪ Possibilities of Working on Future Projects ▪ Knowledge of Developing Trends 	<ul style="list-style-type: none"> ▪ New regulations ▪ Environmental factors ▪ Governmental obligations ▪ Loss of time and reputation ▪ Contractual financial losses ▪ Inclement Weather ▪ Economic Factors

P4	<ul style="list-style-type: none"> ▪ The size and importance of the work ▪ Transportation costs ▪ Duration of construction ▪ University support ▪ Experience / Skills 	<ul style="list-style-type: none"> ▪ Site surrounded by lots of existing buildings (University) ▪ Design: ▪ Inexperienced Workers 	<ul style="list-style-type: none"> ▪ Loosening of regulations ▪ There is no pressure from the shareholder ▪ Using RMP ▪ Possibilities of Working on Future Projects 	<ul style="list-style-type: none"> ▪ New regulations ▪ Environmental factors ▪ Governmental obligations ▪ Loss of time and reputation ▪ Contractual financial losses ▪ Inclement Weather ▪ Economic Factors
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Table 2: SWOT Analysis Table for each Project

4. Conclusions

Through the SWOT analysis that is shown in Table (2), which was used to identify risk areas for each project, the following was determined:

- 1- The CPM and S-Curve were used in the first project and the focus was on project management and ignoring risk management, and SWOT analysis was not implemented.
- 2- In the second project, SWOT analysis was used by the project management, and the results appeared convincingly on the project's performance, although it was not implemented in an ideal manner.
- 3- In the third project, the risks appeared clearly in the cost and the implementation period due to not using any of the risk management techniques, which were neglected by the project management, and even if they were implemented, this was done in a very low manner.
- 4- In the fourth project, good risk management was implemented through continuous workshops, good follow-up of risks, and identification of ways to control risks by following the (RMP) method.

This study showed that most of the projects in Malaysia (construction projects) do not follow or use risk management techniques, they focus on the experience factor and neglect the prediction aspect. Whereas, a small number of project managers follow risk management techniques in their projects. The main factor for this is the lack of knowledge of risk management among the project management and team, as well as the absence of strict legislation and laws that oblige companies and contractors to follow a systematic approach to risk management in projects. Also, many project managers use risk management methods indirectly or unintentionally due to their lack of knowledge of these methods and their lack of knowledge of modern methods of risk management and not taking advantage of previous failures through which, they can analyze the causes of failure and find successful alternative solutions.

The technical, financial, environmental and human variables are key factors for the success of the project, which require a full awareness of these factors. Projects in general, should focus on the success factors and try to benefit from them because their returns are reflected in the company's reputation, budget and time, and also reduce risks to a large extent [14]. In this study, a broad and targeted view was presented, through which the reasons for the non-implementation of risk management were identified, which are likely to affect construction project management in Malaysia.

The most important step that must be taken by officials in the construction industry in Malaysia is to provide in-depth training programs related to risk management to encourage contractors and companies to apply risk management methodology in their projects [15].

The limitation of this study is that this study was conducted solely in the construction industry in Malaysia. As most construction projects in Malaysia do not have systematic risk management procedures, this study could not find successful examples of conducting risk management in construction projects in the country; thus, a comprehensive model for risk management could not be developed for the local construction industry.

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