



جامعة الجميع الذكية
EVERYONE'S SMART UNIVERSITY

Everyone's Smart University

Project (Spring 2021)

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Section

Master

Date

Thursday

18 / 03 / 2021.

Course Code

(PMG510)

Project Risk Management

Instructions:

- اخر موعد للتسليم هو يوم السبت 2021-05-08 في تمام الساعة ٩ مساءً.
- الإجابة متاحة باللغة الإنجليزية أو اللغة العربية مع مراعاة أن تكون المصطلحات العلمية باللغة الانجليزية.
- يتم تسليم المشروع في صيغة ملف . pdf مع الالتزام نموذج الجامعة ولن تقبل أي مستندات أخرى.
- يجب مراعاة أقسام البحث الرئيسية (مقدمة Introduction، دراسات علمية سابقة Literature Review، طريقة البحث Methodology، النتائج والمناقشة Results and Discussion ، وأخيراً المراجع References . وان كان هناك ملحقات Appendices يتم إضافتها)
- يجب الالتزام بـ Theme موحد كما يلي:
- حجم الخط 12.
- نوع الخط Arial.
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Instructor's Name: Eng. Mosaab M. Hamed

Risk Management in an Owned House Construction Project

1. Introduction

Risk management (RM) is a term that is used in a variety of sectors. While each industry has its own RM requirements, the basic concepts of the definition are generally the same regardless of the industry. According to the Project Management Institute (PMI) (2004) project risk management is one of the nine most important aspects of project commissioning, this suggests a close connection between risk management and project performance. Although risk management is defined as the most challenging aspect of construction management (Winch, 2002; Potts 2008), it is encouraged in all projects to prevent negative consequences (Potts, 2008).

Because of the size of each project, the construction industry operates in an extremely volatile environment (Sanvido et al., 1992). Each organization's goal is to be effective, and RM can help with that. However, it is important to note that risk management is not a tool that guarantees success; rather, it is a tool that aids in the chance of success. As a result, risk management is a proactive rather than a reactive concept.

This project seeks to construct a new house for our family in Riyadh. My husband approaches threats in such a way that he is aware of risks but do not employ any formal strategies for dealing with them. he does assume, however, that risk management techniques will help the project perform better. My role as a project manager in this project is to analyze risk management strategies through the project life cycle.

2. Literature Reviews

2.1. The risk management

The PMBOK® Guide (2004) defines a project risk as “an uncertain event or condition that, if it occurs, has a positive or negative effect on at least one project objective”. There are many risks that could cause the construction project to fail, and it is critical to understand which risk factors are active at the same time in the project. As stated by Raz et al. (2002),

too many project risks as undesirable events may cause construction project delays, excessive spending, unsatisfactory project results or even total failure.

2.2. Benefits of risk management

The RMP should be continuously developed during the project to maximize risk management performance. Risks will be identified and managed in this manner in all phases (Smith et al. 2006). Risk management aids in gaining a deeper understanding of the potential consequences of unmanaged risks and how to prevent them (Thomas, 2009). Working with risk management also gives you greater control over the project as a whole and more effective problem-solving processes (Perry, 1986). Risk management also includes a procedure for minimizing potential and unexpected surprises (Cooper et al. 2005).

2.3. Risks in construction projects

Due to the nature of the construction sector, RM is a very important process. It is most widely used in those projects which include high level of uncertainty. Because of that, the portfolio of risks associated with all participants over the project life cycle (PLC) should be considered to ensure that the project goals are met (Cleland and Gareis, 2006).

In the construction industry, there are a variety of risks that can be found and encountered in any project, regardless of its size or scope. The most common risks includes changes in design, scope, and project completion dates (Gould and Joyce, 2002).

2.4. Risk management process

The risk analysis and management techniques have been described in detail by many authors (Ahmed et al., 2007; Smith et al., 2006). A typical risk management process includes the following key steps (Wysocki, 2009) :

- Risk identification;
- Risk assessment;
- Risk mitigation;

- Risk monitoring.

Risk identification is the first and perhaps the most important step in the risk management process in the construction project and the clarification of risk responsibilities [29]. Risk identification develops the basis for the next steps: analysis and control of risk management.

3. Methodology

The aims of this study were: first, to identify contractors' opinion on the significance of the construction projects risks; and second, to explore the risk analysis and risk management usually used. A brainstorming session has been taken with the contractor and owner to find the major risk the usually face in such projects.

Once we've identified the potential risks to this project, we now need to sit down and assess each risk based on the probability of becoming reality and the impact they will have on the project if they occur.

$$\text{Risk level} = \text{Risk probability} \times \text{Risk impact}$$

Risks are ordered based on the multiplication of frequency and impact scales. To quantify the values of the risk probability and risk impact, a scale of 1–5 representing low to high probability and impact is used.

After the risks and probabilities are determined, the risk score calculated to use risk matrix which shows the combination of impact and probability that in turn yield a risk priority (shown by the red, yellow, and green colour).

Risk responses has been developed and divided into three according to the level of risks:

- Low risk → risk acceptance
- Moderate risk → risk mitigation
- High risk → risk avoidance

3. Results and Discussion

Table 1 shows that the identified risks in the study broken down into seven sub-categories: design risks, external risks, environmental risks, organizational risks, project management risks, right of way risks, and construction risks.

	Risk	Probability	Impact	Risk Level
Design risks				
D1	Design errors and omissions	4	5	20
D2	Design process takes longer than anticipated	3	4	12
D3	Owner request late changes	3	3	9
D4	Failure to carry out the works in accordance with the contract	3	3	9
External risks				
Ex1	New stakeholders emerge and request changes	2	4	8
Ex2	Public objections	1	3	3
Ex3	Laws and local standards change	1	3	3
Ex4	Tax change	1	4	4
Environmental risks				
En1	Environmental analysis incomplete	2	4	8
En2	New alternatives required to avoid, mitigate or minimize environmental impact	2	4	8
Organizational risks				
O1	Inexperienced workforce and staff turnover	3	3	9
O2	Delayed deliveries	3	3	9
O3	Lack of protection on a construction site	2	4	8
Project management risks				
P1	Failure to comply with contractual quality requirements	3	4	12
P2	Scheduling errors, contractor delays	4	4	16
P3	Project team conflicts	3	3	9
Right of way risks				
R1	Expired temporary construction permits	1	4	4
R2	Contradictions in the construction documents	2	3	6
Construction risks				
C1	Construction cost overruns	4	4	16
C2	Technology changes	2	4	8

Table 1: identified risks table

The risk matrix (Table 2) illustrates a risk rating assignment for identified risks.

Very High					
High				P2,C1	D1
Moderate			D3,D4,O1,O2,P3	D2,P1	
Low			R2	EX1,EN1,EN2,O3,C2	
Very Low			EX2,EX3	EX4,R1	
	Rare	Occasional	Somewhat frequent	Frequent	Very Frequent

Table 2: Risk Matrix

Further on, for each problem identified during brain brainstorming session, respondents were asked to propose an action which should be taken in order to respond to the risks. The results are gathered in Table 3.

Risk	Risk	Probability	Impact	Severity	Response	
					Type of Response	Description
D1	Design errors and omissions	4	5		avoid	by involving experts in the process
D2	Design process takes longer than anticipated	3	4		mitigate	By being active in the project and questioning unclear issues
D3	Owner request late changes	3	3		mitigate	make a pressure for decisions being make on time
D4	Failure to carry out the works in accordance with the contract	3	3		mitigate	Make sure that contract is clear
Ex1	New stakeholders emerge and request changes	2	4		mitigate	Make sure all new stakeholders not involved
Ex2	Public objections	1	3		accept	Make required changes
Ex3	Laws and local standards change	1	3		accept	Make required changes
Ex4	Tax change	1	4		accept	Make required changes
En1	Environmental analysis incomplete	2	4		mitigate	involve specialists from the field
En2	New alternatives required to avoid, mitigate or minimize environmental impact	2	4		mitigate	Make sure that all environmental laws have no impact
O1	Inexperienced workforce and staff turnover	3	3		mitigate	well prepared procurement
O2	Delayed deliveries	3	3		mitigate	Being active in the process and take an action when any problem occurs
O3	Lack of protection on a construction site	2	4		mitigate	Make sure all safety requirements have been achieved
P1	Failure to comply with contractual quality requirements	3	4		mitigate	highlight all potential risks or problems on the workshop or ameeting
P2	Scheduling errors, contractor delays	4	4		avoid	Being active in the process and take an action when any problem occurs
P3	Project team conflicts	3	3		mitigate	facilitate cooperation by organizing project team meetings
R1	Expired temporary construction permits	1	4		accept	Renew the required documents
R2	Contradictions in the construction documents	2	3		accept	well prepared procurement
C1	Construction cost overruns	4	4		avoid	By using quality systems and self control
C2	Technology changes	2	4		mitigate	involve specialists from the market

Table 3: Risk Response

In the proposed approach, Expected Monetary Value (EMV) analysis is used as a tool to carry out risk quantification. Risk event probability is an estimate of probability that a given risk will occur. Table (4) show the EMV for each risk and the total number.

Risk	Probability	Impact cost	EMV
D1	0.8	5000	4000
D2	0.6	5000	3000
D3	0.6	1500	900
D4	0.6	7500	4500
Ex1	0.4	5000	2000
Ex2	0.2	1500	300
Ex3	0.2	1500	300
Ex4	0.2	25000	5000
En1	0.4	3500	1400
En2	0.4	2500	1000
O1	0.6	25000	15000
O2	0.6	25000	15000
O3	0.4	12000	4800
P1	0.6	70000	42000
P2	0.8	25000	20000
P3	0.6	15000	9000
R1	0.2	10000	2000
R2	0.4	1000	400
C1	0.8	50000	40000
C2	0.4	7500	3000
Total		298500	173600

Table 4: EMV

After conducting the Risk Analysis, we have a list of risks with a priority and urgency assigned. By using Expected Monetary Value, we can quantify each risk to determine whether our analysis is backed by numbers. As a result, we have SAR 298,500 as total impact of the risks in the project and SAR 173,600 as total of EMV. The cost of the risk shows a high cost impact if it compared with the total cost of the project (which about SAR 1,000,000).

Risk management in the construction project management context is a comprehensive and systematic way of identifying, analyzing and responding to risks to achieve the project objectives. To management the risk effectively and efficiently, the contractor must understand risk responsibilities, risk event conditions, risk preference, and risk management capabilities.

5. References

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