Risk and disaster management

Final term paper

Submitted by

Gulwareen bacha (15492)

Submitted to

Sir yaseen

Date: 26-06-2020

Risk Management Plan

1. INTRODUCTION

1.1. Purpose and Objectives

Risk Management is the systematic process of identifying, analyzing, and responding to project risks. It includes maximizing the probability and consequences of positive events and minimizing the probability and consequences of adverse events to project objectives. This risk management plan defines how the project team will handle risks to achieve the goal.

1.2. Overview of the Company and Project

Table 1: Overview of the project and company.

Size:	With a budget of 15,000,000, this project is a medium sized project
Complexity:	This project involves multiple divisions within the organization, but does not involve any other agency or external organization. The project does work with complex formulas. We rate this medium complexity.
Importance to Business:	This project is determined to be of high priority within the agency.
Visibility:	While not directly public facing, delivers very important public information.
Company History	Company does projects of this size or complexity
High Management:	High management does such kind of projects frequently.
Project Manager.:	Project Manager does such project frequently.
Agency Project Team	About 50% of the company have done a similar project

Risk Management Effort Decision:	It has been determined that the project will spend a moderate amount of time performing the following risk assessment activities.

2. RISK-RELATED DEFINITIONS

There are a number of terms used in risk management that need we need to define to ensure clear communications.

2.1. Risk

An uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives. Risk is often a measure of the inability to achieve overall project objectives within defined project requirements and constraints and has three components: (i) the probability of occurrence, (ii) the impact of the risk on the program, and (iii) the time duration during which the consequences will occur if the risk is not mitigated.

2.2. Probability of Occurrence

The following table defines the probability of occurrence.

Table 1 – Risk Probability of Occurrence

Likelihood	Description	Probability	Score
91% through 99%	Almost Certain	> 0.90	5
61% through 90%	"Probably" will occur	0.61-0.90	4
41% through 60%	"Likely" to occur	0.41-0.60	3
11% through 40%	"Unlikely" to occur	0.11-0.40	2
1% through 10%	"Very unlikely" to occur	< 0.05	1

2.3. Risk Impact

The following table defines the risk impact categories and terms. For positive risks, consider the opposite of the impact description. The examples would remain the same except having a positive impact to the project.

Table 2 – Risk Impact

Impact Description	Example	Descriptor	Impact value	Score
An event that if it occurred, would cause project failure	Schedule adjustment >2 months Cost impact > 40%	Extraordinary	Cost of variance	5
An event that if it occurred, would cause major cost/ schedule increases	Schedule adjustment >1 month Cost impact > 20%	Major	Cost of variance	4
An event that if it occurred, would cause moderate cost/ schedule increases	Schedule adjustment >2 weeks Cost impact > 10%	Moderate	Cost of variance	3
An event that if it occurred, would cause minor cost/ schedule increases	Schedule adjustment >1 week Cost impact > 5%	Minor	Cost of variance	2
An event that if it occurred, would cause very small or negligible kind of effect on the project objective.	Schedule adjustment >2 days Cost impact > 5%	Insignificant	Cost of variance	1

2.4. Risk Score

The risk score is a value calculated that is the product of probability of occurrence and impact. We use the score to compare risks as part of the risk prioritization process. Table 3 is the matrix used to develop the risk score. The values range from 1 (very low exposure) to 25 (very high exposure). Although there are no specific break points in the risk exposure ranking, those risks with an exposure value of less than 10 are considered low risks, those risks with an exposure value between 11 and 19 are considered moderate risks, and those risks with an exposure value of 20 or more are generally considered high risks. The definitions of Low, Moderate, and High are as follows:

- **Low Risk**: Has little or no potential for increase in cost, disruption of schedule, or degradation of performance. Actions within the scope of the planned project and normal management attention should result in controlling acceptable risk. No response plans will be made for these risks. The project will monitor for them and manage them as they come up.
- **Moderate Risk:** May cause some increase in cost, disruption of schedule, or degradation of performance. Special action and management attention may be required to control acceptable risk. The project will do some response planning for these risks.
- **High Risk:** Likely to cause significant increase in cost, disruption of schedule, or degradation of performance. Significant additional action and high priority management attention will be required to control acceptable risk. The project will do in-depth response plans for these risks.

Table 3 – Risk Score	Impact				
Probability	Negligible (1)	Minor 2)	Moderate 3)	Serious (4)	Critical (5)
Very likely to occur (5)	5	10	15	20	25
Probably will occur (4)	4	8	12	16	20
About 50% chance of occuring (3)	3	6	9	12	15
Unlikely (2)	2	4	6	8	10
Very unlikely to occur (1)	1	2	3	4	5

Note: For Positive risks or opportunities we use the same table and descriptions except instead of trying to avoid the risk, we will endeavor to make the risk occur and gain the positive impact.

3. ORGANIZATION

This section defines the roles and responsibilities for risk management.

3.1. Roles & Responsibilities

Table 4 – Roles & Responsibilities

Roles	Responsibilities
Project Manager: The overall coordinator of the Risk Management Program.	• Maintaining this Risk Management Plan • Maintaining the Risk Management Data Base and distributing updates • Briefing the team on the status of risks • Tracking efforts to reduce moderate and high risk to acceptable levels • Providing risk management training • Facilitating risk assessments and • Preparing risk briefings, reports, and documents required for Project Reviews
Project Team: Responsible for identifying, monitoring and managing risks	• Coordinate with senior management to review and recommend to the Project Manager changes on the overall risk management approach based on lessons learned. • Report new risks to the Project Manager. • Ensure that risk is a required topic at each Project Meeting • Accomplish assigned mitigation tasks and report status/completion of mitigation actions to the Project Manager.
Subject Matter Experts: Responsible for implementing risk management tasks per this plan.	• Review and recommend to the Project Manager changes on the overall risk management approach based on lessons learned. • Quarterly, or as directed, participate in the update to program risk assessments made during the previous quarter. • Review and recommend any changes to the risk assessments made and the risk mitigation plans proposed. • Report new risks to the Project Manager via e-mail. • Accomplish assigned mitigation tasks and report status/completion of mitigation actions to the Project Manager for entry into the database.
Stakeholders	• The stakeholders will participate in the project through the Project. The stakeholders may identify risks and should pass the information through the Project Team. • All risk identification, tasking, and reporting will be handled through the project team member(s) assigned to the “End User”.

4. RISK IDENTIFICATION AND ANALYSIS

This section describes the risk management process and provides an overview of the risk management approach.

4.1. Identification

Brainstorming is an efficient method that uses social interaction for the risk identification process. Using this technique, stakeholders will be divided into group of 5-8 people. Each group will be brought in, given a brief overview of the project, then, using the brainstorming technique, they will be asked to identify any opportunities, they see. We will then ask them to identify any risks. We will ask the groups to then perform an affinity diagram to categorize the risks and identify any missing risks/opportunities. In addition to the above, the core project team will perform a risk breakdown structure (RBS). This involves stepping through the Work Breakdown Structure (WBS) task by task and identifying risks & opportunities associated with the task. In addition to this technique we will also refer to the checklist of some common risks given in the Loosemore book "Risk Management in Construction" while discussing about risk in the assigned project

4.2. Semi-Quantitative Risk Analysis

In this approach semi-quantitative analysis, the values attributed to different categories of likelihood and consequences reflect the relative magnitude of consequences and likelihood rather than absolute values. In this case the project team will determine the impact and probability scores for each risk to calculate the risk score. They will use the tables in Section 2 of this document.

RISK REGISTER

The following table showing risk registered

#	Risk Event	Risk Category	Cause	Effect	Risk Type	Objective	Probability	Impact	Rating	Strategy / Response
1	Project not fully funded	Financial	Lack of Stakeholder Interest	Project halted	Threat	Cost	2	3	6	Mitigate
2	Increase in material cost due to market forces	Financial	Inflation	Cost over run	Threat	Cost	2	3	6	Accept
3	Increase in labour wages	Financial	Government Polices	Profit Decrease	Threat	Cost	3	2	6	Accept
4	Inflation	Financial	Government Polices	Cost of Project Increased	Threat	Cost	2	3	6	Accept
5	Cash Flow	Financial	Contract Dispute	Project halted	Threat	Time	2	2	4	Mitigate
6	Inaccurate cost estimate	Design	Un Experienced Staff	Cost over run	Threat	Cost	1	3	3	Mitigate
7	Design incomplete	Design	Unexperienced Designer	Project Delayed	Threat	Time	2	2	4	Mitigate
8	Unexpected geotechnical or groundwater issues	Design	Incomplete Geotechnical Study	Project Delayed	Threat	Time	2	4	8	Mitigate
9	Surveys incomplete	Design	Lazy Surveyor	Project Delayed	Threat	Time	2	2	4	Mitigate
10	Improper Formwork	Construction	Unskilled Labour	Project Delayed	Threat	Time	2	2	4	Mitigate
11	Improper Steel Fixing	Construction	Complex Design	Cost over run	Threat	Cost	2	2	4	Mitigate
12	Poor Compaction	Construction	Lack of Equipment	Settlement of Foundation	Threat	Quality	2	3	6	Mitigate
13	Poor Quality of Material	Construction	Improper Storage	Quality of Construction Decrease	Threat	Quality	2	3	6	Mitigate

14	Labour Efficiency	Construction	New Labour	Quality of Construction Decrease	Threat	Quality	2	2	4	Mitigate
15	Extreme Site Conditions	Construction	Heavy Rain Fall	Project Delayed	Threat	Time	2	2	4	Accept
16	Water Shortage	Construction	Pump Failure	Curing Seized	Threat	Quality	2	3	6	Mitigate
17	Subcontractor capabilities	Construction	Competition	Quality of Construction Decrease	Threat	Quality	2	2	4	Mitigate
18	Material availability and delivery	Construction	Land Slide	Project Delayed	Threat	Time	2	3	6	Mitigate
19	Demotivation of Project Team	Organizational	wages not paid	Project will suffer	Threat	Time	2	2	4	Mitigate
20	Pressure to deliver project on an accelerated schedule	Organizational	Management pressure	Quality compromised	Threat	Quality	2	2	4	Mitigate
21	Change Scope	Scope	Inexperienced designer	Project delayed	Threat	Time	1	5	5	Mitigate
22	Scheduling errors	Project Management Risks	Careless scheduling	Time not properly managed	Threat	Time	2	2	4	Mitigate
23	Meetings not held b/w all the related stakeholders	Project Management Risks	Inexperienced Project Manager	Project Delayed	Threat	Time	2	2	4	Mitigate
24	Lack of coordination/communication	Project Management Risks	Arrival of new manager	Reduced efficiency	Threat	Time	1	2	2	Mitigate
25	Material Shortage	Resource	Ordering less material	Project delayed	Threat	Time	1	3	3	Mitigate
26	Accident on site	Physical	Improper scaffolding	Moral down	Threat	Time	1	4	4	Mitigate
27	Damage to equipment	Physical	Poor maintenance	Cost Increased	Threat	Cost	1	2	2	Mitigate
28	Theft	Physical	Improper security	Cost Increased	Threat	Cost	1	2	2	Mitigate

Q2: **Cost benefit analysis:**

A cost benefit analysis (also known as a benefit cost analysis) is a process by which organizations can analyze decisions, systems or projects, or determine a value for intangibles. The model is built by identifying the benefits of an action as well as the associated costs, and subtracting the costs from benefits.

Follow these steps to do a Cost-Benefit Analysis.

Step One: Brainstorm Costs and Benefits

First, take time to brainstorm all of the costs associated with the project, and make a list of these. Then, do the same for all of the benefits of the project. Can you think of any unexpected costs? And are there benefits that you may not initially have anticipated?
When you come up with the costs and benefits, think about the lifetime of the project. What are the costs and benefits likely to be over time?

Step Two: Assign a Monetary Value to the Costs

Costs include the costs of physical resources needed, as well as the cost of the human effort involved in all phases of a project. Costs are often relatively easy to estimate (compared with revenues).

It's important that you think about as many related costs as you can. For example, what will any training cost? Will there be a decrease in productivity while people are learning a new system or technology, and how much will this cost?

Remember to think about costs that will continue to be incurred once the project is finished. For example, consider whether you will need additional staff, if your team will need ongoing training, or if you'll have increased overheads.

Step Three: Assign a Monetary Value to the Benefits

This step is less straightforward than step two! Firstly, it's often very difficult to predict revenues accurately, especially for new products. Secondly, along with the financial benefits that you anticipate, there are often intangible, or soft, benefits that are important outcomes of the project.

For instance, what is the impact on the environment, employee satisfaction, or health and safety? What is the monetary value of that impact?

As an example, is preserving an ancient monument worth $500,000, or is it worth $5,000,000 because of its historical importance? Or, what is the value of stress-free travel to work in the morning? Here, it's important to consult with other stakeholders and decide how you'll value these intangible items.

Step Four: Compare Costs and Benefits

Finally, compare the value of your costs to the value of your benefits, and use this analysis to decide your course of action.

To do this, calculate your total costs and your total benefits, and compare the two values to determine whether your benefits outweigh your costs. At this stage it's important to consider the payback time, to find out how long it will take for you to reach the break even point – the point in time at which the benefits have just repaid the costs.

Example

Custom Graphic Works has been operating for just over a year, and sales are exceeding targets. Currently, two designers are working full-time, and the owner is considering increasing capacity to meet demand. (This would involve leasing more space and hiring two new designers.)

He decides to complete a Cost-Benefit Analysis to explore his choices.

Assumptions

- Currently, the owner of the company has more work than he can cope with, and he is outsourcing to other design firms at a cost of $50 an hour. The company outsources an average of 100 hours of work each month.
- He estimates that revenue will increase by 50 percent with increased capacity.
- Per-person production will increase by 10 percent with more working space.
- The analysis horizon is one year: that is, he expects benefits to accrue within the year.

Costs

Category	Details	Cost in First Year
Lease.	750 square feet available next door at $18 per square foot	$13,500

Category	Details	Cost in First Year
Leasehold improvements.	Knock out walls and reconfigure office space	$15,000
Hire two more designers.	Salary, including benefits	$75,000
	Recruitment costs	$11,250
	Orientation and training	$3,000
Two additional workstations.	Furniture and hardware	$6,000
	Software licenses	$1,000
Construction downtime.	Two weeks at approximately $7,500 revenue per week	$15,000
Total		$139,750

Benefits

Benefit	Benefit Within 12 Months
50 percent revenue increase.	$195,000

Benefit	Benefit Within 12 Months
Paying in-house designers $15 an hour, versus $50 an hour outsourcing (100 hours per month, on average: savings equals $3,500 a month.)	$42,000
10 percent improved productivity per designer ($7,500 + $3,750 = $11,250 revenue per week with a 10 percent increase = $1,125/week.)	$58,500
Improved customer service and retention as a result of 100 percent in-house design.	$10,000
Total	$305,500

Q3:

Monday

22 Shabân 1426H

الاثنين

٢٢ شعبان ١٤٢٦هـ

Gulvareen Bacha 15492

3

(1) Normal Probability distribution:-

This is the most important distribution in the CBUs. You need to get very comfortable with dealing with the tables, & describ probabilities associated with each distributio

The normal Pdf: $f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$.

where μ = mean.

σ^2 = variance.

π = 3.14159.

e = 2.71829.

Important things about normal distributio

(1) There are infinitely many variations of normal distribution differentiated by μ & σ^2.

(2) The highest point of normal is mea which is also the median.

(3) The normal distribution is symmetric. this implies that;

$$F(x) = 1 - F(-x).$$

NOTES

Thursday
25 Shabân 1426H

الخميس
٢٥ شعبان ١٤٢٦هـ

Q3: (b)

15492.

$\mu = 60{,}000$.

$\sigma^2 = 15000$

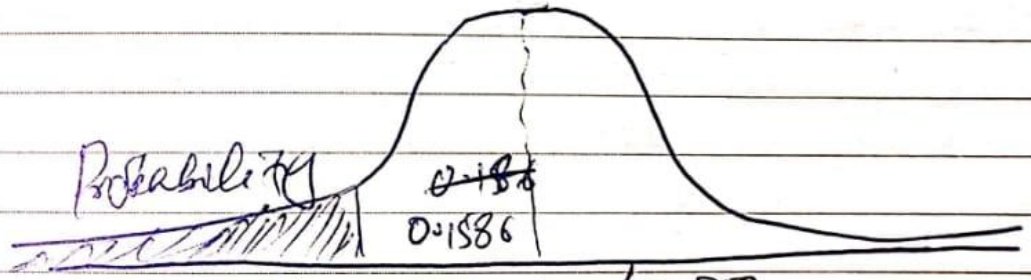
$P(X < 45000)$.

$$Z = \frac{45000 - 60{,}000}{15000}$$

$Z = -1$.

From table;

area under the curve = 0.1586.



NOTES

ملاحظات

$P(X < 45000) = 1 - 0.15866$

$= 0.84134$.