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The Risk Management Programing for Urban Systems

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ABSTRACT

Risk Management is the process of identification, analysis and either acceptance or mitigation of uncertainty in investment decision-making. Essentially, Risk Management (RM) occurs anytime an investor or fund manager analyzes and attempts to quantify the potential for losses in an investment and then takes the appropriate action (or inaction) given their investment objectives and risk tolerance. Inadequate risk management can result in severe consequences for companies as well as individuals. Risk management is uncertainly management including identification, assessment, monitoring and reducing the impact on the business. A proper risk management program can be minimized with the adequate risk management strategies. A director for RM program required special tools and techniques like: avoiding risk with elimination of the factors and consequences of the risk, limiting risk with reducing the likelihood of damage, risk transfer with transmission the potential damage to another party such as insurance company. This paper identifies significant need to Risk Management for urban systems and paraphrases the risks in Electronic Cards system. Hence the mangers can decide the adequate strategy for these risks and improve the system.
KEYWORDS: Risk Management (RM), Strategy, Urban systems.

1. INTRODUCTION

Since the advent of civilization, humans have faced the possibility of damage. The first risks were in nature which causes risks. These risks included humans, not only animals. Gradually people learned to anticipate unpleasant events collectively and individually and prepare themselves to deal with them. They built shelters and start saving for the future. These measures have created new risks. Structures were being weak against damage and savings were being attacked by others, created new risks. The challenge has still grown with confronting risk. Nowadays, organizations and systems are stood in challenging environment. Prerequisite survive and environmental sustainability of organizations in this circumstances, are keeping pace with developments and appropriated respond. Accurate accountability requires a correct decision. Explicitly, in all circumstances aspects and decisions are not specified perspicuity. Eventual or certain hazards must be considered among making decisions or definite risks, which could affect the outcome of decisions, as discussed in the field of Risk Management (RM). Of course development and technology are the latest risks are faced. Growthing the cost of damage is only a function of the increasing number of risks. As mentioned, there is no way to escape from risks, hence society must find ways to deal with them. Some fundamental risks are being abidance by the government and collective endeavor. But some risks are existed in the responsibility of community. According to the wide range of risks, systematic approach is needed to deal with them [1]. And also the priority of the risks and identifying of the risks are important questions which are discussed in the RM.

2. Definition:

Caring the projects will not achieve the defined purpose is named the risk [2]. It can be written as:

Risk= Fear (Probability)* Damage (wastage)

Existing vulnerability and potential of the system are analyzed for calculating of the probability of an events. Also '*efficacy'* referring to intensity of damage and losses incurred, which depends on the sensitivity and accuracy of the system components.

Risk management is uncertainly management including identification, assessment, monitoring and reducing the impact on the business.

A proper risk management program can be minimized with the adequate risk management strategies. As Boehm mentioned [3], the RM process consists of two main phases: risk estimation which including the identification, prioritization and analysis. And risk control which including the planning, monitoring and corrective actions [4]. As fairly discussed, the RM is including seven phases: identification, estimation the like hood, intensity of effects, extend in order to adjust, monitoring the factors, provide a comprehensive design, management of the crisis and recovery of post- crisis.

RM can be categorized as the actual risk or speculative risk. The actual risk is a risk that the probability of loss but there is no possibility of profit. For example the probability of accident is kind of actual risk [5]. The speculative risk is the risk that chance of profit is further the chance of losing. Plant development is one of the speculative risk that has an attractive besides the risk [6]. The others classified the risk as an internal and external risk in the system [7]. The internal risks are controlled by the organization itself but the external risk is out of the system and uncontrollable.

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According to the PMBOK standard [2], the following classification are done in RM program.

1- Climate: for example Unexpected, heavy snowfall
2- Technology: for example Advent of a new technology
3- Politics: for example Setting new international sanctions
4- Laws and regulations: for example Change in customs tariffs
5- Economy: for example Increase in the unit price of a project resource
6- Human resources: for example Disease or death of a project team member
7- Safety: for example Conflagration
8- Security: for example Attack of hackers to the project website

3. Risk Management Program:

A director for RM program required special tools and techniques like: avoiding risk with elimination of the factors and consequences of the risk, limiting risk with reducing the likelihood of damage, risk transfer with transmission the potential damage to another party such as insurance company. According to the PMBOK standard [2] the RM includes:

1- Plan risk management
2- Identify risks
3- Qualitative risk analysis
4- Quantitative risk analysis
5- Plan risk responses
6- Monitor and Control risks

Plan risk management describes how to identify, analyze the qualitative and quantitative, response planning, monitor and control of risks through the project lifecycle. (Fig.1)

Fig. 1.

❖ The risk management program should be composed of meetings between project team and stakeholders. The other plan is decision on project risk management program and charter like instruction and maps. Also decisions in relation to evaluation of risk and the implementation of the risk. (Table 1& 2)

Table 1.

	1 Remote	2 Unlikely	3 Possible	4 Likely	5 Certain
1 Trivial	1	2	3	4	5
2 Minor	2	4	6	8	10
3 Lost time	3	6	9	12	15
4 Major	4	8	12	16	20
5 Fatal	5	10	15	20	25

Table 2.

project objective	very low 0.05	Low 0.1	Moderate 0.2	High 0.4	Very high 0.8
Cost	insignificant cost increas	<10% cost increase	10-20% cost increase	20-40% cost increase	>40% cost increase
Time	insignificant time increas	<5%time increase	5-10% time increase	10-20% time increase	>20% time increase
Scope	scope decrease barely noticeable	inor areas of scope affect	ajor areas of scope affect	ope reduction unacceptable to sponsor	oject end item is effectiv useless
Quality	Quality degradation barel noticeable	only very demanding applications are affected	Quality reduction require sponsor approval	Quality reduction unacceptable to sponsor	oject end item is effectiv useless

❖ Identifying risks involve determining and documenting risk characteristics. Identification process is repeatable and can be gain from same projects documentation. Also it can be cognized with brain storming method. At last preparing the Risk Break Structure (RBS) is useful. (fig.2)

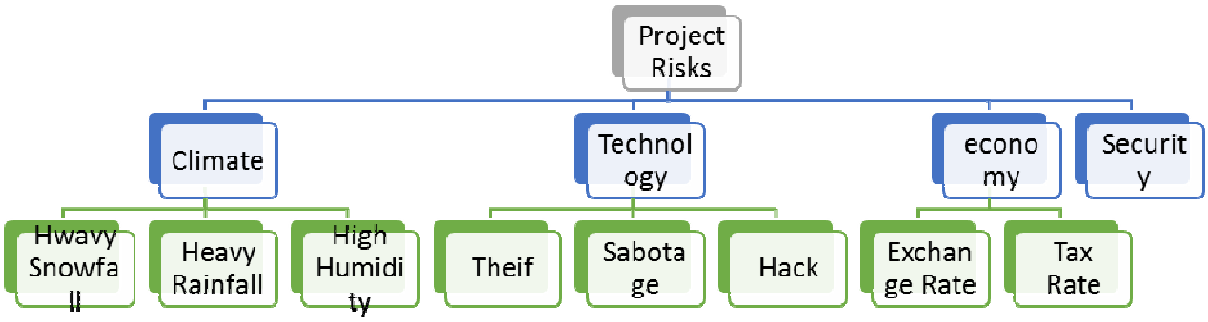

Fig. 2.

❖ Qualitative risk analysis is the method for describing probability of the risk and affectivity of it. This method should be used for the initial review or screening or when rapid assessment (Table 3).

Table 3.

	effect				
probability	unimportant	insignificant	Apathetic	the most important	very important
certain	medium	medium	high	high	high
high probability	low	medium	medium	high	high
likely	low	medium	medium	medium	high
low probability	low	low	medium	medium	high
seldom	low	low	low	medium	medium

❖ Quantitative Risk analysis is considered the probability of each risk and its consequences on the objectives of the project. The PRIMAVERA PERTMASTER software can be used as a useful tool.

❖ Plan Risk responses is identified ways to reduce risk and enhance the opportunities of the project [8]. In order to reduce the likelihood of a response is used from the possibility of very high and medium risk with the advantages and costs responses. Also it can be selected the best answer for project formulation and implementation of risk response plan. Risk response strategies are include:

- Avoiding risk
- Changing in the method
- Protection and safety system
- Preventive maintenance
- Review of performance
- Regular inspection
- Education and skills
- Mitigate risk
- Risk sharing such as insurance
- Risk retention if not possible to avoiding

❖ Monitoring and controlling of known risk and recognition of new risks and assess the impact of the RM program are important (Figure 3).

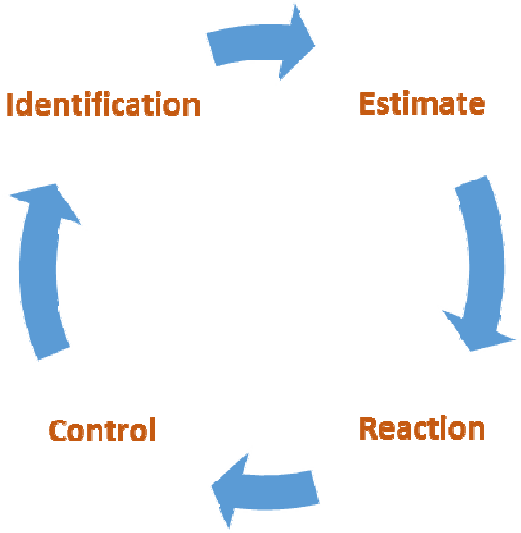

Fig. 3.

4. Example of the RM programing in urban systems:

Integrating E-cards for Vehicles is the example of RM program in urban system. The E card is used for bus, train and metro. The first step is to identify risks in this project (Table 4).

Table 4. Table example

Part	Phase	Risk
Software	0	e card software is not ready
Planning	1	e cost is not considered appropriate
Planning	2	e time is not considered appropriate
Card	3	lays in the habit of using the card

In this step project risk analysis should be done as below:

Degree of risk= ∑ (the risk efficacy* Probability of the risk)

And also it can be simplified as:

Degree of risk= (Effect on time* Probability of the risk) + (Effect on cost* Probability of the risk) + (Effect on the range* Probability of the risk) + (Effect on the quality* Probability of the risk)

Then the analysis can be shown like the table 5.

Table 5. Table example

Risk	Probability	Project Objectives				Degree of risk
		A	B	C	D	
Delays in the habit of using the card	0.3	0.3	0.5	0.9	0.3	0.6
The time is not considered appropriate	0.3	0.5	0.9	0.3	0.3	0.6
The cost is not considered appropriate	0.5	0.9	0.1	0.3	0.1	0.7
The card software is not ready	0.5	0.3	0.7	0.1	0.7	0.9

Probability: Very Low=0.1, Low=0.3, Medium=0.5, High=0.7, Very High=0.9
Project Objectives: A=Cost, B=Time, C=Range, D= Quality

The probability and risk impact grading matrix is shown in Table 6.

Table 6.

Criteria to assess the impact of risk on project objectives					
Project Objectives	**Very Low 0.1**	**Low 0.3**	**Medium 0.5**	**High 0.7**	**Very High 0.9**
Cost	on-significant increase in cost	ncreased cost less than 5%	reased cost between 5% 10%	reased cost between 10% 20%	creased cost more th 20%
Time	on-significant increase in time	ming deviation less than 5%	iming deviation betwe 5%-10%	iming deviation betwe 10%-20%	iming deviation mo than 20%
Range	Slight decrease in the rang	mpact on the poor rang	mpact on the major ran	acceptable decrease in range from master	The final product is practically useless
Quality	Slight decrease in the qualit	ffective only in the cont of working with high ski requirements	Decrease in the quality eds the permission of t master	acceptable decrease in quality from master	The final product is practically useless

In the next step prioritizing the risks are needed as shown in Table 7.

Table 7.

Priority of the risks			
Degree of priority	**Risks**	**Phase**	**The risk factor made**
1	Misinformation	5th	2.34
2	Deficit information of vehicles	5th	2.34
3	Reaching the correct card	5th	2.34
4	Delays in the habit of using the card	5th	2.16
5	Problem in the proper functioning of the software	4th	2.1

At last the activities to response the risk is written. Client focus, the importance of work, significant information, coordination and avoid the rush to collect information are some of the activities to response the risk in this project.

5. Conclusion:

The need to Risk Management should emerge from a construction organization's strategies to enable it to gain the desired benefits and market share. The characteristics of partnering and integrated management can enhance a construction organization's capability to RM program. RM program could be represented as a dynamic process within an organization's strategies and structure. There are numerous models that have been developed to represent the RM process within construction organizations. Within these models the decision analysis systems constitute pivot points for the RM process. However, evaluating the process, especially the implementation phase which includes the transformation of RM program into reality, has only been partially studied. This phase deals with problems identified in early phases and includes new types of construction activity. A high portion of risk can be accommodated if a company can manipulate them within the overall short- and long-term views of its projects.

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