Study of Risk Management for Successful Project Accomplishment

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Abstract

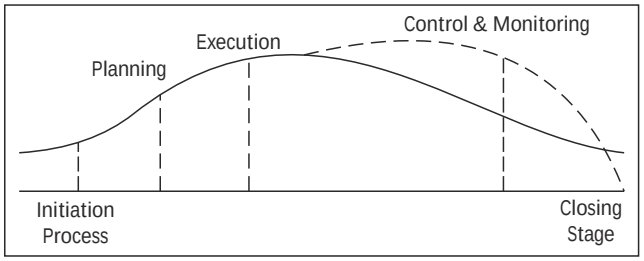
Risk Management is becoming a 'fundamental competency' for Companies. Now a days, Companies sometimes win a Project, not because it had quoted a low price, but because it had demonstrated to the owners, that the Company is having the best Risk Management Systems. Risk Management is an essential and important concept to be considered in all Project Management activities, especially in the contemporary Social and Economic Environment. Whenever we face a Risk, one of the biggest challenges is in deciding what to do about it. The word 'Risk' itself sounds negative and implies a 'Threat to The Outcome'. This was the perception in earlier days, but this has changed nowadays. Earlier there was a lack of Structured Approach to study the Risk in project execution. Risk was addressed as and when deemed required. It was a 'situation based' or a 'case by case' reaction. Sometimes Contingencies Provisions were kept while preparing the estimate for covering an uncertain event; Mostly, some percentage was added to the Cost for Contingency. The situation changed once the organization started understanding the importance of Risk Analysis in Project Management. It was seen that the increases in contingencies expenditure narrowed the profit margin and delayed the project executions. On the other hand, too many provisions under the contingencies, decreased the competencies of a business. To strike a balance, the need was felt to analysis the Risk and address the impact under Project Management Principles. More Research is required to identify and quantify the Project Risks and to create Effective Risk Management Tools and Techniques.

Keywords: Risk Management, Project Management, Social & Economic Environment, Contingencies Provisions, Body of Knowledge, Decision Tree Analysis.
Classification-JEL : D81, G32, H43

1. UNDERSTANDING A PROJECT

A project is a temporary endeavor, undertaken to create a unique product, service or result. Every project has definite stop and end. In any project whether small or big, risk is inevitable. The risk varies from project to project. Every project big or small, complex or simple, with low risk or high risk are ultimately handled by 'project evaluation and execution team'. This team needs to do their best to not only reduce the risk in project but to minimize the overall time required for implementation and final execution and commissioning of the project. Execution is just a part of project life cycle processes. The 'project management body of knowledge' is a complete collection of processes, best practices, terminologies and guidelines, that are accepted as 'standards' within the project management industry. As per project management body of knowledge, the project life cycle comprises of: Each process has different functions, and risk may occur in all the processes.

Chart 1 : Project Life Cycle



The project life cycle consists of the following five steps :

- The project conceptualization and project approval are provided by the sponsors.
- The planning process refers to costing, preparation of documents, setting of timeline.
- The execution process refers to site activities and managing progress of the project.
- The control and monitoring process refers to budgeting and value management principles and management information systems.
- And closing stage process refers to final billing, closure reports, lessons learned and achievements made etc.

2. RISK PERCEPTION - NEGATIVE RISK OR POSITIVE RISK

A risk is just an uncertainty that matters. Leading standards and guidelines define the concept of risk, and it's outside as well as inside impacts. Risk can be used to describe uncertainties, which if they occur, would have a negative impact on any business. The same word can also describe uncertainties, which if they occur, would be helpful. In short, there are two sides of risk – negative risk and positive risk. Accepting this 'principle' is one thing, using this in 'practice' is another. The traditional risk management process contained initializing, identifying, analyzing, planning responses, implementation and review, though these can clearly be used to handle both risk and opportunities. Companies who have already been using this process find it difficult to use risk management to benefit from the opportunities. They use the technique, only to mitigate and avoid the risk or simply the threat.

3. IDENTIFYING THREATS AND OPPORTUNITIES

Uncertainty is something which may or may not happen, this can actually help us to achieve our objectives, for example, it guides us, to work smarter and cheaper. One of the purposes of risk management is to identify risks that are important and difficult to manage and manage them. It may seem that risks have to be managed, because they have negative impacts and hence their probability of occurrence and impacts need to be minimized. This is only partially true. Risks with negative impacts are threats to business and are to be handled as such, however, not always because they are bad. There may be uncertain events which may have positive impacts on the project. They are not threats, per se, but they are 'Positive Risks'.

4. RISK MANIFESTATION

Definition of risk varies, depending on the sector and project. Risk is an uncertain event or condition, which if occurs, can have a 'positive' or 'negative' impact on project objectives. The simplest definition of risk is 'uncertainty that matters and it matters because it can affect one or more objectives, because risk cannot exist in a vacuum. We need to study and find out which of the objectives could be affected, if the risk occurs. A more complete definition of risk could therefore be 'an uncertainty, that if it occurs, could affect one or more objectives i.e., project cost, time or quality, etc.' for example, availability of skilled resources during the festive season is uncertain in some parts of the country and there is a risk factor of the project in their region. Let us take a project in eastern parts/states of India, the impact of ganesh festival on a project is not an uncertainty, whereas it is an uncertainty in the western parts/states of our country, where ganesh festival is a very important festival and the people may move-out from the project site, to celebrate this important festival.

5. RISK ENCOUNTERED IN A TYPICAL PROJECT

Risk is an unavoidable factor in project

execution, based on lesson learned and project experience, one can predict the extent of risk's impact if it occurs and prepare a response for mitigating it. Present covid-19 pandemic is a major unknown risk which had physical, psychological and economical impact on the entire globe to which india is not an exception. Project execution has been mainly impacted by covid-19 pandemic. Such scenarios are always there in any project, but the situation is unprecedented and unknown to anyone. Therefore, risk management and risk mitigation practices play an important role in situations like these, where it is extremely uncertain to know and control the risk crisis.

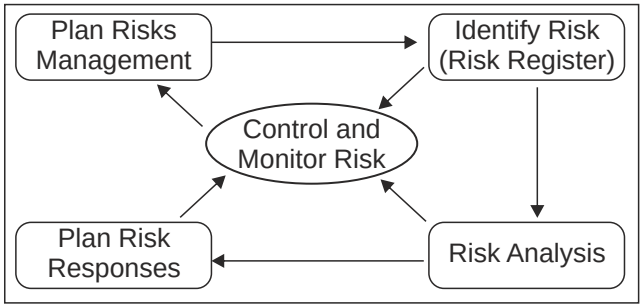
6. PROJECT RISK MANAGEMENT PROCESS

The risk management comprises of the following steps:

a) Planning for Risk Management : While planning, following should be considered:

- Risk with small impacts can be ignored or managed easily.
- Risk with considerable impact should be addressed at initial; stages or during execution of project. This will help in eliminating or minimizing such risks.
- Risk with the potential to escalate into bigger problems and destroy the project goal and objective should be addressed properly in a timely manner. To ensure that the risk does not fall into a threat category, a well guided risk management program/strategy is required, and it has to be in place for all projects.

Chart 2 : Risk Management Process



Source : Risk Management Process as per PMBOK Guide, Fifth Edition.

b) Identifying Risk : Identification of risk in a project is a critical activity. One should identify risks which fall under the following category:

Risks due to External Factors:

- Stakeholders
- Government Policies
- Clients' Expectations
- Material Availability
- Act of God

Risks due to Organizational Factors:

- Organizational Relationship and Structure
- Management policies on Mergers and Acquisitions
- Cultural Differences
- Resource Deployment Issues
- Project Management Factors:
- Contractual Relations and Communications
- Technological Problems
- Site Conditions and Construction Procedures
- Construction occupational safety, Team Cohesiveness

c) Risk Analysis : Risk analysis is a set of procedure where the project outcomes and objectives are analyzed for changes because of occurrence of some uncertain events. One of the most important parts of risk analysis is the analysis of probability of risk occurrence (x).

Some of the criteria of the same are:

High Probability –	80 % $\leq$ X $\leq$ 100%
Medium-High Probability –	80 % $\leq$ X $\leq$ 100%
Medium-Low Probability –	30 % $\leq$ X < 60%
Low probability –	0 % < X < 30%

Another aspect of risk analysis is looking for probability of risk occurrence through a timeframe. The timeframe, in which risk or more precisely the uncertain event may occur, needs to be identified as under:

Table 1 : Identifying Uncertain Event

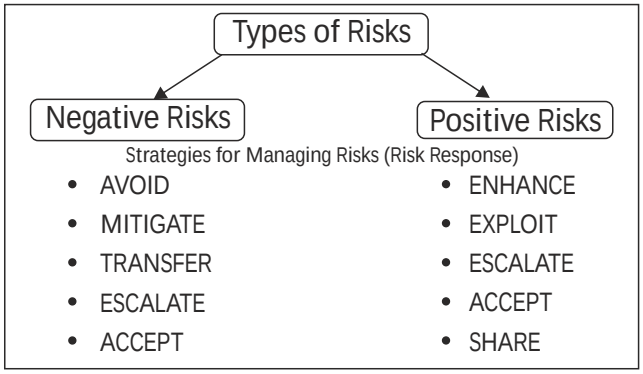
Time	Closeness to Event
From Now till One Month	Near
From One Month till the Next 6 Months	Medium
Greater than 6 Months	Far

d) Risk Responses : It is of crucial importance risk response is simply the strategies which and organization can apply, for managing the risks.

Risk Responses for Negative Risks :

- Avoid : This strategy is best suited for situations where the risks are crucial and the organization does not want to enter into a scenario where such risks could occur. If it is possible to avoid risk, it is considered the most viable and beneficial option for any entity. Such risks can be avoided, if possible, by changing plans, scope of work and or the schedule of project.

Chart 3 : Types of Risks



- Mitigate : It is basically the risk response which intends to reduce the probability of risk occurrence to as minimum as possible. The strategy is to abate the effect of any adverse impact or probability of such impact as much as possible.
- Transfer : when any particular risk or set of risks cannot be managed or mitigated by the organization itself, it transfers the risk to a willing third party. Insurance contracts are anexample where any entity can transfer some risks to the insurance company through an agreement.
- Escalate : Escalate Strategy is used when a person managing risk under a project does not have the power or authority of managing any particular risk. In such a case, the person needs to approach the higher authority or management for providing proper risk strategy.
- Accept : When a non-critical and insignificant risk is faced by any project manager, it simply can be left unmanaged. In other words, when risks are small, compared to the project/organization size, they can simply be left unacknowledged. Sometimes it is beneficial not to manage a risk as the costs to manage them outweigh the benefits to avoid them.

Risk Responses for Positive Risks

- Enhance: Every positive risk is based on some factors driving that risk to occur or not to occur. If somehow the management of the organization could tap into these factors and enhance/increase/influence these factors, to further increase the gains from the positive risk, it would fall under this strategy.
- Exploit: This strategy aims to make sure that the risk happens so that the benefit underlying the risk or the situation is captured. An active example of this situation could be, if by providing training to the workforce, with a certain fixed outlay, there could be around 10% year-on-year savings on the cost of consumables, the management would try to utilize this opportunity to the fullest.
- Escalate: Escalation of risk can be understood as passing on the information to the higher management, or one's seniors in case the former does not have the authority to act autonomously in the situation.
- Accept: Doing nothing and leaving the situation as it is called acceptance strategy. Accepting that the opportunity will come in one's way or not is simply 'do nothing' response and it is used by many project

managers as it avoids extensive study and expenditure on application of risk management techniques.

- Share: The basic idea of this strategy is based on partnership principle, or simply not working alone. If a certain positive risk is noticeable but the organization cannot utilize its benefit on its own, then the organization can 'team-up' with other organization having the resources the former does not have, to encash the risk.

e) Control and Monitor Risk : To ensure the proper and coordinated execution of risk plans and to measure the effectiveness of the same, control and monitoring of risks is of utmost importance. This phase or process comes at the end of risk management processes and is one of the most important of them all. The success or failure or part thereof of the whole process can be learnt only if the control and monitoring is done with due diligence. It is not only an 'aftermath' of the outcome but also an analysis that helps future risk management process and their implementation. It provides the knowledge and experience to the project manager about the effectiveness of the whole process of the project.

- Control: Control includes a comparison of actual performance to that of standards laid down during beginning of the project, analyzing the said variances, if any, finding out the trends of these analyses so that they could be put to use in future projects, valuating any alternatives to the situation.
- Monitor: Collection of project performance reports and data, applying performance measures and reporting the outcome lies in the purview of control.

7. HEALTH SAFETY AND ENVIRONMENTAL RISK

One of the major factors which is affecting the project outcome is health safety and environmental risk. Safety work is considered 'at risk' but in construction sector, due to emphasis on project execution and the priority set on the execution of the work, the due emphasis is not given to safety work. Therefore, it is creating lot of issues when accidents occur, so it will delay the project outcome and emotional level of the managers and laborer. So, the project manager should consider the health safety and environmental risk management as separate entity for all risk management processes. Health safety and environmental related risk are not given due weightage in project risk assessment when compared to time, cost and schedule. Presently they are identified as part of project risk only. So, one must give due diligence and priority to health safety and environmental risks also. Most project management plans do not include health safety and environmental plan, whereas, to avoid risk element it should be considered as part of management plan. The quantitative analysis i.e. The impact on project objectives is analyzed using expected monetary value or decision tree analysis.

a) Expected Monetary Value Analysis : One of the quantitative analysis is to work out the expected monetary value of the risk, by which we can create a contingency reserve for mitigating any risk coming during the project execution. By experience and probability, one can very well work out the expected monetary value. In the below mentioned example, we are taking in consideration that there are three different aspects whichare going to impact the project execution i.e. The climatic conditions, workers impact and planning.

The example for calculating expected monetary value is as under :-

- Project: Construction Sector
- Conditions:
- The Climatic Conditions : Hot climate and rainy condition will delay the schedule completion by four weeks and the cost, let's say, will be rs. 1,00,000 and the probability of occurrence of this risk is, let's say, 20%.

Thus, cost impact of this condition will be =20/100*1,00,000 = rs. (-) 20,000

- workers impact : due to festive seasons, availability of workers is a problem. Let us assume that impact on the project due to this is rs. 50,000 and the probability of occurrence of this risk is, let's say, 10%

Thus, cost impact of this condition will be =10/100*50,000 = rs. (-) 5,000

- xplanning: let us say that, proper planning and advance action in deployment of machineries and other resources, for project execution, will provide positive risk in cost saving of rs. 80,000 and the probability of occurrence of this risk is, let's say, 15%

Thus, cost impact of this condition will be =15/100*80,000 = rs. (+) 12,000

expected monetary value based on above risks = rs. 12,000 (-) rs. 20,000 (-) rs. 5,000 = (-) rs. 13,000

Therefore, project manager will create a contingency reserve of rs. 13,000, to mitigate these risks. The methodology adopted here is same for all types of projects and the 'golden rules' of project risk management do not change sector wise.

b) Decision Tree Analysis : Decision Tree analysis is an important quantitative technique which has been neglected in past years but it is enjoying something of revival. Some people think it should be reserved for strategic decisions while others regard this technique as complex and difficult. As a matter of fact, it is quite simple and can be applied to many different uncertain situations. This decision tree approach recognizes that there are two major factors which affect the future, i.e. Choice and chance. In evaluating these, we need to consider two parameters, i.e. Cost and consequences. The first step in building decision tree is to identify the choices we are trying to make in trying to achieve the objectives. These choices form the branches of the tree, for example,

Whether to Make or to buy?

Whether to in-house the design or out-source the design?

Whether to fast track the project or use traditional approach?

Whether to use innovative methodology or already established practices?

Whether it is low priority or High Priority, etc.

These choices will create multiple branches like that of a tree, to help in choosing the decision to be made. Each of these decisions leads to different outcome, which are reflected in the decision tree, using the other elements in the tree. The simplest factor associated with alternative choices is cost, including both implementation cost and opportunity cost.

Let us understand the calculation of expected monetary value through decision tree analysis:

- Project : Information Technology Sector
- Decision to be made : Launch New Software or Upgrade Existing Software
- Cost of Development of New Software : Rs. 130 Lakhs
- Cost of Upgrading Existing Software : Rs. 70 Lakhs

8. CONCLUSION

Project risk management is a cumbersome and wide study which has immense use in the contemporary environmental. This is so because to make a project successful, the present business environment and its associated factors not only require a workforce with strong skill set but also require that the project manager perceives the risks hidden in the project environment which can affect its execution, implementation and the final outcome. Risk analysis, its management, mitigation and control processes are becoming a popular study and is being used by almost every project manager before beginning to execute any project. Risk analysis and management is primarily used to ensure that the number of surprises, in other words risks, that can occur during execution of any project are reduced to a

Benefits of New Package :

Yield Revenue of Rs. 180 Lakhs with 70% Probability =	Net Revenue (180*70%) = Rs. 126 Lakhs
Yield Revenue of Rs. 100 Lakhs with 30% Probability =	Net Revenue (100*30%) = Rs. 30 Lakhs
Net Revenue : Rs. 126 Lakhs + Rs. 30 Lakhs =	Rs. 156 Lakhs
Net Benefit from Launching New Software =	Rs. 156 Lakhs – Rs. 130 Lakhs (Cost) = Rs. 26 Lakhs

Benefits of Upgrading Existing Package :

Yield Revenue of Rs. 130 Lakhs with 70% Probability =	Net Revenue (130*70%) = Rs. 91 Lakhs
Yield Revenue of Rs. 75 Lakhs with 30% Probability =	Net Revenue (70*30%) = Rs. 22.5 Lakhs
Net Revenue : Rs. 91 Lakhs + Rs. 22.5 Lakhs =	Rs. 113.5 Lakhs
Net Benefit from Launching New Software =	Rs. 113.5 Lakhs – Rs. 70 Lakhs (Cost) = Rs. 43.5 Lakhs

From The above analysis, it can be seen that Upgrading the Existing Software would be more financially beneficial option than Launching a New Software.

number as small as possible. This not only reduces the overall cost of the project but also increases the effectiveness of the desired outcome of the project. While no one can predict future with certainty, one can make sure that the losses from negative risks occurring from uncertain future events can be reduced to the least possible and any gains from positive risks can be maximized. This is and has always been the basis of risk management and its related processes.

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