4 Risk Management

Syllabus

Concepts of Risks and Risk Management; Risk Management Activities; Effective Risk Management; Risk Categories; Aids for Risk Identification; Potential Risk Treatments; Risk Components and Drivers; Risk Prioritization.

Contents

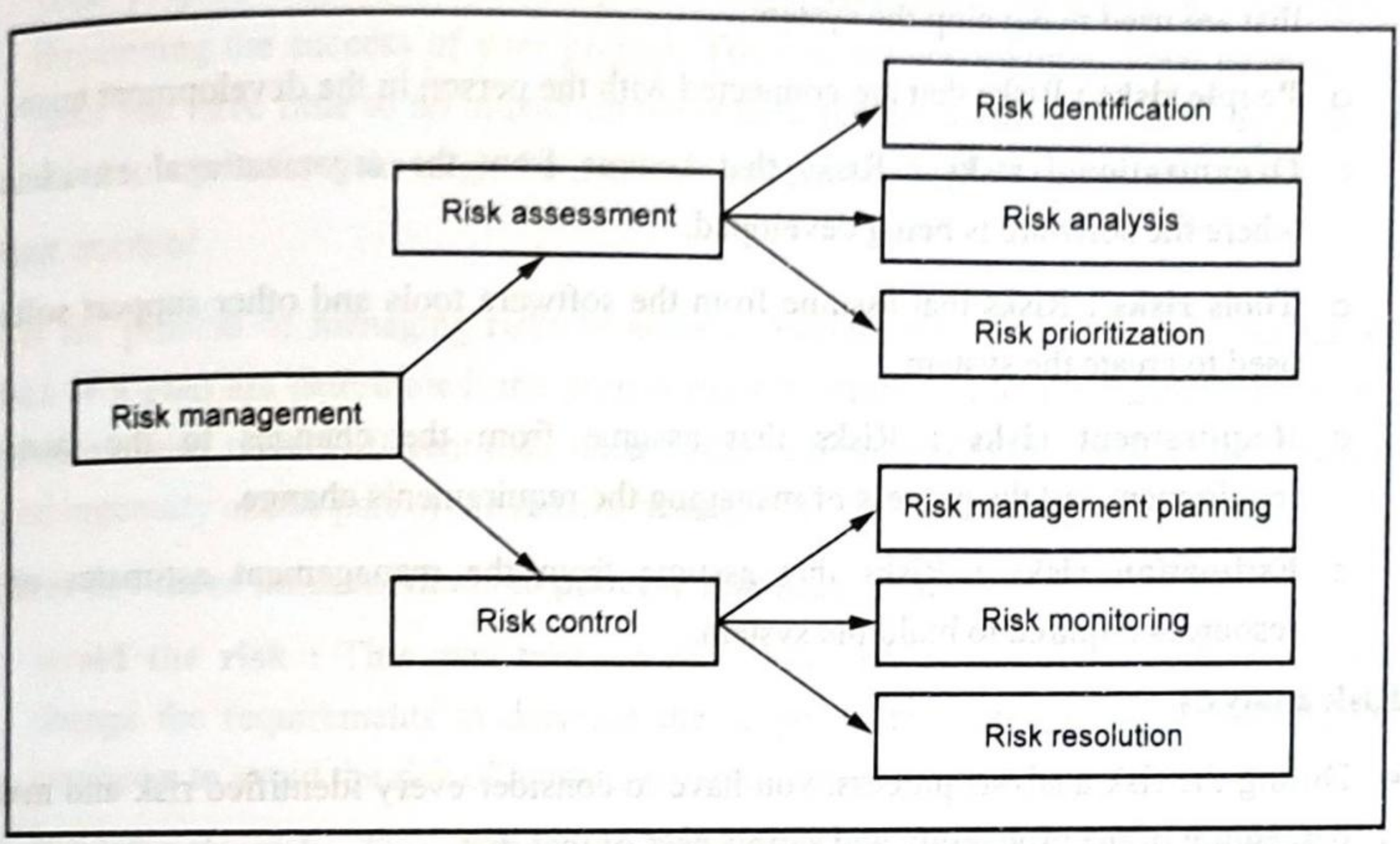
4.1 Concept of Risk

- A risk is a potential problem - It might happen and it might not
- Conceptual definition of risk
  - Risk concerns future happenings
  - Risk involves change in mind, opinion, actions, places, etc.
  - Risk involves choice and the uncertainty that choice entails
- Two characteristics of risk
  - **Uncertainty** - The risk may or may not happen, that is, there are no 100 % risks (those, instead, are called constraints)
  - **Loss** - The risk becomes a reality and unwanted consequences or losses occur

4.2 Risk Management

- Project risk management is the process of identifying, analyzing and responding to any risk that arises over the life cycle of a project to help the project remain on track and meet its goal. Risk management isn't reactive only; it should be part of the planning process to figure out risk that might happen in the project and how to control that risk if it in fact occurs.
- A risk is anything that could potentially impact your project's timeline, performance or budget. Risks are potentialities, and in a project management context, if they become realities, they then become classified as "issues" that must be addressed. So risk management, then, is the process of identifying, categorizing, prioritizing and planning for risks before they become issues.
- Risk management can mean different things on different types of projects. On large-scale projects, risk management strategies might include extensive detailed planning for each risk to ensure mitigation strategies are in place if issues arise. For smaller projects, risk management might mean a simple, prioritized list of high, medium and low priority risks.

4.3 Risk Management Activities



❑ Risk Assessment

- The objective of risk assessment is to division the risks in the condition of their loss, causing potential. For risk assessment, first, every risk should be rated in two methods :
  - The possibility of a risk coming true (denoted as r).
  - The consequence of the issues relates to that risk (denoted as s).
- Based on these two methods, the priority of each risk can be estimated :

$$p = r * s$$

Where p is the priority with which the risk must be controlled, r is the probability of the risk becoming true, and s is the severity of loss caused due to the risk becoming true. If all identified risks are set up, then the most likely and damaging risks can be controlled first, and more comprehensive risk abatement methods can be designed for these risks.

1. Risk identification

- The project organizer needs to anticipate the risk in the project as early as possible so that the impact of risk can be reduced by making effective risk management planning.
- A project can be of use by a large variety of risk. To identify the significant risk, this might affect a project. It is necessary to categories into the different risk of classes.

- There are different types of risks which can affect a software project :
  - **Technology risks :** Risks that assume from the software or hardware technologies that are used to develop the system.
  - **People risks :** Risks that are connected with the person in the development team.
  - **Organizational risks :** Risks that assume from the organizational environment where the software is being developed.
  - **Tools risks :** Risks that assume from the software tools and other support software used to create the system.
  - **Requirement risks :** Risks that assume from the changes to the customer requirement and the process of managing the requirements change.
  - **Estimation risks :** Risks that assume from the management estimates of the resources required to build the system.

2. Risk analysis

- During the risk analysis process, you have to consider every identified risk and make a perception of the probability and seriousness of that risk.
- There is no simple way to do this. You have to rely on your perception and experience of previous projects and the problems that arise in them.
- It is not possible to make an exact, the numerical estimate of the probability and seriousness of each risk. Instead, you should authorize the risk to one of several bands :
  1. The probability of the risk might be determined as very low (0 - 10 %), low (10 - 25 %), moderate (25 - 50 %), high (50 - 75 %) or very high (+ 75 %).
  2. The effect of the risk might be determined as catastrophic (threaten the survival of the plan), serious (would cause significant delays), tolerable (delays are within allowed contingency), or insignificant.

3. Risk prioritization

- Not all risks are created equally. You need to evaluate the risk to know what resources you're going to assemble towards resolving it when and if it occurs.
- Having a large list of risks can be daunting. But you can manage this by simply categorizing risks as high, medium or low. Now there's a horizon line and you can see the risk in context. With this perspective, you can begin to plan for how and when you'll address these risks.

- Some risks are going to require immediate attention. These are the risks that can derail your project. Failure isn't an option. Other risks are important, but perhaps not threatening the success of your project. You can act accordingly. Then there are those risks that have little to no impact on the overall project's schedule and budget. Some of these low-priority risks might be important, but not enough to waste time on.

❑ Risk control

- It is the process of managing risks to achieve desired outcomes. After all, the identified risks of a plan are determined: the project must be made to include the most harmful and the most likely risks. Different risks need different containment methods. In fact, most risks need ingenuity on the part of the project manager in tackling the risk.
- **There are three main methods to plan for risk management :**
  1. **Avoid the risk :** This may take several ways such as discussing with the client to change the requirements to decrease the scope of the work, giving incentives to the engineers to avoid the risk of human resources turnover, etc.
  2. **Transfer the risk :** This method involves getting the risky element developed by a third party, buying insurance cover, etc.
  3. **Risk reduction :** This means planning method to include the loss due to risk. For instance, if there is a risk that some key personnel might leave, new recruitment can be planned.
- **Risk Leverage :** To choose between the various methods of handling risk, the project plan must consider the amount of controlling the risk and the corresponding reduction of risk. For this, the risk leverage of the various risks can be estimated.
- Risk leverage is the variation in risk exposure divided by the amount of reducing the risk.

  Risk leverage = (Risk exposure before reduction – Risk exposure after reduction) / (Cost of reduction)

1. **Risk planning :** The risk planning method considers each of the key risks that have been identified and develop ways to maintain these risks.
   - For each of the risks, you have to think of the behavior that you may take to minimize the disruption to the plan if the issue identified in the risk occurs.
   - You also should think about data that you might need to collect while monitoring the plan so that issues can be anticipated.
   - Again, there is no easy process that can be followed for contingency planning. It rely on the judgment and experience of the project manager.

2. **Risk monitoring** : Risk monitoring is the method king that your assumption about the product, process, and business risks has not changed.
   - Assessing whether predicted risks occur or not
   - Ensuring risk aversion steps are being properly applied
   - Collect information for future risk analysis
   - Determining which risks caused which problems
3. **Risk resolution** : Once you have profiled your risk they can be ranked into an ordered list representing the various threats to the project to be dealt with. The more significant can then be examined and assigned an action by the project team.

   Typical actions are :
   - **Research** : The risk is not yet fully understood. Its impact or likelihood of occurrence may be unclear or the context in which it may occur could seem unreasonable. Further research by members of the project team is warranted.
   - **Accept** : The risk is unavoidable and must be accepted as-is. This category of risks become extremely important to a project since they cannot be resolved but still represent a threat to completion. Anticipation therefore become the key to dealing with this category of risk.
   - **Reduce** : The risk as it stands is unacceptable. The project team must act to reduce the risk and to establish contingency plans should the risk occur. The risk will have to reviewed in future to define the threat it poses.
   - **Eliminate** : The risk is unacceptable under any circumstances and must be eliminated as a possibility. The project team must put in place processes and procedures not only to ensure the immediate threat is eliminated but that it does not re-occur in the future.

4.4 Principle of Risk Management

1. **Global perspective** : In this, we review the bigger system description, design, and implementation. We look at the chance and the impact the risk is going to have.
2. **Take a forward-looking view** : Consider the threat which may appear in the future and create future plans for directing the next events.
3. **Open communication** : This is to allow the free flow of communications between the client and the team members so that they have certainty about the risks.

4. **Integrated management :** In this method risk management is made an integral part of project management.
5. **Continuous process :** In this phase, the risks are tracked continuously throughout the risk management paradigm.

4.5 Effective Risk Management

- An effective strategy for dealing with risk must consider **three** issues.
  - Risk mitigation (i.e., avoidance)
  - Risk monitoring
  - Risk management and contingency planning
- **Risk mitigation** (avoidance) is the primary strategy and is achieved through a plan
  - Example : Risk of high staff turnover

Strategy for Reducing Staff Turnover

- Meet with current staff to determine causes for turnover (e.g., poor working conditions, low pay, competitive job market)
- Mitigate those causes that are under our control before the project starts
- Once the project commences, assume turnover will occur and develop techniques to ensure continuity when people leave
- Organize project teams so that information about each development activity is widely dispersed
- Define documentation standards and establish mechanisms to ensure that documents are developed in a timely manner
- Conduct peer reviews of all work (so that more than one person is "up to speed")
- Assign a backup staff member for every critical technologist
- During risk monitoring, the project manager monitors factors that may provide an indication of whether a risk is becoming more or less likely
- Risk management and contingency planning assume that mitigation efforts have failed and that the risk has become a reality
- RMMM steps incur additional project cost
- Large projects may have identified 30 - 40 risks
- Risk is not limited to the software project itself
- Risks can occur after the software has been delivered to the user

4.6 Risk Categorization - Approach #1

- **Project risks**
  - They threaten the **project plan.**
  - If they become real, it is likely that the **project schedule** will slip and that costs will increase
- **Technical risks**
  - They threaten the **quality** and **timeliness** of the software to be produced
  - If they become real, **implementation** may become difficult or impossible
- **Business risks**
  - They threaten the **viability** of the software to be built
  - If they become real, they **jeopardize** the project or the product
- **Types of business risk**
  - **Market risk -** Building an excellent product or system that no one really wants
  - **Strategic risk -** Building a product that no longer fits into the overall business strategy for the company
  - **Sales risk -** Building a product that the sales force doesn't understand how to sell
  - **Management risk -** Losing the support of senior management due to a change in focus or a change in people
  - **Budget risk -** Losing budgetary or personnel commitment.

Risk Categorization - Approach #2

- **Known risks**
  - Those risks that can be **uncovered** after careful evaluation of the project plan, the business and technical environment in which the project is being developed, and other reliable information sources (e.g., unrealistic delivery date)
- **Predictable risks**
  - Those risks that are **extrapolated** from past project experience (e.g., past turnover)
- **Unpredictable risks**
  - Those risks that can and do occur, but are extremely **difficult to identify** in advance

4.7 Aids for Risk Identification

- Risk identification is a systematic attempt to **specify threats** to the project plan
- By identifying known and predictable risks, the project manager takes a first step toward **avoiding** them when possible and **controlling** them when necessary
- **Generic risks**
  - Risks that are a potential threat to every software project.
- **Product-specific risks**
  - Risks that can be identified only by those a with a clear understanding of the technology, the people, and the environment that is specific to the software that is to be built.
  - This requires examination of the project plan and the statement of scope.
  - "What special characteristics of this product may threaten our project plan ?"

❑ Known and Predictable Risk Categories

1 - Product size	Risks associated with overall size of the software to be built.
2 - Business impact	Risks associated with constraints imposed by management or the marketplace.
3 - Customer characteristics	Risks associated with sophistication of the customer and the developer's ability to communicate with the customer in a timely manner.
4 - Process definition	Risks associated with the degree to which the software process has been defined and is followed.
5 - Development environment	Risks associated with availability and quality of the tools to be used to build the project.
6 - Technology to be built	Risks associated with complexity of the system to be built and the "newness" of the technology in the system.
7 - Staff size and experience	Risks associated with overall technical and project experience of the software engineers who will do the work.

4.8 Potential Risk Treatment

- This is also referred to as Risk Response Planning. During this step you assess your highest ranked risks and set out a plan to treat or modify these risks to achieve acceptable risk levels. How can you minimize the probability of the negative risks as well as enhancing the opportunities ? You create risk mitigation strategies, preventive plans and contingency plans in this step. And you add the risk treatment measures for the highest ranking or most serious risks to your **Project Risk Register**.

4.9 Risk Components and Drivers

- The project manager identifies the **risk drivers** that affect the following risk components
  - **Performance risk** - The degree of uncertainty that the product will meet its requirements and be fit for its intended use.
  - **Cost risk** - The degree of uncertainty that the project budget will be maintained.
  - **Support risk** - The degree of uncertainty that the resultant software will be easy to correct, adapt, and enhance.
  - **Schedule risk** - The degree of uncertainty that the project schedule will be maintained and that the product will be delivered on time.
- The impact of each risk driver on the risk component is divided into one of **four impact levels**
  - Negligible, marginal, critical, and catastrophic
- Risk drivers can be assessed as impossible, improbable, probable, and frequent

4.10 Risk Prioritization

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