Risk Analysis And Management

Marwadi University

Computer Engineering Diploma

Unit 4:-
Risk Analysis And Management
Software Engineering (09CE2402)

Risk

- A risk is a potential problem – it might happen and it might not, this is uncertainty.
- Risk concerns future happenings.
- We don’t know whether a particular event will occur or not, but if it does, has a negative impact on a project.
- We can not eliminate the risk properly ,but we can try to minimize it.

RISK -EXAMPLE

- Team is working on a project and the developer walks out of project and other person is recruited in his place and he doesn’t work on the same platform and converts it into the platform he is comfortable with.

- Now the project has to yield the same result in the same time span. Whether they will be able to complete the project on time. That is the risk of schedule .

Types of Risk (Risk Categorization)

(1) Project Risks

(2) Technical Risks

(3) Business Risks

(4) Known Risks

(5) Predictable Risks

(6) Unpredictable Risks

Types of Risk (Risk Categorization)

(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
- Example: (1) There's always a risk that your key experts will leave.

(2) If your team are inexperienced or need to acquire new skills, that's another risk.

Types of Risk (Risk Categorization)

(2) Technical Risks

- - They threaten the quality and timeliness of the software to be produced
- - If they become real, implementation may become difficult or impossible
- Example:
- (1) This risk includes delays arising out of software & hardware defects or the failure of an underlying service or a platform.
- For instance, halfway through the project you might realize the cloud service provider you are using doesn't satisfy your performance benchmarks.

Types of Risk (Risk Categorization)

(3) Business risks

- - If they become real, they occur problem in the project or the product
- - Top five business risks are: (Sub-categories of Business risks)

    1) Market Risk
    2) Strategic Risk
    3) Sales Risk
    4) Management Risk
    5) Budget Risk

Sub-categories of Business Risk

Sr. No.	Risk Type	Description
1	Market Risk	Building an excellent product or system that no one really wants
2	Strategic Risk	Building a product that no longer fits into the overall business strategy for the company
3	Sales Risk	Building a product that the sales force doesn't understand how to sell
4	Management Risk	Losing the support of senior management due to change in focus or a change in people
5	Budget Risk	Losing budgetary or personnel commitment

Types of Risk (Risk Categorization)

(4) 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, poor development environment.)

Types of Risk (Risk Categorization)

(5) Predictable risks

- - Those risks that are extrapolated from past project experience
- (e.g., past turnover, poor communication with the customer)

(6) Unpredictable risks

- - Those risks that can occur, but are extremely difficult to identify in advance

Risk Management Strategies

Risk Management Strategies

(1) Reactive Risk Management

(2) Proactive Risk Management

(1) Reactive risk Management

- Software team does nothing about risks until something goes wrong.
- Then team flies into action in an attempt to correct the problem rapidly.
- This is called as “Fire Fighting Mode”.
- When this fails, “Crisis Management” takes over and the project is in danger of failure.

Reactive risk management: Reactive risk management attempts to reduce the tendency of the same or similar accidents which happened in past being repeated in future.

(2) Proactive risk Management

- It begins long before technical work is initiated.
- Potential risks are identified, their probability and impacts are assessed and ranked by their importance.
- The software team establishes a plan for managing risk.

Proactive risk management: Proactive risk management attempts to reduce the tendency of any accident happening in future by identifying the boundaries of activities, where a breach of the boundary can lead to an accident.

Risk Management

Risk Management

- Risk management is concerned with identifying risks and drawing up plans to minimize their effect on a project.
- A risk is a probability that some adverse circumstance will occur
  - Project risks affect schedule;
  - Product risks affect the quality or performance of the software being developed;
  - Business risks affect the organization developing the software.

Risk Management Process

Identify possible risks

recognize what can go wrong

Analyze each risk to estimate the probability that it will occur and the impact (i.e., damage) that it will do, if it does occur

Rank the risks by probability and impact

- Impact may be negligible, marginal, critical, and catastrophic

Develop a plan to manage those risks having high probability and high impact

Risk Identification

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
- - Product-specific risks

Risk Identification

❖ **Generic Risks:-**

- Risks that are a potential threat to every software project

❖ **Product-Specific Risks**

- Risks that can be identified only by those who have clear understanding of the technology, the people and the environment that is specific to the software that is to be built.
- “What special characteristics of this product may threaten our project plan?"

Risk Identification –Item Checklist

- One method for identifying risks is to create a risk item checklist.
- The checklist focuses on some subset:
    1. Product size
    2. Business impact
    3. Stakeholders characteristics
    4. Process identification
    5. Development environment
    6. Technology to be built
    7. Staff size and experience

Risk Identification –Item Checklist

(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

Risk Identification –Item Checklist

(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

Risk Identification –Item Checklist

(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

Risk Components and Drivers

- The project manager identifies the risk drivers that affect the following risk components

(1) Performance Risk - the degree of uncertainty that the product will meet its requirements and be fit for its intended use

(2) Cost Risk - the degree of uncertainty that the project budget will be maintained

(3) Support Risk - the degree of uncertainty that the resultant software will be easy to correct, adapt, and enhance

(4) Schedule Risk - the degree of uncertainty that the project schedule will be maintained and that the product will be delivered on time

Risk Components and Drivers

- The impact of each risk driver on the risk component is divided into one of four impact levels

1) Negligible
2) Marginal
3) Critical
4) Catastrophic (Very great trouble)

Risk Projection

Risk Projection

- Attempts to rate each risk in two ways:
  1. Probability that the risk is real.
  2. Consequences of the problems associated with the risk.

Risk Projection

There are four risk projection steps intended to consider risks in a manner that leads to prioritization.

1) Establish a scale that reflects the perceived likelihood of a risk (e.g., 1-low, 10-high)
2) Precisely describe the consequences of the risk.
3) Estimate the impact of the risk on project and product.
4) Asses the overall accuracy of the risk projection.

Risk Exposure (RE)

$$RE = P * C$$

P=probability of occurrence for each risk

C=cost of project when risk occurs

- Risk Exposure can be computed for each risk, once the estimation of the cost of the risk is made.
- The total RE for all the risks can provide a mean for adjusting the final cost.

Risk Refinement (Risk Assessment)

Risk Refinement

- During early stages of project planning, a risk may be stated quite generally.
- As time passes and more is learned about the project and the risk, it may be possible to refine the risk into a set of more detailed risks, each somewhat easier to mitigate, monitor, and manage.
- One way to do this is to represent the risk in condition-transition-consequence (CTC) format .
- That is, the risk is stated in the following form: Given that <condition> then there is concern that (possibly) <consequence>.

Risk Refinement: Example

- Given that all reusable software components must confirm to specific design standards and that some do not confirm, then there is concern that (possibly) only 70 percent of the planned reusable modules may actually be integrated into the as-built system, resulting in the need to custom engineer the remaining 30 percent of components.

Risk Refinement: Example

This general condition can be refined in the following manner: <condition>

Subcondition 1. Certain reusable components were developed by a third party with no knowledge of internal design standards.

Subcondition 2. The design standard for component interfaces has not been solidified and may not conform to certain existing reusable components.

Subcondition 3. Certain reusable components have been implemented in a language that is not supported on the target environment.

Risk Refinement: Example

The consequences associated with these refined sub-conditions remains the same (i.e., 30 percent of software components must be customer engineered), but the refinement helps to isolate the underlying risks and might lead to easier analysis and response.

Risk Control

Risk Control

- Risk assessment is a passive activity identifying the risks and their impacts, risk control comprises active measures that are taken by project management to minimize the impact of risks.
- Risk control has 3 categories :
  - **Risk avoidance(mitigation)**
  - **Risk monitoring**
  - **Risk management**

Risk Control

- **Mitigation:** How can we avoid the risk?
- **Monitoring:** What factors can we track that will enable us to determine if the risk is becoming more or less likely?
- **Management:** what contingency plans do we have if the risk becomes a reality?

Risk Mitigation

- Risk Mitigation is a project avoidance activity.
- If a software team adopts a proactive approach to risk, avoidance is best strategy, achieved by developing a plan for mitigation.
- Problem: Risk of high staff turnover

Risk Mitigation : Solution

- 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.
- Define documentation standards and establish mechanisms to be sure that documents are developed in a timely manner.
- Assign a backup staff member for every critical technologist.

Risk Monitoring

- Risk Monitoring is a project tracking activity
- The project manager monitors factors that may provide an indication of whether the risk is becoming more or less likely.
  - General attitude of team members based on project pressures.
  - Interpersonal relationships among team members.
  - Potential problems with compensation and benefits.
  - The availability of jobs within the company and outside it.

RMMM Plan


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RMMM Plan

- It documents all work performed as part of risk analysis and is used by the Project Manager as part of the overall project plan.
- Alternatively, each risk is documented individually using a Risk Information Sheet(RIS).

Risk information sheet

Risk ID: P02-4-32	Date: 5/9/02	Prob: 80%	Impact: high

Description:
Only 70 percent of the software components scheduled for reuse will, in fact, be integrated into the application. The remaining functionality will have to be custom developed.

Refinement/context:
Subcondition 1: Certain reusable components were developed by a third party with no knowledge of internal design standards.
Subcondition 2: The design standard for component interfaces has not been solidified and may not conform to certain existing reusable components.
Subcondition 3: Certain reusable components have been implemented in a language that is not supported on the target environment.

Mitigation/monitoring:
1. Contact third party to determine conformance with design standards.
2. Press for interface standards completion; consider component structure when deciding on interface protocol.
3. Check to determine number of components in subcondition 3 category; check to determine if language support can be acquired.

Management/contingency plan/trigger:
RE computed to be $20,200. Allocate this amount within project contingency cost. Develop revised schedule assuming that 18 additional components will have to be custom built; allocate staff accordingly.
Trigger: Mitigation steps unproductive as of 7/1/02

Current status:
5/12/02: Mitigation steps initiated.

Originator: D. Gagne	Assigned: B. Laster

Thank You!!!!