# Chapter 12 – Project Management

Lecture 1

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## Topics covered

- ✧ Risk management
- ✧ Managing people
- ✧ Teamwork

## Software project management

- Concerned with activities involved in ensuring that software is delivered on time and on schedule and in accordance with the requirements of the organisations developing and procuring the software.

- Project management is needed because software development is always subject to budget and schedule constraints that are set by the organisation developing the software.

## Success criteria

- ✧ Deliver the software to the customer at the agreed time.
- ✧ Keep overall costs within budget.
- ✧ Deliver software that meets the customer’s expectations.
- ✧ Maintain a happy and well-functioning development team.

# Software management challenges

- ✧ The product is intangible.
  - A manager of shipbuilding  or a civil engineering project can see the product being developed.
  - If a schedule slips, the effect on the product is visible-parts of the structure are obviously unfinished
  - Software is intangible
  - Software cannot be seen or touched. Software project managers cannot see progress by simply looking at the artefact that is being constructed.

## Software management challenges

- Many software projects are 'one-off' projects.
  - Large software projects are usually different in some ways from previous projects. Even managers who have lots of previous experience may find it difficult to anticipate problems.
- Software processes are variable and organization specific.
  - We still cannot reliably predict when a particular software process is likely to lead to development problems.

# Management activities

✧ *Project planning*

- Project managers are responsible for planning, estimating and scheduling project development and assigning people to tasks.
- They supervised the work to ensure that it is carried out to the required standards and monitor progress  to check that the development is on time and within the budget.

✧ *Reporting*

- Project managers are usually responsible for reporting on the progress of a project to customers and to the managers of the company developing the software.
- They have to able to communicate at a range of levels, from detailed technical information to management summaries

## Management activities

✧ *Risk management*

- Project managers assess the risks that may affect a project, monitor these risks and take action when problems arise.

✧ *People management*

- Project managers have to choose people for their team and establish ways of working that leads to effective team performance
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## Management activities

✧ *Proposal writing*

- The first stage in a software project may involve writing a proposal to win a contract to carry out an item of work.
- The proposal describes the objectives of the project and how it will be carried out.
- It usually includes cost and schedule estimates and justifies why the project contract should be awarded to a particular organization or team
- Proposal writing is a critical task as the survival of many software companies depends on having  enough proposal accepted and contract awarded

## Risk management

- Risk management is concerned with identifying risks and drawing up plans to minimise their effect on a project.
- A risk is a probability that some adverse circumstance will occur
- Risk may threaten the project, the software that is being developed, or the organization

# Risk management

✧ Risks are categories as:

- Project risks affect schedule or resources;
- Product risks affect the quality or performance of the software being developed;
- Business risks affect the organisation developing or procuring the software. For example, a competitor introducing a new product is a business risk

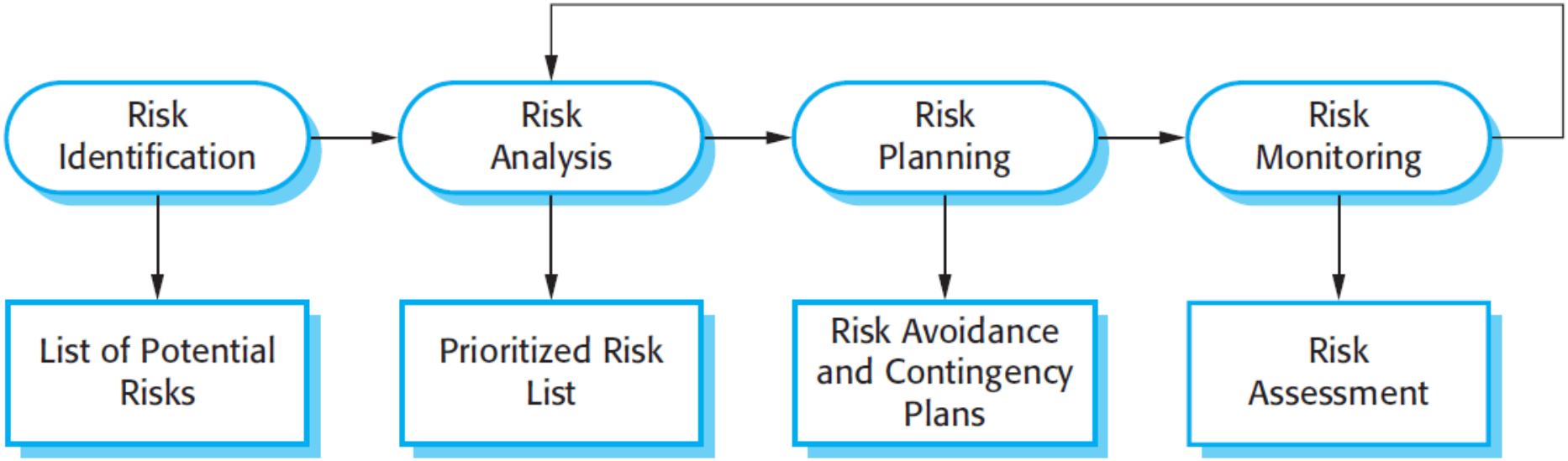
# Examples of common project, product, and business risks

| Risk | Affects | Description |
|---|---|---|
| Staff turnover | Project | Experienced staff will leave the project before it is finished. |
| Management change | Project | There will be a change of organizational management with different priorities. |
| Hardware unavailability | Project | Hardware that is essential for the project will not be delivered on schedule. |
| Requirements change | Project and product | There will be a larger number of changes to the requirements than anticipated. |
| Specification delays | Project and product | Specifications of essential interfaces are not available on schedule. |
| Size underestimate | Project and product | The size of the system has been underestimated. |
| Tool underperformance | Product | Tools, which support the project, do not perform as anticipated. |
| Technology change | Business | The underlying technology on which the system is built is superseded by new technology. |
| Product competition | Business | A competitive product is marketed before the system is completed. |

# The risk management process

- ✧ Risk identification
  - Identify project, product and business risks;
- ✧ Risk analysis
  - Assess the likelihood and consequences of these risks;
- ✧ Risk planning
  - Draw up plans to avoid or minimise the effects of the risk;
- ✧ Risk monitoring
  - Monitor the risks throughout the project;

# The risk management process



# Risk identification

- ✧ May be a team activities or based on the individual project manager’s experience.
- ✧ A checklist of common risks may be used to identify risks in a project
  - Technology risks:
    - Risk that derived from the software or hardware technologies that are used to develop the system
  - People risks:
    - Risk that are associated with the people in the development team

# Risk identification

- Organisational risks:
  - Risks that derived from the organization environment where the software is being developed
- Requirements risks:
  - Risks that derived from the software tools and other support software used to develop the system
- Estimation risks:
  - Risks that derived from the management estimates of the resources required to build the system

# Examples of different risk types

| Risk type | Possible risks |
|---|---|
| Technology | The database used in the system cannot process as many transactions per second as expected.<br>Reusable software components contain defects that mean they cannot be reused as planned. |
| People | It is impossible to recruit staff with the skills required.<br>Key staff are ill and unavailable at critical times.<br>Required training for staff is not available. |
| Organizational | The organization is restructured so that different management are responsible for the project.<br>Organizational financial problems force reductions in the project budget. |

# Examples of different risk types

| Tools | The code generated by software code generation tools is inefficient.<br>Software tools cannot work together in an integrated way. |
|---|---|
| Requirements | Changes to requirements that require major design rework are proposed.<br>Customers fail to understand the impact of requirements changes. |
| Estimation | The time required to develop the software is underestimated.<br>The rate of defect repair is underestimated.<br>The size of the software is underestimated. |

## Risk analysis

- ✧ Assess probability and seriousness of each risk.
- ✧ Probability may be very low, low, moderate, high or very high.
- ✧ Risk consequences might be catastrophic, serious, tolerable or insignificant.

# Risk types and examples

| Risk | Probability | Effects |
|---|---|---|
| Organizational financial problems force reductions in the project budget . | Low | Catastrophic |
| It is impossible to recruit staff with the skills required for the project . | High | Catastrophic |
| Key staff are ill at critical times in the project . | Moderate | Serious |
| Faults in reusable software components have to be repaired before these components are reused. | Moderate | Serious |
| Changes to requirements that require major design rework are proposed . | Moderate | Serious |
| The organization is restructured so that different management are responsible for the project . | High | Serious |
| The database used in the system cannot process as many transactions per second as expected . | Moderate | Serious |

# Risk types and examples

| Risk | Probability | Effects |
|---|---|---|
| The time required to develop the software is underestimated . | High | Serious |
| Software tools cannot be integrated . | High | Tolerable |
| Customers fail to understand the impact of requirements changes . | Moderate | Tolerable |
| Required training for staff is not available . | Moderate | Tolerable |
| The rate of defect repair is underestimated . | Moderate | Tolerable |
| The size of the software is underestimated . | High | Tolerable |
| Code generated by code generation tools is inefficient . | Moderate | Insignificant |