

Module 5

Project Risk Management and Procurement Management

Introduction

This module examines two additional facilitating project management functions – risk, and procurement management. Project risk management is the art and science of identifying, assigning, and responding to risk throughout the life of a project and in the best interests of meeting project objectives. Project procurement management is defined as the processes required to acquire goods and services for a project from outside the performing organisation.

Upon completion of this module you will be able to:



Outcomes

- *explain* the nature of risks in relation to project management.
- *identify* the different types of risk faced in project management.
- *construct* a plan to mitigate and monitor risk during the project lifespan.
- *evaluate* the risk exposure of a project.
- *apply* procurement management as a competitive tool in project management.
- *implement* the six processes in project procurement management.



Terminology

Project risk management:	Defined as identifying risk events and developing strategies to respond and control risks should they occur in a project. Especially important during planning stage and continues throughout implementation stage.
Business risk:	Normal risk of doing business that carries opportunities for both gains and losses. Example; Nokia's phones were not popular with consumers who preferred iPhones and Nokia suffered financial losses.
Pure or insurable risk:	Risk that presents an opportunity for loss only. Example; a fire that damages the business premises. Insurance coverage can be purchased.

Known risks:	Risks that were identified for a particular project. Example; earthquakes are a known risk in Japan.
Unknown risks:	Risks that were not identified or that could not be reasonably identified. Example; assassination of the head of a country that leads to chaos in that country.
Frequency or probability of occurrence of a risk event:	How often a risk event may occur. Usually expressed in terms of how many times the risk event occurs in a given period.
Severity of impact of a risk event:	The degree or seriousness that a risk event poses to the project. Can be expressed in monetary losses, loss of lives and loss of time.
Project procurement management:	The processes required to acquire goods and services for a project from external parties.
Make-or-buy analysis:	An analysis on whether an organisation should make a product or provide a service in-house or outsource. The criteria in the analysis include costs and competencies.
Fixed price or lump sum contracts:	Contracts with a fixed total price for the delivery of a well-defined product (e.g. \$20 million for the construction of a five-storey office building with related specifications) or service (\$2,000 per machine for the rental and servicing of office photo-copier machines).
Cost reimbursable contracts:	Contracts involving payment to the vendor for direct and indirect actual costs incurred, plus a profit margin and incentive to the suppliers.
Unit price contracts:	Contracts where the total value of the contract is a function of the quantities needed to complete the work. Example; \$1,200.00/ton of cement.
Statement of work:	A detailed technical and qualitative description of the work required for the procurement.
Requests for proposal:	Outlines the general problem and requirements of the buyer for the potential suppliers to propose a solution.
Invitations to quote:	To solicit price quotes for products (usually ready-made) with clearly defined features or for services where the tasks are clearly defined.



Required Reading



Reading

Reducing Project Management Risk:

<http://www.netcomuk.co.uk/~rtusler/index.html>

Project risk management

Project risk management is the art and science of identifying, assigning, and responding to risk throughout the life of a project and in the best interests of meeting project objectives.

Risk management can often result in significant improvements in the ultimate success of projects. Risk management can be applied to:

- Selecting projects
- Determining project scope
- Developing schedules
- Developing cost estimates.

Risk management helps stakeholders understand the nature of the project, involves team members in defining strengths and weaknesses and helps to integrate the other project management knowledge areas.

Project risk management defined

Let's start with a basic understanding of the concepts of risk management and its general application within a project.

Risk management is a process that focuses on identifying risk events and developing strategies to respond and control risks should they occur in a project. It is not a one-time event carried out at the beginning of a project.

Risk management is a critical process in project management which is not often conducted or handled well. Defining and using a risk management process in your projects is proactive management. Risk management allows the project manager to view the project across the life cycle to identify, assess, prioritise, respond to and control project risk. Effective risk management increases the probability of project success by:

- Preventing surprises/problems
- Preventing management by crisis
- Improving customer/stakeholder satisfaction
- Increased profitability and competitive advantage.

PMI^{TM6} in the Project Management Body of Knowledge (PMBOKTM) defines risk management as 'the systematic process of identifying, analysing, and responding to project risk.' It includes maximising the probability and consequences of positive events and minimising the probability and consequence of adverse events to project objectives.

Risk management and the project planning process

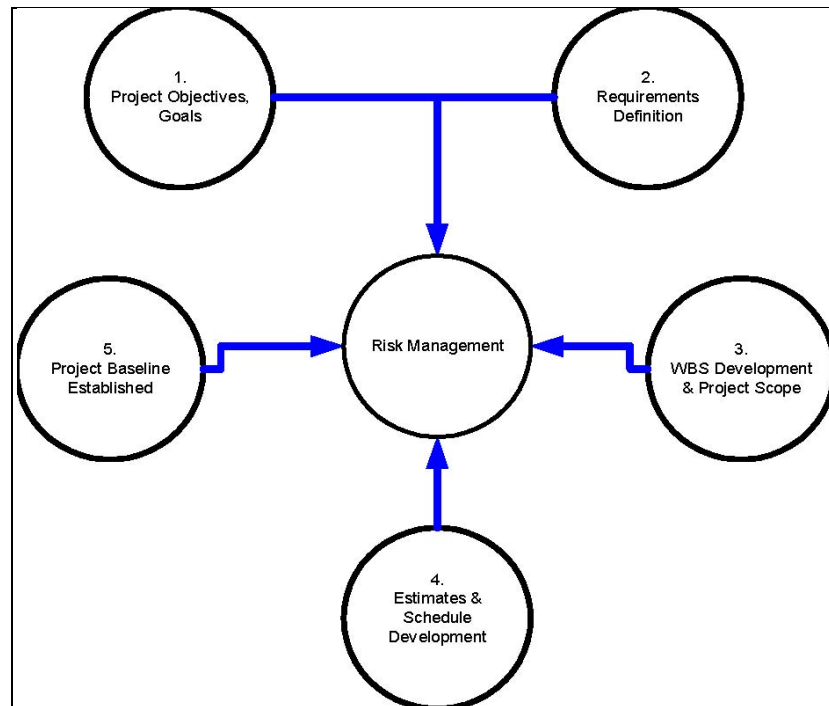


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The nature of risk

A source of risk is any factor that can affect project performance, slow down or stop the project. Considerations are probability of the occurrence and the impact to the project should the risk occur.

At the onset of a project or during the initiation phase there is much uncertainty or unknown. Clarity of potential risk occurs once planning has completed and as the project implementation runs through until completion.

Risk impact is the greatest during the mid-point of project implementation when a significant amount of money and time have been expended.

⁶PMI – Project Management Institute TM



Risk is often described as a negative value when in fact this definition is not necessarily an accurate perception. A risk event can have either a positive (opportunity) or negative (threat) impact to the project. For example, there are threats that may not occur in the project, and there are opportunity events that may or may not occur. Both threats and opportunities must be addressed in a good risk management plan.

An example of an opportunity might be the use of new technology that in itself has some risk; however using the technology could reduce development time. A threat example is using untried technology in a project which could fail and set the project behind schedule or even require the investment of an alternative technology. Defining the probability of such occurrences and their impact to the project should they occur is essential to defining your risk management plan.

Risk is comprised of identifying events that may or may not occur in a project and assessing the probability of the occurrence along with the impact to the project should the risk occur.

Definition at the beginning of the project process of the objectives and performance criteria has a fundamental influence on the level of project risk. Tight schedules and budgets can make a project more “risky” if there is no flexibility in the schedule and reaching the target may be questionable to begin with.

Project risk management requires that strategies developed for managing risk must be inclusive of strategies for managing project objectives. Often projects establish objectives and performance criteria for the project without consideration for various stakeholder groups who hold an interest or are impacted by the project. All impacted parties need to be included in this first step of establishing parameters for the project. It is only then that a thorough risk management process can be developed and implemented in a project.

Overall project risk is related to the risk components identified previously, (event, probability, impact). The term risk exposure is often used to describe the extent or significance of a particular risk to the project. Risk exposure is calculated by multiplying the probability of a risk occurrence by the impact should the risk occur. We will discuss tools and processes to assess risk using this concept in future modules. Suffice it to say that risk is a function of all three components and will vary from project to project and according to the players involved in the project and the situations particular to environments. PMI™ distinguishes business risk from pure risk.

- **Business risk:** Normal risk of doing business that carries opportunities for both gains and losses. (Business risk occurs as a result of business decisions such as the decision to use a new technology in a project to leverage future business opportunities.)
- **Pure or insurable risk:** Risk that presents an opportunity for loss only. (For this type of risk you could purchase insurance)
- **Known risks:** Risks that were identified for a particular project

- **Unknown risks:** Risks that were not identified or managed – unknown risks if they occur on a project and are positive are called windfalls.

The role of risk management in a project

Risk management is a critical part of the project planning process. Risk management has the potential to influence project design and project activities throughout the life of the project. It is therefore important to establish a risk management plan in the early phases of a project and to conduct risk management activities as a normal part of the project management process.

Risk management is a proactive process when conducted well can modify future incidents and their potential impact on the project. If a project manager carries out a thorough risk management process it will reduce the amount of time spent on reactive and crisis management. Effective risk management reduces crisis management to an acceptable level.

Good project management can be viewed as risk management. Good planning and change control, setting goals and milestones in itself are responses to general sources of risk such as human error. Establishing a risk management process in the early stages of the project integrated into the project plan will provide a positive effect on proactive and reactive risk management during the life of the project.

The project manager is responsible for initiating and leading the process of project risk management. In other words, the project manager must ensure that risk management happens. This would include ensuring that risk management is integrated into all aspects of project management, such as the project plan or the change control process.

In addition, the project manager must effectively communicate with the team members to provide direction concerning risk management. The project manager must ensure that the team members understand the risk management process for the project and use the appropriate risk management tools and techniques to ensure the effective management of risk.

While the project manager initiates, leads, and provides direction for risk management, the team members are responsible for carrying out risk management as they are also the ones who actually do the work. The risk management activities carried out by the team would include performing risk identifying and analysing risks, developing response strategies and carrying them through when necessary, and controlling risk. The team members must then communicate on a consistent and frequent basis to the project manager, the findings, strategies, and actions.

The project sponsor and the project steering committee have a role in the risk management process. They must agree to the risk management plan developed by the project team and the project manager and these are the people that the project manager notifies when a risk is identified. Agreement is essential to ensure that both the sponsor and any steering

committee understand the types and nature of the risks the project is exposed to and how the team plans to address the risks. In essence, agreement is a sign-off process thereby reducing the element of surprise should a risk occur.

Risk belongs to the organisation and the customer. It belongs to the organisation because any risk can affect the ability to carry the project to completion, and it affects the customer in a more indirect fashion; if a risk can jeopardise the organisation's ability to complete the project, it can harm the customer if the final product is delayed, delivered or otherwise affected by risk.

One of the largest hurdles to overcome for a project manager is senior management understanding and attitude toward risk. Often this is a result of minimal understanding of the concepts of risk and a preference to rely on aggressive risk taking as a positive process. Better decisions are made with higher chance of success when there is a common understanding and acceptance of risk management as a key process in the project.

Risk and the project life cycle

The diagram below depicts that elements of risk management occur across and throughout the project life cycle. Risk monitoring and control occurs during the implementation phase and re-planning is completed during the implementation and close out phase.

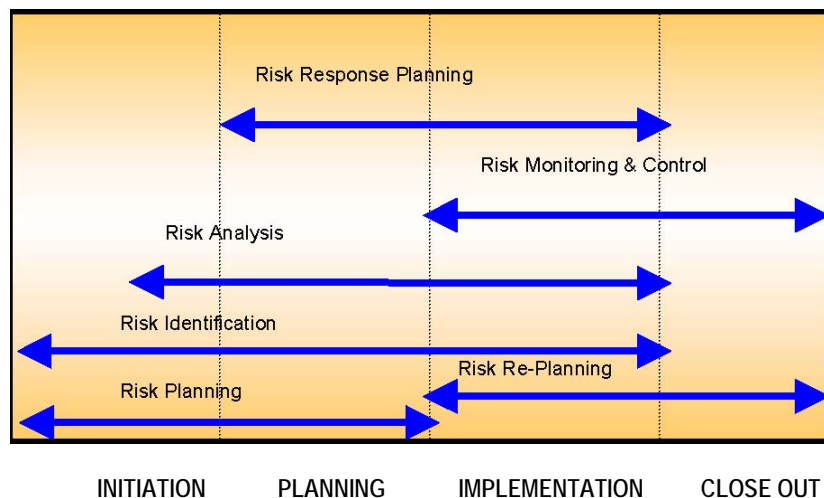


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The risk management process

The PMBOK™ provides an overview of the processes defined as:

- **Risk Management Planning** – deciding how to approach and plan the risk management activities for a project
- **Risk Identification** – determining which risks might affect the project and documenting their characteristics

- **Qualitative Risk Analysis** – performing a qualitative analysis of risks and conditions to prioritise their effects on project objectives
- **Quantitative Risk Analysis** – measuring the probability and consequences of risks and estimating their implications for project objectives
- **Risk Response Planning** – developing procedures and techniques to enhance opportunities and reduce threats to the project's objectives
- **Risk Monitoring and Control** – monitoring residual risks, identifying new risks, executing risk reduction plans, and evaluating their effectiveness throughout the project life cycle.

All processes interact with each other and with all knowledge areas within the PMBOK. The PMBOK also defines inputs, tools and techniques and outputs for each of the processes identified within risk management.

The process description for risk management is depicted in the chart below.

- Risk Identification
- Risk Analysis
 - Qualitative
 - Quantitative.
- Risk Response Development
- Risk Response Control
 - Implement Strategy.
- Evaluate Results
- Document Results.

The following diagram depicts a standard risk management process.

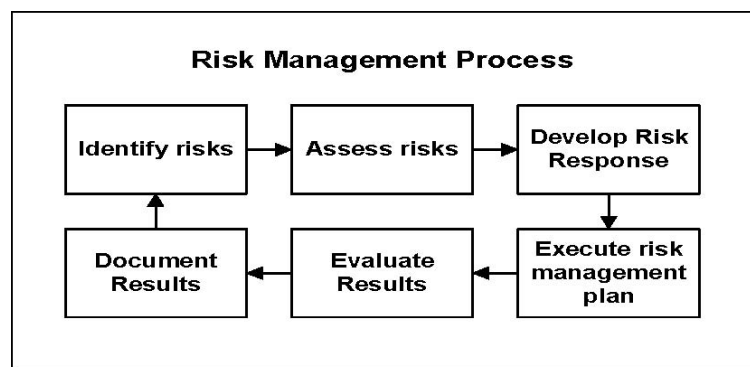


Diagram used with permission Enterprise Project Management Ltd.



The above diagram displays that risk management is conducted as a continuous process throughout the entire project life cycle. Planning and execution are continuous.

Sources of risks in projects

A number of studies have shown that projects share some common sources of risk. In 1996 the Standish Group developed⁷ the following top ten success criteria for information technology projects based on interviews with 60 IT professionals (weight indicate relative importance) - the same concept is true across business projects within organisations:

Success Criterion	Weight
User involvement	19
Executive Management support	16
Clear statement of requirements	15
Proper planning	11
Realistic expectations	10
Smaller project milestones	9
Competent staff	8
Ownership	6
Clear visions and objectives	3
Hard-working, focused staff	3
Total	100

Broad Categories of risk include:

- **Market risk** – will the project product be marketable, and competitive?
- **Financial risk** – is the project affordable and will it provide the expected ROI? What about opportunity cost? Could the money be better spent elsewhere?
- **Technology Risk** – is the project technically feasible? Will the technology meet project objectives? Will the technology be obsolete before the product is produced?

The Project Management Institute has a specific interest group on risk management. Check out their website at <http://www.risksig.com/>

⁷The Standish Group. (1996) *Unfinished Voyages* (www.standishgroup.com/voyages.html)

Risk identification

Risk identification involves identifying which risks are likely to affect a project and documenting the characteristics of each. The most effective way of identifying project risks is by using some form of systematic approach, whether it be by project management knowledge area, systems development life cycle phase or developing a customised checklist based on previous project experience.

Risk events are specific things that may occur to the detriment of the project (significant changes in project scope, strikes, supply shortages, etc.). To characterise or define a risk event you need to examine and document the following parameters.

1. What is the probability of occurrence?
2. What is the impact to the project or the outcome if it does occur (severity)?
3. When might it occur?
4. How often might it occur (frequency)?

Risk symptoms are the indicators or triggers for the actual risk event. For example, cost overrun may be symptomatic of poor estimation, or product defects may be symptomatic of a poor quality supplier. Identification and documentation of potential risk symptoms provides a diagnostic tool for project teams and suggests potential corrective action.

Risk qualitative and quantification assessments

Risk analysis (qualitative or quantitative) is the process of evaluating risk to assess the range of possible project outcomes. The approach involves estimating probability of occurrence, potential impact on the project and possible mitigation strategies. By quantifying risks, project managers and teams can then rank and prioritise them and establish acceptable risk thresholds.

Expected Monetary Value

Expected monetary value is defined as the product of the risk event probability times the risk event's monetary value. That is, if the estimated cost of a risk event (e.g., the senior subject matter expert quitting and having to recruit and hire a new one) is \$10,000 and the probability of it occurring is 20 per cent, the expected monetary value would be $20\% \times \$10,000 = \$2,000$.

PERT Estimations

Programme Evaluation and Review Technique (PERT) analysis, discussed in Module 2, is actually a highly simplified risk analysis method. It involves the provision of three estimates of an activity's duration – pessimistic, optimistic and most likely. The technique places four times the weight on the most likely estimate than on the optimistic or



pessimistic ones. A more accurate and flexible method is something called Monte Carlo simulation.

Monte Carlo Simulation for Project Risk Analysis

Simulation uses a system model to analyse expected behaviour or performance. Monte Carlo analysis is a risk quantification technique that simulates a model's outcome many times (100 – 1,000 times) to provide a statistical distribution of the calculated results.

Monte Carlo analysis also uses pessimistic, optimistic, and most likely estimates and the probabilities of their occurrence. Simulations such as these are a more sophisticated method for creating estimates than PERT and can more accurately help determine the likelihood of meeting project schedule or cost targets. Many organisations globally use Monte Carlo simulation for risk analysis. PC software programmes like @RISK provide Monte Carlo simulation capability to project management software like MS Project and to standard PC spread sheets.

Expert Judgment

Many firms use the past experience and intuition of experts in lieu of or as a supplement to quantitative risk analysis. One common approach to gathering expert opinion is the Delphi method, used to derive a consensus among a panel of experts to make predictions about future developments. The method uses repeated rounds of questioning including feedback of earlier responses to take advantage of group input to refine the response. The process is continued until the group responses converge to a specific solution. This method works well in developing probability assessments for risk events.

Quantification of Risk in Project Management

Risk is a measure of the probability and consequence of not achieving a project on time and budget. Thus risk for each event is a function of two components: likelihood of occurrence and its subsequent impact.

Mathematically Risk = f(likelihood, Impact)

Decision making under risk is crucial. It can be categorised into three types:

1. Decision-making under certainty
2. Decision-making under risk
3. Decision-making under uncertainty.

Let's look at each of these by taking an example from Kerzner (2003) to explain these three situations and the decision-making process.

1. Decision-making under certainty

Here we are 100 per cent aware of what the states of nature will be and the respective outcome. Say we have three strategies and each one has the

probability of occurrence, then the maximum of all expected values would be a manager's choice.

States of Nature			
Strategy	N1 = Up	N2= Even	N3=Low
S1	\$50	\$40	-\$50
S2	\$50	\$40	\$60
S3	\$100	\$80	\$90

Obviously strategy S3 will always yield high profits then other two. So a project manager would always select S3 in this situation.

2. Decision-making under risk

Risk can be attributed to outcomes that can be established within confidence limits known as probability distribution. The question is how much probability can be assigned. These probabilities are often estimated or come from previous experience. Using the previous example, we are going to assign the probability of occurrence as 25 per cent, 25 per cent and 50 per cent respectively for three states of nature N1, N2 and N3 as indicated below.

States of Nature			
Strategy	N1 = Up	N2= Even	N3=Low
	0.25	0.25	0.5
S1	\$50	\$40	-\$50
S2	\$50	\$50	\$40
S3	\$100	\$80	\$90

Calculation:

The expected value for strategy S1, S2 and S3 are:

$$E1 = 0.25 (\$50) + 0.25 (\$40) - 0.5 (\$50) = -\$2.5$$

$$E2 = 0.25 (\$50) + 0.25 (\$50) + 0.5 (\$40) = \$45$$

$$E3 = 0.25 (\$100) + 0.25 (\$80) + 0.5 (\$90) = \$90$$

So based on the expected value, the project manager will select strategy S3 with highest yield \$90.

The probability assignment varies from one manager to another. When the probability assignment gets changed, the choice of strategy gets changed as yield changes. That means when the probability of occurrence is changed to 30 per cent, 25 per cent and 45 per cent respectively, the yield changes, hence the decision.



4. Decision-making under uncertainty

Under uncertainty, meaningful assignment of probability is not possible. We are completely in the dark about the occurrence of any crisis. Decision making under uncertainty implies that there is no single dominating strategy. The following are four basic criteria for making decision under uncertainty.

- a. Hurwicz criterion (maximax criterion)
- b. Wald criterion (maximin criterion)
- c. Savage criterion (minimax criterion)
- d. Laplace criterion (uncertainty is converted into risk).

We are going to explain each of them with examples.

a. Hurwicz criterion (maximax criterion):

The decision maker is always optimistic and attempts to maximise its profits. In applying this criterion, a strategy with maximum profits will be chosen. The use of maximax criteria is based on how big the risk is that can be undertaken and how much one can afford to lose. The project manager would always go for strategy S3 because maximum profit is \$100 (refer to example in 2).

b. Wald criterion (maximin criterion)

Wald or maximin criterion is a pessimistic rather than optimistic position where the attempt is to minimise the maximum loss. Referring to the example in (2), the minimum payoffs are -50, 40 and 80. As the objective is to minimise the maximum loss, the project manager would select 80 in strategy S3.

c. Savage criterion (minimax criterion)

The project manager's objective is to minimise the maximum regret. Therefore, the regret table can be calculated from the example cited in section (2). The regret table can be calculated by subtracting all the elements in each column from the largest element. The maximum regret is the largest one for each strategy in each row.

States of Nature			
Strategy	N1 = Up	N2= Even	N3=Low
S1	\$50	\$40	-\$50
S2	\$50	\$50	\$40
S3	\$100	\$80	\$90

Regret table			
Strategy	N1 = Up	N2= Even	N3=Low
S1	\$100-\$50	\$80 - \$40	\$90 - (-\$50)
S2	\$100 - \$50	\$80 - \$50	\$90 - \$40
S3	\$100 - \$100	\$80 - \$80	\$90 - \$90

Regret table				
Strategy	N1 = Up	N2= Even	N3=Low	Maximum regrets
S1	\$140	\$50	\$40	\$140
S2	\$50	\$50	\$30	\$50
S3	\$0	\$0	\$0	\$0

The savage criterion would select strategy S3, the minimum of all.

d. Laplace criterion (uncertainty is converted into risk)

In Laplace criterion the uncertainty situation is transferred into risky situation. No probability is attached to uncertainty but definitely to situation under risk. In this situation each states of nature has an equal probability of occurrence say $1/3 = 33.33$ per cent.

We can explain this using the same example from section (2) with probability $1/3$.

States of Nature			
Strategy	N1 = Up	N2= Even	N3=Low
	0.33	0.33	0.33
S1	\$50	\$40	-\$50
S2	\$50	\$50	\$40
S3	\$100	\$80	\$90

Calculation:

The expected value for strategy S1, S2 and S3 are

$$E1 = 0.33 (\$50) + 0.33 (\$40) - 0.33 (\$50) = \$13.2$$

$$E2 = 0.33 (\$50) + 0.33 (\$50) + 0.33 (\$40) = \$46.2$$

$$E3 = 0.33 (\$100) + 0.33 (\$80) + 0.33 (\$90) = \$89.1$$



The Laplace criterion would select strategy S3 resulting in profit of \$89.1.

Finally, risk is inevitable. Is the project manager ready to minimise the loss or decide what kind of risk to take?

Risk response development

Risk response development is the process of taking steps to enhance opportunities and developing responses to risks. The following are the four basic responses to risk:

1. **Risk avoidance** involves eliminating a risk or threat, usually by eliminating its causes (e.g., using hardware or software that is known to work, even though there may be newer solutions available).
2. **Risk acceptance** can be either active or passive:
 - a. Passive Acceptance means accepting the consequences should a risk occur.
 - b. Active Acceptance means developing a contingency plan should the risk occur (e.g. work around).
3. **Risk mitigation** involves reducing the probability and/or the impact of a risk event.
4. **Risk transference** involves transferring the risk to a third party e.g. buying insurance in the event that you have an accident.

The following matrix depicts risk response strategies for technical, cost, and schedule risks:

Technical Risks	Cost Risks	Schedule Risks
Emphasise team support and avoid stand-alone project structure	Increase the frequency of project monitoring	Increase the frequency of project monitoring
Increase project manager authority	Use WBS and Network Diagram/CPM	Use WBS and Network Diagram/CPM
Improve problem handling and communication	Improve communication project goals understanding and team support	Select the most experienced project manager
Increase the frequency of project monitoring	Increase project manager authority	
Use WBS and NETWORK DIAGRAM/CPM		

Risk management plans, contingency plans and contingency reserves

A **risk management plan** documents the procedures for managing risk throughout the project. It summarises the results of risk identification and

analysis processes and describes what the project team's general approach to risk management will be. A risk management plan should address the following questions:

1. Why is it important to take/not take this risk in relation to the project objectives?
2. What is the specific risk and what are the risk mitigation deliverables?
3. What risk mitigation approach will be used?
4. Who are the persons responsible for implementing the risk management plan?
5. When will the milestones associated with the mitigation approach occur?
6. How much is required in terms of resources to mitigate risk?

Contingency plans are predefined actions that the project team will take if an identified risk event occurs.

Contingency reserves are provisions held in reserve by the project sponsor for possible changes in scope or quality that can be used to mitigate cost and/or schedule risk.

Risk response control

Risk response control involves responding to risk events over the course of the project by executing the risk management plan and risk management processes.

This requires on-going risk awareness and monitoring. New risks may be identified during the course of the project and should go through the same risk assessment process as those identified in advance. When contingency plans are not in place or an unplanned risk event occurs, a workaround or temporary fix may need to be found.

Top Ten Risk Item Tracking

Top ten risk item tracking is a communication tool used for maintaining awareness of risk throughout the life of a project. It consists of a periodic review with management and the customers of what they feel are the period's most significant risk items. A risk-tracking chart is developed that shows current and previous month's top ten risks.

Risk management reviews:

- keep key stakeholders aware of factors that could prevent project success
- provide opportunities to develop and/or consider alternate risk mitigation strategies
- promote confidence in the project team by demonstrating its ability to proactively manage risk.



Using software to assist in project risk management

Software tools are available to assist in various aspects of risk management. Risks can be tracked in databases or spread sheets. Spread sheet software can also assist in simple risk analysis. More sophisticated risk management software is also available that can help you build models and run simulations to analyse and respond to project risks. Monte Carlo simulation software is a particularly useful tool for helping to get a better idea of project risks and risk drivers.

The sign of good risk management is that minimal crisis management is required (i.e., fires to put out) during the life of the project.

Project procurement management

Project procurement management is defined as the processes required to acquire goods and services for a project from outside the performing organisation. Many private companies use the word purchasing instead of procurement. Outsourcing is a process that is becoming more common in organisations globally.

Common reasons for outsourcing projects are:

- **Cost reduction.** Both fixed and variable (recurrent) costs of many products and services are lower when supplied by a firm that specialises in that area and can, therefore, offer economies of scale.
- It allows line employees to **focus** on the core business and core competencies.
- It provides **access** to specific skills and technologies, which would be too expensive for the company to acquire and maintain.
- **Staffing flexibility.** It's often easier and more economical to use contractors to cover peak workloads than to try to staff the entire project internally.
- **Increased accountability.** A well-written contract clarifies responsibilities and sharpens the focus on key project deliverables.

The key processes and activities involved in project procurement management are as follows:

Process	Description	Activity
Procurement planning	Determining what to procure and when	'Make or buy' decision
Solicitation planning	Documenting project requirements and identifying potential sources	Issue request for proposal
Solicitation	Obtaining quotations, bids, offers, or proposals as appropriate	Receive proposals
Source selection	Choosing from among potential vendors	Award contract
Contract administration	Managing the relationship with the vendor	Complete substantial amount of work
Contract close-out	Completion and settlement of the contract, including resolution of any open items.	Formally close contract

Procurement planning

Project procurement planning is the process of identifying which project needs can best be met by using products or services outside of the organisation. Key questions are:

1. Do we outsource?
2. How do we outsource?
3. What to outsource?
4. How much to outsource?
5. When to procure?

Inputs needed for procurement planning include the project scope statement, product description, market conditions and constraints and assumptions. Outsourcing is often used when people with specialised skills are needed over a short period of time.

Procurement Planning Tools and Techniques

Make-or-buy analysis is used to help an organisation decide if it is in their best interests to make certain products or perform certain services inside the organisation, or if it is better to buy them from an outside organisation. For IT hardware and software it is important to include the full life cycle cost including installation, training, maintenance and support. Expert judgement, both internal and external, is an asset in making procurement decisions.

Types of contracts

Different types of contracts can be used to create different performance incentives. The three main types are fixed price (lump sum), cost reimbursable (including cost plus), and unit price.



1. **Fixed price or lump sum contracts** are contracts with a fixed total price for the delivery of a well-defined product or service. In this case, the vendor assumes the majority of the risk. This is especially true on contracts for the provision of a service where the actual amount of time it will take to complete the service cannot be accurately predicted. Fixed price contracts are therefore more commonly used for the procurement of goods or products.
2. **Cost reimbursable contracts** are contracts involving payment to the vendor for direct and indirect actual costs. Indirect costs such as overheads are often calculated as a straight percentage of direct costs. These types of contracts often include a profit margin and incentives for meeting or exceeding specific project objectives. In this type of contract, the buyer assumes more of the risk. There are three main types of cost reimbursable contracts. In order of lowest to highest risk to the buyer they are:
 - a. **Cost plus incentive fee (CPIF)** – a contract where the buyer pays the vendor for allowable performance costs along with a predetermined fee and an incentive bonus.
 - b. **Cost plus fixed fee (CPFF)** – a contract where the buyer pays the vendor for allowable performance costs plus a fixed fee payment usually based on a percentage of estimated costs.
 - c. **Cost plus percentage of costs (CPPC)** – a contract where the buyer pays the vendor for allowable performance costs along with a predetermined percentage based on total costs.
3. **Unit price contracts** are contracts where the buyer pays the vendor a predetermined amount per unit of service to complete the work. This is sometimes referred to as a time and materials contract. IT consultants often use this type of contract where they are paid a fixed fee per hour plus expenses for travel.

Contracts should take into consideration issues unique and critical to project success (such as programmer experience) and include termination clauses. Termination clauses are the contract language that deals with how the buyer or seller may trigger the end of the contractual arrangement.

Statement of Work

Many contracts include a **statement of work (SOW)**, which is a description of the work required for the procurement. Its purpose is to allow potential vendors to determine if they have the requisite expertise to perform the work and to allow them to develop a cost estimate. The statement of work should be clear, concise and complete.

Solicitation planning

Solicitation planning involves preparing the documents needed for soliciting goods or services and determining the evaluation criteria for

awarding the contract. The two most common types of solicitation documents are **Requests for Proposal (RFP)** and **Invitations to Quote (ITQ)**. An RFP is a document used to solicit proposals from prospective vendors. The RFP outlines the general requirements and it is up to respondents to come up with a solution. Invitations to Quote are usually used to solicit price quotes for products with specific features or for services where the tasks are clearly defined.

All solicitation documents should be written to facilitate accurate and complete responses from prospective vendors. They should include:

- background information on the organisation and project
- relevant statement of work
- project schedule
- description of desired response
- evaluation criteria
- pricing forms
- required contractual provisions (e.g. general liability insurance, registration with WCB).

Vendor track records are important in all contracts. Vendors should be asked to supply a list of relevant past projects and references.

Clear evaluation criteria are important not only in terms of ranking proposals but also in terms of protection against lawsuits from losing bidders. Key things to look for in vendor proposals are:

- clear understanding of requirements
- technical capability
- financial capacity and stability
- management approach
- price.

Solicitation

Solicitation involves obtaining proposals or bids from prospective vendors. Organisations may advertise their desire to procure goods or services in a number of ways including newspaper ads, Internet bid sites or through private solicitation to a known and trusted vendor.

Most government projects require an open bidding process unless a compelling case can be made for a “sole source” contract. Competitive bidding should result in the best price options for the buyer. Buyers should beware of “low ball” bids where vendors have undercut the competition in an attempt to win the contract but may not have allowed themselves sufficient compensation to do a quality job. Buyers should reserve the right to select any bidder (not just the lowest priced one).



A bidders' conference is a meeting with prospective vendors to ensure all suppliers have a clear and common understanding of the project requirements, products and services.

Source selection

Source selection involves evaluating bidders' proposals, choosing the best one, negotiating the contract, awarding the contract and notifying the successful and the unsuccessful bidders. Formal proposal evaluation sheets help to quantify and simplify the selection process. Caution should be taken not to place too much emphasis on the technical aspects of the proposal. It also has to be well managed. If a number of proposals have been received, an iterative selection procedure is often used in which a short-list is created in the first round of evaluations and then a final selection made from the short list. Short-listed candidates may be invited to make a presentation to the evaluation/selection committee and/or asked to prepare a best and final offer (BAFO). The final output from the source selection is a contract that binds the vendor to provide specific goods and services and obligates the buyer to pay for them. Unsuccessful bidders should be notified and provided an opportunity to discuss the shortcomings of their proposals.

Contract administration

Contract administration entails managing the relationship with the vendor to ensure that the vendor's performance meets contractual requirements. A contract is a legal document and should have scrutiny by a legal professional. The project manager and project team should be involved in drafting and administering the contract.

Change control is an important part of contract administration. The following suggestions ensure adequate change control for projects that involve outside contractors:

- Changes to any part of the project need to be reviewed, approved and documented by the same people in the same way that the original part of the plan was approved.
- Evaluation of any change should include an impact analysis. How will the change affect the scope, time, cost and quality of the goods and services being provided?
- Changes must be documented in writing. Project team members should document all important meetings and phone calls.

Constructive change orders are oral or written acts or omissions by someone with actual or apparent authority that can be construed to have the same effect as a written change order. Project managers or team members should be mindful that what they say to a vendor is not unintentionally construed as an order to do or not do something.

Contract close-out

Contract close-out is defined as completion and settlement of the contract, including resolution of any open items.

Contract close-out activities:

- Verification that that all work is complete, correct and satisfactory and all activities in the work break down structure are 100 per cent complete and closed.
- Updating records to reflect final results.
- Archiving information for future use.
- Formal written notice from contract administrator to vendor that the contract has been completed and closed.
- Procurement audits to identify lessons learned.
- Project lessons learned documented by team and project manager.



Module summary



Summary

In this module you learned two broad and critical areas in project management, namely risks management and procurement management.

Project risk management is both an art (personal judgement and experience) and science (based on past data and calculation). Each complements the other in identifying, assessing and responding to project risks. Project risk management is critically important at the planning stage of a project where the major risks events are identified and counter measures taken. But the risk management does not end at the planning stage, it is continuously conducted throughout the project by the project team.

Project procurement management covers the needs for procurement and the key procurement processes. As the nature and needs of one project tend to be different from another, most pure project-based organisations tend to be “light” on assets, i.e. own few fixed assets. This has made procurement management a critical function in securing the needed resources to meet the needs of each new project. As you have seen, procurement management serves as an important function to reduce costs by maximising resource flexibility.

Assignment



Assignment

1. With the aid of suitable examples, explain what types of purchases in a project would be suitable for the following contracts:
 - a. Fixed price contract
 - b. Cost reimbursable contract
 - c. Unit price contract.
2. Why is risk assessment more difficult in a project environment when compared to a non-project environment?



Assessment



Assessment

1. What is the importance of project risk management in project management?
2. Identify the key stages of managing risk.
3. How would a project team address an unanticipated risk event?
4. What are the implications of good risk management on the organisation's stakeholders?
5. Describe the different ways of solicitation in the procurement process.
6. Why are the processes and procedures in project procurement management important and what are the implications if they were absent or not followed?
7. What are the advantages of outsourcing?
8. What are the downsides or risks of outsourcing?

Assessment answers

1. What is the importance of project risk management in project management?

Risk is any factor that can affect project performance, slow down or stop the project consequently threatening the goals and objectives of the project. Risk management is critical to project management for the following reasons:

- Risk management is critical during the project planning process as it may influence project design and project activities throughout the life of the project
- Risk management can anticipate future negative incidents and their potential impact on the project. This will reduce the amount of time spent on reactive and crisis management
- The severity of risk impact increases as the project implementation progresses and more resources (time and money) are sunk in
- Effective risk management raises the probability of successfully meeting the project goals and objectives
- Risk management impacts the stakeholders and project sponsors by delaying delivery of products or services, and reducing the expected returns of investments
- Risk can be an opportunity. A superior technology untested in the field is in itself a risk. Utilising the new technology (should it prove to work well) will provide an opportunity that the old technology is unable to provide.

2. Identify the key stages of managing risk

There are six main stages in the risk management process:

- **Risk Management Planning** – deciding how to approach and plan the risk management activities for a project
- **Risk Identification** – determining which risks might affect the project and documenting their characteristics
- **Qualitative Risk Analysis** – performing a qualitative analysis of risks and conditions to prioritise their effects on project objectives
- **Quantitative Risk Analysis** – measuring the probability and consequences of risks and estimating their implications for project objectives
- **Risk Response Planning** – developing procedures and



techniques to enhance opportunities and reduce threats to the project's objectives

- **Risk Monitoring and Control** – monitoring residual risks, identifying new risks, executing risk reduction plans, and evaluating their effectiveness throughout the project life cycle.

3. How would a project team address an unanticipated risk event?

Should an unanticipated risk event occur, then the project team needs to assess the severity of the risk event. If the risk event is too severe, then the recommendation may be to kill off the project. If the risk event is not severe and hence manageable, then a temporary fix or modification may need to be found. The depth of experience and innovativeness of the project team comes into play here. Before these temporary fix or modifications can be implemented, the project team must carry out the change control process where the revised costs, time and quality are presented for the top management and project sponsors' approval.

When approval is secured, the contingency reserves (provisions held in reserve by the project sponsor for possible unforeseeable changes) will be released for the modification to be carried out.

4. What are the implications of good risk management on the organisation's stakeholders

Good risk management has the following implications on the organisation's stakeholders:

- By incorporating the element of risk management into designing the project and the project activities, the project is said to be more robust in that the probability of failure is reduced. For the stakeholders, the probability of killing off the project halfway through (and writing off the sunk costs) is minimal.
- Good risk management raises the probability of successfully meeting the project goals and objectives. To the stakeholders, it means successfully launching the new product and services to the market. It increases competitiveness of the company and the expected returns of investments.

5. Describe the different ways of solicitation in the procurement process?

In terms of documentation, solicitation can be in the form of:

- Requests for Proposal (RFP). When the services or solution needed can be in a variety of forms, an RFP is the document used to solicit proposals from prospective vendors. The RFP outlines the general requirements and it is up to respondents to come up with a solution and the costs.

- Request for Quotation (RFQ). RFQ is used to source for quotations for products with specific or standard features and services where the tasks are clearly defined.

In terms of communicating the solicitation, the ways are:

- Advertisement in the media; newspapers, trade magazines and so on
- Internet bid sites
- Direct solicitation with known suppliers.

6. Why the processes and procedures are important in the procurement process and what are the implications if they were absent or not followed?

The main processes consist of Procurement Planning, Solicitation Planning, Solicitation, Source Selection, Contract Administration and Contract Close-out. These processes are important because:

- They represent a systematic and orderly acquisition of the products or services required by the project team. The right acquisitions are made and provided to the project team at the correct time
- These processes also ensure that the procurement expenditure incurred are budgeted for so that there will be no costs overrun
- They introduce the element of transparency in the procurement process and create a level playing field for the suppliers
- They ensure that the right balance between price and quality is struck when selecting the supplier, and not the lowest priced supplier who may not deliver the required quality.

In the absence of these processes and procedures, the entire procurement process will break down as there is no control. All the earlier mentioned reasons in favour of observing the procurement process will be lost. It should also be noted that procurement management is a fiduciary duty. Absence of these processes and procedures may lead to corruption.

7. What are the advantages of outsourcing?

The advantages of outsourcing in projects are:

- Cost reduction. Both fixed and variable (recurrent) costs of many products and services are lower when supplied by a firm that specialises in that area and can, therefore, offer economies of scale
- Staffing flexibility. It's often easier and more economical to use contractors to cover peak workloads than to try to staff the entire project internally



- It allows project team members to focus on the core business and core competencies while the non-core competencies are outsourced. This increases the probability of success of the project
- It provides access to specific specialist skills and technologies, which would be too expensive for the project organisation to acquire and maintain
- Asset flexibility. As the asset requirements vary from one project to another, pure project-based organisations may not want to be encumbered with the accumulation of assets from the previous projects
- Increased accountability. The project organisation has to issue well-written contracts which clarifies responsibilities and sharpens the focus on key project deliverables.

8. What are the downsides or risks of outsourcing?

- New suppliers are not familiar with the project organisation's rules and culture. Training needs to be provided. A phasing-in period is also required as the suppliers adjust their operating procedures and get settled down
- As suppliers are independent and external parties, the project organisation is not able to monitor and exert control over them. This can result in service failures and sub-standard products from the suppliers
- Quality from an external source needs to be constantly checked. In-house quality is deemed as built-in as the processes and standards are developed internally
- External suppliers may leak out confidential project information to the competitors
- As more and more services and products are outsourced, the project organisation will have more suppliers making it more difficult and complex to manage the "extended organisation".