

Project Planning – Quality, Risk, Resources & Communications

COMP6204: Software Project Management and Secure
Development

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Overview

- Objectives
- What Is Quality?
- Benefits of Project Quality Management
- Quality Planning and the Quality Management Plan
- Processes in Quality Management
- Quality scope & Quality costs
- Project Resource Planning
- Project Resource Management, Organisational Breakdown Structure & Resource Histograms
- Communications Planning
- Project Risk Management

Objectives

- Discuss the project **quality management** planning process, and explain the **purpose** and **contents** of a **quality management plan** and **quality metrics**
- Explain the **project resource** management planning and estimate **activity resources** processes, and create a **resource management plan**, **team charter**, **resource requirements**, and a **resource breakdown structure**
- Discuss the project **risk management** planning processes, and explain how a risk management plan, a **risk register**, and **change requests** are used in **risk management planning**

What Is Quality?

- **Quality** is a term which is very often *misunderstood* in projects.
- Quite often it is equated to adhering to quality standards or providing the best possible features to a product.
- Experts define quality based on *conformance* to *requirements* and *fitness* for use.
 - Conformance to requirements means that the project's **processes and products** meet written specifications
 - Fitness for use means that a **product** can be used as it was intended
- According to the PMP, **quality management** in project management is defined as:
“the degree to which a set of inherent characteristics fulfils the requirements.”

Quality Metrics

- A *metric* is a standard of measurement
- To achieve the **desired quality**, we plan **quality activities**, like **reviews**, **inspections** and **testing**.
 - Outputs of these are called **metrics**, or **measurements**.
 - These **metrics** are compared against what is an **acceptable range** in a project.
- **Metrics** allow organisations to **measure** their **performance** in **certain areas** and to **compare** them **over time** or with other organisations
- Examples of common metrics used by organisations include **failure rates** of products produced, **availability** of goods and services, and **customer satisfaction ratings**.

Benefits of Project Quality Management

- **Higher Levels of Customer Satisfaction** – communicating with the customer will ensure they're up to date and aware of any issues. Incremental customer feedback can also help you to deliver a better final product.
- **Better Quality Products** – This will help to deliver a final product that meets customer expectations.
if add buffer then clear the deadlines or not to use it
- **Increased Productivity** – With a project quality management system *everyone knows deadlines* and *what is needed in advance*. Having set *deadlines, meetings, and reports* can influence the project team to hit *targets* early to *keep the project on track*.
- **Financial gains** – Projects can *run over budget* if good quality management is absent.

two diagram multiple(Possibility to find risk and cost of fixing the risk)

Quality Planning and the Quality Management Plan

- *Quality planning* includes identifying which **quality standards** are relevant to the project and **how best to satisfy** those standards
- It also involves **designing quality** into the **products** of the project as well as the **processes** involved in managing the project
- Like other plans, the size and **complexity** of quality management plans varies to meet project needs

Processes in Quality Management – Quality Planning

1. Here, the **quality plan** is created.

- Every plan should have a **desired objective** or **goal**, and quality plan is no exception.
- The **goal** of quality management should be **clearly communicated** to all the **stakeholders** in a project.
- After the **goal is defined**, the **measures** to ensure the level of **standard** should be identified.
 - How are you going to **measure** the customer **satisfaction**?
 - What is the **level of quality** that the **stakeholders** are **expecting**?
 - How to **determine** if the **quality measures** will lead to **project success**?

Processes in Quality Management – Quality Assurance

2. **Quality Assurance:** This procedure will supply **evidence** to your stakeholders that all **activities relating to quality** are being **done** as has been defined and **promised**.
- Quality assurance is all about **evaluating** if a project is moving towards *delivering quality services*.
 - This can be achieved via a **project audit** or **process checklist**, and **tests**.
 - Both **quantitative** and **qualitative** metrics are used so that you can measure project quality and consumer satisfaction effectively.

Processes in Quality Management – Quality Control

3. **Quality Control**: Here, operational techniques are used in order to ensure quality standards.
- Any time a problem arises relating to quality or if the quality plan is not executed in the desired manner, **corrective actions** should be effective.
 - **Quality control** involves **monitoring project results and delivery** to check if they are meeting desired results or not.
 - If not, then **alternative actions** should be implemented.
 - While **quality assurance** happens **prior** to a **problem benign identified**, **quality control** is more of a **reaction process**, and so it happens once there has been the identification of a problem, with methods of improvement suggested here.








Quality scope




- Quality management includes both **looking out** for **product quality** (the system being created or maintained) as well as **process quality** (are you following good practices?)
- Many organisations use **charts** to keep track of **metrics**, such as a **project dashboard**—a graphical screen summarizing **key project metrics**

Quality Control & Metrics

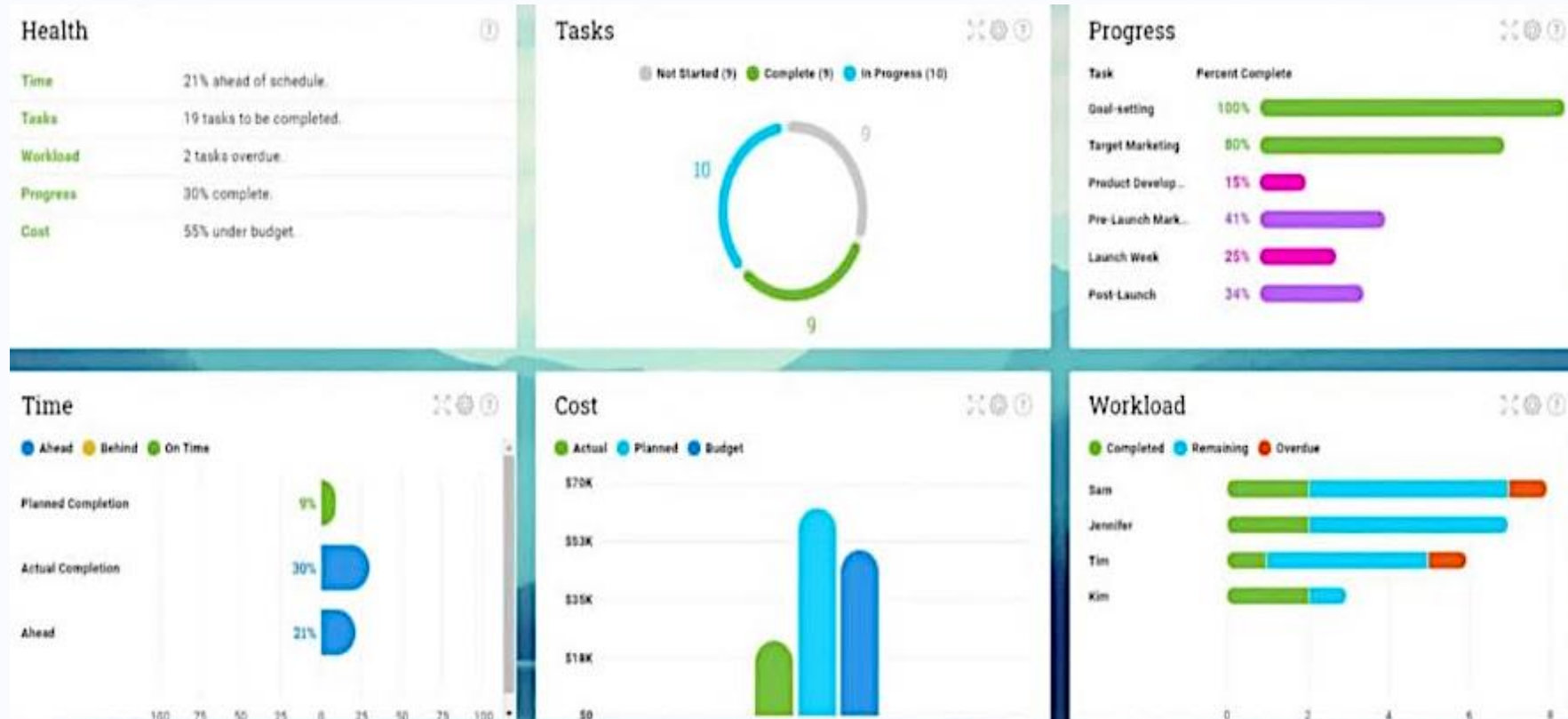
Sample Project Dashboard for Just-In-Time Training Project

As of January 20

Metric Name	Description	Status	How measured	Explanation
Scope	Meeting project scope goals		Earned value chart	On target
Time	Completing the project within one year		Earned value chart	On target
Cost	Staying within budget - under \$1 million		Earned value chart	A little over budget
Survey response	Must be at least 30%		Surveys received/sent	Got 33% response
Customer satisfaction	Average course rating of at least 3.0/5.0		Course evaluations	Goal part of success criteria
	- Number of course evaluations received	38	Feed from online system	All course participants must complete
	- Average course rating	2.7	Feed from online system	DVD course had low ratings
Cost reduction	Recoup investment within two years	N/A	Cost/employee for training	Can't measure until project is completed
Courses developed	Meeting milestones for development		Milestone dates	Course development on target
Number of people trained	Meeting goals of people trained		Filling scheduled classes	Last minute cancellations

-  = on target
-  = slightly off target/caution
-  = off target/problem area

Sample Project Dashboards



Source: projectmanager.com (2021)

Quality costs

- Good quality often pays for itself in the long run
- Quality has more to do with prevention than inspection.
- When a product is made with better quality then little effort and money needs to be spent in inspecting it.
- Work carried out without much regards to quality and there is a heavy dependency on inspection and the need to spend too much on rework.
 - Avoids defects, rework, bad publicity, etc.
 - It is also best to have in-process inspection at various points within the process while the product is being produced instead of final inspection.
 - If a defect is caught early, it takes less time and money to fix it.

Cost of Quality

cost of conformance is less than non-conformance

- Quality costs include cost of conformance and costs of non-conformance.
- Cost of conformance are all those costs that are expended in trying to achieve good quality.
- Cost of non-conformance are all those costs that are expended because the quality is not good

Cost of Conformance	Cost of Non-conformance
Process improvement	Rework
Quality training	Scrap
Inspection	Loss of business due to adverse impact on brand image
Testing	Warranty / liability costs
	Litigation costs

$$\text{CoQ} = \text{Cost of Conformance} + \text{Cost of Non-conformance}$$

Cost of Quality – Optimum Point

- If we invest, for example, £1 in the cost of conformance, and we tend to save more than £1 from the cost of non-conformance, then we reduce the CoQ.
- This continues until we reach the optimum level of quality.
- After this, additional £1 in cost of conformance gives less than £1 savings in cost of non-conformance.
- We always plan to achieve this optimum level of quality.

Who is Involved in Planning, Executing and Maintaining a Quality Management Plan?

- **The Project Manager:** The PM develops the quality management process in order to make sure all deliverables meet quality expectations.
- **Team Members:** The team is responsible for meeting the quality expectations of the plan as they execute their tasks by following the standards designed by the project manager.
- **The Organisation:** The org standardizes quality controls across all projects and makes sure that its staff is trained with the skills needed to deliver quality products or services.
- **Stakeholders:** Stakeholders need to explain clearly what their quality expectations are and they are responsible for approving the delivery of that product or service.
- **Customers:** Customers and users should be consulted like stakeholders if the project is designed to create a product or service for customers.

Key elements typically included in a Project Quality Plan

- 1. Quality Objectives:** Clearly define the quality objectives of the project. These objectives should be specific, measurable, achievable, relevant, and time-bound (SMART).
- 2. Quality Standards and Criteria:** Identify the relevant industry standards, regulations, and quality criteria that the project must adhere to. This ensures that the project aligns with established benchmarks.
- 3. Roles and Responsibilities:** Clearly define the roles and responsibilities of team members involved in quality management. This includes identifying who is responsible for quality planning, assurance, and control.
- 4. Quality Assurance Activities:** Describe the proactive activities that will be implemented to ensure that quality standards are met throughout the project life cycle. This may include process audits, reviews, and inspections.
- 5. Quality Control Activities:** Specify the reactive activities that will be implemented to monitor and verify the quality of project deliverables. This may involve testing, inspections, and other control measures.
- 6. Quality Metrics and Measurement:** Define specific metrics and measurements that will be used to evaluate and track the project's quality performance. This could include defect rates, compliance percentages, and other relevant indicators.

Key elements typically included in a Project Quality Plan – Cont.

7. Documentation and Reporting: Outline the documentation requirements for quality management, including the creation of quality records, reports, and any other necessary documentation. Define the frequency and recipients of quality reports.

8. Change Control: Establish a process for managing changes that may impact the project's quality. This includes a formalized change control procedure to assess, approve, and implement changes without compromising quality standards.

9. Training and Competency: Identify the training needs for project team members to ensure they have the necessary skills and knowledge to meet quality objectives. This may involve training programs, certifications, or other competency-building activities.

10. Risk Management: Integrate quality considerations into the project's risk management plan. Anticipate and address potential quality risks, and establish contingency plans for quality-related issues.

11. Customer Satisfaction: Define how customer satisfaction will be measured and addressed. This could involve regular feedback mechanisms, customer surveys, and mechanisms for handling customer complaints or concerns.

12. Continuous Improvement: Establish a process for continuous improvement of project processes and deliverables. Encourage the team to learn from experiences and apply lessons learned to future projects.

A well-developed Project Quality Plan provides a roadmap for maintaining and enhancing the quality of project deliverables throughout the project life cycle. It ensures that quality is managed systematically and becomes an integral part of the project management process.

Quality Control Template

Quality Control

Issue	Description	Imperfections	Identified By	To Be Fixed By	Priority	Status	Date Opened	Date Closed	Notes
Installation	Not connecting as designed	10	Jeff T.	Sam R.	Critical	Open	5-Apr		
Functionality	Needs to work more seamlessly	3	Jeff T.	John P.	Low	Open	9-Apr		
Stress	Breaking under normal use	5	Jeff T.	John P.	Medium	Open	25-Mar		
Performance	Not meeting performance expectations	9	Margot S.	Sam R.	High	Closed	3-Apr	9-Apr	

Project Resource Planning

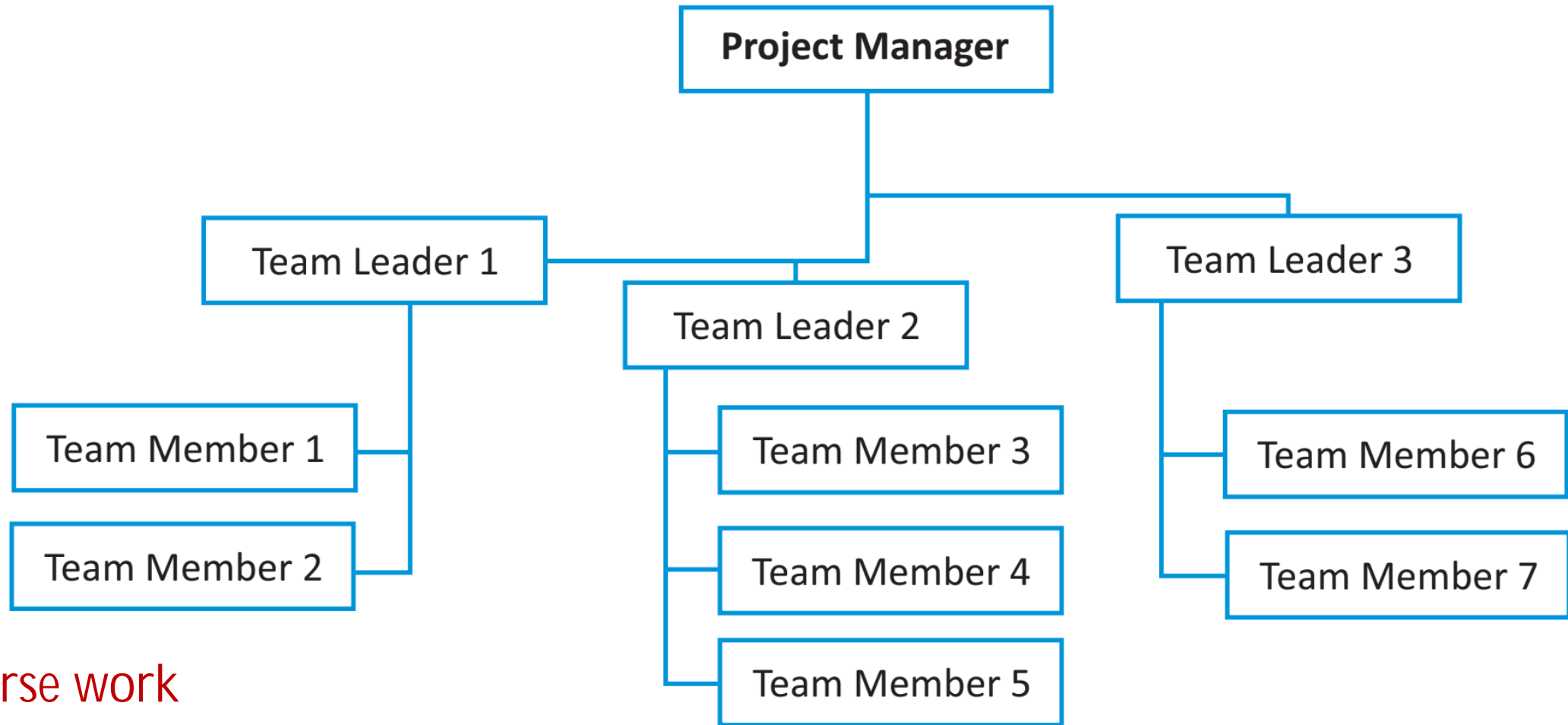
Project Resource Management

- Every project needs **resources**. These can be **human resources**, **machines** and **materials**.
- **Human resources** are probably the only resources used in services. Hence, a project needs to plan human resources that would be required.
 - This would include the **numbers of resources**, their **locations**, and their **skills**.
- **Project resource management** is concerned with making **effective use** of the **people** involved with a project as well as **physical resources** (materials, facilities, equipment, and infrastructure)

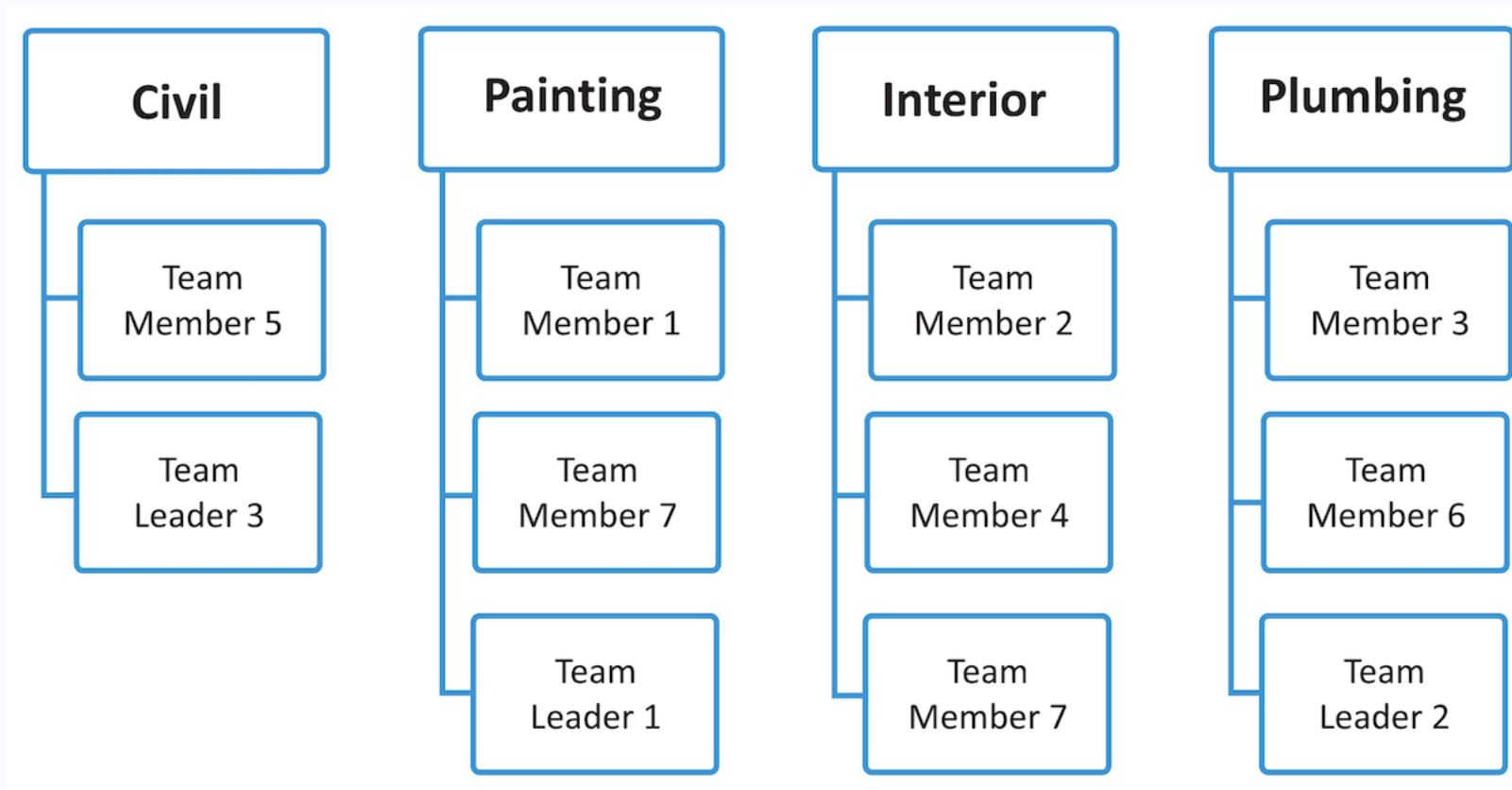
Project organizational chart

- Similar to a company's **organisational chart**, a **project organisational chart** is a graphical representation of how **authority** and **responsibility** is **distributed** within the project
- This can be depicted in two ways - using reporting relationship and using skills
- When we create a structure showing reporting relationships it is called **Organizational Breakdown Structure (OBS)**
- When the structure is made **on the basis of skills of the team** it is called ***Resource Breakdown Structure (RBS)***
course work

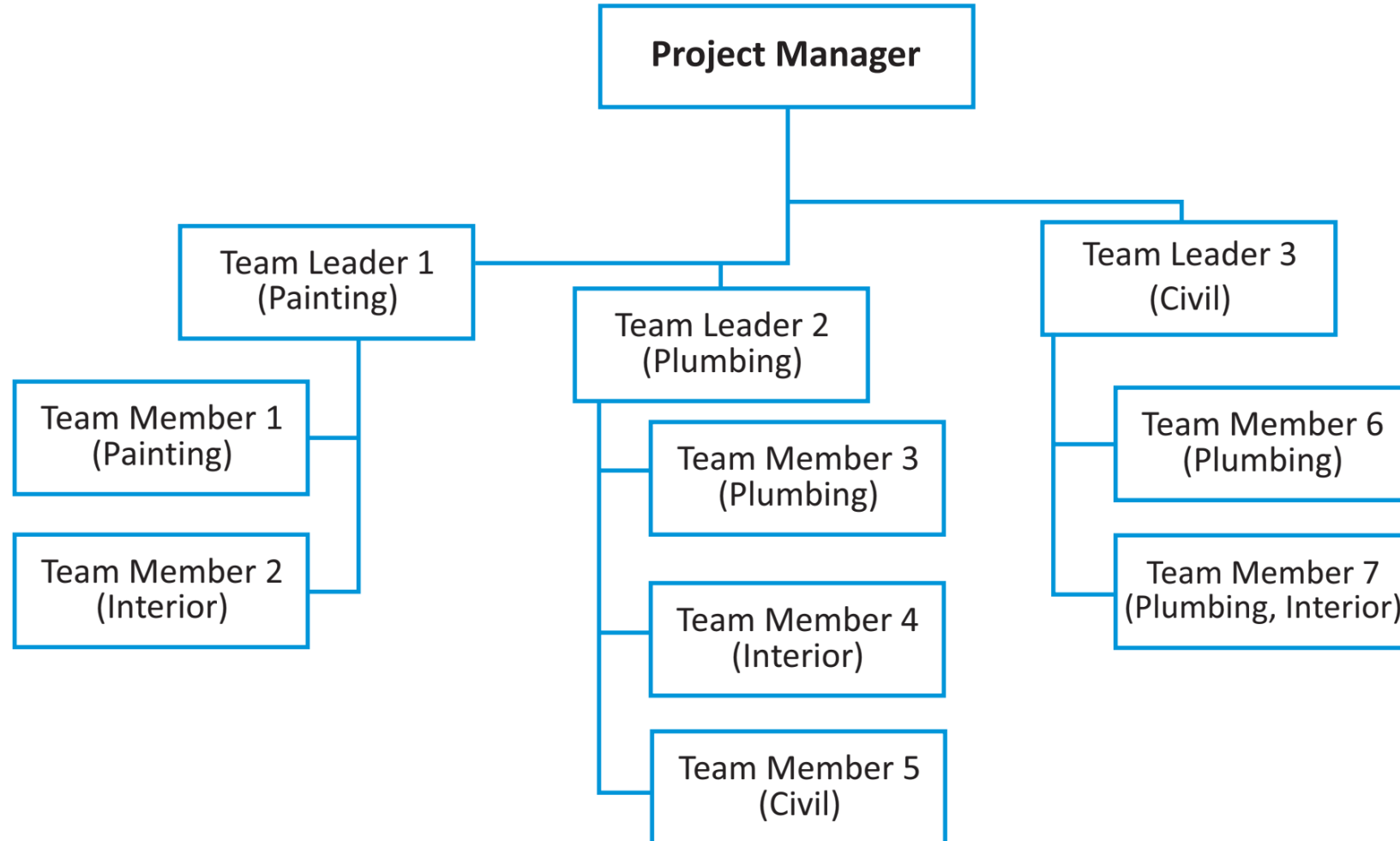
Organisational Breakdown Structure – An Example



Resource Breakdown Structure – An Example



Combining both OBS and RBS



Responsibility Assignment Matrices

- A **responsibility assignment matrix (RAM)** is a matrix that maps the work of the project as described in the **work breakdown structure (WBS)** to the **people responsible** for performing the work
- For smaller projects, it is best to assign **WBS activities to individuals**;
- For larger projects, it is more effective to assign the work to **organisational units** or **teams**

RACI charts

- **RACI charts** are a type of RAM that show:
 - **R**esponsible (who does the task),
 - **A**ccountable (who signs off on the task or has authority for it),
 - **C**onsulted (who has information necessary to complete the task), and
 - **I**nformed (who needs to be notified of task status/results)

Sample RACI Chart

? describe the activity

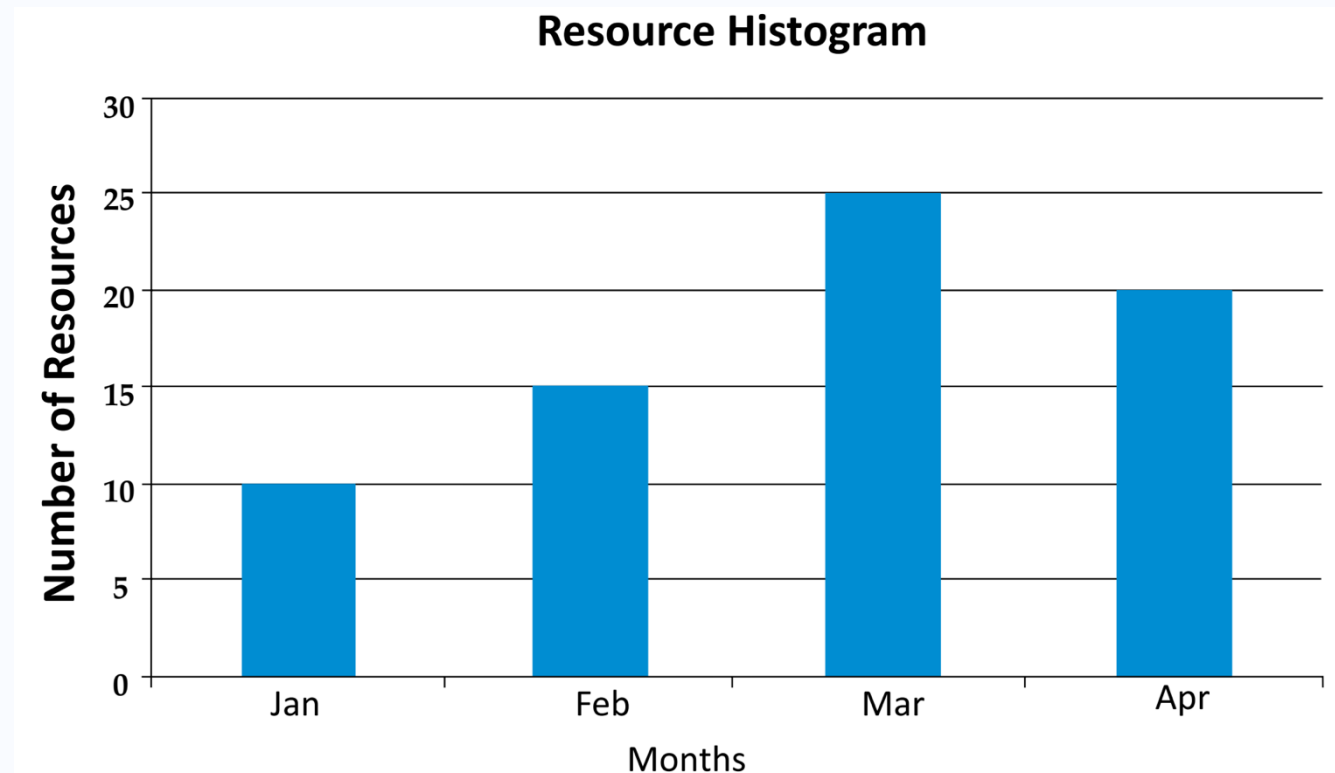
Activity	John	Mary	Leon	Jack
1	R	A	C	I
2		R, A		C, I
3	R	C	R, A	I
4		C	I	R, A

An Alternative RACI Matrix

Activity	Responsible	Accountable	Consult	Inform
1	John	Mary	Leon	Jack
2	Mary	Mary	Jack	Jack
3	John, Leon	Leon	Mary	Jack
4	Jack	Jack	Mary	Leon

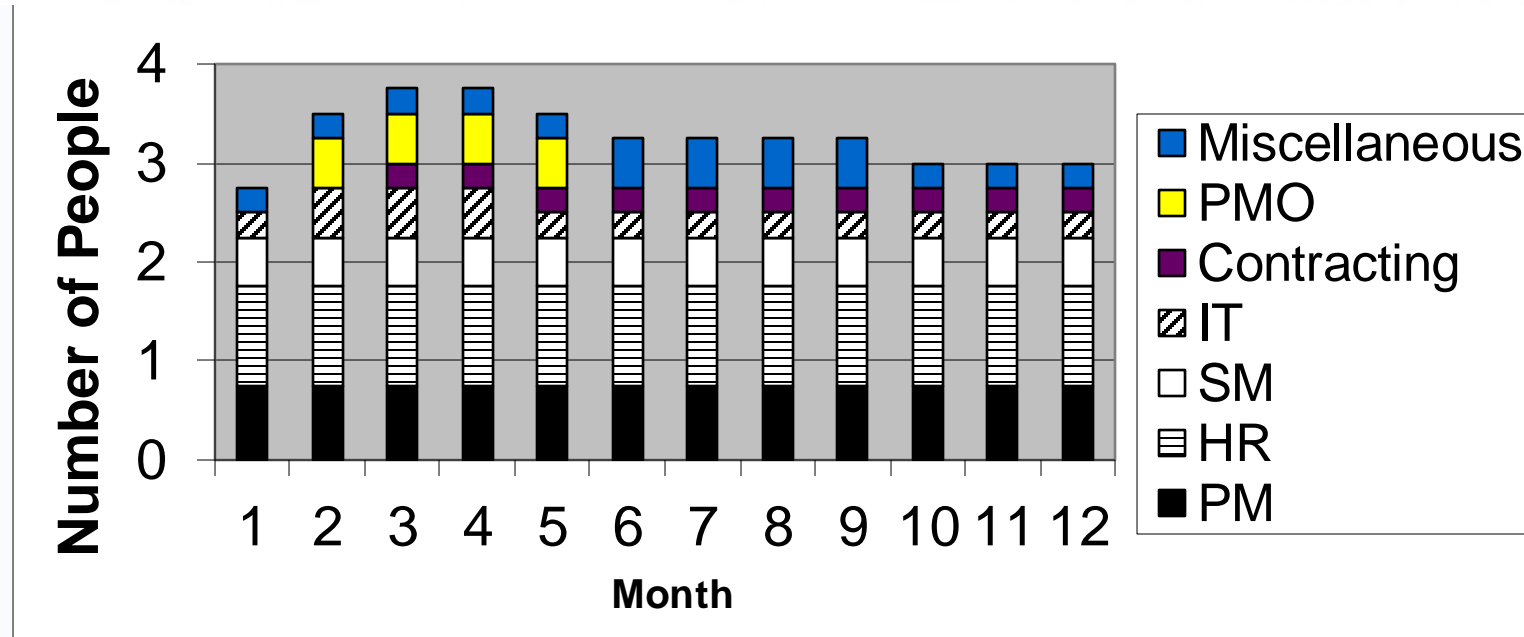
Resource Histograms

- Once we have assigned the work, we will be able to come up with **staffing requirements** in the form of a **Resource Histogram**
- It is a bar chart showing staff requirements over the period of the project as shown below:



Resource Histogram – Another example

Type of Resource	Meaning	Month											
		1	2	3	4	5	6	7	8	9	10	11	12
PM	Project Manager	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
HR	Human Resources	1	1	1	1	1	1	1	1	1	1	1	1
SM	Supplier Management	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
IT	Information Technology	0.25	0.5	0.5	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Contracting	Contracting	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
PMO	Project Management Office	0	0.5	0.5	0.5	0.5	0	0	0	0	0	0	0
Miscellaneous	Miscellaneous	0.25	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.25



Staffing Management Plans

- A **staffing management plan** describes when and how people will be **added** to and **removed** from a project
- The plan should also include ways of **hiring** and **releasing** resources.
 - Project resources can either be **hired from within the company** or from outside by **recruiting new resources**.
- It describes the **types of people needed** to work on the project, the **numbers needed for each type of person** each month, and how these resources will be acquired, trained, rewarded, and reassigned after the project

Estimating Activity Resources

- *Estimating activity resources* involves *estimating* the *type*, *quantity* and *characteristics* of *team resources* and *physical resources* (i.e., materials, equipment, and supplies) *required to complete* the *project*.
- This process is closely related to estimating *activity durations* and *costs*.
- It is important that the people who help determine what resources are necessary include people who have *experience* and *expertise* in similar projects and with the *organization performing* the *project*.
- Resource estimates should be *updated* as needed during the project.

Important Questions to Answer in Activity Resource Estimating

- How *difficult* will it be to perform specific activities on this project?
- Is there anything *unique* in the project's scope statement that will affect resources?
- Are there *specific resources* better *suited* to perform the *activities*?
- What is the *organization's history* in doing similar *activities*?
- Have they done *similar activities* before? What level of personnel did the work?

Important Questions to Answer in Activity Resource Estimating – Cont.

- Does the organization have *appropriate people*, *equipment*, and *materials* available for performing the work?
- Are there any organizational *policies* that might affect the *availability* of *resources*?
- Does the organization need to *acquire* more *resources* to accomplish the work?
- Would it make sense to *outsource* some of the work?
- Will *outsourcing increase* or *decrease* the amount of *resources* needed and their *availability*?
- What *assumptions* have been made or need to be made?

Communications Planning

- Every project needs to communicate with its stakeholders.
- Details of the communication are to be decided for each project during the planning stage and documented carefully. They should contain the following:
 - **Who will communicate**
 - The project's performance reports should be communicated by a pre-designated person or set of persons.
 - This ensures that there is no redundancy or mismatch in communication

Communications Planning – Cont.

- What will be communicated
 - It is important that the performance report formats and frequencies are agreed upon with the stakeholders.
 - Generally, the project team suggests the details that should go in the reports and gets approval from the stakeholders.
 - Different stakeholders have different communication requirements.
 - Some would like to get detailed reports, whereas others would like to get summary reports
 - Similarly, they might also need reports at different frequencies.

Communications Planning – Cont.

- When will the communication happen
 - Every project sends reports at a set frequency - daily, twice a week, weekly, fortnightly, monthly etc.
 - Many stakeholders would like to get a frequent report, say weekly and, another less frequent report, say monthly.
 - All this needs to be captured and documented
- How will it be communicated
 - There are various communication mediums using which reports can be sent.
 - Most common mediums are letter, and email.
 - Stakeholders would have their own choice of medium using which they should receive the reports.

Effective Communication

- Communication happens between two parties, sender and receiver.
- In order for the communication to be effective there are certain pre-requisites.
- Effective communication means that the message sent by the sender has been understood by the receiver
- For verbal communication, it is the language, pronunciation, and the speed of the speech.
- For written communication, it is the language, spelling, and the handwriting.
- It is also important for the sender to use the correct communication medium.
 - For all contractual communication, the communication has to be written.

Project Risk Management

- PMI defines a project *risk* as an *uncertainty* that can have a *negative* or *positive* effect on *meeting project objectives*
- *Risks* may be *negative* ones that cause *harm* to the project (called *threats*) or positive ones that cause benefit to the project (called *opportunities*).
- We are most often worried about the *threats* as they have the *ability* of *derailing* the project.
- *Inadequate risk planning* is the top cause of *project failures*.
- The main planning processes in risk management planning are *identifying risks*, performing *risk analysis*, and *planning risk responses*.

Identifying Risks

- The first, and the most important step in risk management planning is to identify all the project risks.
 - You cannot **manage** risks until you **identify** them
- Identifying risks involves **determining** which **risks** are **likely** to affect a project and **documenting** the **characteristics** of each
 - The main outputs of this process are a **risk register** and a **risk report**
 - The most common ways of identifying risks on a project are **brainstorming**, **historical** information, and **checklists**.

Risk Id	Risk Statement	Category	Root Cause

What is a risk register?

- A **risk register** is a document that is used as a **risk management tool** to **identify potential setbacks within** a project.
- The aims of **risk register** to collectively **identify**, analyse, and **solve risks** before they become problems.
- While usually cantered around projects, other circumstances where **risk management** is helpful include product launches and manufacturing.

Common risk scenarios



Source: <https://asana.com/resources/risk-register>

What is included in a risk register?

20 Common Project Risks - Example Risk Register

	Risk identification - Risk name or ID #
	Risk description - Brief overview of the risk
	Risk category - Corresponding classification
	Risk likelihood - How likely it is the risk will happen
	Risk analysis - Potential impact of the risk
	Risk mitigation - Risk response plan
	Risk priority - Level of risk compared to others
	Risk ownership - Person responsible for overseeing the solution
	Risk status - Progress of the risk mitigation plan

Source: <https://asana.com/resources/risk-register>

Analysis of Risks

Risk Id	Risk Statement	Category	Root Cause	Probability	Impact	Severity	Priority

- Severity is just the combination of probability and impact
- Based on this combination the priority is decided.

Analysis of Risks

Risk ID	Risk Statement	Category	Root Cause	Probability	Impact	Severity	Priority
1	Employee attrition during project execution	HR	Lower staff morale due to overtime work and rework. Lack of motivation due to few incentives.	M	M	MM	3
2	Unavailability of skilled resources during execution	HR	Special skills required on the project	H	H	HH	1

Risk ID	Risk Statement	Category	Root Cause	Probability	Impact	Severity	Priority
3	Delayed arrival of servers required for project integration	Procurement	Past records show that the servers are complex to build and require parts to be procured	M	H	MH	2
4	Delayed sign-off of project deliverables by customer leading to project delay	External	Customer involvement too low	L	M	LM	4

Responding to Risks

- Once the risks have been **prioritized**, we need to do **something** about them, so they do not **interfere** with the project **objectives**. We start with the top priority risk and go down.
- The responses to risk could be: **Avoid**, **Mitigate**, **Transfer**, or **Accept**.
 - **Avoiding** a risk means taking actions to completely remove the risk.
 - The most common response to risks is **mitigation**.
 - **Mitigation** means **reduction** in the **probability** or **impact** of risk, or **both**.
 - **Transfer** of risk takes place when our actions transfer the risk to a **third party**.
 - The most common ways of transferring are outsourcing and insurance.
 - Finally, if nothing can be done about a risk or a risk is too low in priority, we may decide to **accept** the consequences of the Risk.

Responding to Risks – An Example

Risk ID	Risk Statement	Category	Root Cause	Probability	Impact	Severity	Priority	Response
1	Employee attrition during project execution	HR	Lower staff morale due to overtime work and rework. Lack of motivation due to few incentives.	M	M	MM	3	Mitigate - Keep enough contingency in schedule. Provide incentives for early delivery.
2	Unavailability of skilled resources during execution	HR	Special skills required on the project	H	H	HH	1	Mitigate - Keep list of probable candidates ready. Employ hiring agencies.

Responding to Risks – An Example

Risk ID	Risk Statement	Category	Root Cause	Probability	Impact	Severity	Priority	Response
3	Delayed arrival of servers required for project integration	Procurement	Past records show that the servers are complex to build and require parts to be procured	M	H	MH	2	Mitigate & Transfer - Plan for vendor site visit once a week. Put late delivery penalty in vendor contract.
4	Delayed sign-off of project deliverables by customer leading to project delay	External	Customer involvement too low	L	M	LM	4	Accept

Procurement Planning

- Projects either **make** things on their own or buy from outside.
- **Buying things** from outside is called **procurement**.
- In such a case, the **project** is the **buyer**, and the **vendor** is the **seller**.
- A decision is first made on what to **procure** and what to **make**.
- After that, the project decides on how the **procurement** should happen – using which kind of **contract**.

Common Considerations in Favour of Making

- Project has expertise/capability in making it
- Project has idle resources/free capacity
- There is proprietary information involved in doing the work
- It is cheaper to make
- It is faster to make
- It is not available in the market to buy

Common Considerations in Favour of Buying

- Project does not have the capability to make it
- It is cheaper to buy
- It is faster to buy (available off the shelf)

Contract Type Selection

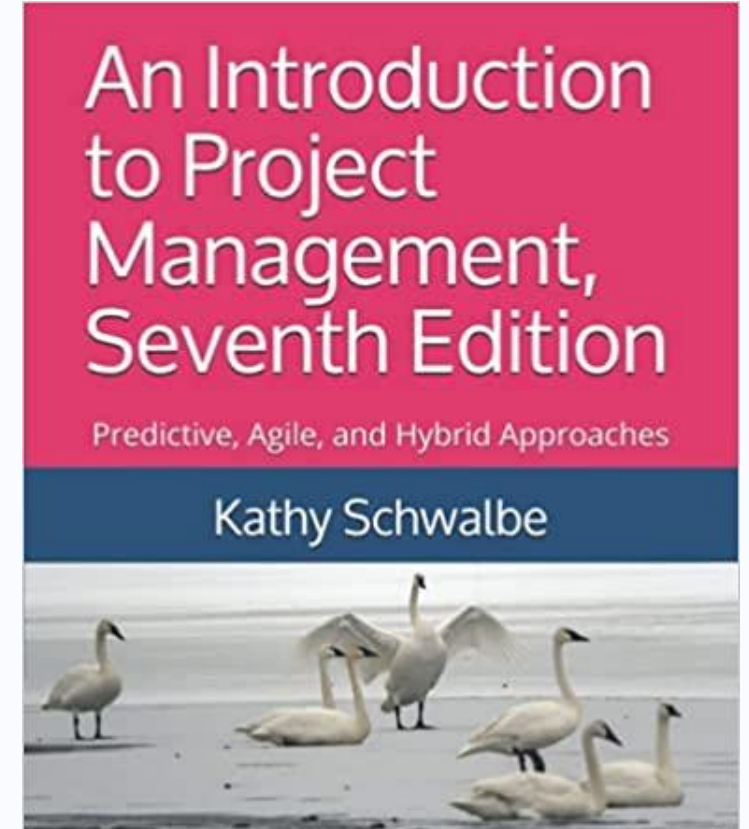
- Once it has been decided what needs to be procured, we need to decide on the type of contract to be used.
- This decision is based on two factors – scope clarity and risk sharing.
- There are three types of contracts that can be used based on these two factors.
 1. Cost Plus / Cost Reimbursable Contract
 - The buyer agrees to pay the seller at actual plus an additional profit for their service
 2. Rate Contract (Annual Rate Contract/Time & Material Contract)
 3. Fixed Price (FP) / Lumpsum Contract

Best Contract for Different Situations

Scope Clarity	Risk Sharing	Contract Type to use
Low	Mostly with Buyer	Cost Plus
Medium	Shared between Buyer and Seller	Rate Contract
High	Mostly with Seller	Lumpsum

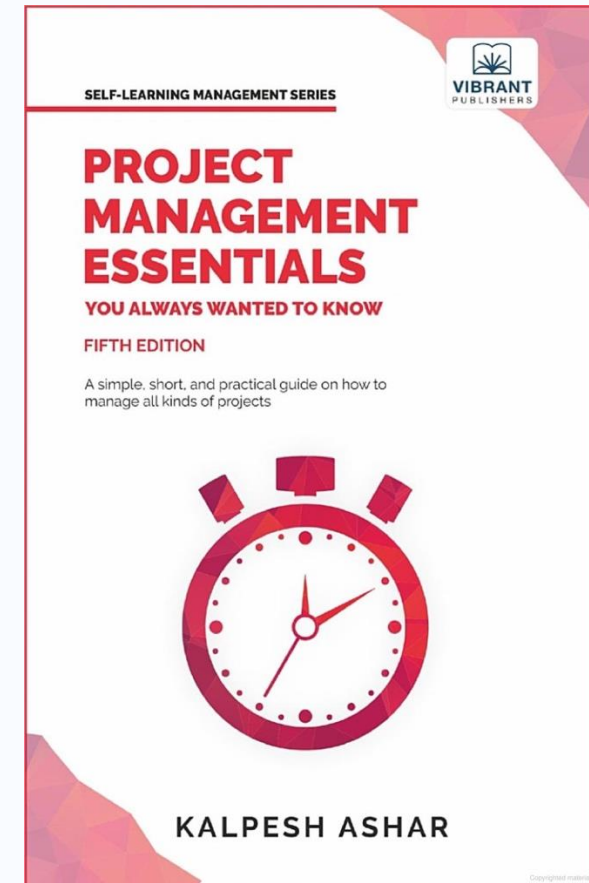
Reference

- Chapter 6: Planning Projects, Part 3 (Quality, Resource, Communications, Stakeholder, Risk, and Procurement Management)



Reference

- Chapter 4 of:
Project Management Essentials You Always Wanted To Know, 5ed



YOUR QUESTIONS