

Fundamentals of Software Project Management

MCA SEMESTER 1 – SOFTWARE PROJECT
MANAGEMENT-MODULE 1

What is a Project?

A project is defined as a sequence of tasks that must be completed to attain a certain outcome.

It has a defined beginning and end, specific objectives, and constraints such as scope, time, and resources.

According to the Project Management Institute (PMI), the term Project refers to “to any temporary endeavor with a definite beginning and end”.

Projects are characterized by their temporary nature, meaning they are not ongoing operations but rather efforts with a clear start and finish aimed at achieving particular goals

The success of a project is typically measured by how well it meets its objectives, stays within its budget, and is completed on time.

Can we have some Examples?

Examples



Building a New Software Application



Renovating a Building



Organizing a Marketing Campaign



Launching a New Product



Conducting a Research Study



Hosting an Event

Each of these examples has a clear goal, defined start and end dates, and specific deliverables.

Few Jargons



Project Type



Contract Type



Engagement
Model

Project & Contract Types

Project Types

- Development Projects
- Testing Projects
- Production Support and Maintenance Projects
- *Migration Projects*
- *Modernization Projects*

Contract Types

- Fixed Price Contracts
- Time and Material Contracts



Web Applications: **E-commerce Platforms:** Online stores like Amazon, eBay, and Shopify. **Social Networking Sites:** Examples include Facebook, Twitter, and LinkedIn.



Mobile Applications: **Messaging Apps:** WhatsApp, Telegram. **Gaming Apps:** Angry Birds, Candy Crush, and Pokémon Go.



Enterprise Software: **Enterprise Resource Planning (ERP):** SAP, Oracle ERP, and Microsoft Dynamics.



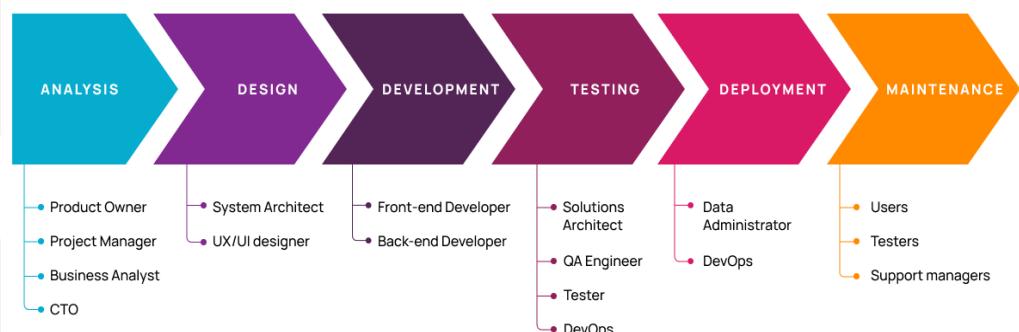
Financial Technology (FinTech): **Online Payment Systems:** PayPal, Stripe, and Square. **Cryptocurrency Platforms:** Bitcoin wallets, Ethereum smart contracts, and crypto exchanges like Coinbase.



Educational Technology (EdTech): **Online Learning Platforms:** Coursera, edX, and Khan Academy

Development Projects

Software Development Lifecycle



DevOps, a combination of "development" and "operations", is a software development practice that integrates development and operations into a single, continuous process

Testing Projects

Web Application Testing

Mobile Application Testing

API Testing

Load Testing

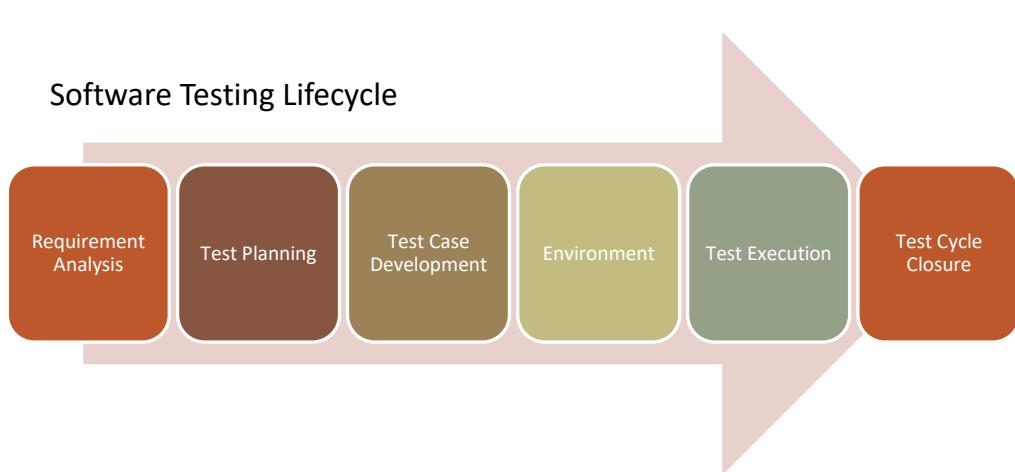
Regression Testing

UI Testing

UAT Testing

Data Migration Testing

Beta Testing



Training by Bhushan Gaonkar

Production Support & Maintenance Projects

Issue Tracking

Incident Response

Feature Enhancements

Code Refactoring

SLA Monitoring

Help Desk & Technical Support

Patch Updates

User Training

Bug Fixing

Managing and maintaining software applications once they are live and being used in a Production environment.

Contract?

A contract is a legally binding agreement between two or more parties that outlines the terms and conditions under which certain actions will be performed or obligations fulfilled.

Key Elements of a Valid Contract

1. **Offer and Acceptance** – One party makes an offer, the other accepts.
2. **Mutual Consent** – All parties agree willingly, with a “meeting of the minds.”
3. **Consideration** – Something of value is exchanged (e.g., money, services, goods).
4. **Legal Capacity** – Parties must be legally capable of entering into an agreement.
5. **Lawful Purpose** – The contract must not involve illegal activities.
6. **Definiteness** – Terms (scope, timelines, payment) must be clear and specific.



IT Project Example

- **Case:** A company hires a software vendor to build a payroll system.
- **Contract:** States the **scope** (features of payroll system), **timeline** (6 months), **cost** (₹20 lakh), and **responsibilities** (vendor delivers, client provides data).
- **Purpose:** Ensures clarity, avoids disputes, and provides a legal remedy if one side fails.

In simple terms:

A contract is a **written or verbal promise, recognized by law, that ensures both parties stick to their commitments.**

Contract Types



Fixed Price Contract

Fixed Price Contracts

- **Definition:** The client and vendor agree on a pre-determined price for the entire project, regardless of the actual effort or time required.
- **When to Use:**
 - Requirements are well-defined and unlikely to change.
 - Project scope, timelines, and deliverables are clear.
 - Budget certainty is a priority.
- **Advantages:**
 - Predictable cost for the client.
 - Encourages vendor efficiency.
 - Minimal client involvement after requirements are finalized.
- **Risks / Disadvantages:**
 - Limited flexibility for changes (scope creep → renegotiation).
 - Higher vendor risk → may inflate cost estimates.
 - Potential quality trade-offs if vendor cuts corners to stay profitable.

Example: Building a payroll system with fixed scope and compliance requirements.

Time and Material Contract

- **Definition:** The client pays based on actual effort (hours/days of labor) and materials used. Billing rates are agreed upon (e.g., hourly developer rate).

- **When to Use:**

- Requirements are evolving or unclear at the start.
- Projects demand agility and client involvement.
- R&D, prototypes, or iterative development.

- **Advantages:**

- Flexibility to adjust scope and priorities mid-project.
- Transparent billing tied to real effort.
- Better suited for Agile/Scrum approaches.

- **Risks / Disadvantages:**

- Uncertain final budget → higher cost risk for the client.
- Requires close client oversight and governance.
- Potential inefficiency if vendor is not well-managed.

Example: Developing a mobile app where features may change based on market feedback.

Key Comparison

Aspect	Fixed Price	Time & Material (T&M)
Cost Predictability	High – fixed upfront	Low – varies with effort
Scope Flexibility	Low – rigid	High – adaptable
Risk on Vendor/Client	Vendor bears more risk	Client bears more risk
Best Fit	Well-defined projects	Dynamic, evolving projects

Rule of Thumb:

- Choose **Fixed Price** when you know **exactly what you want**.
- Choose **T&M** when you need **flexibility to discover and adapt** during execution.

Engagement

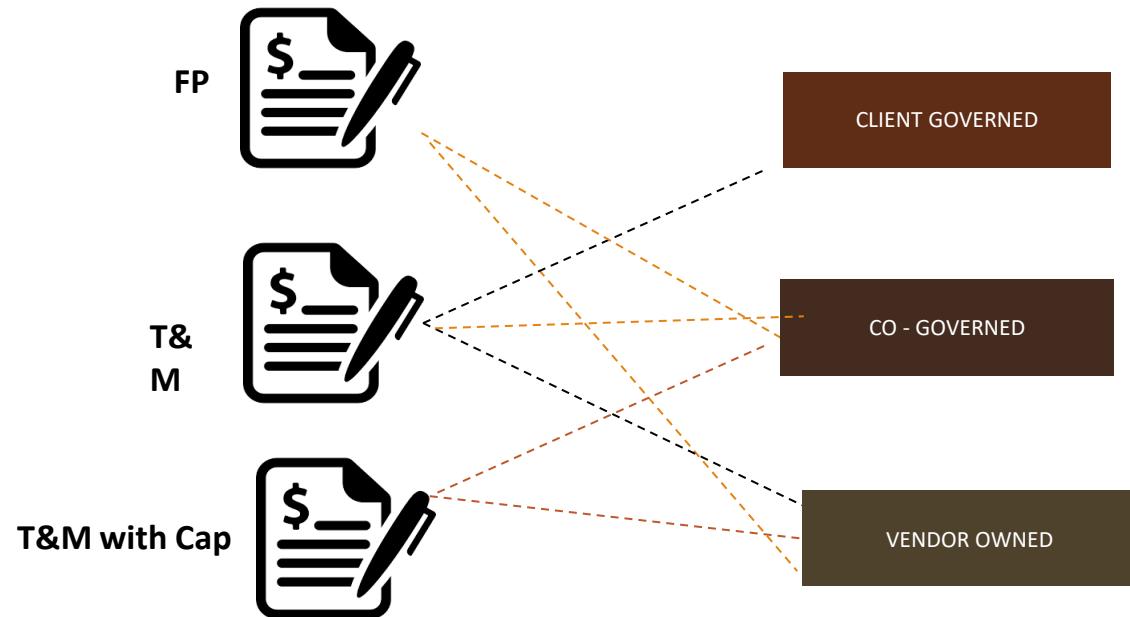
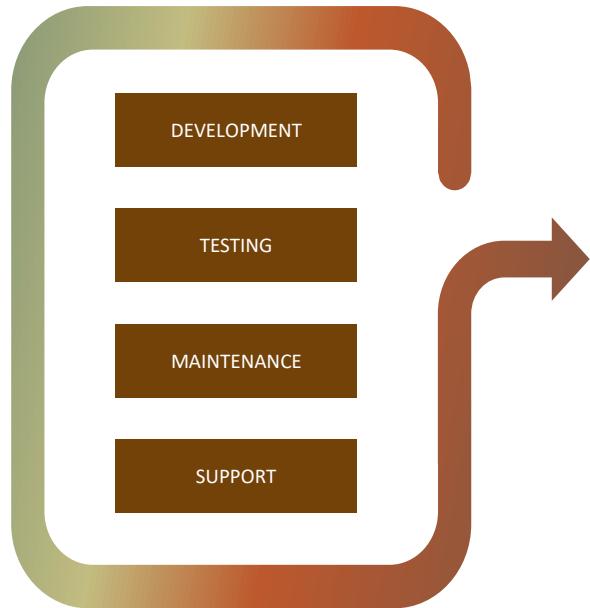
Project engagement refers to the process of initiating, planning, executing, and managing a project and which stakeholder exerts **CONTROL**.

Client Governed: client has significant control over the management, oversight, and decision-making processes.

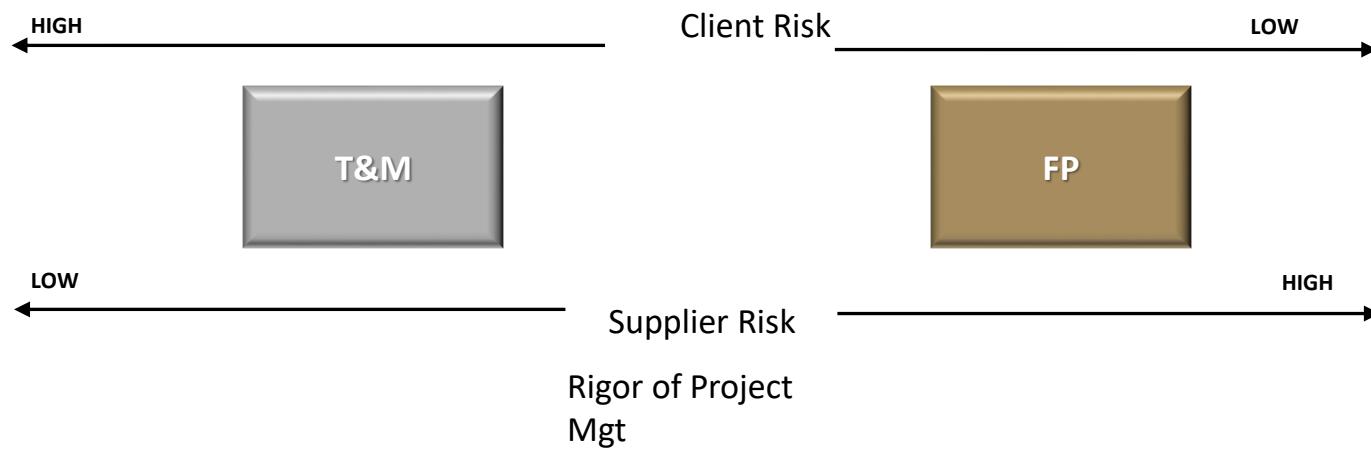
Co-Governed : both client and the vendor share responsibility for governance, decision-making, and management. This is a Collaborative Approach

Vendor Owned : vendor has primary control and responsibility for the management, execution, and decision-making processes. In this, the client trusts the vendor's expertise

Relationships



Risk – Reward



Fixed Bid Vs T&M

	Fixed Price	T & M
Target	Small duration, Firm requirements, MVP, well defined goals	Long term, evolving requirements, several iterations, transparency in process
Identity	Detailed scope of work in SoW, deliverables, payment milestones	Broad level of scope definition in SoW, named resources with rates
Risk	Risk at vendor side, expects continuous Risk Monitoring and Responses	Risk at the client end, less influence of risk impact on vendor
Client Control	Very negligible, primarily interested in the end product and its value	High – particularly on resource handling, work performance monitoring
Payment	Milestone based, on acceptance of milestone delivery, may have rewards and penalties	Time worked * number of resources * bill rate Very close monitoring on absenteeism
Expectation	Strong Project Management Skills Techno Functional expertise	Technical Skills Time and Quality Management

MVP: A minimum viable product is a version of a product with just enough features to be usable by early customers who can then provide feedback for future product development.

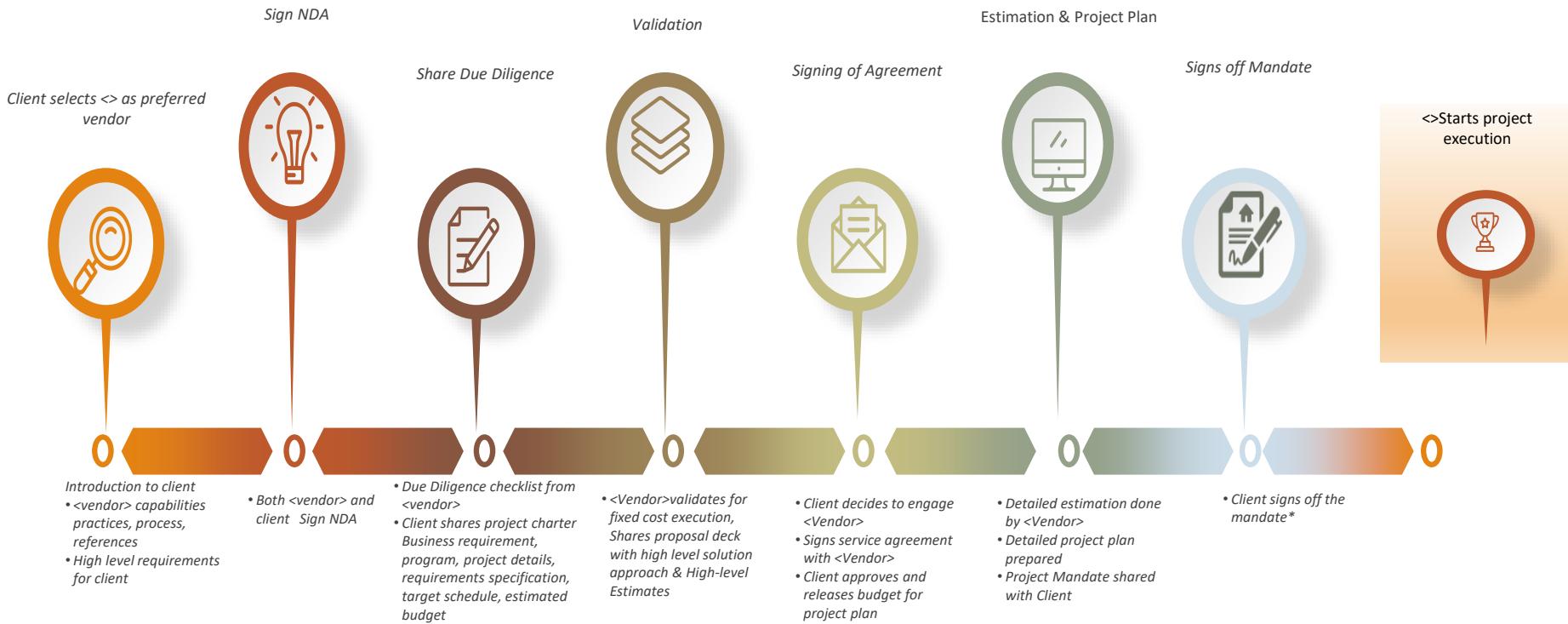
Project Life Cycle

Phases:

1. Initiation
2. Planning
3. Execution
4. Monitoring & Control
5. Closure



Engagement Process



Estimation is a vendor exercise for Fixed price contracts, while it could be a joint exercise (client and vendor) for T&M

Execution Process

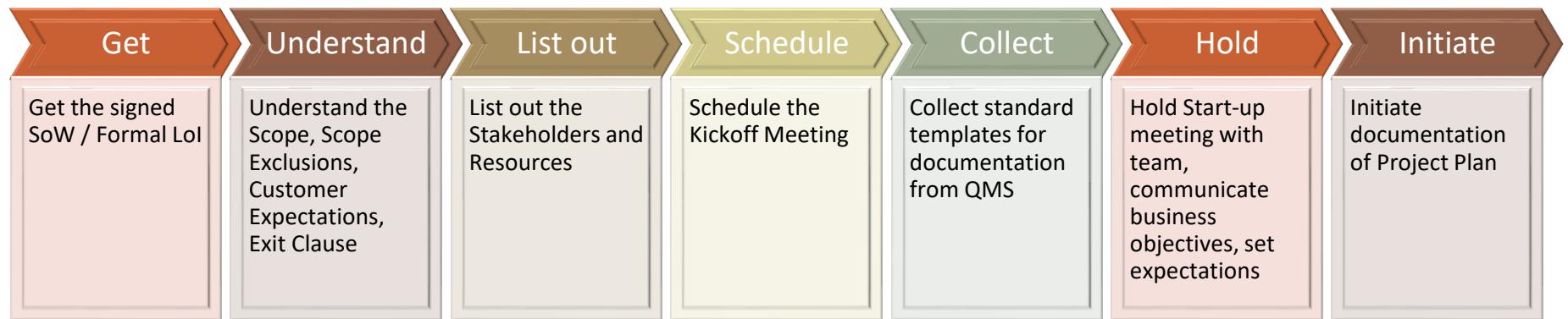
<Vendor> adapts and customizes the delivery based on the complexity and need of the customer and executes the project according to the approved plan



Phases



Project Initiation Phase



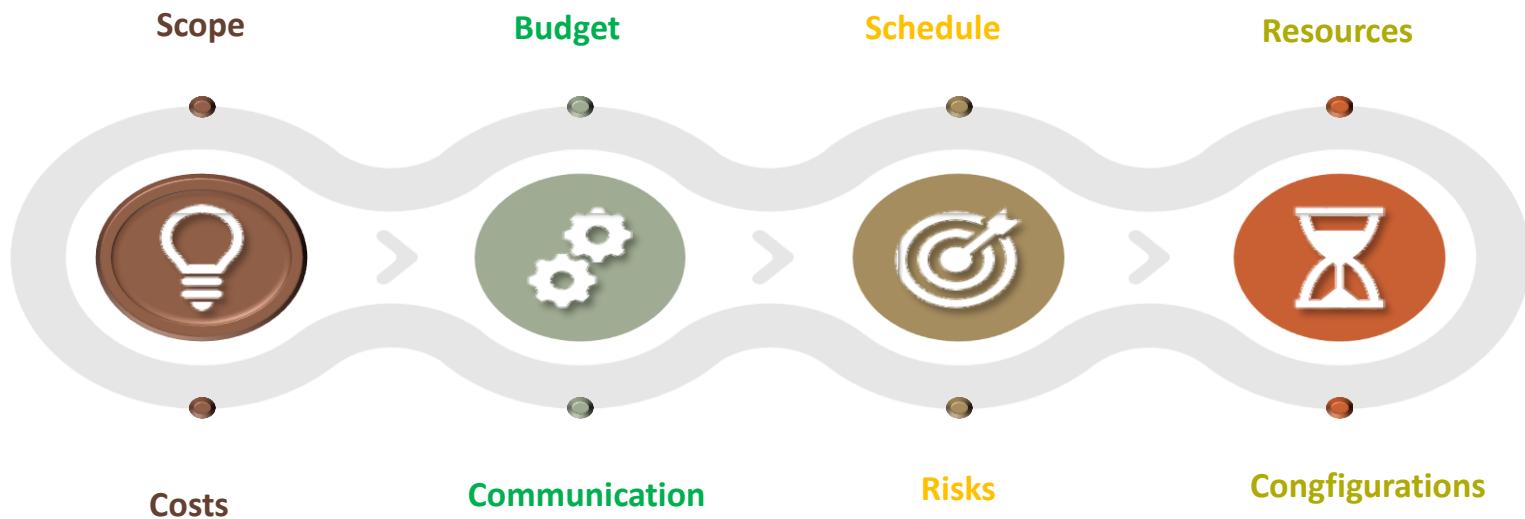
Question: What other activities to be included in Project Initiation Phase?

Quiz

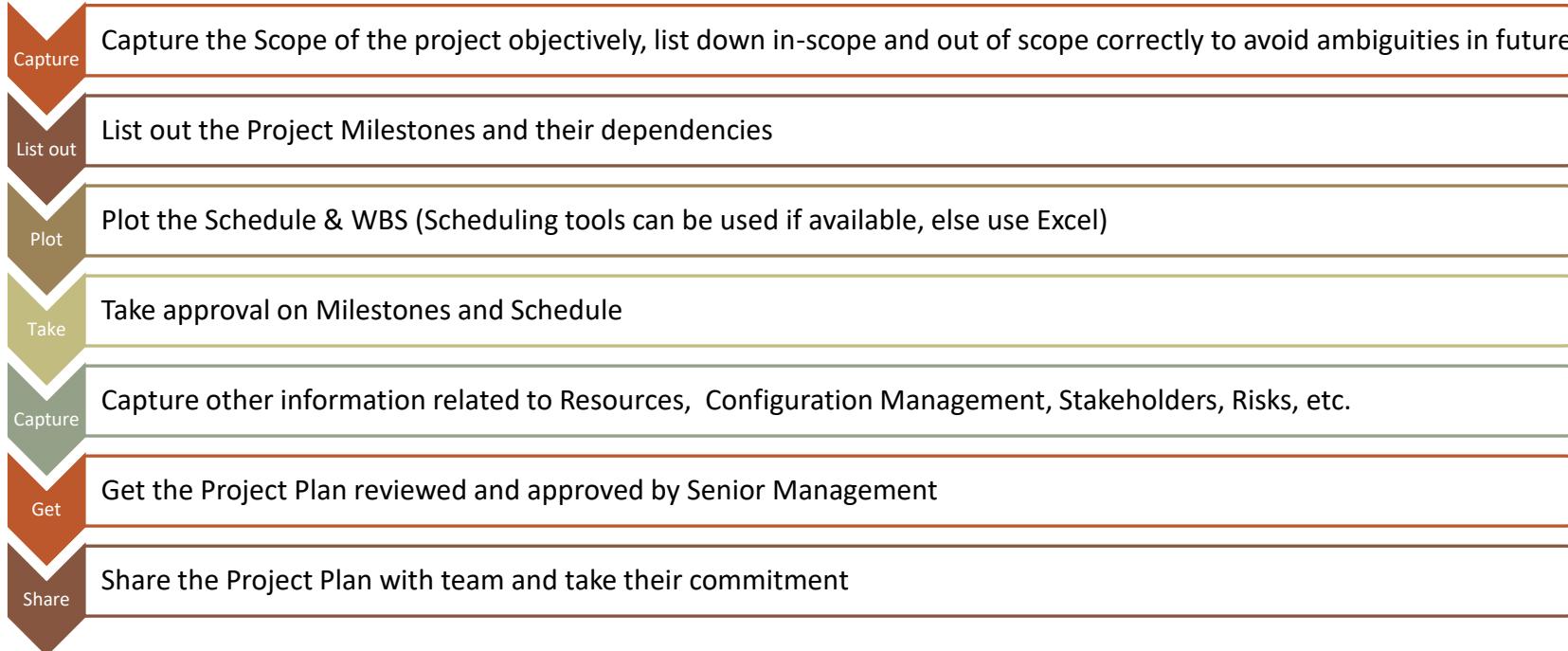
- A project can get started with ?
 - Signed SoW / Client LoI / Go-ahead formal mail from Client and Go-ahead from <Vendor> Leadership
- What is the main motive to hold a Kickoff meeting?
 - Bring all Stakeholders to a single platform to understand about the project objectives, risks and plans
- For the successful outcome in T & M project, the scope has to be very clear and detailed from the start. True or False?
 - False
- What do you understand by the term, “Exit Clause”?

QUIZ TIME

Project Planning Phase



Create a Project Plan

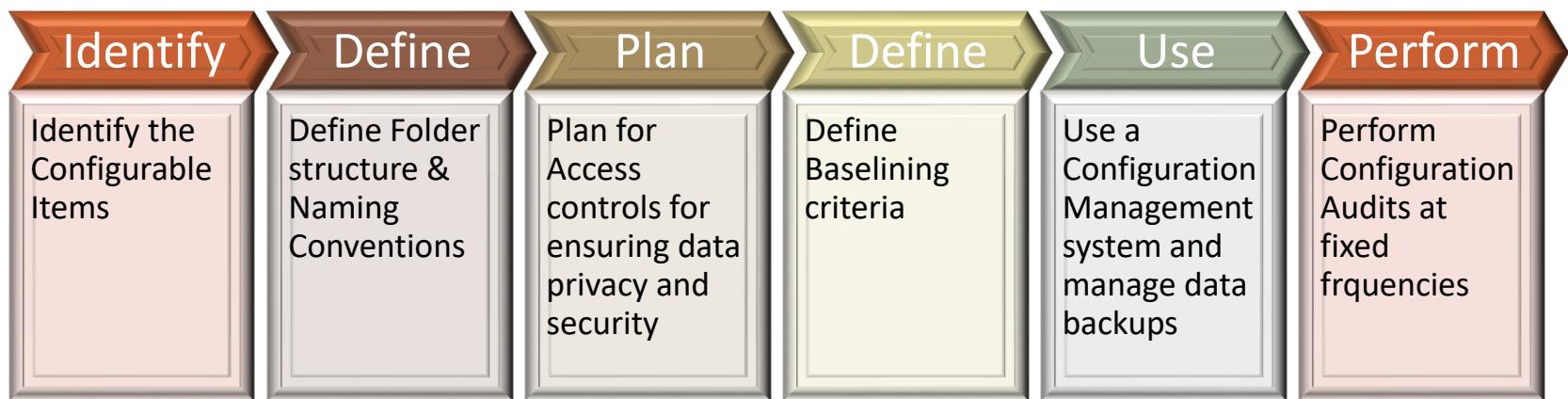


Resource Management



Skill	Resource	Required Rating	Current Rating	Training Needs
Java	ABC	Expert – 3	Intermediate -2	Java Advanced Training
Java	LPQ	Expert – 3	Expert – 3	Not required

Configuration Management



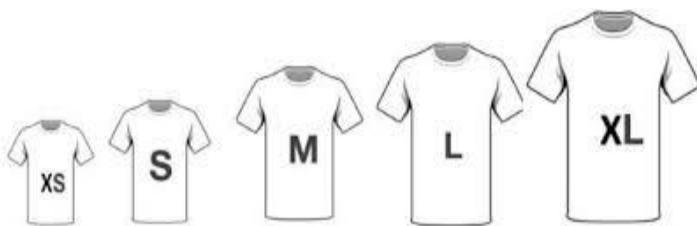
Data Loss & Security breaches can cost us millions and can lead to trust issues with customer

Stakeholder Management

- Stakeholders = anyone impacted by the project.
- Types: Internal & External



Estimation Process



T-shirt Size Estimation

STEP 1: Identify Tasks: List all the tasks that need to be completed for the feature.

- Task 1: Design the user interface
- Task 2: Develop the login functionality
- Task 3: Integrate with the backend API
- Task 4: Write unit tests
- Task 5: Perform user acceptance testing

STEP 2: Define T-Shirt Sizes: Establish what each T-shirt size represents in terms of effort. For example:

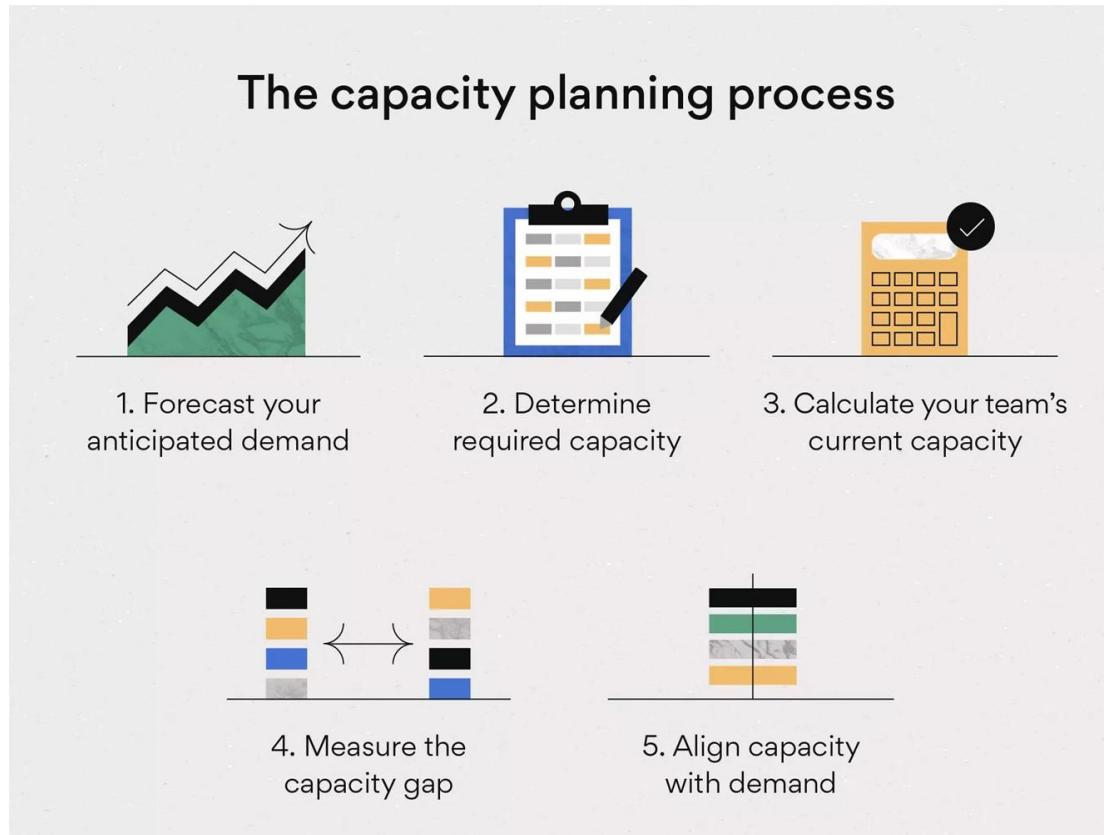
- XS (Extra Small): 1-2 hours
- S (Small): 3-5 hours
- M (Medium): 6-10 hours
- L (Large): 11-20 hours
- XL (Extra Large): 21-40 hours

STEP 3: Estimate Each Task: The team discusses each task and assigns a T-shirt size based on the estimated effort.

- Task 1: Design the user interface - M
- Task 2: Develop the login functionality - S
- Task 3: Integrate with the backend API - L
- Task 4: Write unit tests - S
- Task 5: Perform user acceptance testing - M

STEP 4: Review and Adjust: The team can review the estimates to ensure they are realistic and make any necessary adjustments in subsequent sprints and customer meetings.

Capacity Planning



Capacity Planning

Capacity Planning

Steps

To understand the Capacity planning better, let us consider a hypothetical Agile team working on a software development project for a two-week sprint:

STEP 1: Define Team Capacity:

- Team Members: 5 developers
- Working Days: 10 days (2 weeks)
- Daily Working Hours: 8 hours
- Total Capacity: $5 \text{ developers} * 10 \text{ days} * 8 \text{ hours} = 400 \text{ hours}$

STEP 2: Estimate Work

- User Story 1: Implement login feature - 40 hours
- User Story 2: Develop user profile page - 60 hours
- User Story 3: Create settings page - 50 hours
- User Story 4: Integrate payment gateway - 80 hours
- User Story 5: Write unit tests - 30 hours

STEP 3: Prioritize Tasks

- High Priority: User Story 1, User Story 2, User Story 4
- Medium Priority: User Story 3
- Low Priority: User Story 5

Capacity Planning

STEP 4: Balance Capacity and Demand

- Total Estimated Work: $40 + 60 + 50 + 80 + 30 = 260 \text{ hours}$
- Available Capacity: 400 hours
- Ceremony/ event time: 10 hours
- Buffer for Unplanned Work: 20% of capacity = 80 hours
- Adjusted Capacity: $400 - 90 = 310 \text{ hours}$

Since the total estimated work (260 hours) is within the adjusted capacity (310 hours), the team can take up additional stories or can also accommodate changes within the sprint of capacity around 80-90 hours.

STEP 5: Review and Adjust

- Daily Stand-ups: Monitor progress and address any blockers.
- Mid-Sprint Review: Check if the team is on track and adjust if necessary.

STEP 6: Monitor Team Velocity

- Team velocity to be monitored in the project. Refer Metrics, KPI and status reports for more details.



ASSIGNMENT

Assignment 1

Assignment - 1

You have been awarded a project to build a Bus Ticket booking system by Rodstar Travels Inc

You have been awarded a project to build a Food delivery system by Karma Foods Pvt Ltd

You have been awarded a project to build an Ecommerce portal for Sport Equipments by Frazer Sports Limited

Write 10 stories for your respective Projects and Compute Story Points for each Story

Risk Management



Risk is an uncertain future event that may have an impact on the Project outcomes.



A risk may prevent or delay the achievement of project goals.



A risk is not certain – It may or may not happen.



Not all risks are bad, some (calculated) risks needs to be taken in order to Grow.

Risk Management - Flow



Risk Management – Sources of Risk



Project size and complexity



Requirements & Change



Organization & Sponsorship



Stakeholders & Schedule



Team & Technology



Vendors & External factors



Business factors

Risk Management – Identification techniques and Assessment

Brainstorming

Delphi

Interviewing

SWOT

Expert Judgement

Documentation Reviews

Risk Assessment

Schedule Impact

Cost Impact

Quality Impact

Probability of Occurrence



ASSIGNMENT

Assignment 2

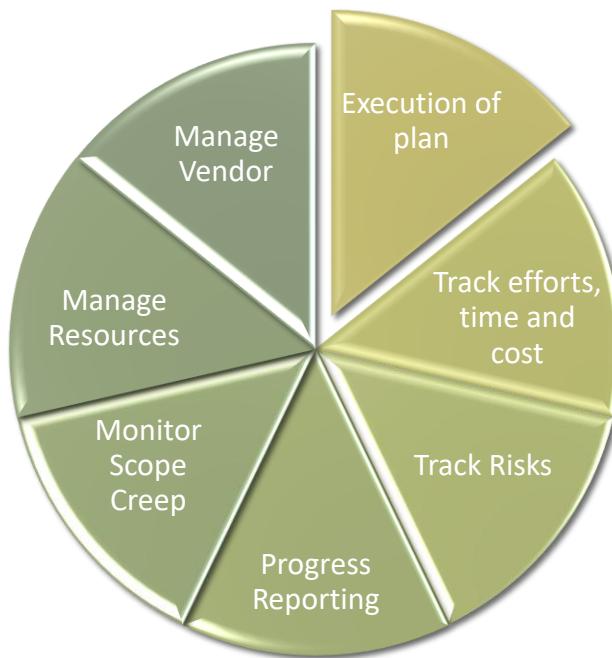
Assignment-2

Identify Risks in your project and
create a Risk Management Plan



Microsoft Excel
Worksheet

Project Execution Phase



Phase where maximum action takes place

Project Execution – Monitoring & Control

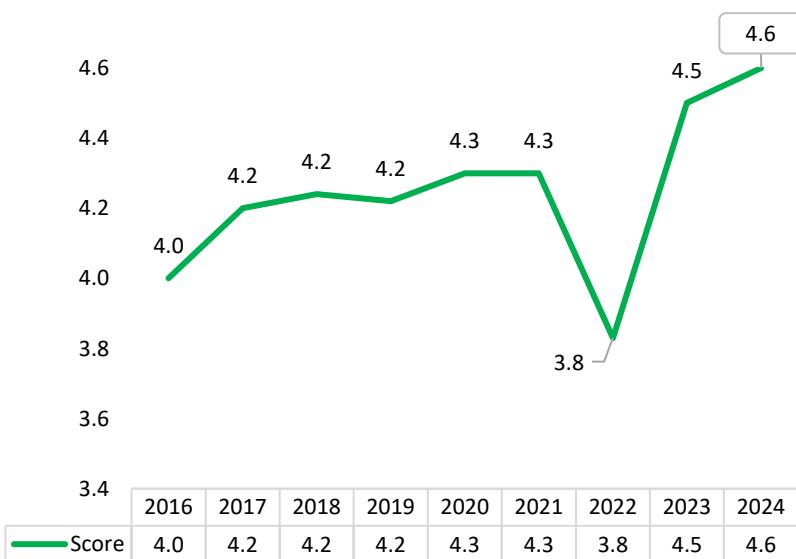
-  Track the schedule on a regular basis and make changes as required
-  Communicate schedule changes if any to relevant stakeholders
-  Review Risks and Metrics and take corrective action
-  Keep an eye of escalations and plan out actions objectively
-  Conduct team meeting on regular basis and track the actionable
-  Check the team performance and provide help in time
-  Be in touch with finance for payments and invoices
-  Interact with stakeholders as per the stakeholder plan and manage dependencies
-  Conduct formal reviews by taking help of SMEs
-  Give a status to Senior management regarding the health of the project

Project Governance

Sr	Project Name	SVH	Head Count	Previous Risk Score	Current Risk Score	Contract Management	Staffing	Scoping, Delivery Milestones & Timelines	Project Dependencies	KPIs	Customer Feedback	Project Finance
1	Project 1	Ron	10	81%	90%							
2	Project 2	Jerry	16	81%	81%							
3	Project 3	Amanda	25	81%	81%							
4	Project 4	Clive	5		81%							
5	Project 5	Jacob	12	50%	50%							
6	Project 6	Ross	10	42%	42%							
7	Project 7	Andy	15	34%	34%							
8	Project 8	Rita	8	49%	20%							
9	Project 9	Jiza	135	17%	17%							
10	Project 10	Sam	24	8%	14%							

Customer Satisfaction Index (CSAT)

Organization Score



Communication

Strengths



- Team is proactive in managing tasks and communication.
- Updates on ticket that the team is working on and sharing them with the product team.
- Patience and attention to detail while communicating complex workflows

Improvement Areas



- The junior member's communication in the team should be more effective.
- The team needs to take the initiative to communicate between Agile ceremonies and meetings to continue progress.

Delivery Team Competency

Strengths



- The team is competing for the required tasks and will acquire training if skills are found to be lacking, making the team more effective.
- Insurance domain knowledge continues to improve
- The team is learning progressively and doing their best to upskill themselves.

Improvement Areas



- Technical competence of the team
- Domain knowledge needs to be better in the team.

Deliverables Timeliness & Quality

Strengths



- The quality and timelines committed to are met or renegotiated if needed.
- Better quality of deliverables due to refinement meetings.
- Working on weekends to ensure timely delivery.

Improvement Areas



- Quality of deliverables is lacking
- Unit testing to be carried out before raising it to QA or the product team.

Engineering Practices

Strengths



- Good co-ordination and commitment within Agile teams
- When needed the right expertise is brought in from within Xoriant. It's proven to be the right choice!
- Reliable engineering practices of the Xoriant team to making critical engineering decisions.

Improvement Areas



- Technical competence of the team
- Code coverage
- Engineering process trainings for the team members
- Effectiveness in managing technical challenges
- Adherence to Engineering standards and Quality output

CSAT and NPS: Key Stakeholders

For Top 20 Accounts



**CUSTOMER ENGINEERING MANAGER (CEM)-
LINE MANAGER**

Frequency : Once in 6 months (TnM & Release based)/ End of Project (FP Dev)

Initiated by : PM/ DM

Scope: Project Level

Scale : 1 to 5

Survey will be launched through a common CSAT DL : voiceofcustomer@<Vendor>.com



**CUSTOMER ENGINEERING HEAD (CEH)
– LOB HEAD/ C LEVEL**

Frequency : Once a year

Initiated by : VH /SVH/ LOB Head/ C Level

Scope : Account Level

Scale : Only NPS

CSAT and NPS : Parameters

Customer Engineering Manager / Line Manager

 Deliverables Timeliness & Quality

 Delivery Team Competency

 Engineering Practices

 Project Governance

 Communication

 New ideas/initiatives

 Overall Ratings

Customer Engineering Head/ LOB Head - NPS



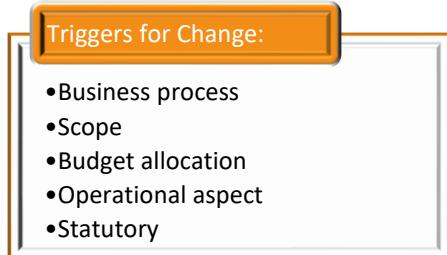
Would you select
<Vendor> for next project
(NPS)



Would you Recommend
<Vendor> to others (NPS)

NPS: Net Promoter Score

Project Execution – Change Management Process



Change Control Board



It's a group of people from the project team that meets regularly to consider changes to the project.



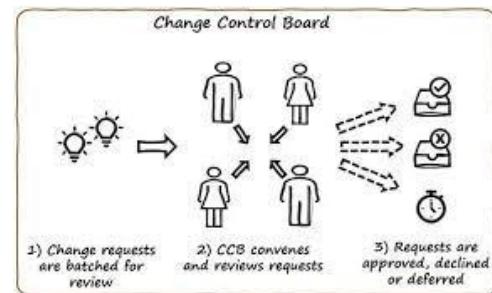
It includes representatives of the relevant functional areas of the project in addition to the project manager.



Through this process of detailed examination, the change control board decides on the viability of the change request or makes recommendations accordingly.

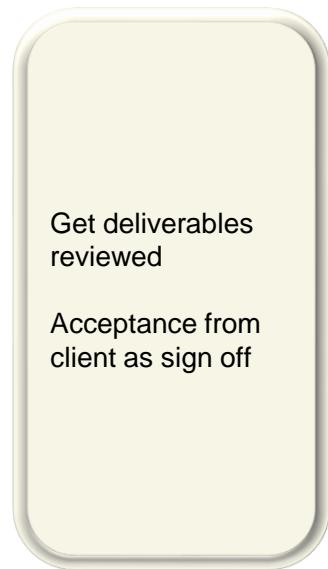


Once the change control board has approved a change, the change must be managed.



Who can play the role of CCB in our projects?

Project Closure Phase



When is a project considered a Success?

- If a project is completed on time and on a budget can be considered a success.
- *However, a project can be evaluated on many criteria:*
 - Does it meet business requirements?
 - Is it delivered on schedule and on a budget?
 - Does it deliver the expected value and ROI? (*where do we define this?*)



What defines a successful project is likely to change based on the type of project. This is why it is important to define what project success means during the initiation and planning phases of a project.

Re-cap

Project Phases

Initiation

- SoW Sign off
- Resource Ramp-up
- Understanding Scope
- Re-visit Estimation
- Prepare for Kick off
- Define roles and responsibilities
- Set Expectations

Planning

- Project Planning
- Requirement analysis / Information Gathering
- Baseling of Plan with sign off
- Setting up Governance process
- Identify Training needs

Execution & Monitoring

- Execution of plan
- Track efforts, time and cost
- Track Risks
- Progress Reporting
- Monitor Scope Creep
- Manage Resources
- Manage Vendor

Closure

- Sign off
- Closure Audit
- Sharing of Learning
- Financial Closure
- Administrative Closure
- Resource Evaluation
- CSAT Survey

Quiz

- When is Project Closure initiated?
 - Only once client formally acknowledges acceptance of project deliverables in all respects
- Which process needs to be closed first?
 - Contractual Closure
- How does Team performance evaluation help?
 - It influences the team members' eligibility to the next assignment
- Why should a closure audit be conducted?
 - To ensure that no process, or any artefact is left out

QUIZ TIME

Conflict Management

Opposing ideas

Project stress

Unforeseen requirements

Budgetary constraints

Lack of commitment

Personal ego clashes

Poor Leadership

Bias / impartial behavior

Lack of communication



If not addressed on time, conflicts can hamper project progress and employee productivity, leading to delayed and poor-quality deliverables.

As a PM, how would you manage these Conflicts?

Project Manager

Leadership

Time Management

Delegation

Communicator

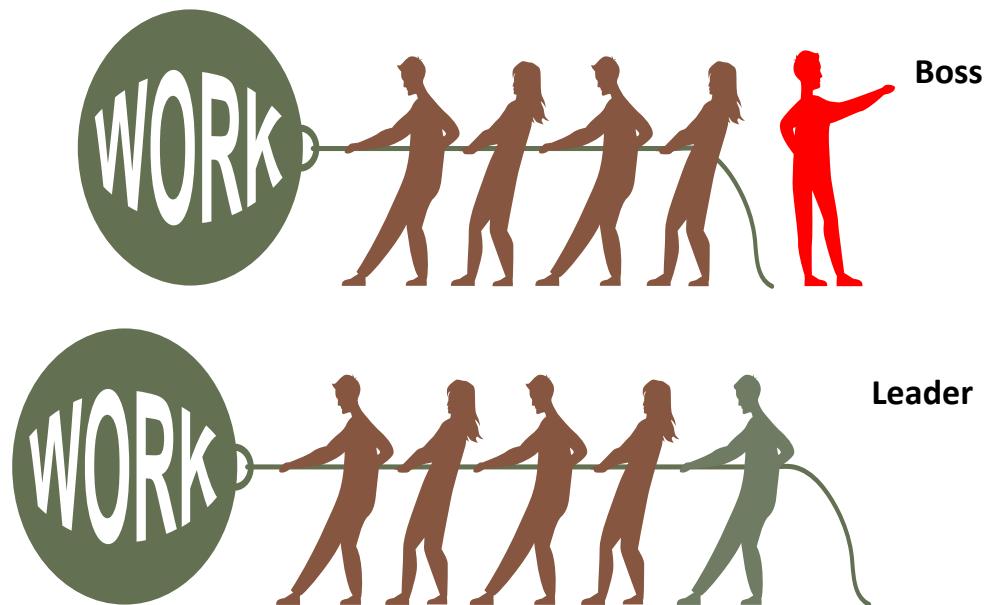
Problem Solver

Decisive

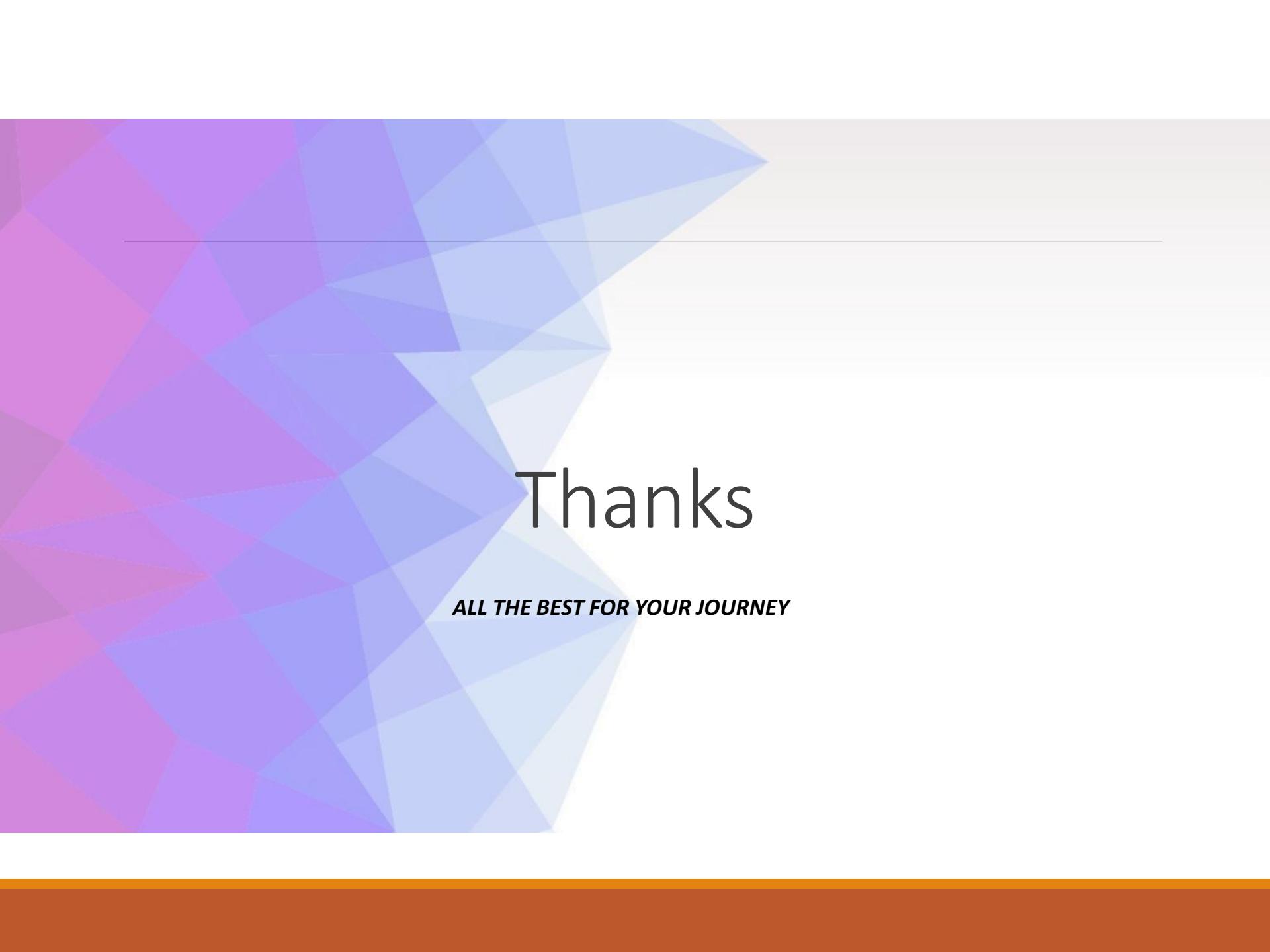
Motivator

Communicator

Empathy



Is Project Management a Science or an Art?



Thanks

ALL THE BEST FOR YOUR JOURNEY

Handouts

7 Key Project Terms to Know

1. Project Lifecycle

The project lifecycle refers to the five phases all projects must progress through, from start to finish. [The phases of a project lifecycle](#) serve as the most basic outline that gives a project definition. These five phases are initiation, planning, execution and closure.

2. Project Scope

[Project scope](#) is a key aspect of the project planning stage. In many ways, it is the starting point. Determining project scope requires the project manager and their team to set goals and objectives, detail deliverables, create tasks, establish important dates and more. Project scope defines desired outcomes and all specific factors which will affect reaching them.

3. Stakeholder

A [stakeholder](#) refers to anyone and everyone involved in a project. A stakeholder can be involved at every stage of the project, or just in a certain way. [Stakeholder analysis](#) helps categorize how investors, team members, vendors, contractors and more can affect your project.

4. Deliverable

A [deliverable](#) refers to the specific outcome(s) a project creates. Deliverables can be “tangible” or “intangible,” meaning they can be a physical product or something conceptual. Typically, deliverables are the need that inspired the project in the first place. If someone contracts a builder to design and construct an office space, the office is a tangible deliverable.

Handouts

5. Milestone

[Milestones](#) are predetermined achievements that help track project progress. Think of milestones as checkpoints. These checkpoints are decided on before a project begins, so the project manager and team know when they are on track to achieve deliverables. Without milestones, it's difficult to know if the project is on the road to success or needs to reroute.

6. Resources

A resource is anything necessary to complete a project. In a software project, people are an essential resource. That said, other resources — like time, infra and tools — are just as important. A project manager must be able to identify all the project resources in order to [create a resource plan](#) and manage the resources accordingly. When resources are left unaccounted for, it is easy to mismanage them.

7. Dependencies

[Project dependencies](#) refer to how resources must be shared and allocated within a project. Many projects will use the same resources for different purposes and across different stages. Understanding this dependency is the only way to ensure there is enough of resource to go around. Similarly, all projects are broken down into tasks. When one task cannot begin before another is completed, these tasks share a dependency.

Thank You

Leadership in Projects

- Modern Leadership Approaches:
 - Transformational
 - Servant Leadership
 - Adaptive Leadership
- Styles: Autocratic, Democratic, Laissez-faire.
- Project managers often combine styles based on context.

Assignment – Summary with examples

Exercises & Activities

- Group Discussion: Identify stakeholders for a 'Hospital Management System' project.
- Short Activity: Map a simple project into 5 life cycle phases.

Thank You

Remember:

"The best time to plant a tree was 20 years ago. The second best time is now."