

PMP NOTES

WRITTEN BY



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PE, PMI-ATPI, PMP, PFMP, PGMP, PMI-ACP
DASM, DASSM, PMI-SP, PMI-RMP, PMI-PBA

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LESSON NO. 01 / PMP EXAM 2023

FUNDAMENTALS OF PROJECT MANAGEMENT BUSINESS ENVIRONMENT

Project

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Large-scale job
Planning/Execution/Completion
Pre-identified studios, time studies
Tasks start/finish

Temporary endeavor undertaken to create unique product service or result.

Operations

continuous, repetitive, day-to-day routine tasks

Example:

Manufacturing of car



- ★ First model car is a project as it would be unique and time-bound.
- ★ All other similar cars would be operational work as those wouldn't be unique.

Program

written set of instructions system to follow
Group of Projects managed in a coordinated way to achieve common benefits.

Development of a Housing community
Road Network
Houses
Sewerage system
Electrification

Interdependency

Objectives:

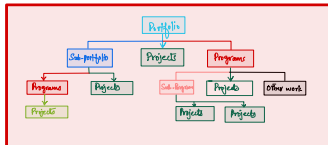
- managing resources across functional departments
- Identifying and controlling cross-functional dependencies

Portfolio

multiple Programs, Projects, Operations
Maximization of wealth
Peace/Prosperity
Gender equality, Poverty, Education
Environmental organization

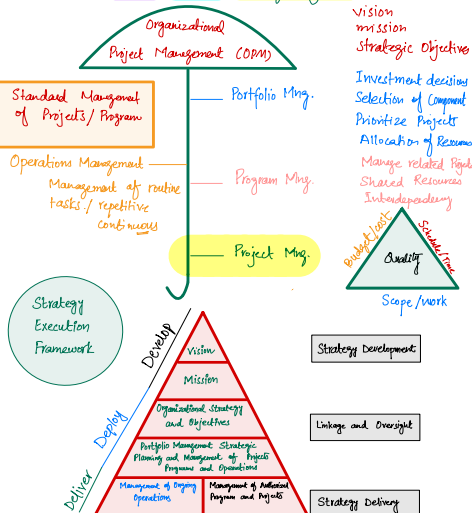
Strategic objectives

Collection of Projects, Program, sub-portfolio and operation managed collectively to achieve strategic objectives.



Organizational Project Management (OPM)

Senior Management, CEO, C-suite, Director
Vision, mission, Strategic objective (Direction)



Project Management Office (PMO)

Centralized Management Structure

Integration, standardization of PM Practices

Supportive PMO: Support, Data, Training, Coordination, SOPs

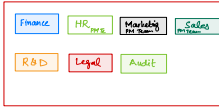
Controlling PMO: Exercise Authority, Monitoring, Compliance

Directive PMO: Highest Authority, Appointment of PM, Direct

Organizational Structures

- Functional Organization
- Matrix Organization
- Projectized Organization
- Composite Organization

Functional organization



Departments, Functions
Functional Manager
Silos, SOPs, KPIs,
Non-existent coordination

Matrix Organization



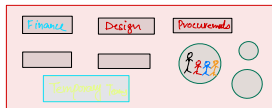
Coordination/coordination
Sharing Resources
Project Managers + Functional Mgrs
Strong Matrix: PM > FM
Balanced Matrix: PM ≈ FM
Weak Matrix: FM > PM
Project Coordinator

Projectized Organizations / Temporary



Separate Teams for each Project
Not enough support
No learning curve
Duplication of resources
No Home/Permanent Office
No Speciality

Composite Organization



Permanent Teams
Temporary Teams
Functions
Matrix

Organizational Influences

- Organizational Process Assets (OPAs)
- Enterprise Environmental Factors (EEFs)

PESTLE
TECOP
VUCA

Internal EEFs

Resources, Infrastructure, culture, value
Hierarchy, relations, Power distribution

External EEFs

Supply chain, Economy, Security
Contracts, wages, competitors
Weather, Regulations, Transition

Project-related work



- ★ To fulfill demand of Market
- ★ maintenance Purposes

★ To Solve a Problem

★ To exploit an opportunity

Business Case

Economic Feasibility study of a Project
Economic Justification of your Project

- Needs Assessment
- Current State evaluation
- Future State
- Available Options/Analysis
- Recommendation

Cost-Benefit Analysis

- Net Present Value (NPV)
- Return on Investment (ROI)
- Internal Rate of Return (IRR)
- Return on Equity (ROE)
- Payback Period (PB)

Net Present Value (NPV)

Investment = \$500,000 (Cash outflow 2023) / Present Value (PV)
Return = \$1,500,000 (Cash inflow 2025) / Future value (FV)
Duration = 5 Years
PV = $\frac{FV}{(1+i)^n}$ [i: interest rate = 3%]
n = 5 years
NPV = Return - Investment = 403,994 - 500,000
NPV = - \$96,006

Internal Rate of Return (IRR)

Loan = \$100,000 [i = 9%]
Return = 9%
NPV = 0

Payback Period

Shorter paybacks means more attractive investment.

Business Case

Feasibility studies / Select

Benefits Management Plan

Expected Benefits, Timeliness, Owner, Metrics
Thresholds, Tolerances, Frequency, Guidelines

Governance Structure for Projects

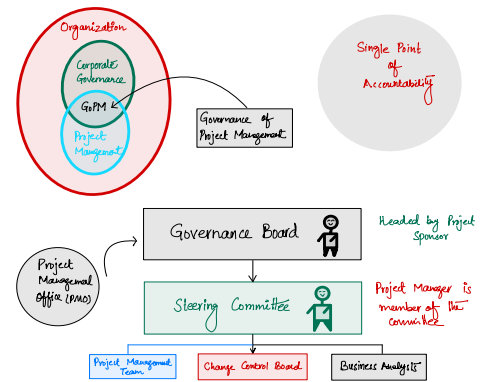
It is a system by which a project is controlled and monitored.

- ★ Roles/Responsibilities of stakeholders
- ★ Methods and procedures for decision-making
- ★ Communication protocols and Escalation Procedures
- ★ Authorization and approvals for utilization of resources
- ★ Project life cycle

Oversight function that is aligned with Governance model of the organization.

Governance Roles

- Sponsor
- Steering committee
- Project Management Office (PMO)
- Project Manager



Projects are divided into phases:

- Sequential Phases
- Overlapping Phases



Governance job is to conduct Phase Review after every phase.

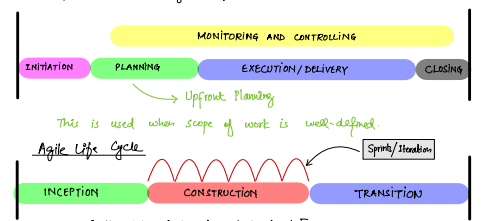
Phase Gate 0: Phase Review
★ Stage gate
★ Kill point
Phases are like mini-projects as they are initiated, planned, executed, monitored, closed.

Project Life Cycle

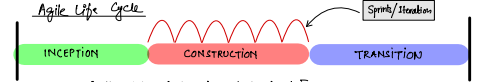
It is life of a Project and normally it

- Waterfall Life Cycle
- Agile Life Cycle
- Hybrid Life Cycle

Waterfall



Agile Life Cycle



Agile Life Cycle is divided into types

- Iterative Life Cycle
- Incremental Life Cycle

Knowledge Projects

★ Agile is used for knowledge Projects
★ Waterfall is used for Industrial Project
★ Hybrid approach is used for project with both type of work

Agile Manifesto

Published in 2001, has 4 values & 12 Principles

4 Values

- Individuals and Interactions over Processes and Tools
- Customer Collaboration over Contract Negotiation
- Working Software/Product over Comprehensive Documentation
- Responding to change over Following a Plan

12 Principles

- Highest Priority is customer satisfaction
- Welcome changing requirements
- Frequent delivery of working software
- Collaborate with the customer
- Build Projects around motivated individuals
- Face-to-face communication
- Working software is measure of progress
- Permit sustainable pace
- Continuous Attention to Technical Excellence
- Simplify is not of maximizing productivity
- Self-organized teams are the best
- Regular introspection and adaptation

Project Compliance

Ensuring compliance is crucial for the success of the Project



PMO, Project Team, Quality Assurance Group, Regulatory agencies, etc. are responsible to ensure compliance.

5 Best Practices for Compliance

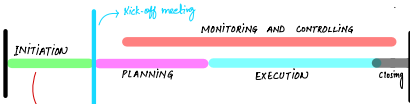
- Documentation
- Risk Planning
- Compliance Counsel
- Audit
- Stewardship

see you in Lesson No. 21 Starting the Project

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Lesson No. 2 Animal Starting the Project/ Project Initiation



① Develop Project Charter/ Build Shared understanding



What we add in Charter?

- Goals and Objective
- Deliverables
- High level Scope
- High level Schedule
- High level Budget
- Key Risks
- Key Assumptions
- Key constraints
- Major Issues
- Milestones
- Success criteria/KPIs
- Exit Criteria
- Pre-approved financial Resources
- Name of PM with Authority
- Name of sponsor with Authority

- Why product is being developed?
- What is target customer?
- When and how product would be developed?
- What are differentiators?

For Shared understanding, reviews

- Contracts
- Motiv
- Service-level agreements
- Letter of Agreement or intent
- Verbal agreement
- Communications
- Statement of work (SOW)

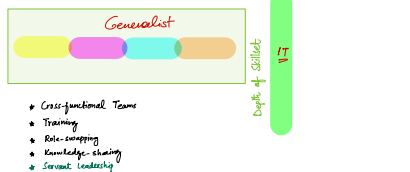
- Kick-off meeting**
- Establishes project context
- Align team vision with stakeholders
- Announce project initiation
- Identify sponsor/ key stakeholders
- Present project charter, mission
- Initiate Product Backlog
- Present Backlog to participants
- Clarify Roles and Responsibilities
- Present results of Planning efforts

Tools and Techniques

- Product Box Exercise
- XP Indicator
- Impact Judgment, Incentives, Reinforcement
- Document Analysis
- Lesson Learned
- Quality Policy

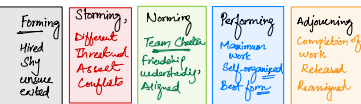
Tasks

2. Team Formation



Bruce Tuckman's Team Development Model

Five Stages of Tuckman Ladder:

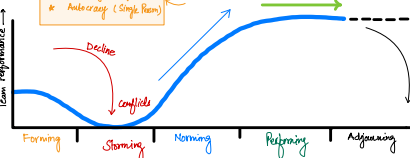


PMI Code of Ethics

- Responsibility
- Respect
- Honesty
- Fairness

Team Charter

- Norms, values, code of conduct
- Acceptable/unacceptable behavior
- Meeting norms/ protocols
- Conflict management
- Communication methods
- Decision-making hierarchies
- Ground Rules
- Performance Expectations



Project Team Roles

- Project Management Staff
- Project work Staff
- Supporting Experts
- Business Partners

Virtual Teams

Team members rarely have face-to-face interaction. Collocation: Members physically located close to one another.

Challenges

- Performance Tracking
- Cultural Barrier
- Language Barrier
- Time zone differences
- Difficulty in coordination
- Lack of some of unity
- Preference to individual goals

Waterfall

- Sponsor
- Project Manager
- PM Team
- Other stakeholders

Agile

- Product Owner
- Scrum Master
- Development Team
- Stakeholders

3. Stakeholders Identification

- Departments/Functions
- Functional Head
- Senior Management
- Employees/Team
- Finance department

- Vendors/Suppliers
- End users/ Customer/ client
- Regulating agencies
- Public
- Government
- Financial Institute/ NGO
- Competitors

Could impact Project
could be impacted by Project
Perceive themselves to be impacted

- Feedback Monitoring
- Performance Gap
- Decision-making
- Resources (Money, People, Software)
- Requirements
- Approvals
- Assist in work

Tools/Techniques

- Interviews
- Questionnaires
- Facilitated workshop
- Digital media (Email)
- Posters or advertising
- Intrapersonal skills
- Active Listening
- Emotional Intelligence
- Communication methods
- Push, Pull, Interactive

① Identify stakeholders

Stakeholders Register

Name/ Role/ Org/ Designation/ contact detail/ Expectation, Needs
Power/ Interest/ Influence/ Current engagement level/ Desired engagement level

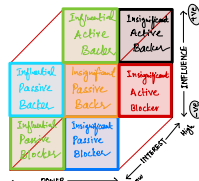
② Analysis

Power-Interest Matrix



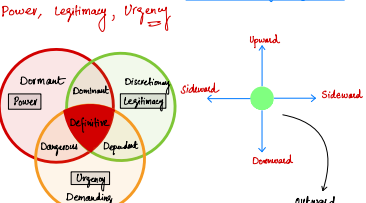
Stakeholders Cube

Power: High/Low
Interest: High/Low
Influence: High/Low
Active/Passive
Influential/Insignificant
Active/Passive
Blocker/Enabler



Salience Model

Power, Legitimacy, Urgency



③ Engagement Planning

Stakeholders Engagement Plan

Communications Management Plan

Requirements, Frequency, Methods, Model, medium, Format, Template, detail
who? Reserving?

Communication Methods

1. Push Communications

Sender Report/ Email/ Letter Receiver
Minutes of meeting

2. Pull Communication

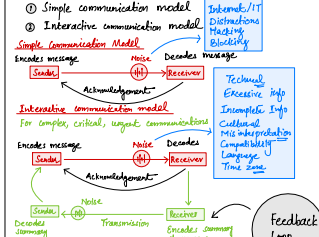


- * Showpoint
- * Website
- * Bulletin Board
- * Dashboard
- * White Board

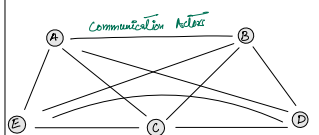
3. Interactive Communication

Real-time communication
Face-to-face communication, Video conferencing, Audio
Instant messaging (IM),

Communications Model



Communication Channels



communication channels represent complexity of communication network.

$$C.C = \frac{n(n-1)}{2}$$

where n = no. of stakeholders involved in the communication process
if n = 10 $\Rightarrow \frac{10(10-1)}{2} = \frac{10 \times 9}{2} = 45$

Communication modes

Written	74%	65%	34%	24%	5%
Verbal	15%	34%	64%	54%	15%
Non-verbal	15%	15%	14%	24%	84%

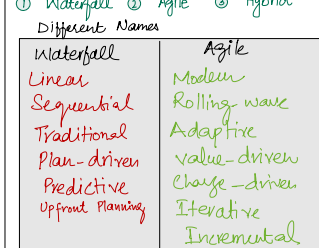
Stakeholders Engagement Assessment Matrix

Stakeholder	Unaware	Neutral	Resistant	Supportive	Leading
Government	CEL				DEL

Current Engagement level CEL
Desired Engagement level DEL

4. Selection of Appropriate Methodology

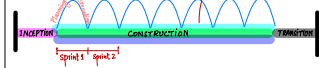
① Waterfall ② Agile ③ Hybrid



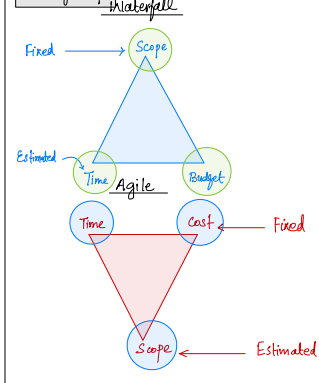
Linear Planning



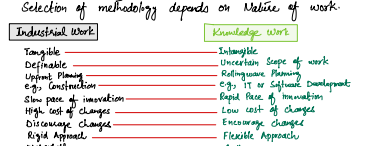
This is upfront Planning
High level planning for overall project
Detailed planning for near term work



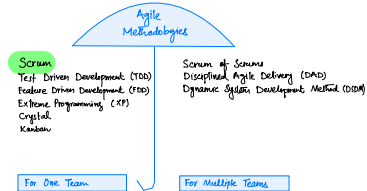
Role of Scope



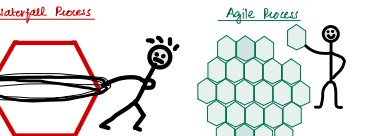
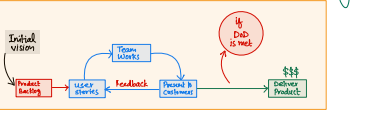
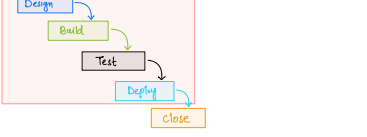
Basis of selection of Methodology/Approach



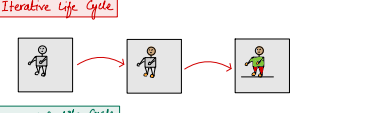
Agile Methodologies



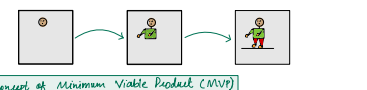
Types of Life Cycles



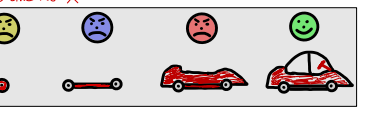
Iterative Life Cycle



Incremental Life Cycle



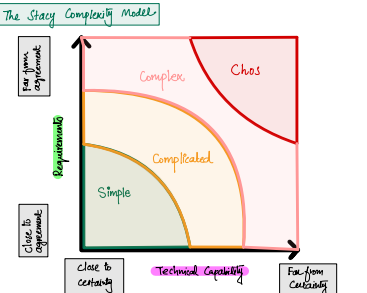
Concept of Minimum Viable Product (MVP)



Like This (Minimum Viable Product)



The Stacey Complexity Model



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LESSON NO. 03 PLAN THE PROJECT

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MONITORING AND CONTROLLING

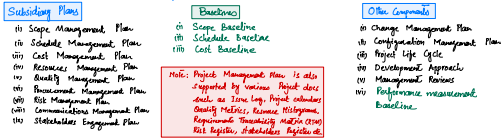
INITIATING PLANNING EXECUTING CLOSING

→ This lesson is about Planning the Project.

Purpose of Project Planning is to create **Project Management Plan**

It contains:

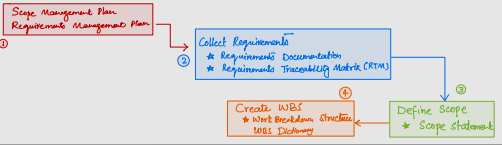
- Subsidiary Plans
- Baselines
- Other components



Scope Planning (Waterfall or Predictive)

Scope: Work included in Project is called Project Scope
100% Project Scope: Activities included in the Project
100% Project Scope: Features of the Product

Scope Planning is a four-step process:



1. Scope Planning

1.1) Scope Management Plan
SOP, Policies, procedures, Tools and Techniques

Scope related Processes, Policies, methods
Roles and Responsibilities, Templates and Forms
Tools/Techniques, Units, Performance measurement Rules
Authority levels, Validated

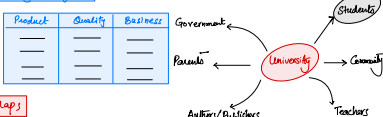
2. Collect Requirements

In this process requirements are collected from stakeholders. Two documents are generated.

1.1) Requirements Documentation 1.2) Requirements Traceability Matrix

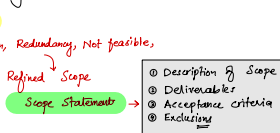
Tools:

Surveys, meeting, site visits, Interviews, historical analysis
Document Analysis, Business Requirement, documents
Lessons Learned, Expert Judgement, Market research, competitor
Benchmarking, Observation, Brainstorming, nominal Group,
Focus Group (SME + Key stakeholders), Prototype,
Affinity Diagram, Context Diagram



3. Define Scope

Remove Duplication, Redundancy, Not feasible,



Product Analysis

To make sure that complete Scope of Product and Project has been identified.

4. Create Work Breakdown Structure

In this step we decompose project scope into smaller and more manageable parts. Two documents are created in this step:

1. Work Breakdown Structure (WBS)

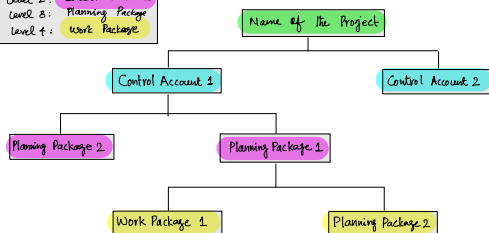
WBS is hierarchical decomposition of Scope.

It has following levels:

- Level 1: Name of Project
- Level 2: Control Accounts
- Level 3: Planning Package
- Level 4: Work Package

2. Work Breakdown Structure Dictionary

WBS Dictionary contains detail of different work elements.



Scope Baseline

It is approved version of the Project Scope. Once this is developed, Scope planning is completed. Baseline includes 3 elements:

- Scope statement
- WBS
- WBS Dictionary

Approved Scope ✓

Agile Scope Planning

Five Levels of Planning

1. Vision statement
2. Roadmap Planning
3. Release Planning
4. Sprint Planning
5. Daily Planning

INCEPTION

1. Vision statement
2. Product Roadmap

CONSTRUCTION

1. Release Planning
2. Sprint Planning
3. Daily Planning

Release

1. Transition

1. Vision statement

It is overall direction of the Product
What is going to be developed?
Who is the end user/customer?
When it would be developed? Phases
Who will be doing what?
What are the differentiators?

Sample

For (Target customer)
The (Statement of need as opportunity)
Who (Product Name) is a (Product category)
That (Key benefit, reason to buy)
Unlike (Primary competitive Alternative)
Our Product (Statement of Primary Differentiation)

2. Product Roadmap

Visual display of when different elements of Product would be developed.

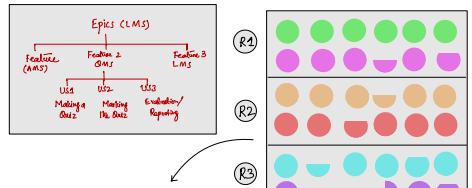
- Define goals and objective
- Understand customer value-proposition
- Divide the work into Releases (A Release is a time-based duration)
- Divide milestones into



3. Release Planning

Release is a time-based duration and its length varies from 2-6 months.
Features are divided into different increments.

Product Backlog



Product Backlog is a prioritized list of user stories. A user story is a product functionality from user's perspective.

Format of a User Story

As a USER I want FUNCTIONALITY in the product so that I can achieve BUSINESS OBJECTIVE.

INVEST

- Independent
- Negotiable
- Valuable
- Estimable
- Small
- Testable

In Agile Release Planning, Release Backlog is developed and divided into iterations



4. Sprint Planning

Sprint or Iteration is a time-based duration and its length varies from 2-4 weeks. Length of duration depends on sizes of features and how frequently feedback is needed.

Prioritization Techniques

- Simple → H, M, L
- MoSCoW → Must Have, Should Have, Could Have, Would Have
- Paired Comparison
- 100 Points method
- Monopoly Money / Buy a feature
- RAND Model

Activities in Sprint Planning

1. Elaborate User stories
2. Story Prioritization
3. Estimation of User stories
4. Defining Acceptance Criteria
5. Story Planning

Definition of Done (DoD)

Acceptance Criteria

5. Daily Planning/Daily Standup

- What team did yesterday?
- What would be done tomorrow?
- Are there any blockers?

Costing and Budgeting

Waterfall

There are three steps in costing and budgeting

1. Develop cost Management Plan
2. Estimate Cost
3. Develop Schedule

1. Cost Management Plan

- Guidelines, Processes, Procedures,
- Roles and Responsibilities
- Tools and Techniques
- Units of measurement
- Performance measurement Rules
- Template and formats
- Level of Precision
- Level of Accuracy
- Control Accounts
- Control Thresholds
- Reporting Formats
- Procedures for cost recording

2. Estimate Cost

Various Techniques are used to Estimate Activity Duration.

- Analogous estimation
- Parametric Estimation
- Probabilistic Estimation
 - Triangular Distribution
 - Peta Estimation (PERT)
- Bottom-up Estimation
- Heuristics

Suppose

Activities	Estimate
A	\$200
B	300
C	700
D	100
E	500
Cost Estimate	\$1,800

This estimate is for activities only and it does not have additional funds for Risk or future uncertain events, therefore Reserve Analysis is needed

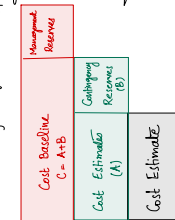
3. Determine Budget

It is the process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.

Reserve Analysis

Reserves are funds allocated to respond to known and unknown Risks

1. Contingency Reserves for Known Risks
2. Management Reserves for Unknown Risks



Approved cost Baseline!

Contingency Reserve Calculation

Formula: $EMV = \text{Impact of Risk} \times \text{Probability}$

Risks	Probability	Impact	EMV
R1	0.7	\$100	70
R2	0.6	50	30
R3	0.9	200	180
R4	0.8	300	240
R5	0.5	100	50

EMV = \$570

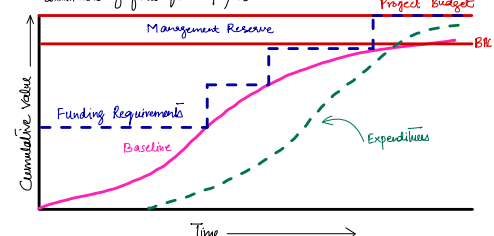
Management Reserve Calculation

Management Reserves are for Unknown or Unidentified Risks. Therefore, exact amount of Management Reserves cannot be determined. The Contingency Reserves are determined based on Past Experience and Importance of Project, organizations allocate 1-3% of Estimate as Management Reserves.

Note: Project Manager is not authorized Management Reserve without Prior Specific approval of Project Sponsor or relevant authority.

Funding Limit Reconciliation

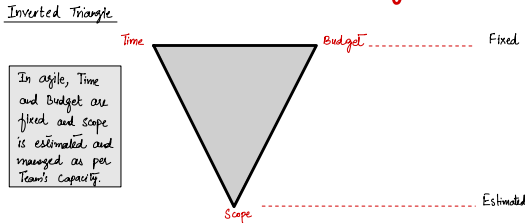
Expenditures should be reconciled with any funding limits on the commitment of funds for the project





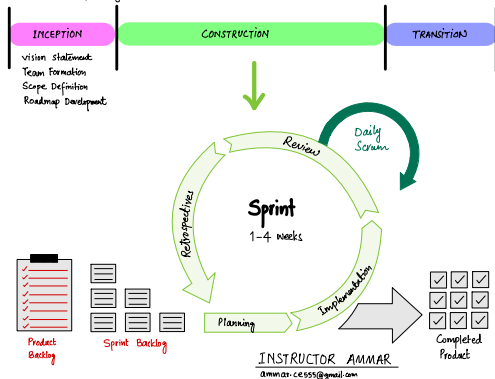
Agile Project Scheduling

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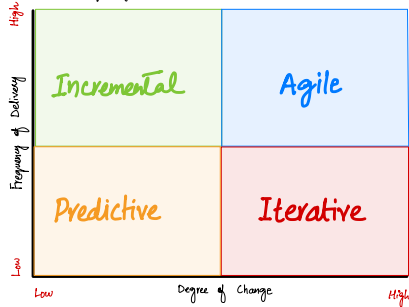


Timeboxing: Agile breaks-up entire project into small fixed duration called time-boxes

Agile Life Cycle



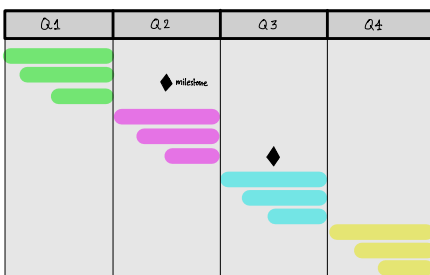
The Continuum of Life Cycle



Product Roadmap Development

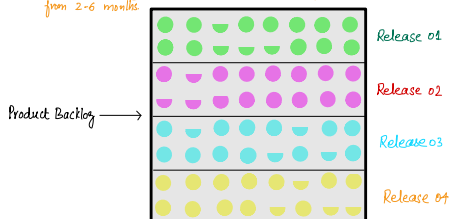
Roadmap outlines vision, direction, priorities, and progress over time. It includes Themes, Epics, Features, Stories.

Dependencies, Priorities, milestones dates, Sequences, Release dates

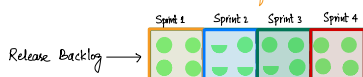


Agile Release Planning

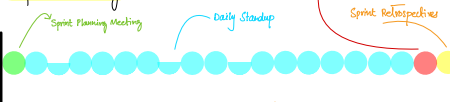
In this a release is divided into sprints. Release length varies from 2-6 months



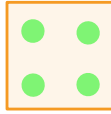
Release Backlog of Release 1 is divided into sprints. A sprint is also a time-based duration that varies from 1-4 weeks.



Sprint Planning



Sprint Backlog



Tasks in Sprint Planning

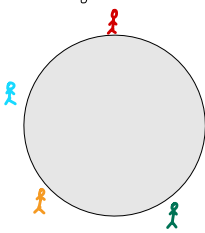
- ★ Story Prioritization
- ★ Story Sizing
- ★ Estimation
- ★ Story Tasking
- ★ Defining Acceptance criteria
- ★ Resource allocation
- ★ Definition of Ready (DoR)
- ★ Definition of Done (DoD)

Estimation of User Stories

Relative vs Absolute Estimation
Story Points vs Hours-based Estimation

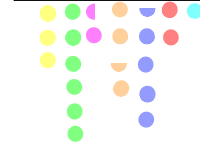
Estimation Techniques

Planning Poker



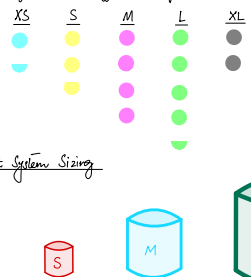
Fibonacci Series

0 1 2 3 5 8 13 21



T-Shirt Sizing

Based on novelty, complexity and level of effort required; user stories are categorized into different categories.



Bucket System Sizing



Three-point Estimation (Probabilistic Estimate)

Optimistic Estimate
Pessimistic Estimate
Most Likely Estimate

$$3E = \frac{OE + ML + PE}{3}$$

Agile Capacity Planning

No. of user stories to be picked up in an iteration depends on Team's capacity. It is an estimation of how much work team can realistically complete without being burnt out.

Ideal Capacity = No. of Team members × No. of hours × No. of days in Sprint
= 02 × 08 × 10 → 160 Hours (Assuming 100% utilization)

Efficiency Factor = 0.8

Realistic Efficiency = 0.8 × 160 Hours

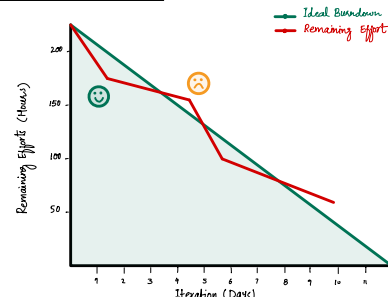
Team's Efficiency = 128 Hours

Based on above capacity, Team pulls user stories from Product Backlog.

Team's Velocity

Velocity is the average amount of work team completes in a sprint. Suppose Team's velocity is 110 hours in past iterations. Accordingly Team would adjust capacity for subsequent Sprints.

Iteration Burndown Chart



Waterfall Project Scheduling

What is Project Schedule?

It is a plan that represents how and when the Project will deliver the Products, services or results.

- ★ List of activities with dependencies
- ★ Project Network Diagram
- ★ Bar chart

1. Schedule Management Plan

Policies, procedures, roles/responsibilities
Tools/ Techniques, Templates, formats, units
Performance measurement

2. Define Activities

List of Activities, List of milestone, activity attributes
milestone has zero duration

List of Activities
A
B
C
D
E

3. Sequence activities

Precedence Relationship

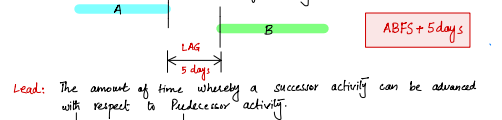
- Finish-to-start (FS)
- Start-to-start (SS)
- Finish-to-Finish (FF)
- Start-to-Finish (SF)

Types of dependencies

- Mandatory Dependencies
- Discretionary Dependencies
- Internal Dependencies
- External Dependencies

Finish-to-start (FS)

Lead vs Lag
Lead: Amount of time whereby a successor activity will be delayed with respect to a preceding activity on the critical path.



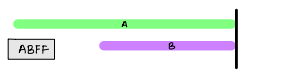
2. Start-to-Start (SS) Relationship

A relationship in which a successor activity B cannot start until a predecessor activity A has started.



3. Finish-to-Finish (FF)

A relationship in which a successor activity B cannot finish until a predecessor activity A has finished.

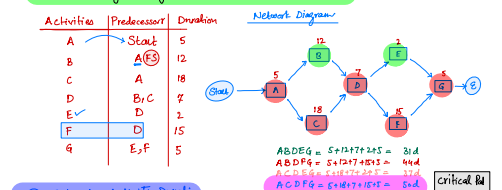


4. Start-to-Finish (SF)

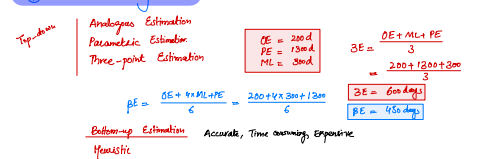
A logical relationship in which a predecessor activity cannot finish until a successor activity has started.



Precedence Diagramming Method and Critical Path Method

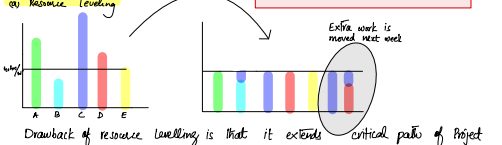
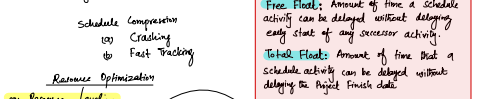


4. Estimate Activity Duration



5. Develop Schedule

In this step, schedule is finalized by schedule compression if needed and optimizing resources allocation.





Risk Management in Waterfall

Definition: Any uncertain event that could have negative or positive impact on Project outcome is called a Risk.

Threat: A Risk with negative Impact

Opportunity: A Risk with Positive Impact

Types of Risks:

- Business Risks vs Pure Risks
- Event-based Risks vs Non-event based Risks

- Variability Risks
- Ambiguity Risks

Risk Management Process



1 Risk Management Plan

Standardizing Guidelines, SOs, methods, Policies, Procedure

Definition, Terminologies, Tools, Techniques, Templates and formats

Roles and Responsibilities, Reporting mechanisms, Risk Breakdown Structure (RBS)

Risk Appetite/Threshold: Risk Categories

Risk Appetite: An organization's willingness to take Risks.

High: Risk Taker

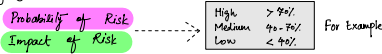
Med: Risk Neutral

Low: Risk Averse

Concept of Risk Tolerance and Risk Threshold

- Risk Tolerance is acceptable range of variation in Project Riskiness
Say $50000 \pm 5\%$
- Risk Threshold is upper limit of Risk Tolerance which would be \$55,000 in this case.

Key Definitions



Risk Categories

- P Political Risks
- E Economic Risks
- S Social Risks
- T Technical Risks
- E Environmental Risks
- L Legal Risks

- T Technical
- E Environmental
- C Commercial
- O Operational
- P Political

Risk Breakdown Structure (RBS)

All Sources of Risks	Political Risks	Regulatory changes Instability and Transition Lack of Project Funding
	Business Risks	
	Operational Risks	
	Stakeholders Risks	
	Market Risks	

Lowest Level of RBS is called Prompt list.

Roles and Responsibilities

- Project Manager
- Risk Manager
- Risk Owner
- Risk Action Owner

2 Risk Identification

In this process, Threats and Opportunities are identified and documented in Project Risk Register.

Various Tools and Techniques are used in this process:

Brainstorming, Workshops, Nominal Group, Surveys, Questionnaires, Document Analysis

Prompt list, Checklist, Interviews, Expert opinion,

Examples of Identified Risks

- Threats:**
- Supply Chain Risks
 - Manpower Unavailability
 - Equipment Breakdown
 - Inventory Shortage
 - Resource constraints
 - Environmental Hazards
 - Regulatory Changes
 - Inflation

Opportunities

- New Technology
- Acquisition of new Assets/Resources
- New Skillset
- Process Improvement
- Decrease in Prices
- Partnership Agreement
- Joint Ventures

Outputs of this Process

Risk Register

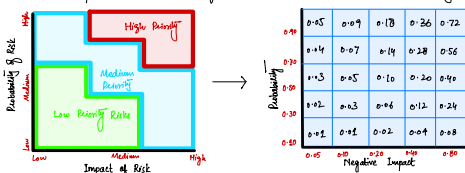
ID	Description	Category	Probability	Impact	Mitigation Action	Trigger	Risk Owner

Risk Report

- This is for stakeholders and it includes:
- Total No. of identified Risks
- Major Sources of Risks
- Risk Trends

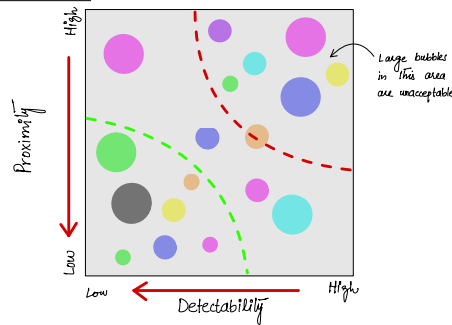
3 Qualitative Risk Analysis

In this process risks are categorized and prioritized based on Probability and Impact



Bubble Chart

Bubble Size = Impact Value



4 Quantitative Risk Analysis

In this process, impact of risks are quantified. Various Techniques are used:

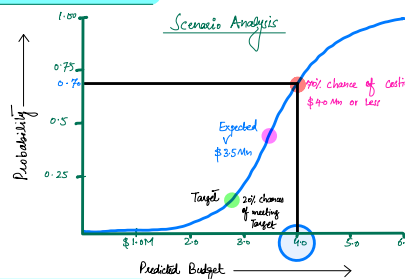
Expected Monetary Value (EMV)

Formula: $EMV = \text{Impact of Risk} \times \text{Probability}$

Risks	Probability	Impact	EMV
R1	0.7	\$100	70
R2	0.6	50	30
R3	0.7	200	140
R4	0.8	300	240
R5	0.5	100	50

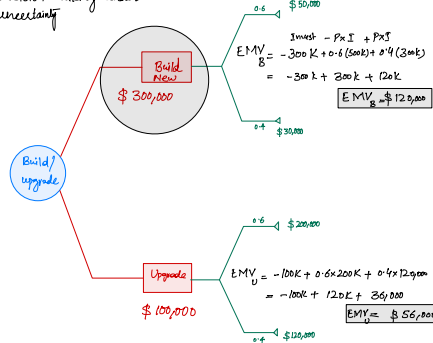
EMV = \$570

Monte Carlo Simulation

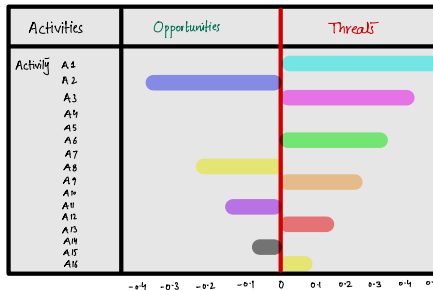


Decision-Tree Analysis

Decision-making under uncertainty



Sensitivity Analysis / Tornado Diagram



As a result of all above Techniques, Overall Risk Factor is quantified and reported to the Senior Management as part of Risk Report development.

5 Plan Risk Responses

Strategies for Threats

- Risk Escalation
- Risk Transference/Deflection
- Risk Avoidance
- Risk Mitigation
- Risk Acceptance
- Contingent Response Strategies

Strategies for Opportunities

- Risk Escalation
- Risk Sharing
- Risk Exploitation
- Risk Enhancement
- Risk Acceptance
- Contingent Response Strategies

Risk Management in Agile

Purpose of Risk Management is to minimize uncertainty in the Project

- Implicit Risk Management
- Explicit Risk Management

Implicit Risk Management

Risk Management is built-in in Agile methodology.

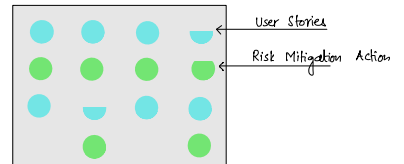
- Iterative development
- Rolling-wave Planning
- Daily Standup Meeting
- Sprint Review Meeting
- Sprint Retrospectives
- Customer Collaboration
- Regular Feedback
- Proven Architecture
- Continued Visibility
- Sufficient Functionality
- Production Ready
- Delighted Customers
- Continuous delivery, Testing, and Integration

Explicit Risk Management

Risk Management during Sprint Planning Meeting is an imp activity.

Risk Adjusted Product Backlog

It is sprint backlog with risk response actions associated with risky activities



Risk Census

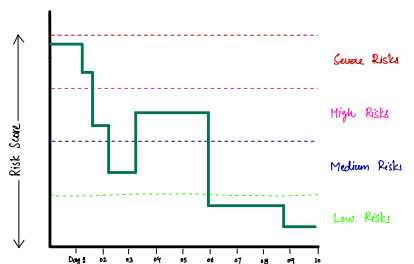
In Agile, Risk Census is conducted to analyze impact of risk based on Probability, Impact and various other factors

Risk Spikes

In Agile, a Spike refers to a time-based research activity that helps Team make informed decisions. Risk Spikes are fixed duration in which Team investigates Risk in detail and define Mitigation Actions.

Risk Burndown Charts

A Risk Burndown chart shows the trend in the risk score for an initiative. For Example:



Note: Risk Score is the quantitative total of Probability time Impact.

Risk Lists

Similar to Waterfall, Risks are identified in Agile and Risk List is established which is further analyzed in Risk census

Technical Debt

In agile technical debt is regularly paid to avoid uncertainty. Technical debt is deferred cost of work not done at an earlier point in the product life cycle.

Concept of ROAM in Agile

ROAM is an acronym that stands for

- Resolve: No further action is needed.
- Own: Someone is appointed to own the Risk for Analysis
- Accept: Risk cannot be resolved so accept it as it is
- Mitigate: A plan needs to be formulated to eliminate threat

Above are various responses to Risk.

Risk Modified KANBAN Board

Story	Tasks	In Progress	Testing/Review	Done

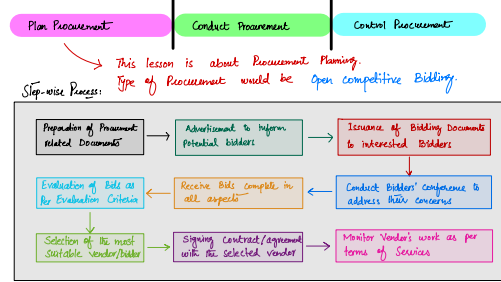


Resources/Procurement in Waterfall

Procurement: Purchase of Goods or Services for Project

- Centralized Procurement System
- Decentralized Procurement System

Processes



During Planning Stage, following documents are generated.

- Resources Management Plan
 - Procurement Management Plan
 - Statement of Work (SOW)
 - Make or Buy Analysis
 - Procurement Strategy
 - Bidders' Evaluation Criteria
 - Independent Cost Estimates
 - Bidding Documents
- Resource Breakdown Structure
 - Resource Histogram
 - Resource Calendar
 - Responsibility Assignment Matrix (RAM)
 - RACI Chart

1. Resources Management Plan

It is a component of Project Management Plan that describes how project resources are acquired, allocated, monitored and controlled. It may include:

- Resource identification
- How to acquire resources
- Roles and Responsibilities
- Project Organization Chart
- Project Team Resource Management
- Methods for Resource control
- Tools and Techniques
- Reporting Mechanisms

2. Procurement Management Plan

- Procurement Processes, policies, procedures, steps
- Tools and Techniques
- Type of Procurement e.g. Single Stage Procurement, Two stage Procurement
- Role/Responsibilities regarding procurement processes
- Template and Forms to be used in Procurement

3. Statement of Work

A narrative description of Products, services or results to be delivered.
Specifications of Product/Service
Model, Make, Size, colour, Type, Features, Quantity etc.

4. Make or Buy Analysis

- Various factors impact an organization's decision regarding outsourcing or insourcing.
- Cost
- Quality
- Time
- Skilled/Capability
- Technology
- Focused Areas of business
- Core
- Periphery
- Regulatory Requirements

5. Procurement Strategy

- Delivery Methods
- Procurement Phases
- Suitable type of contracts

Procurement Delivery Methods

- Design-Build (D-B)
- Design-Bid-Build (DBB)
- Construction Manager at Risk (CMAR)
- Job Ordering Contracting
- Construction Manager Multi-Prime (CMMP)
- Integrated Project Delivery (IPD)
- Public Private Partnership (PPP)
- Design-Build-Operate (DBO)
- Build-Own-Operate-Transfer (BOOT)

Types of Contracts

- Fixed Price Contracts
- Cost-Reimbursable Contracts
- Time and Materials Contracts

Fixed Price Contracts

1. Firm Fixed Price Contract / Lump Sum Contract (FFP)

This type of contract is negotiated when scope of work is clearly defined and certain.
Risk lies with the Seller/Service Provider.
Contract Price = Fixed Price including Profit

2. Fixed Price Incentive Fee (FPIF)

In order to motivate seller, an agreed incentive is added in the contract.
Contract Price = Fixed Price including Profit + Performance-based Incentive

3. Fixed Price Economic Price Adjustment (FPEPA)

To adjust impact of rapidly changing prices for long-term Project, FPEPA is negotiated.
Buyer and seller both are compensated based on decrease/increase in Prices respectively

Cost Reimbursable Contracts

1. Cost Plus Profit Contract

This type of contract is negotiated when scope of work is not well-defined.
Actual cost plus agreed Profit is paid to the seller.

2. Cost Plus Incentive Fee (CPIF)

It provides incentive to seller to complete the Project by meeting certain cost and time targets.
The contract type specifies a target cost, a target fee, minimum and maximum fees and a fee adjustment formula.

Time and material Contract

This type of contract is negotiated when precise statement of work (SOW) is not readily available.
Also when levels of effort cannot be estimated.
Buyer pays on a per-hour or per-item basis. e.g. Contract = \$100 Per Hour Plus Expense

Procurement Phases

Sequence of Phases with description of each Phase.
Procurement Performance Indicators and milestones.
Criteria for making from Plan-to-Phase.
Monitoring and Evaluation of Progress.
Reasons for Knowledge Transfer.

6. Bid Evaluation Criteria

In open competitive bidding, multiple bidders compete in the procurement. In order to select the most suitable seller, bids are evaluated based on criteria:

- Technical Evaluation
 - Financial Evaluation
- Cost
 - Past Experience
 - Similar Project Experience
 - Financial Capability
 - Track Record/Reputation/Credibility
 - Human Resource Capability
 - Warranty

7. Independent Cost Estimate

To evaluate bidders' quotations, internal estimates are developed for reference. Some organizations define threshold beyond which a bid is rejected.
For Example: Independent Cost Estimate = \$ 200,000
Threshold = $\pm 5\%$

8. Bidding Documents

These are three types of Bidding Documents

- Request for Information (RFI)
- Request for Quotation (RFQ)
- Request for Proposal (RFP)

9. Draft Contract Agreement

A mutually-binding agreement that obligates the seller to provide the specified Product or Services/Result and obligates the buyer to pay for it as per terms and conditions.

Legalize working agreements

Give structure to working relationship

Further collaboration with Partners

Consider Risks associated with contract type

Define-Benefits to the buyer

Can be tailored for the Partnership

Components of a Contract

- Description of Work- Deliverables and Scope
- Delivery Date and Schedule Information
- Identification of Activities, where appropriate
- Responsibilities of both Parties
- Management of Technical and Business Aspects
- Price and Payment Terms
- Provisions for Termination/cancellation of contract
- Applicable Guarantees and warranties
- Dispute Resolution Mechanism
- Procedures for amendments to the Contract
- Intellectual Property
- Definition of key Terminologies
- Security, confidentiality and data Privacy
- Force Majeure
- Default by either Party
- Applicable Laws
- Performance Measurement Rules and Procedures
- Rules for Sub-contracting
- Procedures for changing Product Scope
- Rules for Price adjustment if any
- Currency for Payments

Once all above documents are generated, Procurements are conducted where first step is advertisement.

Procurement in Agile

Types of Contracts in Agile Methodology

1. Multi-phased Structure

In this type of contract, work is divided into two categories:

- Fixed Items
- Variable Items

A master Service Level Agreement (SLA) is signed, followed by a detailed Statement of Work (SOW).

2. Value-Delivery Contracts

In such type of contract, milestones are defined based on value-delivery.
Payment term are defined accordingly.

3. Fixed Price Increment

Total Project Scope is decomposed into smaller fixed-price micro deliverables.
This type of contract gives more control to customer on how to spend money.
It also helps in limiting supplier's financial Risk.

4. Not-to-Exceed Time and Material

Budget is limited to a fixed amount. In addition, it gives freedom to customer to explore ideas and change existing user stories by removing existing or contingency hours are added to manage unforeseen circumstances.

5. Graduated Time and Material Contract

Correct quality and timely delivery of work is financial reward for early and reduce for late delivery.

6. Early Cancellation Option

It enables flexible delivery of scope using Definition of Done (DoD). If partial delivery of scope satisfies the customer, contract can be cancelled for free.

7. Dynamic Scope Option

It gives option to vary scope and fund increment at specific points while limiting supplier risk. Scope varies at specific points to adjust features.

8. Money for Nothing, Change for Free

This clause is added in the agreement based on the idea that the customer can make any change they would provided that the total contract work is not changed.

Agile contracts are flexible and easy to modify as compared to waterfall contracts.

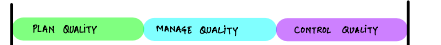
Quality Planning

Quality: Fitness for use of a Product determine its quality

Grade: It is specific category of material. It could be High, Medium, low depending on the requirement.

Quality Assurance vs Quality Control

Quality Assurance	Quality Control
Defect Prevention Process-focused Audits	Product Appraisal Product focused Inspection/ Tests



In this lesson, Planning part of Quality Management is covered.

1. Quality Management Plan

It is a component of Project Management Plan that describes how applicable Policies, procedures and guidelines will be implemented to achieve the quality objectives. It includes:

- Quality Policy
- Processes / Procedures / Methods
- Tools and Techniques
- Template and Forms
- Roles and Responsibilities
- Cost of Quality

Cost of Quality

Cost of Conformance	Cost of Failure
<u>Cost of Prevention</u> - Processes - Resources / Equipment / Machinery - HR Training cost	<u>Cost of Internal Failure</u> - Rework - Scrap
<u>Cost of Appraisal</u> - Inspection cost - Cost of Testing - Destructive Testing	<u>Cost of External Failure</u> - Warranty - Claims

Quality Improvement Methods

- Lean Six Sigma
- KAIZEN
- PDCA Model (by Edward Deming)
- Value Stream Mapping
- DMAIC Framework
- Agile Methods (Scrum, Kanban, Crystal Methods)

2. Quality Metrics

In order to test quality of Product, quality matrices are defined.

Product Characteristics	Name of Test	Test Description	Frequency	Acceptable Threshold	Remarks
Durability					
Weight					
Heat Resistant					
Permeability					

Integration Management

In this knowledge Area, all the plans are integrated and consolidated to get Project Management Plan

Subsidiary Plans

- Scope Management Plan
- Schedule Management Plan
- Cost Management Plan
- Resource Management Plan
- Quality Management Plan
- Procurement Management Plan
- Risk Management Plan
- Communication Management Plan
- Stakeholder Engagement Plan

Baselines

- Scope Baseline
- Schedule Baseline
- Cost Baseline

Note: Project Management Plan is also supported by various Project documents such as Issue Log, Project charters, Quality Metrics, Resource Histogram, Responsibility Assignment Matrix (RAM), Risk Register, Stakeholder Register etc.

Other Components

- Change Management Plan
- Configuration Management Plan
- Project Life Cycle
- Development Approach
- Management Review
- Performance measurement Baseline

Change Management Plan

It is a component of Project Management Plan that establishes change control Board, documents the Extent of the Authority and describes how the change control system will be implemented.

Configuration Management Plan

It is a component of Project Management Plan that establishes how changes to various Project Artifacts would be made. It also includes guidelines regarding Version Controlling.





LESSON 4: LEAD TEAM

by Instructor Ammar

Lesson 4: Leading Team

Leadership Styles

Directive Leadership

Authoritative, Decision
micro-management

Transformational Leadership

Development, Learning
Training, skills

Interactional Leadership

Good relations, connections
strong bonds with members

Servant-leadership Style

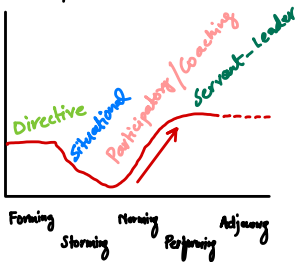
Serves, respects, contributes
Autonomy, Freedom, decision
Laissez-faire Leadership
Self-organized Teams

Participatory Leadership

Inclusion, participation,
opinion, consensus
ownership, Accountability

Situational Leadership

Adapt to the situation,



TEAM CHARTER

Norms, values

Acceptable behaviour

Decision-making rules

- Unanimity
- Majority > 50%
- Plurality > Largest

40% — A
30% — B
20% — C
10% — D

d) Autocracy

Meeting Norms

Disputes resolution

Violations/Punishment

Values/ PMI Code of Ethics

- Responsibility
- Respect
- Honesty
- Fairness

ammar.cess55@gmail.com

PMP EXAM PREPARATION

IN

L2

PLANNING

EXECUTION

CL

Emotional Intelligence

understanding emotions to regulate behaviours

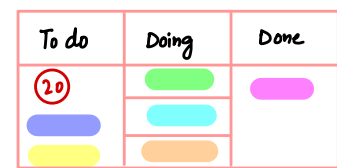
- Self-awareness
 - Self-Regulation
 - Social-awareness
 - Social-Regulation
- Empathy
Motivation, Empathy
Conflicts Mng

Effective Communication

Active Listening
Effective Feedback

Information Radiators

KANBAN Board

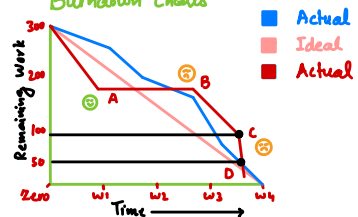


Pull-System
WIP Limit

SCRUM Board



Burndown Charts



Training, Coaching, Mentoring

Performance Appraisals
Knowledge-share Culture

Training calendars

Certifications

Mentorship

- Job-shadowing
- Reverse-shadowing

Conflict Management

Causes: miscommunication, misunderstanding
Competition, misaligned Priorities

Substantive

Work-related
Process, Tool, Sequence

Personal

Personalities
Ego, Dislike, Hatred



Collaborative Environment

- Communication
- Cross-training
- Diverse-skillset

Colocation: Same Location (Tight Matrix)

Cocreation: Creating together

Transparency: Info sharing
PMIS

Artifacts Management System

Configuration Management Sys

Version Control System

TEAM EMPOWERMENT

Psychological Safety

Motivational Theories

Maslow's Hierarchy of Needs



Herzberg's Two Factors

Motivation

Demotivation

Motivators

Hygiene

Appreciation

Acknowledgment

Development

Challenging Tasks

Career path

Purpose-driven work

McGregor's X & Y Theory

Theory X	Theory Y
Self-centered	Common interest
Self-interest	Work
No work	Trust
Micromanagement	Delegation
Irresponsible	Self-organized
Accountable	Responsible
No effort	Extra effort
Productivity ↓	Productivity ↑

McClelland's Theory of Needs



Justice Theory

- Procedural Justice
- Interactional Justice
- Distributive Justice

Decision-making

Fist of Five

5 Fingers: Full Support

Closed Fist: No Support

Less than 3: Discussion

Roman Voting

Thumb up: Yes

Thumb Down: No

Sideways: Undecided

Planning-Poker



Consensus-driven

Unanimity

Dot Voting



Monopoly Money

Fake currency equal Budget



Responsibility / Accountability

RACI CHART

Responsible, Accountable, Consult
Inform

Activity	Team	PM	SME	Spencer
Design	R	A	C	I
Procurement	A	I	-	-

Support Team Performance

Management by Objective (MBO)

SWOT Analysis

Personality Testing

Myers-Briggs Type Indicator

Extrovert vs Introvert

Thinkers vs Feelers

Sensors vs Intuitives

Judgers vs Perceivers

Big Five Personality Model
(OCEAN Model)

- Openness
- Conscientiousness
- Extraversion
- Agreeableness
- Neuroticism

Disc Model

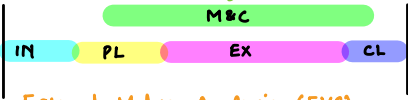
Dominance, Influence, Steady, Conscientiousness



LESSON 5: SUPPORT TEAM PERFORMANCE

1 Evaluate Project Progress

Schedule / Cost Management



Earned Value Analysis (EVA)

		PV			EV	AC
A	\$ 200	January	\$ 200	80%	\$ 160	\$ 180
B	\$ 300	February	\$ 500	50%	\$ 310	\$ 370
C	\$ 400	March	\$ 900	30%	\$ 430	\$ 520
D	\$ 200	April	\$ 1100	40%	\$ 510	\$ 640
E	\$ 100	May	\$ 1200			
F	\$ 300	June	\$ 6500			

$$BAC = \$1,500$$

$$\text{Schedule Variance} = SV = EV - PV$$

$$SV = 510 - 1100 \Rightarrow SV = -\$590$$

$$SPI = \frac{EV}{PV} = \frac{510}{1100} \Rightarrow SPI = 0.46$$

$$\text{Cost Variance} = EV - AC$$

$$CV = 510 - 640 \Rightarrow CV = -\$130$$

$$CPI = \frac{EV}{AC} = \frac{510}{640} \Rightarrow CPI = 0.79$$

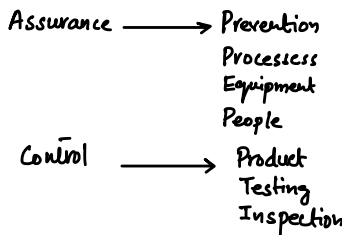
$$EAC = \frac{BAC}{CPI} = \frac{1500}{0.79} \Rightarrow EAC = \$1,899$$

$$TCPI = \frac{\text{Remaining work}}{\text{Remaining Budget}} = \frac{\text{Total} - \text{Completed}}{\text{Total} - \text{Expenses}}$$

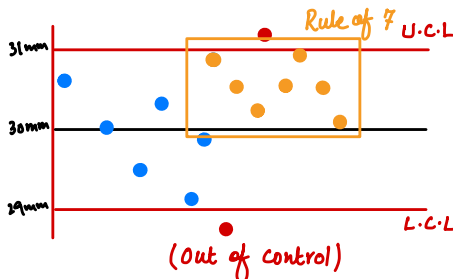
$$= \frac{BAC - EV}{BAC - AC} = \frac{1500 - 510}{1500 - 640} = \frac{990}{860}$$

$$TCPI = 1.15 \text{ or } 115\%$$

Quality Assurance & Control

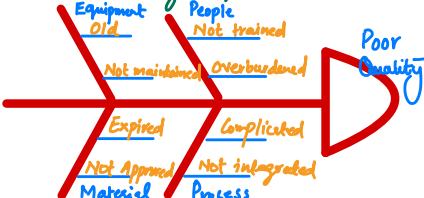


Control Charts



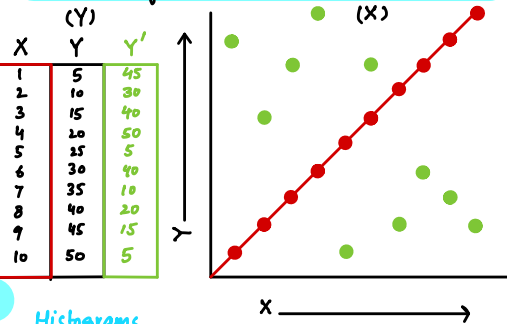
(Out of control)

Fishbone Diagram / Ishikawa

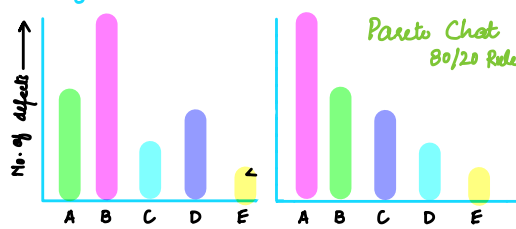


SCATTER PLOT

Poor Quality → Overburdened Employees



Histograms



5-WHY ANALYSIS

5 is just number / Root cause of the Problem

Audits / Inspection

Verified Deliverables

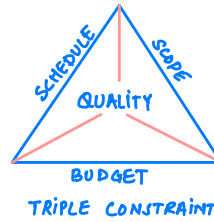
SCOPE MONITORING

Addition / Deletion

Scope Creep
Gold Plating

Validate Scope

verify with Acceptance Criteria
Comparison of Actual work with Planned
Formally Accept / Rejection

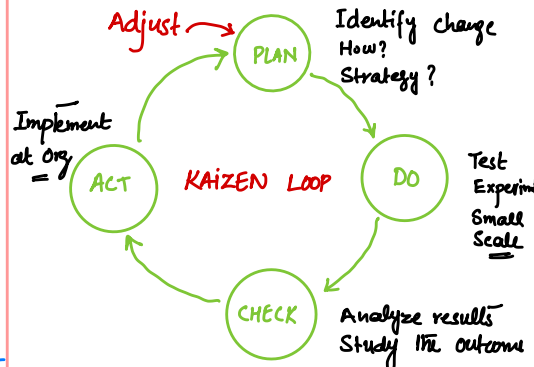


Implement Ongoing Improvement

KAIZEN LOOP

PDCA / PDSA

Plan, Do, Check, Act



Retrospectives:

Right, wrong, Lessons Learned

Areas of improvement

LEAN CONCEPTS

minimizing waste from the Processes

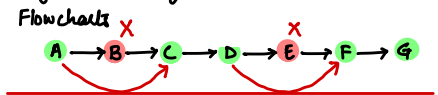
DOWNTIME

Defects, Overproduction, Waiting time, Non-utilized talent, Transportation, Inventory Motion, Excessive Processing

LEAN SIX SIGMA

VALUE STREAM MAPPING

Any Process / workflow that creates value



Issues Management

Issue vs Risk

Issue log

Risk Register

Issue owner

Risk owners

workaround

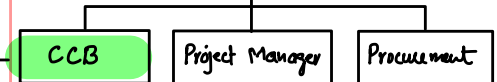
ID	Description	Opened	Due date	Priority	Owner	Status
1	Poor Quality of material	11/22/23	11/23/23	High	PM	Open
2	Other Issues					
3						

CHANGE MANAGEMENT

Change Management Plan

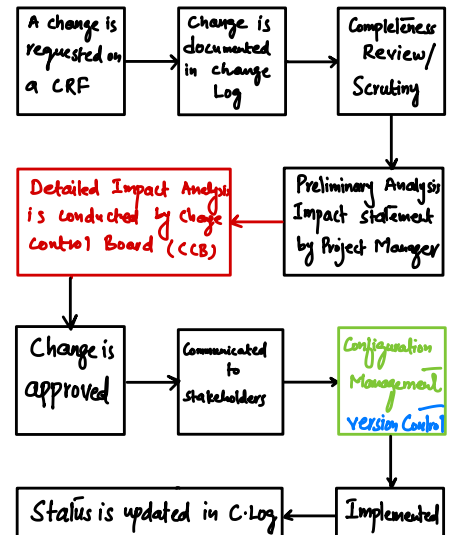
- SOPs, Process, who?, Format
Change Request form, Authority
change Control Board (CCB)

Governance Sponsor



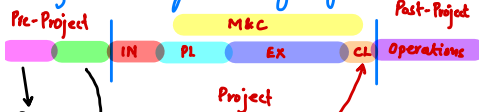
Process

→ Preventive Action
→ Corrective Action
→ Defect Repair



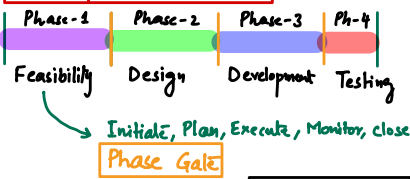
LESSON 6: CLOSE THE PROJECT

Project Management Life Cycle



- (1) Project/Phase closure
- (2) Benefits Realization
- (3) Knowledge Transfer

(1) Project/Phase Closure



Stage gate, Kill point, Go-No go decision

Governance Board

Project Manager

Sequential Phases
Parallel Phases

Reasons for closure

- (1) work is completed
- (2) Project does not align with strategic objectives of the organization
- (3) Lack of resources
- (4) Regulatory compliance
- (5) Not profitable
- (6) Not needed, competitor
- (7) Customer priority has changed

Exit Criteria / Success Criteria

Collections of conditions which should be met before project closure

Acceptance Criteria	Definition of Done
Set of conditions which should be met (Test Scenarios) (External)	Team's checklist to ensure product is ready to be used (Internal)

Requirements Traceability Matrix (RTM)

Elicited, Analyzed, Designed, Developed
Tested, validated, Delivered

Final Report

Acceptance of deliverables
Transition of the Product
Update OPA:



Product Transitioning

Transition Plans

Readiness Assessment
Resources, Space, People,
Training Requirement, Manual

Who? Roles, responsibilities, confidentiality concerns

Planned Blackouts

When services are not available due to upgradation/ Integration of New features of the Product.

Lessons Learned documentation

All relevant stakeholders

Lessons Learned Register

Lessons Learned Repository

[Organizational Process Assets]

Explicit knowledge: Easily identified
Tacit knowledge: Unspoken

Close Open Procurements

- * Accept vendor's work (Scope validation)
- * Resolving disputes
- * Handling claims of vendor
- * Processing any outstanding Payment
- * Issue completion certificate
- Contract agreement

Close all Financial Accounts

All due payments are processed.
No receivables/Payables are pending.
Performance guarantees are released!
Withheld payments are processed
Penalties, deductions are made.

Disposition of Resources

Human Resources are re-assigned or released!
Resource utilization Report

Archive entire Project Information

updating Organizational Process Assets
collection of all historical data
Financial data repositories
Lessons learned repositories
Procurement related repositories
Risk related repositories
Issues Management repositories

Transfer of Liability

Recipient takes ownership of the product
Risks are transferred to the receiving

Celebrations

If Project is successful and customers are satisfied.

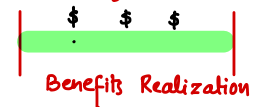
Post-implementation Support

Make sure product is free from defects
Defects Liability Period (DLP)



If there is any defect in the product then you are responsible to resolve that free of cost

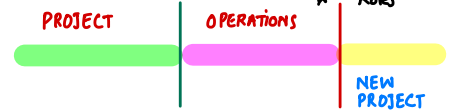
Post-Project Activities



DEVOPS

Development + Operations

Upgradation of Product

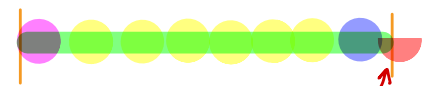


- * Results of benefit realization are used for future projects to improve Planning and benefits Management.
- * To perform root-cause analysis as why project isn't providing planned Benefits.

Knowledge Transfer

Retrospectives

Lessons Learned workshops/meetings



Iteration Retrospectives

Right, wrong, Areas of improvement

Schedule, Budget, Quality, Risk,
Issues Management, Changes in Project Scope.

Project Scope: Work in the Project

Product Scope: Features of the Product

Root cause Analysis

Why-why, Ishikawa, Fishbone,
Root-cause Analysis diagram
Cause-and effect diagram

meetings, Surveys, Focus Group
workshops, interviews, Brainstorming
Nominal Group meeting,

Final Retrospectives in Agile

Project-specific Lessons Learned are documented.

Sponsor, Project Manager, PM Team, Stakeholders

Product owner, Scrum Master, Dev Team, St.

Lessons-Learned Repository / OPAs.

Summary: Ensure completion, Formal Acceptance
Financial/Procurements are closed,
Product Transitioning, Lessons Learned
Release Resources, Final Report, Celebration!



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