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# Top Notch Management Excellence



**Project  
Management  
Institute®**

Qsriram

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## About Sriram



I have been involved in IT Software development since 1997. I have unique combination of process, technical and industrial skills. As a Digital Leader, I have expert level of knowledge in agile and practices with this combination I can help process and technology people, understand the agile world.

The “**Top Notch Management Excellence**” book comprises of Project Management, Agile Project Management, Program Management & Portfolio Management. One in All, All in One & Key to Success.

My agile journey started in 2011, when I was a part of Tata Consultancy Services. I practiced scrum and agile methods thoroughly over several years and my teams are highly successful in delivering products using agile techniques.

I am proficient in agile engineering, coaching practices and SAFe consulting practices. I have more than 5 years of experience as a senior architect cum senior manager in development. I religiously follow key agile engineering practices like TDD, Refactoring, CI and Collective Ownership. Worked in USA, UK for TCS, AtoS, Cognizant & IBM - Agile customers, which creates a global agile experience.

I moved back to India in 2016 and created agile websites and released books related to Scrum Alliance Professional, Agile Coaching and Implementing SAFe 5.0 practices.

Throughout my agile journey, I have been associated the agile professionals, who have helped and mentored me in the journey where sky is the limit.

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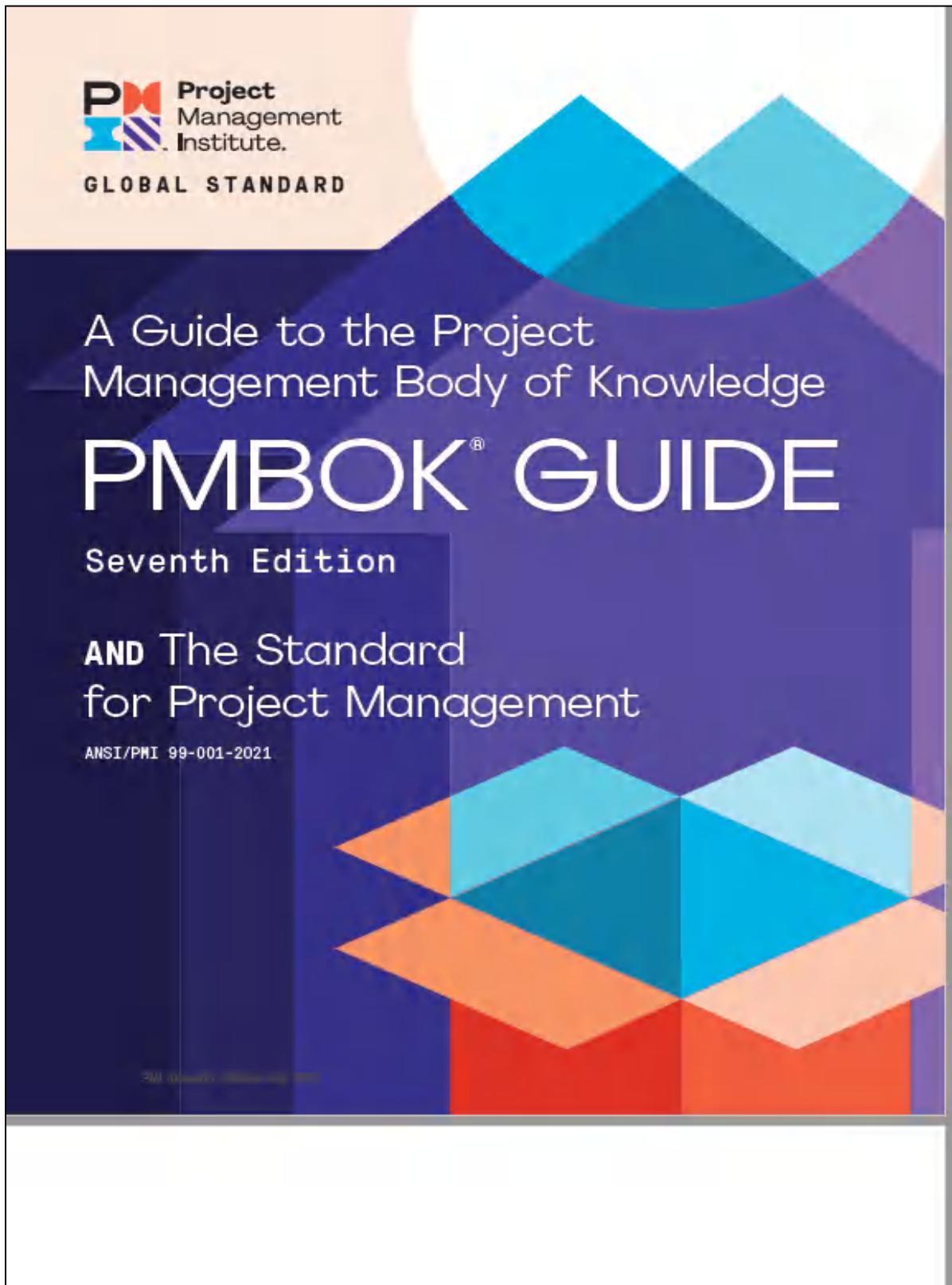
# **Project Management Excellence**

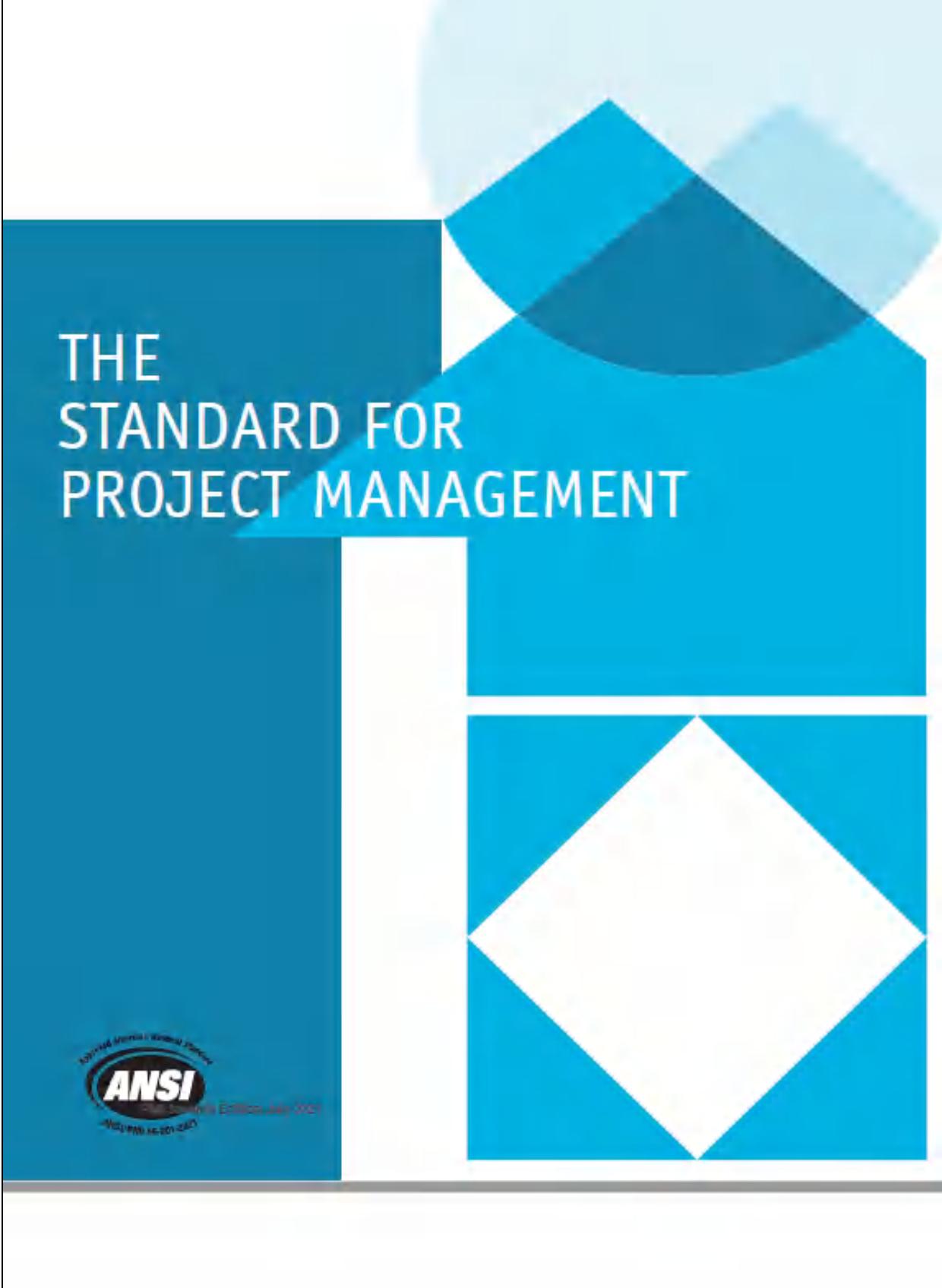
**Seventh Edition**



# **Sriram**

## Project Management 7<sup>th</sup> Edition





# THE STANDARD FOR PROJECT MANAGEMENT



*The Standard for Project Management* provides a basis for understanding project management and how it enables intended outcomes. This standard applies regardless of industry, location, size, or delivery approach, for example, predictive, hybrid, or adaptive. It describes the system within which projects operate, including governance, possible functions, the project environment, and considerations for the relationship between project management and product management.

*The Standard for Project Management* consists of the following sections:

Section 1 Introduction

Section 2 A System for Value Delivery

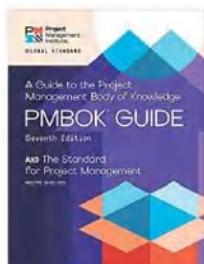
Section 3 Project Management Principles

# The Standard for Project Management

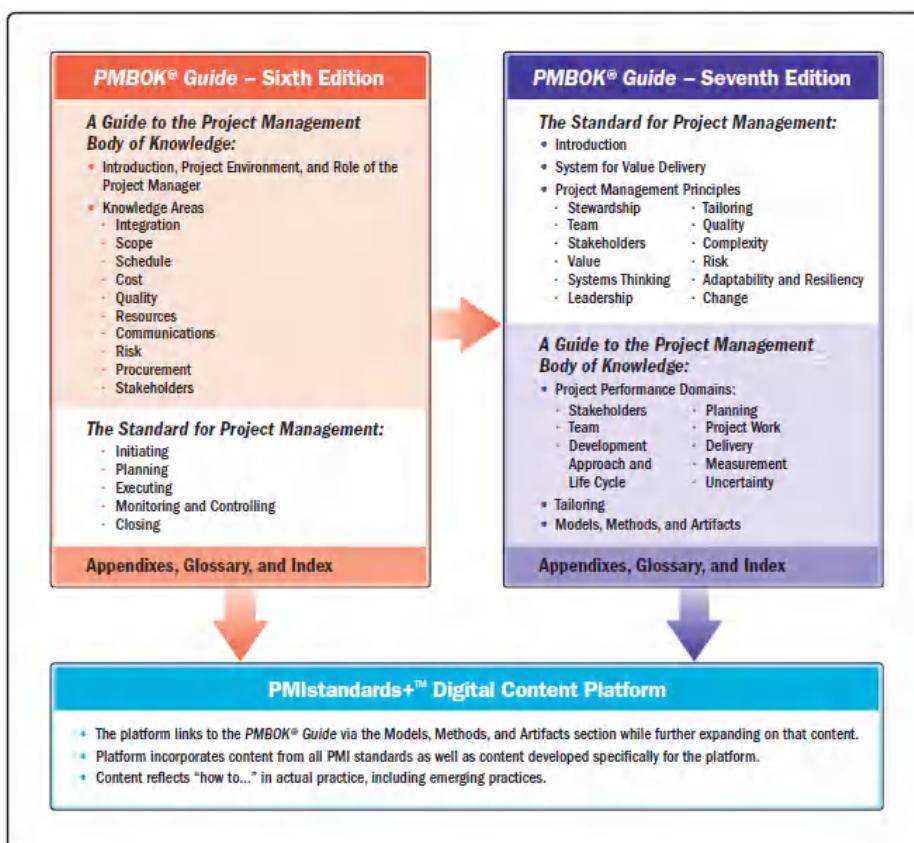
## Section 1 Introduction

### What is a PMBOK Guide?

A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Seventh Edition and The Standard for Project Management which get released on August 1, 2021. PMI actively involves stakeholders around to understand what is happening in the field of project management.



### Share PMBOK Edition Comparison? What are its changes?



Revision to *The Standard for Project Management* and Migration from the Sixth Edition to the Seventh Edition of the PMBOK® Guide and the PMIstandards+™ Digital Content Platform

# Terms in Project Management

## **What is Project?**

A Project is a temporary endeavor undertaken to create a unique product, service or result in your organization.

## **What is Product?**

An artifact that is produced, is quantifiable, and can be either an end item in itself or a component item.

## **What is Operation?**

Day-to-day work within an organization to accomplish the goals of the organization.

## **What is Program?**

Related projects, subsidiary programs, and program activities that are managed in a coordinated manner to obtain benefits not available from managing them individually.

## **What is Portfolio?**

Projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives

## **What is Outcome?**

An end result or consequence of a process or project.

## **What is Project management?**

The application of knowledge, skills, tools, and techniques to project activities to meet project requirements.

## **What is Project Manager?**

The person assigned by the performing organization to lead the project team that is responsible for achieving the project objectives.

## **What is Project team?**

A set of individuals performing the work of the project to achieve its objectives.

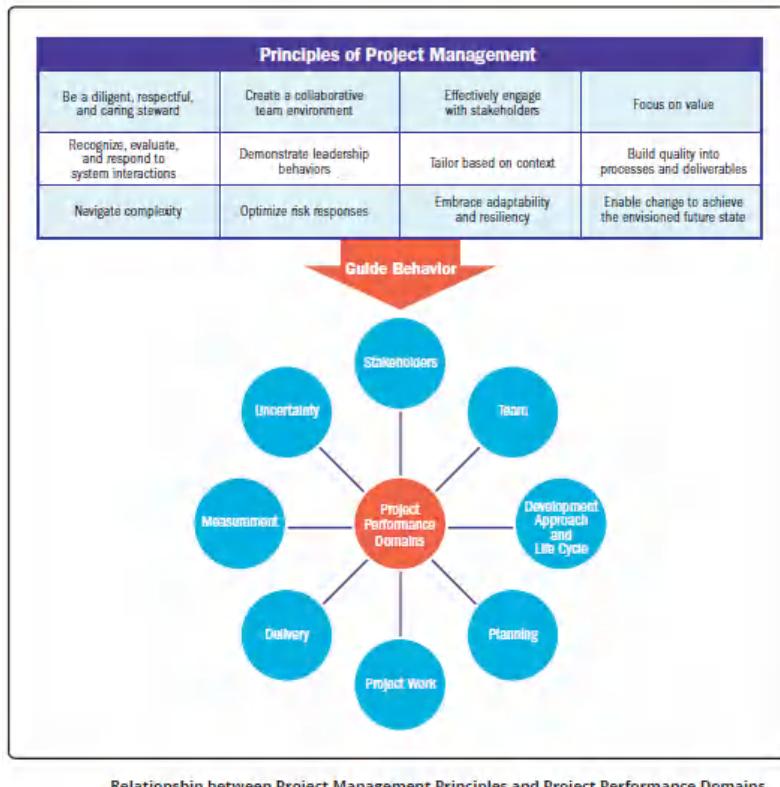
## **What is System for value delivery?**

A collection of strategic business activities aimed at building, sustaining, and/or advancing an organization.

## **What is Value?**

The worth, importance, or usefulness of something.

# What are the principles of Project Management? & What are the Project Performance Domains? What is the relationship between them?



A project performance domain is a group of related activities that are critical for the effective delivery of project outcomes. Project performance domains are interactive, interrelated, and interdependent areas of focus that work in unison to achieve desired project outcomes. There are eight project performance domains:

1. Stakeholders
2. Team
3. Development Approach and Life Cycle
4. Planning
5. Project Work
6. Delivery
7. Measurement
8. Uncertainty

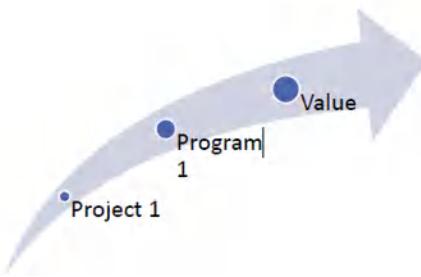
## Section 2 Value Delivery System

### Creating Value

- Projects exist inside a larger system, such as a governmental agency, organization, or contractual arrangement.
- Project can:
  - Creating a new product, service, or result
  - Creating positive social or environmental offerings
  - Improving efficiency or productivity
  - Enabling the changes within an organization

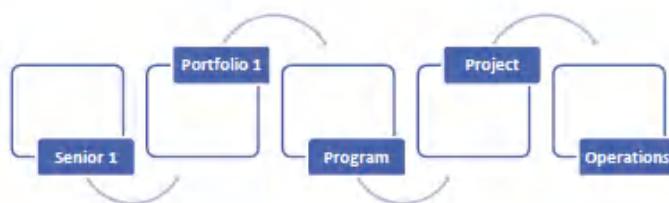
### Value Delivery Components

There are various components, such as portfolios, programs, projects, products, and operations, that can be used individually and, in a group, create value.



### Information Flow

- Value delivery systems work best with information effectively flowing between different components.
- For example, senior managers to portfolios to programs to project to operations.



## Organizational Governance Systems

- Governance system works together with the value delivery system to enable smooth workflows, manage issues, and support decision making.
- Governance systems deliver a framework with functions and processes that guide activities.
- A governance framework can comprise of elements of oversight, control, value assessment, integration among components, and decision-making capabilities.

## Functions Associated with Projects

- People conduct project delivery.
- They do so by doing functions necessary for the project to run effectively and efficiently.
- Functions related to the project can be fulfilled by one person, by a group of people, or combined into defined roles.
- Coordinating a collective work effort is extremely important to the success of any project
- Provide oversight and coordination
- Present objectives and feedback
- Facilitate and support
- Perform work and contribute insights
- Apply expertise
- Provide business direction and insight
- Provide resources and direction
- Maintain governance

## The Project Environment

Internal and external environments can influence planning and other project activities.

### Internal

- Factors internal to the organization can arise from the organization itself, a portfolio, program, another project, or a combination of these.
- Includes: Process assets, data assets, infrastructure, resource availability, employee capability

### External

- Factors external to the organization can enhance, constrain, or have a neutral influence on project outcomes
- Includes: Marketplace conditions, Regulations, Industry standards, physical environment

## Product management considerations

**Product Management:** “Product management is an organizational function within a company dealing with new product development, business justification, planning, verification, forecasting, pricing, product launch, and marketing of a product or products at all stages of the product lifecycle” -[Wikipedia](#)

Product management may initiate programs or projects at any point in its life cycle to create or enhance specific components, functions, or capabilities

While product management is a separate discipline, it represents a key integration point within the program management and project management disciplines.

## Section 3 Project Management Principles

### What are the Principles of Project Management?

- Principles serve as foundational guidelines for strategy, decision making, and problem solving
- Professional standards and methodologies are often based on principles
- Principles for project management provide guidance for the behavior of people involved in projects

### What is the PMI Code of Ethics and Professional Conduct?

- Principles can, but do not necessarily, reflect morals.
- A code of ethics is related to morals.
- A code of ethics for a profession can be adopted by an individual or profession to establish expectations for moral conduct.
- PMI is based on four values: -
  - Responsibility
  - Respect
  - Fairness
  - Honesty

## Compare Project vs. General Management Principles?

Principles of project management can also have areas of overlap with general management principles



## What are the 12 Principles of Project Management?

1. Be a diligent, respectful, and caring steward
2. Create a collaborative project team environment
3. Effectively engage with stakeholders
4. Focus on value
5. Recognize, evaluate, and respond to system interactions
6. Demonstrate leadership behaviors
7. Tailor based on context
8. Build quality into processes and deliverables
9. Navigate complexity
10. Optimize risk responses
11. Embrace adaptability and resiliency
12. Enable change to achieve the envisioned future state

## 1. Be a Diligent, Respectful, and Caring Steward

- STEWARDSHIP: “The act of taking care of or managing something, for example property, an organization, money or valuable objects.” - <https://www.oxfordlearnersdictionaries.com/>
- Stewards act sensibly to carry out actions with integrity, care, and trustworthiness while keeping
- compliance with internal and external guidelines
- They demonstrate a broad commitment to financial, social, and environmental impacts of the projects they support. Stewardship has responsibilities both within and external to the company.
- Stewardship includes:
  - **Integrity** -> Stewards behave honestly and ethically
  - **Care** -> Stewards are fiduciaries of the organizational matters in their charge, and they diligently oversee them.
  - **Trustworthiness** -> Stewards represent themselves, their roles, their project team, and their authority accurately, both inside and outside of the organization.
  - **Compliance** -> Stewards comply with laws, rules, regulations, and requirements.
- A holistic view of stewardship considers financial, social, technical, and sustainable environmental awareness.

## 2. Create a collaborative project team environment

### Team

- Projects are done by project teams
- Project teams are made up of people who have diverse skills, knowledge, and experience
- Project teams that work collaboratively can finish a shared objective more effectively and efficiently than individuals working on their own

- Project teams work within organizational and professional cultures and guidelines, often establishing their own “local” culture.
- A collaborative project team environment facilitates: - Alignment with other organizational cultures and guidelines, Individual and team learning and development, and Optimal contributions to deliver desired outcomes.
- Project Teams will be affected by: -
  - **Team agreements:** - Team agreements represent a set of behavioral parameters and
  - **Organizational structures:** - Project teams use, tailor, and implement structures that help
  - **Processes:** - Project teams define processes that enable completion of tasks and work assignments
- Transparency on roles and responsibilities can improve team cultures.
  - **Authority** -> The order of having the right, within a given context, to make relevant decisions, establish or improve procedures, apply project resources, expend funds, or give approvals.
  - **Accountability** -> The condition of being answerable for an outcome. Accountability is not shared
  - **Responsibility** ->
    - The condition of being obligated to do or fulfill something. Responsibility can be shared
    - A diverse project team can develop the project atmosphere by bringing together different perspectives
    - Teams should incorporate practice standards, ethical codes, and other guidelines as part of the professional work within the project team and the organization

- A collaborative project team environment promotes the free exchange of information and individual knowledge

### 3. Effectively engage with stakeholders

#### Stakeholders

- Engage stakeholders proactively and to the point needed to contribute to project success and customer satisfaction
- Stakeholders impact projects, performance, and outcomes
- Project teams work for other stakeholders by engaging with them
- Stakeholder engagement proactively improves value delivery
- Stakeholders can affect many aspects of a project, including but not limited to: -
  - Scope/requirements
  - Schedule
  - Cost
  - Project team
  - Plans
  - Outcomes
  - Culture
  - Benefits realization
  - Risk
  - Quality
  - Success
- Identifying, analyzing, and proactively engaging with stakeholders from the start to the end of the project.
- Project teams are a group of stakeholders.

- Consist of defining how, when, how often, and under what situations stakeholders want to be and should be engaged.
- This relies on interpersonal skills, including taking initiative, integrity, honesty, collaboration, respect, empathy, and confidence.
- Engagement helps project teams detect, collect, and evaluate information, data, and opinions.
- Project teams actively engage other stakeholders throughout the project to minimize potential negative impacts and maximize positive impacts.

## 4. Focus on Value

- Continually evaluate and adjust project alignment to business objectives and intended benefits and value.
- Value is the ultimate indicator of project success.
- Value can be realized throughout the project, at the end of the project, or after the project is complete.
- Value, and the benefits that contribute to value, can be defined in quantitative and/or qualitative terms.
- A focus on outcomes allows project teams to support the intended benefits that lead to value creation.
- Project teams evaluate progress and adapt to maximize the expected value.
- Includes outcomes from the perspective of the customer or end user, is the ultimate success indicator and driver of projects.
- A business case contains at least these supporting and interrelated elements:
  - Business need
  - Project justification
  - Business strategy

- Value is the worth, importance, or usefulness of something. Value is subjective, in the sense that the same concept can have different values for different people and organizations.
- To support value realization from projects, project teams shift focus from deliverables to the intended outcomes. Doing so allows project teams to deliver on the vision or purpose of the project, rather than simply creating a specific deliverable.

## 5. Recognize, evaluate, and respond to system interactions

### System Thinking

- A system is a set of interacting and interdependent components that function as a unified whole.
- A project is a system of interdependent and interacting domains of activity.
- Recognize, evaluate, and respond to the dynamic circumstances within and surrounding the project in a holistic way to positively affect project performance.
- Systems thinking entails taking a holistic view of how project parts interact with each other and with
- external systems.
- Systems are constantly changing, requiring consistent attention to internal and external conditions.
- Being responsive to system interactions allows project teams to leverage positive outcomes.
- Project teams should acknowledge this holistic view of a project, seeing the project as a system
- with its own working parts.
- A project works within other larger systems, and a project deliverable may become part of a larger system to realize benefits.

- As projects unfold, internal and external conditions are continuously changing. A single change can create several impacts Systems thinking also applies to how the project team views itself and its interactions within the project system.
- The project system often brings together a diverse project team engaged in working for a common objective.

## 6. Demonstrate leadership behaviors

### Leadership

- Demonstrate and adapt leadership behaviors to support individual and team needs.
- Effective leadership promotes project success and contributes to positive project outcomes.
- Any project team member can demonstrate leadership behaviors.
- Leadership is different than authority.
- Effective leaders adapt their style to the situation.
- Effective leaders recognize differences in motivation among project team members.
- Leaders demonstrate desired behavior in areas of honesty, integrity, and ethical conduct.
- On a high-performing project multiple people may exhibit effective leadership skills including the project
- It is important to remember that more conflict and misunderstanding can emerge when too many participants attempt to employ project influence in multiple, misaligned directions.
- Leadership should not be confused with authority. Authority is the right to exercise power and control individuals.

- It takes leadership to motivate a people toward a common goal, inspire them to align their individual interests in favour of collective effort, and achieve success as a project team rather than as individuals.
- Team members develops leadership wisdom by adding or practicing a combination of various skills or techniques, including but not limited to:-
  - Focusing a project team around agreed goals
  - Articulating a motivating vision for the project
  - Generating consensus on the best way forward
  - Overcoming obstacles to project progress
  - Negotiating and resolving conflict
  - Adapting communication style and messaging to stakeholders
  - Coaching and mentoring fellow project team members
  - Having self-awareness of one's own bias and behaviors
  - Managing and adapting to change during the project

### **Projects work best when leaders understand what motivates people.**

- Project teams can flourish when project team members use suitable leadership traits, skills, and characteristics that match the specific needs and expectations of stakeholders.
- Effective leadership promotes project success and contributes to positive project outcomes.
- By mixing styles and leveraging motivators, any project team member or stakeholder can motivate or influence and in turn grow the project team, regardless of role or position.

## 7. Tailor based on context

- Each project is unique.
- Design the project development methods based on the needs of the project and its objectives, stakeholders, governance, and the environment.
- Using “just enough” process to accomplish the desired outcome while maximizing value, managing cost, and enhancing speed.
- Project success is based on adapting to the unique context of the project
- Tailoring the method is iterative, and therefore is a continuous process throughout the project.
- Project teams tailor the proper framework that will enable the flexibility to consistently produce positive outcomes.
- Project teams discuss and decide on the delivery approach and resources on a project-by-project basis.
- Tailoring the project approach to suit the unique characteristics of the project and its environment
- A tailored project approach can produce benefits, such as:
  - Deeper commitment from project team members
  - Reduction in waste in terms of actions or resources
  - Customer-oriented focus
  - More efficient use of project resources

## 8. Build quality into processes and deliverables

### Quality

- Quality is about meeting the acceptance criteria for deliverables.
- Project quality is about satisfying stakeholders' expectations and fulfilling project and product requirements.
- Stakeholders will have to maintain a focus on quality that produces deliverables that meet project objectives and align to the needs set forth by stakeholders.
- Project quality ensures processes are appropriate and as effective as possible.
- Quality may have several different dimensions, including but not limited to the following: -
  - Performance
  - Conformity
  - Reliability
  - Resilience
  - Satisfaction
  - Efficiency
  - Sustainability
- Teams measure quality using metrics and acceptance criteria's.
- The objective is to help ensure that what is delivered meets the objectives of the customer and other relevant stakeholders.

## 9. Navigate complexity

### Complexity

- Complexity is the outcome of human behavior, system interactions, uncertainty, and ambiguity
- Complexity can arise at any point during the project
- Constantly evaluate and navigate project complexity so that approaches and plans enable the project team to successfully navigate the entire project
- Complexity can be introduced by events or conditions Project teams can stay vigilant in identifying elements of complexity and use a variety of methods to reduce the amount or impact of complexity
- Project teams often cannot forecast complexity emerging because it is the result of many conditions and events
- Some of the more common sources of complexity are: -
  - Human behavior
  - System behavior
  - Uncertainty and ambiguity
  - Technological innovation
- Being vigilant for indications of complexity allows project teams to adapt their approaches and plans to navigate potential disruption to effective project delivery

## 10. Optimize the risk responses

- A risk is an uncertain event or condition that, if it occurs, can have a positive or negative effect on one or more objectives.
- Risks can be positive (opportunities) or negative (threats).
- Project teams seek to maximize positive risks (opportunities) and decrease exposure to negative risks (threats).
- Constantly evaluate exposure to risk, both opportunities and threats, to maximize positive impacts and minimize negative impacts to the project and its outcomes.
- Risks are addressed continually throughout the project.
- Risk responses should be: -
  - Appropriate for the significance of the risk,
  - Cost effective,
  - Realistic within the project context,
  - Agreed to by relevant stakeholders, and
  - Owned by a responsible person.
- Project team members engage with relevant stakeholders to understand their risk appetite and risk thresholds.
- An organization's risk attitude, appetite, and threshold influence how risk is addressed.

## 11. Embrace adaptability and resiliency

- Adaptability is the ability to respond to changing conditions.
- Resiliency is the ability to absorb impacts and to recover quickly from a setback or failure.
- Build adaptability and resiliency into the organization's and project team's approaches.
- A focus on outcomes rather than outputs facilitates adaptability.
- A project rarely performs exactly as initially planned.
- Projects are influenced by internal and external factors—new requirements, issues, stakeholder influences, among other factors—which exist in a system of interactions.
- In a project environment, capabilities that support adaptability and resilience include: -
  - Short feedback loops to adapt quickly
  - Continuous learning and improvement
  - Regular inspection and adaptation
  - Open and transparent planning that engages stakeholders
  - Small-scale prototypes and experiments
  - Open organizational conversations
  - Diverse project teams with broad skill sets, cultures, and experience
  - Understanding from past learning
- Building adaptability and resiliency in a project keeps project teams on track to the desired outcome when internal and external factors change, and it helps them recover from setbacks.
- These features also help project teams learn and improve so that they can quickly recover from failures or setbacks and continue making progress toward delivering value

## 12. Enable change to achieve the envisioned future state

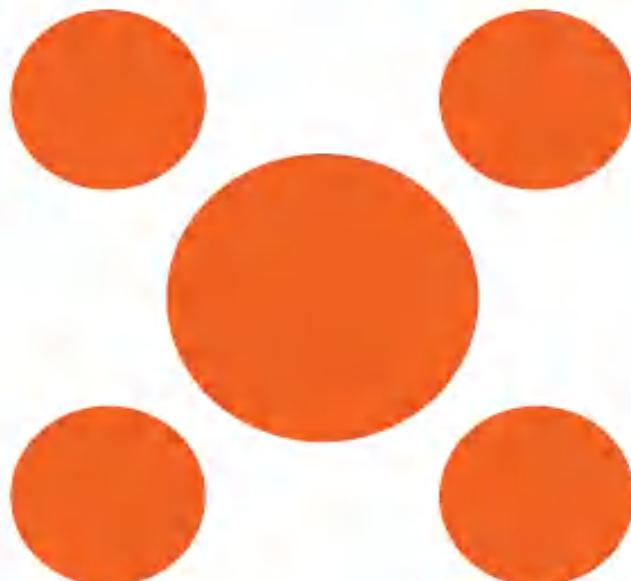
### Change

- Prepare those impacted for the acceptance to go from the current state to the intended future state created by the project output.
- A structured approach will help individuals, groups, and the organization transition from the current state to a future desired state.
- Change can originate from internal influences or external sources.
- Enabling change can be challenging as not all stakeholders embrace change.
- Attempting too much change in a short time can lead to change fatigue and/or resistance.
- Stakeholder engagement and motivational approaches assist in change adoption
- Remaining relevant in today's business environment is a fundamental challenge for all organizations.
- Change in an organization can originate from internal sources and external sources.
- Enabling change in an organization can be challenging.
- Effective change management uses a motivational strategy rather than a forceful one.
- Knowing and addressing the needs of stakeholders to embrace change throughout the project life cycle helps to integrate the resulting change in the project work, making a successful outcome more likely

# A GUIDE TO THE PROJECT MANAGEMENT BODY OF KNOWLEDGE

(PMBOK® GUIDE)

The information contained in the PMBOK® Guide is not an American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, the information in the PMBOK® Guide may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirementPMI Seventh Edition, July 2021 conformance to an ANS standard.



# A Guide to the Project Management Body of Knowledge

## Structure of the PMBOK® GUIDE

*A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* – Seventh Edition. It describes the relationship of the *PMBOK® Guide* to *The Standard for Project Management* changes to the *PMBOK® Guide*, the relationship to PMIstandards+™ (PMI's digital platform for standards), and provides a brief overview of the content

In addition to this Introduction, this edition of the *PMBOK® Guide* contains three sections:-

**Section 1 Project Performance Domains:** This section identifies and describes eight project performance domains that form an integrated system to enable successful delivery of the project and intended outcomes.

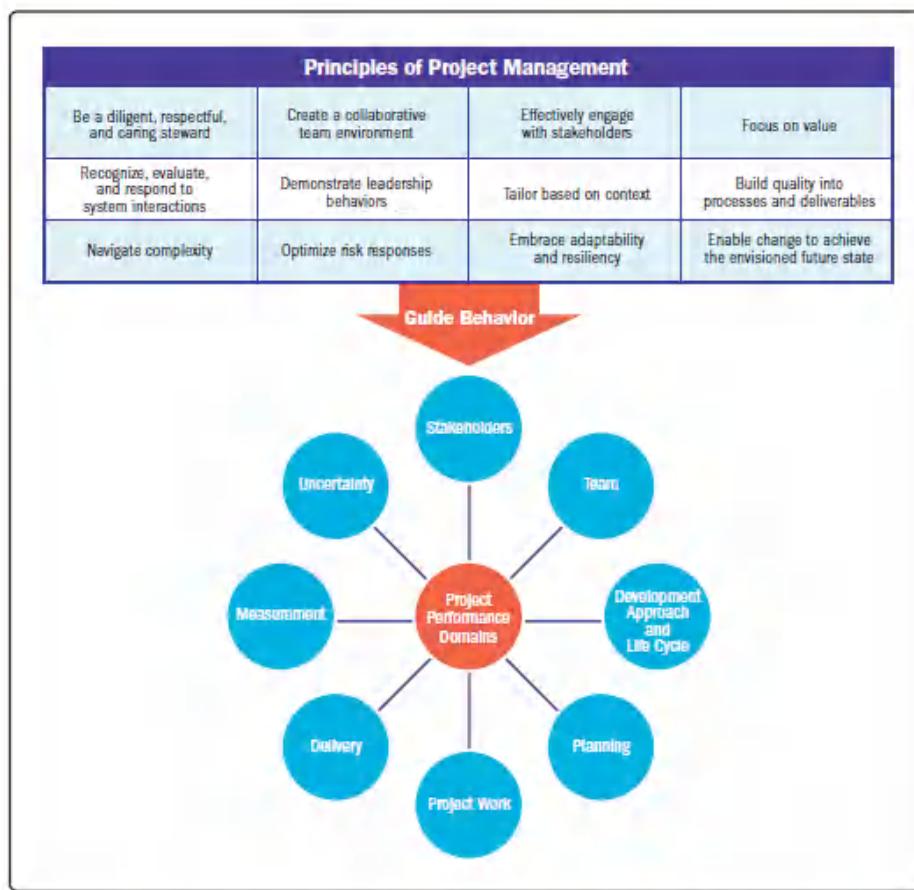
**Section 2 Tailoring:** This section describes what tailoring is and presents an overview of what to tailor and how to go about tailoring individual projects.

**Section 3 Models, Methods, and Artifacts:** This section presents a brief description of commonly used models, methods, and artifacts. These models, methods, and artifacts illustrate the range of options project teams can use to produce deliverables, organize work, and enable communication and collaboration.

# Section 1. Project Performance Domains

## Principles and Performance Domain

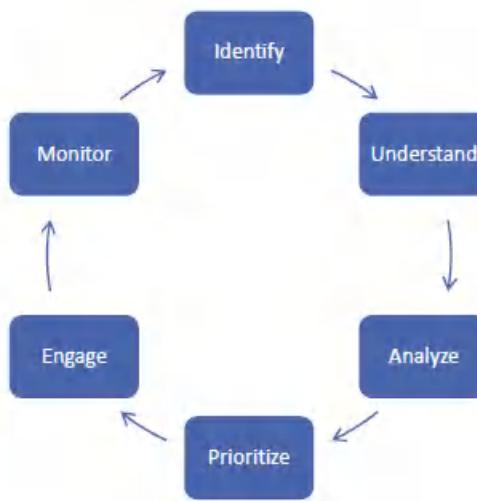
- Domains are a group of related activities that are critical for the effective delivery of project outcomes.
- They are interactive, interrelated, and interdependent areas of focus that work in unison to achieve desired project outcomes.
- They operate as an integrated system, with each domain being interdependent of the other domains to enable successful delivery of the project and its intended outcomes.
- The specific activities undertaken within each of the performance domains are determined by the context of the organization, the project, deliverables, the project team, stakeholders, and other factors.



## 1.1 Stakeholders Performance Domain

- Addresses activities and functions associated with stakeholders.
- A productive working relationship with stakeholders throughout the project.
- Stakeholder agreement with project objectives.
- Stakeholders who are project beneficiaries are supportive and satisfied while stakeholders who may oppose the project or its deliverables do not negatively impact project outcomes.
- Defining and sharing a clear vision at the start of the project can enable good relationships and alignment throughout the project

### Effective Stakeholder Engagement



#### Identify

- Identification is done throughout the project to understand who your stakeholders are, both internal and external.

#### Understand and Analyze

- the project manager and the project team should seek to understand stakeholders' feelings, emotions, beliefs, and values.

## Prioritize

- Focus on stakeholders with the most power and interest as one way to prioritize engagement.

## Engage

- Entails working collaboratively with stakeholders to introduce the project, elicit their requirements, manage expectations, resolve issues, negotiate, prioritize, problem solve, and make decisions.

## Monitor

- Throughout the project, stakeholders will change as new stakeholders are identified and others cease to be stakeholders.

Outcome	Check
A productive working relationship with stakeholders throughout the project	Productive working relationships with stakeholders can be observed.
Stakeholder agreement with project objectives	A significant number of changes or modifications to the project and product requirements in addition to the scope may indicate stakeholders are not engaged or aligned with the project objectives.
Stakeholders who are project recipients are supportive and satisfied; stakeholders who may oppose the project or its deliverables do not negatively impact project results	Stakeholder behavior can indicate whether project recipients are satisfied and supportive of the project or whether they oppose it. Surveys, interviews, and focus groups  A review of the project issue register and risk register can identify challenges associated with individual stakeholders.

## 1.2 Team Performance Domain

Deals with activities and functions associated with the people who are responsible for creating project deliverables that realize business outcomes.

Outcomes includes:-

- Shared ownership
- A high-performing team
- Appropriate leadership and other interpersonal skills

This performance domain entails establishing the culture and environment that enables a collection of diverse individuals to evolve into a high-performing project team.

Terms used in this domain made of:-

- Project Manager: Assign by the business to lead the team and is responsible for accomplishing the project objectives
- Project Management team: People who are directly involved in project management activities
- Project Team: A group of individuals performing the work of the project to achieve its purposes

Management activities includes:-

- Meeting project objectives,
- Effective processes, planning, coordinating, measuring, and monitoring work, among others.

Leadership activities includes:

- Influencing
- Motivating
- Listening
- Enabling

Leadership can be centralized and distributed.

- Centralized: Accountability (being answerable for an outcome), is usually assigned to one individual,
- Distributed: Shared among a project management team, and project team members

**Servant leadership** is a method of leadership that is based on the understanding and addressing the needs and development of project team members.

Servant leaders place emphasis on developing project team by focusing on addressing questions, such as:-

- Are project team members growing as individuals?
- Are project team members becoming healthier, wiser, freer, and more autonomous?
- Are project team members more likely to become servant leaders?

Servant leadership behaviors include:-

- Obstacle removal
- Diversion shield
- Encouragement and development opportunities

## **Common Aspects of Team Development includes:-**

- Vision and objectives: Everyone are aware of the project vision and objectives
- Roles and responsibilities: members understand and fulfil their roles and responsibilities
- Project team operations: Facilitating project team communication, problem solving, and the process of coming to consensus
- Guidance: ensure everyone is headed in the right direction
- Growth: Identifying where the project team is carrying out well and pointing out areas where the project team can improve

## **Project team culture:-**

- Each project team develops its own team culture.
- The project manager is important in establishing and maintaining a safe, respectful, non-judgmental environment that allows the project team to communicate openly.
- This is accomplished this is by modelling behaviors such as:-
  - Transparency
  - Integrity
  - Respect
  - Positive discourse
  - Support
  - Courage
  - Celebrating success

## **High Performing Project Teams**

Here are a Number of factors that contribute to high-performing project teams:-

- Open communication
- Shared understanding
- Shared ownership
- Trust
- Collaboration
- Adaptability
- Resilience
- Empowerment
- Recognition

## **Leadership**

Leadership skills are valuable for all project team members whether the project team is operating. This includes:-

- Establishing and Maintaining Vision
- Critical Thinking
- Motivation
- Interpersonal Skills
- Emotional intelligence. Being able to be self-aware, self-manage and have social awareness and social skills.
- Decision making.
- Conflict management

Leadership methods are also tailored to meet the needs of the project, the environment, and the stakeholders. This can depend on:

- Experience with the type of project

- Maturity of the project team members
- Organizational governance structures
- Distributed project teams

## Possible outcomes with results

Outcome	Check
Shared ownership	All team members know the vision and objectives.
A high-performing team	The team trusts each other and collaborates. The team adapts to changing situations and is resilient in the face of challenges. The project team feels empowered and empowers
Appropriate leadership and other interpersonal skills are demonstrated by all team members	Team members apply critical thinking and interpersonal skills. Team members leadership styles are appropriate to the project context and environment.

## 1.3 Development Approach & Life Cycle Performance Domain

- Deals with activities and functions associated with the development approach, cadence, and life cycle phases of the project.
- Delivery cadence refers to the timing and frequency of project deliverables.
- Outcomes includes:-
  - Correct development approaches.
  - A project life cycle that connects the delivery of business and stakeholder value from the beginning to the end of the project.
  - A project life cycle consisting of phases that facilitate the delivery cadence and development approach required to produce the project deliverables.
- Projects can have a single delivery, multiple deliveries, or periodic deliveries.
- A development approach is the means used to create and evolve the product, service, or result during the project life cycle.
- There are different development approaches. Three common approaches include:-
  - Predictive approach
  - Adaptive approach, including both iterative and incremental
  - Hybrid approach
- There are several factors that influence the selection of a development approach:-
  - Product, service, or result
  - Degree of innovation
  - Requirements certainty
  - Scope stability
  - Ease of change
  - Delivery options
  - Risk

- Safety requirements
  - Regulations
  - The project
  - Stakeholders
  - Schedule constraints
  - Funding availability
  - Organization
  - Organizational structure
  - Culture
  - Organizational capability
  - Project team size and location
- The type and number of project phases in a project life cycle rest on upon many things..

One example of a life cycle can be:



## Possible outcomes with results

Outcome	Check
Development approaches are reliable with project deliverables	The development approach for deliverables (predictive, hybrid, or adaptive) reflects the product variables and is suitable for the project and the organization.
A project life cycle entailing phases that connect the business and stakeholders to value from the beginning to the end of the project	Project work from start to end is represented in the project phases.
Project life cycle phases that facilitate the delivery cadence and development approach required to create the deliverable.	The cadence for development, testing, and deploying is represented in the life cycle phases.

## 1.4 Planning Performance Domain

- Deals with activities and functions associated with the initial, ongoing, and evolving organization and coordination necessary for delivering project deliverables and outcomes.
- The purpose of planning is to proactively develop an approach to create the project deliverables.
- Outcomes includes:
  - The project moves in an organized, coordinated, and deliberate manner.
  - There is a holistic approach to providing the project outcomes.
  - Evolving information is elaborated.
  - Time spent planning is appropriate.
  - Planning is sufficient to manage stakeholder expectations.
  - There is a process for the adaptation of plans.
- Because each project is unique, the volume, timing, and frequency of planning varies.
- Variables include, but are not limited to:
  - Development approach
  - Project deliverables
  - Organizational requirements
  - Market conditions
  - Legal or regulatory restrictions
- When planning things to consider will be:-
  - Delivery – What is the scope being delivered by the project
  - Estimating – Scope, schedule, budget of resources both people and physical

- Schedules - Models used to determine when work has to be done
- Budget- How much work will cost
  
- Planning for how the team will be made begins with identifying the skill sets required to accomplish the project work.
- Communication planning overlaps with stakeholder identification, analysis, prioritization, and engagement
  
- Physical resources apply to any resource that is not a person.
- Procurements can happen at any time during a project.
- There will be changes throughout the project.
- Some changes are a result of a risk event and others are due to customer requests or other reasons

## Possible outcomes with results

Outcome	Check
The project moves in an organized, coordinated, and deliberate manner.	A performance review of project results against the project baselines
There is a holistic approach to delivering the project outcomes.	The delivery schedule, funding, resource availability and procurements
Evolving information is elaborated to produce the deliverables and outcomes.	Initial information about deliverables and requirements compared to current information can demonstrate appropriate elaboration.
Time spent planning is appropriate for the project.	Project plans and documents demonstrate the correct level of planning
Planning information is sufficient to manage stakeholder expectations.	The communications management plan and stakeholder analysis indicate that the communications are sufficient to manage stakeholder expectations.
There is a process for the adaptation of plans throughout the project.	Projects using a backlog show the adaptation of plans throughout the project. Projects using a change control process have change

## 1.5 Project Work Performance Domain

- Deals with activities and functions associated with establishing project processes, managing physical resources, and fostering a learning environment.
- Project work is connected with establishing the processes and performing the work done by the project team to deliver the expected deliverables and outcomes.
- Outcomes includes:-
  - Efficient and effective project performance.
  - Project processes are suitable for the project and the environment.
  - Appropriate communication with stakeholders.
  - Efficient management of physical resources.
  - Effective management of procurements.
  - Improved team capability due to continuous learning and process improvement.
- Project work keeps the project team dedicated and project activities running correctly.

This includes but is not limited to:-

- Managing the flow of existing, new and change work.
- Keeping the project team focused
- Establishing an efficient project systems and processes
- Communicating with stakeholders
- Managing physical resources
- Working external vendors
- Monitoring changes
- Enabling project learning and knowledge transfer.

- The project manager and the project team establish and periodically review the processes the project team is using to conduct the work.
  - This can take the form of reviewing task boards such as using Kanban.
  - Process tailoring can be used to optimize the process for the needs of the project
  - Balancing constraints can take the form of fixed delivery dates, compliance to regulatory codes, a predetermined budget, and quality.
- 
- Project managers have a responsibility for assessing and balancing the project team focus and attention.
  - Much of the project work is associated with communication and engagement.
  - Some projects require materials and supplies from third parties.
  - Planning, ordering, transporting, storing, tracking, and controlling these physical resources can take a large amount of time and effort.
- 
- Working on procurements which can involve hiring and managing vendors throughout the project. This includes managing bids and contracts.
  - Monitoring new work and changes.
  - From time to time, the project team may meet to determine what they can do better in the future (lessons learned) and how they can improve and challenge the process in upcoming iterations (retrospectives).

## Possible outcomes with results

Outcome	Check
Efficient and effective project performance	Status reports show that project work.
Project processes that are appropriate for the project and the environment	Evidence shows that the project processes have been tailored to meet the needs of the project and the environment.
Appropriate communication and engagement with stakeholders	The project communications management plan and communication artifacts demonstrate that the planned communications are being delivered to stakeholders.
Efficient management of physical resources	The amount of material used, scrap discarded, and amount of rework indicate that resources are being used efficiently.
Effective management of procurements	A procurement audit demonstrates that appropriate processes utilized were sufficient for the procurement and that the contractor is performing to plan.
Effective handling of change	Projects using a predictive approach have a change log and Projects using an adaptive approach have a backlog that shows the rate of accomplishing
Improved capability due to continuous learning and process improvement	Team status reports show fewer errors and rework with an increase in velocity.

## 1.6 Project Delivery Performance Domain

- Deals with activities and functions associated with delivering the scope and quality that the project was undertaken to achieve.
- Outcomes includes:-
  - Projects contribute to business objectives
  - Projects realize the outcomes
  - Project benefits are realized in the time frame
  - The project team has an understanding of requirements.
  - Stakeholders accept and are satisfied with project deliverables.
- Project delivery is about meeting requirements, scope, and quality expectations to produce the expected deliverable.
- Some project deliver value throughout and others deliver the bulk at the end.
- The project manager will need to understand how the deliverable is able to deliver value to the stakeholders. This includes:
  - Requirements gathering.
  - Evolving and discovering requirements
  - Managing requirements
  - Define and decompose the scope
  - Completion of deliverables

- Quality requirements can be reflected in the completion criteria, definition of done, statement of work, or requirements documentation.
- The project manager must the following of quality:
  - Cost of Quality
    - Prevention.
    - Appraisal.
    - Internal Failure
    - External Failure
  - Cost of Change

## Possible outcomes with results

Outcome	Check
Projects contribute to business objectives and advancement of strategy	The organization plans and the project demonstrate that the project deliverables and business objectives are aligned.
Projects realize the outcomes they were initiated to deliver	The business case and underlying data indicate the project is still on track to realize the intended outcomes.
Project benefits are realized in the time frame as planned	The project deliveries are being achieved as planned.
The project team has a clear understanding of requirements	In predictive development, small change in the initial requirements reflects understanding. In projects where requirements are developing, a clear understanding of requirements may not take place until well into the project.
Stakeholders accept and are satisfied with project deliverables	Interviews, observation, and end user feedback indicate stakeholder satisfaction.

## 1.7 Measurement Performance Domain

- Deals with activities and functions associated with assessing project performance and taking appropriate actions to maintain acceptable performance.
- Outcomes includes:
  - A reliable understanding of the status of the project.
  - Actionable data to enable decision making.
  - Timely and appropriate actions to keep the project on track.
  - Achieving targets and generating business value
- Involves measuring project performance and implementing appropriate responses to keep the project on track.
- This domain evaluates the amount to which the work done in the Delivery Performance Domain is meeting the metrics identified in the Planning Performance Domain.
- Measures are used for multiple reasons, including:-
  - Evaluating performance compared to plan
  - Tracking the utilization of resources
  - Demonstrating accountability
  - Providing information to stakeholders
  - Assessing whether project deliverables are on track
  - Ensuring the project deliverables will meet customer acceptance criteria.
- Creating effective measurements helps to ensure the right things are measured.
- Ways to measure performance include:-
  - Key Performance Indicators (KPI) - two types of KPIs: leading indicators and lagging indicators.

- Leading indicators predict changes or trends in the project
- Lagging indicators measure project deliverables or events. They provide information after the fact.
- Effective Metrics
  - Use of SMART (Specific, Meaningful, Achievable, Relevant, Timely) criteria.
- What to measure includes:-
  - Deliverable Metrics
    - Information on errors or defects
    - Measures of performance
  - Delivery
    - Work in progress
    - Lead time
    - Cycle time
    - Process efficiency
  - Baseline Performance
    - Start and finish dates
    - Actual cost compared to planned cost
  - Resources
    - Planned resource utilization compared to actual resource utilization
  - Business Value
    - Cost-benefit ratio
  - Stakeholders
    - Mood chart
  - Forecasts

- Metrics can be presented using:
  - Dashboards
  - Information Radiators
  - Visual Controls
  
- Pitfalls associated with measurement includes:
  - Hawthorne effect
  - Vanity metric
  - Demoralization
  - Misusing the metrics
  - Confirmation bias
  
- A portion of measurement is having agreed to plans for measures that are outside the threshold ranges.
- Thresholds can be established for a assortment of metrics such as schedule, budget, velocity, and other project-specific measures.

## Possible outcomes with results

Outcome	Check
A reliable understanding of the status of the project	Review measurements and reports demonstrate if data is reliable.
Actionable data to facilitate decision making	Measurements indicate whether the project is performing as expected.
Timely and appropriate actions to keep project on track	Measurements provide indicators and/or current status
Achieving targets and generating business value by making informed and timely decisions	Comparing the actual performance to the planned performance

## 1.8 Uncertainty Performance Domain

- Deals with activities and functions associated with risk and uncertainty.
- Effective execution of this performance domain results in the following desired outcomes:
  - An awareness of the environment in which projects occur
  - Proactively exploring and responding to uncertainty.
  - An awareness of the interdependence of multiple variables on the project.
  - The capacity to anticipate threats and opportunities
  - Project delivery with little or no negative impact
  - Opportunities are realized to improve project performance and outcomes.
  - Cost and schedule reserves are utilized
- Projects happen in environments with varying degrees of uncertainty.
- Uncertainty in the broadest sense is a state of not knowing or unpredictability.
- Uncertainty presents threats and opportunities that project teams explore, assess, and decide how to handle.
- There are many shades to uncertainty, such as:-
  - Risk associated with not knowing future events
  - Ambiguity associated with not being aware of current or future conditions
  - Complexity associated with dynamic systems having unpredictable outcomes.
- Options for responding to uncertainty: -
  - Gather information
  - Prepare for multiple outcomes
  - Build in resilience

- Volatility exists in an environment that is subject to rapid and unpredictable change.
- Volatility can occur when there are ongoing fluctuations in available skill sets or materials.
- Risks are an aspect of uncertainty.

## Possible outcomes with results

Outcome	Check
An awareness of the environment in which projects occur.	The team incorporates environmental considerations when evaluating uncertainty, risks, and responses.
Proactively exploring and responding to uncertainty	Risk responses are aligned with the project constraints.
An awareness of the multiple variables on the project	Actions to address complexity, ambiguity, and volatility.
The capacity to anticipate threats and opportunities	Systems for identifying, capturing, and responding to risk are appropriately.
Project delivery with little or no negative impact from unforeseen events	Scheduled delivery dates are met, and the budget performance is within the Variance.
Realized opportunities to improve project performance and outcomes	Teams use established mechanisms to identify and leverage opportunities.
Cost and schedule reserves used effectively to maintain alignment with project objectives	Teams take steps to proactively prevent threats.

## Section 2. Tailoring

### 2.1 Overview

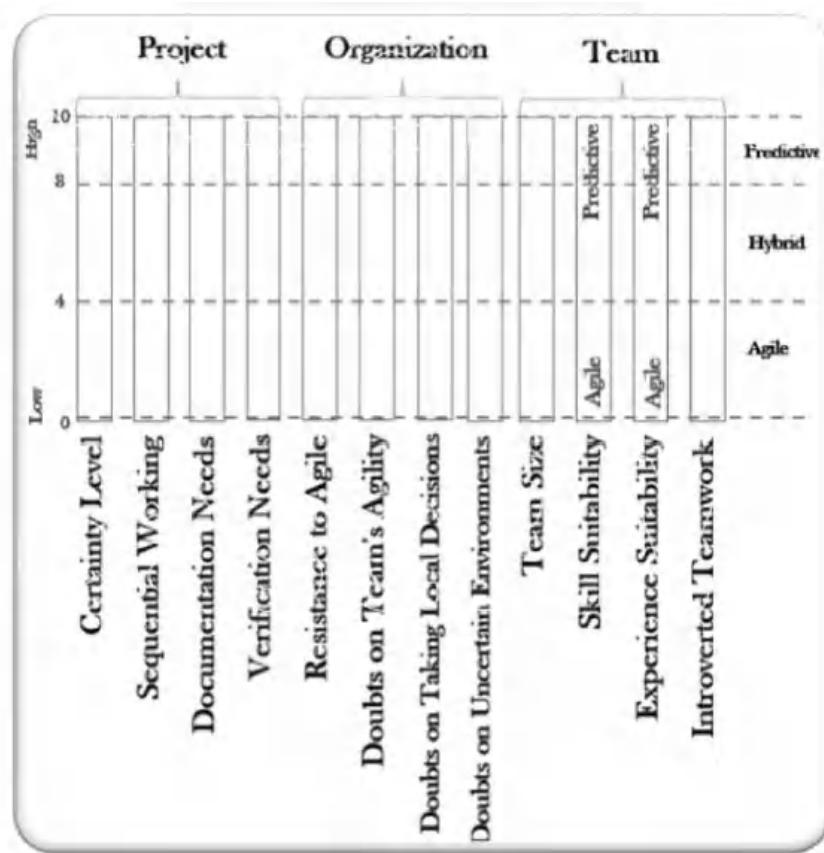
- Tailoring is the deliberate adaptation of the project management approach, governance, and processes to make them more suitable for the given environment and the work at hand.
- Tailoring involves understanding the project context, goals, and operating environment. Projects operate in complex environments that need to balance potentially competing demands that include, but are not limited to: -
  - Delivering as quickly as possible
  - Minimizing project costs
  - Optimizing the value delivered
  - Creating high-quality deliverables and outcomes
  - Providing compliance with regulatory standards
  - Satisfying diverse stakeholder expectations
  - Adapting to change

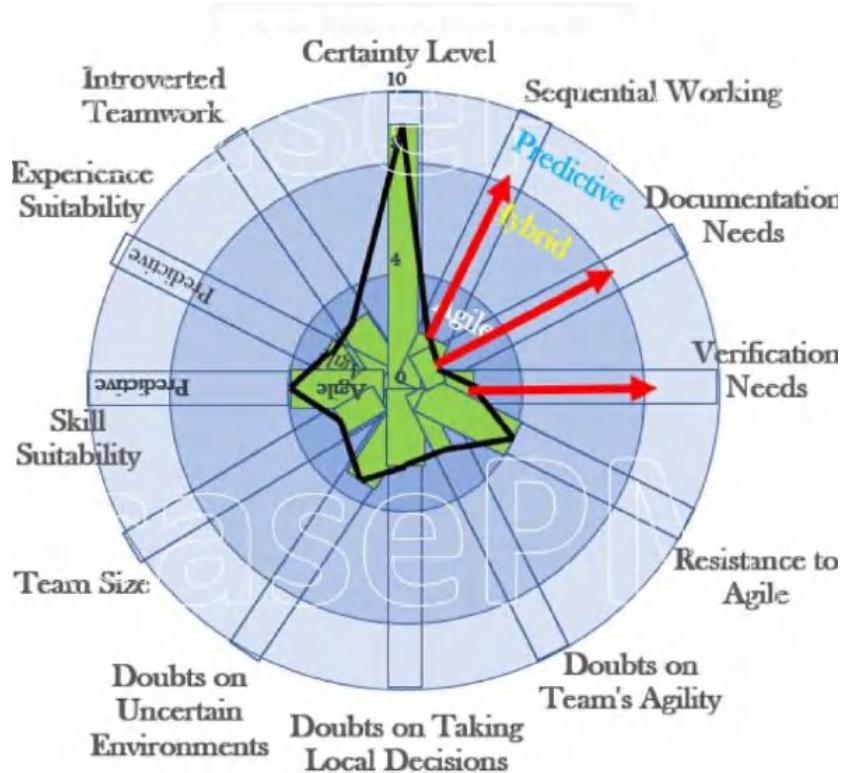
### Benefits of Tailoring

Tailoring produces direct and indirect benefits to organizations. These include, but are not limited to: -

- More commitment from project team members who helped to tailor the approach,
- Customer-oriented focus, as the needs of the customer are an important influencing factor in its development
- More efficient use of project resources.

## Tailoring Concept





## 2.2 What to tailor?

Project aspects that can be tailored include: -

- Life cycle and development approach selection
- Processes
- Engagement
- Tools
- Methods and artifacts

### Life cycle and development approach selection

Deciding on a life cycle and the phases of the life cycle is an example of tailoring. Additional tailoring can be done when selecting the development and delivery approach for the project. Some large projects may use a combination of development and delivery approaches simultaneously.

For instance, building a new data center could involve (a) the use of predictive approaches for the physical building construction and finishing and (b) an iterative approach for understanding and establishing the computing capabilities required. Viewed from a project level, this combination of approaches represents a hybrid approach, but the construction team and the computing team may only experience a predictive or iterative development approach.

## Processes

Process tailoring for the selected life cycle and development approach includes determining

which portions or elements should be: -

- Added, to bring required rigor, coverage, or address unique product or operating environment conditions, etc. (e.g., adding independent inspections for safety-critical projects);
- Modified, to better suit the project or project team requirements (e.g., modifying the format of project documents to accommodate project team members with vision limitations);
- Removed, to reduce cost or effort since it is no longer required or is not economical for the value it adds (e.g., removing the creation of meeting minutes for a small, collocated project team with good communications);
- Blended, to bring additional benefits or value by mixing or combining elements (e.g., adding appreciative inquiry methods from organizational management to the lessons

learned meetings of predictive project management to help foster better collaboration)

- Aligned, to harmonize elements so there is consistent definition, understanding, and application (e.g., many disciplines have standards and practices associated with risk management that are sufficiently different from each other that would need to be aligned). For example, on multidisciplinary project teams, different disciplines may have specific elements, such as their own language, tools, and practices related to the same area of focus.

## Engagement

Tailoring engagement for the people involved in the project includes:-

- People: This entails evaluating the skills and capabilities of the project leadership and the project team; then selecting who should be involved and in what capacities based on the project type and operating conditions. For example, on a challenging or time-constrained project, assigning very experienced project team members is more logical than using inexperienced project team members.
- Empowerment: Empowerment involves choosing which responsibilities and forms of local decision making should be deferred to the project team. Some environments and team member capabilities support high levels of empowerment. In other situations, less empowerment with more supervision and direction might be preferable.
- Integration: Project teams can include contributors from contracted entities, channel partners, and other external entities in addition to staff from inside the sponsoring

organization. Tailoring considers how to create one project team from a diverse collection of contributors to facilitate optimal project team performance and realization of project outcomes.

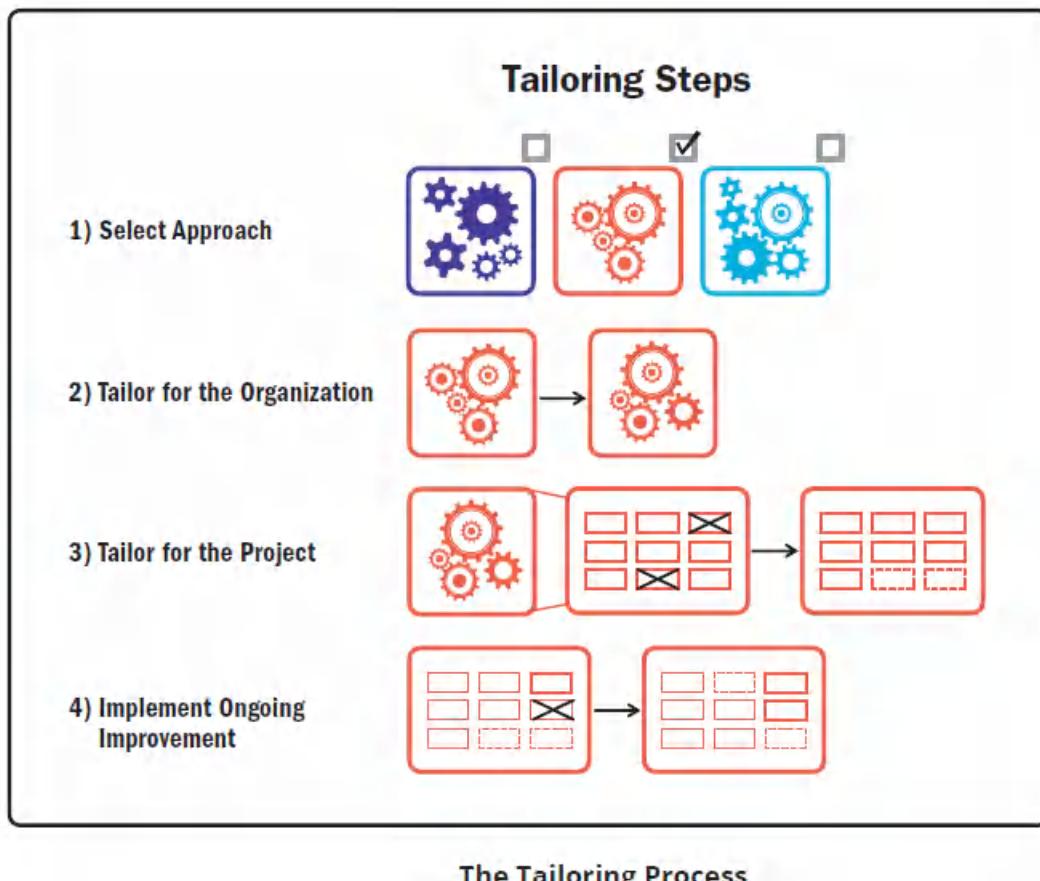
## Tools

Selecting the tools (e.g., software or equipment) the project team will use for the project is a form of tailoring. Often, the project team has the best insight into the most suitable tools for the situation, but those choices might need tempering based on the associated costs. Additionally, organizational leaders can impose constraints that the project team cannot change.

## Methods and artifacts

Tailoring the means that will be used to achieve the project outcomes is performed so that the methods are suited for the environment and the culture. Tailoring the documents, templates, and other artifacts that will be used on the project helps to make sure the artifacts are appropriate for the project and the organization.

## 2.3 Tailoring Process



### Tailor the Project

Many attributes influence tailoring for the project. These include, but are not limited to:

- Product/deliverable
- Project team
- Culture

The project team should ask questions about each attribute to help guide them in the tailoring process. Answers to these questions can help identify the need to tailor processes, delivery approach, life cycle, tools, methods, and artifacts.

## **Product/Deliverable**

Attributes associated with the product or deliverable include, but are not limited to:-

- **Compliance/criticality**:- How much process rigor and quality assurance is appropriate?
- **Type of product/deliverable**:- Is the product well known and physical, for example, something easy to recognize and describe like a building? Or something intangible like software or the design of a new drug?
- **Industry market**:- What market does the project, product, or deliverable serve? Is that market highly regulated, fast moving, or slow to evolve? What about competitors and incumbents?
- **Technology**:- Is the technology stable and well established or rapidly evolving and at risk of obsolescence?
- **Time frame**:- Is the project time frame short as in weeks or months, or long as in several years?
- **Stability of requirements**:- How likely are there to be changes to core requirements?
- **Security**:- Are elements of the product business confidential or classified?
- **Incremental delivery**:- Is this something the project team can develop and get stakeholder feedback on incrementally, or something that is hard to evaluate until near completion?

## **Project Team**

Project team considerations include:-

- **Project team size**:- How many full-time and part-time people will be working on the project?
- **Project team geography**:- Where are the team members predominantly located geographically? Will some or all of the team be remote or colocated?
- **Organizational distribution**:- Where are the team's supporting groups and other stakeholders located?
- **Project team experience**:-Do the project team members have any experience in the industry, in the organization, or working with each other? Do they have the skills, tools, and technology required for the project under consideration?
- **Access to customer**:- Is it practical to get frequent and timely feedback from customers or customer representatives?

## **Culture**

Evaluating the culture includes considerations regarding:-

- **Buy-in**:- Is there acceptance, support, and enthusiasm for the proposed delivery approach?
- **Trust**:- Are there high levels of trust that the project team is capable of and committed to delivering the project outcomes?
- **Empowerment**:- Is the project team trusted, supported, and encouraged to own and develop its working environment, agreements, and decisions?
- **Organizational culture**:- Do the organizational values and culture align with the project approach? This includes empowering versus specifying and checking, trusting local decision making versus requesting external decision making, etc.

## 2.4 Tailoring Performance Domains

The Performance Domains can also be tailored too,

- Stakeholders
- Team
- Development Approach & Life Cycle
- Planning
- Project Work
- Delivery
- Measurement
- Uncertainty



## **Stakeholders**

When tailoring the Stakeholders Performance Domain consider: -

- The overall work environment
- Cultural diversity
- The number of Stakeholders

## **Team**

When tailoring the Team Performance Domain consider: -

- The overall work environment
- Cultural diversity
- The number of team members
- Skills and experience levels of team members
- Organizational human resource development strategy

## **Development Approach & Life Cycle**

When tailoring the Development Approach & Life Cycle consider: -

- Certainty level
- Sequential working
- Documentation and verification need
- Resistance to Agile
- Doubts on team's Agility, taking local decisions, and uncertain environments
- Team size, skills and experience
- Introverted teamwork

## **Planning**

When tailoring the Planning consider: -

- All the factors that may affect any component of the project
- Organizational procedures, templates and process
- The number of sellers
- The business environment

## **Project Work**

When tailoring the Project Work consider: -

- The Management Process
- How to manage and transfer the knowledge and information such as:-
  - The software to be used
  - Ongoing Projects
  - Similar Projects completed before
  - Organizational procedures and processes

## **Delivery**

When tailoring the Delivery consider: -

- The organizational procedures and processes about how to identify and manage the project requirements and quality of deliverables
- The Business Environment
- If the requirements are clear or not

## **Measurement**

When tailoring the Measurement consider: -

- The measurement activities related to benefits realization
- How we measure the business value

- Customer requirements on monitoring and controlling
- Organizational requirements on monitoring and controlling

## **Uncertainty**

When tailoring the Measurement consider: -

- The Risk Appetite and Risk Tolerance
- The Development Approach & the Life Cycle
- The Project Size
- The level of Uncertainty
- The organizational process and procedures about Risk Management
- Importance level of the Project

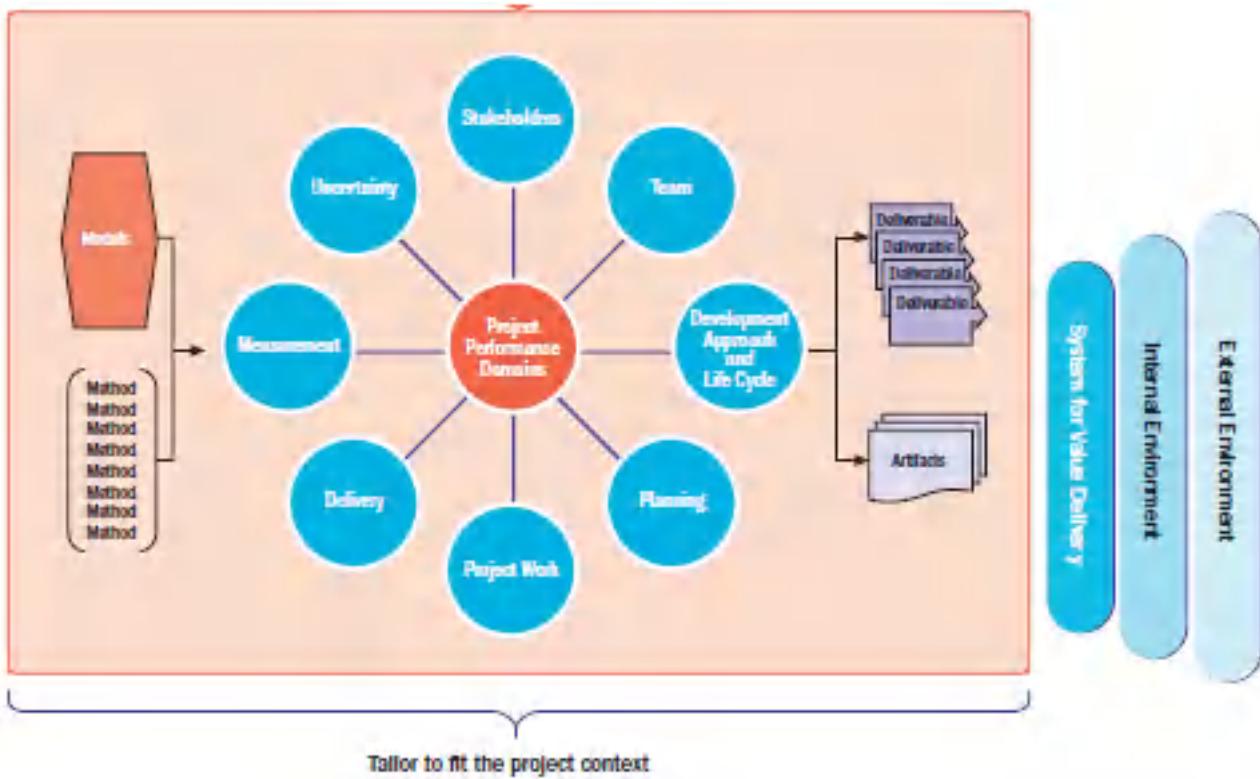
# Section 3. Tailoring Models, Methods & Artifacts

## 3.1 Introduction

**Model.** A model is a thinking strategy to explain a process, framework, or phenomenon

**Method.** A method is the means for achieving an outcome, output, result, or project deliverable

**Artifact.** An artifact can be a template, document, output, or project deliverable



Strategies Approaches Theories Scenarios	Project Work → Processes ←	
Models	Techniques (Methods)	Artifact
<ul style="list-style-type: none"><li>▪ Leadership</li><li>▪ Motivation</li><li>▪ Project Team</li><li>▪ Development</li><li>▪ Communications</li><li>▪ Changes</li></ul>	<ul style="list-style-type: none"><li>▪ Data Gathering and Analysis</li><li>▪ Estimating</li><li>▪ Meetings</li><li>▪ Etc.,</li></ul>	<ul style="list-style-type: none"><li>▪ Strategy</li><li>▪ Documents</li><li>▪ Contracts</li><li>▪ Plans</li><li>▪ Baselines</li><li>▪ Registers and Logs</li></ul>

<ul style="list-style-type: none"> <li>▪ Complexity</li> <li>▪ Etc.,</li> </ul>		<ul style="list-style-type: none"> <li>▪ Hierarchy Charts</li> <li>▪ Diagrams &amp; Charts</li> <li>▪ Reports</li> <li>▪ Etc.,</li> </ul>
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## 3.2 Models

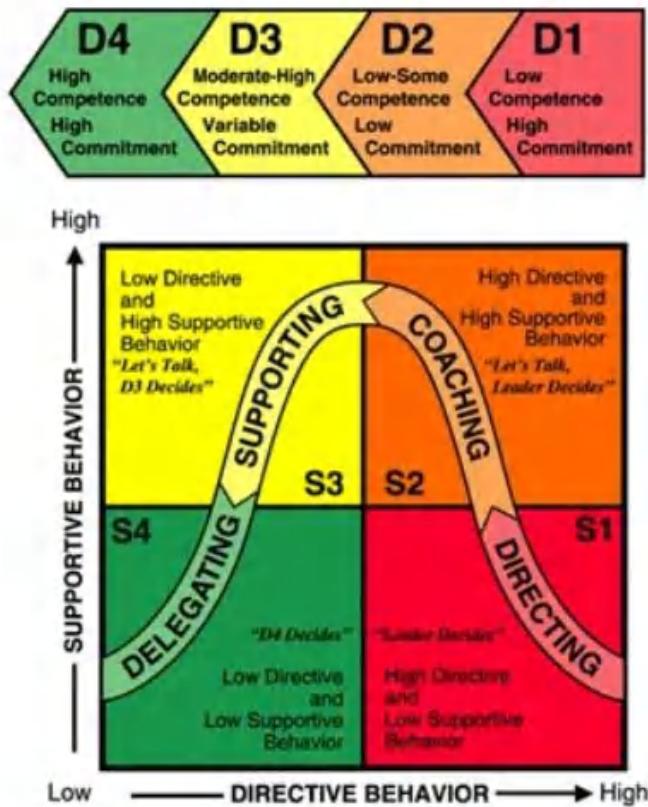
### 3.2.1 Leadership Models

#### Situational Leadership Model

Situational leadership models are a subset of a vast array of leadership models. Just as project teams tailor the processes, methods, life cycles, and development approaches, leadership styles are also tailored. Situational leadership models describe ways to tailor one's leadership style to meet the needs of the individual and the project team. The following are examples of two situational leadership models.

#### Situational Leadership® II

Ken Blanchard's Situational Leadership® II measures project team member development using competence and commitment as the two main variables. Competence is the combination of ability, knowledge, and skill. Commitment speaks to the confidence and motivation an individual has. As an individual's competence and commitment evolve, leadership styles evolve from directing to coaching to supporting to delegating in order to meet the individual's needs.



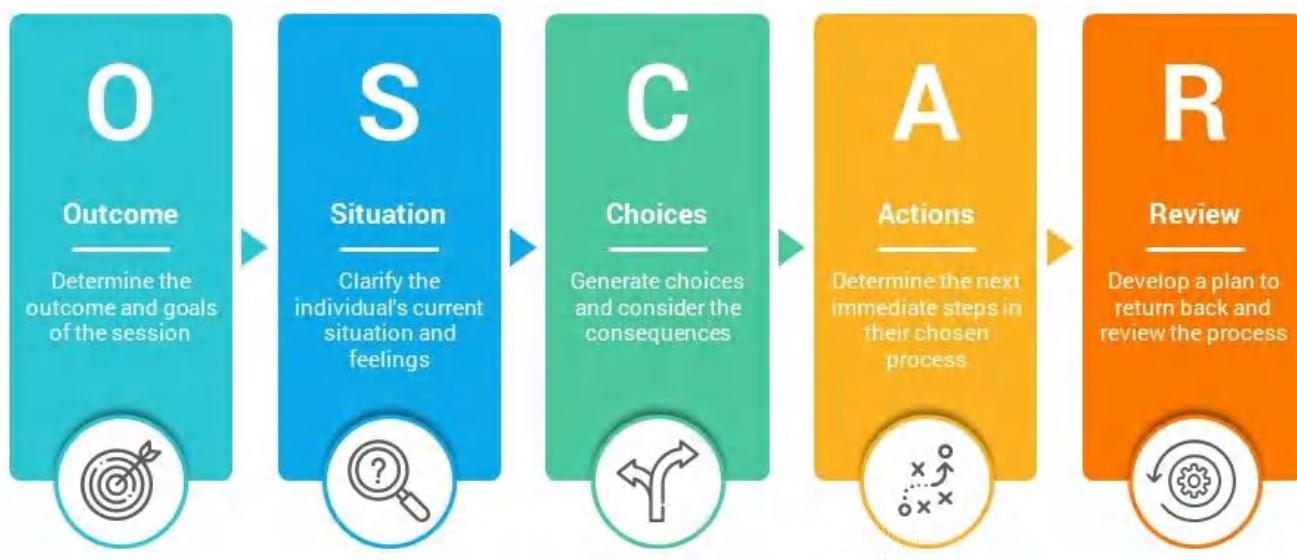
## OSCAR Model

The OSCAR coaching and mentoring model was developed by Karen Whittleworth and Andrew Gilbert. It helps individuals adapt their coaching or leadership styles to support individuals who have an action plan for personal development.

The model refers to five contributing factors:-

- **Outcome**:- An outcome identifies the long-term goals of an individual and the desired result from each conversation session.
- **Situation**:- A situation enables conversation about the current skills, abilities, and knowledge level of the project team member; why the person is at that level; and how that level impacts the individual's performance and peer relationships.

- **Choices/consequences**:- Choice and/or consequences identify all the potential avenues for attaining the desired outcome and the consequences of each choice so an individual can choose viable avenues for reaching their long-term goals.
- **Actions**:- An action commits to specific improvements by focusing on immediate and attainable targets that an individual can work toward within a specified time frame.
- **Review**:- Holding regular meetings offers support and helps to ensure that individuals remain motivated and on track.



### 3.2.2 Motivation Model

People perform better when they are motivated, and people are motivated by different things. Understanding what motivates project team members and other stakeholders helps to tailor rewards to the individual, thereby eliciting more effective engagement. There are a significant number of models that illustrate how people are motivated. Four models are described in Sections.

#### Hygiene and Motivational Factors

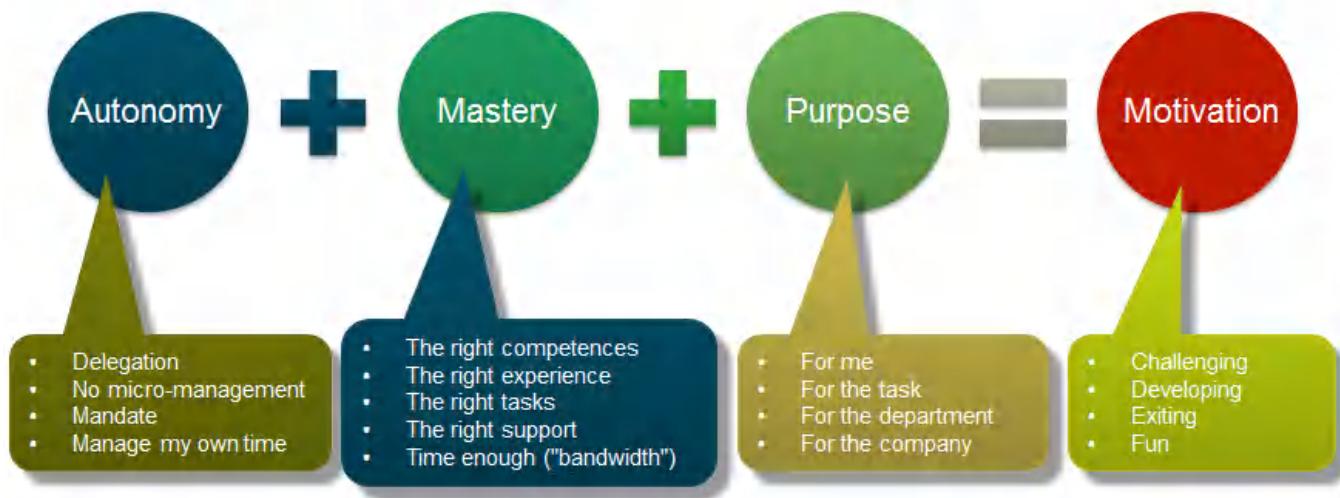


Frederick Herzberg conducted a study of motivational factors in working life. He believed that job satisfaction and dissatisfaction stem from conditions called motivational factors. Motivational factors include matters that relate to the content of the work, such as achievement, growth, and advancement. Insufficient motivational factors lead to dissatisfaction. Sufficient motivational factors lead to satisfaction.

Herzberg also identified hygiene factors related to the work, such as company policies, salary, and the physical environment. If hygiene factors are insufficient, they cause dissatisfaction. However, even if they are sufficient, they do not lead to satisfaction.

## Intrinsic versus Extrinsic Motivation

### Motivation – how do we do it?



Daniel Pink published several books about the intrinsic factors that motivate people. He stated that while extrinsic rewards, such as salary, are motivators to a certain extent, once a person is paid fairly for their work, the motivational power of extrinsic rewards ceases to exist. For complicated and challenging work, such as much of the work on projects, intrinsic motivators are far longer lasting and more effective. Pink identifies three types of intrinsic motivators: autonomy, mastery, and purpose: -

- **Autonomy:** Autonomy is the desire to direct one's own life. This is aligned with being able to determine how, where, and when to accomplish work. Autonomy includes flexible work hours, working from home, and work on self-selecting and self-managing project teams.
- **Mastery:** Mastery is about being able to improve and excel. The desire to do excellent work, learn, and achieve goals are aspects of mastery.
- **Purpose:** Purpose speaks to the need to make a difference. Knowing the project vision and how work contributes to achieving that vision allows people to feel like they are making a difference.

## Theory of Needs



David McClellan's model states that all people are driven by needs of achievement, power, and affiliation. The relative strength of each need depends on an individual's experiences and culture.

- Achievement. People who are motivated by achievement, such as reaching a goal, are motivated by activities and work that is challenging, but reasonable.
- Power. People who are motivated by power like to organize, motivate, and lead others. They are motivated by increased responsibility.
- Affiliation. People who are motivated by affiliation seek acceptance and belonging. They are motivated by being part of a team.

## Theory X, Theory Y, and Theory Z

THEORY X	THEORY Y	THEORY Z
<ol style="list-style-type: none"><li>Employees dislike work and will try to avoid it.</li><li>Employees prefer to be controlled and directed.</li><li>Employees seek security, not responsibility.</li><li>Employees must be intimidated by managers to perform.</li><li>Employees are motivated by financial rewards.</li></ol>	<ol style="list-style-type: none"><li>Employees view work as a natural part of life.</li><li>Employees prefer limited control and direction.</li><li>Employees will seek responsibility under proper work conditions.</li><li>Employees perform better in work environments that are nonintimidating.</li><li>Employees are motivated by many different needs.</li></ol>	<ol style="list-style-type: none"><li>Employee involvement is the key to increased productivity.</li><li>Employee control is implied and informal.</li><li>Employees prefer to share responsibility and decision making.</li><li>Employees perform better in environments that foster trust and cooperation.</li><li>Employees need guaranteed employment and will accept slow evaluations and promotions.</li></ol>

Douglas McGregor devised the Theory X and Theory Y models, which represent a spectrum of employee motivation and corresponding management styles. This was later expanded to include Theory Z.

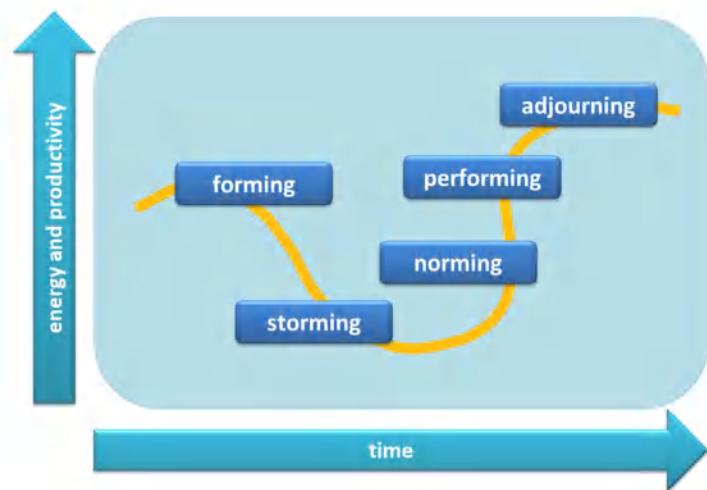
- Theory X. The X side of the spectrum assumes individuals work for the sole purpose of income. They are not ambitious or goal oriented. The corresponding management style to motivate these individuals is a hands-on and top-down approach. This management style is often seen in a production or labor-intensive environment, or one with many layers of management.
- Theory Y. The Y side of the spectrum assumes that individuals are intrinsically motivated to do good work. The corresponding management style has a more personal coaching feel. The manager encourages creativity and discussion. This management style is often seen in creative and knowledge worker environments.

- Theory Z. Abraham Maslow saw Theory Z as a transcendent dimension to work where individuals are motivated by self-realization, values, and a higher calling. The optimal management style in this situation is one that cultivates insight and meaning. William Ouchi's version of Theory Z focuses on motivating employees by creating a job for life where the focus is on the well-being of employees and their families. This style of management seeks to promote high productivity, morale, and satisfaction.

### 3.2.3 Project Team Development Model

Project teams move through different stages of development. Understanding the stage of the team in its development helps project managers support the project team and its growth. The two models presented in Sections to illustrate how project teams move through different stages to become high-performing project teams.

#### Tuckman Ladder

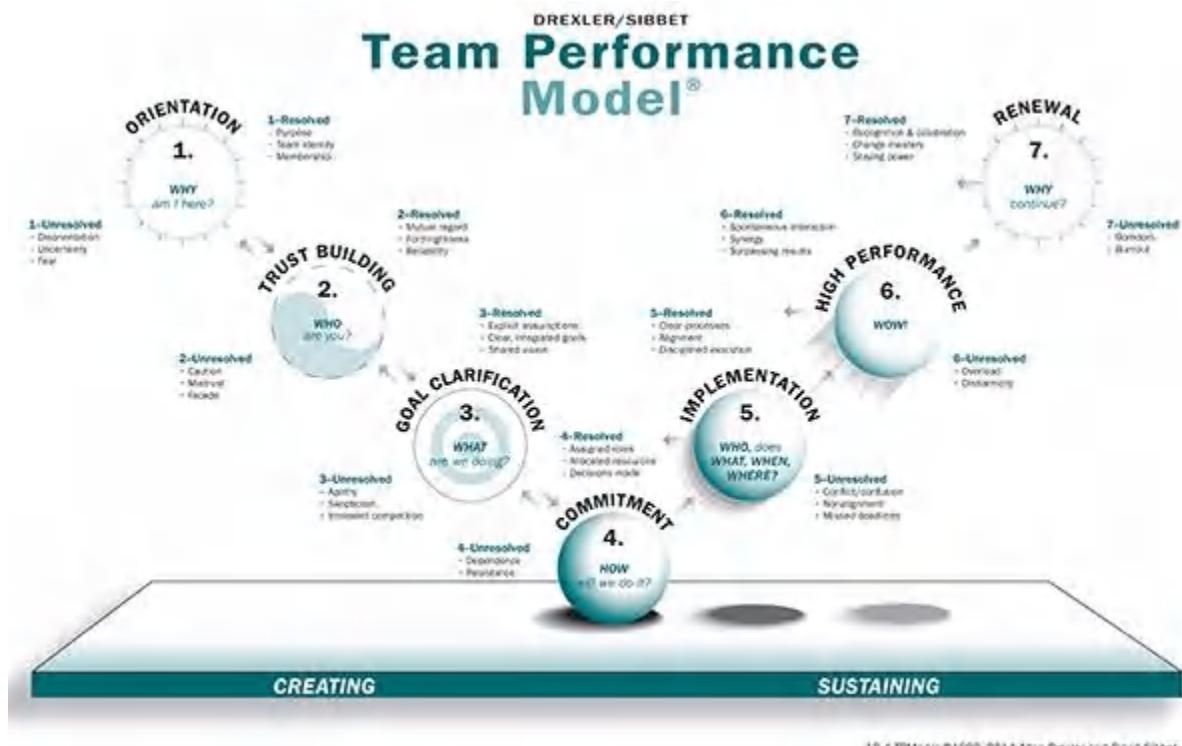


Bruce Tuckman articulated the stages of team development as forming, storming, norming, and performing. Many people add a fifth stage, adjourning.

- **Forming:** -The project team first comes together. Members get to know each other's name, position on the project team, skill sets, and other pertinent background information. This might occur in the kickoff meeting.
- **Storming:** -Project team members jockey for position on the team. This phase is where people's personalities, strengths, and weaknesses start to come out. There might be some conflict or struggle as people figure out how to work together. Storming might go on for some time or pass relatively quickly.
- **Norming:** -The project team starts to function as a collective body. At this point, project team members know their places on the team and how they relate to and interface with all the other members. They are starting to work together. There might be some challenges as work progresses, but these issues are resolved quickly, and the project team moves into action.
- **Performing:** - The project team becomes operationally efficient. This is the mature project team stage. Project teams that have been together for a while are able to develop a synergy. By working together, project team members accomplish more and produce a high-quality product.
- **Adjourning:** - The project team completes the work and disperses to work on other things. If the project team has formed good relationships, some project team members might be sad about leaving the project team.
- The project team culture in this model starts in the forming stage and evolves throughout the rest of the development stages. While this model shows a linear progression, project teams can move back and forth between these stages. In addition, not all project teams achieve the performing or even the norming stages.

## Drexler/Sibbet Team Performance Model

Allan Drexler and David Sibbet developed a team performance model with seven steps. Steps 1 through 4 describe the stages in creating a project team, and steps 5 through 7 cover project team sustainability and performance.



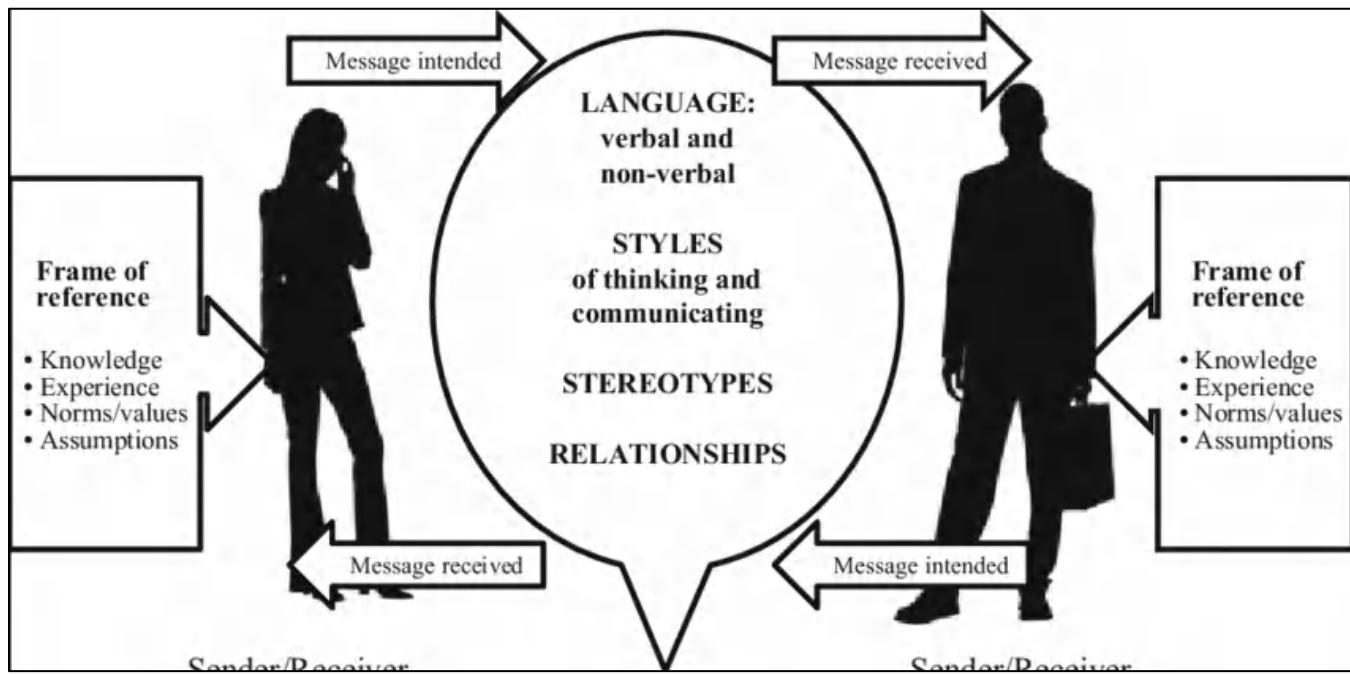
- **Step 1:** - Orientation. Orientation answers the question of why. In this stage, the project team learns the purpose and mission for the project. This usually occurs at a kickoff meeting, or is documented in a business case, project charter, or lean start-up canvas.
- **Step 2:** - Trust building. Trust building answers the question of who. This stage sheds light on who is on the project team and the skills and abilities each person brings. It can also include information about key stakeholders who may not be part of the project team but can influence the project team.

- **Step 3:** - Goal clarification. Goal clarification answers what. In this stage, the project team elaborates the high-level project information. This may include finding out more about stakeholder expectations, requirements, assumptions, and deliverable acceptance criteria.
- **Step 4:** - Commitment. Commitment addresses the question of how. In this stage, the project team starts to define plans to achieve the goals. This can include milestone schedules, release plans, high-level budgets, resource needs, and so forth.
- **Step 5:** - Implementation. High-level plans are decomposed into greater levels of detail, such as a detailed schedule or backlog. The project team starts working together to produce deliverables.
- **Step 6:** - High performance. After the project team has worked together for some time, project team members reach a high level of performance. They work well together, don't need much oversight, and experience synergies within the project team.
- **Step 7:** - Renewal. Renewal is the stage of working through changes on the project team or the project. The deliverables, stakeholders, environment, project team leadership, or team membership may change. This causes the project team to consider if the past behavior and actions are still sufficient, or if the project team needs to go back to a previous stage to reset the expectations and ways of working together.

### 3.2.4 Communications Model

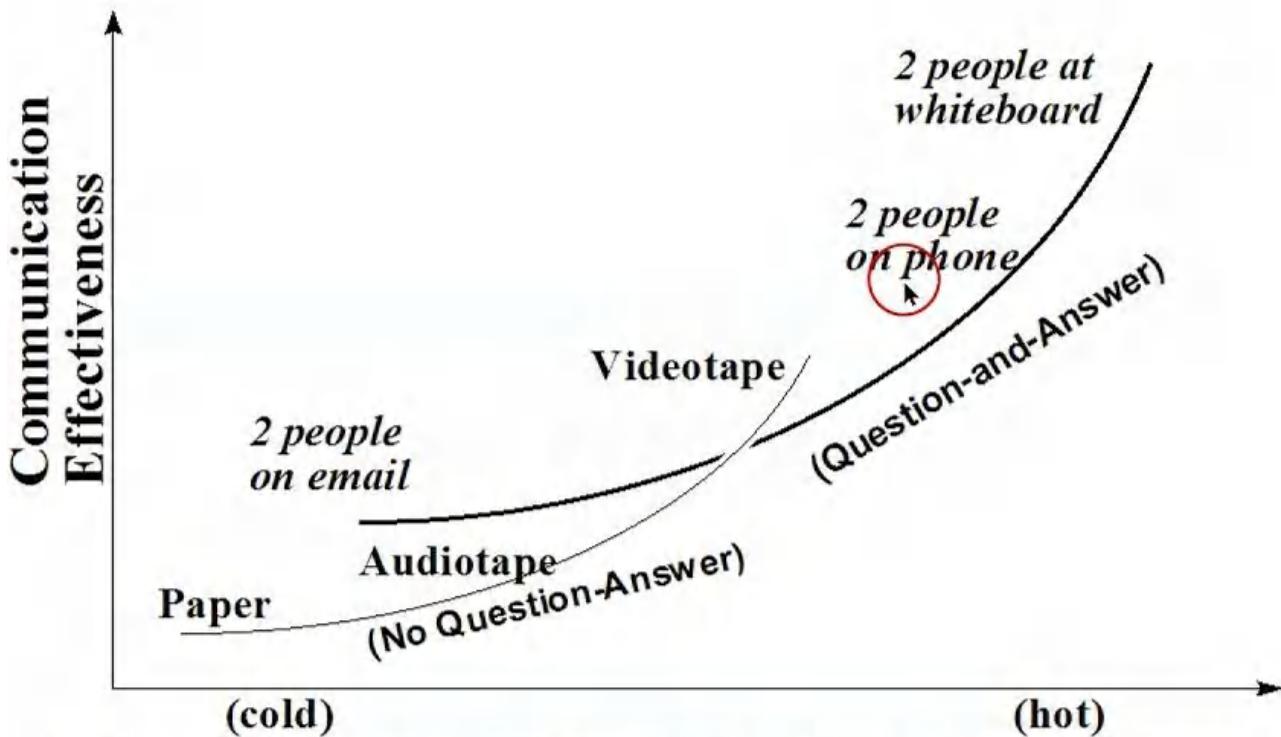
Project success is dependent on effective communication. Communication models demonstrate concepts associated with how sender and receiver frames of reference impact the effectiveness of communication, how the communication medium influences the effectiveness of communication, and the types of disconnects between end-user expectations and reality. With the prevalence of multicultural project teams and dispersed stakeholders, these models provide a way of viewing communication styles and methods to enhance communication efficiency and effectiveness.

#### Cross-Cultural Communication



A communication model developed by Browaeys and Price incorporates the idea that the message itself and how it is transmitted is influenced by the sender's current knowledge, experience, language, thinking, and communication styles, as well as stereotypes and relationship to the receiver. Similarly, the receiver's knowledge, experience, language, thinking, and communication styles, as well as stereotypes and relationship to the sender will influence how the message is interpreted.

## Effectiveness of Communication Channels



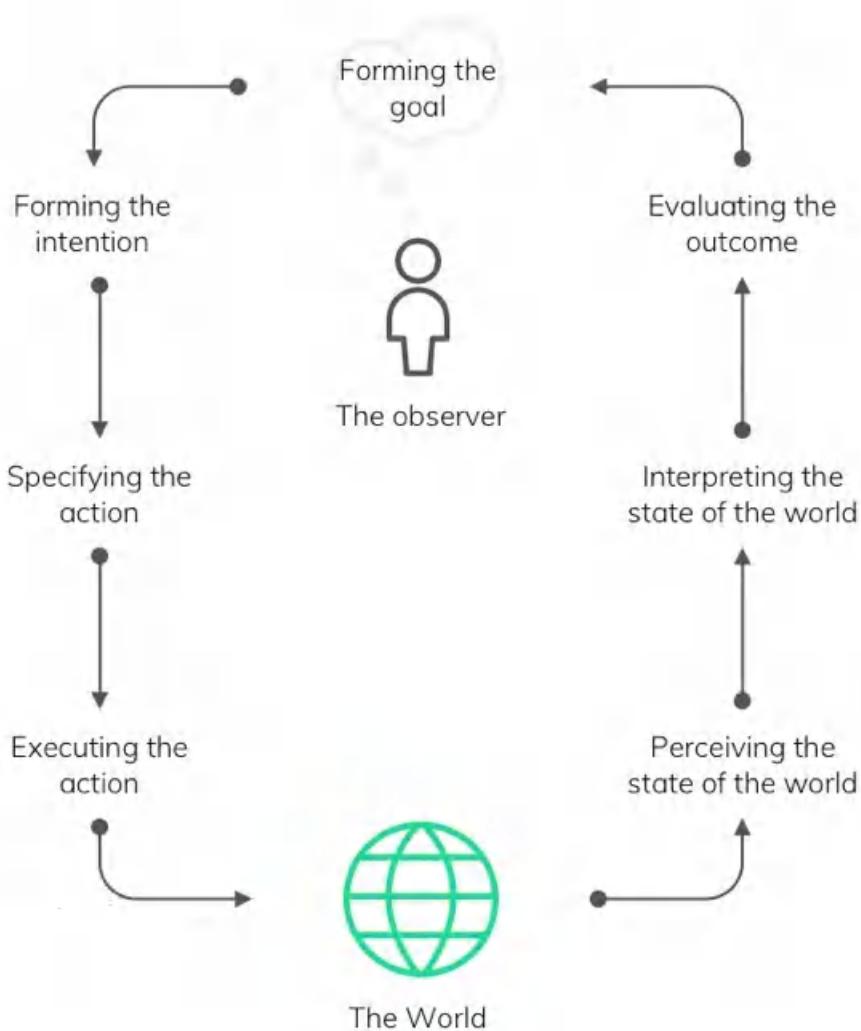
### Richness (“temperature”) of communication channel

Alistair Cockburn developed a model that describes the communication channels along the axes of effectiveness and richness. As defined by Richard Daft and Robert Lengel, richness relates to the amount of learning that can be transmitted through a medium. Media richness is a function of characteristics, including the ability to:

- Handle multiple information cues simultaneously,
- Facilitate rapid feedback,
- Establish a personal focus, and
- Utilize natural language.

Richness in communication allows a broad spectrum of information to be conveyed rapidly. Situations that entail complex, complicated, and personal information benefit from richer communication channels, such as face-to-face communication. Situations that impart simple, factual information can use less rich communication channels such as a note or a text message.

## Gulf of Execution and Evaluation



Donald Norman described the gulf of execution as the degree to which an item corresponds with what a person expects it to do. Said another way, it is the difference between the intention of a user and what the item allows them to do or supports them

in doing. A car that has the ability to parallel park itself would have a gulf of execution if the driver expected to push a button labelled “park” and have the car park itself, and the car did not park itself.

The gulf of evaluation is the degree to which an item supports the user in discovering how to interpret the item and interact with it effectively. The same parking example would show a gulf of evaluation if the controls were not designed in such a way that the driver could easily determine how to initiate the self-parking function.

### 3.2.5 Changes Model

Many projects contain an aspect of changing systems, behaviors, activities, and sometimes, cultures. Managing this type of change requires thinking about how to transition from the current to the future desired state. There are many models that describe the activities necessary for successful change management. Below Sections provide a sampling of the change models.

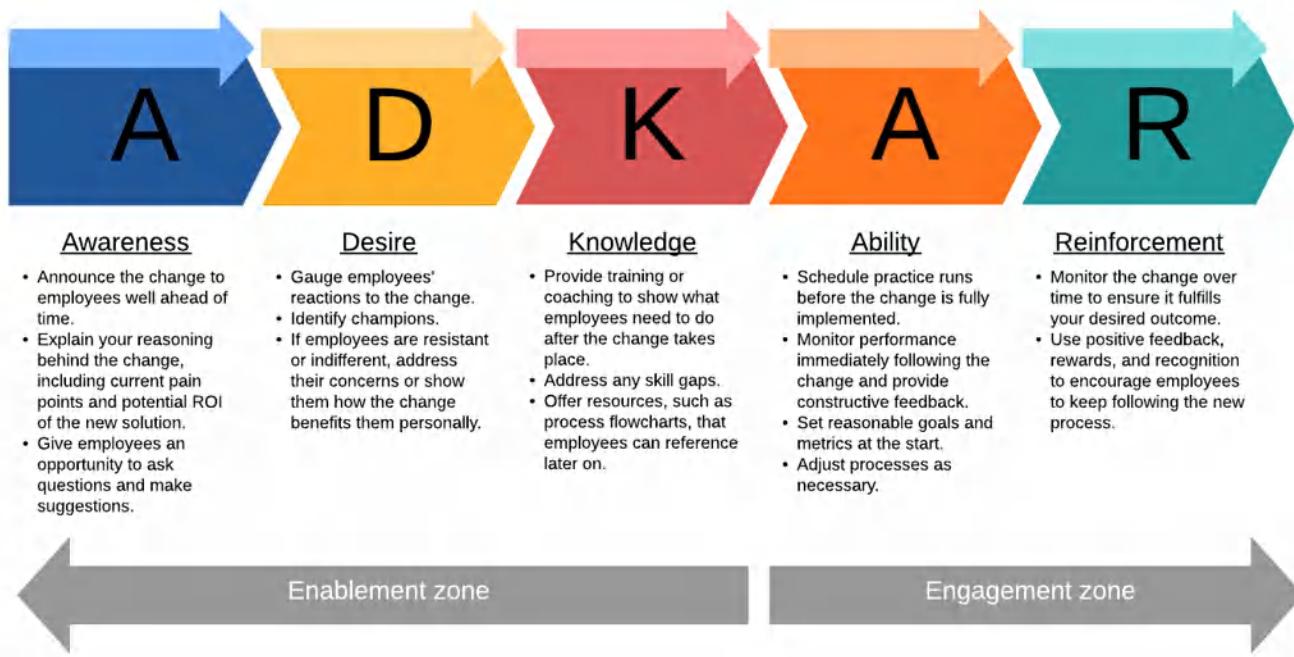
#### Managing Change in Organizations

A *Practice Guide* [3] is an iterative model that is based on common elements across a range of change management models. The framework has five associated elements interconnected through a series of feedback loops:-

- **Formulate change**:- This element focuses on building the rationale to help people understand why change is needed and how the future state will be better.
- **Plan change**:- The identification of activities helps people prepare for the transition from the current to the future state.

- **Implement change**:- This iterative element focuses on demonstrating the future state capabilities, checking to ensure the capabilities are having the intended impact, and making necessary improvements or adaptations in response.
- **Manage transition**:- This element considers how to address needs related to the change that may surface once the future state is achieved.
- **Sustain change**. This element seeks to ensure that the new capabilities continue and previous processes or behaviors cease.

### ADKAR® Model

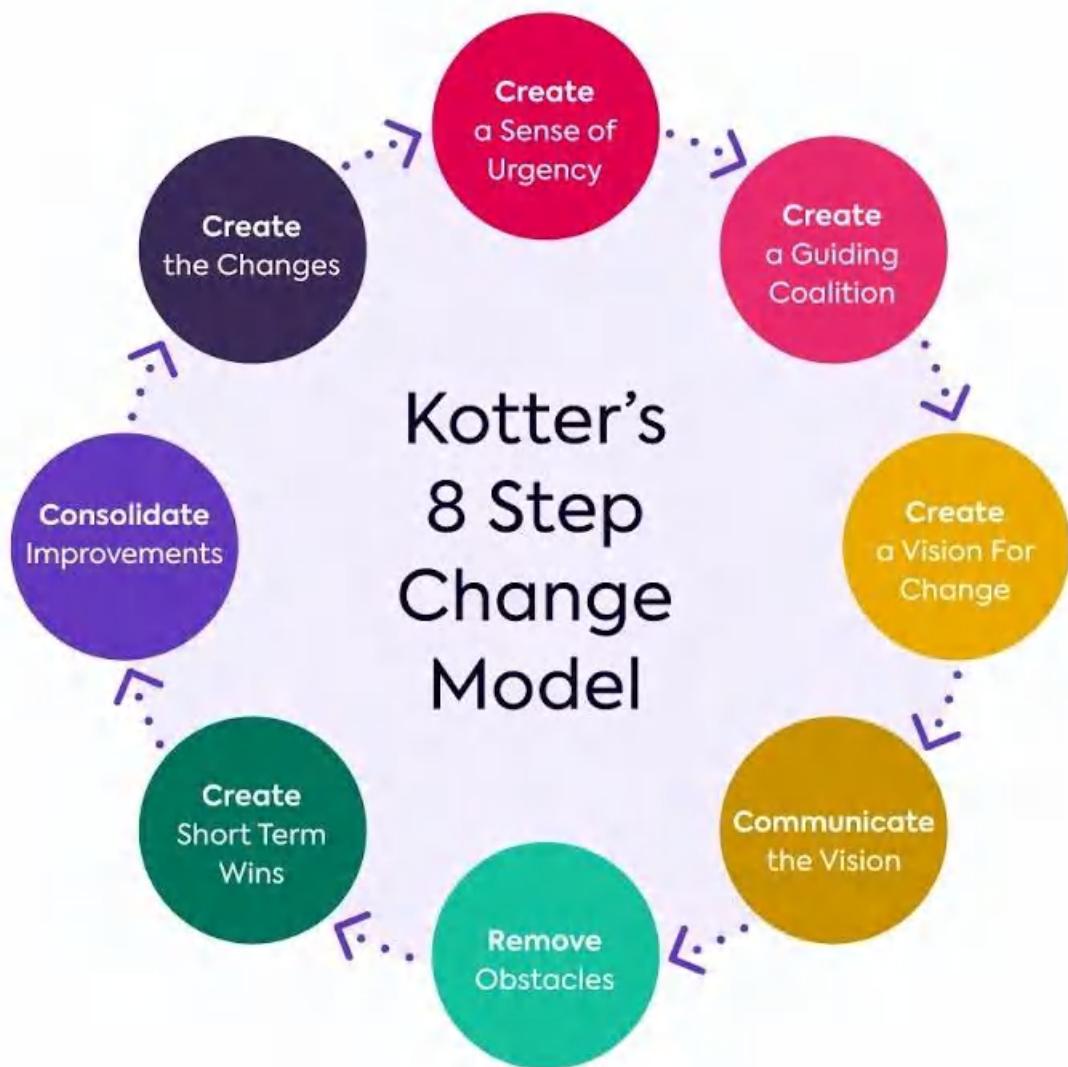


Jeff Hiatt developed the ADKAR® Model which focuses on five sequential steps that individuals undergo when adapting to change:-

- **Step 1: Awareness**:- This step identifies why the change is necessary.
- **Step 2: Desire**:- Once people know why the change is necessary, there needs to be a desire to be part of and support the change.

- **Step 3: Knowledge**:- People need to understand how to change. This includes understanding new processes and systems in addition to new roles and responsibilities. Knowledge can be imparted through training and education.
- **Step 4: Ability**:- In this step, knowledge is supported with hands-on practice and access to expertise and help as needed.
- **Step 5: Reinforcement**:- Reinforcement supports the sustainment of the change. This can include rewards, recognition, feedback, and measurement.

### The 8-Step Process for Leading Change



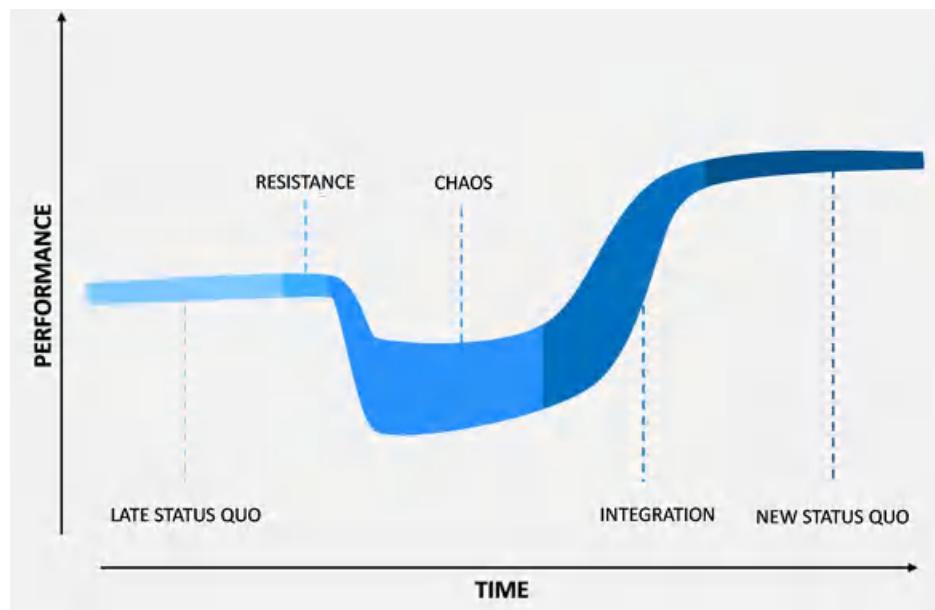
John Kotter introduced the 8-Step Process for Leading Change for transforming organizations. It is a top-down approach where the need for and approach to change originates at the top levels of the organization, and then is promoted down through the organization's layers of management to the change recipients.

The eight steps are:

- **Step 1:** Create urgency. Identify potential threats and opportunities that drive the need for change.
- **Step 2:** Form a powerful coalition. Identify the change leaders. Change leaders are not necessarily based on hierarchy. The change leaders should be influential people from a variety of roles, expertise, social, and political importance.
- **Step 3:** Create a vision for change. Identify the values that are central to the change. Then create a brief vision statement that summarizes the change. Next, identify a strategy to realize the vision.
- **Step 4:** Communicate the vision. Communicate the vision throughout the change process. Apply the vision throughout all aspects of the organization. Senior management and the change coalition should consistently communicate the vision and demonstrate the urgency and benefits of the change.
- **Step 5:** Remove obstacles. All change comes with obstacles. Sometimes the obstacles are outdated processes, sometimes they are based on the organizational structure, and sometimes they are people resistant to change. Regardless, all obstacles need to be addressed.
- **Step 6:** Create short-term wins. Identify quick and easy wins to build momentum and support for the change.
- **Step 7:** Build on the change. Once the short-term wins are complete, the organization needs to set goals for continued improvement.

- **Step 8:** Anchor the changes in corporate culture. Ensure the change becomes ingrained into the culture: continue to communicate the vision, tell success stories, recognize people in the organization who embody and empower the change, and continue to support the change coalition.

### Virginia Satir Change Model

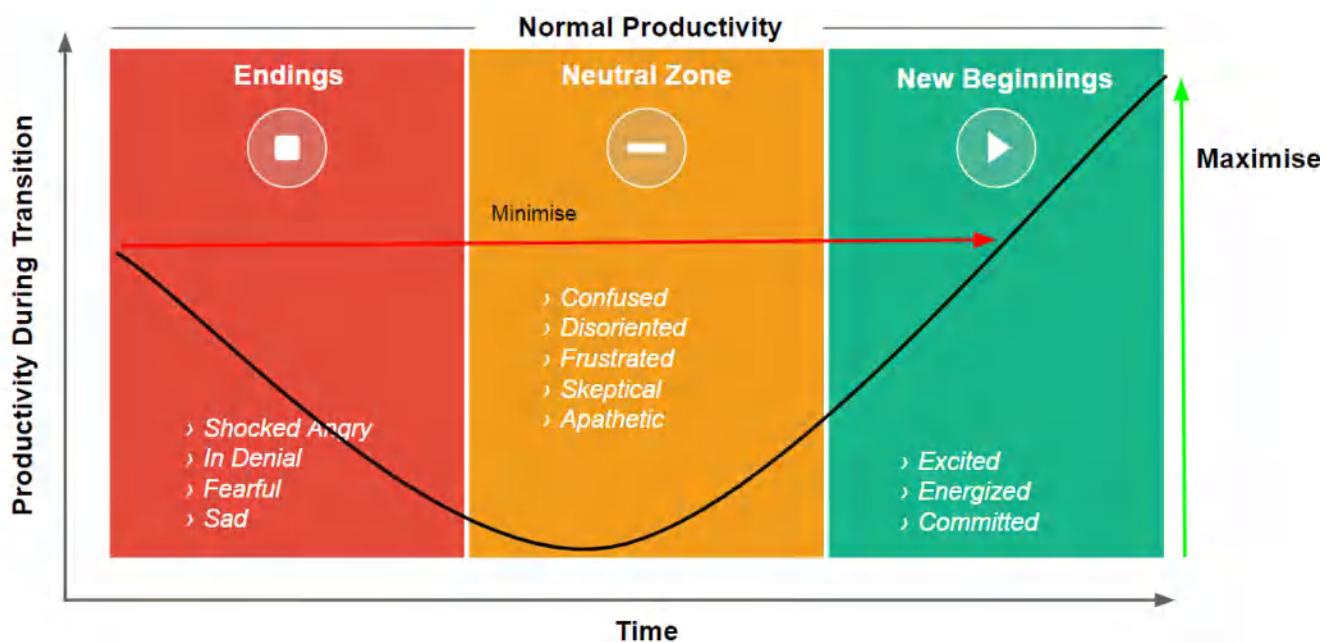


Virginia Satir developed a model of how people experience and cope with change. Its purpose is to help project team members understand what they are feeling and enable them to move through change more efficiently.

- Late status quo. This initial stage is when everything feels familiar and can be characterized as “business as usual.” For some people, business as usual may be good because they know what to expect. For others, this status may feel a bit stale or boring.
- The foreign element. Something happens that shifts the status quo in this stage. This may include initiating a project that introduces change to people’s usual way of working. There is often a period of resistance and reduction in performance after the change is introduced. People may ignore the change or dismiss its relevance.

- Chaos. People are in unfamiliar territory. They are no longer comfortable, and performance drops to its lowest level. Feelings, actions, and behaviors are unpredictable. Some people feel anxious, others may shut down, and some individuals may feel excited. Chaos can make people very creative as they try to find ways to make sense of the situation. They try various ideas and behaviors to see which of these has a positive outcome.
- The transforming idea. People come to a point where they come up with an idea that helps them make sense of the situation. They begin to see how they can find a way out of the chaos and cope with the new reality. Work performance begins to increase.
- Practice and integration. People try to implement their new ideas or behaviors. There may be setbacks and a period of trial and error, but eventually they learn what works and what doesn't. This leads to improved performance. Often performance is at a higher level than it was before the foreign element was introduced.
- New status quo. People get used to the new environment, and their performance stabilizes. Eventually, the new status quo becomes the normal way of working.

## Transition Model



William Bridges' Transition Model provides an understanding of what occurs to individuals psychologically when an organizational change takes place. This model differentiates between change and transition. Change is situational and happens whether or not people transition through it. Transition is a psychological process where people gradually accept the details of the new situation and the changes that come with it.

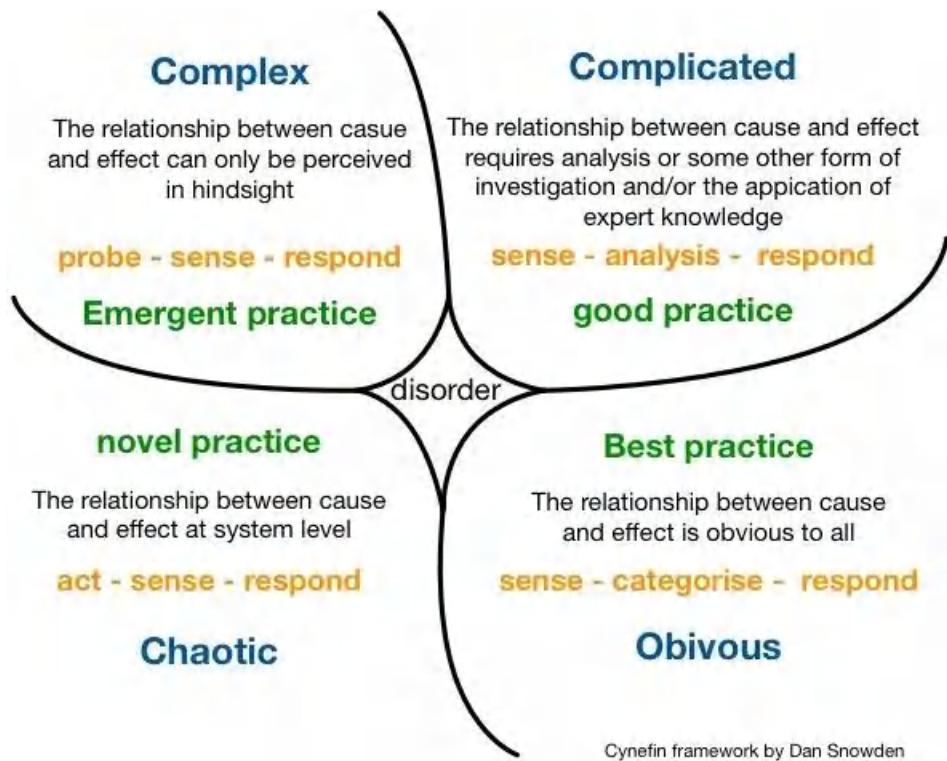
The model identifies three stages of transition associated with change:-

- Ending, losing, and letting go. The change is introduced in this stage. It is often associated with fear, anger, upset, uncertainty, denial, and resistance to the change.
- The neutral zone. The change is happening in this stage. In some instances, people may feel frustration, resentment, confusion, and anxiety about the change. Productivity may drop as people learn new ways of doing work. In other instances, people may become very creative, innovative, and passionate about trying new ways of working.
- The new beginning. At this point, people accept and even embrace the change. They are becoming more adept at the new skills and the new ways of working. People are often open to learning and are energized by the change.

### 3.2.6 Complexity Model

Projects exist in a state of ambiguity and require interactions among multiple systems, often with uncertain outcomes. Complexity is a challenge to work with. The two models described in Below Sections provide a framework to understand complexity and determine how to make decisions in a complex environment.

#### Cynefin Framework

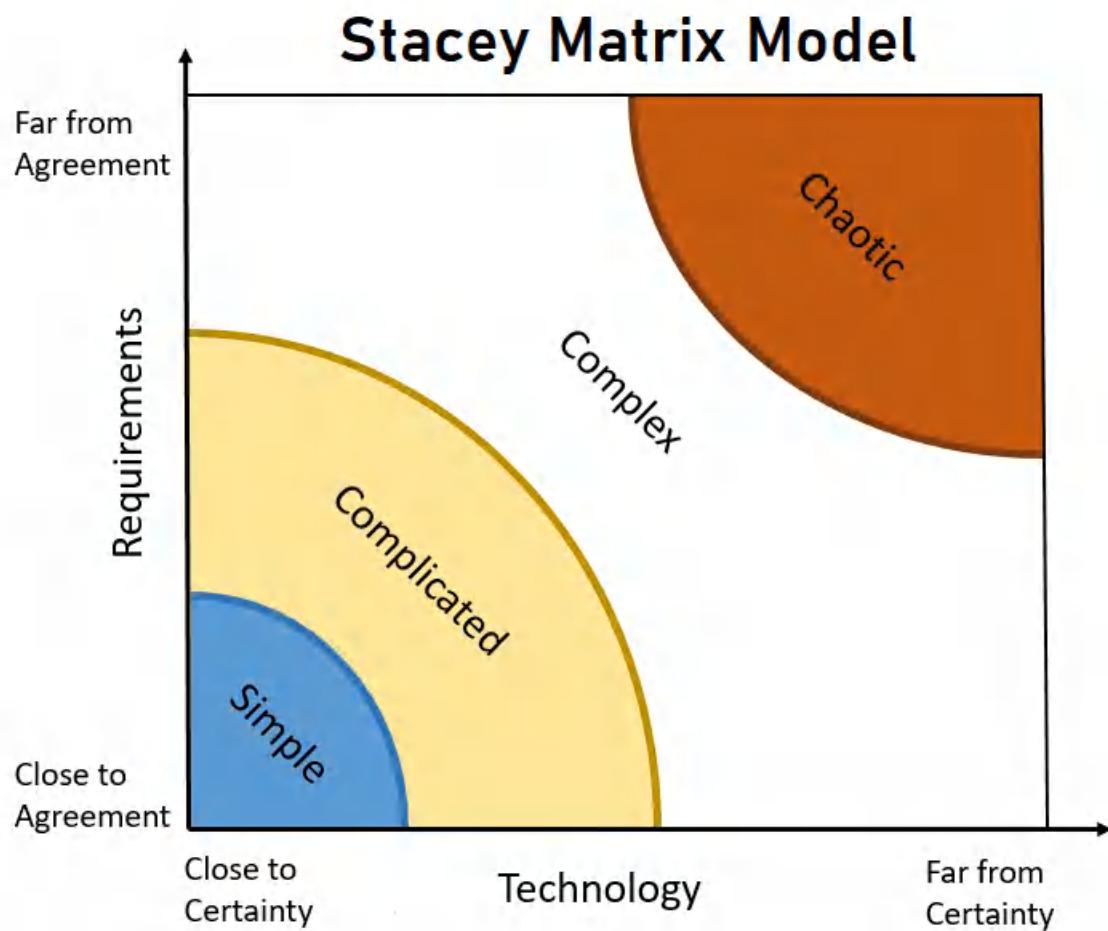


The Cynefin framework, created by Dave Snowden, is a conceptual framework used to diagnose cause-and-effect relationships as a decision-making aid. The framework offers five problem and decision-making contexts:-

Where there is an obvious cause-and-effect relationship, best practices are used to make decisions.

- Complicated relationships exist when there is a set of known unknowns or a range of correct answers. In these situations, it is best to assess the facts, analyze the situation, and apply good practices.
- Complex relationships include unknown unknowns. There is no apparent cause and effect, and there are no obvious right answers. In complex environments, one should probe the environment, sense the situation, and respond with action. This style uses emergent practices that allow for repeated cycles of probe-sense-respond as complex environments change in reaction to multiple stimuli, and what worked once may not be effective the next time.
- In chaotic environments, the cause and effects are unclear. There is too much confusion to wait to understand the situation. In these situations, the first step is to take action to try and stabilize the situation, then sense where there is some stability, and respond by taking steps to get the chaotic situation to a complex situation.
- Disordered relationships lack clarity and may require breaking them into smaller parts whose context links with one of the other four contexts. The Cynefin framework helps identify behaviors, such as probing, sensing, responding, acting, and categorizing, which can help impact the relationships between variables and guide actions.

## Stacey Matrix



Ralph Stacey developed the Stacey matrix which is similar to the Cynefin framework, but it looks at two dimensions to determine the relative complexity of a project: (a) the relative uncertainty of the requirements for the deliverable, and (b) the relative uncertainty of the technology that will be used to create the deliverable. Based on the relative uncertainty of these dimensions, a project is considered simple, complicated, complex, or chaotic. The degree of complexity is one factor that influences tailoring methods and practices for the project.

### 3.2.5 Conflict Model



Conflict is common on projects. Conflict can be healthy and productive when handled well. It can result in greater trust among project team members and a deeper commitment to the outcomes. Fear of conflict can restrict communication and creativity. However, conflict can be unhealthy as well.

Addressing conflict inappropriately can lead to dissatisfaction, lack of trust, and reduced morale and motivation. The model based on work by Ken Thomas and Ralph Kilmann describes six ways of addressing conflict by focusing on the relative power between the individuals and the desire to maintain a good relationship as follows:-

- **Confronting/problem solving**:- Confronting a conflict treats the conflict as a problem to be solved. This style of conflict resolution is used when the relationship between parties is important, and when each person has confidence in the other party's ability to problem-solve.

- **Collaborating**:- Collaborating involves incorporating multiple views about the conflict. The objective is to learn about the various views and see things from multiple perspectives. This is an effective method when there is trust among the participants and when there is time to come to consensus. A project manager may facilitate this type of conflict resolution between project team members.
- **Compromising**:- There are some conflicts in which all parties will not be fully satisfied. In those instances, finding a way to compromise is the best approach. Compromise entails a willingness to give and take. This allows all parties to get something they want, and it avoids escalating the conflict. This style is often used when the parties involved have equal “power.” A project manager may compromise with a technical manager regarding the availability of a project team member to work on the project.
- **Smoothing/accommodating**:- Smoothing and accommodating are useful when reaching the overarching goal is more important than the disagreement. This approach maintains harmony in the relationship and can create good will between the parties. This approach is also used when there is a difference in the relative authority or power of the individuals.

For example, this approach may be appropriate when there is a disagreement with the sponsor. Since the sponsor outranks the project manager or project team member, and there is a desire to maintain a good relationship with the sponsor, adopting an accommodating posture may be appropriate.

- **Forcing**:- Forcing is used when there is not enough time to collaborate or problem-solve. In this scenario, one party forces their will on the other. The party forcing has more power than the other party. A forcing style may be used if there is a health and safety conflict that needs to be resolved immediately.

- **Withdrawal/avoiding:-** Sometimes a problem will go away on its own, or sometimes discussions get heated and people need a cooling-off period. In both scenarios, withdrawing from the situation is appropriate. Withdrawal is also used in a no-win scenario, such as complying with a requirement imposed by a regulatory agency instead of challenging the requirement.

### 3.3 Methods

A method is a means for achieving an outcome, output, result, or project deliverable. The methods described here are a sampling of those commonly used to support project work.

There are many methods that are not described here, either because they are used in project management the same way they are in other disciplines, such as interviewing, focus groups, checklists, and so forth, or because they are not frequently used across a broad spectrum of projects (i.e., the methods are industry specific).

Many of the methods are related by the purpose they serve, such as estimating or data gathering, and therefore, are presented in a group. Others are related by the type of activity involved, such as those in the meetings and analysis groups.

#### Data Gathering Analysis

Data gathering and analysis methods are used to collect, assess, and evaluate data and information to gain a deeper understanding of a situation. The outputs of data analysis may be organized and presented as one of the artifacts shown in Section. The data gathering and analysis methods described here, coupled with the artifacts described in, are often used to inform decisions.

- **Alternatives analysis**:- Alternatives analysis is used to evaluate identified options in order to select the options or approaches to perform the work of the project.
- **Assumption and constraint analysis**:- An assumption is a factor that is considered to be true, real, or certain, without proof or demonstration. A constraint is a limiting factor that affects the execution of a project, program, portfolio, or process. This form of analysis ensures that assumptions and constraints are integrated into the project plans and documents, and that there is consistency among them.

- **Benchmarking:** Benchmarking is the comparison of actual or planned products, processes, and practices to those of comparable organizations, which identifies best practices, generates ideas for improvement, and provides a basis for measuring performance.
- **Business justification analysis methods:-** This group of analysis methods is associated with authorizing or justifying a project or a decision. The outcomes of the following analyses are often used in a business case that justifies undertaking a project:
  - ▷ **Payback period:**- The payback period is the time needed to recover an investment, usually in months or years.
  - ▷ **Internal rate of return (IRR):-** The internal rate of return is the projected annual yield of a project investment, incorporating both initial and ongoing costs into an estimated percentage growth rate a given project is expected to have.
  - ▷ **Return on investment (ROI):-** Return on investment is the percent return on an initial investment, calculated by taking the projected average of all net benefits and dividing them by the initial cost.
  - ▷ **Net present value (NPV):-** Net present value is the future value of expected benefits, expressed in the value those benefits have at the time of investment. NPV considers current and future costs and benefits and inflation.
  - ▷ **Cost-benefit analysis:-** A cost-benefit analysis is a financial analysis tool used to determine the benefits provided by a project against its costs.
- **Check sheet:-**A check sheet is a tally sheet that can be used as a checklist when gathering data. Check sheets can be used to collect and segregate data into categories. Check sheets can also be used to create histograms and matrices as described in Section

- **Cost of quality**:- The cost of quality includes all costs incurred over the life of the product by investment in preventing nonconformance to requirements, appraisal of the product or service for conformance to requirements, and failure to meet requirements.
- **Decision tree analysis**:- A decision tree analysis is a diagramming and calculation method for evaluating the implications of a chain of multiple options in the presence of uncertainty. Decision trees can use the information generated from an expected monetary value analysis to populate the branches of the decision tree.
- **Earned value analysis**:- Earned value analysis is a method that utilizes a set of measures associated with scope, schedule, and cost to determine the cost and schedule performance of a project.
- **Expected monetary value (EMV)**:- The expected monetary value is the estimated value of an outcome expressed in monetary terms. It is used to quantify the value of uncertainty, such as a risk, or compare the value of alternatives that are not necessarily equivalent. The EMV is calculated by multiplying the probability that an event will occur and the economic impact the event would have should it occur.
- **Forecast**:- A forecast is an estimate or prediction of conditions and events in the project's future, based on information and knowledge available at the time of the forecast. Qualitative forecasting methods use the opinions and judgments of subject matter experts. Quantitative forecasting uses models where past information is used to predict future performance. Causal or econometric forecasting, such as regression analysis, identifies variables that can have significant impact on future outcomes.
- **Influence diagram**:- This diagram is a graphical representation of situations showing causal influences, time ordering of events, and other relationships among variables and outcomes.

- **Life cycle assessment**:- This assessment is a tool used to evaluate the total environmental impact of a product, process, or system. It includes all aspects of producing a project deliverable, from the origin of materials used in the deliverable to its distribution and ultimate disposal.
- **Make-or-buy analysis**:- A make-or-buy analysis is the process of gathering and organizing data about product requirements and analysing them against available alternatives such as the purchase versus internal manufacture of the product.
- **Probability and impact matrix**:- A probability and impact matrix is a grid for mapping the probability of occurrence of each risk and its impact on project objectives if that risk occurs.
- **Process analysis**:- This analysis is a systematic review of the steps and procedures to perform an activity.
- **Regression analysis**:- A regression analysis is an analytical technique where a series of input variables are examined in relation to their corresponding output results in order to develop a mathematical or statistical relationship.
- **Reserve analysis**:- This analytical technique is used to evaluate the amount of risk on the project and the amount of schedule and budget reserve to determine whether the reserve is sufficient for the remaining risk. The reserve contributes to reducing risk to an acceptable level.
- **Root cause analysis**:- This analytical technique is used to determine the basic underlying cause of a variance, defect, or a risk. A root cause may underlie more than one variance, defect, or risk.
- **Sensitivity analysis**:- This analytical technique is used to determine which individual project risks or other sources of uncertainty have the most potential impact on project outcomes by correlating variations in project outcomes with variations in elements of a quantitative risk analysis model.

- **Simulations**:- This analytical technique uses models to show the combined effect of uncertainties in order to evaluate their potential impact on objectives. A Monte Carlo simulation is a method of identifying the potential impacts of risk and uncertainty using multiple iterations of a computer model to develop a probability distribution of a range of outcomes that could result from a decision or course of action.
- **Stakeholder analysis**:- This technique involves systematically gathering and analyzing quantitative and qualitative information about stakeholders to determine whose interests should be taken into account throughout the project.
- **SWOT analysis**:- A SWOT analysis assesses the strengths, weaknesses, opportunities, and threats of an organization, project, or option.
- **Trend analysis**:- A trend analysis uses mathematical models to forecast future outcomes based on historical results.
- **Value stream mapping**:- Value stream mapping is a lean enterprise method used to document, analyze, and improve the flow of information or materials required to produce a product or service for a customer.
- **Variance analysis**:- Variance analysis is used to determine the cause and degree of difference between the baseline and actual performance.
- **What-if scenario analysis**:- This analytical technique evaluates scenarios in order to predict their effect on project objectives.

## Estimating

Estimating methods are used to develop an approximation of work, time, or cost on a project.

- **Affinity grouping**:- Affinity grouping involves classifying items into similar categories or collections on the basis of their likeness. Common affinity groupings include T-shirt sizing and Fibonacci numbers.

- **Analogous estimating.** Analogous estimating assesses the duration or cost of an activity or a project using historical data from a similar activity or project.
- **Function point:-** A function point is an estimate of the amount of business functionality in an information system. Function points are used to calculate a functional size measurement (FSM) of a software system.
- **Multipoint estimating:-** Multipoint estimating assesses cost or duration by applying an average or weighted average of optimistic, pessimistic, and most likely estimates when there is uncertainty with the individual activity estimates.
- **Parametric estimating:-** Parametric estimating uses an algorithm to calculate cost or duration based on historical data and project parameters.
- **Relative estimating:-** Relative estimating is used to create estimates that are derived from performing a comparison against a similar body of work, taking effort, complexity, and uncertainty into consideration. Relative estimating is not necessarily based on absolute units of cost or time. Story points are a common unitless measure used in relative estimating.
- **Single-point estimating:-** Single-point estimating involves using data to calculate a single value that reflects a best-guess estimate. A single-point estimate is opposed to a range estimate, which includes the best- and worst-case scenario.
- **Story point estimating:-** Story point estimating involves project team members assigning abstract, but relative, points of effort required to implement a user story. It tells the project team about the difficulty of the story considering the complexity, risks, and effort involved.
- **Wideband Delphi:-** Wideband Delphi is a variation of the Delphi estimating method where subject matter expert's complete multiple rounds of producing estimates individually, with a project team discussion after each round, until a consensus is achieved. For Wideband Delphi, those who created the highest and lowest estimates

explain their rationale, following which everyone re-estimates. The process repeats until convergence is achieved. Planning poker is a variation of Wideband Delphi.

## Meetings and Events

Meetings are an important means for engaging the project team and other stakeholders.

They

are a primary means of communication throughout the project.

- **Backlog refinement**:- At a backlog refinement meeting, the backlog is progressively elaborated and (re)prioritized to identify the work that can be accomplished in an upcoming iteration.
- **Bidder conference**:- Meetings with prospective sellers prior to the preparation of a bid or proposal to ensure all prospective vendors have a clear and common understanding of the procurement. This meeting may also be known as contractor conferences, vendor conferences, or pre-bid conferences.
- **Change control board**:- A change control board meeting includes the group of people who are accountable for reviewing, evaluating, approving, delaying, or rejecting changes to the project. The decisions made at this meeting are recorded and communicated to the appropriate stakeholders. This meeting may also be referred to as a change control meeting.
- **Daily Stand-up**:- A stand-up is a brief collaboration meeting during which the project team reviews its progress from the previous day, declares intentions for the current day, and highlights any obstacles encountered or anticipated. This meeting may also be referred to as a daily scrum.
- **Iteration planning**:- An iteration planning meeting is used to clarify the details of the backlog items, acceptance criteria, and work effort required to meet an upcoming

iteration commitment. This meeting may also be referred to as a sprint planning meeting.

- **Iteration review**:- An iteration review is held at the end of an iteration to demonstrate the work that was accomplished during the iteration. This meeting may also be referred to as a sprint review.
- **Kick-off**:- A kick-off meeting is a gathering of project team members and other key stakeholders at the outset of a project to formally set expectations, gain a common understanding, and commence work. It establishes the start of a project, phase, or iteration.
- **Lessons learned meeting**:- A lessons learned meeting is used to identify and share the knowledge gained during a project, phase, or iteration with a focus on improving project team performance. This meeting can address situations that could have been handled better in addition to good practices and situations that produced very favourable outcomes.
- **Planning meeting**:- A planning meeting is used to create, elaborate, or review a plan or plans and secure commitment for the plan(s).
- **Project closeout**:- A project closeout meeting is used to obtain final acceptance of the delivered scope from the sponsor, product owner, or client. This meeting indicates that the product delivery is complete.
- **Project review**:- A project review meeting is an event at the end of a phase or a project to assess the status, evaluate the value delivered, and determine if the project is ready to move to the next phase, or transition to operations.
- **Release planning**:- Release planning meetings identify a high-level plan for releasing or transitioning a product, deliverable, or increment of value.

- **Retrospective**:- A retrospective is a regularly occurring workshop in which participants explore their work and results in order to improve both process and product. Retrospectives are a form of lessons learned meeting.
- **Risk review**:- A meeting to analyze the status of existing risks and identify new risks. This includes determining if the risk is still active and if there have been changes to the risk attributes (such as probability, impact, urgency, etc.). Risk responses are evaluated to determine if they are effective or should be updated. New risks may be identified and analysed and risks that are no longer active may be closed. Risk reassessment is an example of a risk-review meeting.
- **Status meeting**:- A status meeting is a regularly scheduled event to exchange and analyze information about the current progress of the project and its performance.
- **Steering committee**:- A meeting where senior stakeholders provide direction and support to the project team and make decisions outside of the project team's authority.

## Other Methods

The methods described in this section don't fit into a specific category; however, they are common methods that are used for a variety of purposes on projects.

- **Impact mapping**:- Impact mapping is a strategic planning method that serves as a visual roadmap for the organization during product development.
- **Modelling**:- Modelling is the process of creating simplified representations of systems, solutions, or deliverables such as prototypes, diagrams, or storyboards. Modeling can facilitate further analysis by identifying gaps in information, areas of miscommunication, or additional requirements.
- **Net Promoter Score (NPS®)**:- An index that measures the willingness of customers to

recommend an organization's products or services to others. The score is used as a proxy for gauging the customer's overall satisfaction with an organization's product or service and the customer's loyalty to the brand.

- **Prioritization schema**:- Prioritization schema are methods used to prioritize portfolio, program, or project components, as well as requirements, risks, features, or other product

information. Examples include a multicriteria weighted analysis and the MoSCoW (must have, should have, could have, and won't have) method.

- **Timebox**:- A timebox is a short, fixed period of time in which work is to be completed, such as 1 week, 2 weeks, or 1 month.

# Methods applied across Performance Domains

Mapping of Methods Likely to Be Used in Each Performance Domain

Method	Performance Domain						
	Team	Stakeholders	Dev Approach and Life Cycle	Planning	Project Work	Delivery	Measurement
<b>Data Gathering and Analysis Methods:</b>							
Alternatives analysis				X	X	X	
Assumptions and constraints analysis				X		X	
Benchmarking						X	X
Business justification analysis				X			X
Payback period		X	X				X
Internal rate of return				X			X
Return on Investment				X			X
Net present value		X	X		X	X	
Cost-benefit ratio				X			X
Check sheet						X	X
Cost of quality				X		X	X
Decision tree analysis				X			
Earned value analysis				X			X
Expected monetary value				X			
Forecasting							X
Influence diagram				X			
Life cycle assessment				X			
Make-or-buy analysis				X	X		
Probability and Impact matrix				X			X
Process analysis				X	X	X	X
Regression analysis				X			X
Root cause analysis					X	X	
Sensitivity analysis				X	X	X	
Simulation				X			X
Stakeholder analysis	X			X	X		
SWOT analysis				X			X
Trend analysis							X
Value stream mapping				X	X	X	
Variance analysis							X
What-if scenario analysis				X			X

**Mapping of Methods Likely to Be Used in Each Performance Domain (cont.)**

Method	Performance Domain						
	Team	Stakeholders	Dev Approach and Life Cycle	Planning	Project Work	Delivery	Measurement
<b>Estimating Methods:</b>							
Affinity grouping				X			
Analogous estimating				X			
Function points				X			
Multipoint estimating				X			
Parametric estimating				X			
Relative estimating				X			
Single-point estimating				X			
Story point estimation				X			
Wideband Delphi				X			
<b>Meeting and Event Methods:</b>							
Backlog refinement		X		X	X	X	
Bidder conference	X			X	X		
Change control board					X	X	
Daily standup				X	X		
Iteration review	X				X	X	
Iteration planning	X			X	X	X	
Kickoff	X	X			X		
Lessons learned		X		X	X	X	
Planning				X			
Project closeout	X	X			X		
Project review	X				X	X	X
Release planning	X			X			
Retrospective	X			X			
Risk review					X		X
Status					X		X
Steering committee		X			X		
<b>Other Methods:</b>							
Impact mapping	X	X		X		X	X
Modelling						X	
Net Promoter Score®	X						X
Prioritization schema	X				X		
Timebox				X	X	X	X

## 3.4 Artifacts

An artifact is a template, document, output, or project deliverable. There are many documents or deliverables that are not described here, either because (a) they are somewhat generic, such as updates; (b) they are industry specific; or (c) they are a result of a specific method that was used to create it. For example, while cost estimates are an important artifact, they are the result of various estimating methods.

### Strategy Artifacts

Documents that are created prior to or at the start of the project that address strategic, business, or high-level information about the project. Strategy artifacts are developed at the start of a project and do not normally change, though they may be reviewed throughout the project.

- **Business case**:- A business case is a value proposition for a proposed project that may include financial and nonfinancial benefits.
- **Business model canvas**:- This artifact is a one-page visual summary that describes the value proposition, infrastructure, customers, and finances. These are often used in lean start-up situations.
- **Project brief**:- A project brief provides a high-level overview of the goals, deliverables, and processes for the project.
- **Project charter**:- A project charter is a document issued by the project initiator or sponsor that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities.
- **Project vision statement**:- This document is a concise, high-level description of the project that states the purpose, and inspires the project team to contribute to the project.

- **Roadmap**:- This document provides a high-level time line that depicts milestones, significant events, reviews, and decision points.

## Logs & Registers

Logs and registers are used to record continuously evolving aspects of the project. They are updated throughout the project. The terms log and register are sometimes used interchangeably. It is not uncommon to see the term *risk register* or *risk log* referring to the same artifact.

- **Assumption log**:- An assumption is a factor that is considered to be true, real, or certain, without proof or demonstration. A constraint is a factor that limits the options for managing a project, program, portfolio, or process. An assumption log records all assumptions and constraints throughout the project.
- **Backlog**:- A backlog is an ordered list of work to be done. Projects may have a product backlog, a requirements backlog, impediments backlog, and so forth. Items in a backlog are prioritized. The prioritized work is then scheduled for upcoming iterations.
- **Change log**:- A change log is a comprehensive list of changes submitted during the project and their current status. A change can be a modification to any formally controlled deliverable, project management plan component, or project document.
- **Issue log**:- An issue is a current condition or situation that may have an impact on the project objectives. An issue log is used to record and monitor information on active issues. Issues are assigned to a responsible party for follow up and resolution.
- **Lessons learned register**:- A lessons learned register is used to record knowledge gained during a project, phase, or iteration so that it can be used to improve future performance for the project team and/or the organization.

- **Risk-adjusted backlog**:- A risk-adjusted backlog is a backlog that includes work and actions to address threats and opportunities.
- **Risk register**:- A risk register is a repository in which outputs of risk management processes are recorded. Information in a risk register can include the person responsible for managing the risk, probability, impact, risk score, planned risk responses, and other information used to get a high-level understanding of individual risks.
- **Stakeholder register**:- A stakeholder register records information about project stakeholders, which includes an assessment and classification of project stakeholders.

## Plans

A plan is a proposed means of accomplishing something. Project teams develop plans for individual aspects of a project and/or combine all of that information into an overarching project management plan. Plans generally are written documents but may also be reflected on visual/ virtual whiteboards.

- **Change control plan**:- A change control plan is a component of the project management plan that establishes the change control board, documents the extent of its authority, and describes how the change control system will be implemented.
- **Communications management plan**:- This plan is a component of the project, program, or portfolio management plan that describes how, when, and by whom information about the project will be administered and disseminated.
- **Cost management plan**:- This plan is a component of a project or program management plan that describes how costs will be planned, structured, and controlled.
- **Iteration plan**:- This plan is a detailed plan for the current iteration.

- **Procurement management plan**:- This plan is a component of the project or program management plan that describes how a project team will acquire goods and services from outside of the performing organization.
- **Project management plan**:- The project management plan is a document that describes how the project will be executed, monitored and controlled, and closed.
- **Quality management plan**:- This plan is a component of the project or program management plan that describes how applicable policies, procedures, and guidelines will be implemented to achieve the quality objectives.
- **Release plan**:- This plan sets expectations for the dates, features, and/or outcomes expected to be delivered over the course of multiple iterations.
- **Requirements management plan**:- This plan is a component of the project or program management plan that describes how requirements will be analyzed, documented, and managed.
- **Resource management plan**:- This plan is a component of the project management plan that describes how project resources are acquired, allocated, monitored, and controlled.
- **Risk management plan**:- This plan is a component of the project, program, or portfolio management plan that describes how risk management activities will be structured and performed.
- **Scope management plan**:- This plan is a component of the project or program management plan that describes how the scope will be defined, developed, monitored, controlled, and validated.
- **Schedule management plan**:- This plan is a component of the project or program management plan that establishes the criteria and the activities for developing, monitoring, and controlling the schedule.

- **Stakeholder engagement plan**:- This plan is a component of the project management plan that identifies the strategies and actions required to promote productive involvement of stakeholders in project or program decision making and execution.
- **Test plan**:- This document describes deliverables that will be tested, tests that will be conducted, and the processes that will be used in testing. It forms the basis for formally testing the components and deliverables.

## Hierarchy Charts

Hierarchy charts begin with high-level information that is progressively decomposed into greater levels of detail. The information at the upper levels encompasses all the information at the lower or subsidiary levels. Hierarchy charts are often progressively elaborated into greater levels of detail as more information is known about the project.

- **Organizational breakdown structure**:- This chart is a hierarchical representation of the project organization, which illustrates the relationship between project activities and the organizational units that will perform those activities.
- **Product breakdown structure**:- This chart is a hierarchical structure reflecting a product's components and deliverables.
- **Resource breakdown structure**:- This chart is a hierarchical representation of resources by category and type.
- **Risk breakdown structure**:- This chart is a hierarchical representation of potential sources of risks.
- **Work breakdown structure**:- This chart is a hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives

and create the required deliverables.

## Baselines

A baseline is the approved version of a work product or plan. Actual performance is compared to baselines to identify variances.

- **Budget**:- A budget is the approved estimate for the project or any work breakdown structure (WBS) component or any schedule activity.
- Milestone schedule. This type of schedule presents milestones with planned dates.
- **Performance measurement baseline**:- Integrated scope, schedule, and cost baselines are used for comparison to manage, measure, and control project execution.
- **Project schedule**:- A project schedule is an output of a schedule model that presents linked activities with planned dates, durations, milestones, and resources.
- **Scope baseline**:- This baseline is the approved version of a scope statement, work breakdown structure (WBS), and its associated WBS dictionary that can be changed using formal change control procedures and is used as the basis for comparison to actual results.

## Visual Data & Information

Visual data and information are artifacts that organize and present data and information in a visual format, such as charts, graphs, matrices, and diagrams. Visualizing data makes it easier to absorb data and turn it into information. Visualization artifacts are often produced after data have been collected and analyzed. These artifacts can aid in decision making and prioritization.

- **Affinity diagram**:- This diagram shows large numbers of ideas classified into groups for review and analysis.
  - **Burndown/burnup chart**:- This chart is a graphical representation of the work remaining in a timebox or the work completed toward the release of a product or project deliverable.
  - **Cause-and-effect diagram**:- This diagram is a visual representation that helps trace an undesirable effect back to its root cause.
  - **Cumulative flow diagram (CFD)**:- This chart indicates features completed over time, features in development, and those in the backlog. It may also include features at intermediate states, such as features designed but not yet constructed, those in quality assurance, or those in testing.
- 
- **Cycle time chart**:- This diagram shows the average cycle time of the work items completed over time. A cycle time chart may be shown as a scatter diagram or a bar chart.
  - **Dashboards**:- This set of charts and graphs shows progress or performance against important measures of the project.
  - **Flowchart**:- This diagram depicts the inputs, process actions, and outputs of one or more processes within a system.
  - **Gantt chart**:- This bar chart provides schedule information where activities are listed on the vertical axis, dates are shown on the horizontal axis, and activity durations are shown as horizontal bars placed according to start and finish dates.
  - **Histogram**:- This bar chart shows the graphical representation of numerical data.
  - **Information radiator**:- This artifact is a visible, physical display that provides information to the rest of the organization, enabling timely knowledge sharing.

- **Lead time chart**:-This diagram shows the trend over time of the average lead time of the items completed in work. A lead time chart may be shown as a scatter diagram or a bar chart.
  - **Prioritization matrix**:- This matrix is a scatter diagram where effort is shown on the horizontal axis and value on the vertical axis, divided into four quadrants to classify items by priority.
  - **Project schedule network diagram**:- This graphical representation shows the logical relationships among the project schedule activities.
  - **Requirements traceability matrix**:- This matrix links product requirements from their origin to the deliverables that satisfy them.
  - **Responsibility assignment matrix (RAM)**:- This matrix is a grid that shows the project resources assigned to each work package. A RACI chart is a common way of showing stakeholders who are responsible, accountable, consulted, or informed and are associated with project activities, decisions, and deliverables.
  - **Scatter diagram**:- This graph shows the relationship between two variables.
  - **S-curve**:- This graph displays cumulative costs over a specified period of time.
  - **Stakeholder engagement assessment matrix**:- This matrix compares current and desired stakeholder engagement levels.
  - **Story map**:- A story map is a visual model of all the features and functionality desired for a given product, created to give the project team a holistic view of what they are building and why.
- 
- **Throughput chart**:- This chart shows the accepted deliverables over time. A throughput chart may be shown as a scatter diagram or a bar chart.
  - **Use case**:- This artifact describes and explores how a user interacts with a system to achieve a specific goal.

- **Value stream map**:- This is a lean enterprise method used to document, analyze, and improve the flow of information or materials required to produce a product or service for a customer. Value stream maps can be used to identify waste.
- **Velocity chart**:- This chart tracks the rate at which the deliverables are produced, validated, and accepted within a predefined interval.

## Reports

Reports are formal records or summaries of information. Reports communicate relevant (usually summary level) information to stakeholders. Often reports are given to stakeholders who are interested in the project status, such as sponsors, business owners, or PMOs.

- **Quality report**:- This project document includes quality management issues, recommendations for corrective actions, and a summary of findings from quality control activities. It may include recommendations for process, project, and product improvements.
- **Risk report**:- This project document is developed progressively throughout the risk management processes and summarizes information on individual project risks and the level of overall project risk.
- **Status report**:- This document provides a report on the current status of the project. It may include information on progress since the last report and forecasts for cost and schedule performance.

An **agreement** is any document or communication that defines the intentions of the parties. In projects, agreements take the form of contracts or other defined understandings.

A **contract** is a mutually binding agreement that obligates the seller to provide the specified product, service, or result and obligates the buyer to pay for it. There are different types of contracts, some of which fall within a category of fixed-price or cost-reimbursable contracts.

- **Fixed-price contracts**:- This category of contract involves setting a fixed price for a well-defined product, service, or result. Fixed-price contracts include firm fixed price (FFP), fixed-price incentive fee (FPIF), and fixed price with economic price adjustment (FP-EPA), among others.
- **Cost-reimbursable contract**:- This category of contracts involves payments to the seller for actual costs incurred for completing the work plus a fee representing seller profit. These contracts are often used when the project scope is not well defined or is subject to frequent change. Cost-reimbursable contracts include cost plus award fee (CPAF), cost plus fixed fee (CPFF), and cost plus incentive fee (CPIF).
- **Time and materials (T&M)**:- This contract establishes a fixed rate, but not a precise statement of work. It can be used for staff augmentation, subject matter expertise, or other outside support.
- **Indefinite delivery indefinite quantity (IDIQ)**:- This contract provides for an indefinite quantity of goods or services, with a stated lower and upper limit, and within a fixed time period. These contracts can be used for architectural, engineering, or information technology engagements.
- **Other agreements**:- Other types of agreements include memorandum of understanding (MOU), memorandum of agreement (MOA), service level agreement (SLA), basic ordering agreement (BOA), among others.

## Other Artifacts

The documents and deliverables described here do not fit into a specific category; however, they are important artifacts that are used for a variety of purposes.

- **Activity list**:- This document provides a tabulation of schedule activities that shows the activity description, activity identifier, and a sufficiently detailed scope of work description so project team members understand what work is to be performed.
- **Bid documents**:- Bid documents are used to request proposals from prospective sellers. Depending on the goods or services needed, bid documents can include, among others:
  - ▷ Request for information (RFI),
  - ▷ Request for quotation (RFQ), and
  - ▷ Request for proposal (RFP).
- **Metrics**:- Metrics describe an attribute and how to measure it.
- **Project calendar**:- This calendar identifies working days and shifts that are available for scheduled activities.
- **Requirements documentation**:- This document is a record of product requirements and relevant information needed to manage the requirements, which includes the associated category, priority, and acceptance criteria.
- **Project team charter**:- This document records the project team values, agreements, and operating guidelines, and establishes clear expectations regarding acceptable behavior by project team members.
- **User story**:- A user story is a brief description of an outcome for a specific user, which is a promise of a conversation to clarify details.

## Artifacts applied across Performance Domains

Different artifacts are more likely to be useful in different performance domains. While the delivery approach, product, and organizational environment will determine which artifacts are most applicable for a specific project, there are some performance domains that are more likely to make use of specific artifacts.

**Mapping of Artifacts Likely to Be Used in Each Performance Domain**

Artifact	Performance Domain						
	Team	Stakeholders	Dev Approach and Life Cycle	Planning	Project Work	Delivery	Measurement
<b>Strategy Artifacts:</b>							
Business case		X		X			
Project brief		X		X			
Project charter		X		X			
Project vision statement		X		X			
Roadmap		X	X	X			
<b>Log and Register Artifacts:</b>							
Assumption log				X	X	X	X
Backlog				X	X	X	
Change log					X	X	
Issue log					X		
Lessons learned register					X		
Risk-adjusted backlog				X			X
Risk register				X	X	X	X
Stakeholder register		X		X			
<b>Plan Artifacts:</b>							
Change control plan				X	X	X	
Communications management plan		X		X	X		
Cost management plan				X			
Iteration plan				X			
Procurement management plan				X	X		
Project management plan	X			X	X		
Quality management plan				X	X	X	
Release plan				X		X	
Requirements management plan				X		X	
Resource management plan				X	X		
Risk management plan				X	X		X
Scope management plan				X		X	

## Mapping of Artifacts Likely to Be Used in Each Performance Domain (cont.)

Artifact	Performance Domain						
	Team	Stakeholders	Dev Approach and Life Cycle	Planning	Project Work	Delivery	Measurement
Schedule management plan				X	X	X	
Stakeholder engagement plan		X		X			
Test plan				X	X	X	X
<b>Hierarchy Chart Artifacts:</b>							
Organizational breakdown structure	X	X		X			
Product breakdown structure				X		X	
Resource breakdown structure	X			X	X		X
Risk breakdown structure					X		X
Work breakdown structure				X		X	X
<b>Baseline Artifacts:</b>							
Budget				X	X		X
Milestone schedule			X	X	X		X
Performance measurement baseline				X	X	X	X
Project schedule				X	X		X
Scope baseline				X	X	X	X
<b>Visual Data and Information Artifacts:</b>							
Affinity diagram				X	X		
Burn chart				X		X	X
Cause-and-effect diagram					X	X	
Cycle time chart						X	X
Cumulative flow diagram						X	X
Dashboard					X		X
Flow chart				X	X	X	
Gantt chart				X	X		X
Histogram							X
Information radiator					X		X
Lead time chart						X	X
Prioritization matrix		X			X	X	

## Mapping of Artifacts Likely to Be Used in Each Performance Domain (cont.)

Artifact	Performance Domain						
	Team	Stakeholders	Dev Approach and Life Cycle	Planning	Project Work	Delivery	Measurement
Project schedule network diagram				X	X		
Requirements traceability matrix				X		X	X
Responsibility assignment matrix				X	X		
Scatter diagram					X	X	X
S-curve				X			X
Stakeholder engagement assessment matrix		X		X	X		
Story map				X		X	
Throughput chart						X	X
Use case				X		X	
Value stream map					X	X	X
Velocity chart						X	X
<b>Report Artifacts:</b>							
Quality report					X	X	X
Risk report					X		X
Status report					X		
<b>Agreements and Contracts:</b>							
Fixed-price		X		X	X	X	X
Cost-reimbursable		X		X	X	X	X
Time and materials		X		X	X	X	X
Indefinite time indefinite quantity (IDIQ)		X		X	X	X	X
Other agreements		X		X	X	X	X
<b>Other Artifacts:</b>							
Activity list	X	X		X	X		
Bid documents		X		X	X		
Metrics				X		X	X
Project calendars	X			X	X		
Requirements documentation		X		X		X	X
Project team charter	X				X		
User story		X		X		X	

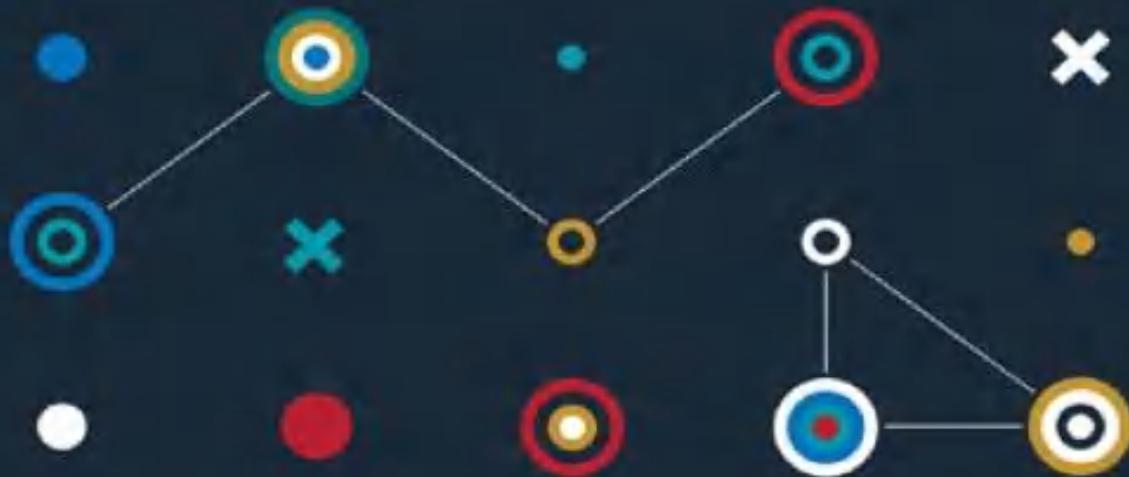
# **Agile Project Management Excellence**



**PMI-ACP®**

# **Sriram**

## Agile Project Management



# AGILE PRACTICE GUIDE



## PMI-ACP Exam Prep

Visit PMI-ACP Website: <https://www.pmi.org/certifications/agile-acp>

### Exam Info

- No of Questions: 120 multiple choice questions (only 100 will be scored)
- Duration: 3 hours
- Can be taken online or in-person testing center
- Online exams:
  - Camera
  - Mic
  - Speakers

### Eligibility Requirements

- Secondary degree (high school diploma)
- 2,000 hours of general project experience working on teams. A current PMP® or PgMP® will satisfy this requirement but is not required to apply for the PMI-ACP
- 1,500 hours working on agile project teams or with agile methodologies. This requirement is in addition to the 2,000 hours of general project experience
- 21 contact hours of training in agile practices

### PMI Audits

- First complete your application like you are being audited
- About 10% of students are audited by PMI
- Will have to mail them the following: -
  - Copy of this PDU certificate
  - Signed experience forms

## Exam Objectives

Covers the 7 domains listed in the PMI-ACP exam content outline published by PMI

Domain	Percentage of Items on the Test
Domain I. Agile Principles and Mindset	16%
Domain II. Value-driven Delivery	20%
Domain III. Stakeholder Engagement	17%
Domain IV. Team Performance	16%
Domain V. Adaptive Planning	12%
Domain VI. Problem Detection and Resolution	10%
Domain VII. Continuous Improvement (Product, Process, People)	9%
<b>Total</b>	<b>100%</b>

## Domain wise exam objectives

### Domain 1: Agile Principles and Mindset (9 Tasks)

#### Task 1

Advocate for agile principles by modeling those principles and discussing agile values in order to develop a shared mindset across the team as well as between the customer and the team.

#### Task 2

Help ensure that everyone has a common understanding of the values and principles of agile and a common knowledge around the agile practices and terminology being used in order to work effectively.

### **Task 3**

Support change at the system or organization level by educating the organization and influencing processes, behaviors, and people in order to make the organization more effective and efficient.

### **Task 4**

Practice visualization by maintaining highly visible information radiators showing real progress and real team performance in order to enhance transparency and trust.

### **Task 5**

Contribute to a safe and trustful team environment by allowing everyone to experiment and make mistakes so that each can learn and continuously improve the way he or she works.

### **Task 6**

Enhance creativity by experimenting with new techniques and process ideas in order to discover more efficient and effective ways of working.

### **Task 7**

Encourage team members to share knowledge by collaborating and working together in order to lower risks around knowledge silos and reduce bottlenecks.

### **Task 8**

Encourage emergent leadership within the team by establishing a safe and respectful environment in which new approaches can be tried in order to make improvements and foster self-organization and empowerment.

## **Task 9**

Practice servant leadership by supporting and encouraging others in their endeavors so that they can perform at their highest level and continue to improve.

## **Domain 2: Value-Driven Delivery (14 Tasks)**

### **Define Positive Value**

#### **Task 1**

Define deliverables by identifying units that can be produced incrementally in order to maximize their value to stakeholders while minimizing non-value added work.

#### **Task 2**

Refine requirements by gaining consensus on the acceptance criteria for features on a just-in-time basis in order to deliver value.

#### **Task 3**

Select and tailor the team's process based on project and organizational characteristics as well as team experience in order to optimize value delivery.

### **Avoid Potential Downsides**

#### **Task 4**

Plan for small releasable increments by organizing requirements into minimally marketable features/minimally viable products in order to allow for the early recognition and delivery of value.

## **Task 5**

Limit increment size and increase review frequency with appropriate stakeholders in order to identify and respond to risks early on and at minimal cost.

## **Task 6**

Solicit customer and user feedback by reviewing increments often in order to confirm and enhance business value.

### **Prioritization**

## **Task 7**

Prioritize the units of work through collaboration with stakeholders in order to optimize the value of the deliverables.

## **Task 8**

Perform frequent review and maintenance of the work results by prioritizing and maintaining internal quality in order to reduce the overall cost of incremental development.

## **Task 9**

Continuously identify and prioritize the environmental, operational, and infrastructure factors in order to improve the quality and value of the deliverables.

### **Incremental Development**

## **Task 10**

Conduct operational reviews and/or periodic checkpoints with stakeholders in order to obtain feedback and corrections to the work in progress and planned work.

### **Task 11**

Balance development of deliverable units and risk reduction efforts by incorporating both value producing and risk reducing work into the backlog in order to maximize the total value proposition over time.

### **Task 12**

Re-prioritize requirements periodically in order to reflect changes in the environment and stakeholder needs or preferences in order to maximize the value.

### **Task 13**

Elicit and prioritize relevant non-functional requirements (such as operations and security) by considering the environment in which the solution will be used in order to minimize the probability of failure.

### **Task 14**

Conduct frequent reviews of work products by performing inspections, reviews, and/or testing in order to identify and incorporate improvements into the overall process and product/service.

## **Domain 3: Stakeholders Engagement (10 Tasks)**

### **Understand Stakeholder Needs**

#### **Task 1**

Identify and engage effective and empowered business stakeholder(s) through periodic reviews in order to ensure that the team is knowledgeable about stakeholders' interests, needs, and expectations.

#### **Task 2**

Identify and engage all stakeholders (current and future) by promoting knowledge sharing early and throughout the project to ensure the unimpeded flow of information and value throughout the lifespan of the project.

#### **Ensure Stakeholder Involvement**

#### **Task 3**

Establish stakeholder relationships by forming a working agreement among key stakeholders in order to promote participation and effective collaboration.

#### **Task 4**

Maintain proper stakeholder involvement by continually assessing changes in the project and organization in order to ensure that new stakeholders are appropriately engaged.

#### **Task 5**

Establish collaborative behaviors among the members of the organization by fostering group decision making and conflict resolution in order to improve decision quality and reduce the time required to make decisions.

## **Understand Stakeholder Needs**

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## **Domain 4: Team Performance (9 Tasks)**

### **Team Formation**

#### **Task 1**

Cooperate with the other team members to devise ground rules and internal processes in order to foster team coherence and strengthen team members' commitment to shared outcomes.

#### **Task 2**

Help create a team that has the interpersonal and technical skills needed to achieve all known project objectives in order to create business value with minimal delay.

#### **Team Empowerment**

#### **Task 3**

Encourage team members to become generalizing specialists in order to reduce team size and bottlenecks, and to create a high performing cross-functional team.

#### **Task 4**

Contribute to self-organizing the work by empowering others and encouraging emerging leadership in order to produce effective solutions and manage complexity.

#### **Task 5**

Continuously discover team and personal motivators and demotivators in order to ensure that team morale is high and team members are motivated and productive throughout the project.

## **Team Collaboration and Commitment**

### **Task 6**

Facilitate close communication within the team and with appropriate external stakeholders through co-location or the use of collaboration tools in order to reduce miscommunication and rework.

### **Task 7**

Reduce distractions in order to establish a predictable outcome and optimize the value delivered.

### **Task 8**

Participate in aligning project and team goals by sharing project vision in order to ensure the team understands how their objectives fit into the overall goals of the project.

### **Task 9**

Encourage the team to measure its velocity by tracking and measuring actual performance in previous iterations or releases in order for members to gain a better understanding of their capacity and create more accurate forecasts.

## **Domain 5: Adaptive Planning (10 Tasks)**

### **Levels of Planning**

#### **Task 1**

Plan at multiple levels (strategic, release, iteration, daily) creating appropriate detail by using rolling wave planning and progressive elaboration to balance predictability of outcomes with ability to exploit opportunities.

#### **Task 2**

Make planning activities visible and transparent by encouraging participation of key stakeholders and publishing planning results in order to increase commitment level and reduce uncertainty.

#### **Task 3**

As the project unfolds, set and manage stakeholder expectations by making increasingly specific levels of commitments in order to ensure common understanding of the expected deliverables.

Adaptation

#### **Task 4**

Adapt the cadence and the planning process based on results of periodic retrospectives about characteristics and/or the size/complexity/criticality of the project deliverables in order to maximize the value.

## **Task 5**

Inspect and adapt the project plan to reflect changes in requirements, schedule, budget, and shifting priorities based on team learning, delivery experience, stakeholder feedback, and defects in order to maximize business value delivered.

### **Agile Sizing and Estimation**

## **Task 6**

Size items by using progressive elaboration techniques in order to determine likely project size independent of team velocity and external variables.

## **Task 7**

Adjust capacity by incorporating maintenance and operations demands and other factors in order to create or update the range estimate.

## **Task 8**

Create initial scope, schedule, and cost range estimates that reflect current high level understanding of the effort necessary to deliver the project in order to develop a starting point for managing the project.

## **Task 9**

Refine scope, schedule, and cost range estimates that reflect the latest understanding of the effort necessary to deliver the project in order to manage the project.

## **Task 10**

Continuously use data from changes in resource capacity, project size, and velocity metrics in order to evaluate the estimate to complete.

## **Domain 6: Problem Detection and Resolution (5 Tasks)**

### **Problem Detection and Resolution**

#### **Task 1**

Create an open and safe environment by encouraging conversation and experimentation, in order to surface problems and impediments that are slowing the team down or preventing its ability to deliver value.

#### **Task 2**

Identify threats and issues by educating and engaging the team at various points in the project in order to resolve them at the appropriate time and improve processes that caused issues.

#### **Task 3**

Ensure issues are resolved by appropriate team members and/or reset expectations in light of issues that cannot be resolved in order to maximize the value delivered.

#### **Task 4**

Maintain a visible, monitored, and prioritized list of threats and issues in order to elevate accountability, encourage action, and track ownership and resolution status.

#### **Task 5**

Communicate status of threats and issues by maintaining threat list and incorporating activities into backlog of work in order to provide transparency.

## **Domain 7: Continuous Improvement (6 Tasks)**

### **Continuous Improvement (Product, Process, People)**

#### **Task 1**

Tailor and adapt the project process by periodically reviewing and integrating team practices, organizational culture, and delivery goals in order to ensure team effectiveness within established organizational guidelines and norms.

#### **Task 2**

Improve team processes by conducting frequent retrospectives and improvement experiments in order to continually enhance the effectiveness of the team, project, and organization.

#### **Task 3**

Seek feedback on the product by incremental delivery and frequent demonstrations in order to improve the value of the product.

#### **Task 4**

Create an environment of continued learning by providing opportunities for people to develop their skills in order to develop a more productive team of generalizing specialists.

#### **Task 5**

Challenge existing process elements by performing a value stream analysis and removing waste in order to increase individual efficiency and team effectiveness.

## Task 6

Create systemic improvements by disseminating knowledge and practices across projects and organizational boundaries in order to avoid re-occurrence of identified problems and improve the effectiveness of the organization as a whole.

## PMI-ACP Exam Domains, Tools & Techniques, Knowledge & Skills

### Value Driven Delivery

Domain	Tools & Techniques	Knowledge & Skills
Value Driven Delivery	ROI, NPV, IRR Agile Earned Value Management (EVM) Product Roadmap Value Stream Mapping WIP Limits Relative Prioritization Risk adjusted backlog Cumulative flow diagrams Task  Kanban boards Chartering Customer valued prioritization Risk burndown graphs	Prototypes, Simulations, demonstrations Incremental delivery Prioritization Project and Quality standards Agile Contracting Agile Accounting System Thinking Variations in Agile Methods Value based analysis

## Stakeholder Management

Domain	Tools & Techniques	Knowledge & Skills
Stakeholder Management	Wireframes Servant leadership User Stories   Backlog Conflict Resolution Agile Modeling Velocity Information radiators Distributed teams Personas Burn down   up charts Story Maps Negotiation	Incorporating stakeholder values Communication management Leadership tools and techniques Stakeholder management Active listening Facilitation methods Globalization, culture and team diversity Vendor management Participatory decision models

## Team Performance

Domain	Tools & Techniques	Knowledge & Skills
Team Performance	Daily Standups Co-located teams Team Space Agile Tooling Adaptive Leadership Emotional Intelligence	Brainstorming Techniques Building Empowered Teams Coaching & Mentoring Building High Performance Teams Team Motivation Colocation & geographically dispersed teams

## Adaptive Planning

Domain	Tools & Techniques	Knowledge & Skills
Adaptive Planning	Process Tailoring Iteration and release planning Wideband Delphi and planning Poker Progressive elaboration Timeboxing Minimally Marketable Feature (MMF) Ideal Time Affinity Estimating Relative Sizing   Story Points	Time, budget, and cost estimation Value-based decomposition and prioritization Agile charters Business Case development Innovation Games

## Problem Detecting & Resolution

Domain	Tools & Techniques	Knowledge & Skills
Problem Detection & Resolution	Cycle Time Escaped defects Continuous Integration Risk based spike Frequent verification and validation Test-driven development   Test First Development Acceptance Test Driven Development	Problem Solving Control Limits Failure Modes & Alternatives Variance and trend analysis

## Continuous Improvement

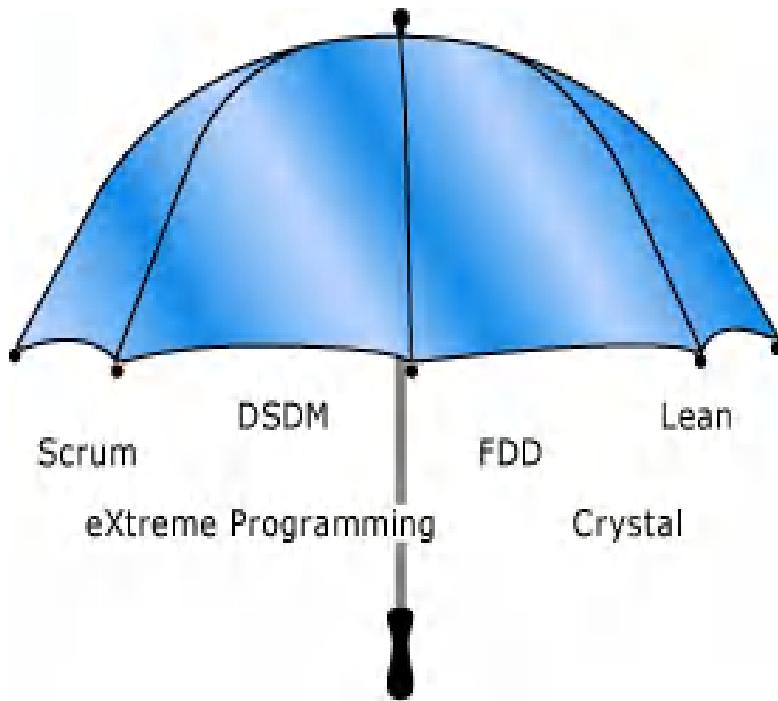
Domain	Tools & Techniques	Knowledge & Skills
Continuous Improvement	Retrospective	Knowledge Sharing Process Analysis Applying new agile practices PMI's code of Ethics & Professional Conduct Continuous Improvement Self-Assessment

# Domain 1. Agile Principles and Mindset

## Section – 1.1 Creating an Agile Mindset

### What is an Agile?

Developed for Software projects, but it is a methodology that can be used on all Projects types. “Agile” is an umbrella term used to encompass dozens of different techniques and disciplines (e.g., Scrum, XP, KANBAN, etc.), all aimed at the adaptive, iterative, incremental development of software. The concept of agile has several different implementations, which are called methodologies. The methodologies can either be applied individually to work or together in combination.



### Prerequisite:

- Work has high uncertainty in scope
- Work involves knowledge workers

Scrum is the most common method of agile, there are others such as extreme programming (XP), lean development, and Kanban.

## What is Agility?

Agility is the ability to deliver customer value while dealing with the inherent project unpredictability and dynamism by recognizing and adapting to change.

## Why Agile?

- Reduce turnaround time for features
- Predictability of market releases – content and timing
- Ability to handle the complex product enhancements
- The main reason for the agile existence due to:-
  - Project priorities change's frequently
  - Need to respond to customer requirements and market dynamics
  - Promote team work and less reliance on individual heroics
  - Course correction and continuous improvements

## What are the benefits of Agile?

- Customer involved throughout the life cycle
- Greater Customer Interaction with all stakeholders
- Constant Feedback is required to stay current and successful
- Greater Value up front
- Change is welcomed by all stakeholders
- Integrate early & often
- Fund incrementally –opt to extend, redirect or cancel at a very granular level
- Deliver & realize value steadily
- Validate designs with users & customers
- Continuously adapt to risk and change

## What is Agile Manifesto? What are Agile 4 Values?

Meeting at Snowbird resort by 17 software pundits and light weight methodologists, February 2001. Created “**Agile Manifesto**”

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value. i.e., Agile Values

**Individuals and interactions over processes and tools**

**Working software over comprehensive documentation**

**Customer collaboration over contract negotiation**

**Responding to change over following a plan**

That is, while there is value in the items on the right, we value the items on the left more.

**Author:** - Kent Beck, Mike Beedle, Arie Van Bennekum, Alistair Cockburn, Ward

Cunningham, Martin Fowler, James Greening, Jim Highsmith, Andrew Hunt, Ron Jerries,

Jon Kern, Brian Marick, Robert C. Martin, Steve Mellor, **Ken Schwaber, Jeff Sutherland,**

Dave Thomas

## Agile Manifesto: Explanation

### Individuals and Integrations Over Process & Tools

- Individuals and interactions are most important
- Processes and tools will be needed on projects
- Projects are completed by people not processes and tools
- Agile projects are people driven

### Working Software over Comprehensive Documentation

- Agile project needs to deliver value
- Value is about the purpose or business need the project aims to deliver
- Documentation is barely sufficient
- Documentation is done just in time –as the last responsible moment
- Documentation might also be just because
  - Industry requirements
  - Organizational requirements

### Customer Collaboration over Contract Negotiation

- Agile is flexible, accommodating, and willing to change
- Contracts are often rigid and uncooperative
- Agile contracts must accommodate change
- There's a difference between being right and doing the right thing

### Responding to Change over a following plan

- Agile welcomes change
- Predictive projects plan everything in advance
- Agile projects have lots and lots of many changes
- Agile projects have uncertainty up front

## What are Agile Principles? What are 12 principles behind Agile Manifesto?

No	Principle	Shortened Version
1	Our highest priority is to satisfy the customers through early and continuous delivery of valuable software	<b>Customer Satisfaction</b>
2	Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.	<b>Welcome Changes</b>
3	Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.	<b>Deliver Frequently</b>
4	Business people and developers must work together daily throughout the project.	<b>Work with business</b>
5	Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done	<b>Motivated People</b>
6	The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.	<b>Face to Face Communication</b>
7	Working software is the primary measure of progress.	<b>Measure Software Done</b>

8	Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.	<b>Maintain Sustainable Pace</b>
9	Continuous attention to technical excellence and good design enhances agility.	<b>Maintain Design</b>
10	Simplicity –the art of maximizing the amount of work not done is essential	<b>Keep it Simple</b>
11	The best architectures, requirements, and designs emerge from self-organizing teams.	<b>Team creates Architecture</b>
12	At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.	<b>Reflect and adjust</b>

## What is Declaration of Interdependence?

Agile and adaptive approaches for linking people, projects and value. We are a community of project leaders that are highly successful at delivering results. To achieve these results:

- We **increase return on investment** by making continuous flow of value our focus
- We **deliver reliable results** by engaging customers infrequent interactions and shared ownership
- We **expect uncertainty** and manage for it to iterations anticipations and adaptation
- We **unleash creativity** and innovation by recognizing that individuals are the ultimate source of value and creating an environment where they can make a difference
- We **boost performance** through group accountability for results and shared responsibility for team effectiveness
- We **improve effectiveness and reliability** through situationally specific strategies processes and practices

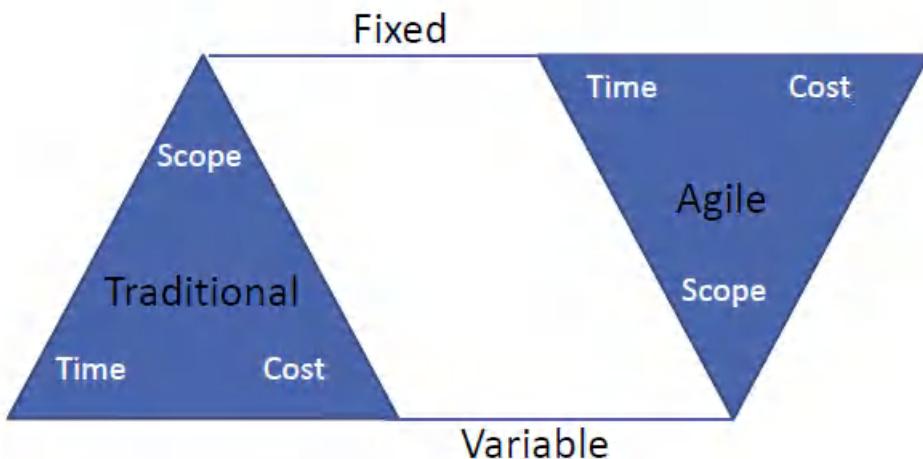
## Agile Project Management Vs. Traditional Project Management?

- Agile builds in increments vs. as a whole
- Agile does planning throughout vs. done all at once
- Agile delivers products over time vs. all at once
- Customers sees value faster vs. at the end
- Agile wants changes vs. discouraging changes

## What is the difference between Being Agile Vs Doing Agile?

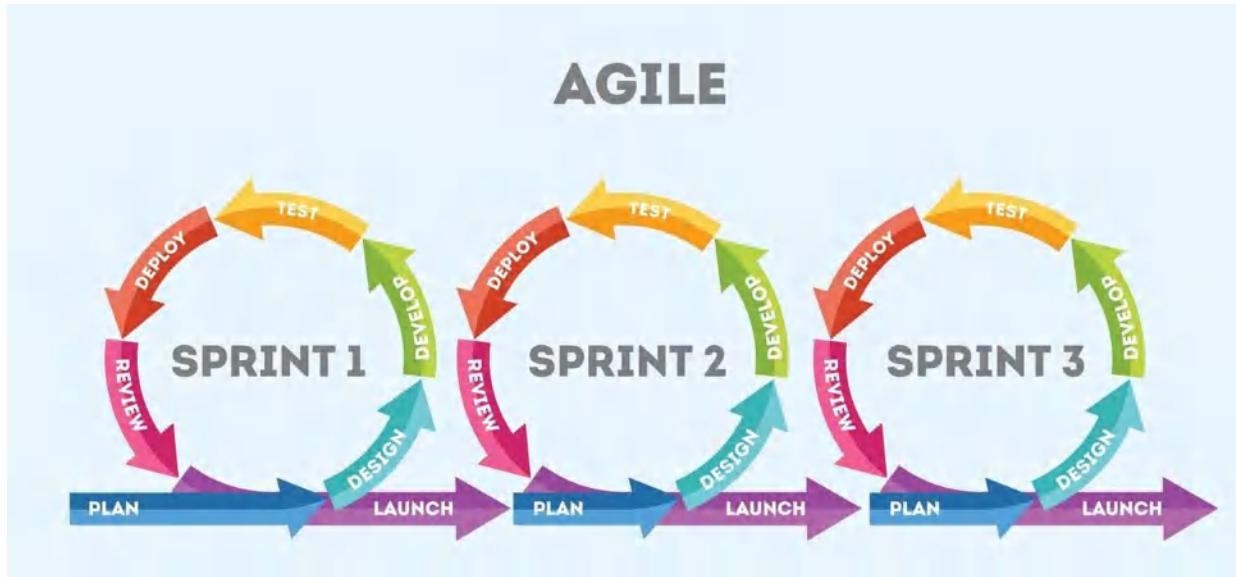
Being Agile	Doing Agile
Possessing an agile mind set	Doing a job without embracing agile
Choose correct practices	Forcing agile practice
Implement correct practices	Command and control
Tailor agile processes	Understand agile

## Triple Constraint | Inverted Triangle Model



- Triple Constraint which deals with Time, Scope & Cost
- Determine - What is Variable and What is Fixed? – Based on that outcome will change.

## How Agile Development works?



- Development follows a continuous improvement cycle, exposing flaws faster and reducing waste
- Value is achieved faster as releases arrive to the customer more frequently
- Advantages are: - Shorter development cycle, Wider market windows, Early customer feedback & Continuous improvement

## What is an Empirical Process Control?

Empirical process controls focus on the following: -

Inspection, Transparency & Adaptation

### Inspection

Inspection in Scrum is depicted through: -

- Use of a common Scrum board and other information radiators
- Collection of feedback from the customer and other stakeholders during the Develop Epic(s), Create Prioritized Product Backlog, and Conduct Release Planning processes.
- Inspection and approval of the Deliverables by the Product Owner and the customer in the Demonstrate and Validate Sprint process.

## Transparency

Transparency allows all facets of any Scrum process to be observed by anyone. This promotes an easy and transparent flow of information throughout the organization and creates an open work culture. In Scrum, transparency is depicted through: -

### Artifacts

- Project Vision Statement
- Prioritized Product Backlog
- Release Planning Schedule

### Information Radiators

- Burndown Chart
- Scrumboard

### Meetings

- Sprint Review Meetings
- Daily Standup Meetings

## Adaptation

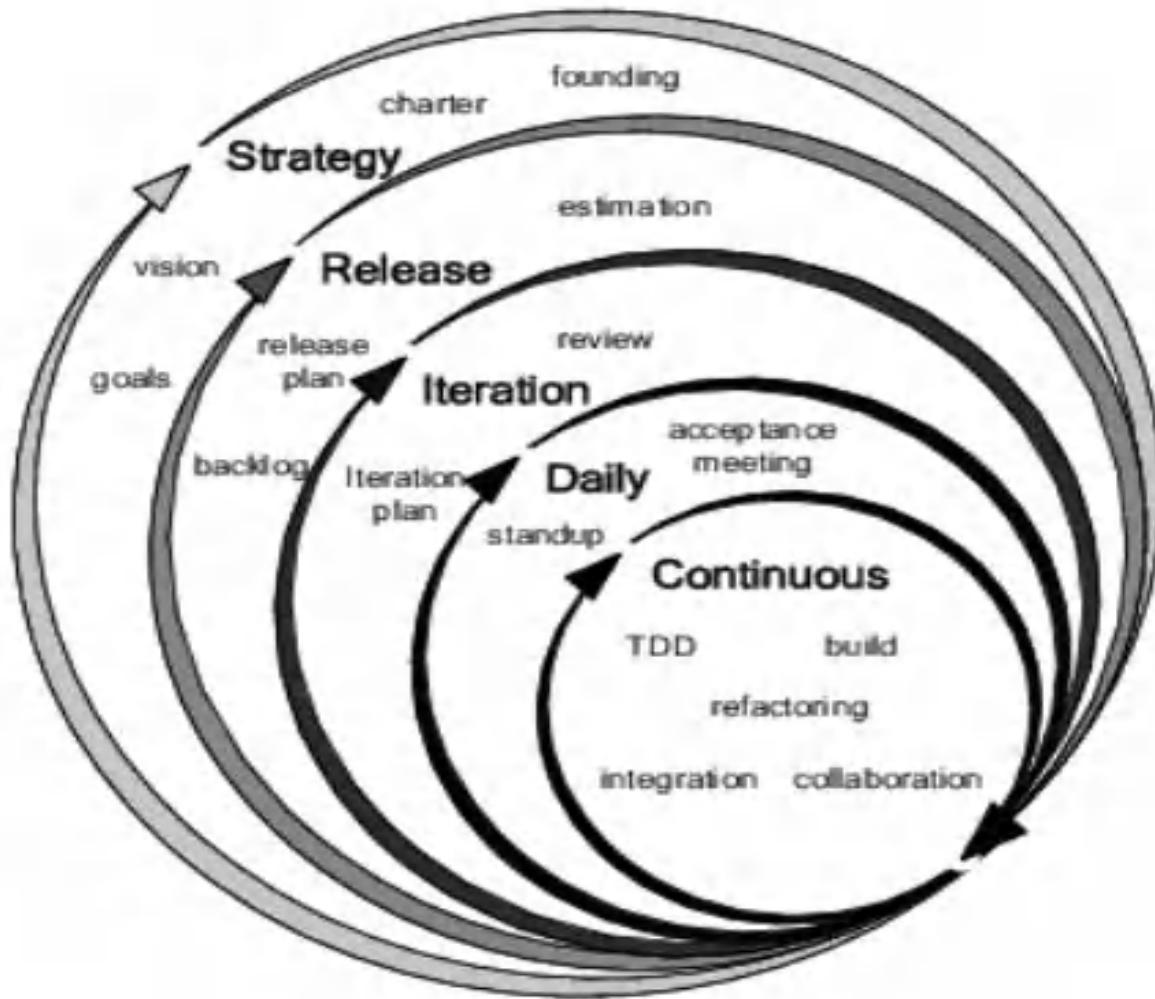
Adaptation happens as the Scrum Core Team and Stakeholders learn through transparency and inspection and then adapt by making improvements in the work they are doing. Adaptation in Scrum is depicted through: -

- Standup Meetings
- Constant Risk Identification
- Change Requests
- Scrum Guidance Body
- Retrospect Sprint Meeting
- Retrospect Project Meeting

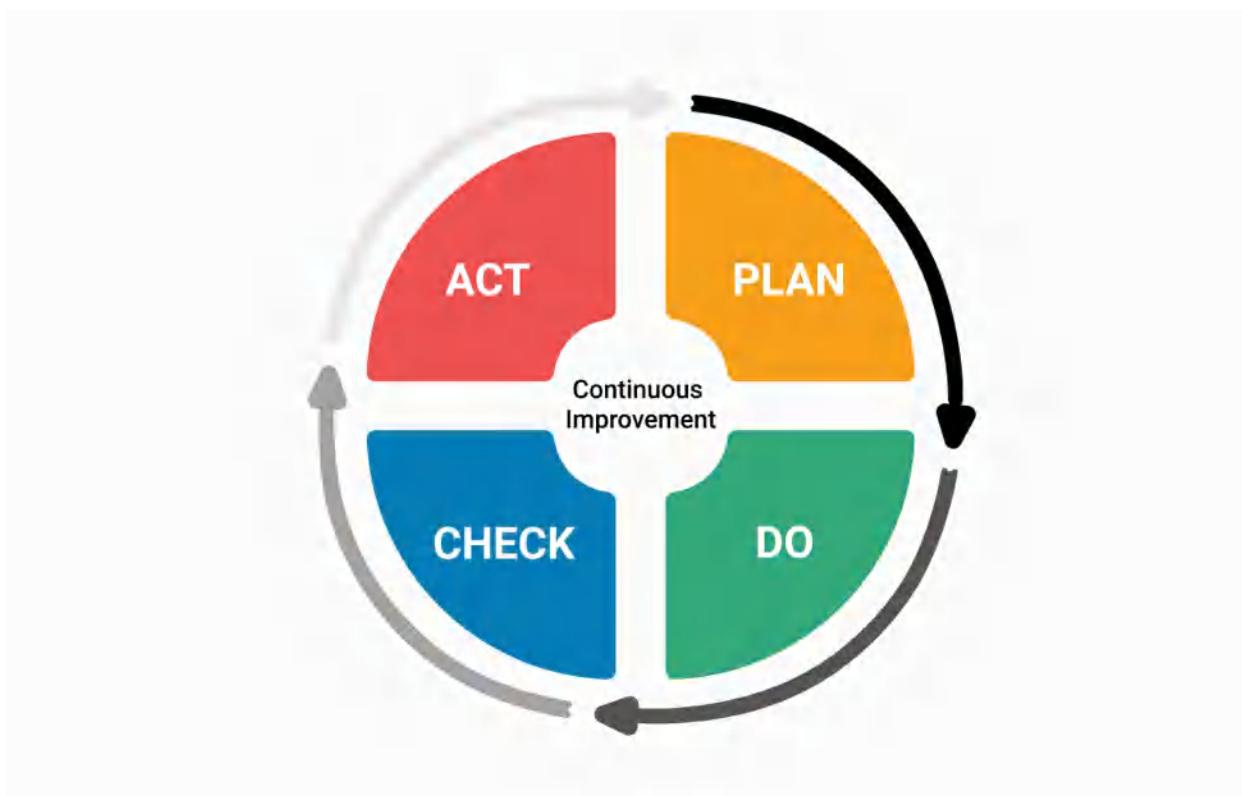
## Why Agile methodology is empirical in nature?

- Course correction at frequent intervals
- Regular customer feedback
- Failure detected early and hence early adoption of corrective measures
- Status is visible to all stakeholders in a consistent way
- Each iteration follows with Inspect, Transparency & Adaptation

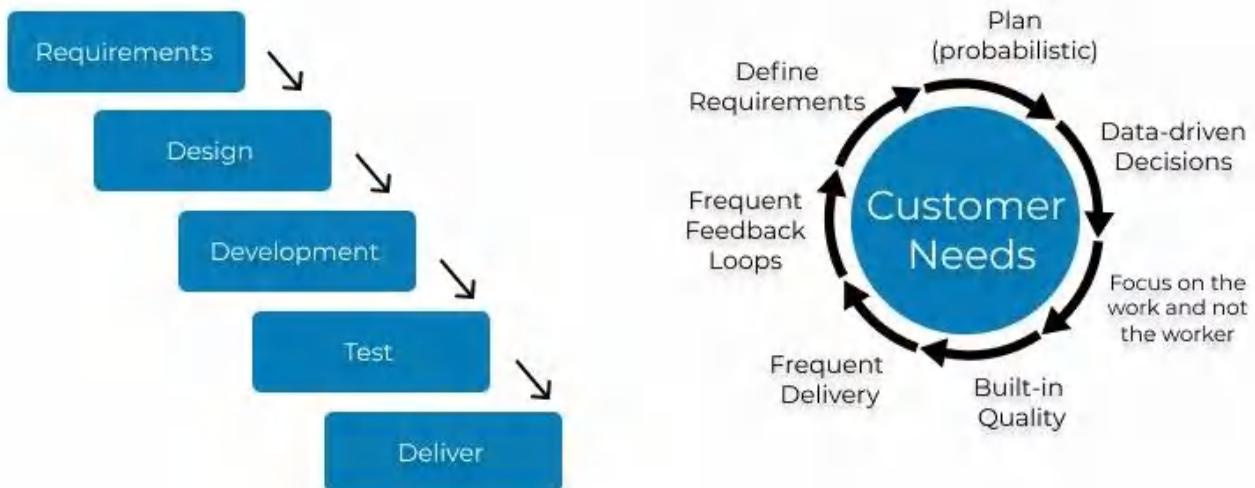
## Sketch the Agile Planning Onion?



## How Continuous Improvement in Agile?

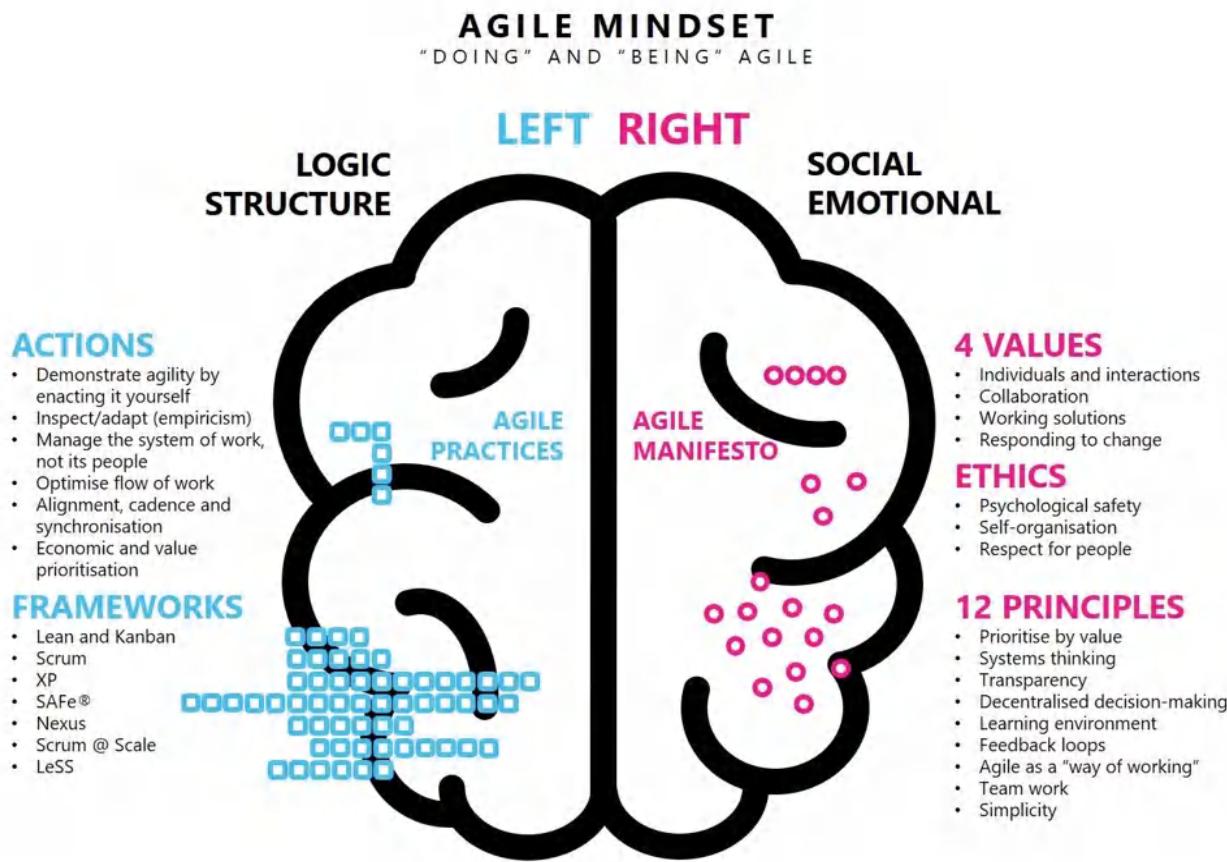


## Traditional Vs Agile Planning?



## What is the Agile Mindset?

The agile mindset is a **thought process** that involves **understanding, collaborating, learning, and staying flexible** to achieve high-performing results. By combining the agile mindset with processes and tools, teams can adapt to change and deliver incremental value to their customers.



### In Short

- Welcoming change
- Working in small value increments
- Using build and feedback loops
- Learning through discovery
- Value driven development
- Failing fast with learning
- Continuous delivery & Continuous improvement

## What are the Twelve Principles for Leading Agile Projects?

- 1.Learn the team members needs
- 2.Learn the project requirements
- 3.Act for the simultaneous welfare of the team and the project
- 4.Create an environment of functional accountability
- 5.Have a vision of the completed project
- 6.Use the project vision to drive your own behavior
- 7.Serve as the central figure in successful project team development
- 8.Recognize team conflict as a positive step
- 9.Manage with an eye toward ethics
- 10.Remember that ethics is not an afterthought, but an integral part of our thinking
- 11.Take time to reflect on the project
- 12.Develop the trick of thinking backwards

## How to Lead the organization effectively?

- Tap into people's intrinsic motivations
  - Discover why team members want to do something and what motivates and then align that to the project goals
- Management vs Leadership

Management → Mechanical Focus

Leadership → Humanistic Focus (on people and purpose)

<b><u>Management Focus</u></b>	<b><u>Leadership Focus</u></b>
<ul style="list-style-type: none"><li>○ Task/things</li><li>○ Control</li><li>○ Command</li></ul>	<ul style="list-style-type: none"><li>○ People</li><li>○ Empowerment</li><li>○ Communication</li></ul>

## **Servant Leadership**

Leader provides what the team needs: -

- Shield team from interruptions
- Remove impediments to progress
- Re)Communicate project vision
- Carry food and water

## **Leadership Tools and Techniques**

- Using these tools still need soft -skills approach
- Modeling Desired Behavior
  - Honesty
  - Forward-Looking
  - Competent
  - Inspiring
- Communicating project vision
- Enabling others to act
  - Switch from exclusive tools to inclusive tools
- Being willing to change the status quo

## **Leadership Task**

- Practice Transparency through Visualization Crate a safe environment for experimentation
- Experiment with new techniques and processes
- Share knowledge through collaboration
- Encourage emergent leadership vis a safe environment

## Section – 1.2 Agile Methodologies

What are the Agile Methodologies? What are the flavours of Agile?

Methodologies	Information
Scrum	Most popular agile methods Strongly codified set of ceremonies, roles and artifacts
XP	Foremost of agile methodologies Strong set of technical practices
Lean Kanban	Lean - Set of principles evolved from manufacturing to eliminate waste Kanban literally means a “signboard” or “billboard” and it supports the use of visual aids to assist and track production. Lean Kanban integrates the use of the visualization methods as prescribed by Kanban along with the principles of Lean creating a visual incremental evolutionary process management system.
DSDM	Offshoot of Rapid Application Development Methodology Cost   Quality/time fixed and requirements prioritized as per MOSCOW
Crystal	Principles are categorized according to criticality and size of the project. Critical Levels: Comfort ( C )   Discretionary Money   Essential Money ( E )   Life ( L )
Feature Driven Development	Plan   Develop and build by feature
Adaptive Software Development ( ASD )	ASD are constant adaptation of processes to the work at hand, provision of solutions to problems surfacing in large projects, and iterative, incremental development with continuous prototyping.
Agile Unified Process ( AUP )	AUP combines industry-tried-and-tested Agile techniques such as Test-Driven Development ( TDD ), Agile Modelling, agile change management, and database refactoring, to deliver a working product of the best quality

<b>Domain-Driven Design (DDD)</b>	Domain-driven design is an Agile development approach meant for handling complex designs with implementation linked to an evolving model.
<b>Test Driven Development</b>	Test Driven Development is a software development method that involves writing automated test code first and developing the least amount of code necessary to pass that test later.

# Scrum

## Introduction to Scrum

### What is Scrum?

**"A framework within which people can address complex adaptive problems, while productively and creatively delivering products of the highest possible values."**

- Scrum uses a methodology called the scrum framework & Scrum is a rugby term
- Scrum is light weight, easy to understand, but can be difficult to master, more flexible and allows other agile practices like XP to plug in
- The scrum framework is a set of practices, roles and responsibilities, events, artifacts, and rules



### Tell me Scrum in 100 words?

- Scrum is an agile process that allows us to focus on delivering the highest business value in the shortest time.
- It allows us to rapidly and repeatedly inspect actual working software in every two weeks.

- The business set the priorities. Team self-organizes to determine the best way to deliver the highest priority features.
- Every two weeks to a month anyone can see the real working software and decide to release it as is or continue to enhance it for another sprint.

## What are the Characteristics of Scrum?

- The most popular ‘Agile Processes’ in Agile software development & well suited for projects that require Empirical process control
- Focuses on self-organizing teams
- Requirements are captured in a prioritized list (Product Backlog)
- Product progresses in a series of month-long “sprints”
- No specific engineering practices prescribed
- Uses generative rules to create an agile environment for delivering projects

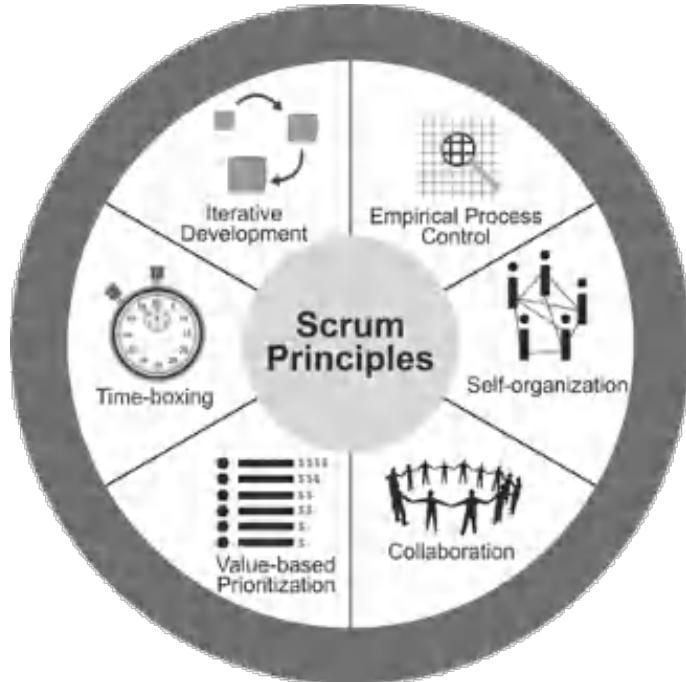
## What is Scrum theory?

Scrum is based on empirical process control. It is not a set methodology but instead is a framework. Inspection, Transparency & Adaptation are the three pillars of Scrum.

## What are the Principles of Scrum?

Scrum principles are the core guidelines for applying the Scrum framework and should mandatory be used in all Scrum projects.

The six Scrum principles are: -



**Empirical Process Control:** This principle emphasizes the core philosophy of Scrum based on the three main ideas of transparency, inspection, and adaptation. Empirical process control aids learning through experimentation, especially when the problem is not well defined or when there are no clear solutions.

**Self-organization:** This principle focuses on today's workers, who deliver significantly greater value when self-organized, and this results in better team buy-in and shared ownership; and an innovative and creative environment which is more conducive for growth.

**Collaboration:** This principle focuses on the three core dimensions related to collaborative work: awareness, articulation, and appropriation. It also advocates project delivery as a shared value-creation process with teams working and interacting together, as well as with the customer and other business stakeholders, to deliver the greatest value.

**Value Based Prioritization:** This principle highlights the focus of Scrum to deliver maximum business value, from early in the project and continuing throughout.

**Time-boxing:** This principle describes how time is considered a limiting constraint in Scrum and used to help effectively manage project planning and execution. Time-boxed elements in Scrum include Sprints, Daily Standup Meetings, Sprint Planning Meetings, Sprint Review Meetings, and Retrospect Sprint Meetings.

**Iterative Development:** This principle defines iterative development and emphasizes how to better manage changes and build products that satisfy customer needs. It also delineates the Product Owner's and organization's responsibilities related to iterative development.

## What are Defined & Empirical Process?

### Defined Process

A **Defined process** defines all steps in advance, same output is expected every time the process is followed, best suits for “Simple” and “Complicated” problem domains.

- Follows pre-defined steps to achieve an Output.
- Suitable when the output is well defined.
- Same output is expected every time the process is followed.
- Best suits for problems those fall into “Simple” and “Complicated” problem domains.



### Empirical Process

An **Empirical process** are interactive, incremental, change often, adapt, and pass through the reviews, Empirical processes are change-driven

As software products and requirements cannot be 100% confirmed, fixed at the beginning, the best way to build the winning product is to continuously inspect, and adapt at regular intervals, effectively and efficiently. Empirical Process is based on such inspect and adapt cycle.



An Empirical Process is: -

- Built based on the series of experiments
- Experience based decision making
- Suitable when the output can't be well defined
- Definition of output is refined based on the result of experiments
- Steps in the process are adjusted based on the feedback from the experiments
- Deming Wheel – Plan – DO Inspect -Adapt

In order to build the winning products and deliver value SCRUM has various feedback loops so that product and process are inspected, adapted and transparent.

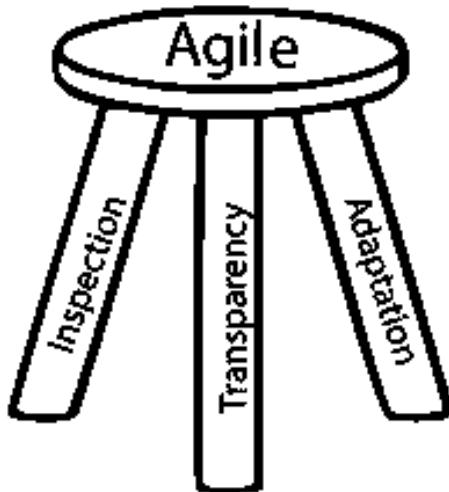
## How would you say Scrum is based on empiricism?

Scrum is based in empiricism because: -

- All Artifacts should be transparent to all stakeholders
- All Scrum roles are empowered to do the job right
- All Scrum meetings allow collaboration and opportunities for inspection and adaptation
- In Scrum, the process is constantly adjusted if needed based on the short and continuous feedback loops at iteration levels

## What are the Pillars of Scrum? What are the three legs of empirical process?

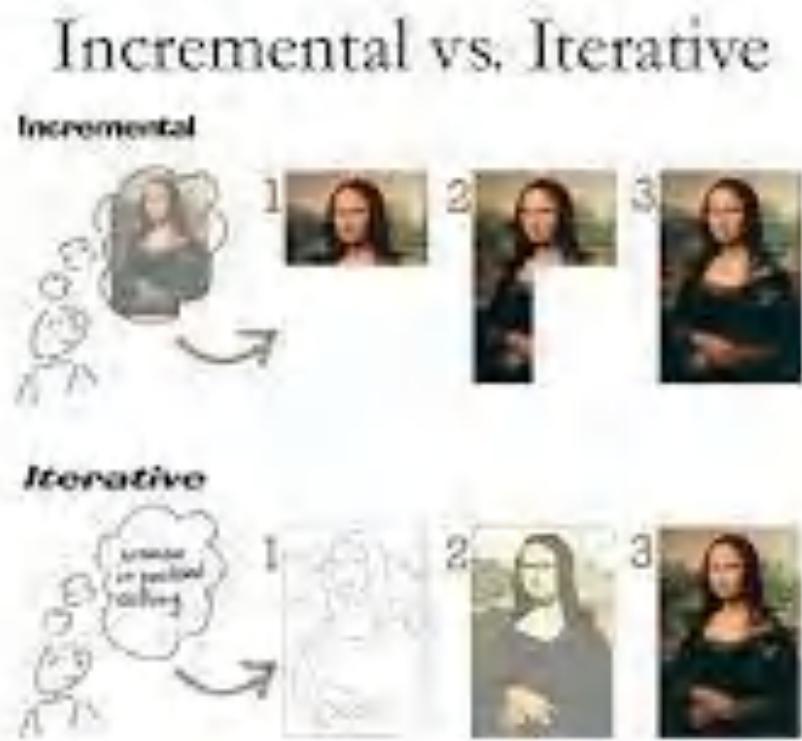
Three legs of empirical process | pillars of SCRUM – Inspection, Adaptation & Transparency: -



- **Inspection** – Frequent Inspection of artefacts helps stakeholders to make any changes to achieve the goal i.e., Timely checks on how well a project is progressing toward goals & looks for problematic deviations or differences from goals
- **Adaptation** – Continuous improvement by adjusting the process based on the inspection i.e., Adjusting a process to minimize further issues if an inspection shows a problem or undesirable trend
- **Transparency** – All artefacts of the process are visible to all the stakeholders. This helps stakeholders to inspect the current stake and take any required action i.e., Visibility to those responsible for the outcome

## How would you say Scrum is incremental and iterative?

Scrum team delivers value incrementally and iteratively



## Iterative Development

Iterative development is to build something, to get some feedback, then refine it to make better, keep doing that until the product is good enough.

### Benefits

- Focus on high value and good Return on Investment (ROI)
- Reduce rarely used features, maximize frequently used features
- Usable product at any time
- Quality Focus
- Effective and efficient

- Usable product at any time
- Sustainable pace of development

## **Incremental Development**

Incremental development is to build small increment of a full fledges product. Each increment adds more software value – like Adding package to a Software Product. After lot of increments, you have got a big Software Product.

### **Benefits**

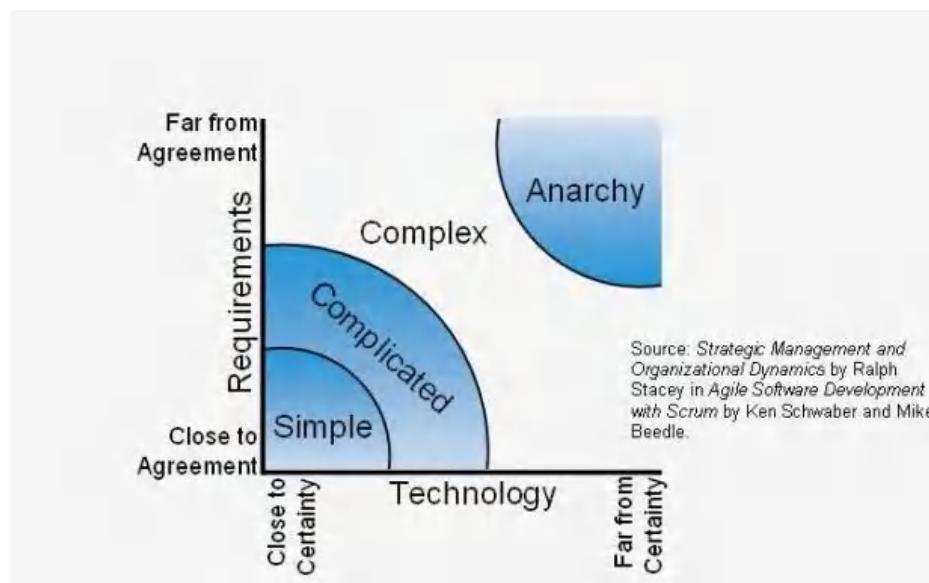
- Reduce risk during development
- Early discovery and mitigation of risks
- Accommodates changes early
- Manageable Complexity
- Higher confidence and satisfaction from early repeated successful delivery
- Early and continuously visibility of product increment
- Better predictability and progress
- Higher quality and lower defects
- Final product close to customer's desire
- Early and regular process improvement
- Continuous collaboration ad engagement with customers
- Effective and efficient
- Usable product at any time
- Sustainable pace of development

## **Coin a Scrum Word from the Scrum values?**



## What is the Project noise level in Agile? What is Ralph-Stacy Complex Model?

Ralph-Stacy complexity model shows the different problem domains and their nature. The model has four problem domains namely Simple, Complicated, Complex & Anarchy | Chaotic.



X- axis captures how something is being done. This represents the technology or implementation method. Y-axis shows what is being done. This represents requirements of the work being done.

### Problem Domains

**Simple:** These problems are those we know what to do and how to do.

**Complicated:** These Problems require a specialized skill. Once you have an expert, they know how to do this.

**Complex:** There is no way to reduce uncertainty on what to do or how to do other than working iteratively. Scrum works best in this problem domain. i.e., Software Development

**Chaotic | Anarchy:** Problems in this region

## What are the Scrum Values?

All work performed in SCRUM needs a set of values as the foundation for the team's processes and interactions. And by embracing these five values, the team makes them more instrumental to its health and success.



**Focus:** Because we focus on only a few things at a time, we work well together and produce excellent work. We deliver valuable items sooner.

**Courage:** Because we work as a team, we feel supported and have more resources at our disposal. This gives us the courage to undertake greater challenges.

**Openness:** As we work together, we express how we're doing, what's in our way, and our concerns so they can be addressed.

**Commitment:** Because we have great control over our own destiny, we are more committed to success.

**Respect:** As we work together, sharing successes and failures, we come to respect each other and to help each other become worthy of respect.

As an organization applies Scrum it discovers its benefits. At the same time, it sees how these values inherently contribute to the success of Scrum and understands why they are both needed, and bolstered, by Scrum.

## Scrum DOGMA | Rule

### SCRUM “DOGMA”

- SCRUM TEAMS WORK IN FIXED LENGTH SPRINTS OF A MONTH OR LESS AND EVERY SPRINT THEY NEED TO BUILD SOMETHING USEABLE
- EVERY SCRUM TEAM NEEDS A SCRUM MASTER AND PRODUCT OWNER AND THE PRODUCT OWNER HAS TO BE ONE PERSON
- EVERY PRODUCT NEEDS A PRODUCT GOAL AS A LONG TERM OBJECTIVE AND EVERY SPRINT NEEDS A SPRINT GOAL
- EVERY TEAM DEFINES WHAT “DONE” MEANS FOR THEM AND WORK ISN’T PRESENTED AS DONE UNLESS IT MEETS THAT DEFINITION
- EVERY SPRINT STARTS WITH SPRINT PLANNING (WHICH TAKES NO MORE THAN 8 HOURS) WHERE THE TEAM PICK A SPRINT GOAL AND MAKE A PLAN FOR THE SPRINT
- THE SPRINT GOAL CAN’T BE CHANGED AFTER SPRINT PLANNING
- THE DEVELOPERS HAVE A DAILY SCRUM (WHICH TAKES NO MORE THAN FIFTEEN MINUTES) AT THE SAME TIME AND PLACE EVERY DAY
- EVERY SPRINT ENDS WITH A SPRINT REVIEW (WHICH TAKES NO MORE THAN 4 HOURS) WHERE THE TEAM AND STAKEHOLDERS DISCUSS WHAT’S BEEN DONE AND WHAT THEY SHOULD DO NEXT...
- .. AND A SPRINT RETROSPECTIVE (WHICH TAKES NO MORE THAN 3 HOURS) WHERE THE TEAM TRY TO FIND BETTER WAYS OF WORKING
- ONLY THE PRODUCT OWNER CAN CANCEL A SPRINT

## Tell me about Scrum Framework in short?

Already we have seen the Agile has 4 Values & 12 Principles.

SCRUM is a simple process framework. SCRUM has

**3 Legs** : Inspect, Adapt, Transparent (Pillars of Scrum)

**3 Roles** : Product Owner | Scrum Master | Development Team (The Scrum Team)

**3 Artifacts** : Product Backlog | Sprint Backlog | Product Increment

**4 Meetings** : Sprint Planning | Daily SCRUM | Sprint Review | Sprint Retrospective

**1 Activity** : Product Backlog Refinement

**5 Values** : Focus | Courage | Openness | Commitment | Respect



**Product Backlog** - Ordered list of items to be worked on for the product

**Sprint Backlog** - Product backlog items selected to work in the Sprint and the work plan to complete those items

**Product Increment** - Completed product backlog items in a sprint, which are ready to be delivered to the customer

**Product Backlog Refinement** - A meeting to get the product backlog items ready for the next few sprints

**Sprint Planning** - A meeting to create the sprint goal and plan the work for the sprint

**Daily Scrum** - A daily 15-minute time boxed event for the Development Team to synchronize activities and create a plan for the next 24 hours

**Sprint Review** - A meeting to inspect the product increment and adapt the product backlog if needed

**Sprint Retrospective** - A meeting for the scrum team to inspect and adapt the process, people and tools

## The Scrum Team

### Who are all the Scrum team member & What are the Roles & responsibilities?

- **Scrum Master** –Responsible for communicating the scrum methodology and ensuring the methodology is used effectively
- **Product owner** –Prioritizes the product backlog to ensure value from each sprint
- **Development team** –The software developers who create the product through the sprint

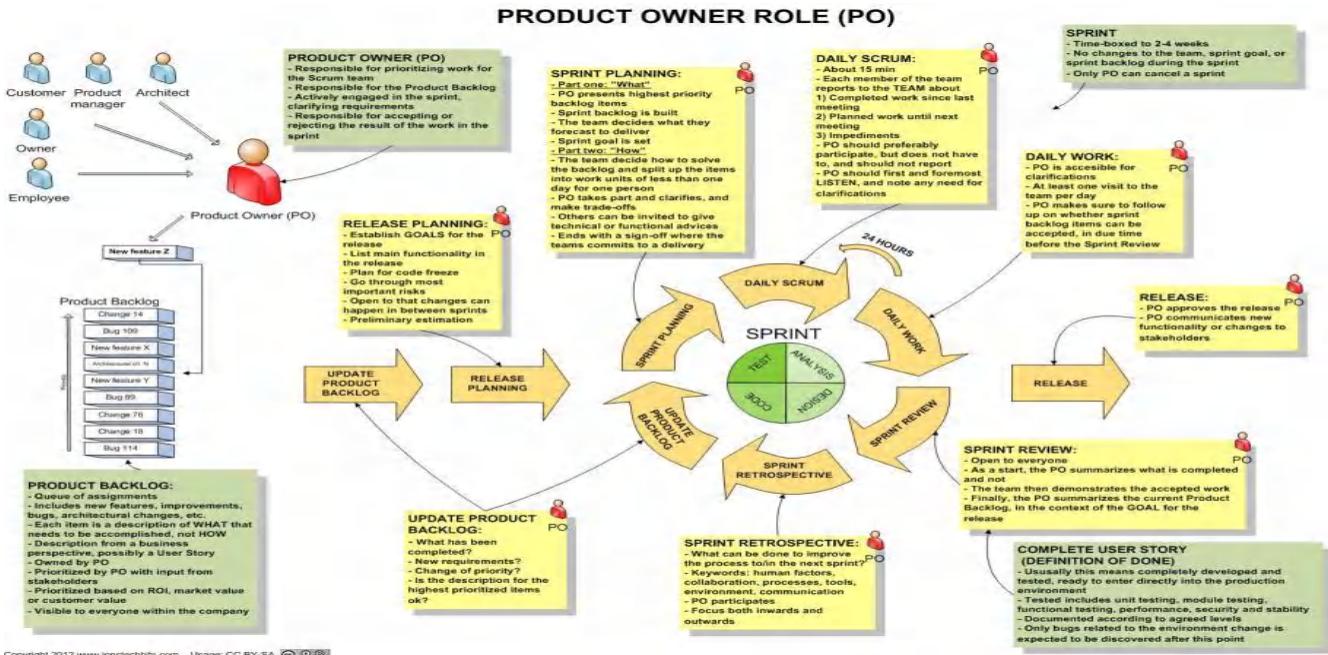
**Scrum Roles:** A different way of thinking, a better way to drive success  
Scrum roles differ from traditional project roles.  
By collaborating, a Scrum team delivers more business value, faster.



Item	Development Team	Product Owner	Scrum Master
Estimates	✓ DT		
Backlog Priorities		✓ PO	
Agile Coaching			✓ SM
Velocity Predictions	✓ DT		
Definition of Done   Sprint Planning	✓ DT	✓ PO	✓ SM
Process Adherence			✓ SM
Technical Decision	✓ DT		

## Product Owner

- Product Owner owns the Product vision
- Defines features, decides on release date and content
- Responsible for market success
- Be responsible for the profitability of the product ([ROI](#))
- Prioritize features according to the market value
- Adjust features and priority every iteration, as needed
- Accept or reject work results
- Maintains and grooms the Product Backlog
- An effective product owner is Committed, Responsible, Authorized, Collaborative, and Knowledgeable ([CRACK](#))



## Product Owner's responsibility to Stakeholders

Product owner collaborates with stakeholders of the product to understand their vision and market conditions and regularly update them on the progress of the product development. Product Owner

- Creates the Product vision if it does not exist
- Creates and manages Product Backlog to fulfil the Product vision
- Reviews the product with stakeholders in Sprint Review meetings to solicit feedback
- Updates stakeholders about progress of the product development typically every sprint
- Represents single voice of customers
- Prioritizes product backlog items based on business needs with the consensus of all stakeholders
- Orders the product backlog items to maximize the delivery value

## **Product Owner responsibility to the team**

- Establishes the shared vision between stakeholders and the team
- Details out the product backlog items as appropriate. Make sure that high value items are ready for implementation in upcoming sprints
- Helps team estimate by clarifying any questions
- Available to the team to answer any questions regarding the product domain during the sprint
- Optimizes the value of the work the development team performs
- Keeps the product backlog transparent, clear and visible to all
- Attend Scrum Meetings
  - Sprint Planning: Helps the team plan to sprint
  - Sprint Review: Reviews the product increment with stakeholders
  - Sprint Retrospective: Contributes to come up with improvement ideas

## **Other responsibilities of a Product Owner**

- Responsible for deciding whether to release the product increment at the end of the sprint
- Creates and manages the release plans
- Tracks the release progress

## Scrum Master

- Responsible for facilitating process & represents management to the project
- Responsible for enacting Scrum rules, values and practices and censure team members and stakeholders not adhering to these rule's ad norms
- Removes impediments
- Looks for ways to enhance productivity
- Assists Product Owner in leveraging Scrum
- Ensure that the team is fully functional and productive
- Enable close co-operation across all roles and functions
- Focuses Team, shield the team from external interferences
- Practices “**Servant Leadership**” – Facilitator and enabler rather than a manager



## **General Responsibilities of Scrum Master**

- Teaches Scrum to the team and the rest of the organization
- Ensures that scrum is understood and enacted
- Facilitate all scrum meetings as needed and requested. Makes sure that meetings are happening the scrum team. Coaches the team on how to complete the tasks on time within the timebox for that meeting
- Responsible for building the product fast by eliminating the waste
- A Servant – Leader for the Scrum Team
- Act as a change agent that increases the productivity of the Scrum team

## **Scrum Master Service to the Product Owner**

The Scrum Master serves the Product Owner in several ways, including: -

- Helps Product Owner to prioritize the work. Teaches PO and Stakeholders value-based prioritization
- Finding techniques for effective Product Backlog management;
- Helping the Scrum Team understand the need for clear and concise Product Backlog items;
- Understanding product planning in an empirical environment;
- Ensuring the Product Owner knows how to arrange the Product Backlog to maximize value;
- Understanding and practicing agility; and,
- Facilitating Scrum events as requested or needed.

## **Scrum Master Service to the Development Team**

The Scrum Master serves the Development Team in several ways, including: -

- Identifies the impediments those are blocking the team to progress and help resolve them as quickly as possible. Scrum Master goal is to make sure the team is highly productive
- Coaching the Development Team in self-organization and cross-functionality;
- Helping the Development Team to create high-value products;
- Removing impediments to the Development Team's progress;
- Facilitating Scrum events as requested or needed; and,
- Coaching the Development Team in organizational environments in which Scrum is not yet fully adopted and understood.

## **Scrum Master Service to the Organization**

The Scrum Master serves the organization in several ways, including: -

- Assess the readiness of the organization to implement the team
- Leading and coaching the organization in its Scrum adoption;
- Planning Scrum implementations within the organization;
- Helping employees and stakeholders understand and enact Scrum and empirical product development;
- Causing change that increases the productivity of the Scrum Team; and,
- Working with other Scrum Masters to increase the effectiveness of the application of Scrum in the organization.

## What are the qualities of an effective Scrum Master?

The Scrum Master to be effective, there various important skills to acquire. Here some of those skills are: - Facilitation | Coaching | Servant Leadership

### I - Facilitation

Facilitation is the process of designing and conducting a successful meeting or event that has a particular objective. Facilitation serves the needs of any group, who are meeting with a common purpose. The person who facilitates the meeting is called a “Facilitator”



#### Characteristics of Facilitator

- Facilitator does not stand in front of the group and lecture
- Facilitator is an active unbiased member of the learning process
- Facilitator has to skillfully assist the group to understand their common objectives, and to help them to achieve these objectives without taking sides in any arguments
- Facilitator guides and helps to achieve consensus

## **Basic Skills of a Facilitator**

- Follows a good meeting practice
- Time keeping
- Run the meeting on agenda
- Assisting the group to brainstorm and problem solve
- Ability to intervene in a way that adds creativity to a discussion rather than leading the discussion
- Ability to understand the group dynamics include:
  - Who is dominating the group? How to stop him/her
  - Who is withdrawn? How to involve him/her
  - Who looks bored? How to get their attention

## **Good Facilitation techniques should: -**

- Help the participants to be comfortable with each other
- Create a fun and interesting learning development
- Boost the energy levels of workshop participants
- Organize interesting and productive group work activities
- Use participatory activities which enable dynamic reviews of what has been learnt?
- Increase group activity so that workshop participants can expand on the new

## **II - Coaching**

According to Tim Gallwey “Coaching is unlocking a person’s potential to maximize their own performance. It’s helping them to learn rather than teaching them”



Coaching is a useful way of developing people’s skills and abilities, and of boosting performance. It can also help deal with issues and challenges before they become major problems.

A coaching session will typically take place as a conversation between the coach and coachee (person being coached), and it focusses on helping the coachee discover answers for themselves

Occasionally, coaching may mean an informal relationship between two people, of whom one has more experience and expertise than the other and offers advice and guidance as latter learns.

### **Qualities of a Coach**

- Coaches help to find solutions
- Coaching helps the organizations to change for the better
- Coaching is long term and sustainable results
- Coaching gives progressive elaboration
- Coaching helps you to review and refine your own solution to make it work

## **Coaching is different from Consulting; the key differences are: -**

- Consultants usually identify and correct the problems. Coaches helps to find solutions
- Consulting is treated like a silver bullet whereas Coaching helps the organizations to change for the better
- Consulting is often short term based and Coaching is long term and produce sustainable results
- Consulting may give sudden spike in improvement and Coaching gives progress elaboration
- Consulting is more of implanting some other's solution but coaching helps you to review and refine your own solution to make it work

## **How Scrum Master can become a good coach?**

- Develop positive attitude and patience
- Lead by example
- Keep up the balance
- Set the realistic pace
- Be cautious about your language
- Open to learn
- Accept feedback

## Compare Teaching Vs Mentoring Vs Coaching?

Comparison	Coaching	Mentoring	Training
<b>Emphasis Is on</b>	Performance or behavior transformation	Career, behavior or all-around personal development oriented	Skill training, upgrading skills or skill advancement
<b>Time Horizon</b>	Short Term	Long Term	Variable – depending on purpose of training
<b>Type</b>	Formal and task oriented and task or performance driven	Informal and relationship oriented and development driven	Formal and usually structured with measurable learning outcomes
<b>Facilitator Skill Requirements</b>	Expert in the field	High knowledge and experience in the field	Expert in the field, high knowledge level and practical applications experience



### **III - Servant Leadership**

You must be the change you wish to see in the world. You are the change agent for your organization.

According to Robert K Greenleaf. The Servant-leader is servant first... it begins with the natural feeling that one wants to serve, to serve first. The conscious choice brings one to aspire to lead. That person is sharply different from one who is leader first, perhaps because of the need to assuage an unusual power drive or to acquire material possessions. The leader-first and servant-first are two extreme types. Between them there are shadings and blends that are part of the infinite variety of human nature.



On character and Servant Leadership

- Listening
- Empathy
- Healing
- Awareness
- Persuasion
- Conceptualization
- Foresight
- Stewardship
- Commitment to the growth of people
- Building community

## The Development Team

- Small group containing all necessary project skills
- Typically, 4 – 9 people. Ideally 7+/- 2 (Note: Scrum Master & Product Owner Excluded)
- **Cross functional** – Programmers, testers, Architects user experience designers, etc.,
- Members should be full-time – May be exceptions for DBA's
- Teams are **self-organizing** (No titles), Manages own work within Sprints
- Membership should change only between sprints
- Focuses on steady delivery of high-quality features
- Generates options for delivery
- Team has **common goal**. Individual Development Team members may have specialized skills and areas of focus, but accountability belongs to the Development Team as a whole.

## The Development Team

**Responsible for delivering a potentially shippable increment of working software.**

- Self-organized
- Cross functional
- Developer as title
- Defines practices
- 4 to 9 persons

A cartoon illustration of a diverse development team consisting of six people of different ethnicities and styles. From left to right: a man with long hair and a beard in a dark t-shirt, a woman with blonde hair in a red top, a man with dark hair in a white t-shirt, a woman with pink hair in a pink top, a Black man in a blue t-shirt, and a man with short hair in a grey t-shirt. They are all smiling and standing close together against a yellow background.

**Team's responsibilities include but not limited to:-**

- Quality of the product increment
- Create the product increment
- Participate in all scrum meetings
- Implement good engineering practices like Continuous Integration, Continuous Delivery, Automation, Collective Ownership, Clean code, Simple design & effectively run the Test-Driven Development & Behavior Driven Development
- Create and manage the product backlog
- Identify and eliminate the “Technical Debt”
- Track progress of the sprint
- Helps the product owner in backlog management by explaining technical constraints
- Estimates Product Backlog items

## **Scrum Artifacts**

### **What are Scrum Artifacts?**

Scrum's artifacts represent work or value to provide transparency and opportunities for inspection and adaptation. Artifacts defined by Scrum are specifically designed to maximize transparency of key information so that everybody has the same understanding of the artifact.

The core Scrum Artifacts are: -

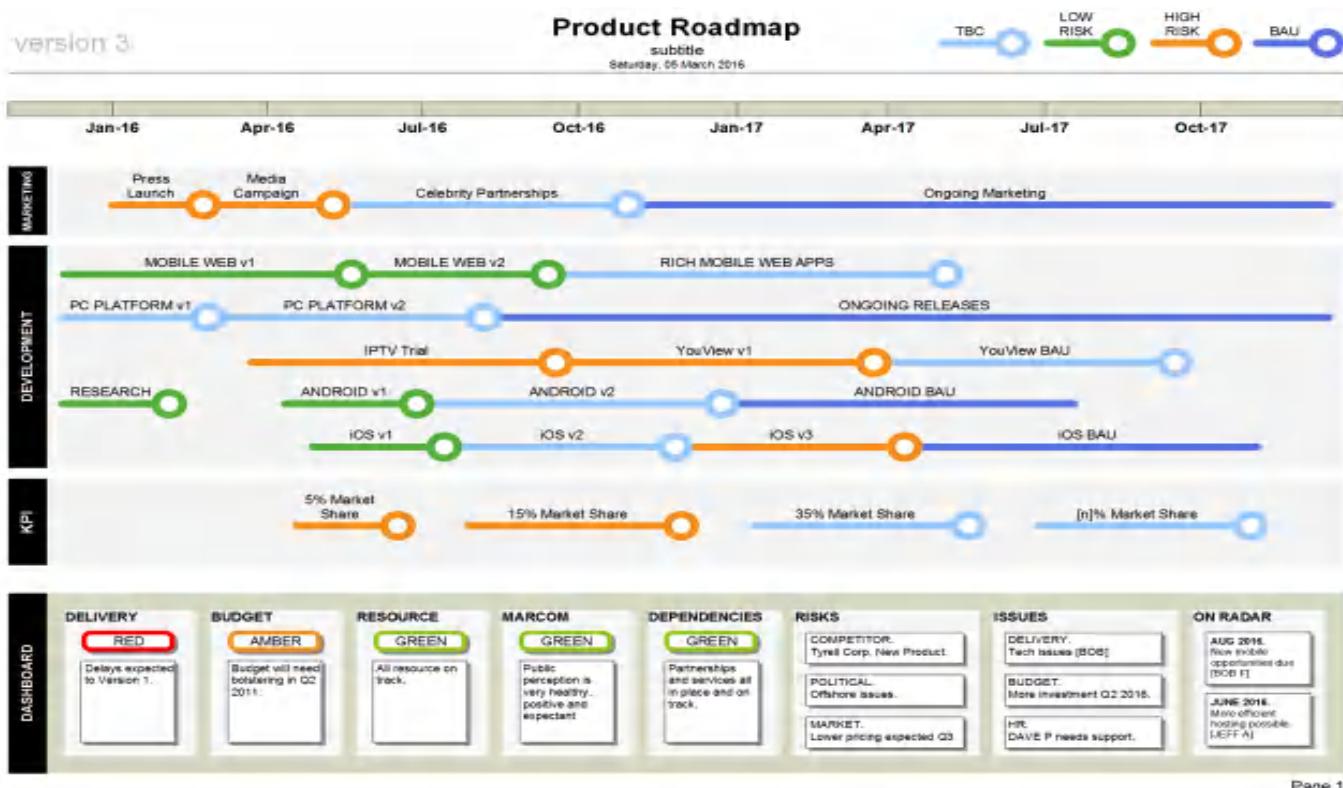
- Product Backlog
- Sprint Backlog

## Product Vision

A product vision is created by the product owner. The product must be in alignment with the company's strategy that describes the business vision. It gives a view to all involved about why the work is being undertaken and what to expect from it.

## Product Roadmap

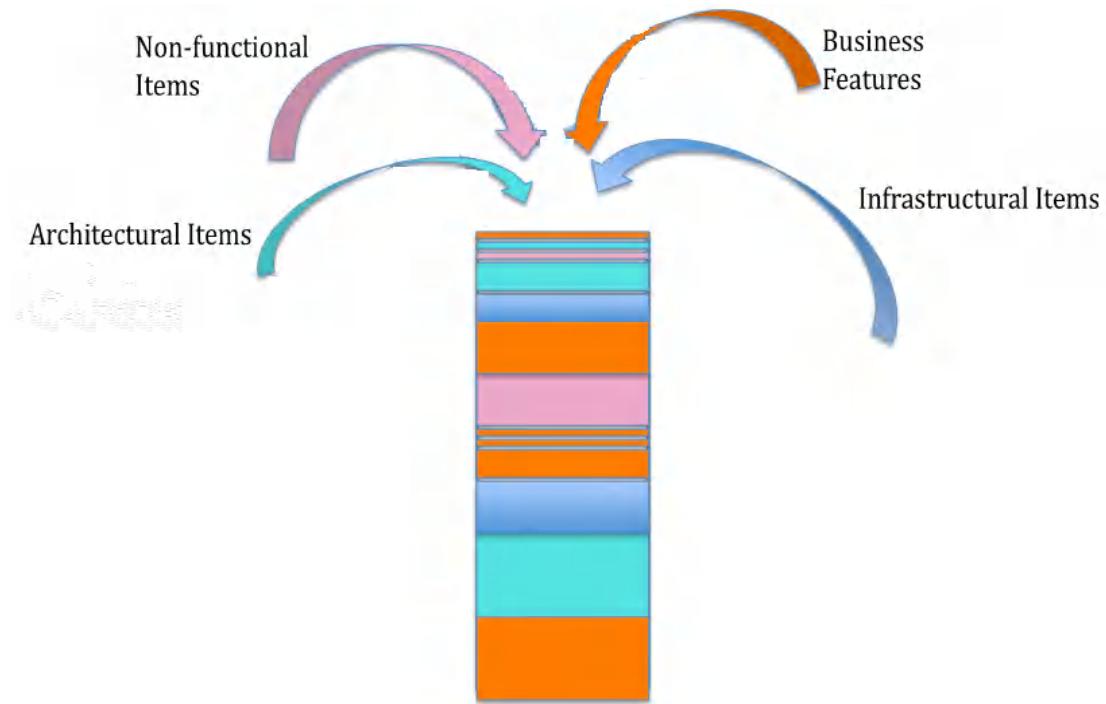
Product Roadmap is a pictorial representation of which product features would be delivered in which release. It is created during the strategy meeting. The product roadmap equates to the product division as a whole. This is done and owned by the product owner.



Page 1

## Product Backlog

- An ordered list of all items that might be needed in the product
- Single source of requirements for any changes to be made to the product
- The Product Owner is responsible for the Product Backlog, including its content, availability and ordering. Items in the Product Backlog are called “Product Backlog Items (PBI)”
- Each product backlog item would have:
  - **Description** – Details of the item
  - **Value** – What business value this item would provide
  - **Estimate** – Effort estimates to build this item
  - **Order** – The order in which the items should be worked in



- The product owner sorts and prioritizes the backlog items
- The development team always works on the most important items based on the prioritized items in the product backlog

- The backlog is always prioritized before the current sprint
- Backlog refinement is done by both the product owner and the development team working in harmony is called grooming or refinement of backlog
- The team estimates their capacity to attack the items in the product backlog
- A Product Backlog is best described as **DEEP**
  - **Detailed Appropriately:** Higher order items are more detailed and well understood compared to lower order items
  - **Estimated:** Product backlog items are estimated in relative size by the development team. Product owner orders the items based on the value and the cost
  - **Emergent:** Product Backlog is a living artifact. It is always updated for details, estimates and order. The life of the product backlog is same as life of the product itself
  - **Prioritized:** Product backlog items are ordered based on the priority. The order is force ranking (1,2,3) so that there are no competing priorities

- To determine the **Priority**

Customer value prioritization is concerned with working on the items that yield the highest value to the customer as soon as possible.

**MoSCoW** is a technique used to prioritize stories into four distinct categories:

- **M – MUST** have this
  - Requirements that are fundamental to the system; without which system will not work and have no value and have to be included in the current delivery time box
- **S – SHOULD** have this
  - Requirements that are important for project success; Important as MUST have but

not as time-critical or have a work around. In other words, not necessary for delivery in the current delivery time box

- **C – COULD** have this

Requirements not necessary; can include if it increases customer satisfaction for little development cost

- **W – WON’T** have this time, but **WOULD** like in the future

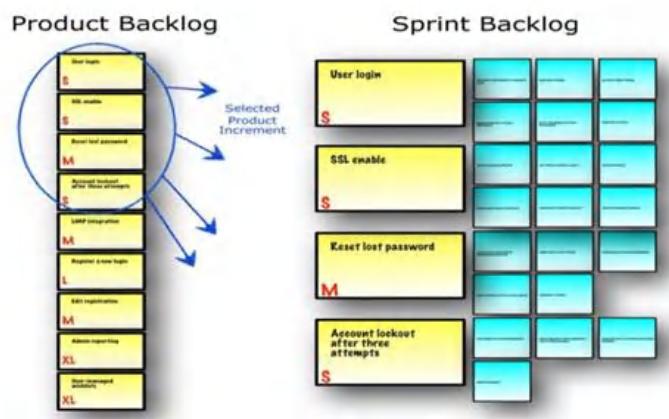
Alternatively **WANT** – No to this release

## Release Backlog

It is created during the Release Planning Meeting and includes only those user stories that are to be delivered in that release, it is a subset of the Product Backlog.

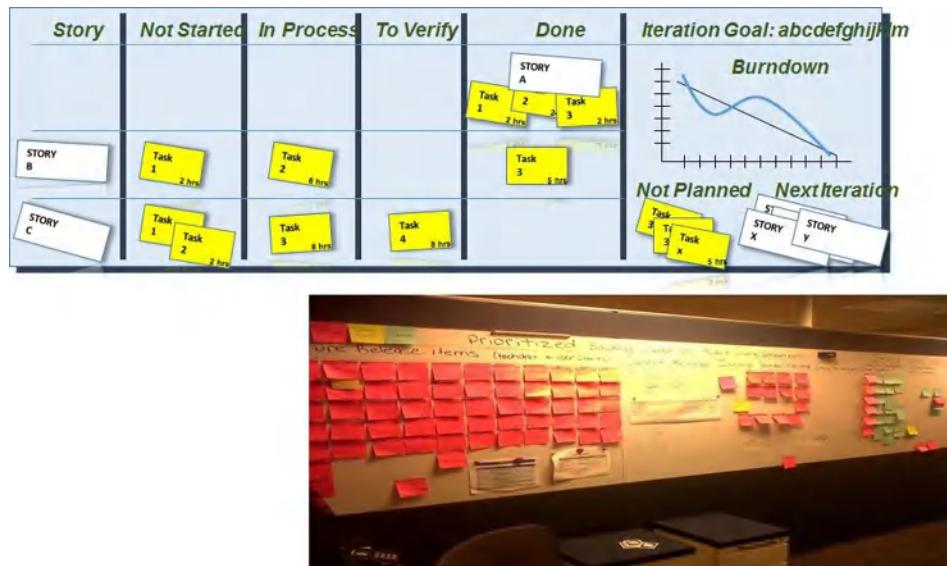
## Sprint Backlog

It is a subset of Release backlog and contains only those user stories that are targeted to be delivered in the particular sprint. It is also accomplished by a plan for the sprint. This is created during Sprint Planning Meeting.



- Highest priority items take into the sprint for implementation and the plan to deliver those items is sprint backlog
- Sprint backlog is created during sprint planning
- Helps team see the total work involved in achieving the sprint goal

- Development team creates and manages the sprint backlog, this includes updating the time left of each task, create any forgotten tasks, update the status of each task etc.
- Team should keep the status of the items up to date so that the sprint progress is transparent
- All items should be updated at least once a day
- Team uses Daily Scrum meeting to inspect and adapt the Sprint backlog



## Product Backlog Refinement

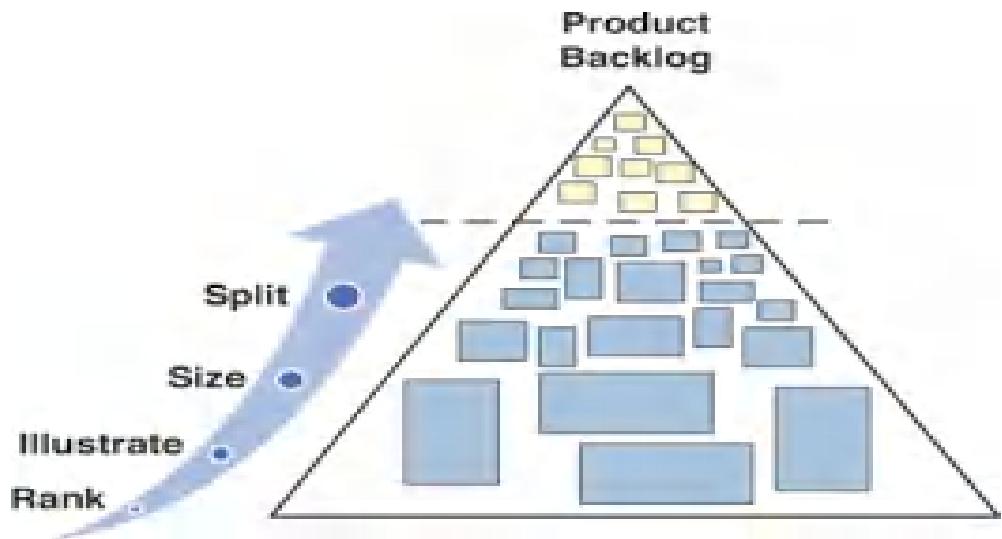
Product backlog refinement is the process through which product backlog items are reviewed by the Scrum team and revised, providing more detail and ensuring that there is greater clarity in the requirements for that item.

When product backlog is initially created it would have items of various sizes, clarity and value. But a scrum team needs clarity on few most important to get started. Backlog could be depicted as the following picture. Items at the top are important right now and should be smaller in size and more details so that team could start implementing them in

upcoming sprints. As you go lower the product backlog, the items are less important and less detailed. Product owner elaborates them as they become important.

Scrum has an activity called “Product Backlog Refinement” to progressively elaborate the product backlog.

- Primary goal of product backlog refinement is to get ready with few items for upcoming one or two sprints
- Product Backlog items that are refined are deemed “Ready” for selection in a Sprint Planning
- Product Backlog Refinement is the act of adding detail, estimates and order to items in the Product Backlog
- Product Backlog Refinement is an ongoing activity throughout a Scrum project
- Team and PO decide the frequency and duration of backlog refinement meeting. However, it is time boxed at 10% of total available time.



## Product Increment



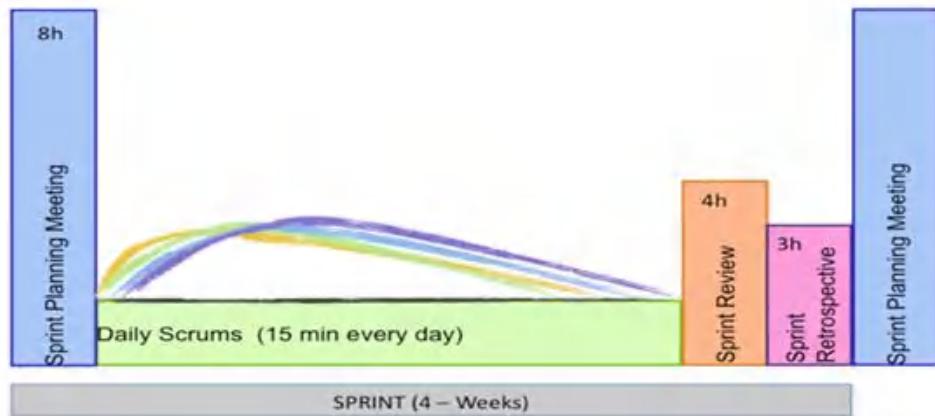
**Input:** Product Backlog Item | **Output:** Updated Product Backlog

### Should the team always release the Product Increment?

At the end of each sprint, the team must produce a potentially shippable product increment with the following features

- High Quality
- Tested
- Completed
- Ready to Use
- As per Definition of Done
- It depends. If the product increment that is produced is usable and adds the value to the business, product owner may choose to release it right away.
- Though the product increment is working, it may not be the feature complete and product owner may not want to release it
- Some business doesn't want to surprise their customers too often by frequent release
- Whether the product increment is shipped or not, building working software every sprint eliminates the technical uncertainty

## Scrum Events | Meetings



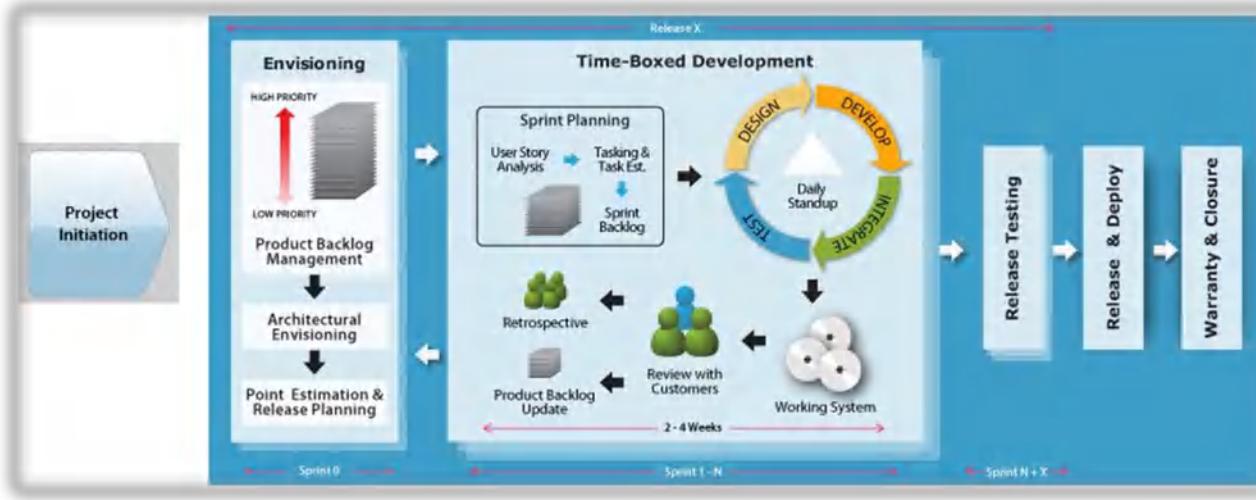
Prescribed events are used in Scrum to create regularity and to minimize the need for meetings not defined in Scrum. All events are time-boxed events, such that every event has a maximum duration. Once a Sprint begins, its duration is fixed and cannot be shortened or lengthened. The remaining events may end whenever the purpose of the event is achieved, ensuring an appropriate amount of time is spent without allowing waste in the process.

Other than the Sprint itself, which is a container for all other events, each event in Scrum is a formal opportunity to inspect and adapt something. These events are specifically designed to enable critical transparency and inspection. Failure to include any of these events results in reduced transparency and is a lost opportunity to inspect and adapt. Scrum activities are also known as events or ceremonies

The major scrum events or ceremonies:

- Sprint planning
- The Sprint
- Daily scrum
- Sprint reviews
- Sprint retrospective

# Timeboxing



- Time boxing is the maximum time allowed for an event
- Time boxing makes tams focus on most important things first
- All Scrum events are time boxed. Sprints are time boxed @ 1 to 4 weeks
- Other Scrum events are time boxed based on the sprint duration
- All official Scrum Events use the agile concept of Timeboxing.
- The SM ensures the events are kept within the timebox.
- Timeboxing helps the members of the Scrum Team™ stay focused on the same objective.
  - As a result, the members who work on a problem are encouraged to come up with the best solution in the time allotted
- Timeboxing limits the work in progress.

**Extending a Sprint for a few more days to achieve the Sprint Goal is not allowed**

## Sprint Planning

The purpose of sprint planning meeting is to determine what the work will be done in that sprint and how the work will be achieved.

<b>Who Attend?</b>	Dev Team, Product Owner and Scrum Master
<b>When?</b>	First day of the Sprint
<b>Time box</b>	4 hours for 2 weeks Sprint   8 hours for 4 weeks Sprint
<b>What?</b>	<ul style="list-style-type: none"><li>▪ Discuss Sprint Backlog</li><li>▪ What to do? – Product Owner</li><li>▪ How to do? – Development Team</li></ul>
<b>Input</b>	<ul style="list-style-type: none"><li>▪ Refined Product Backlog</li><li>▪ Latest product increment</li><li>▪ Projected team's capacity</li><li>▪ Team's prior performance</li></ul>
<b>Outcome</b>	Sprint Backlog & Sprint Goal

### How the Sprint Planning meeting gets executed?

- Product Owner and Project team needs to discuss the goals of the upcoming sprint
- Product Owner and team negotiates stories to select in current sprint from prioritized product backlog for the upcoming sprint
  - Selected stories are estimated with agreed acceptance criteria
  - Team identifies and estimates Task, discusses how the work will be accomplished
- Scrum Master, Product Owner and team can attend the meeting
- Product Backlog has to be groomed by PO prior to sprint planning meeting, Product owner reviews with the team items in the updated backlog

- Self-organized Development team defines how the work will be done in the goals of the sprint will be achieved
- Normally split into 2 sets of 4 hours each Timebox: Max 8 hours per sprint
  - First half for choosing the product backlog items with PO
  - Second half for splitting into tasks and assignment (Product Owner is optional for the second half)
- The development team predicts what can be delivered based on estimates, projected capacity, and past performance to define the sprint goal.
- The development team then determines how this functionality will be built and how the team will organize to deliver the sprint goal.
- Output of this will be the sprint backlog. The work to get done in the next sprint.
- Artifacts – Sprint Goal, Sprint Backlog (Output of Sprint Planning)



**Input:** Refined Product Backlog | Latest Product Increment | Team Capacity

**Outcome:** Sprint Goal | Sprint Backlog

## Sprint Goal

The Sprint Goal is an objective set for the Sprint that can be met through the implementation of Product Backlog.

It provides guidance to the Development Team on why it is building the Increment. It is created during the Sprint Planning meeting. The Sprint Goal gives the Development Team some flexibility regarding the functionality implemented within the Sprint. The selected Product Backlog items deliver one coherent function, which can be the Sprint Goal. The Sprint Goal can be any other coherence that causes the Development Team to work together rather than on separate initiatives.

As the Development Team works, it keeps the Sprint Goal in mind. In order to satisfy the Sprint Goal, it implements the functionality and technology. If the work turns out to be different than the Development Team expected, they collaborate with the Product Owner to negotiate the scope of Sprint Backlog within the Sprint.

## Sprint Cancellation



A Sprint can be cancelled before the Sprint time-box is over. Only the Product Owner has the authority to cancel the Sprint, although he or she may do so under influence from the stakeholders, the Development Team, or the Scrum Master.

A Sprint would be cancelled if the Sprint Goal becomes obsolete.

This might occur if the company changes direction or if market or technology conditions change. In general, a Sprint should be cancelled if it no longer makes sense given the circumstances. But, due to the short duration of Sprints, cancellation rarely makes sense. When a Sprint is cancelled, any completed and “Done” Product Backlog items are reviewed. If part of the work is potentially releasable, the Product Owner typically accepts it. All incomplete Product Backlog Items are re-estimated and put back on the Product Backlog.

The work done on them depreciates quickly and must be frequently re-estimated. Sprint cancellations consume resources, since everyone has to regroup in another Sprint Planning to start another Sprint. Sprint cancellations are often traumatic to the Scrum Team, and are very uncommon.

## The Sprint

The heart of the Scrum is Sprint. A sprint is a timeboxed(time-limited) iteration of 1 - 4 weeks to build a potentially releasable product.

Each sprints contain and consists of the following: -

- Sprint Planning
- Daily Scrums
- Development work
- Sprint Review
- Sprint Retrospective

Sprints best have [consistent durations](#) throughout a development effort. A new Sprint starts immediately after the conclusion of the previous Sprint.

During the sprint, no changes are made that would affect the sprint. The development team members are kept the same throughout the sprint

The development team works on one item at a time to completely build it such that each item could be usable and releasable. Team does all the functions required to complete each item.

### **Sprint is protected**

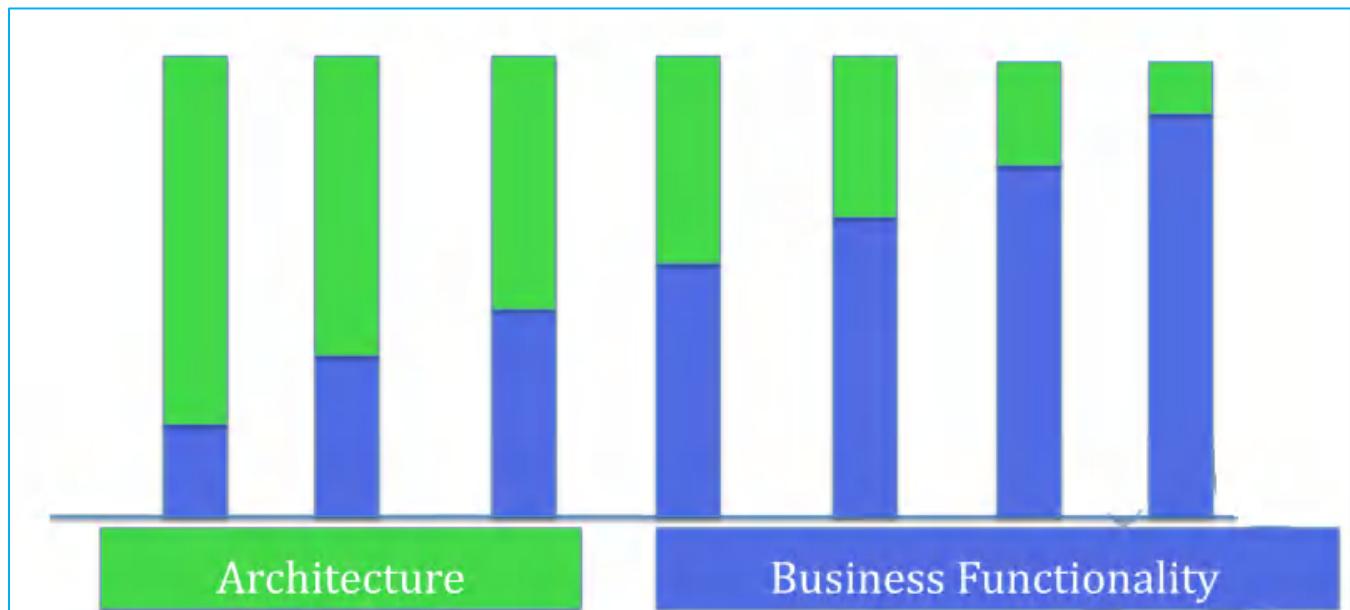
During the Sprint: -

- No changes are made that would endanger the Sprint Goal;
- Quality goals do not decrease; and,
- Scope may be clarified and re-negotiated between the Product Owner and Development Team as more is learned.

Each Sprint may be considered a project with no more than a one-month horizon. Like projects, Sprints are used to accomplish something. Each Sprint has a definition of what is to be built, a design and flexible plan that will guide building it, the work, and the resultant product.

Sprints are limited to one calendar month. When a Sprint's horizon is too long the definition of what is being built may change, complexity may rise, and risk may increase. Sprints enable predictability by ensuring inspection and adaptation of progress toward a Sprint Goal at least every calendar month. Sprints also limit risk to one calendar month of cost.

### **Architecture is built incrementally**



### **Test small test often**

- Testers are involved right from the beginning
- Developers check in code in smaller testable chunks

- Testers try the functionality to see its working
- Testers and developers collaborate throughout the sprint
- The goal is to deliver usable product increment at the end of every sprint

## What else happens in a Sprint?

- DBA's, sysadmin, Technical Writers and any other supporting members are involved ASAP. Data models and database design done incrementally
- Documentation evolves as the stories are implemented
- Executable test document the test cases

## Sprint | Iteration

- Sprint and iteration are essentially the same things. The standard duration for each is two weeks.
- Iteration is a small amount of time (1 to 4 weeks) used to build a small part of the product
- Iteration planning meetings have two parts that are time-boxed

### Part 1 – What

- Product Owner explains the items at the upper part of the Product Backlog
- Team estimates how much they can take on in an iteration
- Team makes a preliminary commitment

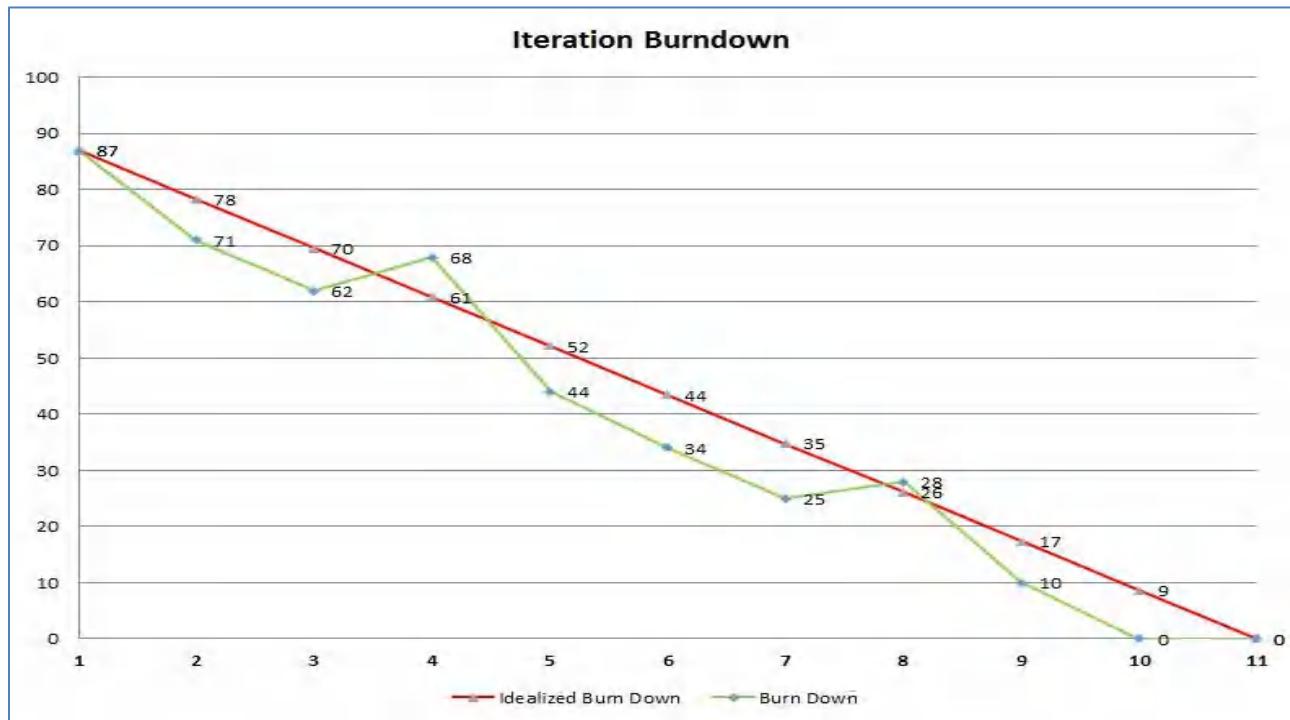
### Part 2 – How

- Team Plans how they are going to implement their commitment
- Team starts with design, and this leads to a list of tasks (Iteration Backlog)
- Team confirms their commitment (or adjust it)

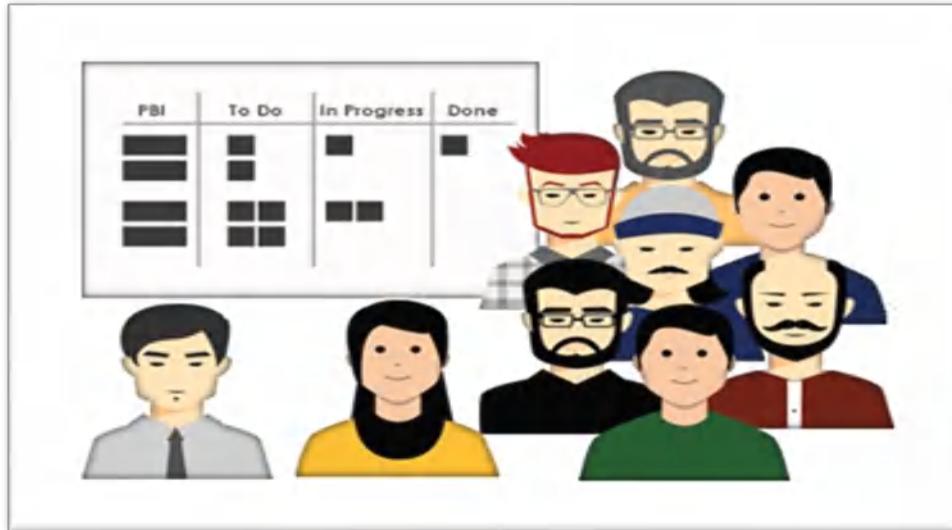
## Sprint | Iteration 0

Iteration 0 is conducted at the start of every release to: -

- (Re) Validate the core and extended team members
- Identify all dependent group signoff need
- Identify the development and test environment
- Identify the dependencies on other projects, teams & resource that may influence the release schedule
- Identify the deliverables and signoff needed
- Identify number of iterations for the release using team velocity (if any)
- Identify the schedule for release testing and release iteration | sprint. As a guideline, have release iteration after every three-time boxed developed iterations
- Identify any assumptions made
- Identify the risks involved in the project
- Detail the project | release schedule
- Create a release plan



## Daily Scrum



<b>Who Attend?</b>	Dev Team and Scrum Master
<b>When?</b>	Entire Sprint duration
<b>Time box</b>	Max 15 Mins
<b>What?</b>	<ul style="list-style-type: none"><li>▪ What did you do yesterday?</li><li>▪ What will you do today?</li><li>▪ Are there any impediments in your way?</li></ul>
<b>Input</b>	Sprint Backlog & Sprint Goal
<b>Outcome</b>	<ul style="list-style-type: none"><li>▪ Plan for next 24 hours</li><li>▪ List of impediments if any</li></ul>

- The purpose of the daily scrum meeting is for development team to sync up, team will inspect and adapt the sprint backlog.
- A 15-minute time-boxed activity for the Development Team to synchronize activities and create a plan for the next 24 hours
- Should be held at the same time and place each day

- Scrum master makes teaches the team how to stick to the time box, make sure that the meeting is happening and facilitates if needed
- Development team member gets together and answer 3 questions:
  - What did you do yesterday?
  - What will you do today?
  - Are there any impediments in your way?

## Sprint Review



<b>Who Attend?</b>	Product Owner, Dev Team and Scrum Master
<b>When?</b>	Last day of the Sprint
<b>Time box</b>	2 hours for 2 weeks sprint   4 hours for 4 weeks sprint
<b>What?</b>	Review Product Increment & give feedback. Feedback goes to the Product Backlog
<b>Input</b>	Product Increment, Product Backlog & Market Conditions
<b>Outcome</b>	<ul style="list-style-type: none"> <li>▪ Feedback on Product</li> <li>▪ Updated Product Backlog</li> <li>▪ Direction for the Product Backlog</li> </ul>

- The purpose of the Sprint Review meeting is to inspect and adapt the product itself.
- Should be time boxed to no more than an hour per week of Sprint
- Product Owner invites few key stakeholders, Scrum Master make sure that the meeting is happening and teaches the team on how to complete it with in the time box
- Takes place at the end of the Sprint
- Development Team demonstrates the product increment built during the sprint
- Development Team talks about any impediments they have to work through while building the product
- Designed to gather feedback from stakeholders on what the Team has completed in the sprint, Stakeholders talks about the market conditions, future direction etc.,
- Product Owner presents the product backlog as it is and discusses what is done and what is not
- To create a conversation between the Team and the stakeholders about how to make the product better
- Product Owner updates Product Backlog based on the new learning

## Sprint Retrospective



<b>Who Attend?</b>	Product Owner, Dev Team and Scrum Master
<b>When?</b>	Last day of the Sprint
<b>Time box</b>	3 hours for 4 weeks sprint
<b>What?</b>	<ul style="list-style-type: none"><li>▪ What went well?</li><li>▪ What did not went well?</li><li>▪ Any improvement – Identify the improvement list</li></ul>
<b>Input</b>	<ul style="list-style-type: none"><li>▪ Feedback  Experiences in the sprint</li><li>▪ Current Practices</li></ul>
<b>Outcome</b>	Prioritized list improvements

- The purpose of the sprint retrospective meeting is to inspect and adapt the process, practices, tools and behaviors of Scrum team members.
- Scrum master attends the accountability standpoint as well as helps the team complete the meeting within the time box

- Opportunity for the Team to inspect and create a plan for improvements to be done during the next Sprint.
- Team discusses: -
  - What went well?
  - What went wrong?
  - What are the improvements? | What to do more of?

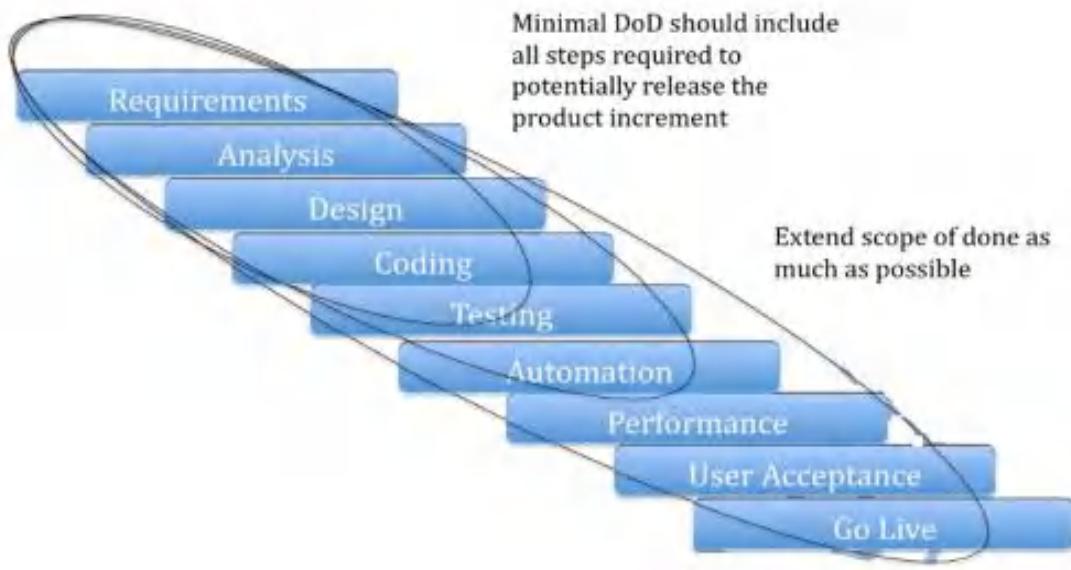
## The Definition of Done

- Definition of Done is a list of attractive activities agreed by the Product Owner and the Development Team to call a backlog item is done during the sprint.
- Definition of Done consist of activities needed for functional and quality requirements
- Team comes up with the DOD and adheres to it while creating the product increment
- Different teams may have different DOD but all teams should follow minimal DOD that includes all critical activities required
- If there are standards at organizational level, a common DOD can capture those and the teams should have separate DOD in addition to one at the organizational level

A stronger DOD leads to higher quality product: -

- Code Complete
- Unit tests Written
- Code Review
- Manual Functional Testing
- Automation
- Updated Documents
- User Acceptance Testing
- Successful Deployment

- Suppose if the DOD is missing essential activities, it is called a Weak DOD. For E.g. Load testing may not be done for every sprint and is deferred to later time.
- A weak DOD causes unfinished work in every sprint. The unfinished work is added back to product backlog. This increased the risk. If a major bug is found during the load testing, that could risk the release
- Weak DOD also increases the Technical Debt. This might include the automation or code reviews



## Scrum Meetings Comparison

1. Sprint Planning		2. Daily Scrum	
<b>Who</b>	Product Owner, Dev Team	<b>Who</b>	Dev Team
<b>When</b>	First day of Sprint	<b>When</b>	Entire Sprint duration
<b>Time box</b>	Max 8 hours	<b>Time box</b>	Max 15 Mins
<b>What</b>	<ul style="list-style-type: none"> <li>* Sprint Back log</li> <li>* What to do? – Product Owner</li> <li>* How to do? – Team</li> </ul>	<b>What</b>	<ul style="list-style-type: none"> <li>* What did you do yesterday?</li> <li>* What will you do today?</li> <li>* Are there any impediments in your way?</li> </ul>
<b>Input</b>	Prioritize Product Backlog	<b>Input</b>	Sprint Backlog
<b>Outcome</b>	Sprint Goal, Sprint Backlog	<b>Outcome</b>	Updated Sprint Backlog
3. Sprint Review		4. Sprint Retrospective	
<b>Who</b>	Stakeholders, Product Owner, Scrum Master	<b>Who</b>	Scrum Master, Product Owner, Team
<b>When</b>	Last day of Sprint	<b>When</b>	End of Sprint
<b>Time box</b>	Max 4 hours for 4 weeks	<b>Time box</b>	Max 3 hours
<b>What</b>	Review Product Increment & give feedback, feedback goes to product backlog	<b>What</b>	<ul style="list-style-type: none"> <li>* What went well</li> <li>* What did not went well</li> <li>* Any Improvements</li> <li>* Identify the improvements list</li> </ul>
<b>Input</b>	Product Increment	<b>Input</b>	Feedback / Experience of team members
<b>Outcome</b>	Product Backlog (Revised)	<b>Outcome</b>	List of Improvements

# User Stories & Estimation

## User Stories

### What is User Story?

User stories are well suited as product backlog items. User story is not a concept from Scrum but commonly used in Scrum projects to manage requirements.

User Story is as any user, I want to create my account: -

- Token for the feature
- Usually written on a small index card
- Captures intent of the failure
- Captures conditions of satisfaction or acceptance test criteria

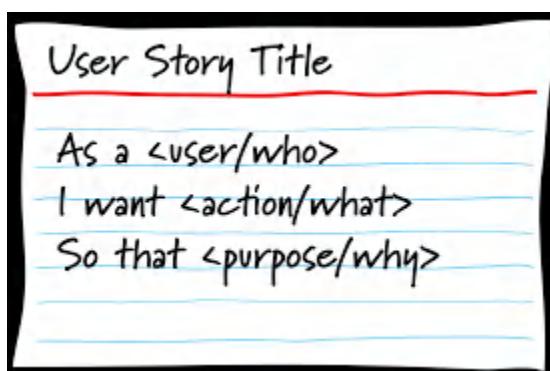
### User story is written in which format?

As a <**who**> I want to <**what**> So that <**why**>

Who: User of the product

What: Activity user wants to perform using the feature

Why: Purpose the feature is going to serve.



## What 3C's of User story?

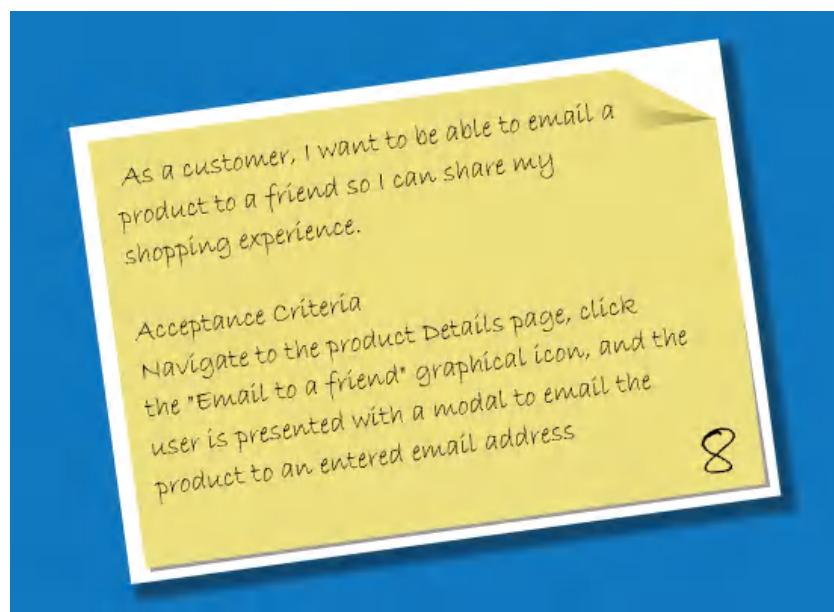
### The Three C's of a User Story



## Acceptance Criteria of User Story?

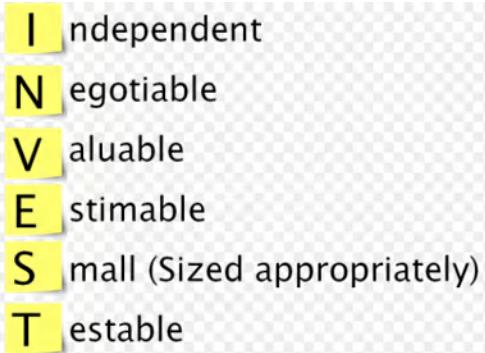
Acceptance Criteria is the criteria if the product satisfies the user story is considered done.

Acceptance Criteria is basis for high level test cases.



## How to write good user stories?

It is essential to write user stories, which are small and independent enough to be worked on in each sprint. For a good product backlog, the team should INVEST in good user stories:



**Independent:** Stories should be independent enough so that the team does not have to pull in many other stories along with that story.

**Negotiable:** Team should be able to negotiate stories in and out of a sprint. This way the team can maximize the value.

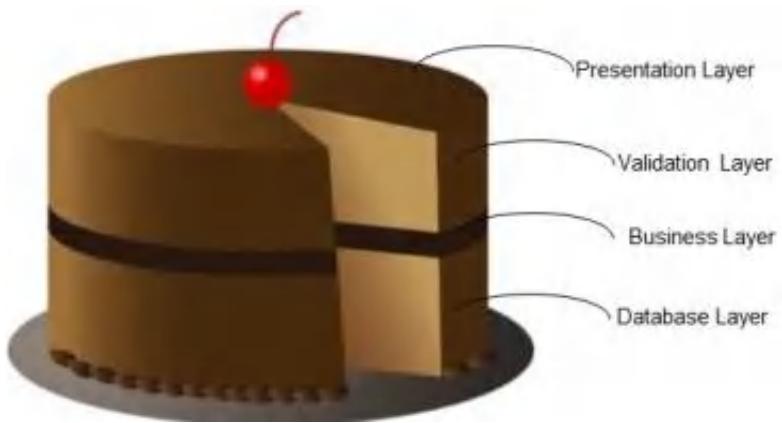
**Valuable:** Valuable to the customer directly or indirectly. A technical story may not add a direct value to the customer.

**Estimable:** Team should be able to estimate the stories. This requires clarity on detail and the stories are independent.

**Sized Appropriately:** Higher order stories are smaller in size such that they could be completed in a sprint

**Testable:** A story should cover one piece of functionality that could be tested in isolation

## How to split the User Story?



We can split the user story into the different layers such as:-

- Presentation Layer
- Validation Layer
- Business Layer
- Database Layer

## Estimation: Planning Poker Game

During Agile estimation, use poker card to raise the points as per the baseline.



Planning Poker® is a consensus-based estimating technique. Agile teams around the world use Planning Poker to estimate their product backlogs. Planning Poker can be used with story points, ideal days, or any other estimating unit.

Planning Poker is an agile estimating and planning technique that is consensus based. To start a poker planning session, the product owner or customer reads an agile user story or describes a feature to the estimators.

Each estimator is holding a deck of Planning Poker cards with values like 0, 1, 2, 3, 5, 8, 13, 20, 40 and 100, which is the sequence we recommend. The values represent the number of story points, ideal days, or other units in which the team estimates.

The estimators discuss the feature, asking questions of the product owner as needed. When the feature has been fully discussed, each estimator privately selects one card to represent his or her estimate. All cards are then revealed at the same time.

If all estimators selected the same value, that becomes the estimate. If not, the estimators discuss their estimates. The high and low estimators should especially share their reasons. After further discussion, each estimator reselects an estimate card, and all cards are again revealed at the same time.

The poker planning process is repeated until consensus is achieved or until the estimators decide that agile estimating and planning of a particular item needs to be deferred until additional information can be acquired.

### **Estimate the Painting Project**

Master Bedroom 20 Ft * 16 Ft – Walk in Close (1/8)	20
Store Room – 4 Ft * 6 Ft	2
Kid's Bedroom – 12 Ft * 12 Ft	13
Guest Bedroom – 10 Ft * 10 Ft	8
Study Room – 10 Ft * 10 Ft – Book Shelves	8
Living Room – 14 Ft * 14 Ft	13
Family Room – 20 Ft * 18 Ft – High Ceiling	40
Foyer – 6 Ft * 12 Ft	5
Servant Room – With Bathroom	8
Exterior Painting	40

## Agile Estimation

Product backlog items are estimated so that the product owner can make trade off decisions in prioritizing the items. Estimates are also required for release or long-term planning. In scrum, the product backlog items are progressively elaborated, so estimating them in hours is very difficult.

Problem		Solution
	(Product Backlog Items)	(Tasks)
<b>Who</b>	Development Team	Development Team
<b>When</b>	Product Backlog Refinement	Sprint Planning
<b>Unit of Measure</b>	Story Points, Function Points, Use Case Point, Ideal Days, etc.,	Hours
<b>How</b>	Planning Poker, Delphi, PERT, COCOMO, Expert Judgement, etc.,	Expert Judgement

### How estimation different in Scrum? Why do we need estimates?

#### Estimates are relative sizes

- Humans are good at estimating by comparison
- Backlog items are estimated in relative sizes
  - Size 4 item is roughly two times bigger than size 2 item
- Size represents the relative effort it takes to complete the item
  - Size 4 item takes two time longer than size 2 item
- Estimates are influenced by
  - How much is there?
  - How hard is it?

- Estimates are at the right granularity
  - Estimates should be roughly accurate than precisely wrong

### **Common units of estimation using Story Points**

Indicates how big is an item?

A 4-point item is two times bigger than 2-point item

Unit less

### **How long it will take in days (Ideal days) if?**

It's all you worked on

No interruptions

No impediments

### **Advantages of Story Points**

Story points are additive, time-based estimates may not be

Story points avoids unit confusion

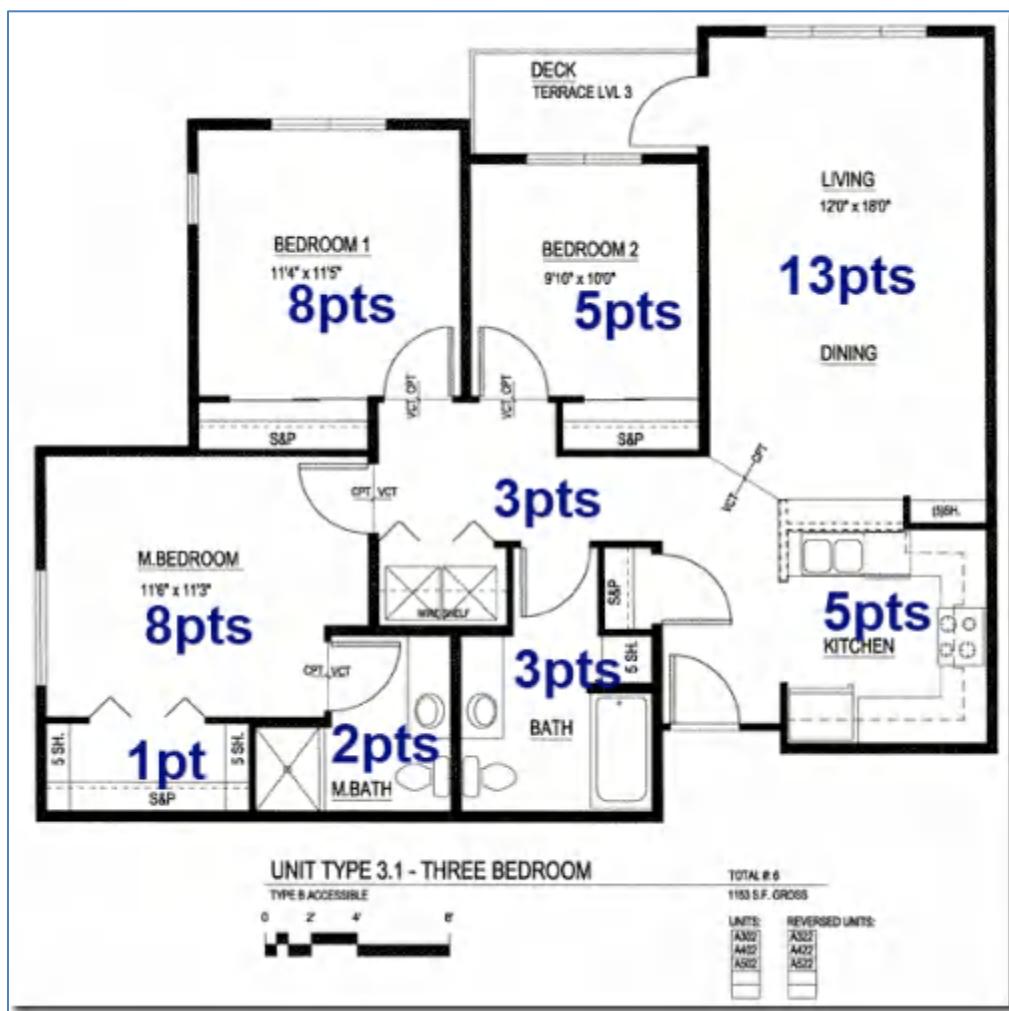
### **Estimate the cement plastering / painting project**

First baseline one area and arrive other area

<b>Area</b>	<b>Story Points</b>
Master Bed Room 20 ft * 16 ft – Walk in closet (1/8)	<b>20</b>
Store Room – 4 ft * 6 ft – ( <b>Baselined</b> )	<b>2</b>
Kid's Bed Room – 12 ft * 12 ft	<b>13</b>
Guest Bed Room – 10 ft * 10 ft	<b>8</b>
Study Room – 10 ft * 10 ft with Book Shelves	<b>8</b>

Living Room – 14 ft * 14 ft	<b>13</b>
Family Room – 20 ft * 18 ft with High Ceiling	<b>40</b>
Foyer – 6 ft * 12 ft	<b>5</b>
Servant Room along with bathroom	<b>8</b>
Pet Dog Room – 4 ft * 6 ft	<b>2</b>
Exterior Painting	<b>40</b>

### Exercise – Derive the story points for below house



## Agile Capacity Planning

**Capacity planning** is the process of determining the production **capacity** needed by an organization to meet changing demands for its products. In Scrum **Capacity planning**, the maximum amount of work that an organization is capable of completing in a given period to build the product.

- A successful sprint starts with the **planning session**.
- Taking the time to plan allows the team to review the work about to be undertaken, **estimate the effort required to complete that work**, and then **commit to a prioritized list of stories and tasks that are within the team's calculated capacity**.
- Agile planning session is to present a **collection of user stories** to the team and allow them to be estimated. This is where team **effort gets aligned with business direction**
- At the **end of the session**, the team should feel committed to completing the work required to implement the agreed-upon list of user stories during the **next sprint**
- A well-formed agile team has a **product owner** who is prepared for the planning session and is ready to present sprint goals and a prioritized list of stories for estimation by the team
- The **product owner** should review the product backlog frequently so that stories are staged and ready-to-go for planning sessions based on the latest business priorities product owner who can clearly state the Vision (why the agile team exists) and can formulate clearly the goals for each Sprint.
- This clearly stated vision and sprint goals should be used to begin the sprint planning session, so that guiding principles can be applied to each story considered for estimating. New stories are typically unfolded as the team asks questions of the product manager during the planning session.

- **Two best practices** for determining team capacity are: -
  - **The total capacity of the team should be based on the following equation:**
  - **# of team members × # of days in the iteration × (no more than) six hours**
  - **Suppose a five-member, well-formed agile team is planning a ten-day sprint.**
  - The capacity of the team is quickly established to be
  - **5 members × 10 days × 6 hours per day = 300 hours capacity.**
  - The ideal daily burn down is, therefore, thirty hours (300 hours of capacity ÷ 10 day sprint).

### Capacity Planning Hours spent in Ceremonies

S. No	Action Items	Formula	Sample	Actual
A	Sprint Planning	= 4 Hours * 4 Developers	16 Hours	
B	Daily Scrum	= 5 Mins * 5 Days	1.25 Hours	
C	Sprint Review	= 2 Hours * 1 Developers	2 Hours	
D	Sprint Retrospective	= 2 Hours * 1 Developers	2 Hours	
E	Product Backlog Refinement	= 4 Hours * 1 Developers	4 Hours	
F	Others		10 Hours	
		Total	35 Hours	

## **Release Planning**

The release planning is a tentative plan for the whole release that covers several sprints

The **Input** for release plans is: –

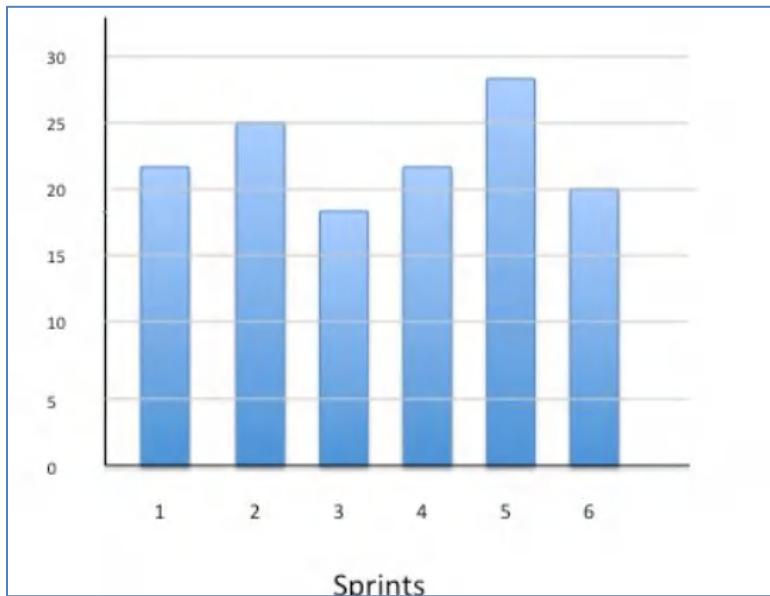
- Release strategy, Priority
- Estimated Product backlog that gives the total size of the release
- Velocity of the team which represents the productivity
- Assumptions, constraints and risks

### **Total size of the backlog**

- Development team estimates items in the backlog. Since all items won't be clear, the team makes their best guess.
- Any estimation technique like planning poker or affinity estimation could be used
- Team can iterate over estimates until they feel that the overall estimate is roughly accurate

### **Velocity**

- A long-term measure that indicates how much work is “done” per sprint
- Velocity is number of points completed per sprint
- Particularly finished stories don't count
- Velocity varies in every sprint



### How do we know the team's velocity?

- If the team is in place for some time, look at the history of the team's velocity
- If the team is new, run couple of sprints to establish the initial velocity
- Use the average velocity over several sprints to predict the completion date

### Let's plan a release

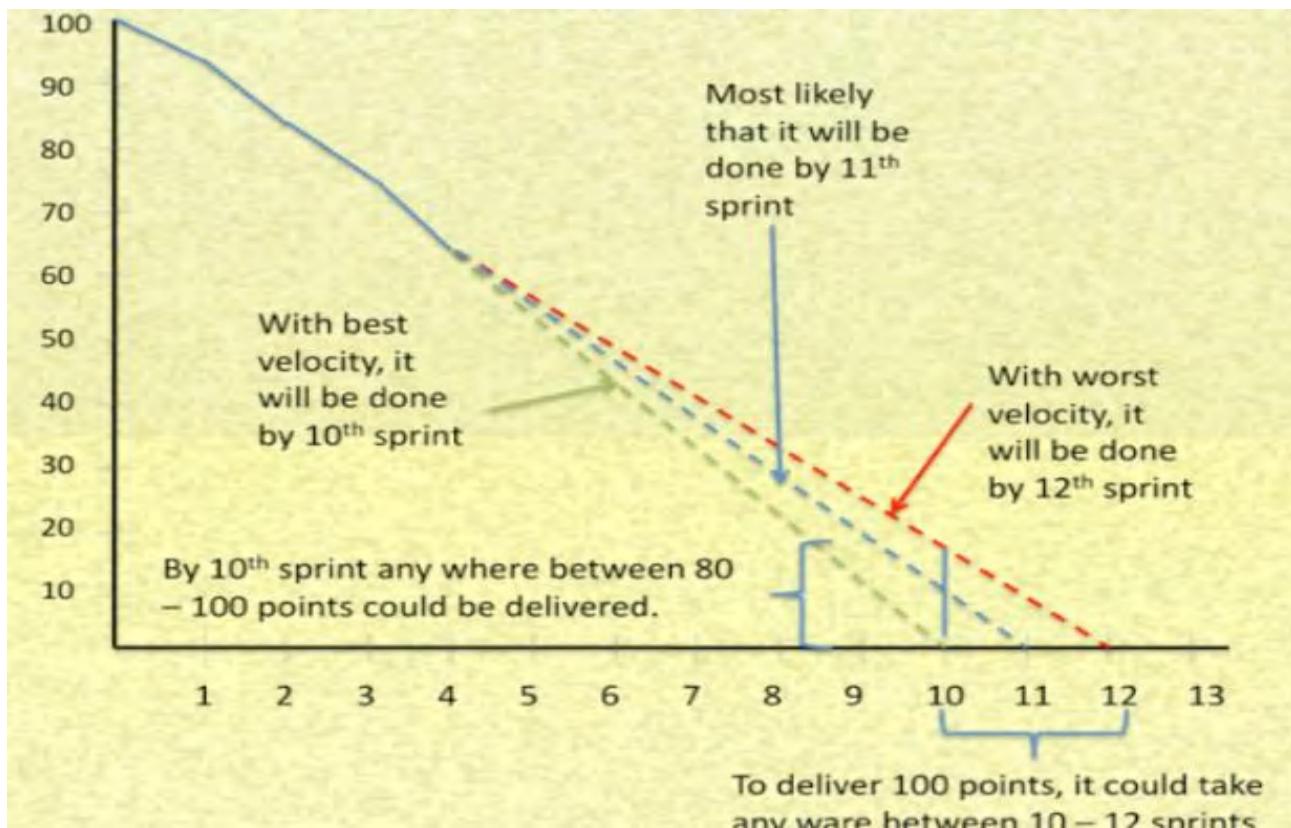
Let's say the release backlog of size 100 points. The team ran 4 sprints and had velocities of 8, 11, 9, 10

Average velocity for 4 sprints:  $38/4 = 9.5$

Best Velocity: 11 | Worst Velocity: 8

Remaining points after 4 sprints: 62 | Required sprints to complete 62 points (Round up value)

@ Average velocity:  $62/9.5 = 7$  sprints | @Best Velocity:  $62/11 = 6$  sprints | @ Worst Velocity:  $62/8 = 8$  sprints



The **output** for release plans is: –

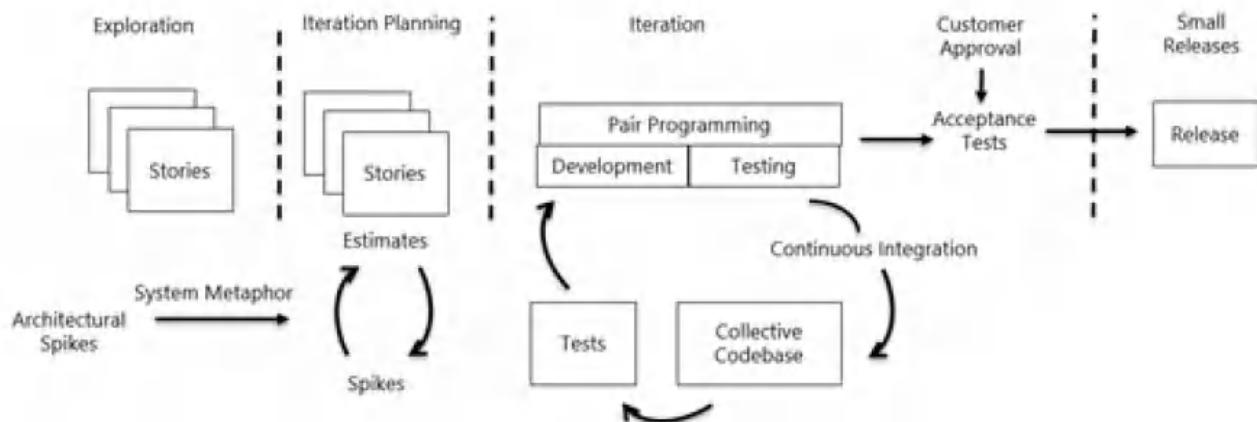
- Release scope/date
- Prioritized backlog
- Ordered estimated in size and forecasted in sprint, Release burnt chart

# XP

## What is XP?

- Extreme programming is also known as XP
- XP is all about software development best practices, while scrum at the project management level focuses on prioritizing work and getting feedback

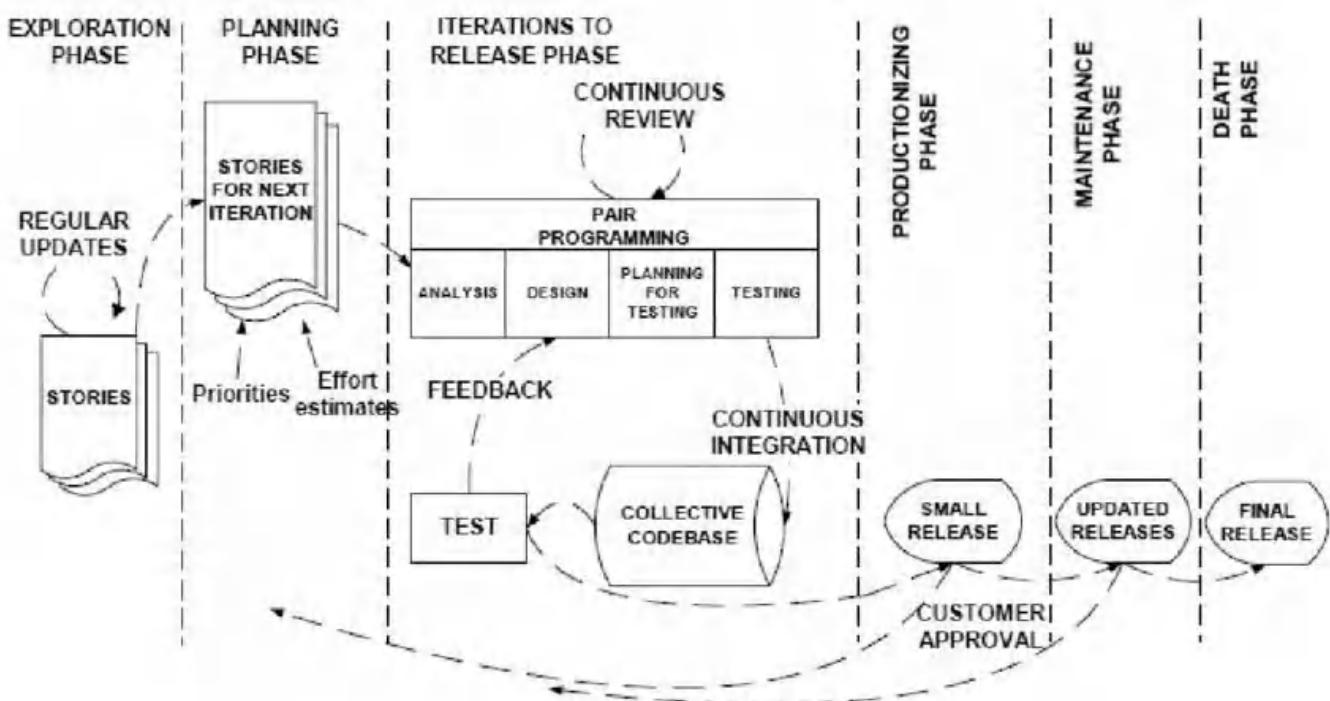
## Extreme Programming (XP) at a Glance



XP recognizes that:

- All requirements will not be known at the beginning
- Requirements will change
- Use tools to accommodate, change as a natural process
- Do the simplest thing that possibly work and refactor
- Emphasis values and principles rather than process

## Share XP Life Cycle or overall flow of XP?



## What are XP Values?

XP has simple rules that are based on 5 values to guide the teamwork, The XP Values are Simplicity, Communication, Feedback, Courage & Respect.

1. **Communication.** Everyone on a team works jointly at every stage of the project.
2. **Simplicity.** Developers strive to write simple code bringing more value to a product, as it saves time and effort.
3. **Feedback.** Team members deliver software frequently, get feedback about it, and improve a product according to the new requirements.
4. **Respect.** Every person assigned to a project contributes to a common goal.
5. **Courage.** Programmers objectively evaluate their own results without making excuses and are always ready to respond to changes.

These values represent a specific mindset of motivated team players who do their best on the way to achieving a common goal. XP principles derive from these values and reflect them in more concrete ways.

### **Simplicity**

Reducing complexity, extra features, and waste. Find the simplest thing that could possibly work

### **Communication**

- Ensuring that the project team knows what is expected of them
- Ensuring the project team knows what other people are working on
- The daily standup meeting is an excellent communication tool

### **Feedback**

- The development team needs feedback early in the project
- Failing fast is a way to get feedback early
- Feedback gives the team an opportunity to improve the project

### **Courage**

- Developers' work is entirely visible to others on the project team
- Team members share code and correct each other's code
- XP uses pair programming

### **Respect**

- Team members must respect one another
- Everyone is responsible for the success and or failure of the project
- Everyone works differently but must work together

## What are the 5 XP Principles?

1. **Rapid feedback.** Team members understand the given feedback and react to it right away.
2. **Assumed simplicity.** Developers need to focus on the job that is important at the moment and follow YAGNI (You Ain't Gonna Need It) and DRY (Don't Repeat Yourself) principles.
3. **Incremental changes.** Small changes made to a product step by step work better than big ones made at once.
4. **Embracing change.** If a client thinks a product needs to be changed, programmers should support this decision and plan how to implement new requirements.
5. **Quality work.** A team that works well, makes a valuable product and feels proud of it.

## What are the XP Concepts?

The XP Concepts are: -

**Technical Debt:** Design and Coding imperfections that needed for correction. It is the cost of shortcuts that are accumulating over time, leading to: -

- Increased Risk
- Slower Time to Market
- Greater Maintenance & Enhancement Costs

Note: Unmanaged Technical Debt leads to systems too un-widely to use, and too expensive to fix, so team needs more attention to handle it on time.

**Stories:** Self-contained elements taken up for implementation

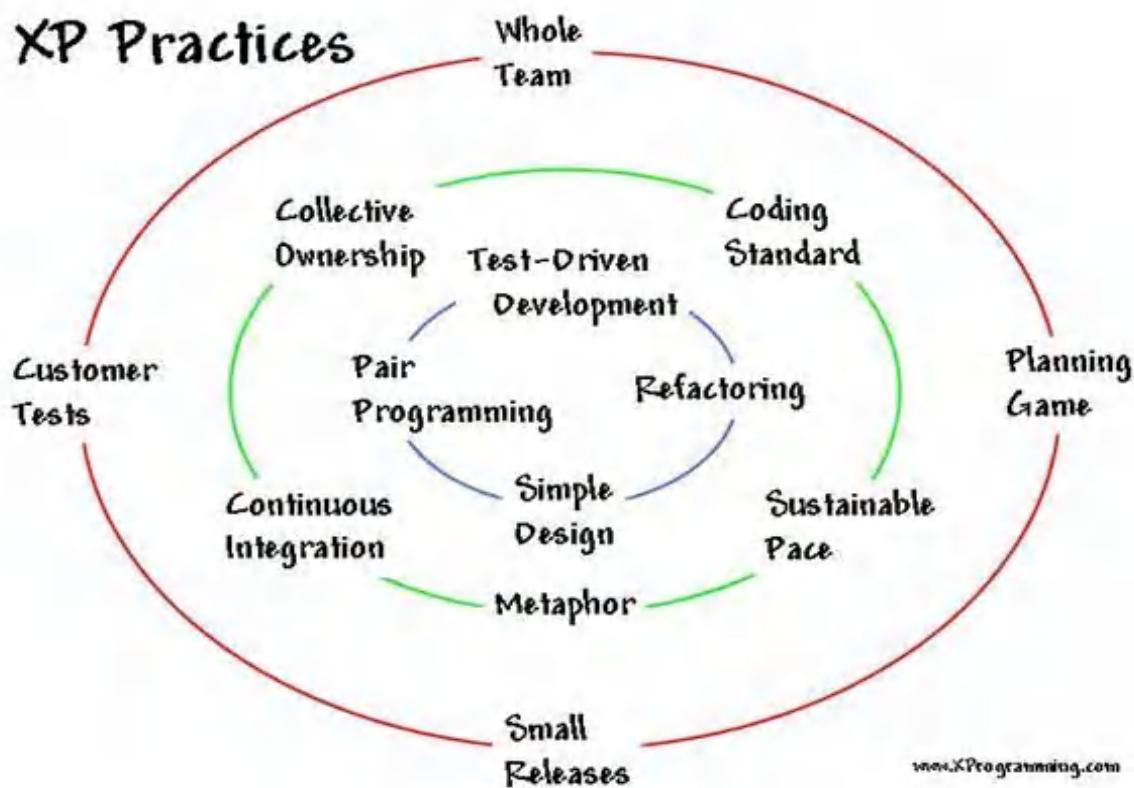
**Timeboxing:** Allocate time and wrap up by that time

**Last Responsible Moment:** Delay till when it is absolutely needed

**Iterations:** Design/Code/test/release within a specific duration

**Refactoring:** Improve Code quality without changing the behavior

## What are the XP Practices?



### Whole Team

- XP team members are collocated
- Generalizing specialist not role specialist
- Efficient and sharing of information

### Planning games

- Planning games are just planning activities
- Release planning is the release of new functionality
  - No more than one or two releases per year
  - The customer outlines the functionality required in the release
  - Developers estimate the difficulty to build the functionality
- Iteration planning is similar to sprint planning
  - Iteration planning happens at the start of every iteration

- The customer defines what functionality they want to see by the end of the iteration
- The development team estimates the difficulty to build the functionality

### **Small Releases**

- Small releases to a test environment are part of the XP practices
- Increases visibility to the customer
- Helps to deploy working software to the end users

### **Customer Tests**

- Definition of the required functionality
- Description of one or more test criteria for the software to be working

### **Collective Ownership**

- Any pair of developers can improve or amend the code
- Multiple people will work on all the code
- Improve defect resolution in discovery
- Knowledge is shared not isolated

### **Coding Standard**

- A coding standard is defined
- The team adheres to the standard
- Provides for consistency in writing the code

### **Sustainable Pace**

- Productivity is optimized through a sustainable pace
- Consistent overtime and long hours are not sustainable

## **Metaphor**

- Metaphors and similes are used to explain designs
- Metaphors help communicate the software to the customer

## **Continuous Integration**

- Compiling the code frequently throughout the day
- Programmer's check-in code to the code repository
- Integration test run automatically for immediate feedback

## **Test Driven Development**

- Acceptance test are written prior to developing new code
- Initial tests will fail because the code has not been fully developed yet
- When the code has been written correctly it will pass the test

## **Refactoring**

- Cleaning up the code
- Removing duplicated code
- Lowering coupling
- Increasing cohesion

## **Simple Design**

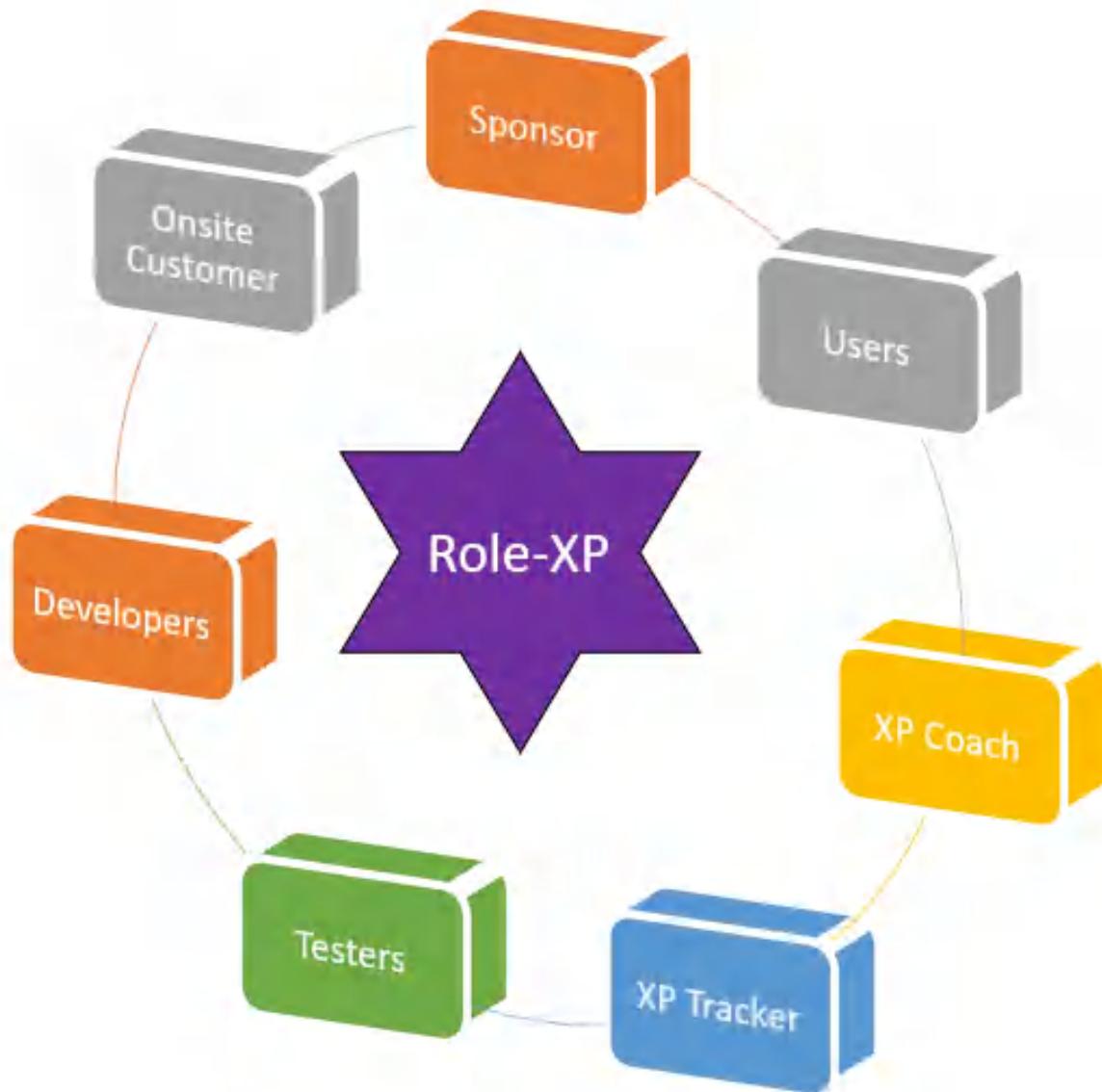
- What is the simplest thing that could work?
- Simple does not mean easy
- Simple design is a risk mitigation approach

## **Pair Programming**

- One person writes the code while the second person reviews the code
- The two people change roles frequently
- The pair will catch mistakes and speed up productivity

## What are the XP Team Roles?

- **Coach** –Mentor/guide/facilitator/communicator similar to the Scrum Master
- **Customer** –the individual who provides requirements priorities and direction for the project similar to the product owner
- **Programmer** –the developers who write the code
- **Testers** –Define and write the acceptability test



## XP Roles with On-Site Customers

What they do	Who
<ul style="list-style-type: none"> <li>▪ Release Planning</li> <li>▪ Provide requirement details and answer queries</li> <li>▪ Prioritize stories</li> <li>▪ Reviewing work in progress</li> <li>▪ Leading iteration demos</li> <li>▪ Stay one step ahead of developers – Crunching, user stories and grooming the backlog train for future iterations</li> </ul>	<ul style="list-style-type: none"> <li>▪ Product managers</li> <li>▪ Domain Experts</li> <li>▪ Interaction Designers</li> <li>▪ Business Analysts</li> </ul>

## XP Roles with Programmers

What they do	Who
<ul style="list-style-type: none"> <li>▪ Pair Programming</li> <li>▪ Incrementally Design &amp; Architect</li> <li>▪ Pare down technical debt</li> <li>▪ Configuration Management: Single Code base and automated builds</li> <li>▪ Implement code and refactor</li> <li>▪ Adhere to coding standards</li> </ul>	<ul style="list-style-type: none"> <li>▪ Programmers</li> <li>▪ Designers and Architects</li> <li>▪ Technical Specialist</li> </ul>

## XP Roles with Testers

What they do	Who
<ul style="list-style-type: none"> <li>▪ Automate regression tests</li> <li>▪ Test for functional and non-functional requirements</li> </ul>	<ul style="list-style-type: none"> <li>▪ Manual testers</li> <li>▪ Automation Engineers</li> </ul>

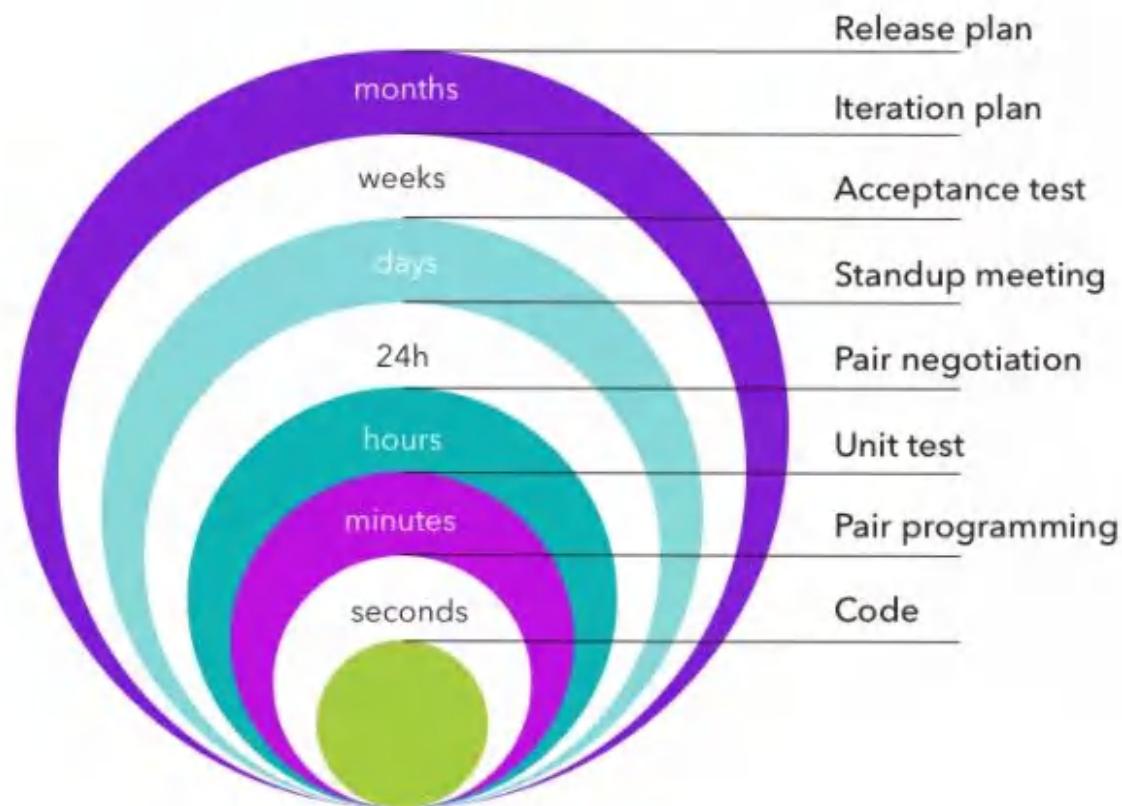
- Exploring testing
- Automated tests in nightly builds

## XP Roles with Coach

What they do	Who
<ul style="list-style-type: none"> <li>▪ Process Coaching</li> <li>▪ Technical Coaching</li> <li>▪ Access to resources</li> <li>▪ Impediment removal</li> <li>▪ Guidance and support</li> </ul>	<ul style="list-style-type: none"> <li>▪ Coaches</li> <li>▪ Project Managers</li> <li>▪ Quality Analysts</li> <li>▪ Executive Sponsors</li> </ul>

## XP Feedback Loops

# XP Feedback Loops



# Comparison of XP with other Frameworks?

## XP COMPARED TO OTHER FRAMEWORKS

### XP vs Scrum

- Shorter iterations
- Flexible with the changes
- Focus on technical practices
- Customer determines the order of feature development
- Longer sprints
- No changes within sprints
- Focus on managerial aspects
- Self-organized teams that decide what features to work on first

### XP vs Kanban

- Iteration-based
- Defined roles
- Focus on technical practices
- Continuous workflow
- No predefined roles
- Focus on visualization

### XP vs Lean

- Focus on iterations and technical practices
- Focus on faster MVP delivery and reducing waste

## When to use XP?

It's important to make sure a company's size, structure, and expertise, as well as the staff's knowledge base allow for applying XP practices. These are the factors to consider.

**Highly-adaptive development.** Some systems don't have constant functionality features and implies frequent changes. XP was designed to help development teams adapt to fast-changing requirements.

**Risky projects.** Teams applying XP practices are more likely to avoid problems connected with working on a new system, especially when a customer sets strict deadlines for a project. Additionally, a high level of customer engagement reduces the risk of their not accepting the end product.

**Small teams.** XP practices are efficient for teams that don't exceed 12 people. Managing such groups is usually easier, communication is more efficient, and it takes less time to conduct meetings and brainstorming sessions.

**Automated testing.** Another factor that can influence the choice of XP is the developers' ability to create and run unit tests, as well as availability of the necessary testing tools.

**Readiness to accept new culture and knowledge.** XP is different from traditional approaches to software development, and the way some of its practices should be implemented might not be obvious. So, it's important that your organization and team members are ready to embrace change. It's also worth inviting an experienced coach if you don't have previous involvement with XP.

**Customer participation.** As XP requires customers, developers and managers to work side-by-side, make sure your client is always available to provide input until a project ends.

Agility principles are becoming increasingly popular as they prove their effectiveness. Even though extreme programming is not the most widespread methodology, it offers a lot of sensible practices that can benefit software development and are worth considering for implementation in your projects.

## What are the Pros and Cons of XP?

EXTREME PROGRAMMING PROS AND CONS	
Advantages	Disadvantages
<ul style="list-style-type: none"><li>• Stable system</li><li>• Clear code</li><li>• Fast MVP delivery</li><li>• Less documentation</li><li>• No overtime</li><li>• High visibility</li><li>• Team collaboration</li><li>• Customer satisfaction</li></ul>	<ul style="list-style-type: none"><li>• Unclear estimates</li><li>• Time waste</li><li>• Not enough documentation</li><li>• Big cultural change needed</li><li>• Pair programming takes longer</li><li>• Collocated teams only</li><li>• Stressful</li><li>• Code over design</li></ul>

# Lean Kanban

## Lean

### What is Lean Software Development?

- Lean is a set of principles that have been taken from lean manufacturing approaches and applied to software development
- Lean is not an agile methodology but agile values are closely aligned.
- Toyota production system
- Visual management tools
- Customer to find value
- Learning and continuous Improvement

Lean Product Development - New Product					
PHASES	1. Project Sprint 0 Product Vision & User Stories	2. Alpha Version Proof of Vision	3. Beta Version Target Market End-User Validation	4. Full Release Continuous Improvement	
PEOPLE/ GROUPS	 Scrum Team  Client Team	On Site w/Development Team or Client & Remote Collaboration  Technical Architect  Product Owner  Project Manager  Client Partner Users	 Development Team  Product Owner  Project Manager  Client End-Users	 Development Team  Product Owner  Client QA  Project Manager  Client Customers	 Client QA  Dedicated Development Team  Product Manager  Client Partner Users
DESIRED OUTCOMES	<ul style="list-style-type: none"> <li>- Technology Stack</li> <li>- Technical Architecture</li> <li>- User Experience Approach</li> <li>- Project Feature Priority</li> <li>- Project Structure &amp; Communications</li> </ul>	<ul style="list-style-type: none"> <li>- Core Features Developed</li> <li>- End User Reaction</li> <li>- Core Feature Set &amp; User Experience Validation</li> <li>- Project Collaboration Assumptions Validated</li> </ul>	<ul style="list-style-type: none"> <li>- 1st Round Features Done</li> <li>- Beta Feedback for Release Version</li> <li>- Full Feature Set Market &amp; End-User Validation</li> <li>- Scope for Future Product(s), Enhancements</li> </ul>	<ul style="list-style-type: none"> <li>- User/Vision Driven Enhancements</li> <li>- Continuing Adoption &amp; New Clients Based on Success</li> <li>- Dedicated, Knowledgeable Product Team</li> </ul>	
TIME	Phase Duration 4-6 Weeks Typical	Phase Duration 2-4 Months Typical	Phase Duration 3-6 Months Typical	Constant Enhancements Team/Project on Monthly Retainer	

### Lean Principles & Practices

3 Principles	5 Core Practices
<input type="checkbox"/> Start with what you know	<input type="checkbox"/> Visualize
<input type="checkbox"/> Agree to pursue incremental, evolutionary change	<input type="checkbox"/> Limiting Work-In-Progress
<input type="checkbox"/> Respect current roles, responsibilities, and job titles	<input type="checkbox"/> Manage Flow <input type="checkbox"/> Make management policy <input type="checkbox"/> Improve collaboratively using "safe to fail" experiments

## What are the Seven Lean Core Concepts?



## Agile Lean Software Development

## What are the Seven Wastes of Lean?

	<b>DEFECTS</b>	Waste from a product or service failure to meet customer expectations
	<b>OVERPRODUCTION</b>	Waste from making more product than customers demand
	<b>WAITING</b>	Waste from time spent waiting for the next process step to occur
	<b>UNUSED TALENT</b>	Wastes due to underutilization of people's talents, skills, and knowledge
	<b>TRANSPORTATION</b>	Wasted time, resources, and costs when unnecessarily moving products and materials
	<b>INVENTORY</b>	Wastes resulting from excess products and materials that aren't processed
	<b>MOTION</b>	Wasted time and effort related to unnecessary movements by people
	<b>EXTRA-PROCESSING</b>	Wastes related to more work or higher quality than is required

## Match the Agile Practices to Lean Development?

### Matching Agile Practices to Lean Principles

Agile Practice	Lean Principles						
	Eliminate Waste	Empower the Team	Deliver Fast	Optimize the Whole	Build quality in	Defer Decisions	Amplify Learning
Teams make their own decisions		✓					
Just-in-time iteration planning						✓	
Team Retrospectives							✓
Two Week Iterations			✓				
Unit Test as we go					✓		
Shadow the business to learn what they do				✓			
Evolving Prototype is the specification	✓						

## What are the Value Stream Mapping Terms?

**Value Stream Mapping** is a lean management method for analysing the current state and designing a future state for the series of events that take a product or service from its beginning through to the customer

**Lead time** is the time taken from when an issue is logged until work is completed on that issue. Lead time is what customer sees

**Cycle Time** is a measure of the time a work item takes to complete. The time a user story takes to get from the backlog to the done

**WIP (Work In Progress)**: Number of work units in progress.

**Throughput:** The amount of material, data, work units that enters into a system and passes to generate output. Velocity, in Agile terms, can be the similar to this

**Little's Law:** Cycle Time = W I P / A C R\* Where \*ACR = Average Completion Rate

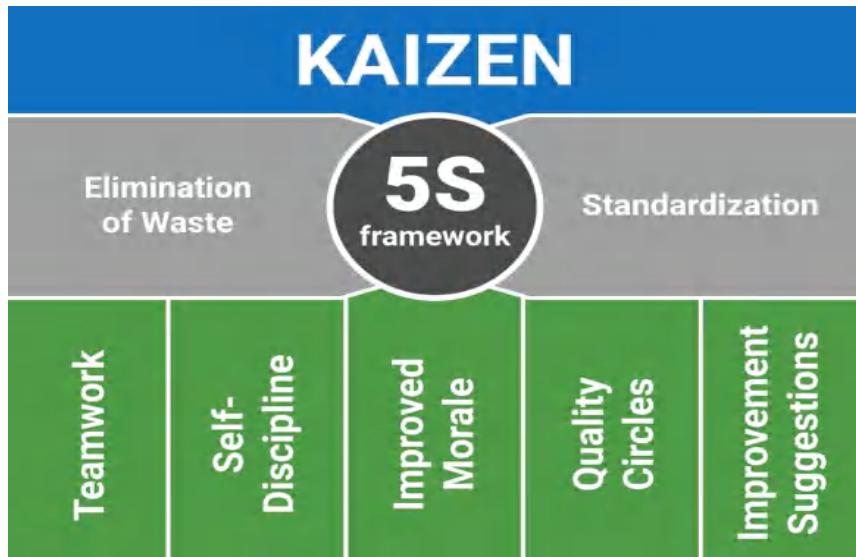
**Total Cycle Time**= Value Added Time + Non Value-Added Time

**Cycle Time Efficiency:** (Value Added Time / Total Cycle Time) \* 100

## What is 5S Framework?

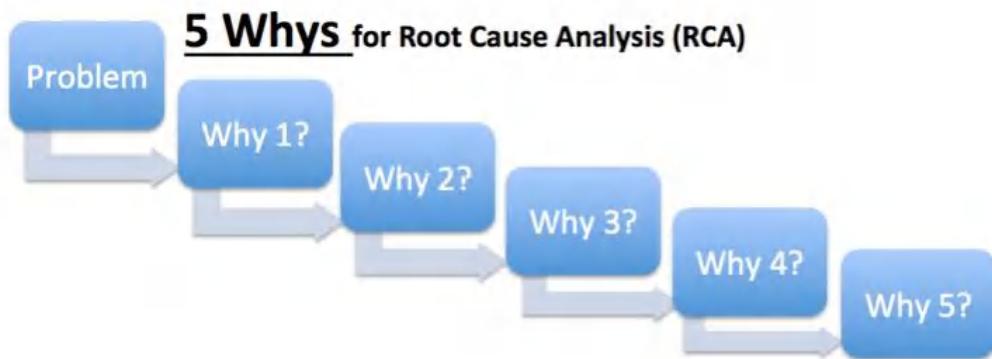
5 S is a methodology that had come out of the techniques within Total Productive Maintenance (TPM) and from the Toyota Production Systems (TPS).

5 S method uses a list of five Japanese Words: Seiri (Sort), Seiton (Straighten), Seiso (Shine), Seikketsu (Standardize), and Shitsuke (Sustain)



## What is 5 Why's?

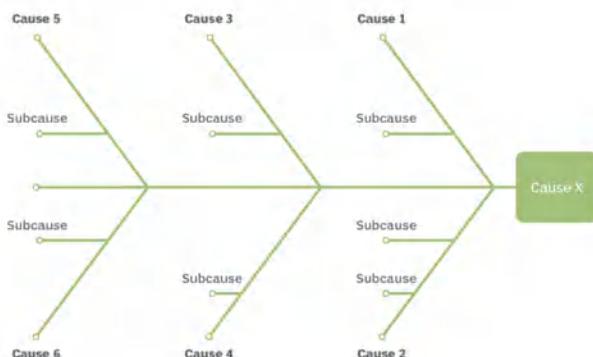
- The 5 Whys is an interactive question-asking technique used to explore the cause-and effect relationships underlying a problem.
- By asking why 5 times and answering it each time we can get the real cause of the problem.
- It is a brainstorming technique



## Fishbone Diagram

A fishbone diagram is a cause-and-effect discovery tool that helps figure out the reason(s) for defects, variations or failures within a process. In other words, it helps break down, in successive layers, root causes that potentially contribute to an effect. Sometimes called an Ishikawa diagram or cause-and-effect analysis, a fishbone diagram is one of the main tools used in a root cause analysis.

**Ishikawa (fishbone) diagram  
for the Five Whys**



## What is Kaizen?

- Japanese term for continuous improvement | Relentless
- Philosophy involving everyone in the organization to make never ending efforts for improvement

# 10 Principles of KAIZEN

*You can always improve yourself. Whether it is learning something new or perfecting a skill you already have, there is room for improvement in everyone's life.*

*See how each principle can be applied to one's PERSONAL LIFE.*

## 1 Never Stop

*There is an area for improvement in everyone's life, no matter how successful they are.*

## 2 Eliminate Old Practices

*Let go of former habits, even if they seemed to have some benefit to you at the time.*

## 3 Be Proactive

*Stop hesitating because of possible hurdles that you foresee, and move forward toward your goal.*

## 4 Don't Assume New Methods Will Work

*Just because something worked for someone else does not mean that it will necessarily work for you.*

## 5 Make Corrections

*Recognize the areas in your life that can use improvement, and make relevant corrections to help you progress.*

## 6 Empower All Employees to Speak Up

*Encourage your friends and family to make suggestions if they see things that you could work on.*

## 7 Crowdsource

*Learn from other people and get some new ideas on things you can add to your routine to create continuous improvement.*

## 8 Practice the "Five Why" Method

*By continuing to ask yourself "why?" you are likely to find the real reason behind a problem.*

## 9 Be Economical

*Consider specific things you can save money on each week, and stop buying them.*

## 10 Don't Stop

*Never consider yourself to be finished. Improvement has no limits, and can be continued on an infinite level.*

*Try to do something just a little bit better each day in order to make a large impact in the long run.*

# Kanban

## What is Kanban?

- Japanese word that means sign board
- The signboard has categories of work for each stage of the production process



## What are the 5 Principles of Kanban?

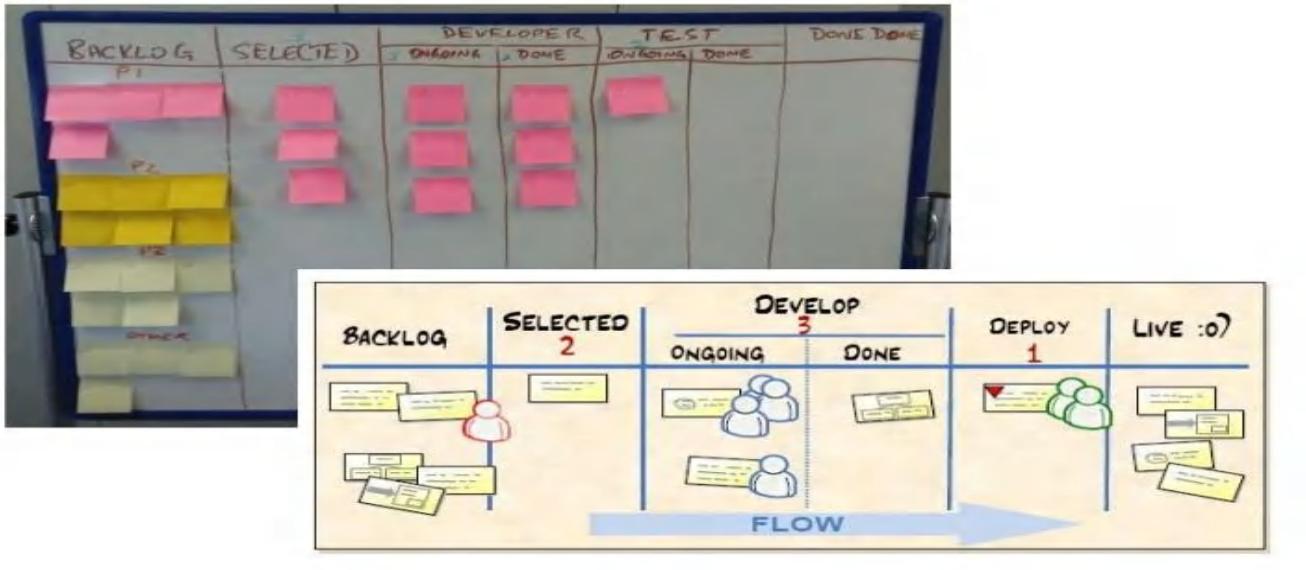
- Visualize the workflow
- Limit work in progress
- Manage flow
- Make process policies explicit
- Improve collaboratively

## What is Kanban Pull system?

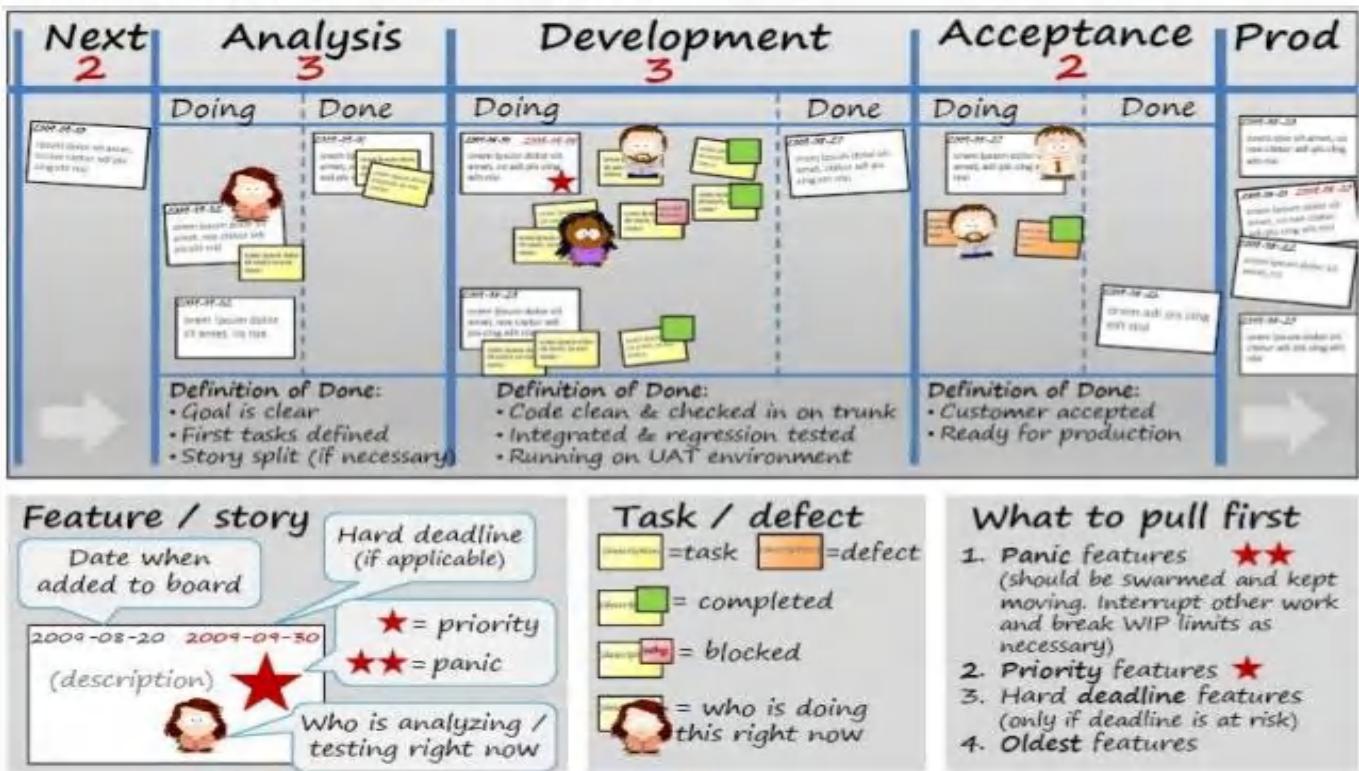
- A pull system moves work through development
- The development team completes an item; the next item in queue is pulled into the next stage of the process
- Kanban does not use timeboxed iterations
- Only so many items can be in each stage of the project
- Work moves from left to right

# Kanban Board

## Kanban Board Illustration - I



## Kanban Board Illustration - II



# Scrumban

## What is Scrumban?

**Scrumban is an Agile framework that helps teams manage projects more efficiently.**

Scrumban was created by mixing two other popular Agile frameworks Scrum and Kanban. Initially, it was used as a stepping stone when switching from one of the parent frameworks to the other. However, in time teams started seeing value in Scrumban and it became a standalone practice.

## Why Scrumban?

- Easier to adopt than Scrum: Scrumban has a less constrained process, more similar to Kanban. Thus, the teams can learn and pick it up faster
- Great for R&D teams and product development: The quick paced process allows to test out ideas quickly and without much loss
- Focused on throughput and continuous improvement: Scrumban ensures the team produces at a steady pace and keeps improving their process

## What are the key aspects of Scrumban?

### 1. Planning & planning trigger

The team plans only for next Sprint and only when needed

In Scrumban the team plans for the next Sprint only. This is done based on previous performance and estimation.

To know when to plan for the next iteration Scrumban teams use a planning trigger. This is a number that defines how many tasks should be left in the backlog when the team holds a planning session.

For example, a team of 5 people have an average cycle time of 1 day and it takes 2 days for them to hold a planning session. To make sure there are no interruptions in the process, they have to hold the planning session at a time where the team still has 2 days of work left in the backlog. So their planning trigger is 10.

## **2. Kanban board**

For visualizing and tracking work items throughout the process

To monitor the work that is being done, Scrumban teams use a Kanban board. This allows them to track all the work that is planned, being done and completed. Kanban boards vary from team to team, but usually are composed out of Backlog, Process section (divided into columns based on your process –Design, Manufacturing, etc.) and Done column.

It is important to note, that the team members pull tasks from the backlog on their own. Once a team member is done with a task, they review the backlog and pick the highest priority task based on their skillset. This is why it is important to review the board daily and reprioritize if needed.

## **3. WIP Limit**

Limits the number of tasks the team can work on at a time

To ensure constant value delivery, Scrumban teams limit the amount of work items the team can work on at any given time. This is called a Work In Progress (WIP) limit.

It helps deliver each individual work item faster and allows to more easily estimate the delivery dates of all work items.

Usually, the teams set this limit based on the amount of people in the team. For example, if there are 5 people in the team the WIP limit is 5. Thus, each team member can work on one task at a time.

#### **4. Work freeze and Triage**

Helps identify and execute the most important work items at the end.

To control the work scope at the end of the project, Scrumban teams use Work freeze and Triage.

First a Work freeze is used, meaning the team cannot add any new tasks to the backlog.

Then, the project manager or the team implements the Triage. Which means they look through the backlog and decide which of the tasks they are going to complete and which will be left undone in this cycle.

These measures help ensure the team delivers a minimum viable product at the end of each sprint throughout the project.

#### **5. Planning buckets**

Aids the Scrumban team in long-term planning efforts.

Planning buckets are the long-term planning technique that Scrumban teams use.

It works by specifying 3 buckets (this can be lists or simply additional columns in a Kanban board) where the team lists out their roadmap.

- The first bucket holds the largest ideas and goals that the team wants to realize within a year.
- The second bucket holds clearer plans that the team wants to realize within 6 months.
- And the third bucket holds specific plans for the next 3 months.

As the team decides to move forth with their plans, they are moved to the backlog and executed in the next iteration.

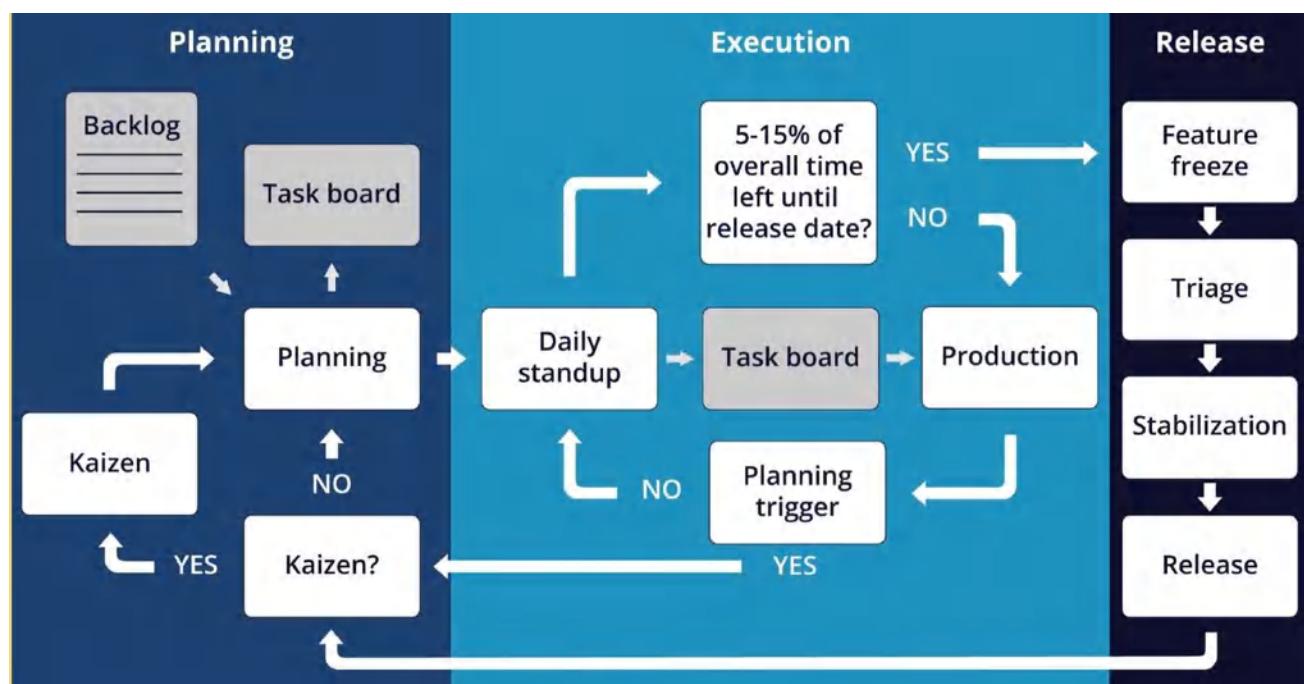
## What are the Team roles in Scrumban?

Scrumban does not specify any roles for the teams to use. Instead, the teams are encouraged to keep the roles they used previously and change them up only if necessary. One thing to note when assembling a Scrumban team is to make sure they are self-managing. As many processes are left for the team to handle without having a project manager.

## Scrumban cycle

The Scrumban cycle usually follows these 6 steps that are repeated during every Sprint throughout the project.

- Planning
- Daily Standup
- Work freeze, Triage & Stabilization
- Release
- Retrospective
- Work Item Refinement



## In-detail

### **1. Work Item Refinement**

Work item refinement takes place before every Sprint and is aimed to identify which of the work items should be considered for the next iteration.

This meeting is attended by the project manager and the stakeholders, and it helps set the direction in which the team will be going next. It is important to consider which of the suggested work items are the most important and why.

Once you have a prioritized list, you also have to define what has to be done for each of those items. So that once the team gathers for a planning session, they can pick up the work item.

### **2. Planning**

Once the project begins and then each time after the planning trigger goes off, the Scrumban team meets to plan tasks for their next Sprint.

The team takes the most important work items from the refined product backlog, specify what has to be done for each and estimate how much time that is going to take. The team only takes so many tasks that they can complete in one Sprint.

### **3. Daily Standup**

The team then starts working on the planned tasks. Each team member pulling tasks from the backlog based on their priority.

To make sure tasks are completed quickly, no team member can work on more than one task at a time. And to track the progress and identify issues, the team gathers each day to review their progress in a short standup meeting.

#### **4. Work freeze, Triage & Stabilization**

If the team is working with time boxed Sprints or the project is coming to an end, the project manager might use a Work freeze. This means that the team can no longer take on new tasks from the backlog.

Then the project manager holds a Triage and decides which of the backlog items the team is going to complete in the current Sprint or project, and which of them will be left unfinished.

Work freeze and triage mean that the amount of work completed by the team will stop growing and stabilize.

#### **5. Release**

Once the team reaches the deadline or completes all the planned tasks, the Sprint ends. The goal of the team is to make an incremental change to the end product during the Sprint and then present it to the stakeholders during the Release.

Here, the project manager or the team representative explains what has been done and gathers feedback from the client. This way checking if they like where the team is going and gather any new requirements. This allows the Scrumban team to adjust course and present the best result for the clients

## 6. Retrospective

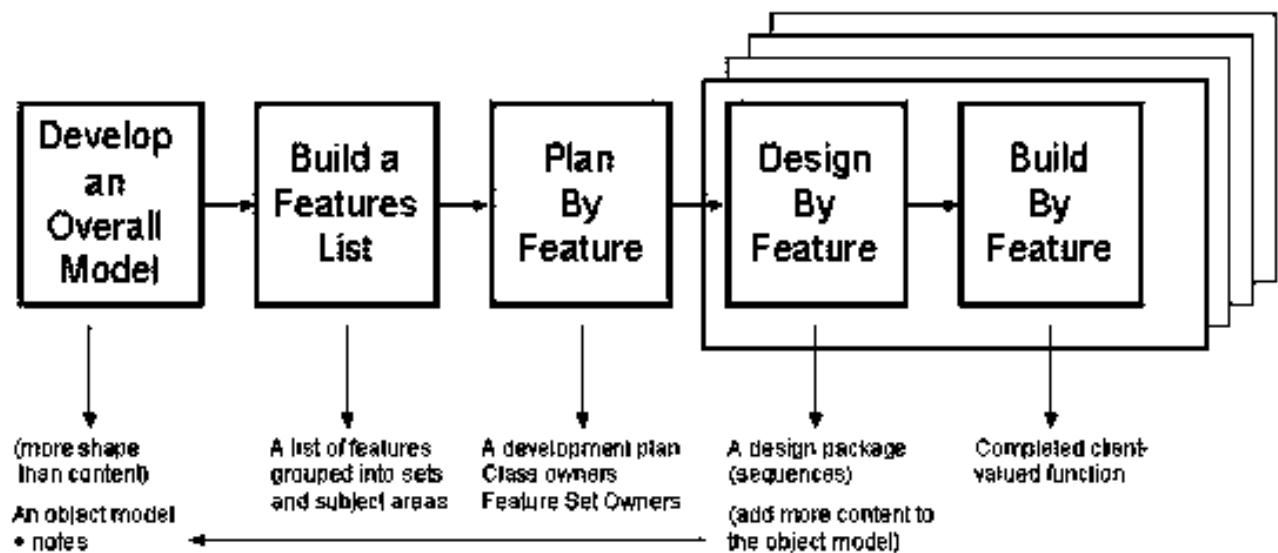
The final step of the Scrumban process is the Retrospective.

After every release, the team gathers to review their work processes and to identify what went well and what needs improvements for the next cycle. This is a good place to implement process changes and to commit to 1 or 2 concrete improvements for the next Sprint. Once the Retrospective is done, the cycle begins again from the first step.

## Feature Driven Development (FDD)

### What is FDD?

- The development team creates a model for the product
- They will build a feature list and a plan for the work
- The team moves through the design and build the directions for the product features
- The team designs by features and builds by features



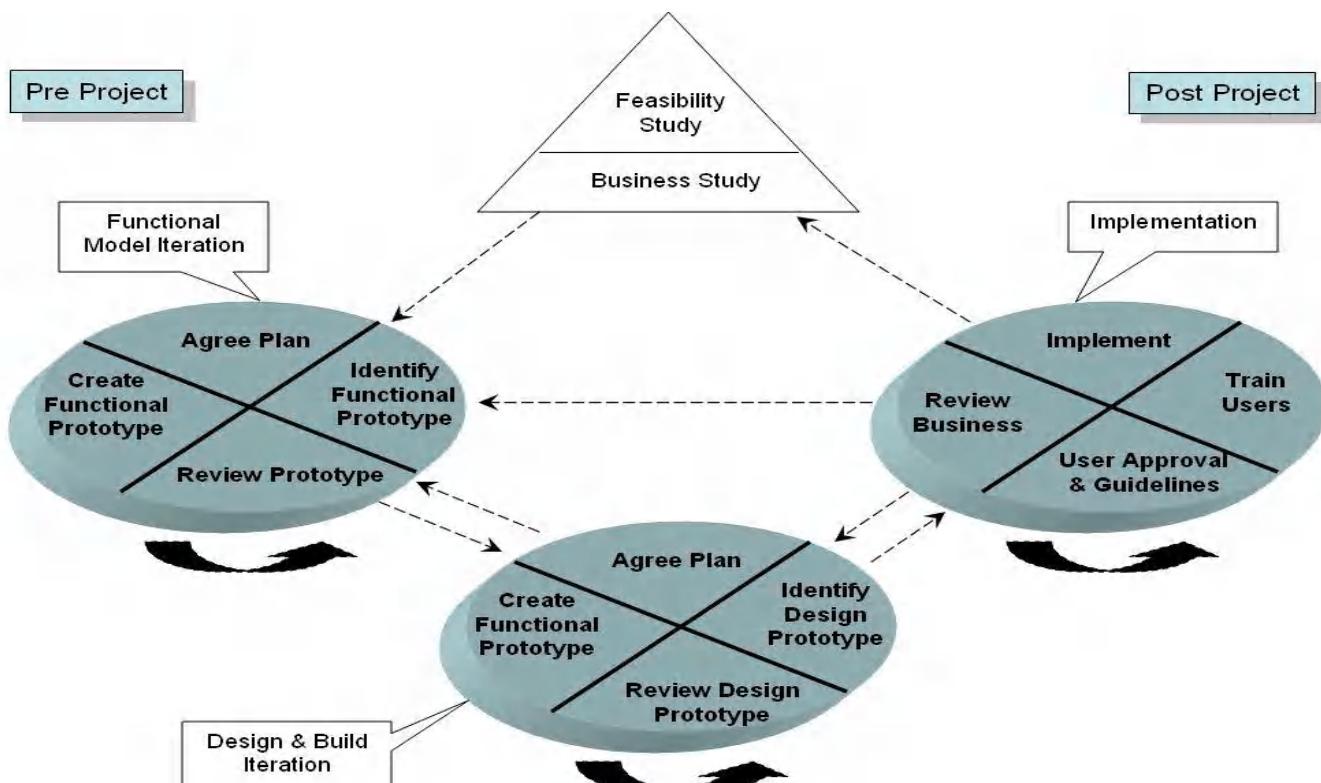
## What are its Features?

- Domain object modeling
- Developing by feature
- Individual class code ownership
- Feature teams
- Inspections
- Configuration management
- Regular builds
- Visibility of progress and results

# Dynamic System Development Method (DSDM)

## What is DSDM?

- Focus on the business need
- Deliver on time
- Collaborate
- Never compromise quality
- Build incrementally from foundations
- Develop iteratively
- Communicate continuously and clearly
- Demonstrate control



# Crystal

## What is Crystal?

- Customized methodologies coded by color names
- Methodologies are appropriate for different criticalities and team sizes
- Criticality is about the impact of a product defect design

## What are the Professional Responsibility and Ethics?

### Responsibility

- Make decisions based on the interests of the company
- Protect proprietary information

### Respect

- Maintain the attitude of mutual co-operation
- Respect cultural differences
- Negotiate in good faith
- Deal with conflict directly
- Don't use your position to influence others

### Fairness

- Look for and disclose conflict of interest
- Don't discriminate

### Honesty

- Understand the truth
- Be truthful of all communications

# Agile Framework Comparison

## Comparison of Scrum Vs XP

Definition	Scrum	Extreme Programming
<b>Time Boxing</b> (Fixed Length period of time)	Sprint	Iteration
<b>Release to Production</b>	Release	Small Release
<b>Agile Planning Meetings</b>	Sprint   Release Planning	Planning Game
<b>Business representative to Project</b>	Product Owner	Customer
<b>Lessons Learned style</b>	Retrospective	Reflection
<b>Agile Project Manager</b>	Scrum Master	Coach
<b>Empowered cross Functional team</b>	Development Team	Team
<b>Brief daily status meeting</b>	Daily Scrum	Daily Standup

## Scrum Vs XP Vs Kanban

Parameters	Scrum based Development	Extreme Programming (XP)	Kanban Methodology
Design Principle [19]	Complex Design	Simplification of Code & accommodation of unexpected Changes through Refactoring	Limits the amount of Work-in-Progress & ensures Waste Reduction
Nature of Customer Interaction [18]	Not compulsorily on-site	On-site Customer Interaction	Not compulsorily on-site
Design Complexity	Complex design	Simple design	Simple visual design
Project Coordinator [18]	Scrum Master	XP Coach	Team Work
Roles Assigned	3 Pre-defined roles: Product Owner, Scrum Master & Development Team	No prescribed roles	No prescribed roles
Process Ownership	Scrum Master	Team ownership	Team ownership
Product Ownership [18]	Product Owner is responsible for product	Group responsibility of product	Group responsibility of product
Team Collaboration	Cross functional teams	Self organizing teams	Team comprises of specialized resources
Work flow Approach	Iterations (sprints)	No iterations. Task flow development	Short iterations
Requirements Management	Requirements Managed in form of artifacts through Sprint Backlog & Product Backlog	Managed in form of Story Cards	Managed using Kanban Boards
Product Delivery	Delivery as per Time boxed sprints	Continuous Delivery	Continuous delivery
Coding Standards	No coding standards	Coding standards are used	No coding standards
Testing Approach	No formal approach used for testing	Test driven development, including acceptance testing	Testing done after implementation of each work product
Accommodation of Changes	Changes not allowed in sprints	Amenable to change even in later stages of development	Changes allowed at any time

## Scrum Positive Challenges

Scrum Positive	Scrum Challenges
<ul style="list-style-type: none"> <li>▪ Inspect   Adapt   Transparency</li> <li>▪ Fail fast   Faster feedback</li> <li>▪ Collective ownership</li> <li>▪ Continuous Improvement</li> <li>▪ Self-Organized team</li> <li>▪ Collaboration</li> <li>▪ Engagement</li> <li>▪ Self-Delivery Teams</li> <li>▪ Well defined roles / ceremonies</li> <li>▪ Early Feedback</li> <li>▪ Accountability</li> <li>▪ Shared risk</li> <li>▪ High Quality</li> <li>▪ Excellent Productivity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Skill set for co-locations</li> <li>▪ Delivery commitment of every two weeks</li> <li>▪ Not having deliverable after every Sprint</li> <li>▪ Larger Team</li> <li>▪ Mind-set Change</li> <li>▪ Ad-hoc requirements within the Sprint</li> <li>▪ Resource Criticality</li> <li>▪ Inefficient resource utilization (Testers are free at the beginning and over busy at the end)</li> <li>▪ Adaptability &amp; Sustainability</li> <li>▪ Time-box collaboration</li> <li>▪ Team level limit (Only for smaller teams)</li> <li>▪ Cross functional team structure</li> <li>▪ Framing Agile centric metrics</li> <li>▪ Some-times story point estimation</li> </ul>

## Kanban Positive Challenges

Kanban Positive	Kanban Challenges
<ul style="list-style-type: none"> <li>▪ Supports dynamic requirements prioritization</li> <li>▪ No time-box value</li> <li>▪ Lead &amp; cycle time delivery can be calculated</li> <li>▪ Visualize blockage through the cumulative flow diagram   workflow</li> <li>▪ Limit Work In Progress</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge work industry (Green –New Brown- Existing project)</li> <li>▪ Arriving optimum WIP limit</li> <li>▪ Lesser Collaboration</li> <li>▪ No Control limit on changes</li> <li>▪ Higher degree of variation</li> <li>▪ Starvation</li> <li>▪ New Product Development</li> </ul>

<ul style="list-style-type: none"> <li>▪ Manage Workflow, Pull</li> <li>▪ Faster Throughput</li> <li>▪ No Team Limit, Allows Specialist</li> <li>▪ Well defined Roles</li> <li>▪ Improves [Kaizen] Process</li> <li>▪ Expose Bottleneck</li> </ul>	<ul style="list-style-type: none"> <li>▪ Limited Estimation / Commitment</li> </ul>
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## Scrum Vs Kanban

Scrum	Kanban
<ul style="list-style-type: none"> <li>▪ Quicker Value Realization</li> <li>▪ Empower &amp; Motivated Teams</li> <li>▪ Customer Satisfaction</li> <li>▪ Good Quality</li> </ul>	<ul style="list-style-type: none"> <li>▪ Better Visualization</li> <li>▪ Faster Throughput, Higher Cyclic Team</li> <li>▪ No Team limit, Allows Specialist Roles</li> </ul>

## Scrum Vs Kanban Vs Scrumban

	Scrum	Kanban	Scrumban
Iterations	1-4 week sprints	Continuous work alongside shorter releases	Continuous work with short planning cycles & longer release cycles
Work routines	Push and pull principles, early binding to team members	Pull principle, late binding to team members	Pull principle, late binding to team members
Scope limits	Sprint limits total work amount	Work in progress limits	Work in progress limits
Planning routines	Sprint planning	Release/iteration planning, demand planning	Planning on demand for new tasks
Estimation	Must be done before a sprint	Optional	Optional
Performance metrics	Burndown	Cumulative flow diagram, lead & cycle time	Average cycle time
Continuous improvement	Sprint retrospective	Optional	Short Kaizen event as an option
Meetings	Sprint planning, daily scrum, retrospective	Can be avoided	Short Kaizen event
Team members	Cross-functional team members	Cross-functional team members, specialization is allowed	Specialization or preference to tasks
Task size	Not bigger than a Sprint	Any size	Any size
New items in iteration	Forbidden	Allowed whenever queue allows it	Allowed whenever queue allows it.
Ownership	Owned by a team	Supports multiple teams ownership	Supports multiple teams ownership
Board	Defined/reset each sprint	Persistent	Persistent
Prioritization	Through backlog	Optional	Recommended on each planning
Roles	Scrum master, product owner, team	Not defined, may vary	Not defined, may vary
Rules	Constrained process	Only a few constraints, flexible process	Slightly constrained process
Fit for	Teams working on product or project which is longer than a year	Support and maintenance teams, continuous product manufacturing	Startups, fast-pace projects, continuous product manufacturing

## Domain 2. Value driven Delivery

### What is Value-Driven Delivery?

- Projects undertaken to generate business value
  - Produce Benefit
  - Improve Service
  - Market Demand
  - Safety Compliance
  - Regulatory Compliance
- The project manager's goal is to increase value and reduce risk as early as possible

### Early Value Delivery

- Agile promote early and often delivery
- Aim to deliver highest value early in project
  - Deliver as many high-value components as soon as possible
    - Reduces risk
  - Stakeholder satisfaction -> Project success
    - Shows understanding of stakeholders' needs
    - Stakeholders are engaged
    - Builds confidence of stakeholders in team

### Benefits

- The longer a project lasts the more opportunity for risk, by delivering high value items early, the team demonstrates an understanding of the customer's needs
- Early value help stakeholders maintain synergy and interest in the project

## Reduce Waste

- Minimize Waste | Waste reduces value
- Poppendieck's Seven Areas of Waste:For E.g.:
  - Partially done work
  - Extra processes
  - Extra features
  - Waiting
  - Defects

## Assessing Value – Agile Metrics (Financial)

### Return on investment (ROI)

- The ratio of the benefits received from an investment to the money invested.  
Usually, a percentage.
- Return on investment is the profitability in a project
- Return on investment is the value of the project minus the investment in the project
- A higher return on investment means you are getting a better return than a lower return bigger is better
- Return on investment is not the best approach to discovering business value in a project

### Internal rate of return (IRR)

- Interest rate you will need to get in today's money to receive a certain amount of money in the future.
- Calculates the NPV of the cost of the project and when the NPV of the project meets or exceeds the NPV of the benefits of the project
- The higher the IRR the more valuable the project is

## **Present Value/Net Present value (NPV)**

- Value of future money in today's terms.
- The calculation of a future amount in today's terms given and assumed interest rate and inflation rate.
- The present value of a revenue stream over a series of time periods
- Higher net present values are good

## **Earned Value Management**

- Formulas that monitor the value of the project as its progressing
- It's unlikely you'll see earned value management on the exam
- EVM is a suite of formulas to show performance
- Earned value compared to actual performance to planned performance

## **Five EVM Rules**

- EV is first
- Variance means subtract
- Index means division
- Less than one is bad in an index
- Negative is bad in a variance

## Accounting on Agile Projects

- Refers to how the different economic models of agile works
- Agile accounting is different than traditional accounting
- Agile looks to deliver value as quickly as possible
- Uses minimal viable product (MVP)
- This leads to more opportunity for incremental funding

## Key Performance Indicators (KPI's)

- Uses as a way to measure the project progress: -
  - Rate of progress: How much points has been completed
  - Remaining work: How much work is yet to be done from the backlog
  - Likely completion date
  - Likely Cost remaining

## Risk Management

- Risk is closely related to value
- Considered as anti-value
- Usually has the potential to remove, erode or reduce value with threats

## Managing Risks Process



### Traditional Risk Management Approach

- Risk in an agile project is anything that threatens the project's goals
- Risk is considered an anti-value
- Risk must be managed in a project
- Risk identification is an iterative activity
- Risk is recorded in a risk log

## Tools to Manage Risk

- Risk-adjusted backlog
- Risk burndown chart

## **Addressing Features with High risk**

- Features that have high levels of risk can be addressed early in project iteration
- High areas of risk need to be addressed sooner rather than later
- A risk adjusted backlog brings risk features into an early portion of the project
- A risk burndown chart tracks risk as they move down in priority and elimination

## **Regulatory Compliance for Agile Projects**

- Mandated requirements usually by government agencies
- Must be implemented into the project work as regular development work
- Doing it after the project work is done

## How Customers Conduct Value Prioritization?

- Valued based prioritization is the one of core practices in agile planning
- Features are prioritized on the basis of business value, risk and dependencies
- Some of prioritization techniques used: -
  - Simple Scheme
  - MoSCoW prioritization
  - Monopoly Money
  - 100-point method
  - Dot Voting or Multi-voting
  - Kano Analysis
  - Requirements Prioritization Model
- Agile teams work on the items that yield the highest value to the customer first
- The product owner is responsible for keeping items in the backlog prioritized by business value
- When changes added to backlog, they must be prioritized for value
- The customer is the person who will declare what success looks like
- The team will discuss with the customer at the end of each iteration the priority of the remaining work items

# Prioritization Techniques

## Simple Scheme

- Priority 1, Priority 2, Priority 3, etc.
- Could be problematic as many items might become the first priority.

## MoSCoW Prioritization

- Must have
- Should have
- Could have
- Would like to have, but not this time

## Dot Voting or Multi-voting

- Each person gets a certain number of dots to distribute to the requirements

## Monopoly Money

- Give everyone equal monopoly money
- They then distribute the funds to what they value the most

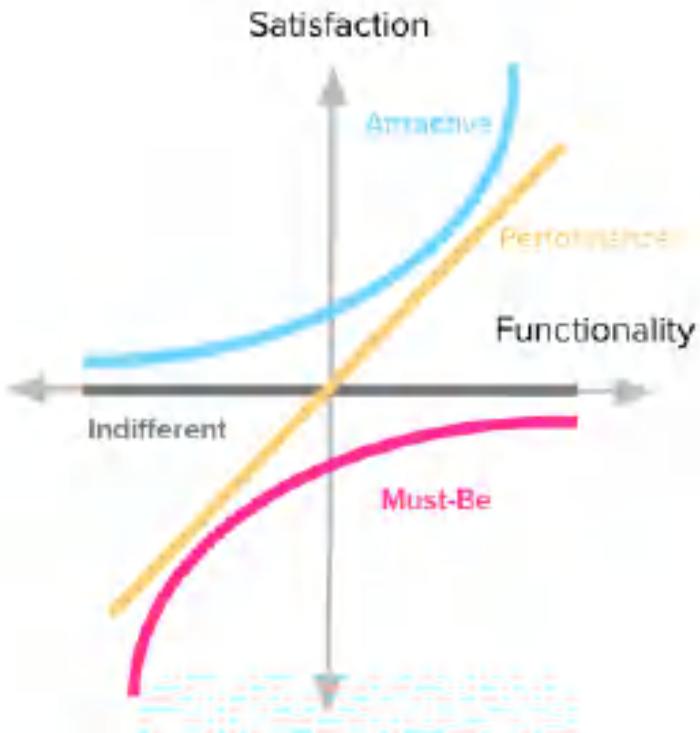
## 100-point method

- Each person is given 100 points
- They then use that to distribute to individual requirements

## Kano Analysis

Helps to understand the customers satisfaction

- Delighters/Exciters
- Satisfiers
- Dissatisfiers
- Indifferent



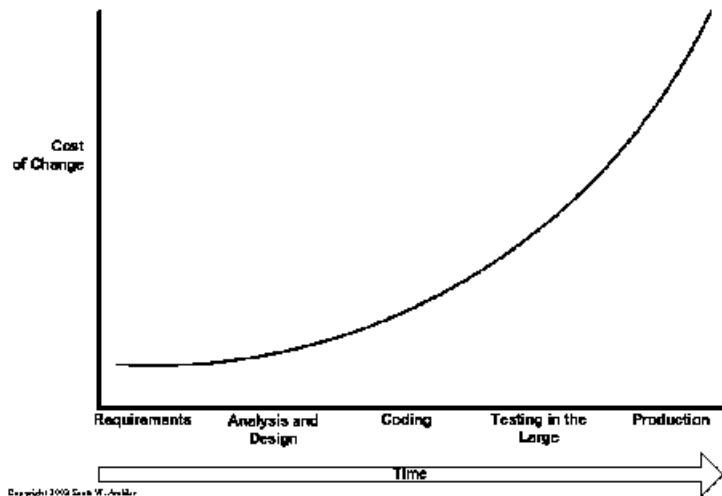
<https://foldingburritos.com/kano-model/>

## Prioritization / Ranking is Relative

Doesn't matter what techniques the customers use priority; the end results should be a list of prioritized features.

## Delivering Value Incrementally

- Incremental delivery is about deploying working parts of a product over the life of the project
- The team regularly deploys working increments
- In software development, its first delivered to a testing environment then to production
- This will reduce the amount of rework by discovering issues early and fixing them
- This is an opportunity for an early return on investment



<http://www.agilemodeling.com/essays/costOfChange.htm>

## Minimal Marketable Feature | Minimum Valuable Product

- A minimum marketable feature is the smallest possible set of functionality that by itself, has value in the market place is called Minimum Marketable Feature
- It refers to a set of functionalities that is complete to be useful, but small enough not to be an entire project i.e., Usually, a module in a software
- Barebones essentials of a product

## Tools for Agile Projects

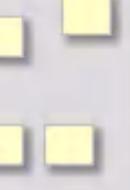
- Agile teams prefer low tech high touch tools over sophisticated computerized models
- Technical tools can exclude team members from interacting
- Consider high tech tools for scheduling:-
  - Data accuracy perception increases
  - A bad estimate is a bad estimate
  - Barriers for stakeholder interaction are created

## Low-Tech, High-Touch Tools

- Use card, charts, Information radiator, whiteboards, and walls
- Promotes communication and collaboration
- Skip using a computer Gantt chart to a Kanban board

## Kanban/Task Board

- An "information radiator" -ensures efficient diffusion of information
- Can be drawn on a whiteboard or even a section of wall
- Makes iteration backlog visible
- Serves as a focal point for the daily meeting

Items	In Progress	Testing	Done
			
	6 cards	4 cards	

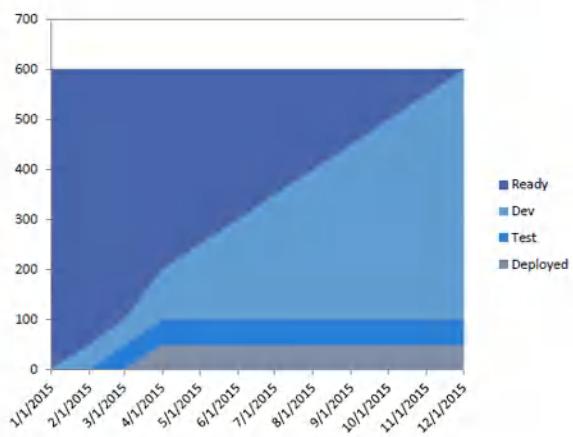
- Also known as a task board
- Help teams monitor the work in progress

## Limit WIP (Work in Progress)

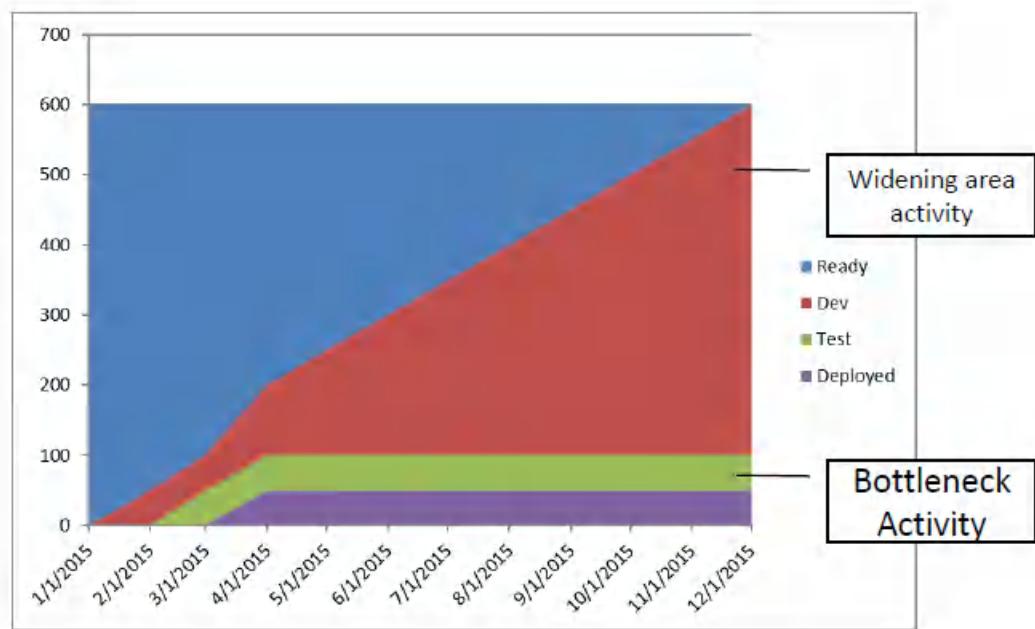
- Includes work that has been started but not completed yet
- Represents money spent with no return
- Hides process bottlenecks that slow the processes
- Represents risk in form of potential risk
- Agile processes aim to Limit and optimize WIP
- Optimal WIP makes processes efficient

## Cumulative Flow Diagrams (CFD's)

Stack graphs that show how work is progressing



## Bottlenecks and Theory of Constraints



## What is Request for Proposal?

- A request for proposal is from the buyer to the seller
- If the seller is to use agile practices it must be defined in the request for proposal
- The buyer may need to educate the vendor about agile practices
- Agile projects welcome change so this may be hard to do with contracts

## Agile Contracting

- Agile's flexibility creates difficulty in outlining contract acceptance criteria
  - Agile attempts to fix resources and time (cost) and vary functionality
- "Customer collaboration over contract negotiation"
  - Close cooperation
  - Active participation
  - Timely and often feedback
- Money for nothing and change for free

- Graduated Fixed Price Contract
  - Buyer / Seller share in risks and rewards
  - Different hourly rates based on:
    - Finish early, Finish on time, Finish late
- Fixed Price Work Packages
  - Mitigate risks of under/over estimating

## Verifying and Validating

- “Gulf of Evaluation”
 

What one person describes is often different from how another interprets
- Resolve problems as soon as possible
- Don’t let little problems grow over time



## Domain 3. Stakeholder Engagement

### Who are Project Stakeholders?

- Those who are impacted by the project: -
  - Customers
  - Project sponsor
  - Project leaders
  - Development team
  - Vendors
  - End users

### How to Identify Stakeholders?

- Stakeholder analysis
- Expert judgment
- Meetings
- Create the stakeholder register

### How to Incorporate Stakeholder Values?

- Work is based on what the stakeholders value
- Engage the product owner to prioritize the backlog
- Work is executed by priorities
- The development team creates the highest priority items
- The development team delivers early value to the business
- Stakeholders are invited to planning meetings and retrospective

## How to Incorporate Community Values?

- Agile teams must share the values of their broader community
- Respect
- Agile works for consensus
- Don't judge suggestions
- Respect differing opinions
- Courage
- Agile teams display courage through demonstrations
- Pair programming
- Product owner prioritizing requirements
- Retrospective

## What are the principles of Stakeholder Engagement?

- Get the right stakeholders
- Insure a stakeholder participation
- Manage stakeholder interest
- Frequently discussed what done looks like
- Show progress to project stakeholders
- Openly discuss project estimates and projections

## What is Stakeholder Stewardship?

- Looking after everyone involved on the project
- Ensuring everyone has everything they need to compete the project successfully
- Starts with identifying the stakeholders

## Educating People about Agile?

- Teach all the stakeholders about the benefits of agile
- Concerns about agile can include:
  - Senior management and sponsor: They are worried about the risk of failing
  - Managers: fear the loss of control
  - Project team: resist agile methods
  - Users: will not get all features

## Engaging Stakeholders

- Short iterations and releases keep them engaged
- Keeping them engaged can lead to stakeholders being more involved and getting more change requests
- This helps us to identify risks and issues early
- If some stakeholders are causing problems, the agile PM will need to use their interpersonal skills to resolve issues
- Need to have a process for escalating stakeholders' issues
- Why such a big focus on stakeholders?
  - Projects are done by people for people

## Methods of Stakeholder Engagement

- Get the right stakeholders involved in stakeholder involvement
- Actively manage stakeholder interest
- Frequently discuss what is done looks like
- Show progress and capabilities
- Candidly discuss estimates and projections

## What is Failing Fast?

- Failing fast means failing early and cheaply, without making huge loss
- Good way to discover misunderstandings
- Ensures the project team understands what stakeholders want

## Set a Shared Vision

Important to ensure customers and agile project team has the same vision Methods includes: -

- Agile Charter
- Definition of “Done”
- Agile Modeling
  - Use case diagram
  - Data models
  - Screen design
- Wireframes
- Personas

## Agile Chartering

- High -level (uses the W5H)
- Agreement
- Authority to proceed
- Focuses on how project will be conducted
  - Allows for flexibility and ability to deal with change
- Project specific processes outlined
- May use project Tweet –Describes project goal in 140 Characters or less.

- Agile charters define: -
  - Who will be engaged
  - What is the project about
  - Where will the project take place
  - When will the project start and end
  - Why this project being chartered
  - How the goals of the project be achieved

## What is Definition of “Done”?

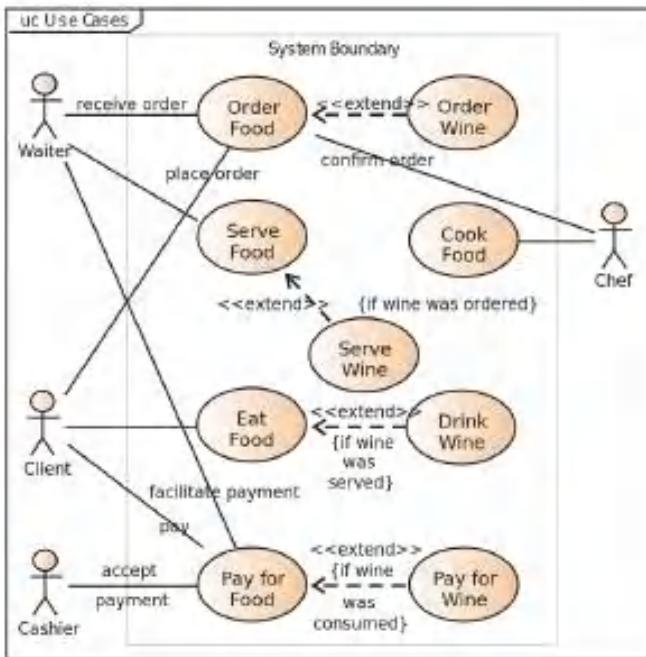
- Creating a shared vision of what done looks like
- Should be done for:
  - User stories
  - Releases
  - Final project deliverables

## What is Agile Modeling?

- Different modeling techniques that are used to help establish the shared vision
- Should be lightweight or “barely sufficient”

## Use case diagrams

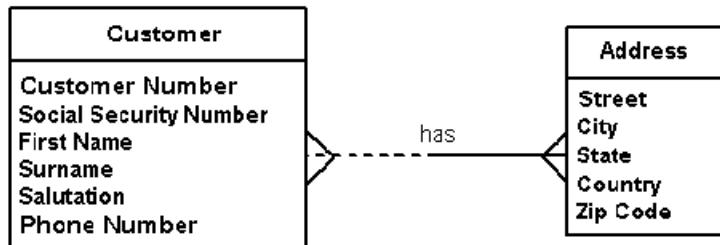
- Visually shows how users would use an application



[https://en.wikipedia.org/wiki/Use\\_case\\_diagram](https://en.wikipedia.org/wiki/Use_case_diagram)

## Data models

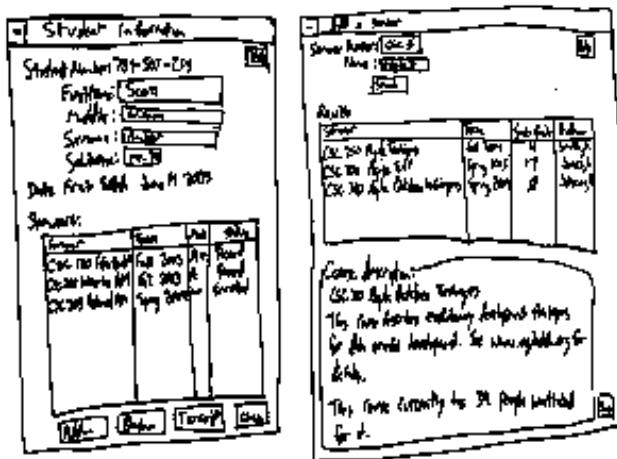
- How the data are structured in tables and their relationships



<http://www.agiledata.org/essays/dataModeling101.html>

## Screen designs

Simple screen shots



<http://agilemodeling.com/artifacts/uiPrototype.htm>

## Wireframes

- A Quick mock-up of product
- Could be screens and data flows between screens
- Ensures that everyone has the same understanding of the product
- A form of low fidelity prototyping
- Quick way to get feedback
- Clarify what “done” looks like
- Validate approach prior to execution

## Personas

- Biographical sketches of key stakeholders
- Quick guides or reminders of key stakeholders and interests
- Provide description of users
- Be grounded in reality
- Be goal-oriented, specific, and relevant
- Be tangible and actionable
- Generate focus
- Help team focus on valuable features to users

## Collaboration is Key in Agile Projects

- Customer collaboration over contract negotiation
- Business people and developers must work together daily throughout the project

## Benefits of Collaboration

- Generates wiser decisions
- Promotes problem solving
- Promotes action
- Build social capital
- Ownership of collective problems

## Engaging People in Agile Projects

- Engagement creates better ideas and put some conversations
- Active problem solving instead of command and control
- Taking action rather than being passive
- Collective ownership of ideas
- Motivates and engages the project team
- Shifts the power downward

## Green Zone/Red Zone

Red Zone	Green Zone
<ul style="list-style-type: none"><li>▪ Blames others for everything</li><li>▪ Responds defensively</li><li>▪ Feels threatened</li><li>▪ Triggers defensiveness</li><li>▪ Doesn't let go or forgive</li><li>▪ Uses shame and blame</li><li>▪ Focus on short-term advantage</li><li>▪ Doesn't seek or value feedback</li><li>▪ Sees conflict as a battle and only seeks to win</li><li>▪ Communicates high level of disapproval</li><li>▪ Sees others as the problem or enemy</li><li>▪ Does not listen effectively</li></ul>	<ul style="list-style-type: none"><li>▪ Take responsibility</li><li>▪ Seeks to respond nondefensively</li><li>▪ Is not easily threatened psychologically</li><li>▪ Attempts to build success</li><li>▪ Uses persuasion rather than force</li><li>▪ Thinks both short and long term</li><li>▪ Welcomes feedback</li><li>▪ Sees conflict as a natural part of life</li><li>▪ Seeks excellence rather than victory</li><li>▪ Listens well</li></ul>

## Hosting Workshops

- Meeting when work gets done
- Retrospectives are a type of workshops
- Ways to make them more effective: -
  - Diverse groups have a larger perspective
  - Use methods such as round-robin to ensure no one dominates
  - Try to get everyone to participate in the first few minutes
- User story workshops are where we write the user stories and keep stakeholders engage

## Brainstorming

- Collaborative technique too rapidly generates lots of ideas
- Maximize number of suggestions allowed
- No stupid ideas entertained
- Will sort through the ideas later

## Brainstorming Methods

- Quite Writing
  - Give people about 5 minutes to write down their ideas
- Round-Robin
  - Pass a token around to ensure everyone will speak
- Free-for-all
  - People shout out their thoughts. May only work in a supportive environment

## Collaboration Games

Also known as Innovation Games

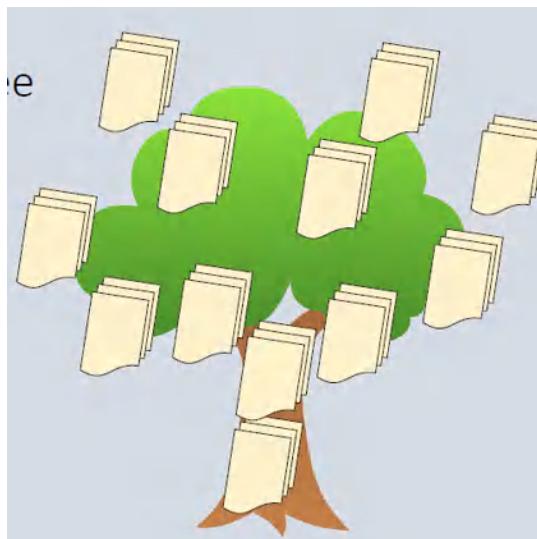
- Remember the future
- Prune the product tree
- Speed-boat (Sailboat)

### Remember the future

- Ask stakeholders to imagine that an upcoming release was successfully completed and to look back
- Gets a better understanding of how a stakeholder would define success
- Outlines how we can accomplish that success for them

## Prune the Product Tree

- Draw a tree and ask stakeholders to add their features to it
- Use stick notes to have them place new features on the tree
- Group the features on the trunk
- Features that are depending on other features would be higher up the tree
- Let's everyone understand the priorities of development



## Speedboat (Sailboat)

- Draw a waterline and a boat moving
- Explain the boat is moving toward the goals of the project
- Ask them to use sticky notes to show what can make the boat move (wind) and what can stop it (anchors)
- Allows stakeholders to identify threats and opportunities

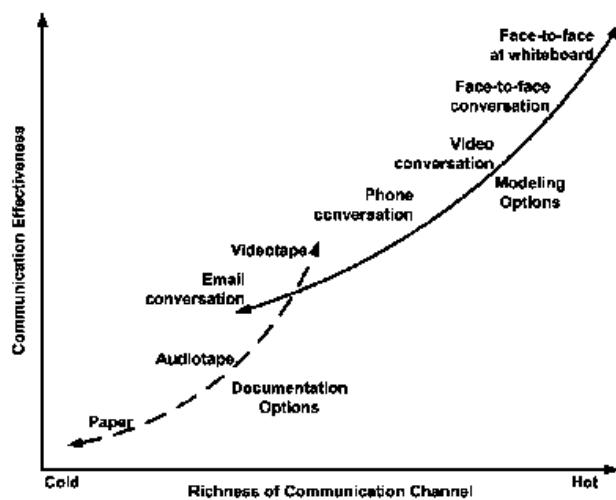
## Communication Model – Sender & Receiver

- Sender
- Encoder
- Medium
- Decoder
- Receiver
- Barrier
- Noise

## Communicating with Stakeholders

- Face to face communication
- Two-way communication
- Knowledge sharing
- Information Radiators
- Social Media

### Face to face communication



## **Two-way communication**

Just don't ask for confirmation or concerns, but actually listen to what they have to say.

## **Knowledge sharing**

- Agile teams work closely with each other such as with pair-programming.
- Using Kanban boards or wireframes are ways to share information
- Use of low-tech tools like a whiteboard will allow all to see the work and understand
- We must encourage it

## **Information Radiators**

- Things that are highly visible
- Used to display information
- Usually includes charts, graphs and boards

## **Social Media**

- Use to communicate
- Can include twitter or Instagram

## Using Critical Soft Skills

- Emotional intelligence
- Negotiation
- Active Listening
- Facilitation
- Conflict Resolution
- Participatory Decision Models

### Emotional intelligence

- Our skill to identify, assess, and influence the emotions of ourselves and others around us
- We need to recognize our own feeling
- Then we can learn how to response to others and how they feel
- Understand how we take care of ourselves will impact other around us
- As an agile PM we have to know when team members are stuck, angry, or frustrated

### Negotiation

- This happens all throughout the project
- Good negotiation will allow everyone to investigate the options and trade-offs
- Most effective when interactions between people are positive and there are room for give and take

### Active Listening

- Level 1: Internal –how is it going to affect me
- Level 2: Focused –put ourselves in the mind of the speaker
- Level 3: Global –builds on level with body language

## Facilitation

- Run effective meeting and workshops.
- Have the following:
  - Goals
  - Rules
  - Timing
  - Assisting

## Conflict Resolution

- All projects will have conflicts
- While some levels of conflicts are good, we need to ensure they don't become a "world war" where people are trying to destroy each other
- Levels of conflict (1-5):
  - Level 1: Problem to solve –sharing info
  - Level 2: Disagreement –Personal Protection
  - Level 3: Contest –Must win
  - Level 4: Crusade –Protecting one's group
  - Level 5: World War –Must destroy the other

Level	Name	Characteristic	Language
One	Problem to solve	Information sharing and collaboration	Open in fact based
Two	Disagreement	Personal protection Trump's resolving the conflict	Garden and open to interpretation
Three	Contest	Winning Trump's resolving the conflict	Includes personal attacks
Four	Crusade	Protecting one's own group becomes the focus	Ideological
Five	World War	Destroy the other	Little or non-existent

## Participatory Decision Models

Engage stakeholder in decision making process

- Simple voting
  - Vote “for” or “against” it
- Thumps up/down/sideways
  - People hold their thumps in a way of if they support it or not. Sideway is if they cannot make up their mind
- Fist of five
  - People how up finger based on they support the idea
  - 1 finger: total support –5 finger: Stop against it



# Domain 4. Team Performance

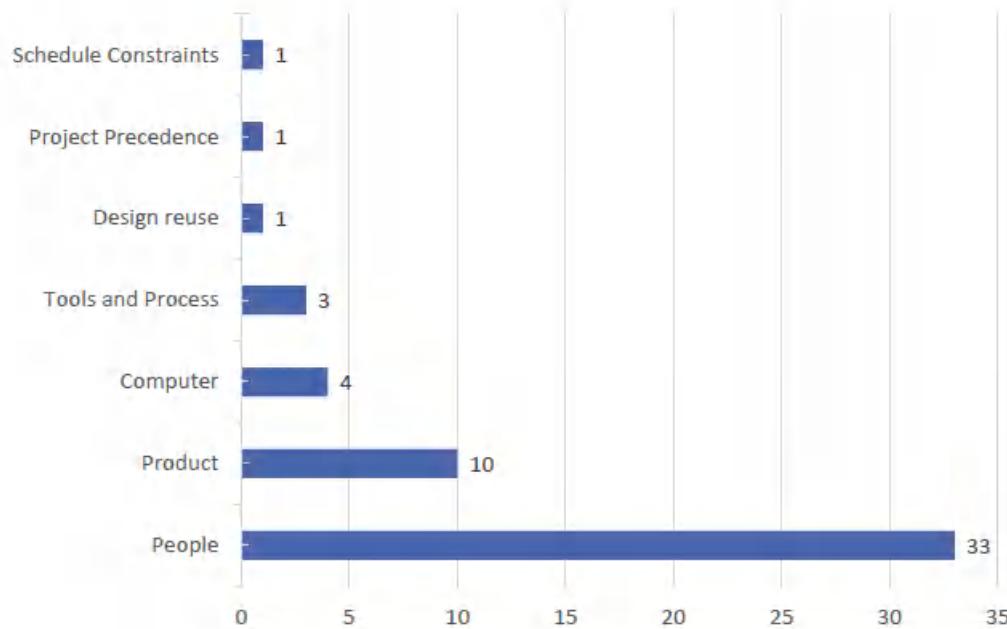
## People Over Processes

- Projects are done by people, not tools
  - Agile manifesto: “Individuals and Interactions over processes and tools”
- Focus on the people side of the project
- Projects are more about people management than tools management

## COCOMO

- Constructive Cost Model
- To determine correlation between project input variables and final cost to use to estimate future projects
- People factors has a score of 33...11 times more significant than tools and processes

## COCOMO II



## **Development Team / Delivery Team**

- Coders
- Writers
- Analyst
- Testers
- People can perform multiple jobs in switch from role to role

## **Development/Delivery Team**

Group that builds and test the increments of the product: -

- Build product in increments
- Update information radiators
- Self-organize and directing
- Share progress by doing daily stand-up meetings
- Write acceptance tests
- Demo the completed product increments
- Holds retrospectives at the end of sprints
- Does release and sprint planning and estimations

## **Product Owner/Customer**

- Prioritizing the product features
- Manage the product backlog ensuing its accurate and up to date
- Ensures the team has a shared understanding of the backlog items

- Defines the acceptance criteria
- Provides the due dates for the releases
- Attends planning meeting, reviews, and the retrospective

## Agile Project Manager (ScrumMaster/Coach)

- Act as a servant leader
- Help the team self-organize and direct themselves
- Be a facilitator
- Ensure the team plan is visible and the progress is known to the stakeholders
- Act as a mentor and coach
- Work with the product owner to manage the product backlog
- Facilitates meeting
- Ensure issues are solved

## Building Teams

- Self-Organizing
- Self-Directing
- Small teams with fewer than 12 members

## Generalizing Specialists

- Have members that can do different tasks
- Members skilled in more than one area
- Share work reduce bottleneck

## High-Performance Agile Teams

- Have a shared vision
- Realist goals
- Fewer than 12 members
- Have a sense of team identity
- Provide strong leadership

## Eight Characteristics of High-Performance Teams

- Self-organizing
- Empowered
- Believe that as a team they can solve any problem
- Committed to team success
- Owns its decisions and commitments
- Motivated by trust
- Consensus driven
- Participate in constructive disagreement

## Experiments (Have a safe place)

- Establish safe environment for disagreement
- Allows team members to build strong commitment to decisions
- Encourage people to experiments with new methods
- Leads to more engagement

## Welcome Constructive Disagreement

- Leads to better buy -in and decisions
- Avoiding conflicts can lead to conflicts escalating

- A safe place for disagreement leads to successful problem solving

## Models of team development

- Shu-Ha-RiModel of Skill Mastery
  - Shu-Obey,
  - Ha –Moving away,
  - Ri–finding individual paths
- Dreyfus Model of Adult Skill Acquisition
  - Novice, Advanced Beginner, Competent, Proficient, Expert

## Tuckman's Five Stages of Team Development

**1.Forming:** team comes together and starts to get to know each other. There is not much conflict or communication.

**2.Storming:** team members start to have conflicts with each other. They start to learn of each other's ideas and may not agree with them. Most conflicts takes place in this stage.

**3.Norming:** the team members begin to agree with each other on the best methods to build the deliverables. Generally, everyone is coming to a consensus.

**4.Performing:** the team is performing well and is working without conflict.

**5.Adjourning:** In this stage, the project is completed and the team is reassigned.

## Adaptive Leadership

- Forming → Directing
- Storming → Coaching
- Norming → Supporting
- Performing → Delegating
- Adjourning

## Training, Coaching, and Mentoring

- Training: Teaching of skills or knowledge
- Coaching: Process that helps a person develop and improve their skills
- Mentoring: More of a professional relationship that can fix issues on an as-needed basis
- Help team stay on track, overcome issues, and continually improve skills
- Individual level
- Whole-team level

## Team Spaces

- Co-located Teams
- Team Spaces
- Osmotic Communication
- Global and Cultural Diversity
- Distributed teams

## Co-Located Teams

- All team member work together in the same location
- Allows for face-to-face time and interaction
- Should be within 33 feet of each other

- No physical barriers
- Sometimes a virtual co-location

## Team Space

- **Lots of low-tech, high touch**
  - Whiteboards and task boards
  - Sticky notes, flip charts
  - Round table
  - No barriers to face-to-face communication
- **Caves and Common**
  - Caves ↗ space team members can retreat to individually
  - Common ↗ space team members can work as group
- **Osmotic Communication**
  - Information flows that occur as part of everyday conversations and questions
  - 33 feet or 10 meters
- **Tacit Knowledge**
  - Information that is not written down; supported through collective group knowledge

## Global and Cultural Diversity

- Time Zones
- Cultures
- Native Languages
- Styles of communications

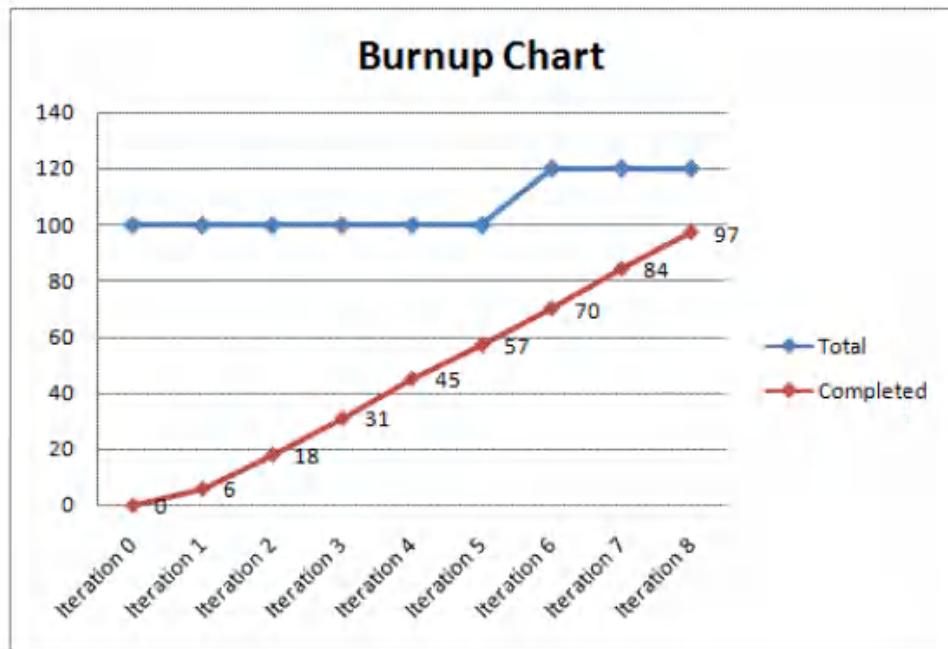
## Distributed Teams

- At least one team member working off-site
- Need to find ways to replicate co-location team benefits
- Agile Tools
  - Low-Tech, High-Touch Tools
  - Digital Tools for distribute teams
    - Video conferencing
    - Interactive whiteboards
    - IM / VoIP
    - Virtual card walls
    - Web cams
    - Digital cams

## Tracking Team Performance

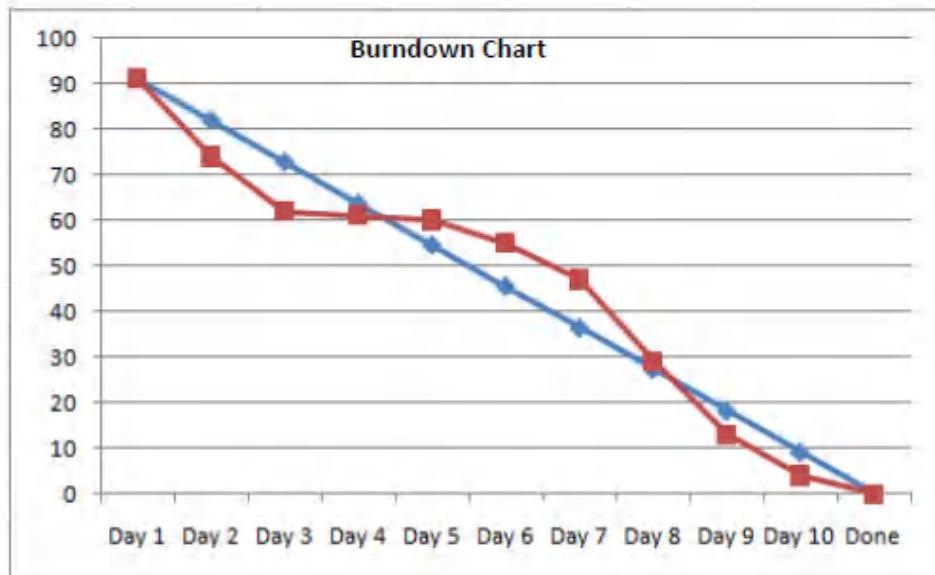
- Burn Charts
  - Burnup
  - Burndown
- Velocity Charts

## Burnup Chart



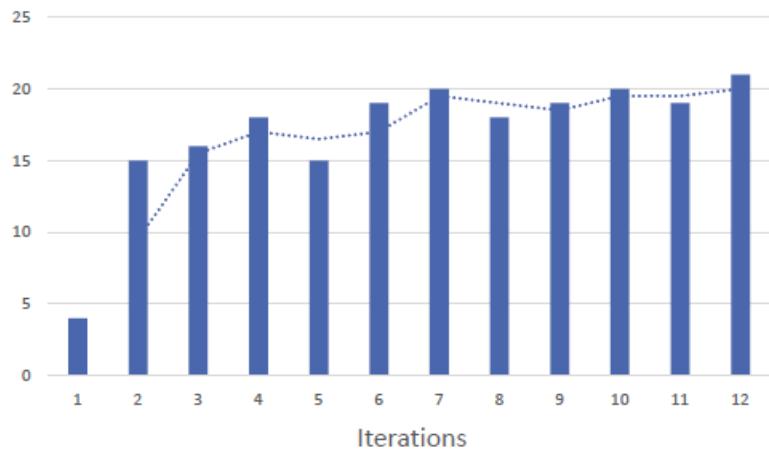
Work that has been done

## Burndown Chart



Work that remains to be done

## Velocity Charts



Show how the team is performing

If a team has to complete 3 iterations with the average velocity of 18 points per iteration, how many iterations would it take to complete 250 points of work?

$250/18 =$  About 14 more iterations.

# Domain 5. Adaptive Planning

## What is Adaptive Planning?

- Planning is ongoing process
- Multiple mechanisms to proactively update plan
- Focus on value delivery and minimize nonvalue-adding work
- Uncertainty drives need to replan
- Frequently discover issues and experience high rates of change

## Agile Plans

Agile planning varies from traditional planning

- 1.Trial and demonstration uncover true requirements, which then require replanning
- 2.Agile planning is less of an upfront effort, and instead is done more throughout the project
- 3.Midcourse adjustments are the norm

## Principles of Agile Planning

1. Plan at multiple levels
2. Engage the team and the customer in planning
3. Manage expectations by frequently demonstrating progress
4. Tailor processes to the project's characteristics
5. Update the plan based on the project priorities
6. Ensure encompassing estimates that account for risk, distractions, and team availability
7. Use appropriate estimate ranges to reflect the level of uncertainty in the estimate
8. Base projections on completion rates
9. Factor in diversion and outside work

## Progressive Elaboration

- Adding more detail as information emerges Includes:
  - Plans
  - Estimates
  - Designs
  - Test scenarios
- Rolling wave planning: Planning at multiple points in time as data becomes available

## Value-Base Analysis and Decomposition

- Assessing and prioritizing the business value of work items, and then plan accordingly.
- Consider payback frequency and dependencies
- Value-Based Decomposition
  - Breaks down requirements and prioritized them
  - Design the product box

## Design the Product Box



## Coarse-Grained Requirements

- Keep Requirements “coarse” then progressively refine them
- Helps keeps the overall design balanced
- Delays decision on implementation until the “last responsible moment”

## Timeboxing

- Short, fixed -duration periods of time in which activities or work are undertaken
  - If work is not completed within time period, move it to another timebox
- Daily Stand-up –15 minutes
- Retrospectives–2 hours
- Sprints–1-4 weeks
- Beware of Parkinson’s Law
  - Work tends to expand to fill the time given

## Agile Estimation

Knowledge of agile estimation theory & ability to perform simple agile estimating techniques

### Why do we estimate?

Determining which pieces of work can be done within a release or iteration

### How are estimates created?

By progressing through the stages planning.

### How should estimates be stated?

Should be started in ranges

## When do we estimate?

Throughout the project. More detail in the later parts of the project

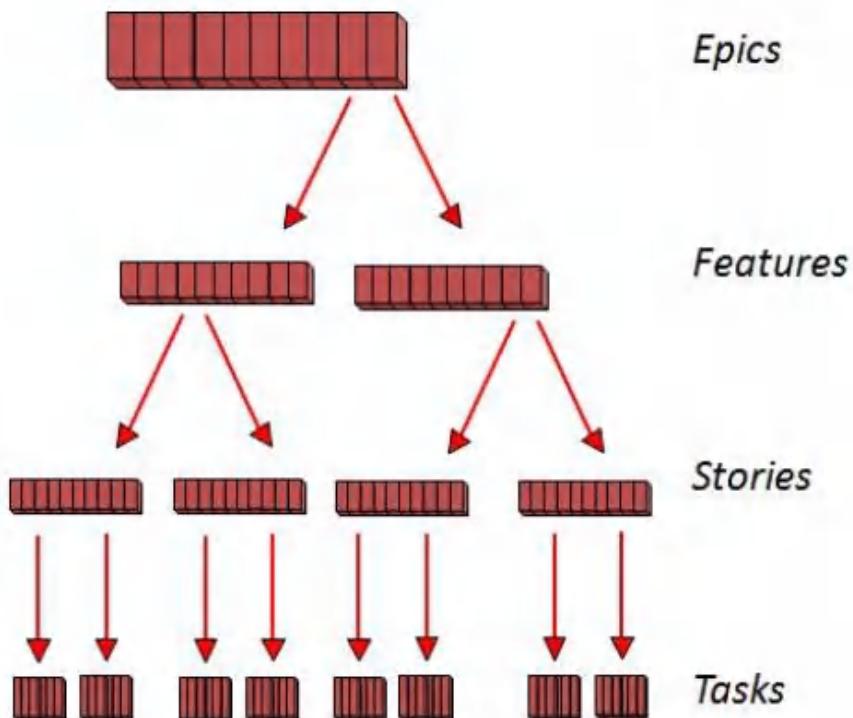
## Who estimates?

Team members will do their own estimates

## Ideal Time

Refers to the time it would take to complete a given task assuming zero interruptions or unplanned problems

## Decomposing Requirements



## User Stories

### User Stories / Backlogs

- Business functionality within a feature that involves 1-3 days of work.
- Acts as agreement between customers and development team
- Every requirement is user story
- Every story, including technical stories, has value
- Common structure of a user story

As a <**user type**>

I <**want to/need, etc.**> goal

So that <**value**>

### Example

- “As a payroll clerk, I want to be able to view a report of all payroll taxes, so that I can pay them on time”
- “As a sales person, I want to be able to see a current list of leads, so that I can call them back quickly”
- “As student of this course, I want to be able to understand the requirements of the exam, so that I know if I qualify for it or not”

## Three C's of Stories

- Have users write the stories on index cards
- No details, it's used to help converse
- 3 Cs:
  - Card
  - Conversation
  - Confirmation

## User Stories -INVEST

Effective user stories should be “**INVEST**”

### **Independent**

◦ Should be independent so it can reprioritize

### **Negotiable**

◦ Should allow for trade-off's based on cost and function

### **Valuable**

◦ Should clearly state the value of it

### **Estimatable**

◦ Should be able to estimate how long to complete

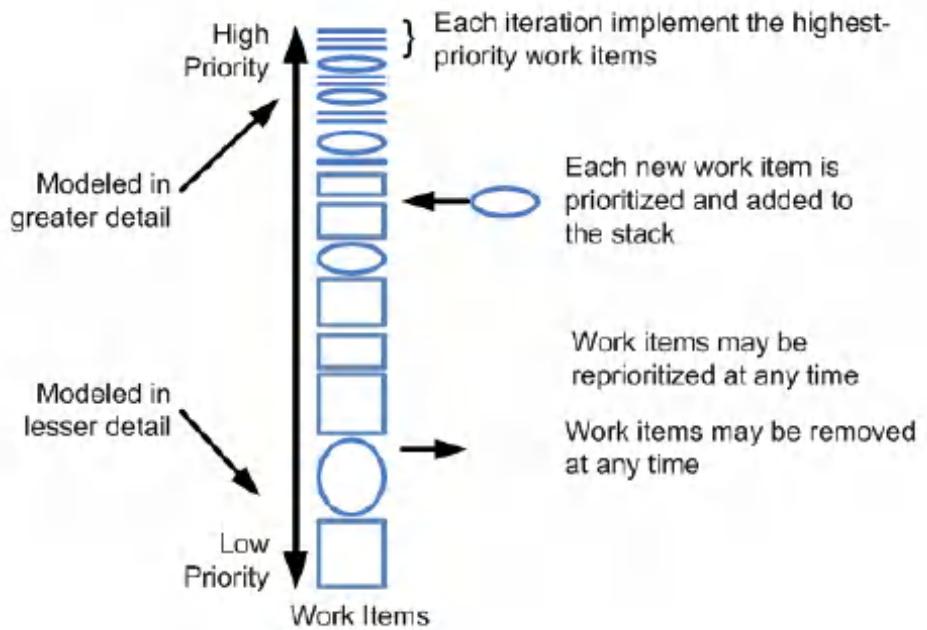
### **Small**

◦ Stories should be between 4-40 hours of work

## Testable

- Should be testable to ensure it will be accepted once completed

## User Story Backlog (Product Backlog)



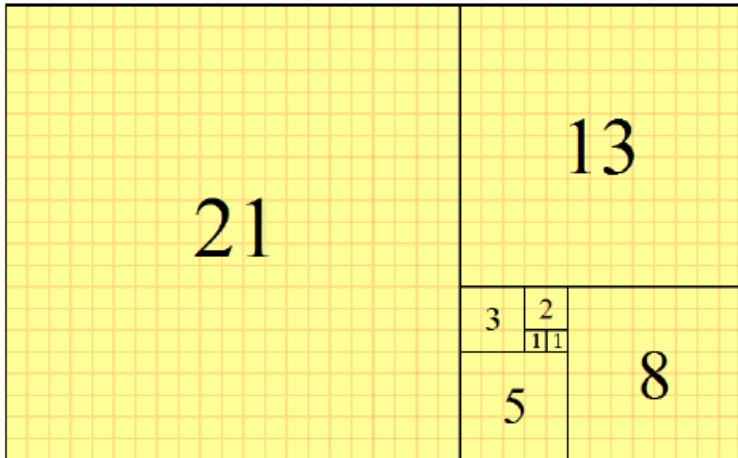
- Prioritize Requirements
- Refining (Grooming) Backlog
  - Keeping the backlog updated and accurately prioritized

## Relative Sizing and Story Points

- Absolute estimates are difficult for humans to make
- Estimates should be relative
- Assign points to each story using a relative number

## Fibonacci Sequence

Fibonacci Sequence: 1, 2, 3, 5, 8, 13, 21



[https://en.wikipedia.org/wiki/Fibonacci\\_number](https://en.wikipedia.org/wiki/Fibonacci_number)

## Guidelines for Using Story Points

- Team should own the definition of their story points
- Story point estimates should be all-inclusive
- Point sizes should be relative
- Complexity, work effort, and risk should all be included in the estimate

## Affinity Estimating and T-Shirt Sizing

- Affinity Estimating
  - Group estimates into categories or collections
- T-Shirt Sizing
  - Place stories in sizes of t-shirts

## Wideband Delphi

- Group-based estimation approach
- Panel of experts, anonymously
- It's used to prevent:
  - Bandwagon effect
  - HIPPO decision making (Highest-Paid Person's Opinion)
  - Groupthink

## Story Maps

- High-level planning tool
- Stakeholders map out what the project priorities early in the planning
- Serves as the “product roadmap”
- Shows when features will be delivered and what is included in each release

## Product Roadmap

- Shows when features will be delivered and what is included in each release
- Can convert the story map into a product roadmap

## Types of Iterations

### Iteration 0

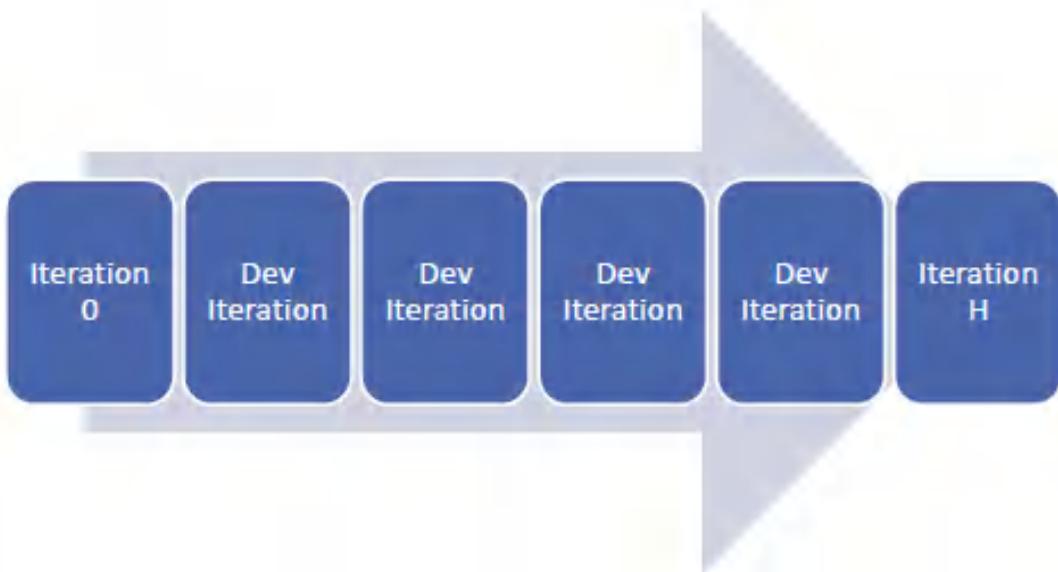
- Set the stage for development efforts
- Doesn't build anything

### Development Iteration

- Build the product increment

### Iteration H (hardening sprint or release)

- Done at the end to clean up codes or producing documentation



## Spikes

- **Architectural spike**
  - Period of time dedicated to proof of concept
- **Risk-Based Spike**
  - Team investigates to reduce or eliminate risk

## Iteration Planning

- Meeting run by the delivery team.
- Discuss the user stories in the backlog
- Select the user stories for the iteration
- Define the acceptance criteria
- Break down the user stories into task
- Estimate the task

## Release Planning

- Meeting with all stakeholders to determined which stories will be done in which iterations for the upcoming release.
- Selecting the user stories for the release
  - Using Velocity –points per iteration
- Slicing the stories
  - Breaking down stories that are too large to be completed in 1 iteration

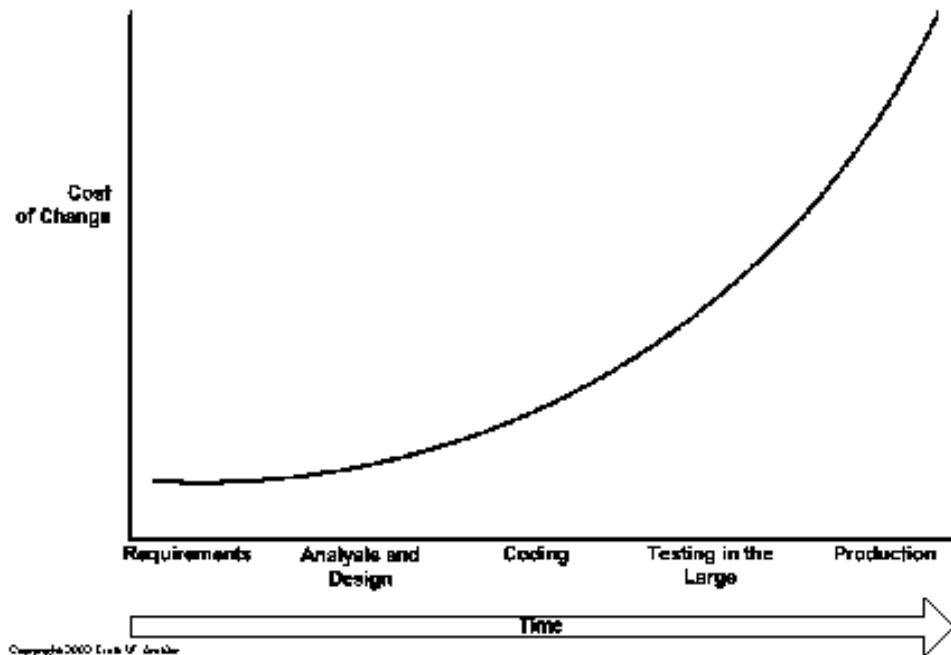
# Domain 6. Problem Detection and Resolution

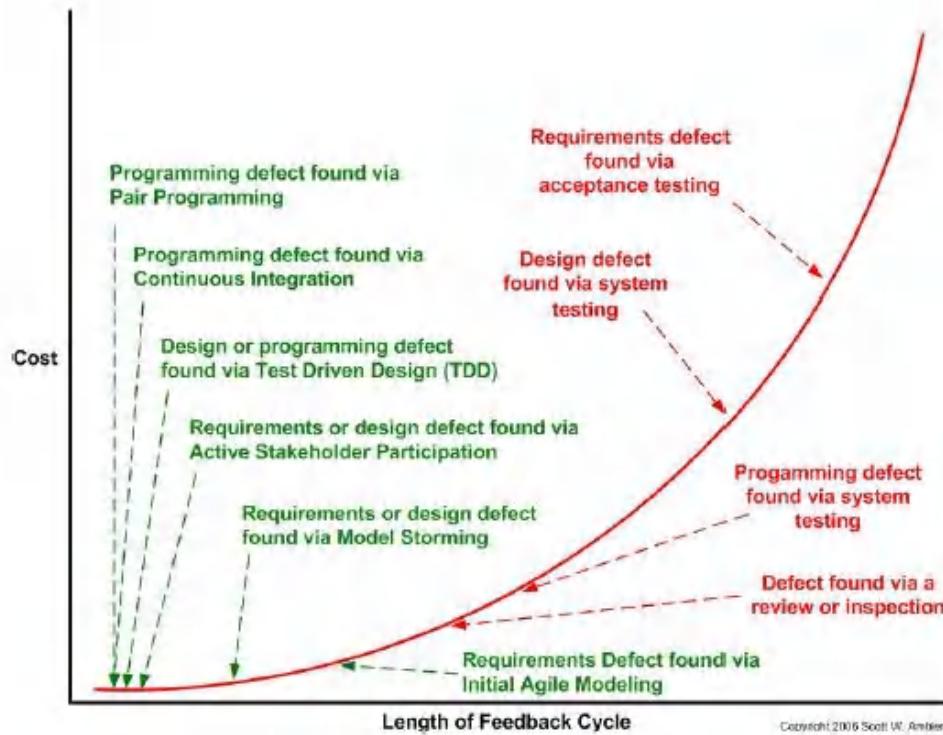
## Understand How Problems Happen

- All projects will have problems
- As a project is progressing the agile PM should expect issues to happen
- Over time issues can delay or change a project objective

## Cost of Change

- Over time the cost of change will increase





## Technical Debt

- Backlog of work caused by not doing regular cleanup
- If not done will lead to the increase cost of development and make it harder to implement changes
- Refactoring is the solution

## Failure Modes

Why do people Fail:

- Making mistakes
- Preferring to fail conservatively
- Inventing rather than researching
- Being creatures of habit
- Being inconsistent

## **Success Modes**

Why do we succeed: -

- Being good at looking around
- Being able to learn
- Being malleable
- Taking pride in work

## Success Strategies

- Balance discipline with tolerance
- Start with something concrete and tangible
- Copy and alter
- Watch and listen
- Support both concentration and communication
- Match work assignment with the person
- Retain the best talent
- Use rewards that preserve joy and combine rewards
- Get feedback

## Lead Time and Cycle Time

### Lead/Cycle time

- Lead time: how long something takes to go through the entire process
- Cycle time: how long something takes to go through a part of the process. Part of lead time.

### Cycle Time

- Measure of how long it takes to get things done
- Closely related to work in progress (WIP)
  - Excessive WIP is associated with several problems
    - Represents money invested with no return on investment yet
    - Hides bottlenecks in processes & masks efficiency issues
    - Represents risk in form of potential rework

- Long cycle times lead to increased amounts of WIP

Cycle Time =  $WIP / \text{Throughput}$

Where Throughput: Amount of work that can be done in a time period

**What would be the cycle time of feature A, if it requires 60 points of work and the team can complete 5 points per day?**

= $60/5$  points per day = 12 days.

## Defects

- Longer defects are left, more expensive to fix
- More work may have been built on top of bad design, resulting in more work to be undone
- Later in development cycle, more stakeholders impacted by defect and more expensive to fix
- Escaped Defects
  - Defects that make it to the customer

## Variance and Trend Analysis

- Variance measure of how far apart things are (or vary)
- Trend Analysis measure that provides insight into future issues
  - Lagging Metrics provides information on something that has already happened
  - Leading Metrics provides information on what is or is about to occur

## Control Limits

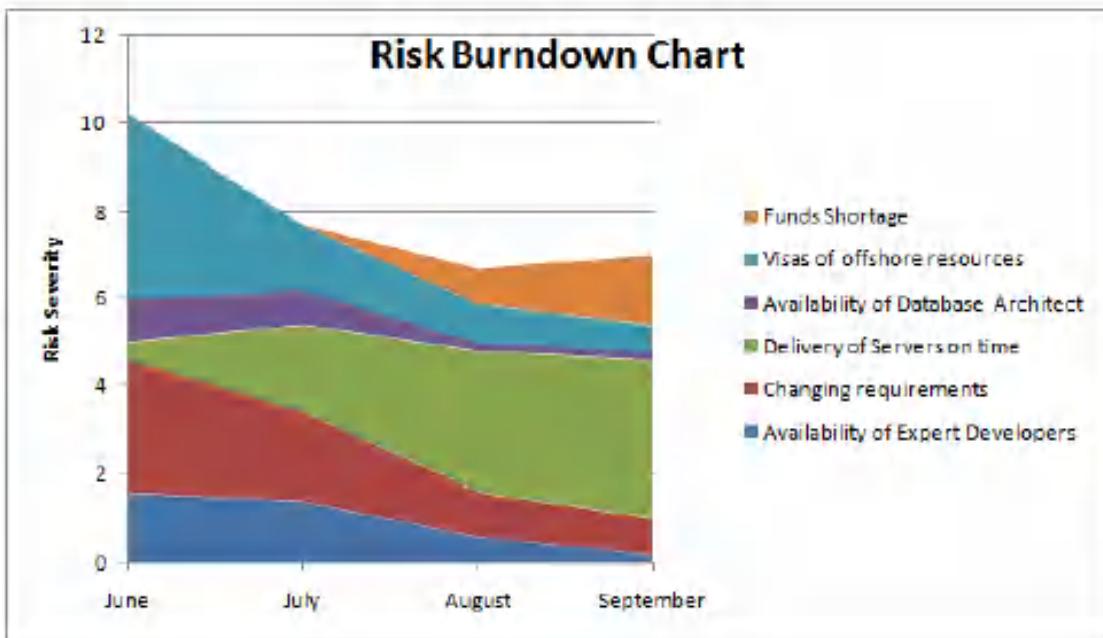
Help diagnose issues before issue occurs

Provide guidelines to operate within

## Risk

- Risk Adjusted Backlog
  - Adjusting the backlog for risk
  - Done after risk response
- Expected Monetary Value = Impact(\$) x Probability (%)
- Risk Severity
  - Risk Probability x Risk Impact
  - Uses a scale of numbers (E.g 1-5)

## Risk Burndown Graphs



## Solving Problems

- Problem Solving as continuous improvement
- Engage the team
- Some problems can't be solved

## Why Engaging the Team?

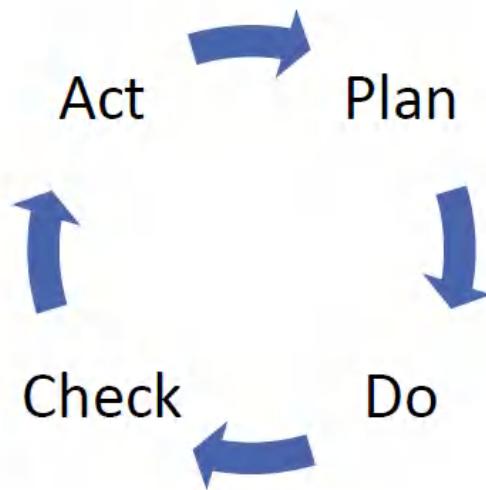
- Team usually produces the best practical solutions
- Benefits
  - Get consensus from all members
  - Gets a broad knowledge base
  - Solutions are practical
  - When ask people work hard to produce good ideas
  - Asking someone for help shows confidence
- Usage and Cautions
  - Solve real problems
  - Poor team cohesion
  - Team and project changes
  - Follow-Through

## Domain 7. Continuous Improvement

### What is Kaizen?

- Kaizen is a process for continuous improvement name after the Japanese word
- Focus on the team to implement small incremental improvement
- Usually follows the Plan-Do-Check-Act (PDCA) cycle by Edwards Deming

### PDCA



### Agile Cycle



## Process Analysis

- Review and diagnose issues
- Look for tailoring possibilities

## Process Tailoring

- Amend methodology to better fit project environment
- Change things for good reason, not just for sake of change
- Develop a hybrid

## Value Stream Map

- Optimize the flow of information or materials to complete a process
- Reduce waste (waiting times) or unnecessary work
- Steps to creating: -
  - Identify the product or service
  - Create a value stream map
  - Review to find waste
  - Create a new map with the desire improvement
  - Develop a roadmap to implement the fixes
  - Plan to revisit it again

## Value Stream Map Example



## Pre-Mortems

- Team meeting that looks at possible things that can cause failure during a project before they take place
- Steps includes:-
  - Think what the failures might be
  - Create a list of reasons that can cause the failures
  - Review the project plan to determine what can be done to reduce or remove the reasons for failure

## Retrospectives

- Special meeting that takes place after each iteration
- Inspect and improve methods and team work
- Offers immediate value
- Should have a 2-hour time limit

## Retrospectives Stages

About 2 Hours for a typical retrospective

1. Set Stage –6 Minutes
2. Gather Data –40 Minutes
3. Generate Insights –25 Minutes
4. Decide What to Do –20 Minutes
5. Close Retrospective –20 Minutes

### 1. Set the Stage

- Start of the retrospective
- Help people to get focus
- Encourage participation to ensure everyone start talking early
- Outlining the approach and topics for discussion
- Get people in mood for contributing information
- Activities includes: -
  - Check-In
  - Focus On/Focus Off
  - ESVP
  - People identify if they are an explorer, shopper, vacationer, or Prisoner

### 2. Gather Data

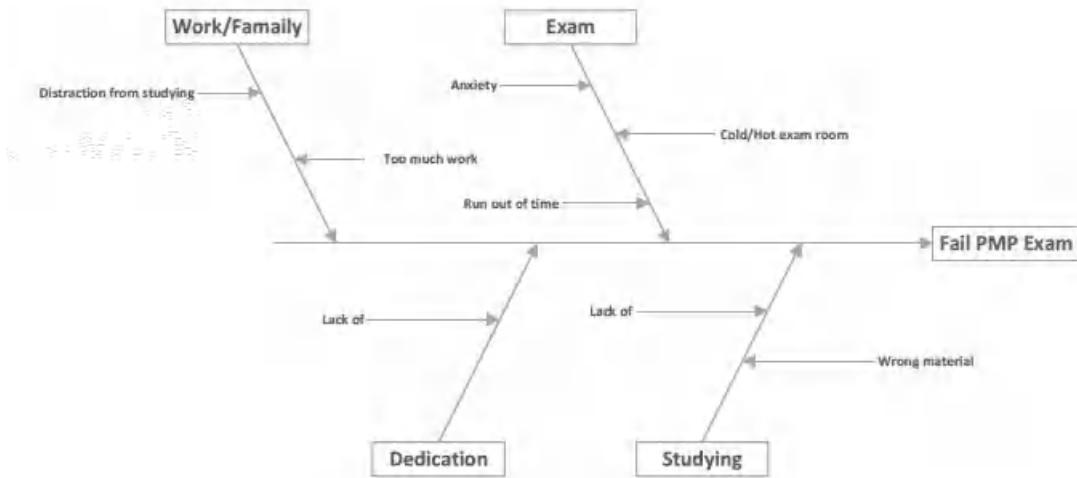
- Create a picture of what happened during the sprint
- Start to collect information to be used for improvement
- Activities: -
  - Timeline
  - Triple Nickels: break the team into 5 groups to spend 5 minutes collecting 5 ideas, 5 time

- Mad, Sad, Glad: what where the team emotion as the sprint was taking place

### 3. Generate Insights

- Analyze the data
- Helps to understand what was found
- Activities Include:
  - Brainstorming
  - Five Whys: asking why five times
  - Fishbone analysis
  - Prioritize with dots: use a dot voting technique

#### Fishbone Analysis



### 4. Decide what to do

- Decide what to do about the problems that was found
- How can we improve for the next iteration
- Activities include: -
  - Short Subjects
  - Smart Goals

## **Short Subjects**

Team decides what actions to take in the next iteration:

- Start doing
- Stop doing
- Do more of
- Do less of

## **SMART Goals**

Team sets goals that are SMART: -

- Specific
- Measurable
- Attainable
- Relevant
- Timely

## **5. Close the Retrospective**

- Opportunity to reflect on what
- happened during the retrospective
- Activities include: -
  - Plus/Delta: make two columns of what the team will do more of and what to do less of

## Team Self-Assessments

- Uses to evaluate the team as a whole
- Things to evaluate can include:
  - Self-organization
  - Empowered to make decisions
  - Belief in vision and success
  - Committed team
  - Trust each other
  - Constructive disagreement

## PMI Code Ethics and Professional Conduct

Four areas of professional behavior:

- Responsibility
- Respect
- Fairness
- Honesty

# Agile Project Management Glossary

**Acceptance Test-Driven Development (ATDD).** A method of collaboratively creating acceptance test criteria that are used to create acceptance tests before delivery begins.

**Agile.** A term used to describe a mindset of values and principles as set forth in the Agile Manifesto.

**Agile Coach.** An individual with knowledge and experience in agile who can train, mentor, and guide organizations and teams through their transformation.

**Agile Life Cycle.** An approach that is both iterative and incremental to refine work items and deliver frequently.

**Agile Manifesto.** The original and official definition of agile values and principles.

**Agile Mindset.** A way of thinking and behaving underpinned by the four values and twelve principles of the Agile Manifesto.

**Agile Practitioner.** A person embracing the agile mindset who collaborates with like-minded colleagues in cross-functional teams. Also referred to as agilist.

**Agile Principles.** The twelve principles of agile project delivery as embodied in the Agile Manifesto.

**Agile Unified Process.** A simplistic and understandable approach to developing business application software using agile techniques and concepts. It is a simplified version of the Rational Unified Process (RUP).

**Agilist.** See *Agile Practitioner*.

**Anti-Pattern.** A known, flawed pattern of work that is not advisable.

**Automated Code Quality Analysis.** The scripted testing of code base for bugs and vulnerabilities.

**Backlog.** See *Product Backlog*.

**Backlog Refinement.** The progressive elaboration of project requirements and/or the ongoing activity in which the team collaboratively reviews, updates, and writes requirements to satisfy the need of the customer request.

**Behavior-Driven Development (BDD).** A system design and validation practice that uses test-first principles and English-like scripts.

**Blended Agile.** Two or more agile frameworks, methods, elements, or practices used together such as Scrum practiced in combination with XP and Kanban Method.

**Blocker.** See *Impediment*.

**Broken Comb.** Refers to a person with various depths of specialization in multiple skills required by the team. Also known as Paint Drip. See also *Tshaped* and *I-shaped*.

**Burndown Chart.** A graphical representation of the work remaining versus the time left in a timebox.

**Burnup Chart.** A graphical representation of the work completed toward the release of a product.

**Business Requirement Documents (BRD).** Listing of all requirements for a specific project.

**Cadence.** A rhythm of execution. See also *Timebox*.

**Collective Code Ownership.** A project acceleration and collaboration technique whereby any team member is authorized to modify any project work product or deliverable, thus emphasizing team-wide ownership and accountability.

**Continuous Delivery.** The practice of delivering feature increments immediately to customers, often through the use of small batches of work and automation technology.

**Continuous Integration.** A practice in which each team member's work products are frequently integrated and validated with one another.

**Cross-Functional Team.** A team that includes practitioners with all the skills necessary to deliver valuable product increments.

**Crystal Family of Methodologies.** A collection of lightweight agile software development methods focused on adaptability to a particular circumstance.

**Daily Scrum.** A brief, daily collaboration meeting in which the team reviews progress from the previous day, declares intentions for the current day, and highlights any obstacles encountered or anticipated. Also known as daily stand-up.

**Definition of Done (DoD).** A team's checklist of all the criteria required to be met so that a deliverable can be considered ready for customer use.

**Definition of Ready (DoR).** A team's checklist for a user-centric requirement that has all the information the team needs to be able to begin working on it.

**DevOps.** A collection of practices for creating a smooth flow of delivery by improving collaboration between development and operations staff.

**Disciplined Agile (DA).** A process decision framework that enables simplified process decisions around incremental and iterative solution delivery.

**Double Loop Learning.** A process that challenges underlying values and assumptions in order to better elaborate root causes and devise improved countermeasures rather than focusing only on symptoms.

**Dynamic Systems Development Method (DSDM).** An agile project delivery framework.

**Evolutionary Value Delivery (EVO).** Openly credited as the first agile method that contains a specific component no other methods have: the focus on delivering multiple measurable value requirements to stakeholders.

**eXtreme Programming.** An agile software development method that leads to higher quality software, a greater responsiveness to changing customer requirements, and more frequent releases in shorter cycles.

**Feature-Driven Development.** A lightweight agile software development method driven from the perspective of features valued by clients.

**Fit for Purpose.** A product that is suitable for its intended purpose.

**Fit for Use.** A product that is usable in its current form to achieve its intended purpose.

**Flow Master.** The coach for a team and service request manager working in a continuous flow or Kanban context. Equivalent to *Scrum Master*.

**Framework.** A basic system or structure of ideas or facts that support an approach.

**Functional Requirement.** A specific behavior that a product or service should perform.

**Functional Specification.** A specific function that a system or application is required to perform. Typically represented in a functional specifications document.

**Hoshin Kanri.** A strategy or policy deployment method.

**Hybrid Approach.** A combination of two or more agile and non-agile elements, having a non-agile end result.

**IDEAL.** An organizational improvement model that is named for the five phases it describes: initiating, diagnosing, establishing, acting, and learning.

**Impact Mapping.** A strategic planning technique that acts as a roadmap to the organization while building new products.

**Impediment.** An obstacle that prevents the team from achieving its objectives. Also known as a blocker.

**Increment.** A functional, tested, and accepted deliverable that is a subset of the overall project outcome.

**Incremental Life Cycle.** An approach that provides finished deliverables that the customer may be able to use immediately.

**Information Radiator.** A visible, physical display that provides information to the rest of the organization enabling up-to-the-minute knowledge sharing without having to disturb the team.

**I-shaped.** Refers to a person with a single deep area of specialization and no interest or skill in the rest of the skills required by the team. See also *T-Shaped* and *Broken Comb*.

**Iteration.** A timeboxed cycle of development on a product or deliverable in which all of the work that is needed to deliver value is performed.

**Iterative Life Cycle.** An approach that allows feedback for unfinished work to improve and modify that work.

**Kaizen Events.** Events aimed at improvement of the system.

**Kanban Board.** A visualization tool that enables improvements to the flow of work by making bottlenecks and work quantities visible.

**Kanban Method.** An agile method inspired by the original Kanban inventory control system and used specifically for knowledge work.

**Large Scale Scrum (LeSS).** Large-Scale Scrum is a product development framework that extends Scrum with scaling guidelines while preserving the original purposes of Scrum.

**Lean Software Development (LSD).** Lean software development is an adaptation of lean manufacturing principles and practices to the software development domain and is based on a set of principles and practices for achieving quality, speed, and customer alignment.

**Life Cycle.** The process through which a product is imagined, created, and put into use.

**Mobbing.** A technique in which multiple team members focus simultaneously and coordinate their contributions on a particular work item.

**Organizational Bias.** The preferences of an organization on a set of scales characterized by the following core values: exploration versus execution, speed versus stability, quantity versus quality, and flexibility versus predictability.

**Organizational Change Management.** A comprehensive, cyclic, and structured approach for transitioning individuals, groups, and organizations from the current state to a future state with intended business benefits.

**Paint-Drip.** See *Broken Comb*.

**Pairing.** See *Pair Work*.

**Pair Programming.** Pair work that is focused on programming.

**Pair Work.** A technique of pairing two team members to work simultaneously on the same work item.

**Personas.** An archetype user representing a set of similar end users described with their goals, motivations, and representative personal characteristics.

**Pivot.** A planned course correction designed to test a new hypothesis about the product or strategy.

**Plan-Do-Check-Act (PDCA).** An iterative management method used in organizations to facilitate the control and continual improvement of processes and products.

**Plan-Driven Approach.** See *Predictive Approach*.

**Predictive Approach.** An approach to work management that utilizes a work plan and management of that work plan throughout the life cycle of a project.

**Predictive Life Cycle.** A more traditional approach, with the bulk of planning occurring up-front, then executing in a single pass; a sequential process.

**Project Management Office (PMO).** A management structure that standardizes the project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques.

**Product Backlog.** An ordered list of user-centric requirements that a team maintains for a product.

**Product Owner.** A person responsible for maximizing the value of the product and who is ultimately responsible and accountable for the end product that is built. See also *Service Request Manager*.

**Progressive Elaboration.** The iterative process of increasing the level of detail in a project management plan as greater amounts of information and more accurate estimates become available.

**Refactoring.** A product quality technique whereby the design of a product is improved by enhancing its maintainability and other desired attributes without altering its expected behavior.

**Retrospective.** A regularly occurring workshop in which participants explore their work and results in order to improve both process and product.

**Rolling Wave Planning.** An iterative planning technique in which the work to be accomplished in the near term is planned in detail, while the work in the future is planned at a higher level.

**Scaled Agile Framework (SAFe®).** A knowledge base of integrated patterns for enterprise-scale lean–agile development.

**Scrum.** An agile framework for developing and sustaining complex products, with specific roles, events, and artifacts.

**Scrumban.** A management framework that emerges when teams employ Scrum as the chosen way of working and use the Kanban Method as a lens through which to view, understand, and continuously improve how they work.

**Scrum Board.** An information radiator that is utilized to manage the product and sprint backlogs and show the flow of work and its bottlenecks.

**Scrum Master.** The coach of the development team and process owner in the Scrum framework. Removes obstacles, facilitates productive events and defends the team from disruptions. See also *Flow Master*.

**Scrum of Scrums.** A technique to operate Scrum at scale for multiple teams working on the same product, coordinating discussions of progress on their interdependencies, and focusing on how to integrate the delivery of software, especially in areas of overlap.

**Scrum Team.** Describes the combination of development team, scrum master, and process owner used in Scrum.

**Self-Organizing Team.** A cross-functional team in which people fluidly assume leadership as needed to achieve the team's objectives.

**Servant Leadership.** The practice of leading through service to the team, by focusing on understanding and addressing the needs and development of team members in order to enable the highest possible team performance.

**Service Request Manager.** The person responsible for ordering service requests to maximize value in a continuous flow or Kanban environment. Equivalent to product owner.

**Siloed Organization.** An organization structured in such a way that it only manages to contribute a subset of the aspects required for delivering value to customers. For contrast, see *Value Stream*.

**Single Loop Learning.** The practice of attempting to solve problems by just using specific predefined methods, without challenging the methods in light of experience.

**Smoke Testing.** The practice of using a lightweight set of tests to ensure that the most important functions of the system under development work as intended.

**Specification by Example (SBE).** A collaborative approach to defining requirements and business-oriented functional tests for software products based on capturing and illustrating requirements using realistic examples instead of abstract statements.

**Spike.** A short time interval within a project, usually of fixed length, during which a team conducts research or prototypes an aspect of a solution to prove its viability.

**Sprint.** Describes a timeboxed iteration in Scrum.

**Sprint Backlog.** A list of work items identified by the Scrum team to be completed during the Scrum sprint.

**Sprint Planning.** A collaborative event in Scrum in which the Scrum team plans the work for the current sprint.

**Story Point.** A unit-less measure used in relative user story estimation techniques.

**Swarming.** A technique in which multiple team members focus collectively on resolving a specific impediment.

**Technical Debt.** The deferred cost of work not done at an earlier point in the product life cycle.

**Test-Driven Development.** A technique where tests are defined before work is begun, so that work in progress is validated continuously, enabling work with a zero defect mindset.

**Timebox.** A fixed period of time, for example, 1 week, 1 fortnight, 3 weeks, or 1 month.

See also *Iteration*.

**T-shaped.** Refers to a person with one deep area of specialization and broad ability in the rest of the skills required by the team. See also *I-Shaped* and *Broken Comb*.

**User Story.** A brief description of deliverable value for a specific user. It is a promise for a conversation to clarify details.

**User Story Mapping.** A visual practice for organizing work into a useful model to help understand the sets of high-value features to be created over time, identify omissions in the backlog, and effectively plan releases that deliver value to users.

**UX Design.** The process of enhancing the user experience by focusing on improving the usability and accessibility to be found in the interaction between the user and the product.

**Value Stream.** An organizational construct that focuses on the flow of value to customers through the delivery of specific products or services.

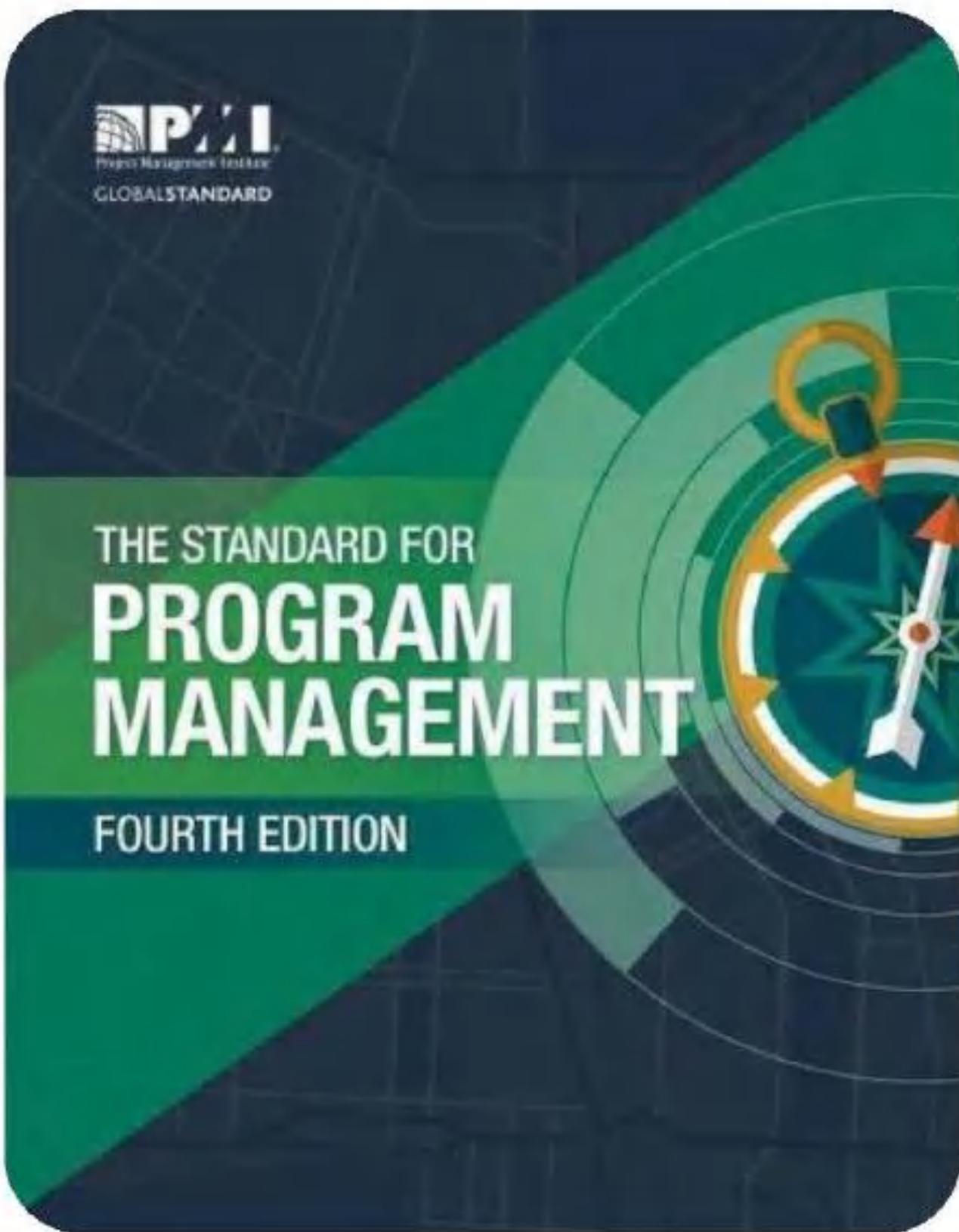
**Value Stream Mapping.** A lean enterprise technique used to document, analyse, and improve the flow of information or materials required to produce a product or service for a customer.

# **Program Management Excellence**



## **Sriram**

## Program Management – Fourth Edition



## The Purpose of Standard for Program Management

- Principles of Program Management
- Good Practice of Program Management
- Understand the role of a Program Manager
- Understand the code of Ethics and Professional

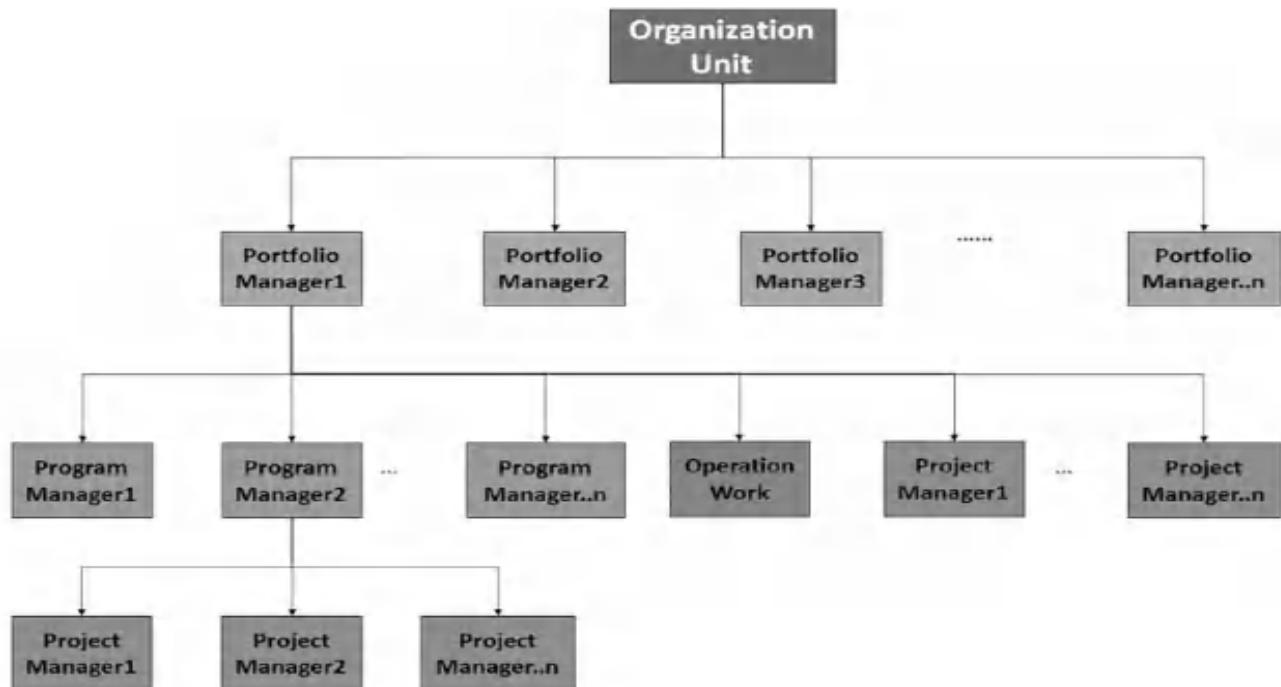
The Standard for Program Management is also intended to provide a common understanding of the role of a program manager in general, and especially when interacting with: -

- Portfolio managers whose portfolio(s) include the program or its components;
- Project managers whose projects are part of the program;
- Program sponsors and other members of the program steering committee. This committee may be referred to as
  - a program or portfolio governance board;
  - Program or project management office;
  - Program team members working on the program or on other subsidiary programs;
  - Program beneficiaries; and
  - Other stakeholders or stakeholder groups (e.g., organizational executives, business partners, clients, suppliers,
  - vendors, leaders or political groups) that may influence the program.

# 1. Introduction to Program Management

## 1.1 Terms in Program Management

- A **Project** is a temporary endeavor undertaken to create a unique product, service or result.
- A **Program** is a group of related projects, subprograms, and program activities managed in a coordinated way to obtain benefits not obtainable from managing them individually.
- **Program Activities** are Work processes or activities performed to support a program
- **Subsidiary Programs** are the Programs Sponsored and conducted to pursue a subset of goals important to the primary program
- **Components** are projects, subsidiary programs or other related activities conducted to support a program
- A **Portfolio** is a collection of projects, programs, and operations managed as a group to achieve strategic objectives.



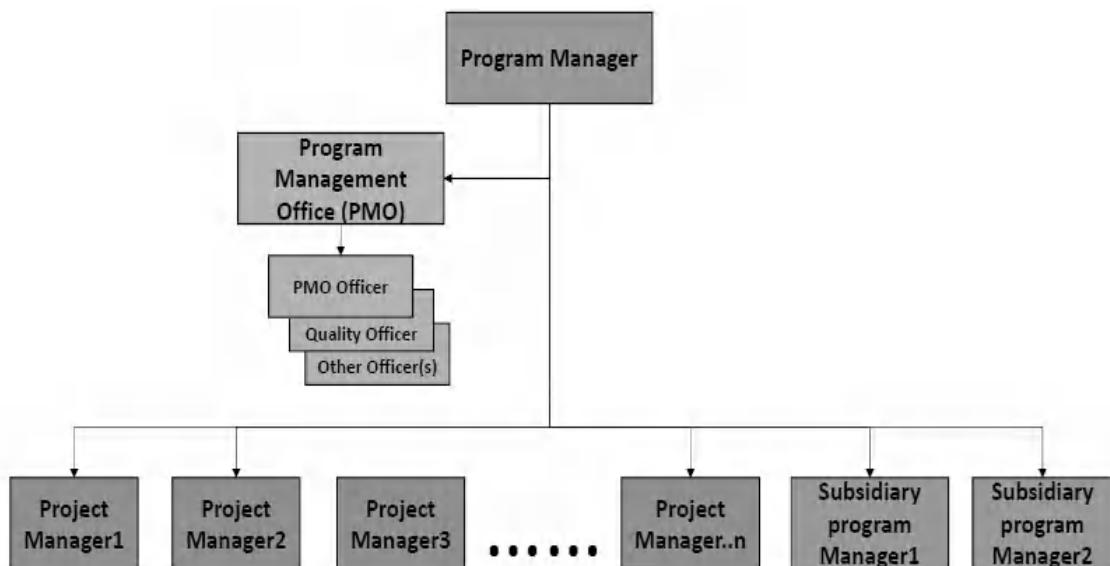
## 1.2 What is Program Management?

Program management is the application of knowledge, skills, and principles to a program to achieve the program objectives and to obtain benefits and control not available by managing program components individually. It involves aligning multiple components to achieve the program goals and allows for optimized or integrated cost, schedule, and effort. The program benefits can be realized incrementally throughout the duration of the program or may be realized at or after the end of the program.

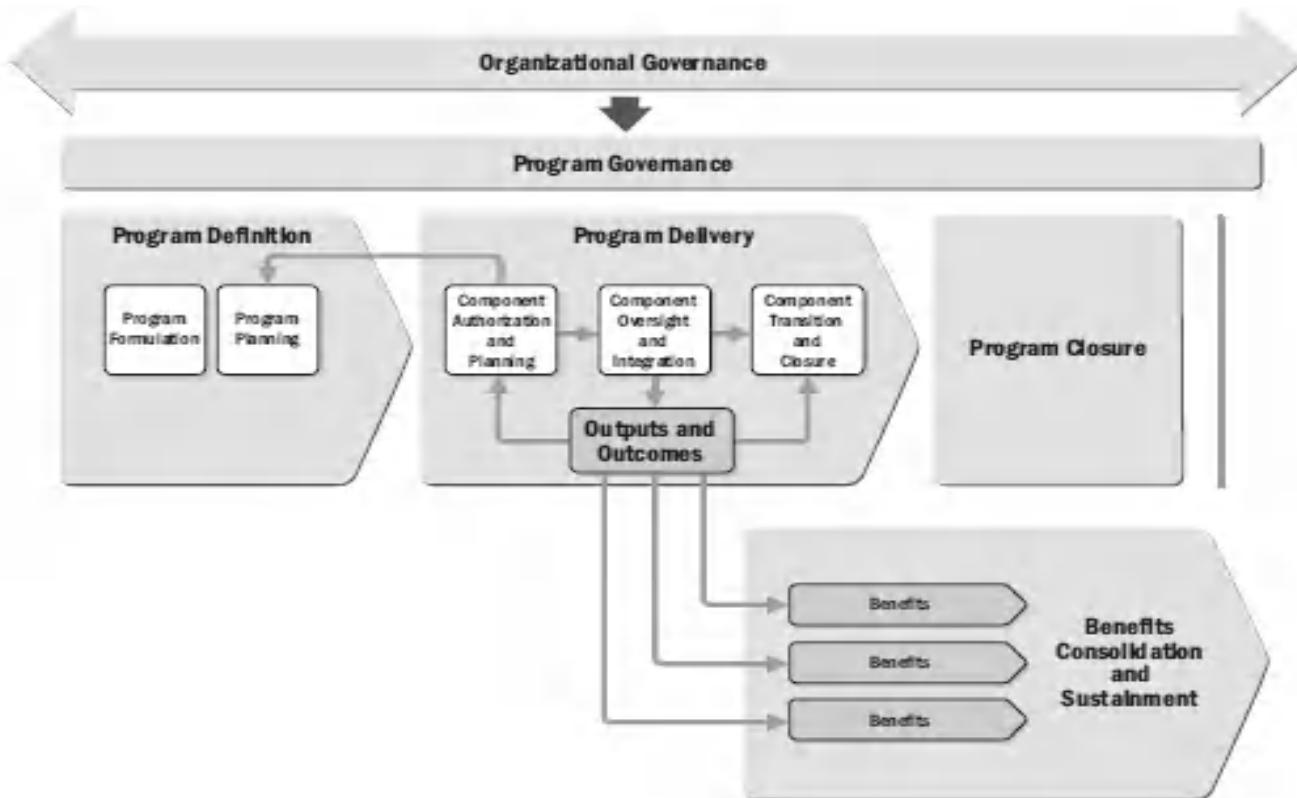
### Benefits of Program Management: -

A benefit is the gains and assets realized by the organization and other stakeholders as the result of outcomes delivered by the program.

- To enhance the current capabilities
- New products or services
- Facilitating change
- Creating or maintaining assets
- Offering new products and services
- Behaviors



## 1.3 Program Life Cycle



## Program Definition



## Program Delivery

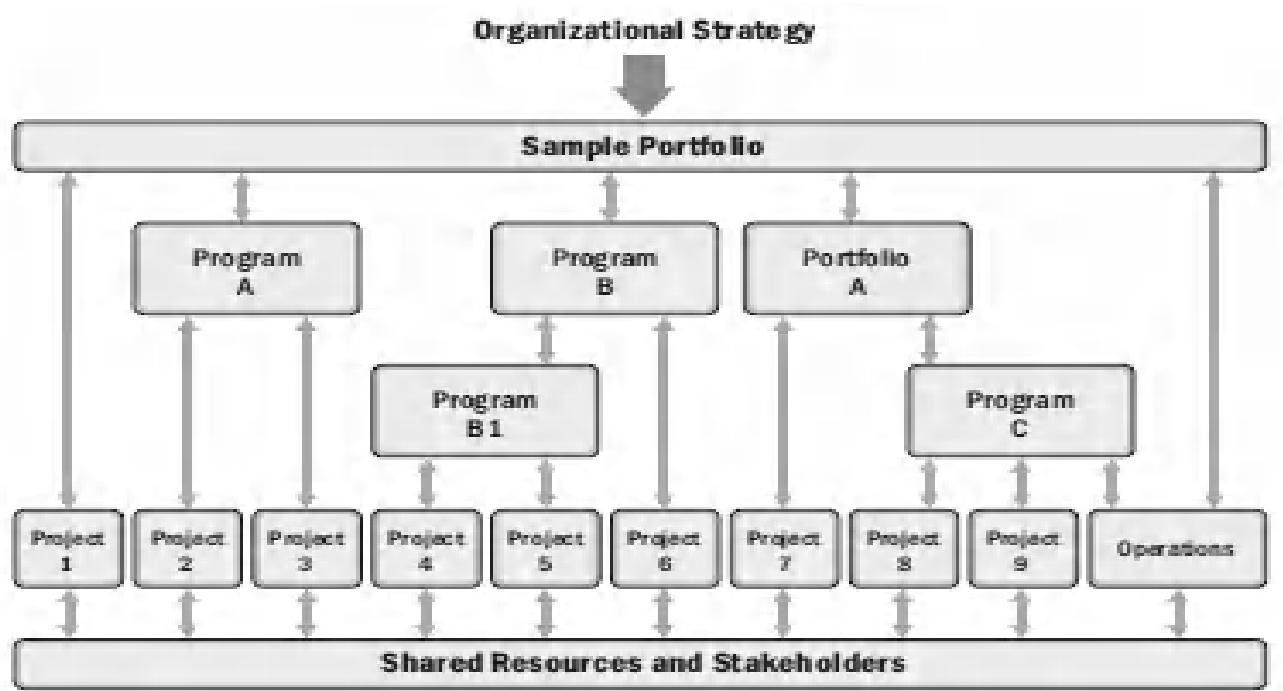


## Program Closure



## Program Benefits

## 1.4 Relationships among Project, Programs & Portfolio Management & The Organizational Project Management (OPM)



Programs and projects, as significant elements of an organization's portfolio, are conducted to produce the outputs and outcomes required to support an organization's strategic objectives.

The program manager oversees and analyzes component interdependencies to determine the optimal approach for managing program components

**Portfolio management** is the centralized management of one or more portfolios to achieve strategic objectives. Portfolio management focuses on the establishment and use of good practices when choosing programs or projects to sponsor, prioritizing their goals and work, and ensuring that they can be adequately resourced.

**Program management** is the application of knowledge, skills, and principles to a program to achieve the program objectives and to obtain benefits and control not available by managing program components individually. Program management focuses on the coordinated and effective delivery of benefits derived from the pursuit of a group of projects and other programs whose outcomes are related.

**Project management** is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Project management focuses on the efficient delivery of the outputs and outcomes required by organizations within defined constraints of time, cost, and specifications.

OPM provides a framework in which portfolio, program, and project management practices are integrated to achieve strategic objectives. OPM supports the coordinated practice of portfolio, program, and project management by linking portfolio, program, and project management principles and practices. OPM is employed to produce improved performance, better results, and sustainable strategic benefits for organizations.

# Comparative Overview of Project, Program & Portfolio Management

## Comparative Overview of Project, Program, and Portfolio Management

Organizational Project Management			
	Projects	Programs	Portfolios
Scope	Projects have defined objectives. Scope is progressively elaborated throughout the project life cycle.	Programs have a larger scope and provide more significant benefits.	Portfolios have an organizational scope that changes with the strategic objectives of the organization.
Change	Project managers expect change and implement processes to keep change managed and controlled.	Program managers expect change from both inside and outside the program and are prepared to manage it.	Portfolio managers continuously monitor changes in the broader internal and external environment.
Planning	Project managers progressively elaborate high-level information into detailed plans throughout the project life cycle.	Program managers develop the overall program plan and create high-level plans to guide detailed planning at the component level.	Portfolio managers create and maintain necessary processes and communication relative to the aggregate portfolio.
Management	Project managers manage the project team to meet the project objectives.	Program managers manage the program staff and the project managers; they provide vision and overall leadership.	Portfolio managers may manage or coordinate portfolio management staff, or program and project staff that may have reporting responsibilities into the aggregate portfolio.
Success	Success is measured by product and project quality, timeliness, budget compliance, and degree of customer satisfaction.	Success is measured by the degree to which the program satisfies the needs and benefits for which it was undertaken.	Success is measured in terms of the aggregate investment performance and benefit realization of the portfolio.
Monitoring	Project managers monitor and control the work of producing the products, services, or results that the project was undertaken to produce.	Program managers monitor the progress of program components to ensure the overall goals, schedules, budget, and benefits of the program will be met.	Portfolio managers monitor strategic changes and aggregate resource allocation, performance results, and risk of the portfolio.

## The Interaction among Portfolio, Program & Project Management

**Portfolio Managers:** Ensure that programs and projects are selected, prioritized, and staffed according to an organization's strategic plan for realizing the desired organizational value.

**Program Managers:** Focus on delivering organizational benefits aligned with the organization's strategic plan through the coordinated management of projects, subsidiary programs, and other supportive work.

**Project Manager:** Focus on the generation of the specific outputs and outcomes required by an organization.

## The Relationship between Program and Portfolio Management

- Collaborative Function of the organization.
- Both works together to ensure that benefits desired or required by an organization are effectively and efficiently delivered.

## The Relationship between Program and Project Management

- Collaborative Function of the organization.
- Both works together to define viable strategies for pursuing program goals and thereby delivering program benefits

## 1.5 The Relationships among Organizational Strategy, Program & Operations Management

- It is important that program managers establish collaborative, mutually supportive relationships with those responsible for managing operations within an organization.
- Together, program and operational managers are responsible for ensuring the balanced and successful execution of an organization's strategic objectives

## 1.6 Business Value

- **Portfolio management** ensures that an organization's programs, projects, and operations are aligned with an organization's strategy.
- It allows organizations to define how they will pursue their strategic goals through programs and projects, and how those programs and projects will be supported by human, financial, technical, or material resources. In so doing, portfolio management optimizes the pursuit of business value.
- **Program management** enables organizations to more effectively pursue their strategic goals through the coordinated pursuit of projects, subsidiary programs, and other program-related activities.
- Program management seeks to optimize the management of related component projects and programs to improve the generation of business value.
- **Project management** enables organizations to more efficiently and effectively generate outputs and outcomes required for the pursuit of an organization's objectives by applying knowledge, processes, skills, tools, and techniques that enhance the delivery of outputs and outcomes by projects.
- Project management seeks to optimize the delivery of business value by improving the efficiency of organizations as they deliver new products, services, or results.

## 1.7 Role of the Program Manager

Program Manager is the person authorized by the performing organization to lead the team or team responsible for achieving the objectives. Program Managers work to ensure that projects, other programs, and program activities are organized and executed in a consistent manner and fulfilled within the established standards

**Program Leadership:** Maintains responsibility for the leadership, conduct, and performance of a program, and for building a program team that is capable of achieving program objectives and delivering anticipated program benefits.

**Meet Organization's Strategic Objectives:** Ensure that program components are adapted as required to meet the organization's strategic objectives.

**Optimize delivery of Program benefits:** Managing uncertainty, navigating complexity, and implementing change in the program environment, to optimize the delivery of program benefits.

**Management of Complex Issues:** Managing or coordinating the management of complex issues that may arise as programs seek to deliver benefits.

**Monitor the outputs and outcomes:** Monitor the outputs and outcomes of a program's component activities and ensure that the program adapts appropriately to them.

**Interaction with Components Managers:** Interact with program managers to provide support and guidance on individual initiatives conducted to support a program

**Interaction with Operational Managers:** Interact with operational managers and stakeholders to ensure that programs receive appropriate operational support and that benefits delivered by the program can be effectively sustained

**Interact with Portfolio Managers:** Interact with portfolio managers to ensure that programs are provided with the appropriate resources and priority

**Integrate the program components:** Integrate the program components deliverables, outcomes, and benefits into the programs end product, services or results such that the program delivers its intended benefits

**Collaborate with Governance Bodies:** Collaborate with governance bodies, sponsors and the program management office to ensure the program's continued alignment with organizational strategy and ongoing organizational support

## Core responsibilities of a Program Manager

- Daily program management throughout the program lifecycle
- Define the program governance
- Plan the overall program and monitor the progress
- Manage the program's budget
- Manage risks and issues and take corrective measurements
- Coordinate the projects and their interdependencies
- Manage and utilize resources across projects
- Manage stakeholders' communication
- Align deliverables to the program's outcome
- Manage the main program documents

## Daily & Monthly Responsibilities of Program Manager

- Work closely with project sponsor, cross-functional teams, and assigned project managers to plan and develop scope, deliverables, required resources, work plan, budget, and timing for new initiatives
- Manage program and project teams for optimal return-on-investment, and coordinate and delegate cross-project initiatives
- Identify key requirements needed from cross-functional teams and external vendors
- Develop and manage budget for projects and be accountable for delivering against established business goals/objectives
- Work with other program managers to identify risks and opportunities across multiple projects within the department
- Analyze, evaluate, and overcome program risks, and produce program reports for management and stakeholders

### 1.7.1 Program Manager Competencies

- Communication Skills
- Stakeholder Engagement Skills
- Change Management Skills
- Leadership Skills
- Analytical Skills
- Integration Skills

## Performance Competencies of Program Manager

- Defining
- Initiating
- Planning
- Executing
- Monitoring & Controlling
- Closing

## Personal Competencies of Program Manager

- Communicating
- Leading
- Building Relationship
- Negotiating
- Thinking Critically
- Facilitating

## 1.8 Role of the Program Sponsor

- Provides Valuable Guidance
- Support the Program
- Assist the Program Manager
- Individual or a group
- Provides Resources
- Securing Fund
- Enabling Success

## 1.9 Role of the Program Management Office

A program management office is a management structure that standardizes the program-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques. A program management office often also supports training and other organizational change management activities. Program management offices may be established within an individual program to provide support specific to that program, or independent of an individual program to provide support to one or more of an organization's programs.

When established as part of a program, a program management office is an important element of the program's infrastructure and an aid to the program manager. It may support the program manager with the management of multiple projects and program activities, for example, by:

- Defining standard program management processes and procedures that will be followed
- Providing centralized support for managing changes and tracking risks, issues, and decisions
- Providing training to ensure that standards and practices are well understood
- Supporting program communications
- Supporting program level change management activities
- Conducting program performance analyses
- Supporting management of the program schedule and budget
- Defining general quality standards for the program and its components
- Supporting effective resource management
- Providing support for reporting to leadership and program steering committees
- Supporting document and knowledge transfer

## Program Vs Project Management

Program and Project differences are: - Uncertainty, Change, Complexity & Success

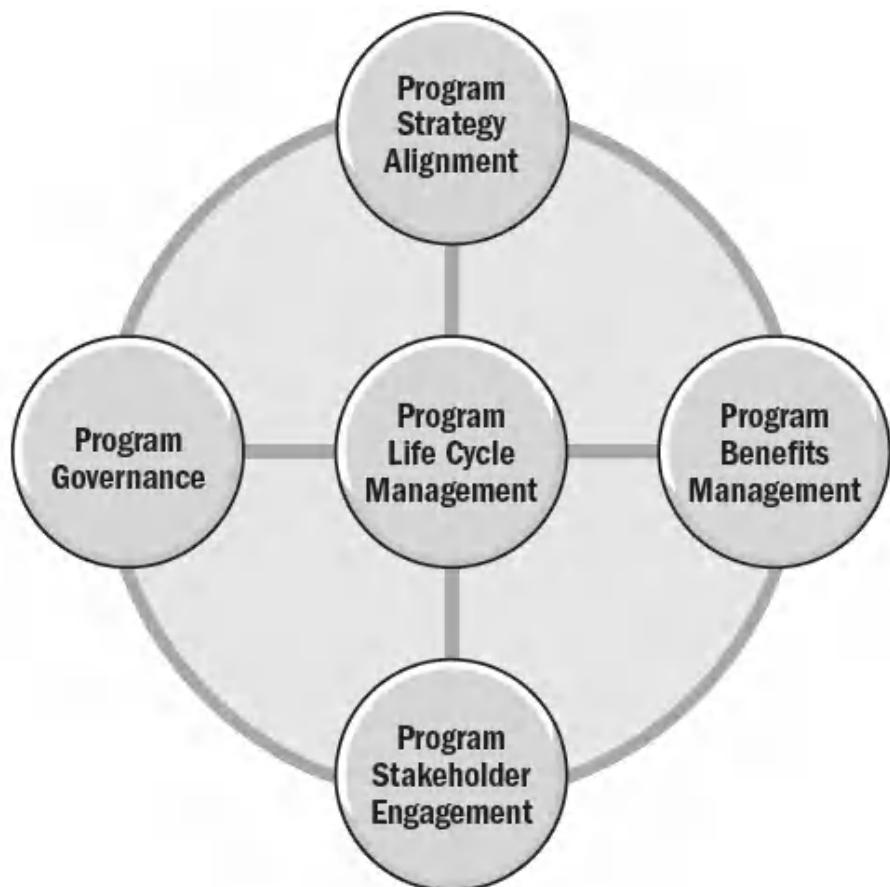


## 2. Program Management Performance Domains

### 2.1 Introduction to Program Management Performance domains

Program Management Performance domains are:

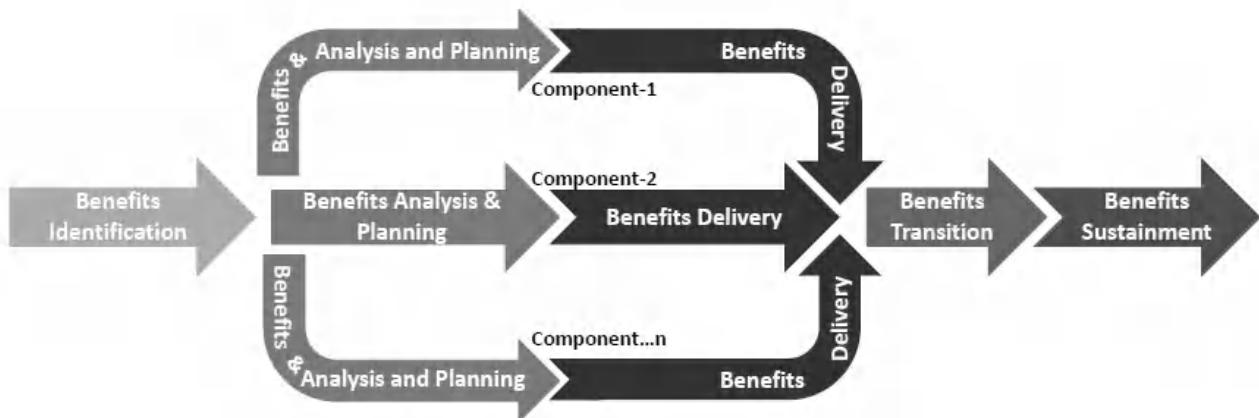
1. Program Life Cycle Management
2. Program Strategy Alignment
3. Program Benefits Management
4. Program Stakeholder Engagement
5. Program Governance



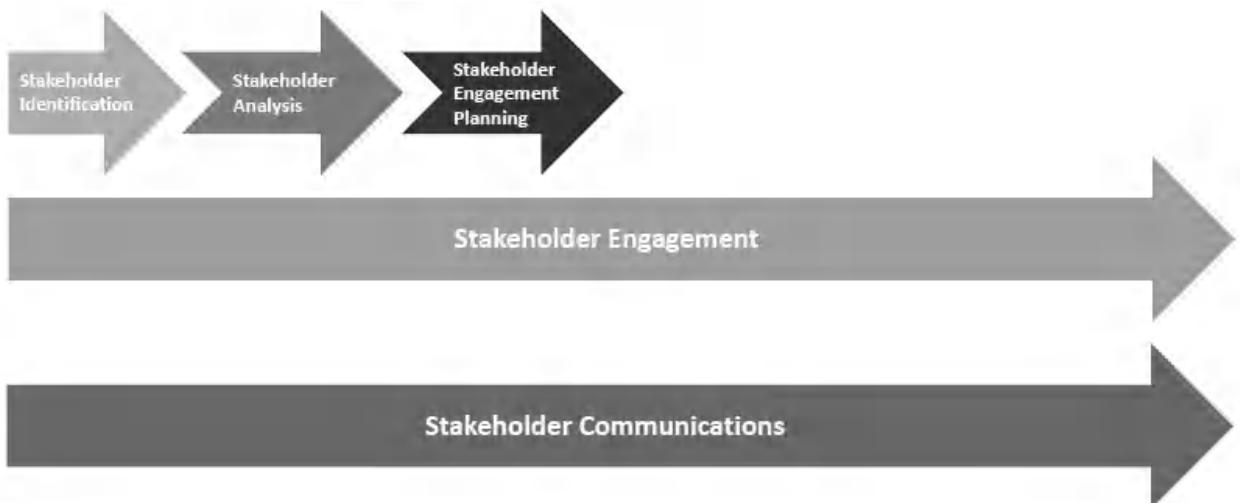
**Program Strategy Alignment:** Performance domain that identifies program outputs and outcomes to provide benefits aligned with the organization's goals and objectives. i.e., Identifying the opportunities and benefits to achieve the organization's strategic objectives through program implementation.



**Program Benefits Management:** Performance domain that defines, creates, maximizes, and delivers the benefits provided by the program. i.e., Defining, creating, maximizing, delivering and sustaining the benefits of the program.



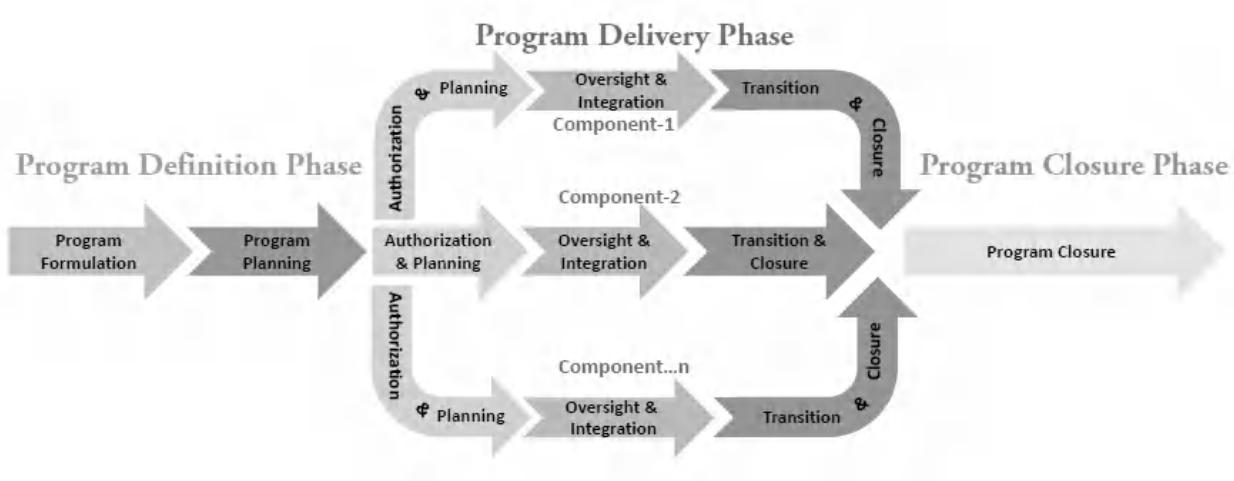
**Program Stakeholder Engagement:** Performance domain that identifies and analyzes stakeholder needs and manages expectations and communications to foster stakeholder support. i.e., Capturing and understanding stakeholder needs, desires and expectations and analyzing the impact of the program on stakeholders, gaining and maintaining stakeholder support, managing stakeholder communications, and mitigating stakeholder resistance.



**Program Governance:** Performance domain that enables and performs program decision making, establishes practices to support the program, and maintains program oversight. i.e., Establishing processes and procedures for maintaining program management oversight and decision-making support for applicable policies and practices throughout the program.

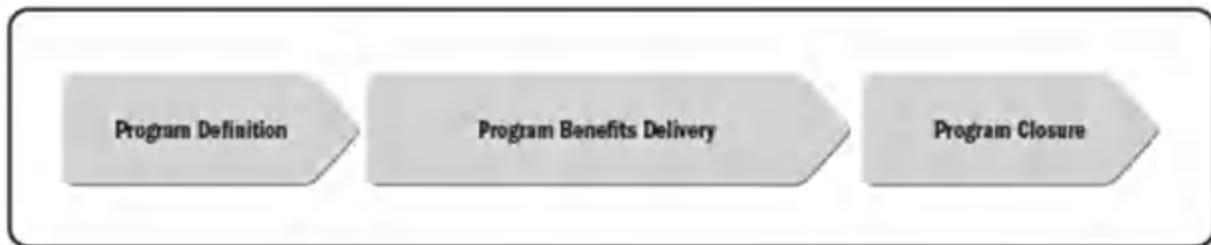


**Program Life Cycle Management:** Performance domain that manages program activities required to facilitate effective program definition, program delivery, and program closure. i.e., Managing all of the program activities related to program definitions, program benefits delivery and program closure.



## 2.2 Program Life Cycle Phases

Manage all of the program activities related to program definition, program benefits, and program closure.



In program life cycle phases, Individual subprograms, projects, and other work make up the program life cycle and are collectively referred to as program components

**Program Definition:** The activities typically occur as the result of an organization's plan to fulfil strategic objectives or achieve a desired state within an organization's portfolio. The primary purpose of the program definition phase is to progressively elaborate the

strategic objectives to be addressed by the program, define the expected program outcomes, and seek approval for the program

**Program Benefits Delivery:** Throughout this iterative phase, program components are planned, integrated, and managed to facilitate the delivery of the intended program benefits

**Program Closure:** The purpose of this phase is to execute a controlled closure of the program

When projects are considered temporary endeavors of relatively short duration, whereas programs often span considerably long durations – multiple years and, in some cases, decades. Regardless of duration, all programs follow a similar trajectory.

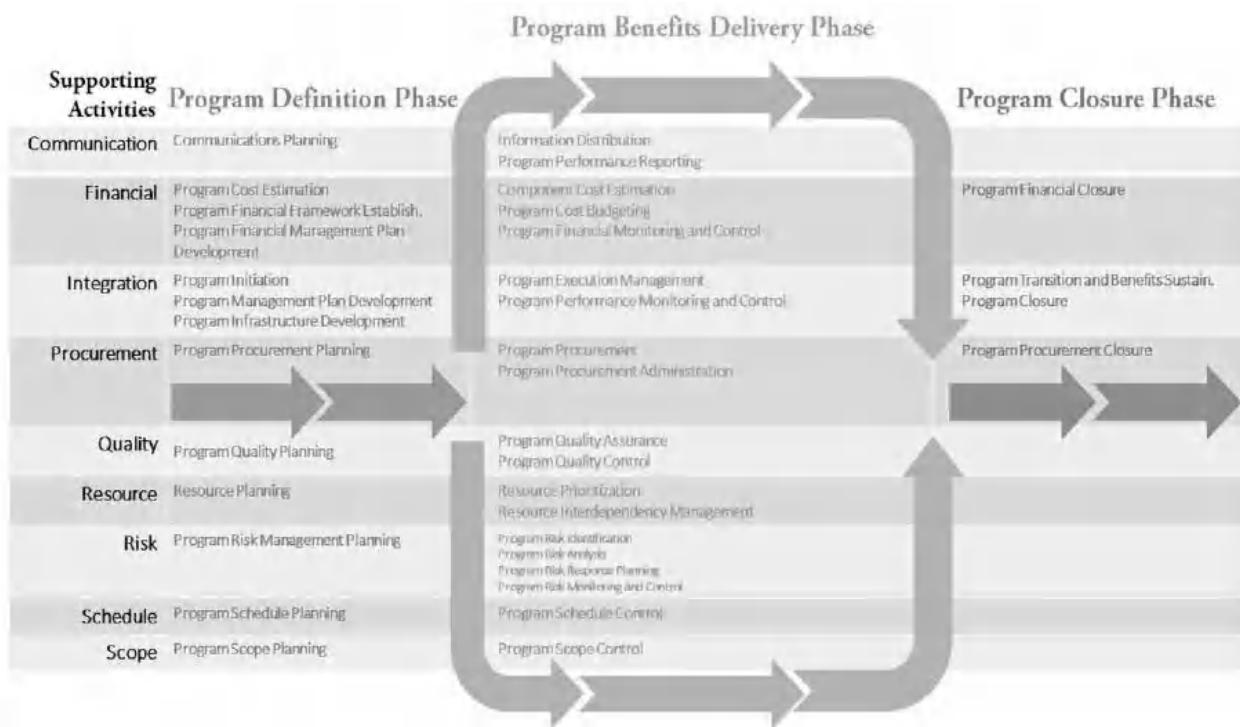
A Program is initiated and defined during program definition phase. It is implemented in the program benefits of delivery phase, where individual components(projects) are initiated, implemented, transitioned, and closed, while benefits are delivered, transitioned, and sustained. The program is transitioned and closed, or the work us transitioned to another program closure phase.

## 2.3 Program Activities

The collection of work undertaken in a program for the purpose of the overall program implementation is collectively known as activities. For example, project risk management activities focus on the individual component projects while program risk management incorporates project-level risk to address the overall risk to the program.



## 2.4 Program Management Supporting Process



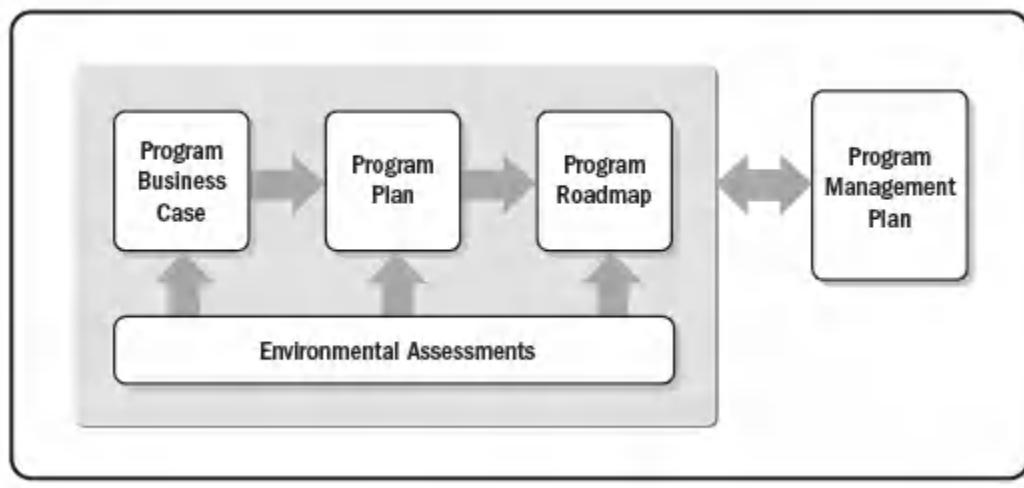
### 3. Program Strategy Alignment

Programs are designed to align with organizational strategy and ensure organizational benefits are realized. To accomplish this, program managers require strategic visioning and planning skills to align program goals with the long-term goals of the organization.

Project Managers lead and direct the work on their components, it is the program manager's responsibility to ensure alignment of the individual plans with the program goals and intended benefits in support of the achievement of the organization strategy.

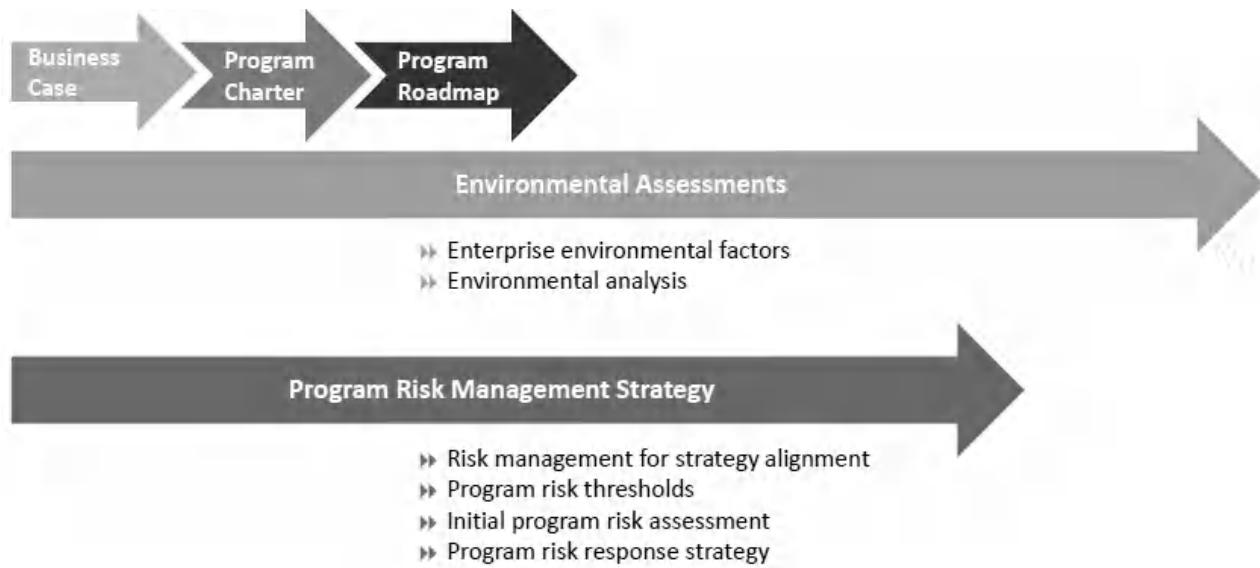
The relationship between the Program Management Plan and other strategy related documents are

- Program Business Case
- Program Charter
- Program Roadmap

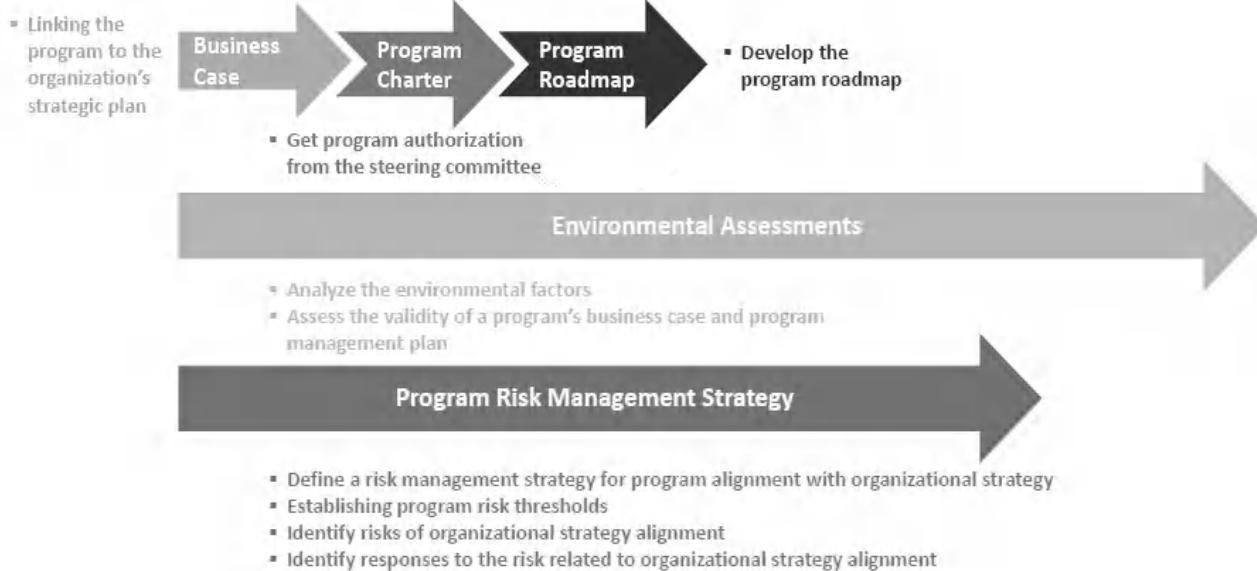


All of these elements become the basis for the development of a comprehensive program management plan that establishes the outline use to achieve the organization strategy and objectives through program implementation

### 3. Program Strategy Alignment Domain Elements



### Major Activities in Strategy Alignment



## Major Artifacts in Strategy Alignment



### 3.1 Artifacts - 1. Program Business Case

The Business case is developed to assess the program's balance between cost and benefit. The business case may be basic and high level or detailed and comprehensive. It includes key parameters used to assess the objectives and constraints for the intended program.

The business case may include the detail about:

- Problems or opportunities
- Business and operation impact
- Cost benefit / Alt. / Financial analysis
- Profits & Benefits
- Market demand
- Social need and env. influence
- Legal implication
- Risk and constraints
- Time to market
- Alignment with strategic objective

## 3.2 Artifacts - 2. Program Charter

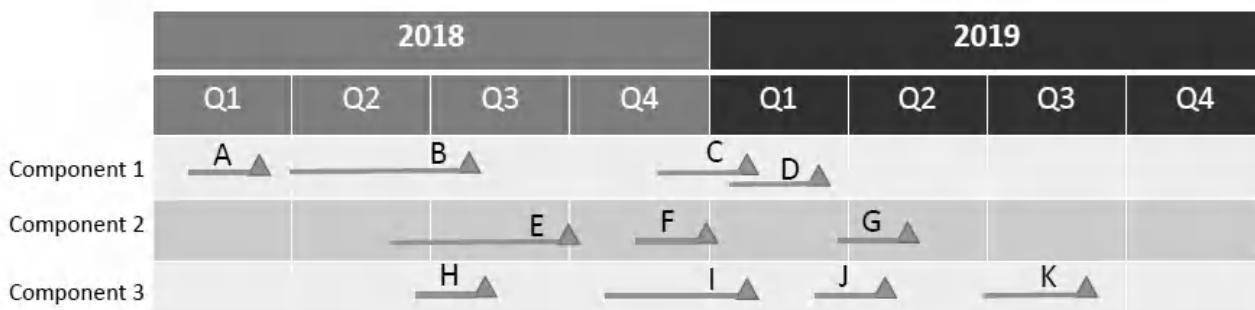
A Program Charter contains the following elements

- Program justification and vision
- Relationship strategic objectives
- Outcomes
- High level program scope
- Planned benefits
- Assumptions, constraints, risks and Issues
- Component structure
- Key milestones
- Cost and resource needs
- Key identified stakeholders
- Success factors

## 3.3 Artifacts - 3. Program Roadmap

A chronological representation of a programs intended direction

- Reflects the pace at which benefits are realized
- Shows the key dependencies
- Provides a high-level view



A: Requirements Completed  
B: Design Approved  
C: Successful Testing  
D: Deployment

E: Requirements Completed  
F: Design Approved  
G: Successful Testing

H: Requirements Completed  
I: Design Approved  
J: Successful Testing  
K: Go Live

## 3.4 Environmental Assessments

These are often influencing inside and outside of the program that have a significant impact on the program's ultimate success. Some of the influences from outside the program are internal to the larger organization, and some come from completely external sources.

### A. Enterprise Environmental Factors

The Enterprise Environmental Factors are:

- Business environment
- Market
- Funding
- Resources
- Industry
- Health, Safety & Environment
- Economy
- Cultural & Geographic Diversity
- Regulatory
- Legislative
- Growth
- Supply base
- Technology
- Risk

### B. Environmental Analysis

The Environmental Analysis that may be used to assess the validity of the business case and program plan. Consideration of the results from one or more environmental analyses enables the program manager to highlight factors that have potential for impacting the program.

The sample environment analysis is given below: -

#### (I) Comparative advantage analysis

When conducting comparative analysis against a strategic initiative and or business case, it is important to consider that competing efforts may reside within or external to the organization. A typical business case includes analysis and comparison against real or hypothetical alternative efforts. Where appropriate, this technique may also include

what-if analyses to illustrate how the program objectives and intended benefits could be achieved by other means

#### **(ii) Feasibility study**

Using the business case, organization goals, and other existing initiatives as a base, this process assesses the feasibility of the program within the organization's financial, sourcing, complexity, and constraint profile. This analysis contributes to the body of information that decision makers require to approve or deny the program proposal.

#### **(iii) SWOT analysis**

To analyze the strengths, weakness, opportunities, and threats (SWOT) of the endeavor provides information for developing the program charter and program plan

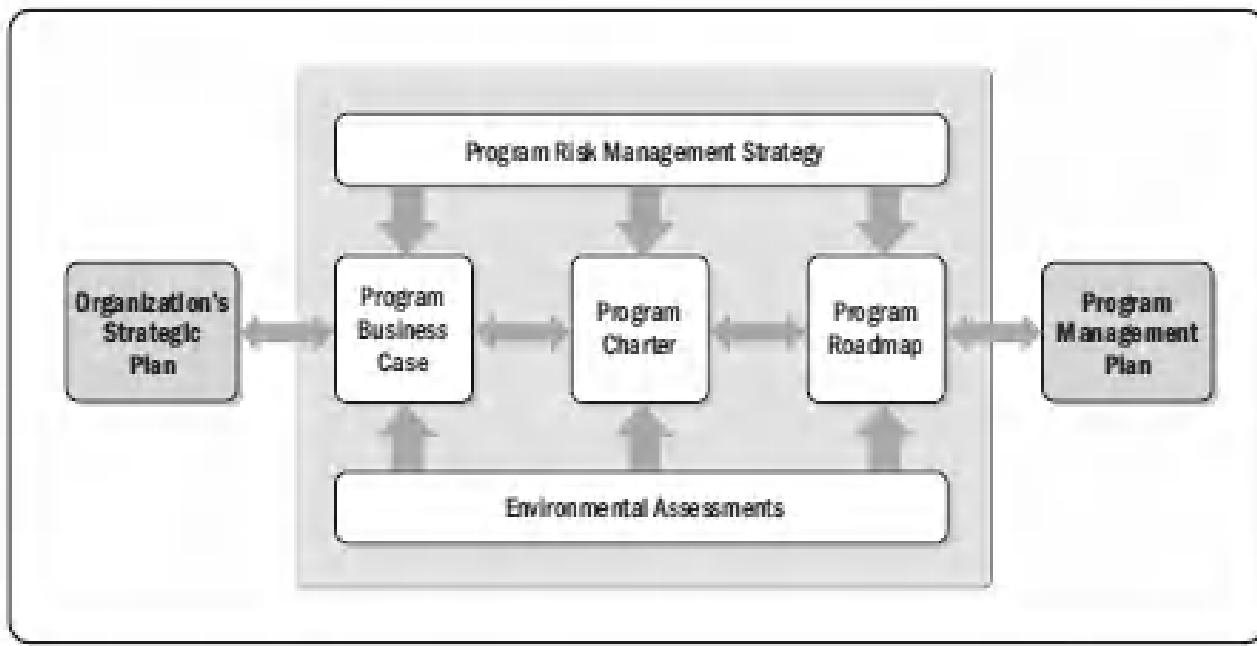
#### **(iv) Assumption's analysis**

Assumptions are factors that, for planning purposes, are considered true, real or certain. Assumptions affect all aspects of the program and are part of the progressive elaboration of the program.

#### **(v) Historical information analysis**

Previously completed programs may be a source of lessons learned and the best practices for new programs. Historical information includes all artifacts, metrics, risks, and estimations from previous programs, projects, and ongoing operations that may be relevant to the current program. Historical information describing the successes, failures, and lessons learned is particularly important during program definition.

## 3.5 Program Risk Management Strategy



### Risk Management for Strategy Alignment

Determining how risks will be communicated to strategic levels of the organization

### Program Risk Thresholds

Risk threshold is the measure of the degree of acceptable variation around a program objective that reflects the risk appetite of the organization and program stakeholders.

### Initial Program Risk Assessment

While program risk management is conducted throughout the life of the program, the initial program risk assessment, prepared during program definition, offers a unique opportunity to identify risks to organizational strategy alignment.

## **Program Risk Response Strategy**

Program risk response strategy combines the elements of the risk thresholds and the initial risk assessment into a plan for how program risks will be managed effectively and consistently throughout the life of the program. For each identified risk, the risk thresholds can be used to identify the specific response strategy based on a number of rating criteria.

As an example, for an organization that views 5 % schedule variance as acceptable: -

Risk threshold—5% schedule delay, Risk rating—no significant risk & Response strategy—accept.

## 4. Program Benefits Management

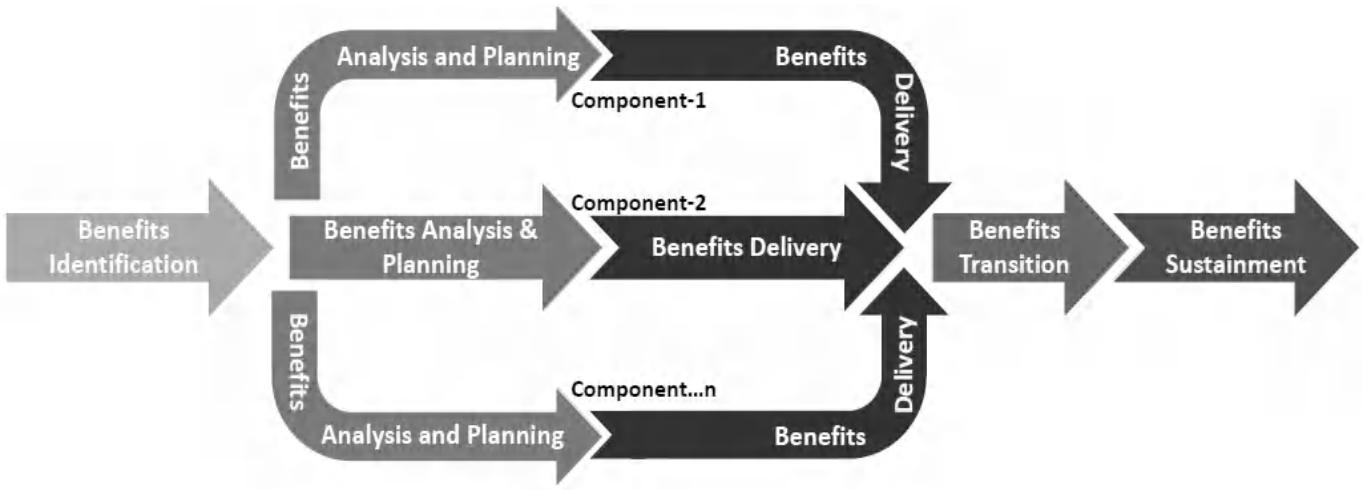
Program Benefits Management comprises a number of elements that are central to program success. Program Benefits Management includes processes to clarify the program's planned benefits and intended outcomes and includes processes for monitoring the program's ability to deliver against these benefits and outcomes.

The purpose of Program Benefits Management is to focus program stakeholders (program sponsors, program manager, project managers, program team, program steering committee, and others) on the outcomes and benefits to be provided by the various activities conducted during the program's duration.

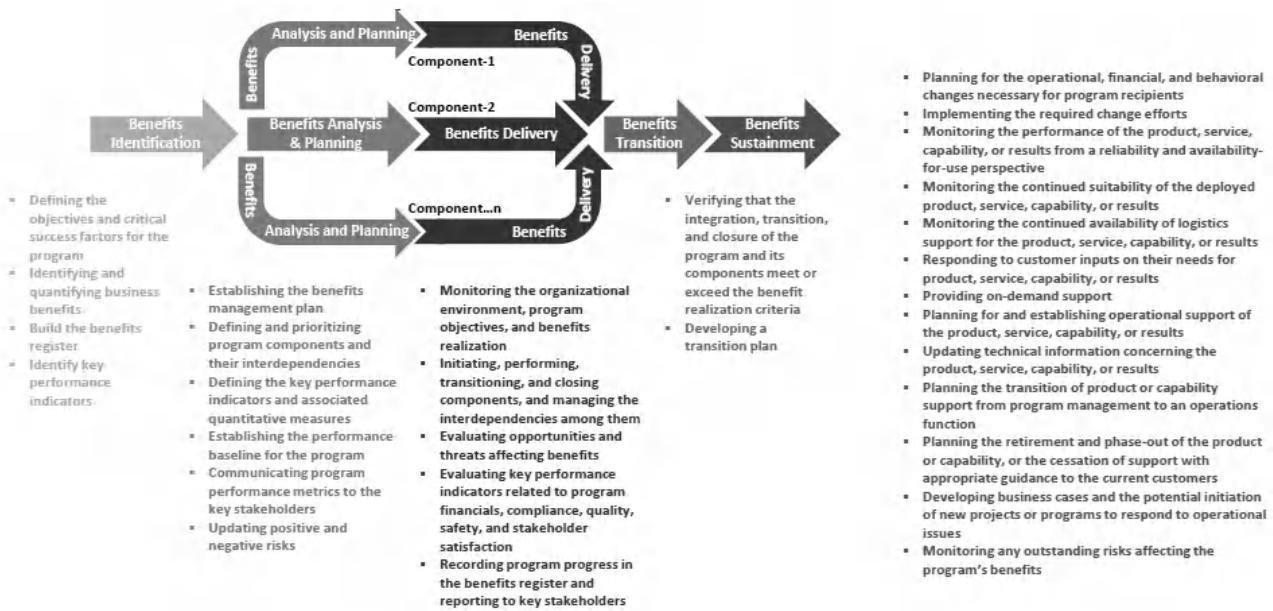
To do this, the program manager employs Program Benefits Management in order to continually: -

- Identify and assess the value and impact of program benefits,
- Monitor the interdependencies among the outputs being delivered by the various components within the program and how those outputs contribute overall to the program's benefits,
- Analyze the potential impact of planned program changes on the expected benefits and outcomes,
- Align the expected benefits with the organization's goals and objectives, and
- Assign responsibility and accountability for the realization of benefits provided by the program and ensure that the benefits can be sustained.

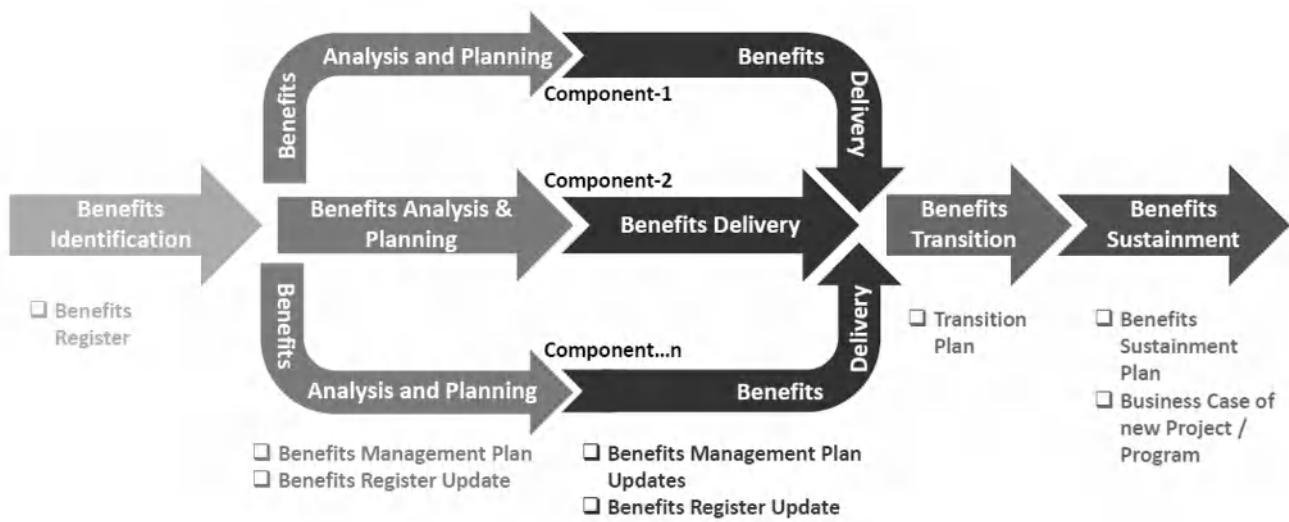
# Benefits Management Domain Phases



## Major Activities



# Major Artifacts



## 4.1. Benefits Identification

The purpose of the benefits identification phase is to analyze the available information about organizational and business strategies, internal and external influences, and program drivers to identify and qualify the benefits that program stakeholders expect to realize.

### Benefits Register

Benefits register includes: -

- List of planned benefits
- Mapping of the planned benefits to the program components
- Description of how each benefit will be measured
- Key performance indicators and thresholds
- Risk assessment and probability & Status or progress indicator
- Target dates and milestones for benefits achievement
- Person, group, or organization responsible for delivering each benefit
- Establishment of processes for measuring progress against the benefits plan

- Tracking and communications processes necessary to record program progress and report to stakeholders

## 2. Benefits Analysis & Planning

The purpose of the benefits analysis and planning phase is to establish the program benefits management plan and develop the benefits metrics and framework for monitoring and controlling both the components and the measurement of benefits within the program. Activities that make up benefits analysis and planning include: -

- Establishing the benefits management plan that will guide the work through the remainder of the program,
- Defining and prioritizing program components and their interdependencies,
- Defining the key performance indicators and associated quantitative measures required to effectively monitor the delivery of program benefits,
- Establishing the performance baseline for the program and communicating program performance metrics to the key stakeholders, and
- Updating positive and negative risks to benefits as more information becomes known

## Benefits Management Plan

Benefits management plan includes:

- Benefit definition and associated assumptions and determination of how each benefit will be achieved
- Linkage between components outputs and the planned program outcomes
- Metrics and procedures to measure benefits
- Roles and responsibilities required to manage the benefits
- How the resulting benefits and capabilities will be transitioned into an operational state

- How the resulting capabilities will be transitioned to the individuals, groups, or organizations
- Process for managing the overall benefits management effort

## Benefits Management & the Program Roadmap

Program benefits management establishes the program architecture that maps how the components will deliver the capabilities and outcomes that are intended to achieve the program benefits. The program roadmap defines the structure of the program components by identifying the relationships among the components and the rules that govern their inclusion. The program roadmap describes evolving aspects of the program including incremental benefits delivery.

## Benefits Register Update

The benefits register, initiated during benefits identification, is updated during benefits analysis and planning. At this time, program benefits are mapped to the program components based on the program roadmap. The benefits register is then reviewed with the appropriate stakeholders to define and approve key performance indicators and other measures that will be used to monitor program performance.

## 3. Benefits Delivery

The purpose of the benefits delivery phase is to ensure that the program delivers the expected benefits, as defined in the benefits management plan. As the program is implemented, risks affecting benefits may be realized, may need to be updated, or may become obsolete; additionally, new risks and updated ones should be included in the benefits register with the associated benefits. Activities that make up benefits delivery include: -

- Monitoring the organizational environment (including internal and external factors), program objectives, and benefits realization to ensure that the program remains aligned with the organization's strategic objectives;
- Initiating, performing, transitioning, and closing components, and managing the interdependencies among them;
- Evaluating opportunities and threats affecting benefits, including updating the benefits register for new opportunities and risks affecting benefits, and updating realized or obsolete risks affecting benefits;
- Evaluating key performance indicators related to program financials, compliance, quality, safety, and stakeholder satisfaction in order to monitor the delivery of benefits; and
- Recording program progress in the benefits register and reporting to key stakeholders as directed in the program communications management plan.

## Benefits and Program Components

Each component should be initiated at the appropriate time in the program and integrated to incorporate its output to the program as a whole. The initiation and closure of these components are significant milestones in the program roadmap and schedule. The milestones signal the achievement and delivery of incremental benefits.

## Benefits Management Plan & Benefits Register Update

Already discussed above, in case of any changes we have to update.

## 4. Benefits Transition

The purpose of the benefits transition phase is to ensure that program benefits are transitioned to operational areas and can be sustained once they are transferred. Value is delivered when the organization, community, or other program beneficiaries are able to utilize these benefits.

Activities that make up benefits transition include:

- Verifying that the integration, transition, and closure of the program and its components meet or exceed the benefit realization criteria established to achieve the program's strategic objectives; and
- Developing a transition plan to facilitate the ongoing realization of benefits when turned over to the impacted operational areas.
- Benefits transition ensures that the scope of the transition is defined, the stakeholders in the receiving organizations or functions are identified and participate in the planning, the program benefits are measured and sustainment plans are developed, and the transition is executed.

Benefits transition activities may include: -

- Evaluation of program and program component performance against applicable acceptance criteria, including
- key performance indicators;
- Review and evaluation of acceptance criteria applicable to delivered components or outputs;
- Review of operational and program process documentation;
- Review of training and maintenance materials (if they apply);
- Review of applicable contractual agreements;

- Assessment to determine if resulting changes have been successfully integrated;
- Activities related to improving acceptance of resulting changes (workshops, meetings, training, etc.);
- Transfer of risk(s) affecting the benefits transitioned to the receiving organization;
- Readiness assessment and approval by the receiving person, group, or organization; and
- Disposition of all related resources.

## Transition Plan

Transition plan include: -

- Checklists to review the organization readiness
- Plan to deploy the product, service, capability, or results
- Rollback plan
- Probable failure scenarios with contingency planning

## Transition Highlights

- Process and Procedure
- Resource Capabilities (training, coaching, secondment, hiring,)
- Internal Readiness
- External Readiness
- Contingency plans (Failure scenarios, Contingency, Rollback plan)
- Deployment

## **5. Benefits Sustainment**

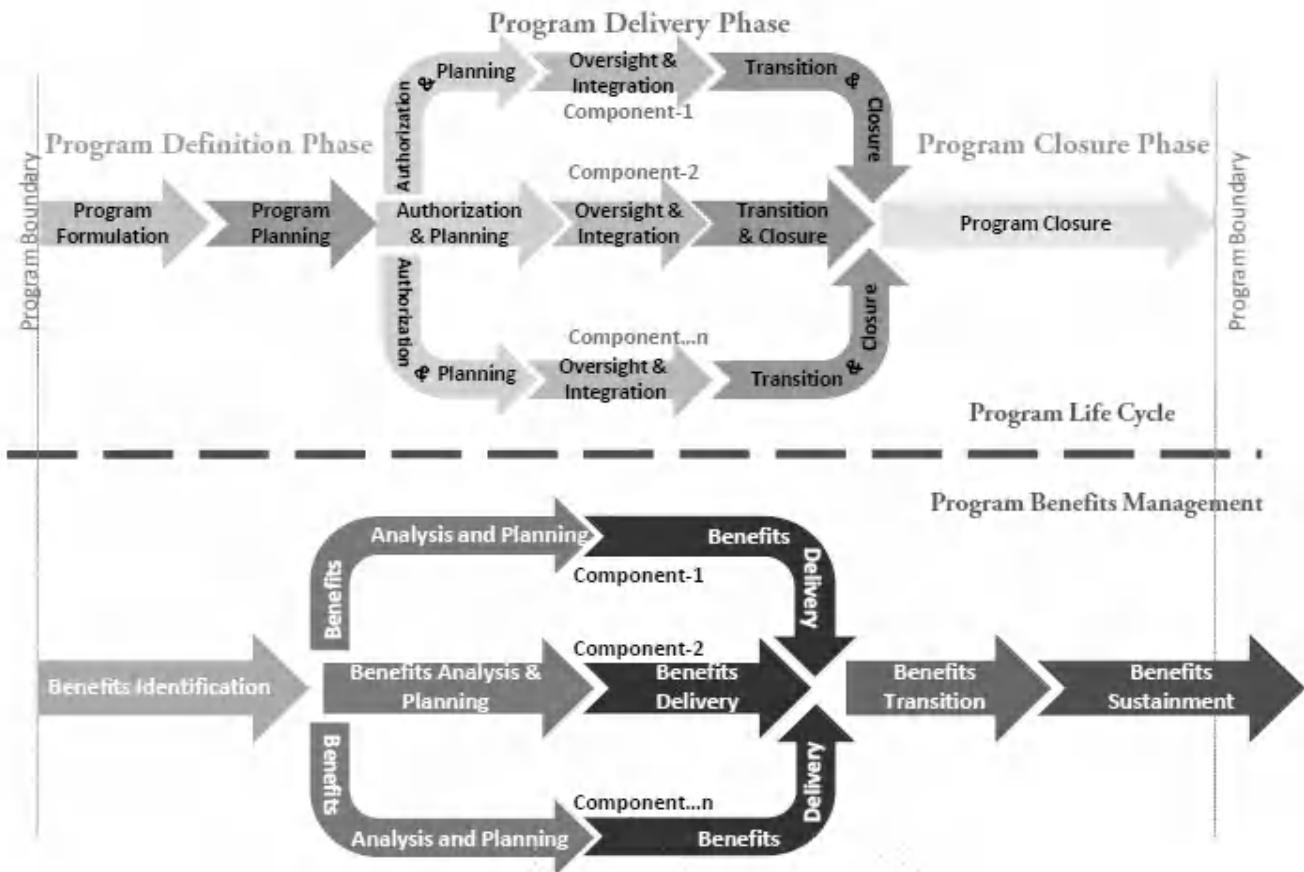
The purpose of the benefits sustainment phase is the ongoing maintenance activities performed beyond the end of the program by receiving organizations to ensure continued generation of the improvements and outcomes delivered by the program. As the program is closed, responsibility for sustaining the benefits provided by the program may pass to another organization or another program. Benefits may be sustained through operations, maintenance, new components, or other efforts. A benefits sustainment plan should be developed prior to program closure to identify the risks, processes, measures, metrics, and tools necessary to ensure the continued realization of the benefits delivered.

### **Benefits Sustainment Plan**

Benefits sustainment plan include: -

- Operational, financial, and behavioral changes necessary for program recipients to continue monitoring performance
- Metrics to measure the performance of the product, service, capability, or results from a reliability, availability for- use, and suitability perspectives
- Processes and procedures to operate for the product, service, capability, or results
- Processes to respond to operational issues with the deployed product, service, or capability, or results
- Process to monitor any outstanding risks affecting the program's benefits

## Benefits Management Relationship with Program Life Cycle



## 5. Program Stakeholder Engagement



### What is Program stakeholders Engagement?

Program Stakeholder Engagement is the performance domain that identifies and analyzes stakeholder needs and manages expectations and communications to foster stakeholder support.

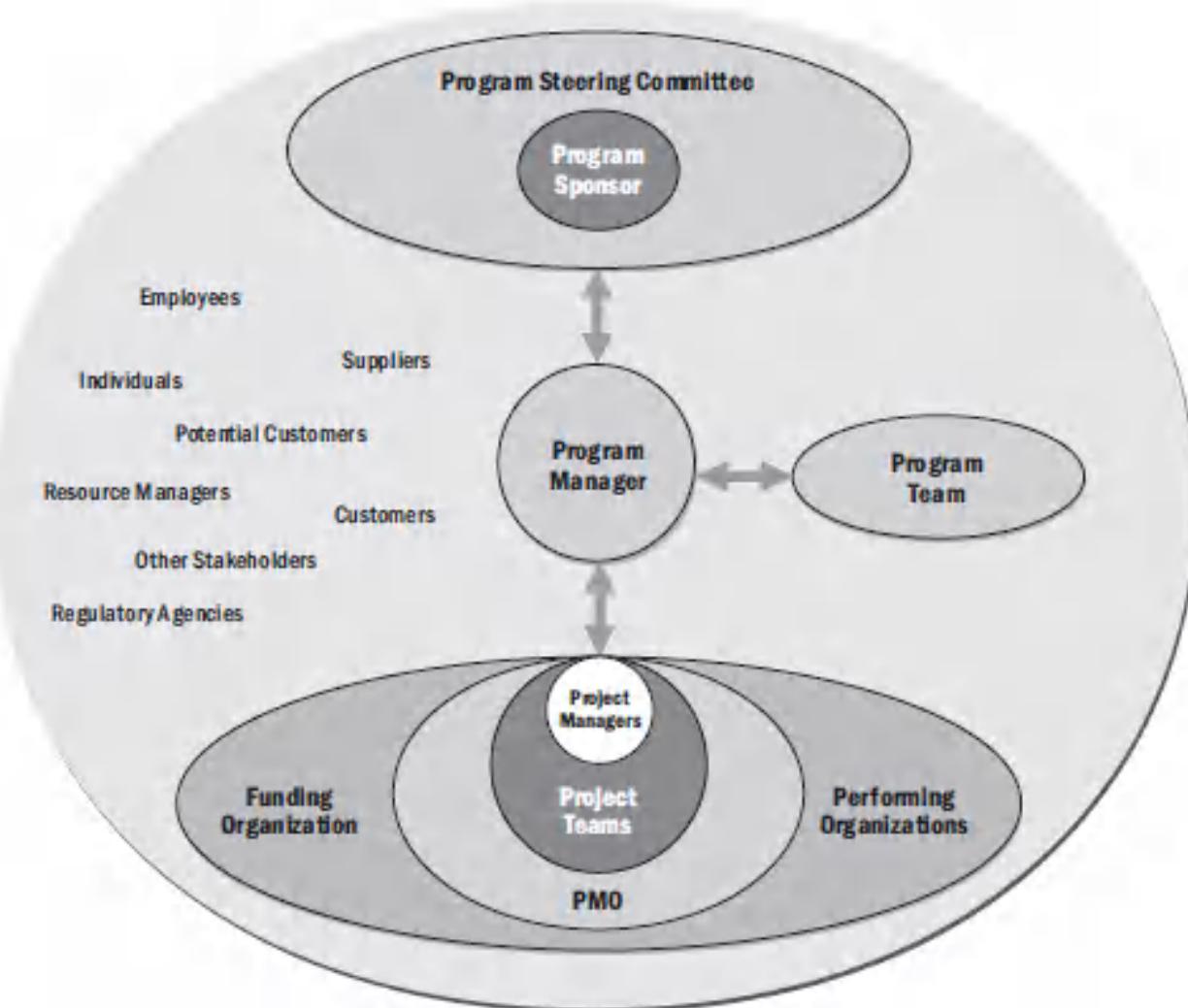
Activities includes: -

- Stakeholder Identification
- Stakeholder Analysis
- Stakeholder Engagement Planning
- Stakeholder Engagement
- Stakeholder Communications

## Who are all the stakeholders in your project?

A stakeholder is an individual, group, or organization that may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project, program, or portfolio.

Stakeholders may be internal or external to the program and may have a positive or negative impact on the outcome of the program. Program and project managers need to be aware of the stakeholders' impact and level of influence to understand and address the changing environments of programs and projects.



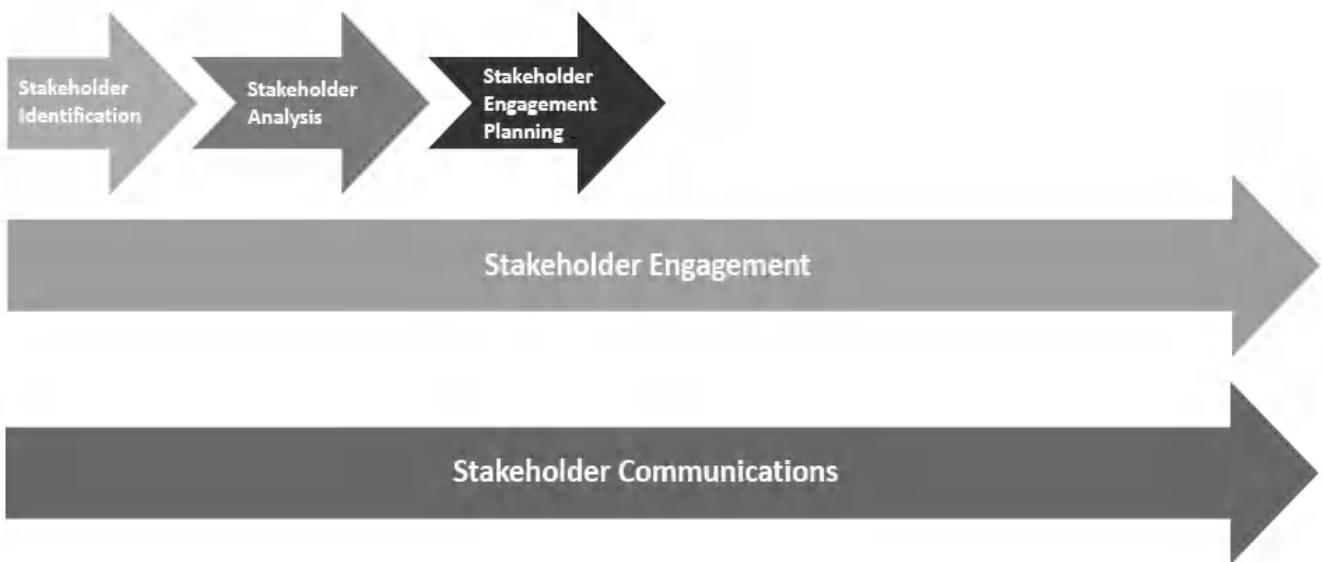
### **Internal stakeholders Examples:**

- Program Sponsor
- Program Manager
- Program team
- Steering Committee
- Contracting department team (if the program or its component has vendors involved)
- Business departments (operation, sales, and others, depend on the program scope)
- Information Technology (IT) department
- HR department (for instances, if new recruitment is required, or performance evaluation is different for the program team)
- Other concerned departments (depends on the program scope)

### **External stakeholders Examples:**

- Customers & Vendors & Recruitment Agents
- Standard Authority (based on the program industry)
- Environment Activists (depends on the program scope)
- May be the Public (depends on the program scope)

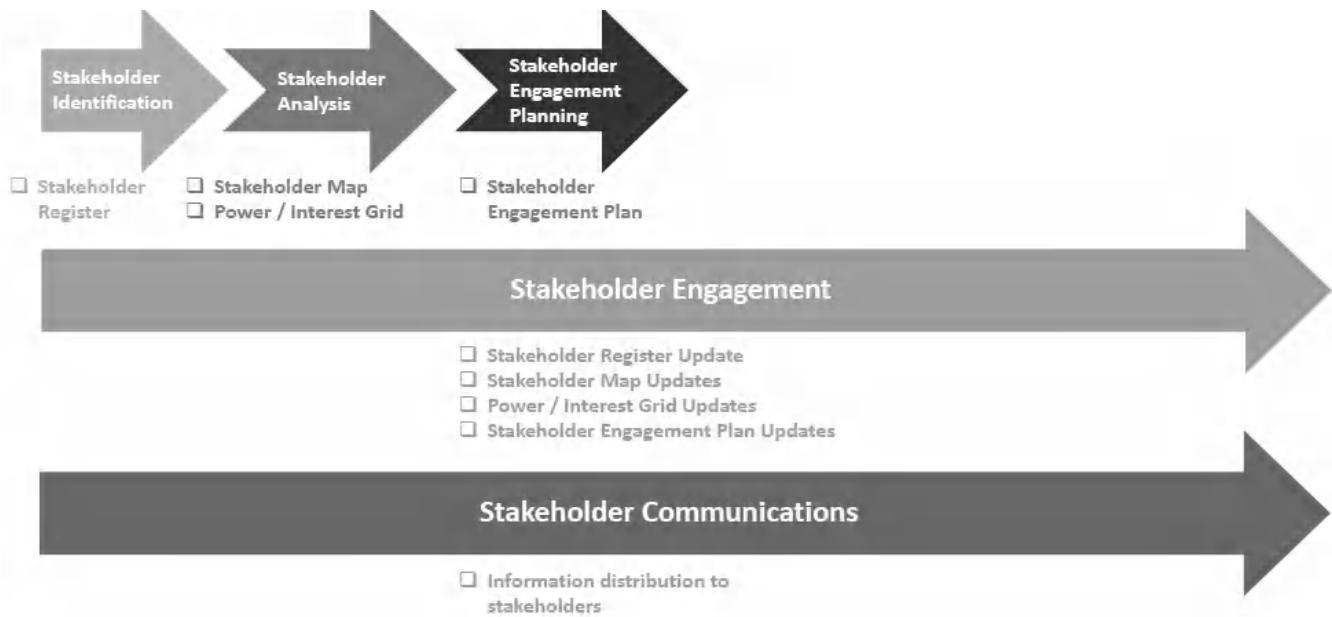
## Stakeholder Engagement Domain



## Stakeholder Major Activities



## Stakeholder Major Artifacts



### 5.1 Stakeholder Identification

Program stakeholder identification aims to systematically identify all key stakeholders (or stakeholder groups) in the stakeholder register.

Name	Organizational Position	Program Role	Support Level	Influence	Communication	Other Characteristics
Stakeholder 1	Director	Supplier	Neutral	Low	Email monthly	Interests
Stakeholder 2	Customer	Recipient	Supportive	Medium	Conference weekly	Needs
Stakeholder 3	Sr. Vice President	Sponsor	Leading	High	Status report quarterly	Status—engaged

**Stakeholder Identification is an iterative process and the stakeholder register should be updated regularly.**

## **Stakeholder Identification Methods**

- Brainstorming
- Focus Groups
- Historical Information
- Expert Judgement
- Interviews
- Surveys & Questionaries
- Stakeholder Register

## **Stakeholder Register**

The Stakeholder Register includes:

- Stakeholder name, contact
- Stakeholder role
- Relationship to the program
- Ability to influence the program outcome
- Degree of support to the program
- Stakeholder required reporting level

## **5.2 Stakeholder Analysis**

Program Stakeholder analysis aims to categorize all listed stakeholder, and highlight differences in their needs, expectations, or influence in order to better understand the organizational culture, politics, and concerns relate to the program, as well as the overall impact of the program.

## Methods

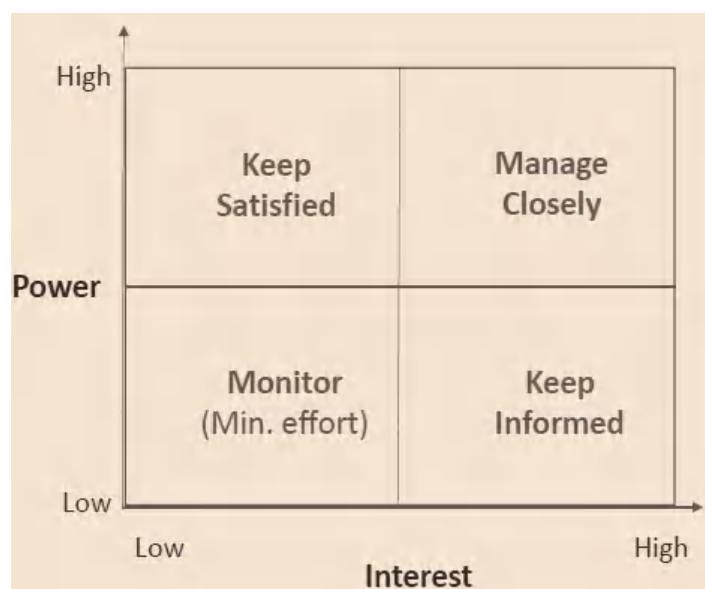
- Focus Groups
- Individual Interviews
- Historical Information
- Questionaries & Surveys

## Stakeholder Map

- Used in the complex programs
- Identify the need for interactions with stakeholders
- Potential partnerships among stakeholders
- Used to remind teams of which stakeholders need to be engaged

## Power / Interest Grid

- Low interest and low power
- High interest and low power
- Low interest and high power
- High interest and high power



## 5.3 Stakeholder Engagement Planning

The stakeholder engagement planning activity outlines how all program stakeholders will be engaged throughout the duration of the program. The stakeholder register and stakeholder map are analyzed with consideration of the organization's strategic plan, the program charter, and program business case to understand the environment in which the program will operate.

As part of the stakeholder analysis and engagement planning, the following aspects for each stakeholder are taken into consideration: -

- Organizational culture and acceptance of change,
- Attitudes about the program and its sponsors,
- Relevant phase(s) applicable to stakeholder's specific engagement,
- Expectation of program benefits delivery,
- Degree of support or opposition to the program benefits, and
- Ability to influence the outcome of the program

## Stakeholder Engagement Plan

The Stakeholder Engagement Plan includes:

- Detailed strategy for effective stakeholder engagement, based on current situation.
- Stakeholder engagement guidelines
- Insight on how the stakeholders is engaged in various components of the program
- The metrics used to measure the performance of stakeholder engagement activities

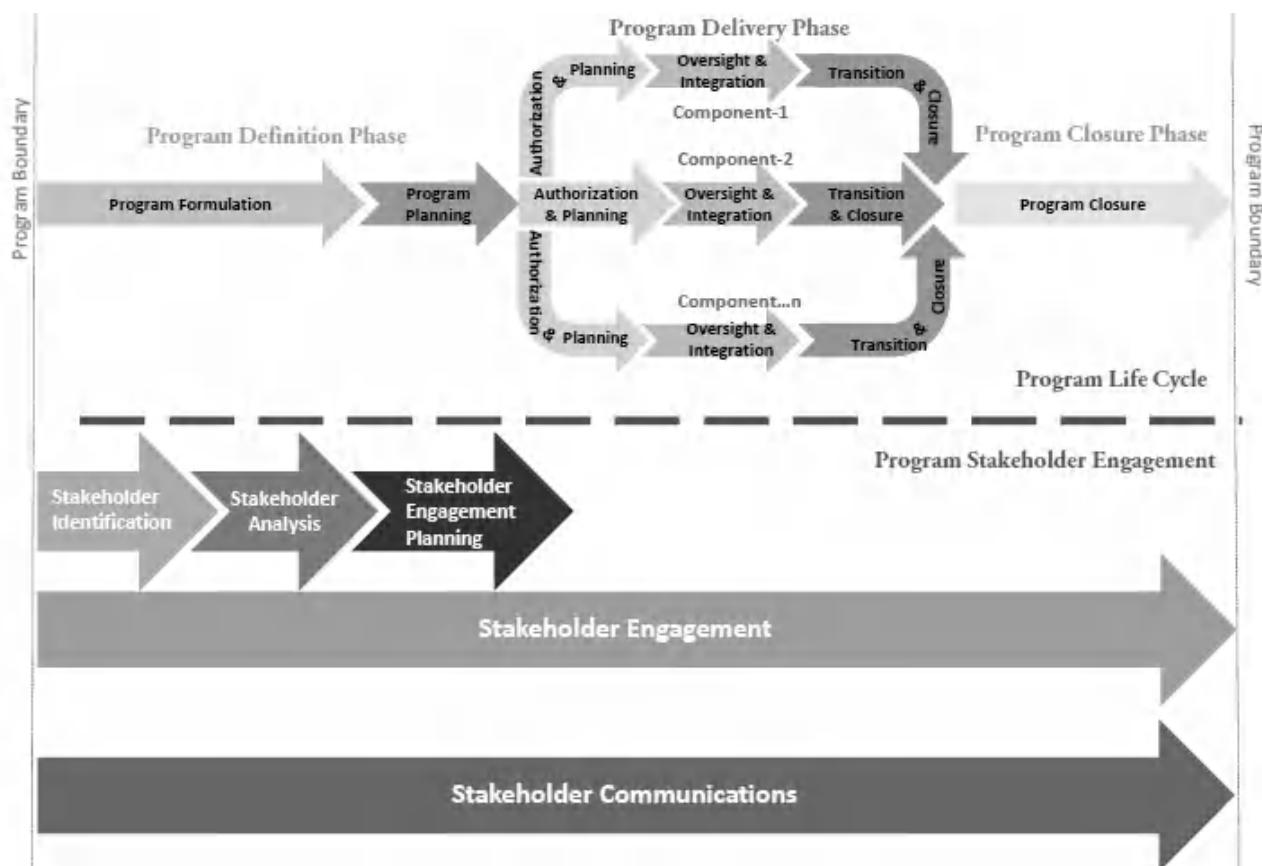
## 5.4 Stakeholder Engagement

- Ensure all stakeholders are adequately and appropriately engaged
- Identify stakeholders, mapping their interests, and planning for stakeholder engagement
- Identify potential risks caused by lack of participation from stakeholders
- Document, prioritize, and track stakeholder issues

## 5.5 Stakeholder Communications

- Distribute the program information to the stakeholder
- Ensure all communications with the stakeholders are logged

## Stakeholder Engagement Relationship with Program Life Cycle



## Stakeholder Discussions

### How would you manage Stakeholders?

- Understand their success criteria
- Provide Weekly Status Reports
- Establish Weekly team meetings and executive steering committees
- Define clear roles and responsibilities

### What are the key components of successful project?

- Balancing scope, schedule and cost
- Understanding success measures of the client
- Ensuring Quality
- Tracking risks and issues

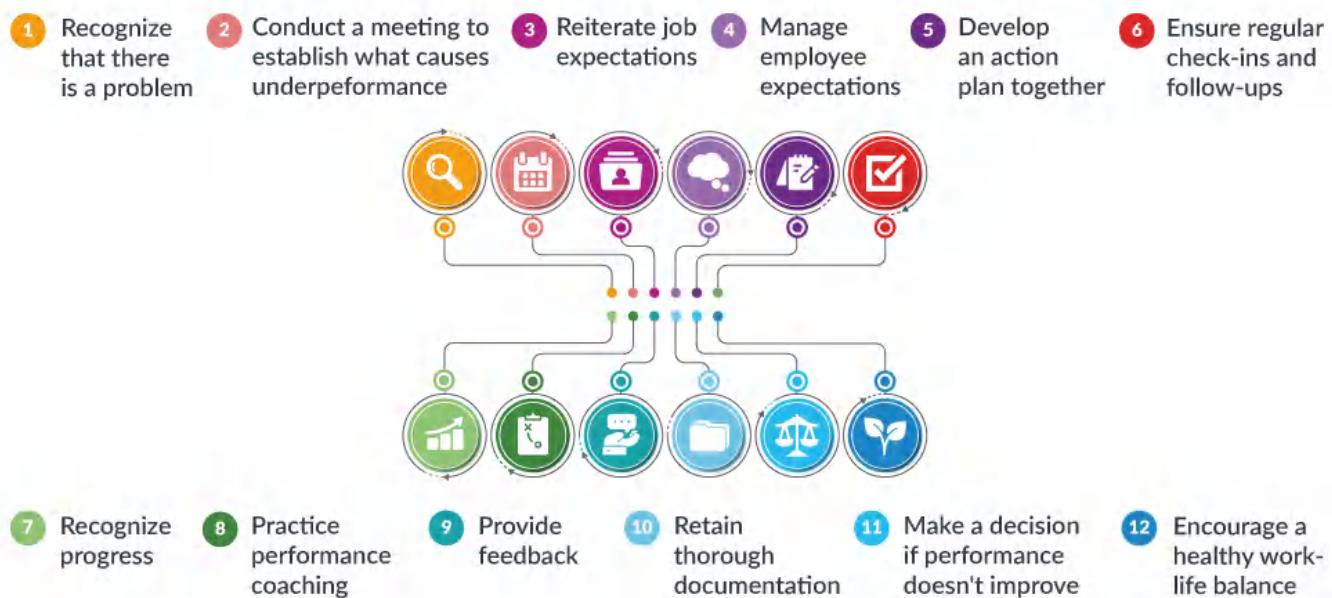
### How do you measure project success?

- By validating that my sponsor is satisfied based on the fact that we have met all of the project requirements
- By being able to measure that the project has satisfied all the Key Performance Indicator
- By having all the major stakeholders satisfied that we have met our goals
- By conducting the post project lessons learned to make sure that no anomalies show up there
- By make sure that all the project deliverables are available in online

## Can you successfully deal with underperforming employees?

I will find-out the root cause for the underperformance, try to find if the reasons for underperformance is under my control if so I will handle it heads-on. If not take the necessary steps by involving HR representative of that business unit.

Taking the following steps can help you address workplace underperformance:



1. Recognize that there is a problem
2. Conduct a meeting and ask questions to establish what causes the employee to underperform
3. Reiterate job expectations
4. Manage employee expectations
5. Develop an action plan together
6. Ensure regular check-ins and follow-ups
7. Recognize progress
8. Practice performance coaching
9. Provide feedback
10. Retain thorough documentation

11. Make a decision if performance doesn't improve - Reassignment | Move out
12. Encourage a healthy work-life balance

Although dealing with underperformance can be a time-consuming process, most underperforming employees will embrace a collaborative effort that coaches them to do their job better.

## What traits does a good employee need to succeed?

The top qualities for the best employees are: -

1. Confident. Confident employees make their employer feel confident. ...
2. Sportive Team player
3. Reliable
4. Prepared
5. Organized
6. Good communicator
7. Self-disciplined
8. Flexible
9. Socially intelligent
10. Passionate. Passion, ambition, drive. ...

**Tell me about a time when you had to make a tough business decision that supported your company's purpose, but may have had a negative, short-term financial impact?**

### **People | Technology | Client**

In my recent project, there was a DR setup that I had to implement for a client. The architects of the client suggested go active-active (i.e., deployed in two regions).

With scalable up-to 100% on each zone but I put my foot down and had several tough conversations from architects to the project management to the senior executives of the client and to my internal technical team and management.

My suggestion was to go active- active across three zones. This was slightly on the expensive side. Slightly 15% expensive than the original active-active solution proposed by the client.

Finally, I was able to convince them though the client took a hit financially in the short term. There was a major outage on AWS cloud, which made both the originally proposed zones unavailable.

As we implemented the solutions across three zones, we were able to move all traffic to the third zone and avoided a major muti hour outage to the client. Thus, saving few million dollars on the SLA penalties.

**If you could work on solving any problem in the world, what one problem would it be?**

I would want to solve the last mile connectivity issues in India.

## **How do you motivate your employees in tough times?**

To motivate Employees In Difficult | Tough Times: -

1. Give Them Vision. ...
2. Don't Hide The Target. ...
3. Provide Regular Feedback. ...
4. Make Employees Part Of The Solution. ...
5. Focus On People Development. ...
6. Communicate! ...
7. Don't Overlook The Power Of Praise. ...
8. Build Fun
9. Be Positive

## **How do you delegate an important assignment to others while ensuring that it will be completed successfully?**

To Delegate Tasks Effectively:-

1. Choose the right person for the job. ...
2. Explain why you're delegating. ...
3. Provide the right instructions. ...
4. Provide resources and training. ...
5. Delegate responsibility \*and\* authority. ...
6. Check the work and provide feedback. ...

## **How would you go about delivering bad news or a decision that will not be popular?**

When it's time to deliver bad news to employees, follow these steps to ensure you're prepared and confident:

1. Research and prepare
2. Practice
3. Avoid small talk
4. Use direct language
5. Provide context
6. Give time for a response
7. Establish next steps

## **When you enter a new workplace with new employees, how would you go about gaining rapport with them?**

To Build Rapport with New Colleagues: -

1. Establish a Common Ground. The first step to building a connection with your new colleagues is identifying common ground. ...
2. Practice Courtesy and Listen to Your Colleagues. ...
3. Be Authentic about Yourself. ...
4. Spend Time with Your New Colleagues. ...
5. Embrace Teamwork and Offer Help

## **Describe how you would manage your work week?**

1. Plan Out Your Week Ahead of Time. Laying out a long term schedule for yourself at the beginning of each work week can help you visually see what tasks lay ahead of you. ...
2. Schedule Tomorrow Today. ...
3. Consider the Times of Day You Work Best. ...
4. Find Tools That Work for You.

## **How to handle different personalities at work?**

To effectively engage with different personality types in the workplace:-

1. Know what the differences are and avoid negative labelling. ...
2. Recognize cultural differences. ...
3. See people objectively, not personally. ...
4. Embrace difference: ask questions. ...
5. Look for the common agenda or goal. ...
6. Respect yourself and pick your battles.

## **How would you handle a decision that you made that did not have the affect that you were expecting to achieve?**

By doing the root cause analysis, it will help to identify the issues and do course correction at frequent intervals.

## **How would you go about disagreeing with your supervisor about a decision that you know is not the right one?**

Tell Me About a Time You Disagreed With Your Boss

1. Choose the right story. ...
2. Admit that you disagreed with your boss. ...
3. Explain what your responsibility was. ...
4. Explain the conflict. ...
5. Explain what action you took to resolve the issue. ...
6. Explain how or why it didn't happen again.

## **You are at a point with an employee that it is best to have them leave the organization. How would you go about the conversation?**

### **General Procedures**

- Creating your employee resignation checklist in the Project Account as well as in the org. portal
- Inform HR that the employee is resigning
- Make plans for the employee to finalize or transition projects to the other team members
- Distribute employee's work and responsibilities to current employees until a replacement can be found
- Request open headcount to replace the departing employee asap

## 5 Ways to Stop a Valued Employee from Quitting

- Talk It Out
- Show Appreciation
- Offer Support
- Put Career Goals in Reach
- Invest in Employee Retention

### Situation to explain the Non-Billable Position to employees

I am very sorry to say that your positions is eliminated and I would not be able to accommodate you in other projects as well. The main reason for this client has reduced their headcount, so I forced to take the decisions.

## 6. Program Governance

Program Governance is the performance domain that enables and performs program decision making, establishes practices to support the program, and maintains program oversight. It includes:

- Program Governance Practices
- Program Governance Roles
- Program Governance Design and Implementation

Program Governance comprises the framework, functions, and processes by which a program is monitored, managed, and supported in order to meet organizational strategic and operational goals.

Management plans, builds, runs and monitors activities in alignment with the direction set by the governance body to achieve the enterprise objectives.

**Effective program governance supports the success of a program by: -**

- Ensuring that the goals of the program remain aligned with the strategic vision, operational capabilities, and resource commitments of the sponsoring organization. Compliance with the reporting and controlling processes required to support this alignment is enforced by the Program Governance domain;
- Approving, endorsing, and initiating the program and securing funding from the sponsoring organization;
- Establishing clear, well-understood agreements as to how the sponsoring organization will oversee the program, and conversely, the degree of autonomy that the program will be given in the pursuit of its goals;

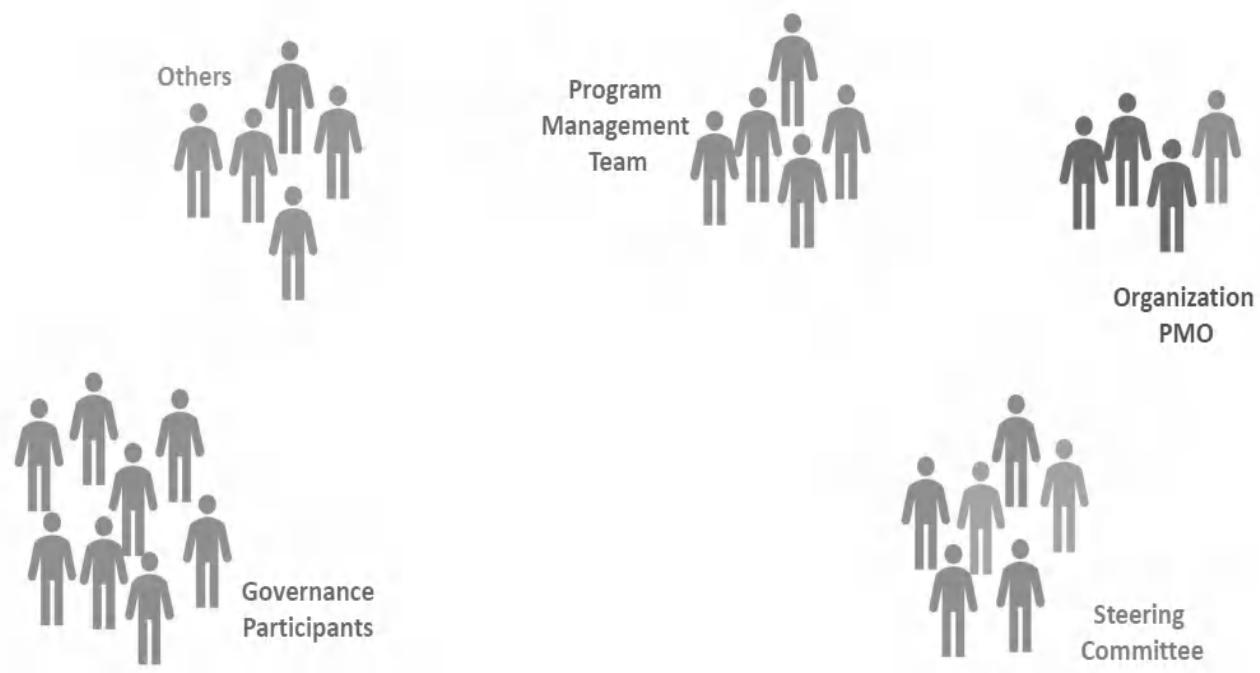
- Facilitating the engagement of program stakeholders by establishing clear expectations for each program's interactions with key governing stakeholders throughout the program;
- Creating an environment for communicating and addressing program risks and uncertainties to the organization, as well as opportunities and issues that arise during the course of program performance;
- Providing a framework that is aligned with portfolio and corporate governance policies and processes for assessing and ensuring the program is compliant. Each program may need to create a particular governance process or procedure, but it should be aligned with the organization's governance principles;
- Designing and authorizing the assurance process and, when required, executing reviews and health checks of the program progress in delivering its expected benefits. Various review types are used, including phase-gate reviews, other decision point reviews, and periodic health checks;
- Enabling the organization to assess the viability of the organization's strategic plan and the level of support required to achieve it;
- Selecting, endorsing, and enabling the pursuit of program components, including projects, subsidiary programs, and other program activities;
- Making decisions to transition between phases, terminate, or close the program.

## Program Governance Domain Elements



- Program Governance Practices
- Program Governance Plan
- Program Governance and Vision and Goals
- Program Approval, Endorsement, and Definition
- Program Success Criteria
- Program Monitoring, Reporting, and Controlling
- Program Risk and Issue Governance
- Program Quality Governance
- Program Change Governance
- Program Governance Reviews
- Program Periodic Health Checks
- Program Component Initiation and Transition
- Program Closure

# Program Governance Participants



## Major Activities



## Major Artifacts



### 6.1 Program Governance Practices

#### Program Governance Plan

The program governance plan include:

- Roles and Responsibilities of the main program organization chart Regular Governance meetings schedule
- List of governance key dependencies, assumptions, and constraints
- List of the methods and metrics
- Description of how information on the components will be collected, consolidated, and reported
- List of the stakeholders who should be engaged and communicated with
- Identification of the areas where governance-related support is needed
- The intended design and implementation of practices

## Success Criteria

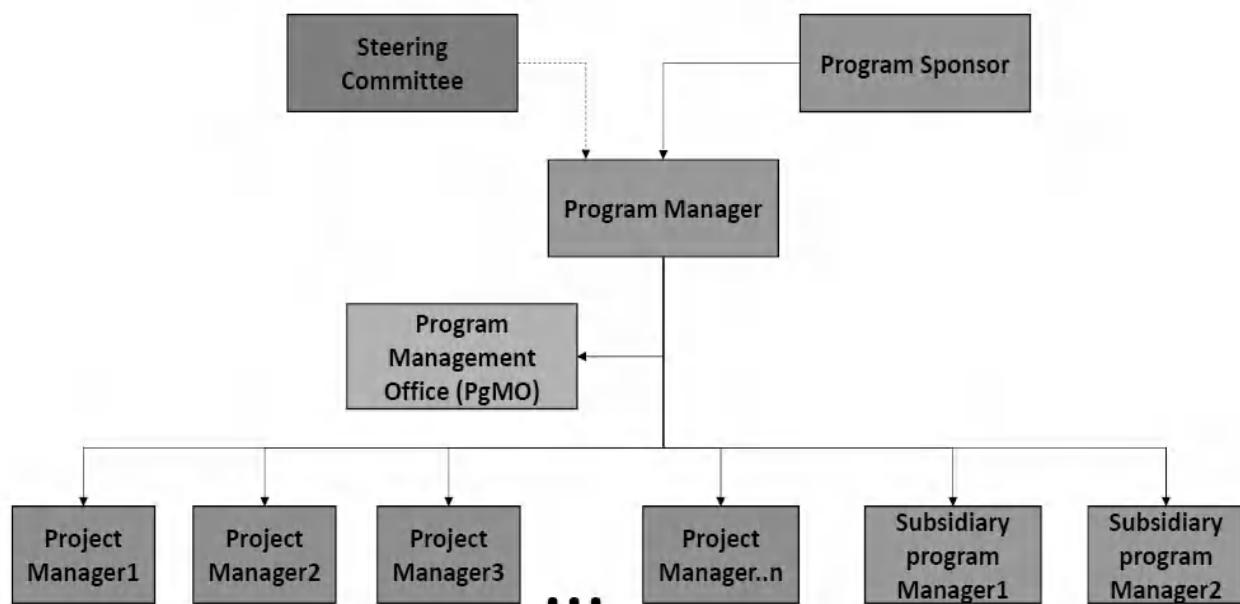
Minimum acceptable criteria for a successful program

Describe the definition of success

Were initially defined in the business case

Reinforce the program alignment to deliver the maximum attainable benefits

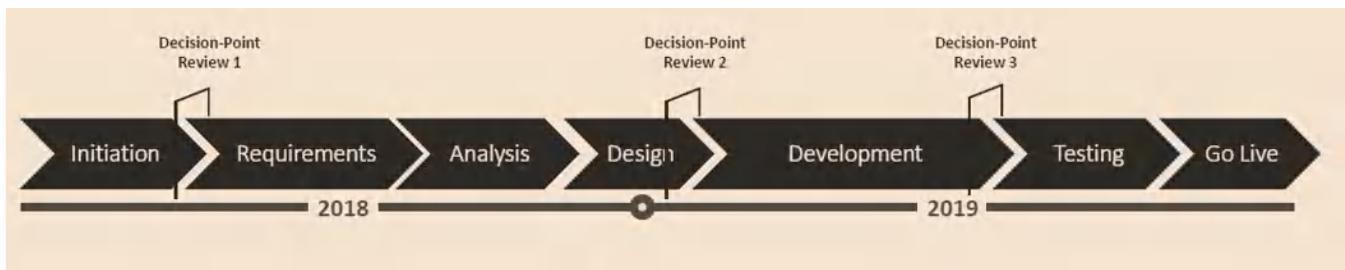
## Program Roles and Responsibilities



## Review, Health-Check, and Audit

- Program Review (Decision-point Review)
- Periodic Health Check
- Audit Types:
  - First Party
  - Second Party
  - Third Party

## Review, Health-Check, and Audit



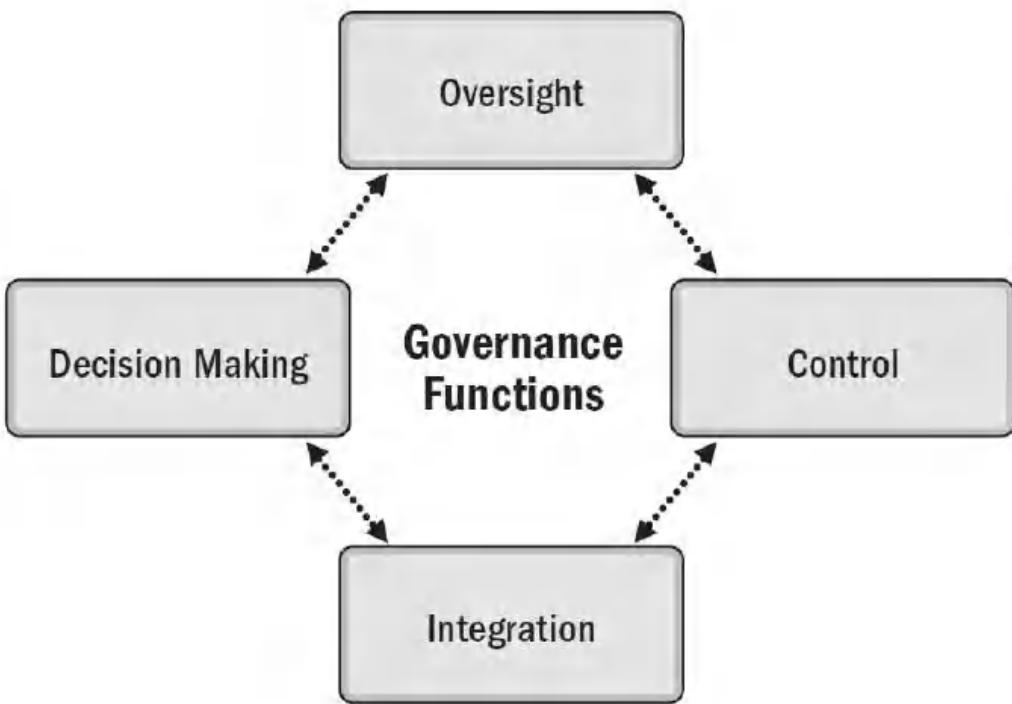
## 6.2 Governance

The program governance is the framework, functions, and processes that guide program management activities in order to deliver benefits to meet organizational strategic and operational goals.

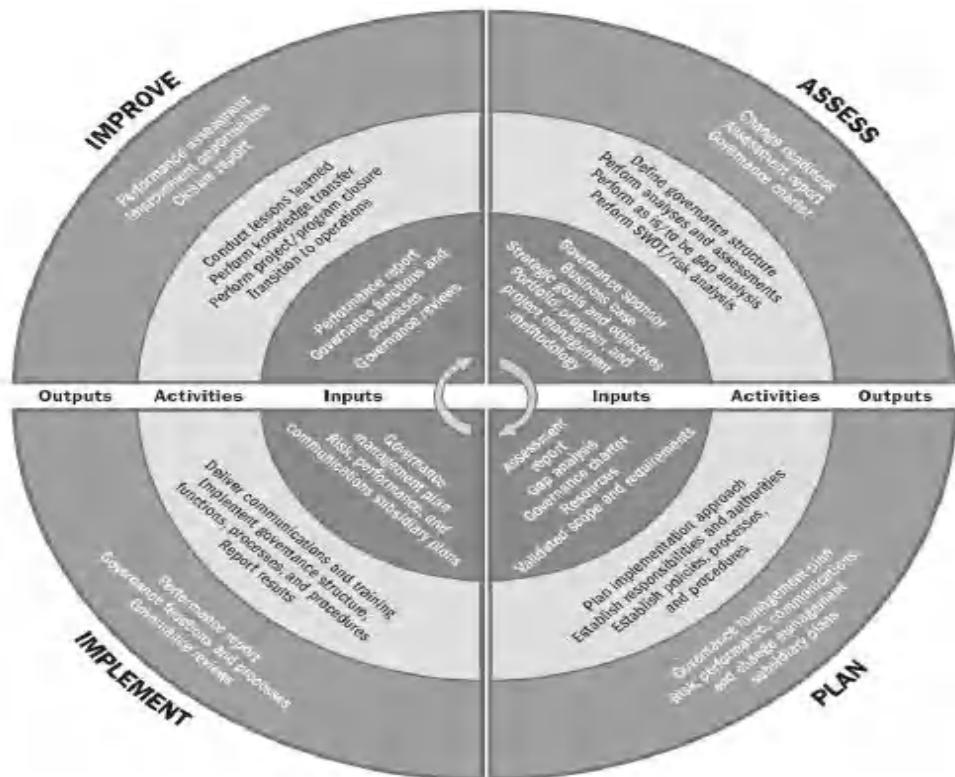
### Four Governance Domains



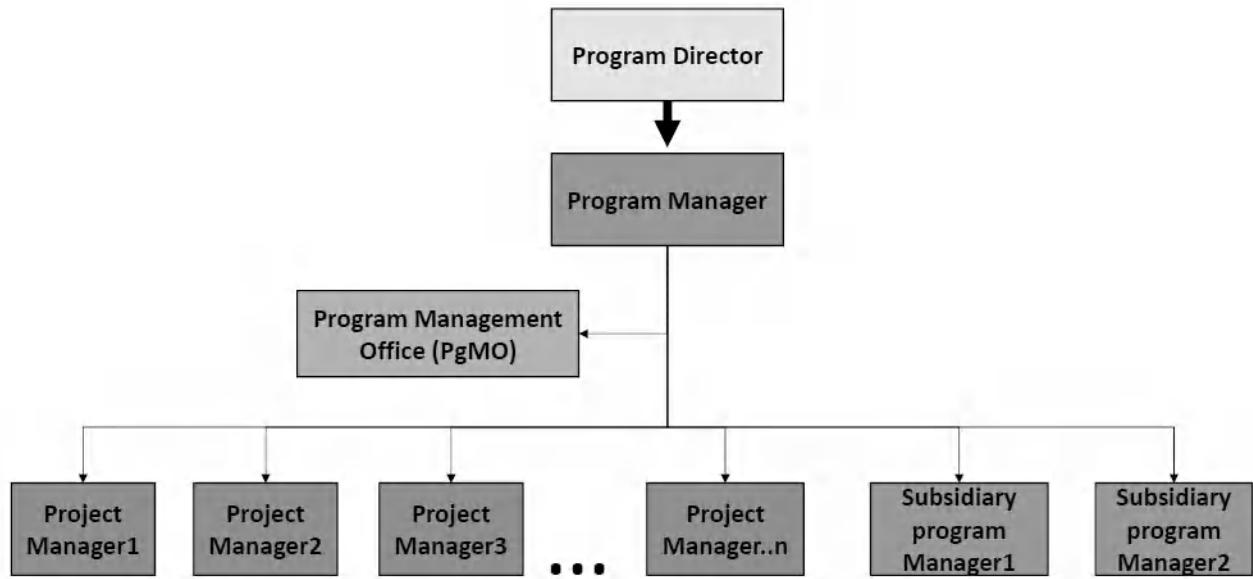
## Four Governance Functions



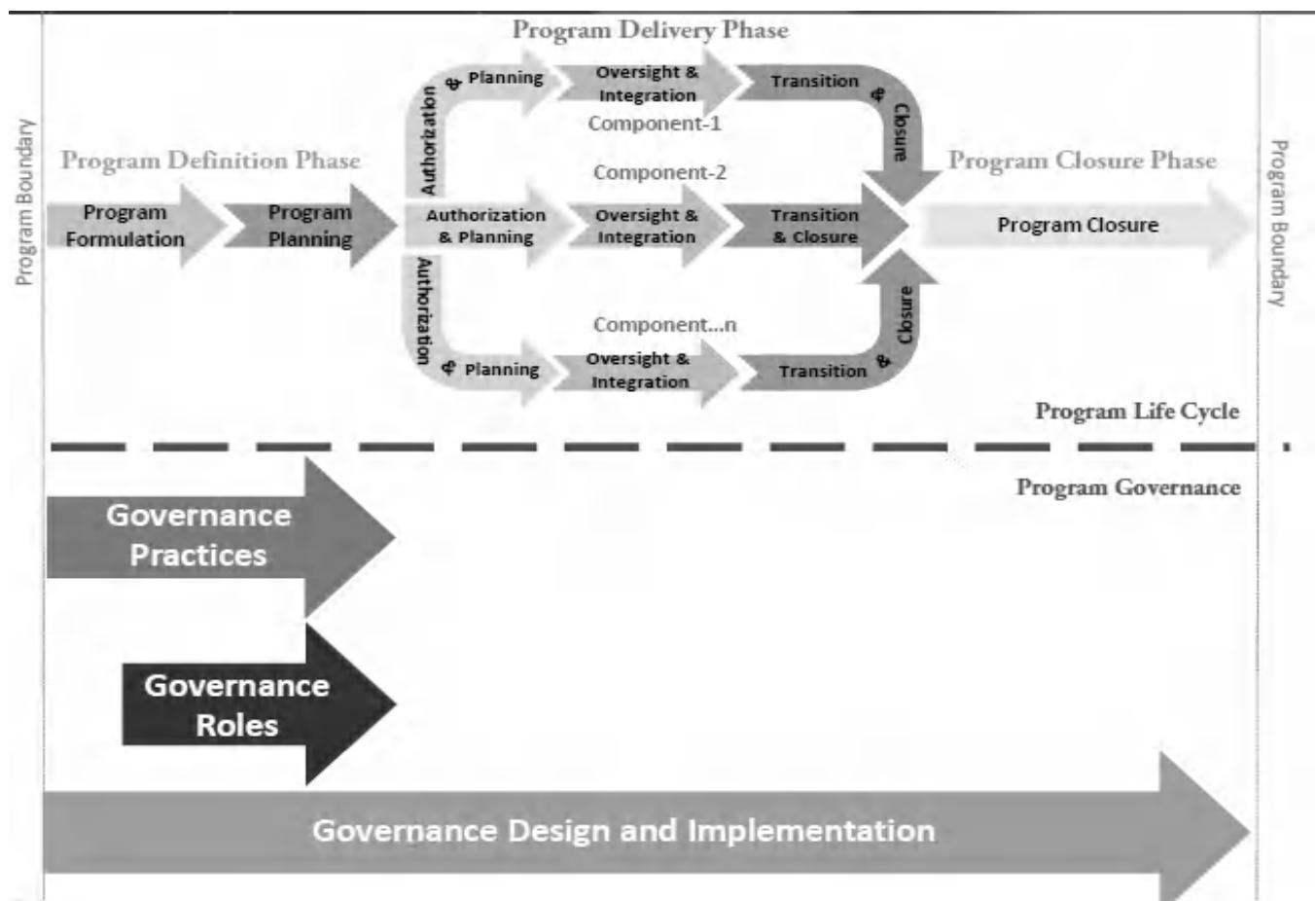
## Governance Framework Implementation



## Program Roles Highlights



## Program Governance Relationship with Program Life Cycle



## 6.3 Program Governance Design & Implementation

Program governance begins with the identification of governance participants and the establishment of governance practices. There is also a need to define the specific expectations for how governance-related roles are filled and responsibilities discharged.

Common [factors](#) to consider when optimizing and tailoring program governance include:

**Legislative environment:** Programs that are significantly influenced by changing legislation may benefit from governance designed for direct interaction with the [legislative authorities](#). In other cases, the interaction is performed by elements of corporate governance on behalf of the program.

**Decision-making hierarchy:** It is critical for decision-making responsibility to be at the level where competence, accountability, and authority reside. There are complexities to this approach. For example, in organizations where employees are not ultimately accountable for their actions or not made to feel accountable for their actions, there is a greater need for controlling practices. In other circumstances, a highly regarded, successful, and experienced program manager and team may be given greater autonomy and decision-making powers than is typically given to program managers.

**Optimized governance:** Generally, it makes sense for the size of the program governance to be optimized and to be as streamlined as possible, while still able to perform the practices of the domain. This will lead to role clarity, effective and targeted support from the organization, and ultimately more rapid and effective decision making, endorsements, and approvals. Program governance should not duplicate program management activity.

**Alignment with portfolio and organizational governance:** Program governance is impacted by the portfolio governance that it supports. The degree to which program governance should align with organizational governance is based on the number, type, and relative importance of the program governance's interactions with corporate groups and governance. Typically, the need for alignment with organizational governance is greatest in the program definition stage as the program governance and the program itself are being formulated.

**Program delivery:** A program that regularly delivers benefits to the organization is likely to require different governance than a program delivering all or most of the benefits at the end. Regular delivery of benefits potentially requires constant change in the operations of the organization and the governance to manage this change is critical throughout the life cycle.

**Contracting:** A program being managed and staffed by employees of the receiving organization is likely to require a different level of governance than a program being delivered by an external party when, in such cases, the management of the legal agreement requires a different governance focus.

**Risk of failure:** The greater the perceived risk of program failure, the greater the likelihood the governance team will monitor progress and success more diligently. This may manifest in a higher frequency of health checks and less decision-making delegation to the program team.

**Strategic importance:** High-value programs critical to the success of the organization and delivering benefits that need to be completely aligned with the strategy may require different or more senior participants on the governance team.

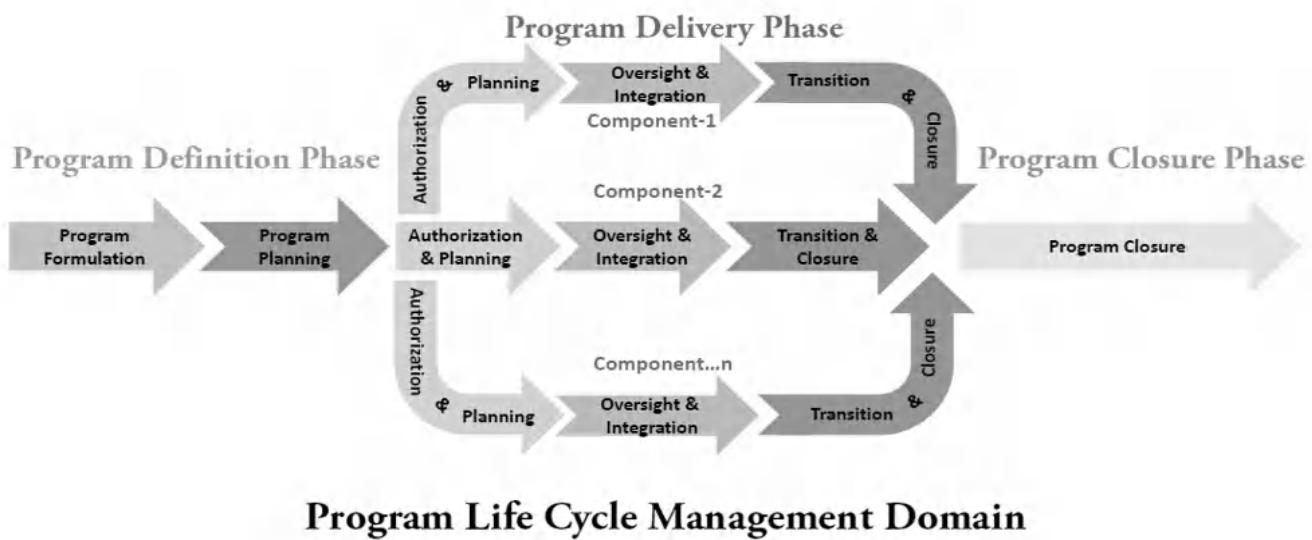
**Program management office (PMO):** In many project- or program-based organizations, a centralized PMO supports the governance of all programs for that organization. In other organizations, PMOs may be formed specifically for a given program.

**Program funding structure:** When funding is secured from outside the delivery organization, for example from the World Bank, there are likely implications on the design of the governance and the skills required.

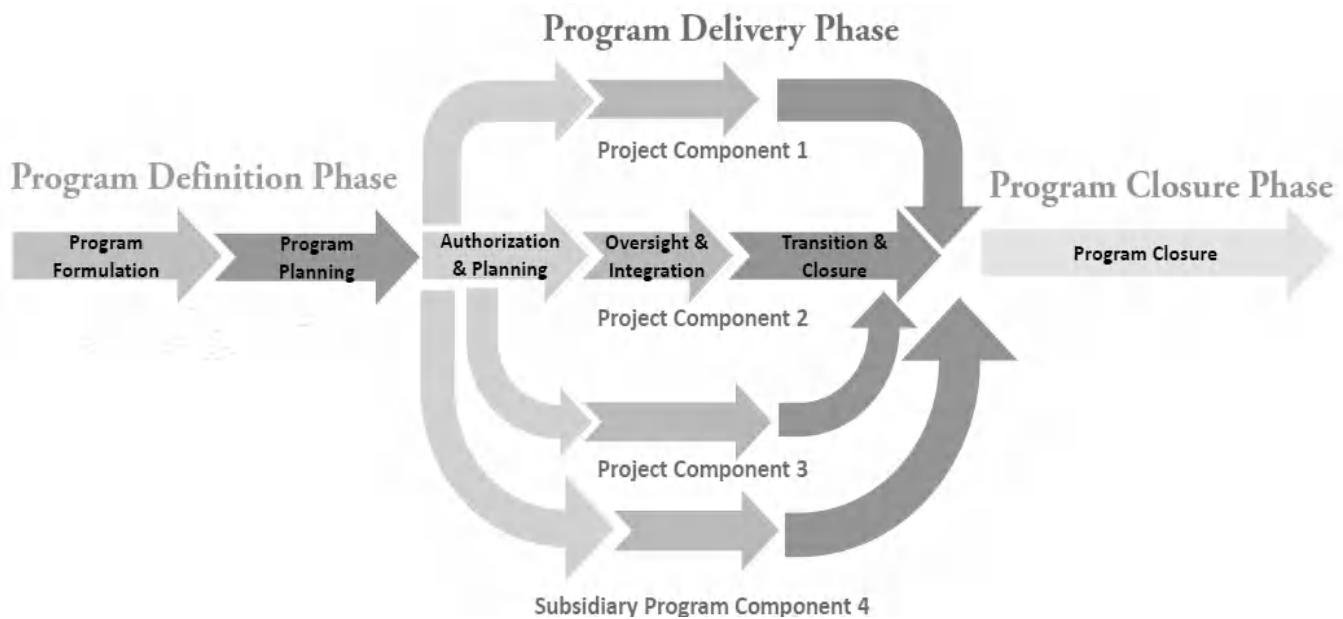
## 7. Program Life Cycle Management

Program Life Cycle Management is the performance domain that manages program activities required to facilitate effective program definition, program delivery, and program closure.

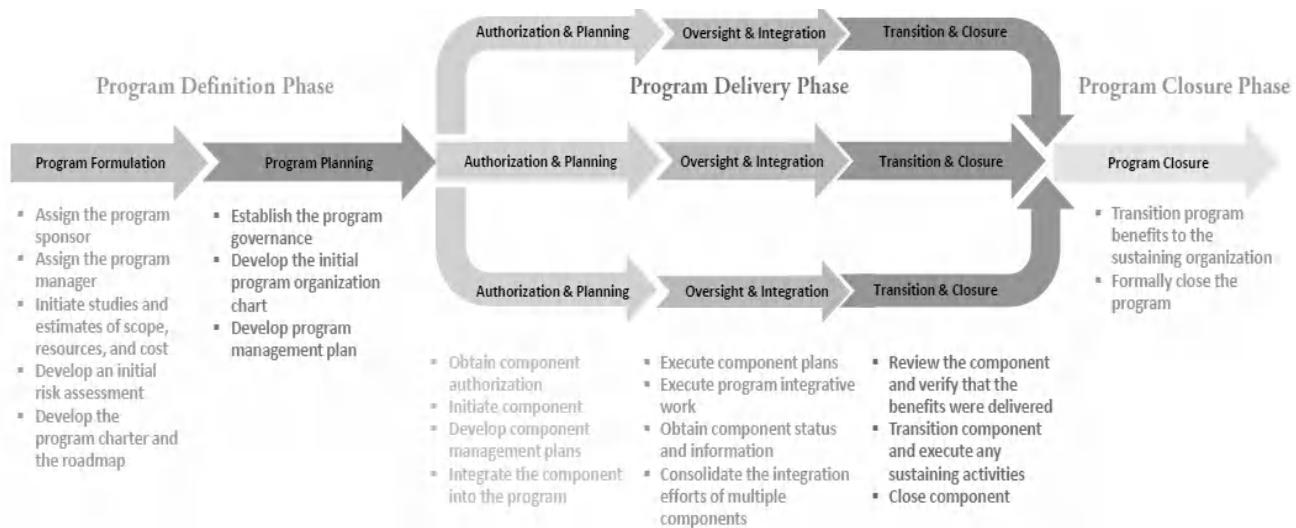
### Program Life Cycle Management Domain



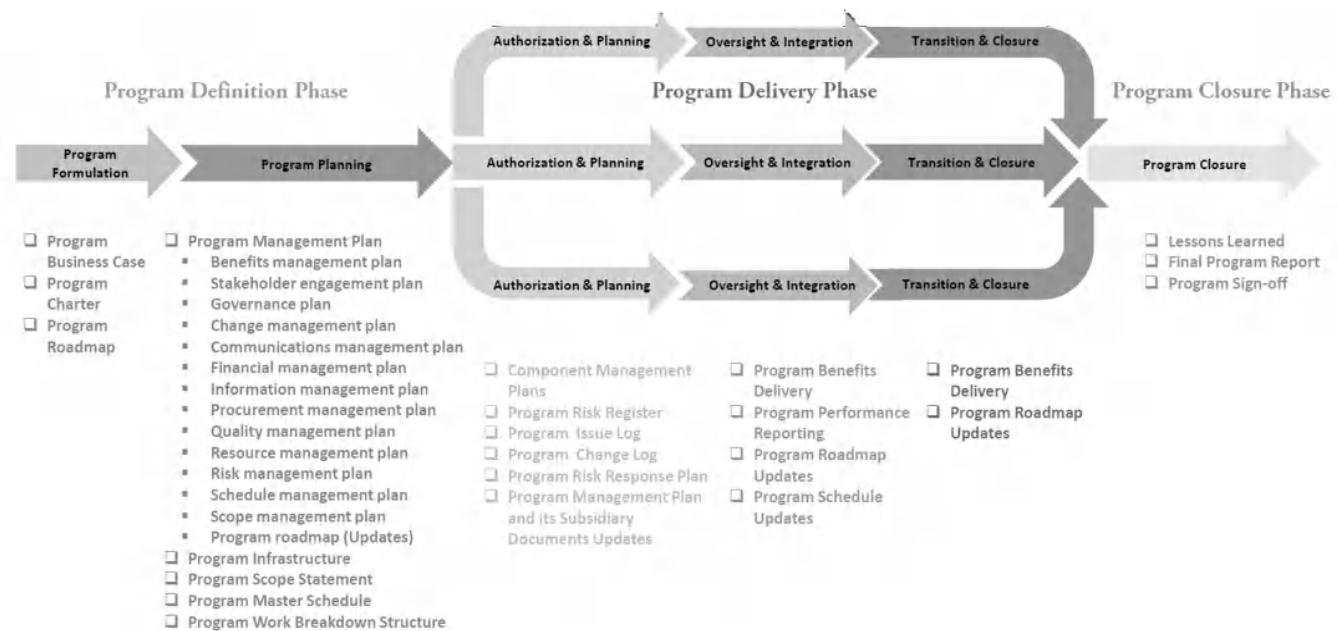
Program Life Cycle Management Domain



# Program Life Cycle Management - Major Program Activities



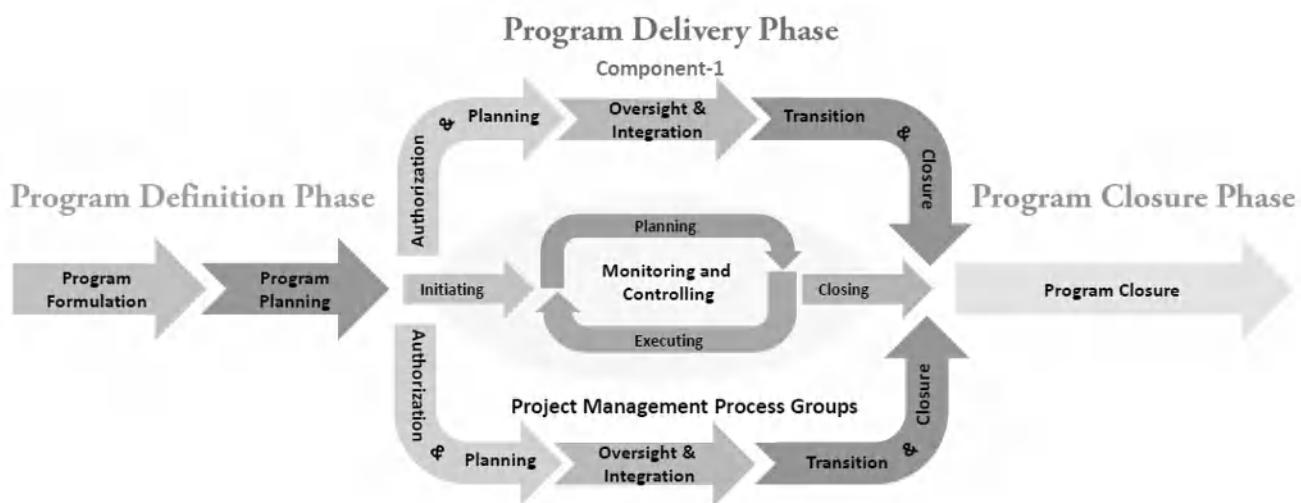
# Program Life Cycle Management - Major Program Artifacts



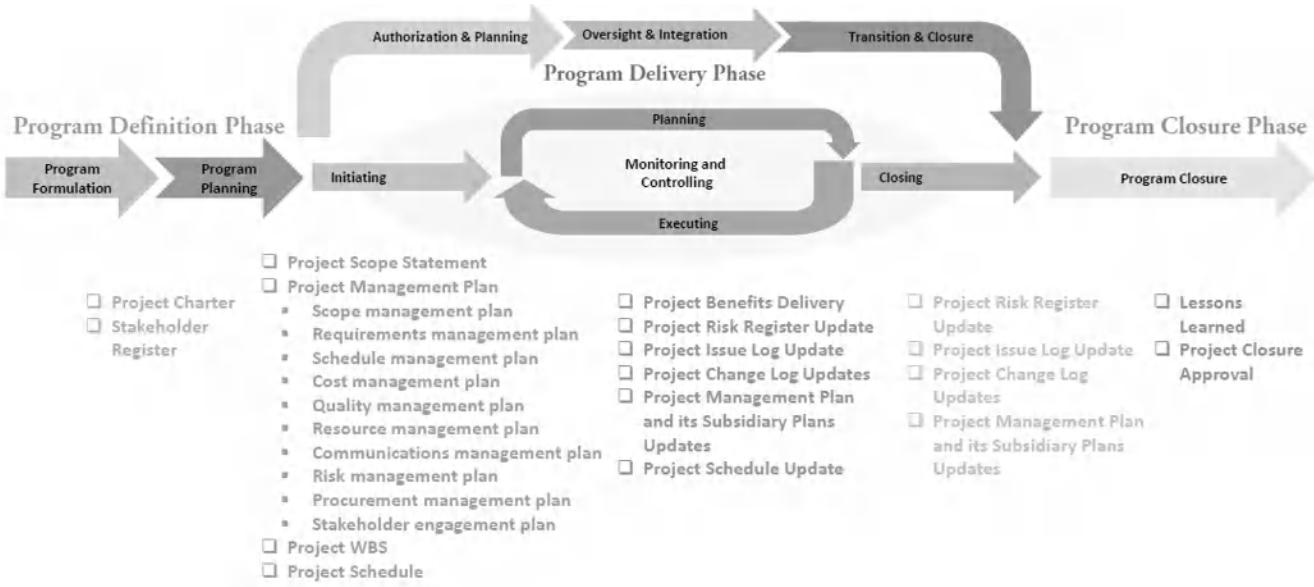
# Program Management Plan

- Benefits management plan
- Stakeholder engagement plan
- Governance plan
- Change management plan
- Communications management plan
- Financial management plan
- Information management plan
- Procurement management plan
- Quality management plan
- Resource management plan
- Risk management plan
- Schedule management plan
- Scope management plan
- Program roadmap

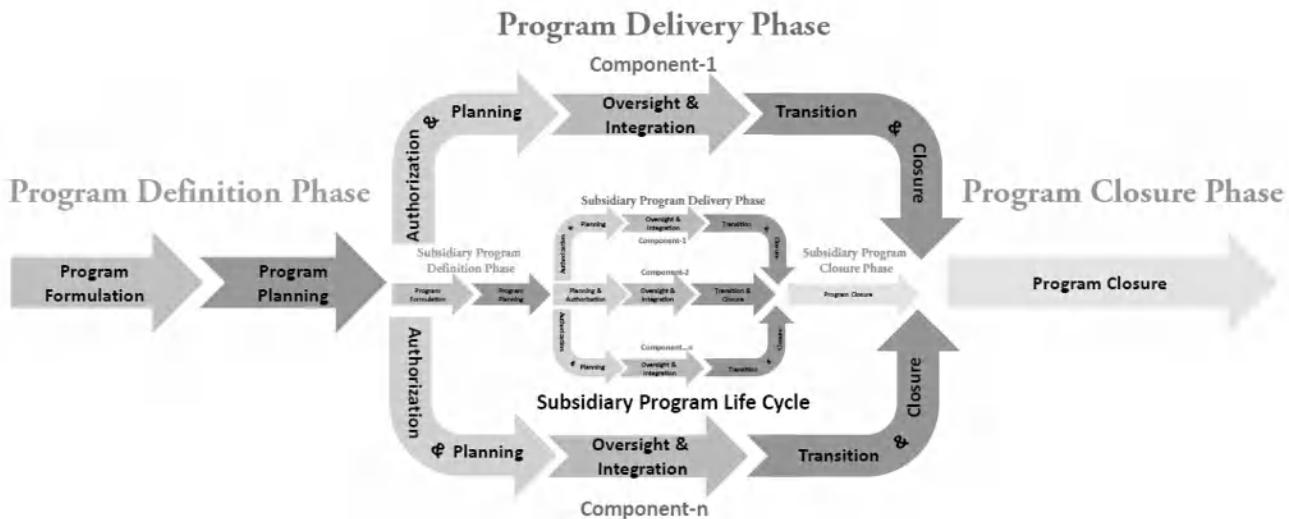
## Relationship with the Project Management PG's



## Component Project - Major Artifacts



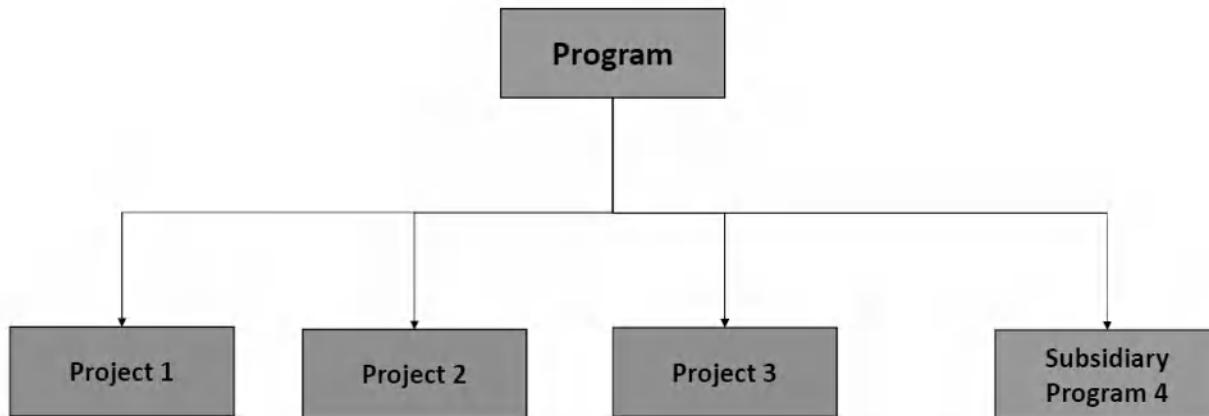
## Relationship with Subsidiary Program Life Cycle



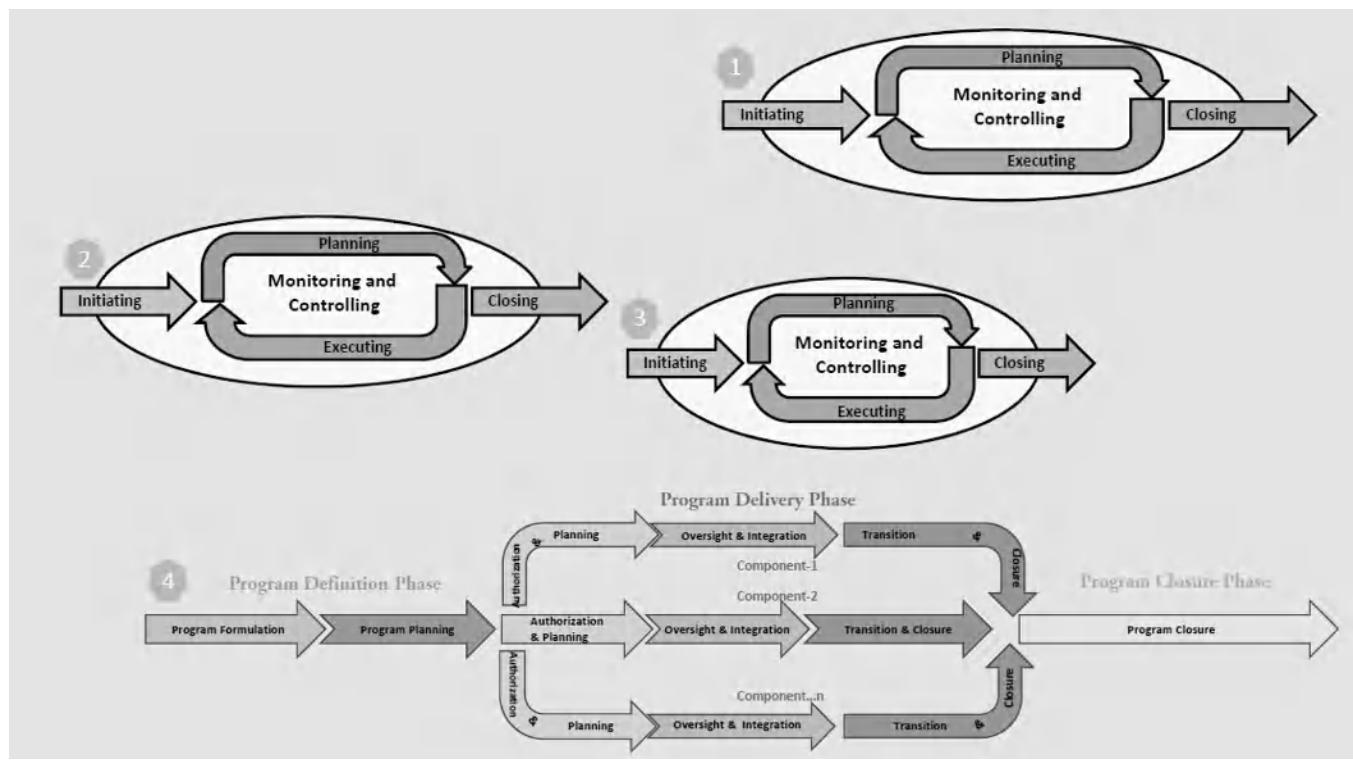
# Component Subsidiary Program - Major Artifacts



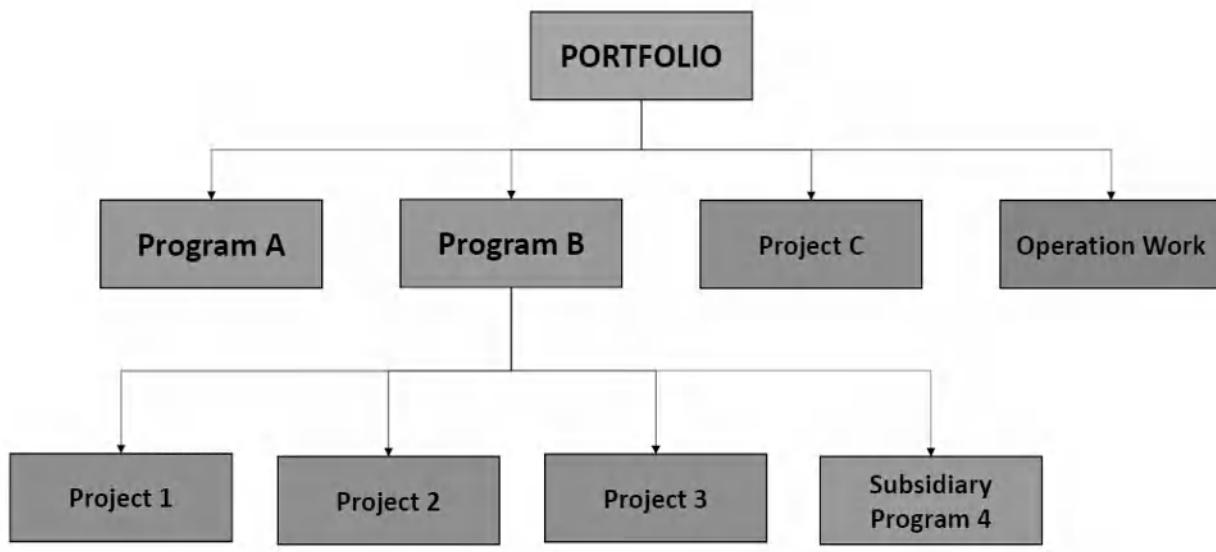
## Program Components Example



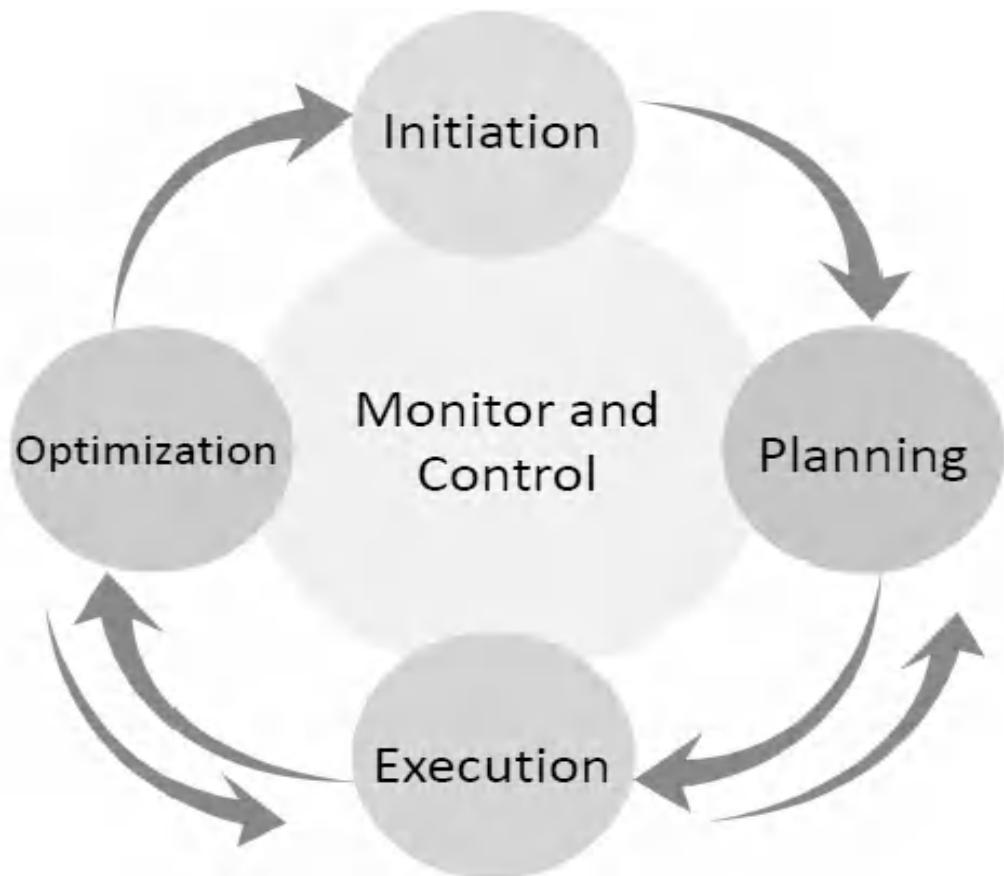
## Program Component's Execution



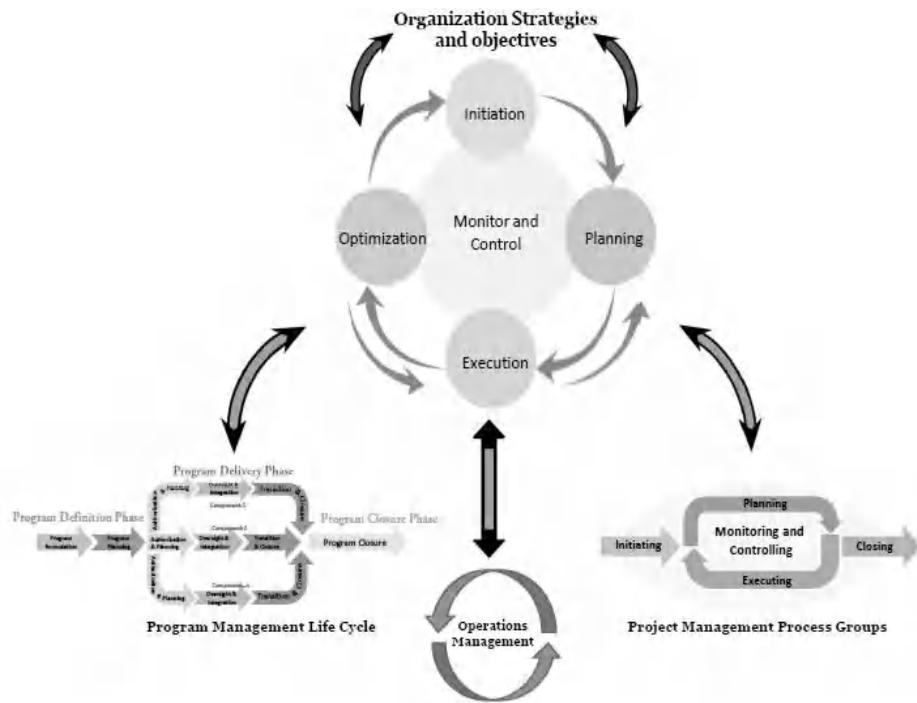
## Program Relationships



## Portfolio Management Life Cycle



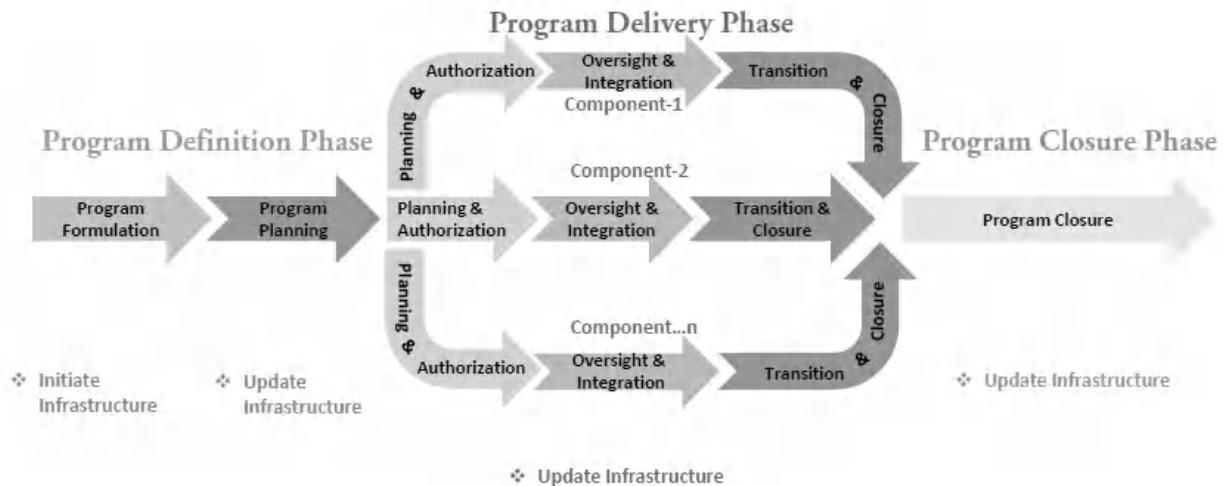
## Relationship with Portfolio Management Life Cycle



## 8. Program Integration Management

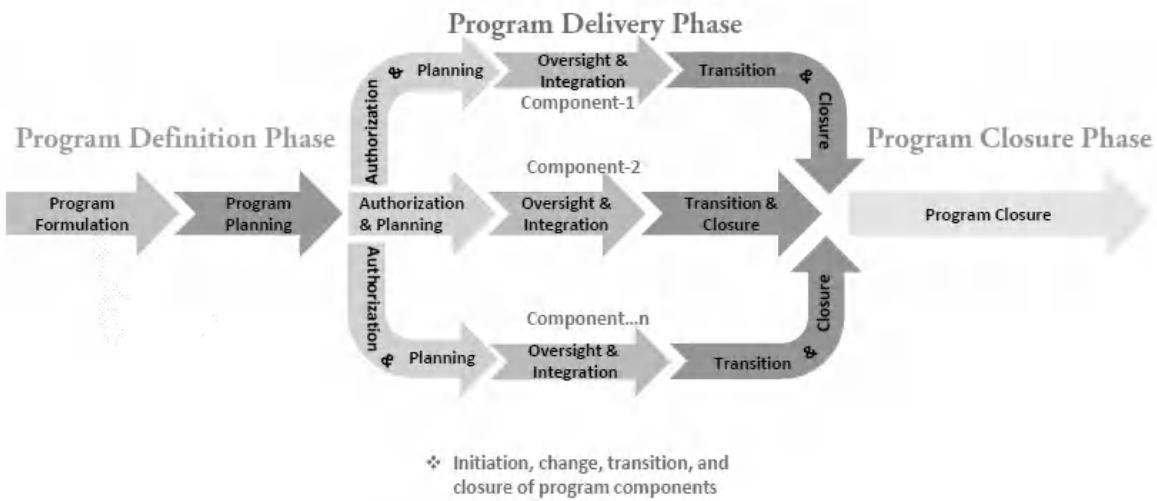
### Program Infrastructure Development

- Program Organization Chart
- Program Management Office (PgMO)
- Program Management Information System (PMIS)



## Program Delivery Management

- Initiate a new program component
- Change requests
- Close or transition a program component

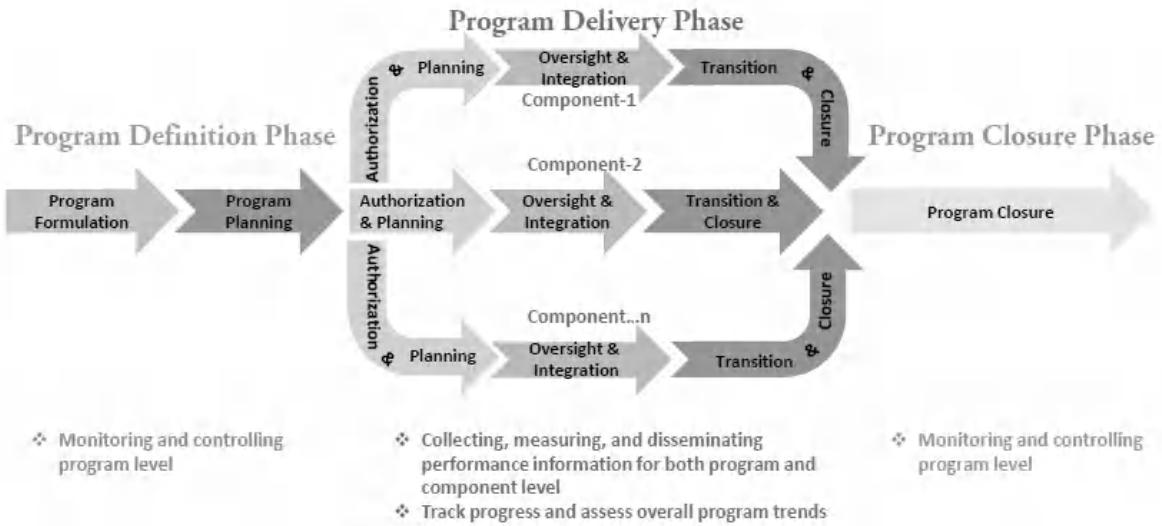


## Program Performance Monitoring & Controlling

- Performed at both program level and component level
- Monitoring activities: collecting and measuring performance information, track progress against, and assess overall program trends
- Controlling activities: corrective or preventive actions
- Escalations to the program steering committee
- Program performance reports

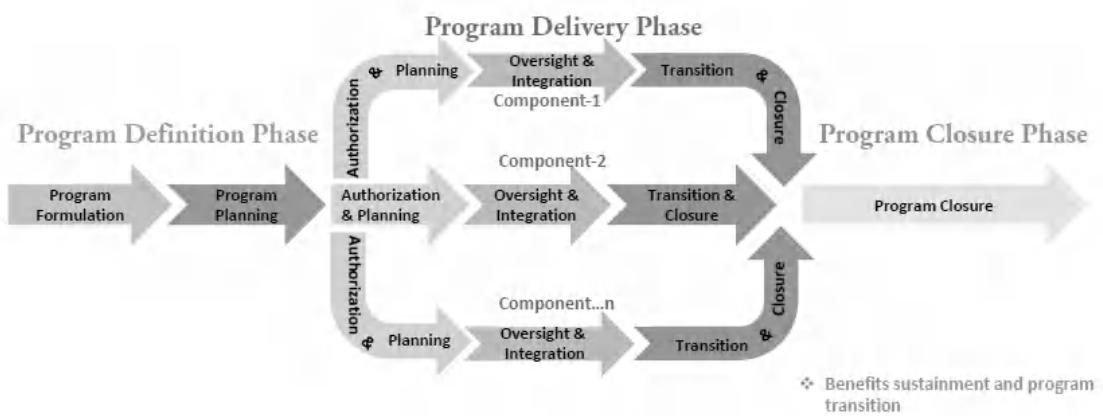
# Program Performance Monitoring & Controlling

- Benefits Sustainment and Program Transition
- Benefits sustainment
- Program transition



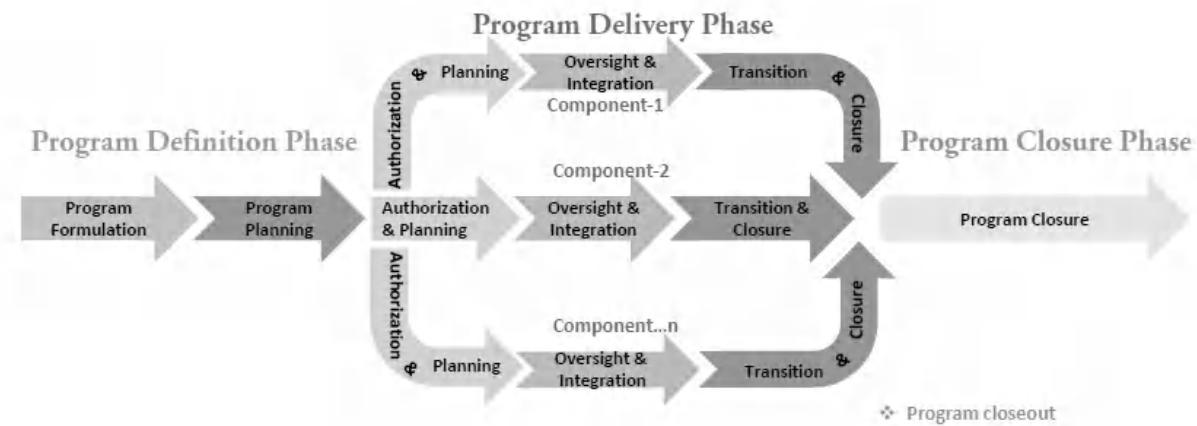
## Benefits Sustainment and Program Transition

- Program Closeout
- Program closing conditions
- Successful program completion
- Lessons learned and resource release
- Final report



## Program Closeout

- Program closing conditions
- Successful program completion
- Lessons learned and resource release
- Final report



# 9. Program Management Supporting Process

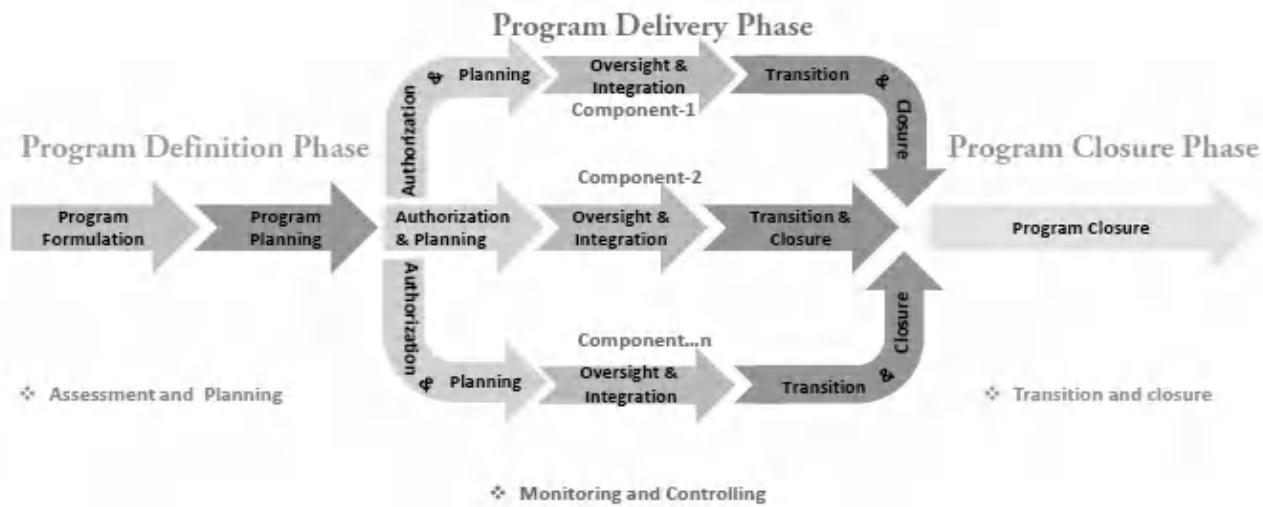
The program level supporting processes enable a synergistic approach for the purpose of delivering program benefits. Like project management supporting process, program management supporting process require coordination with functional groups in the organization.

## Program Activities

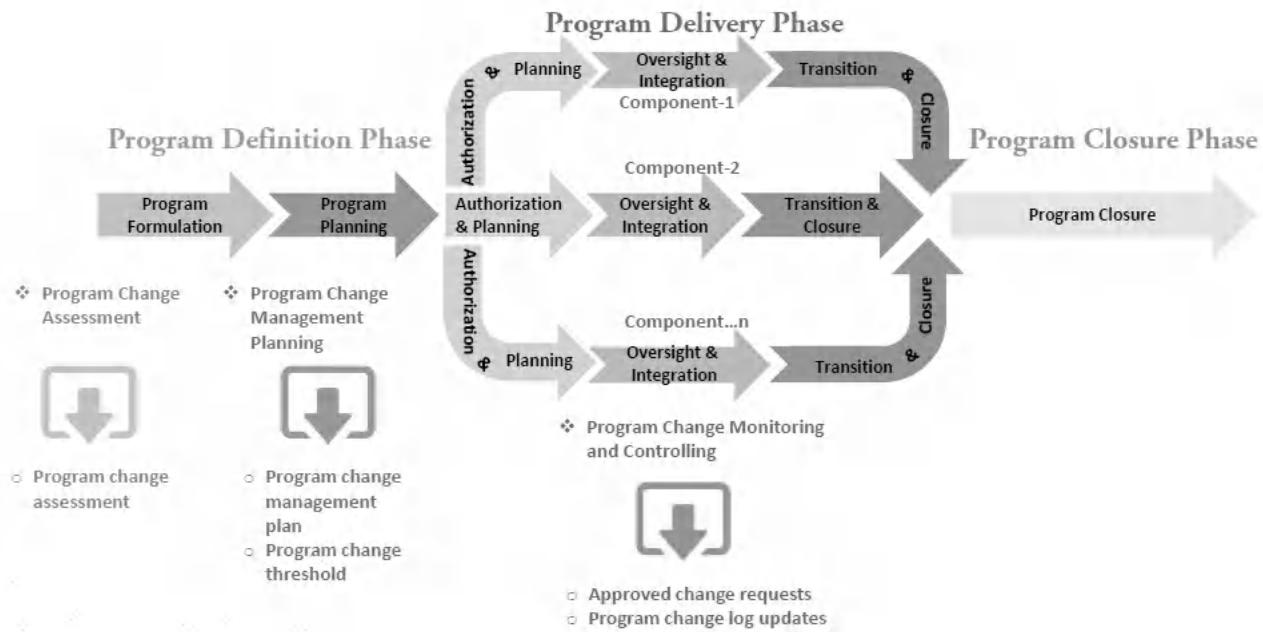
<ul style="list-style-type: none"><li>▪ Program Change Management</li><li>▪ Program Communications Management</li><li>▪ Program Financial Management</li><li>▪ Program Information Management</li><li>▪ Program Procurement Management</li><li>▪ Program Quality Management</li></ul>	<ul style="list-style-type: none"><li>▪ Program Resource Management</li><li>▪ Program Risk Management</li><li>▪ Program Schedule Management</li><li>▪ Program Scope Management</li></ul>
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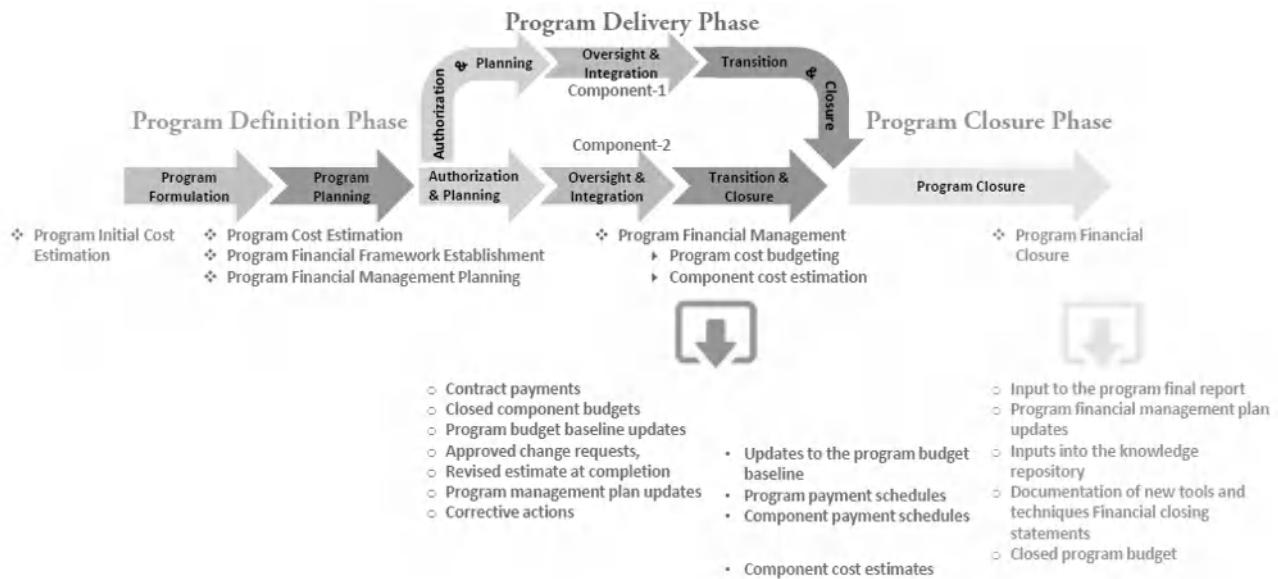
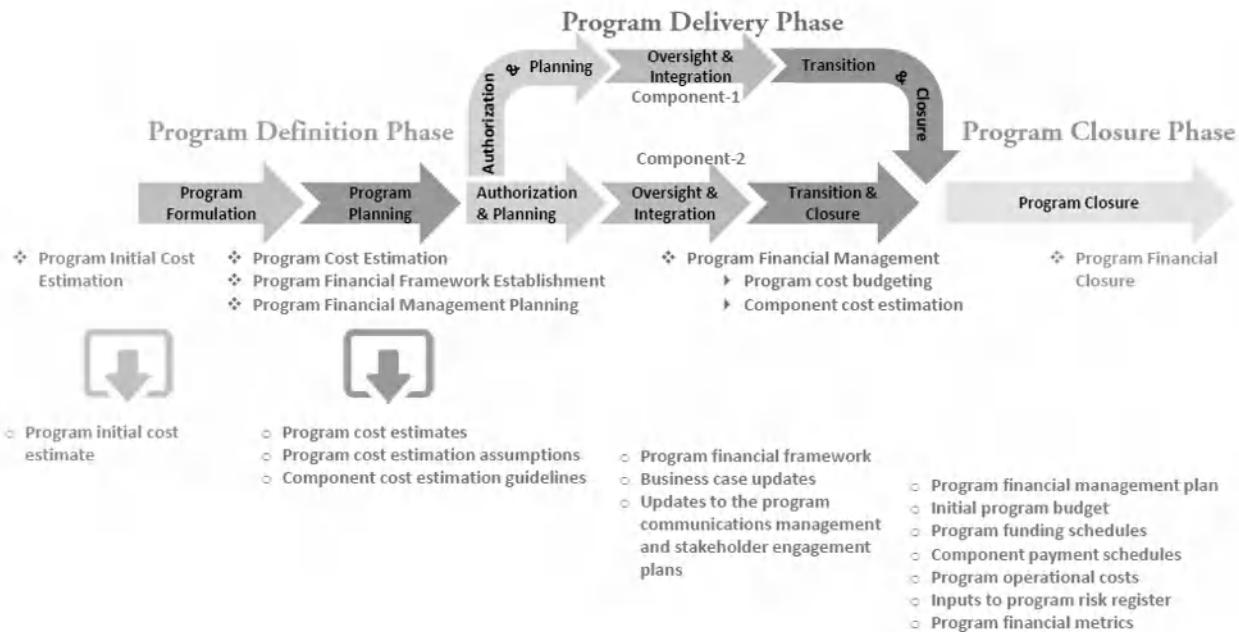
## Program Supporting Activities



## Program Change Management



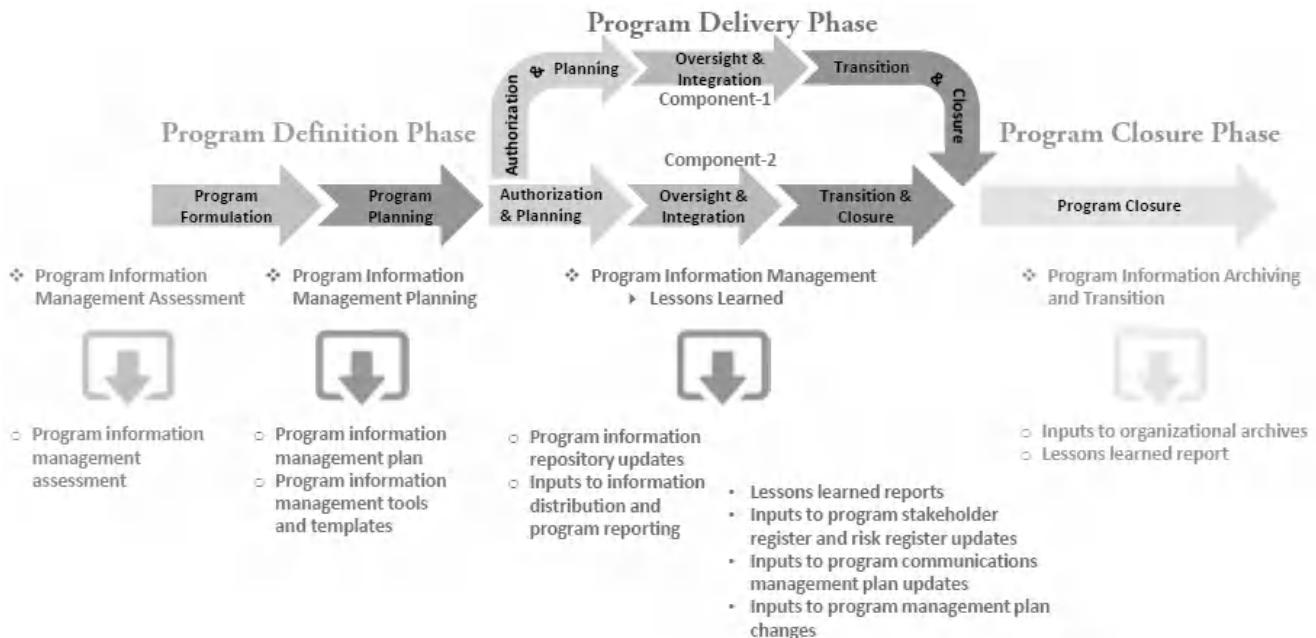
# Program Financial Management



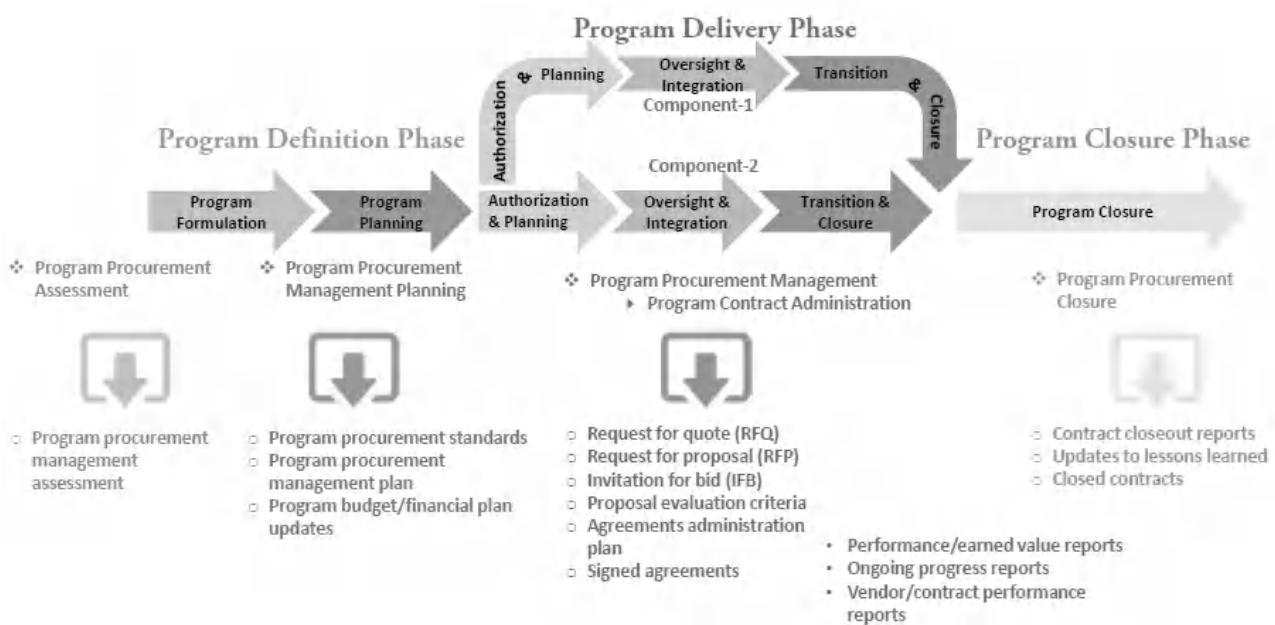
# Program Communications Management



# Program Information Management



# Program Procurement Management



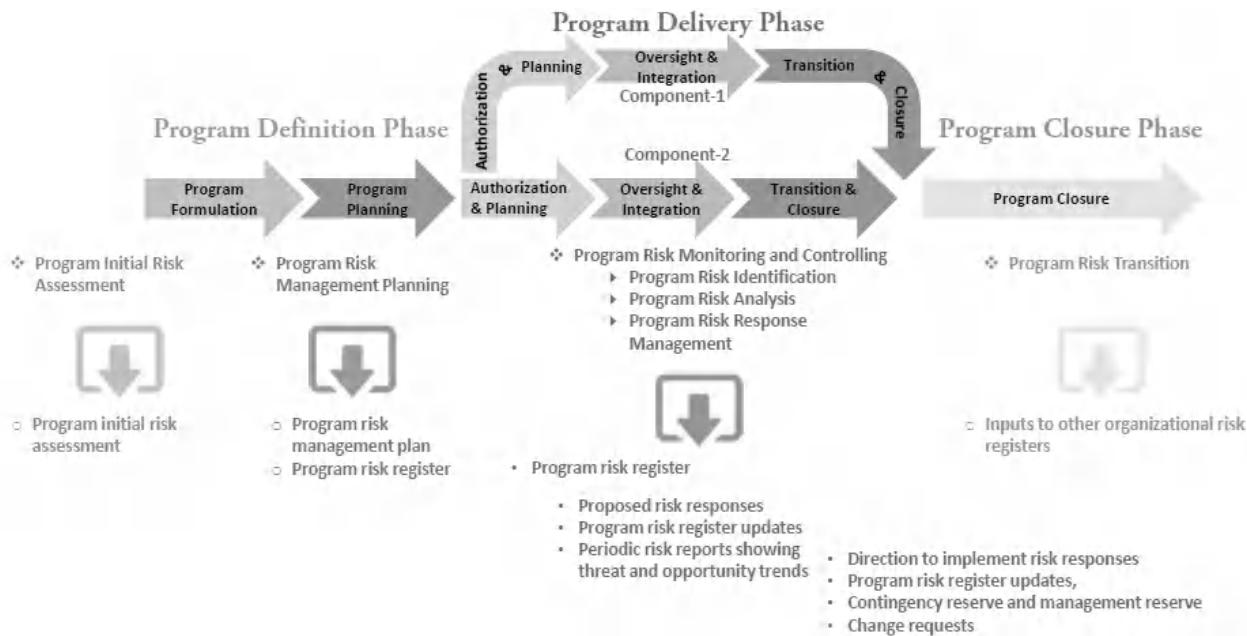
# Program Quality Management



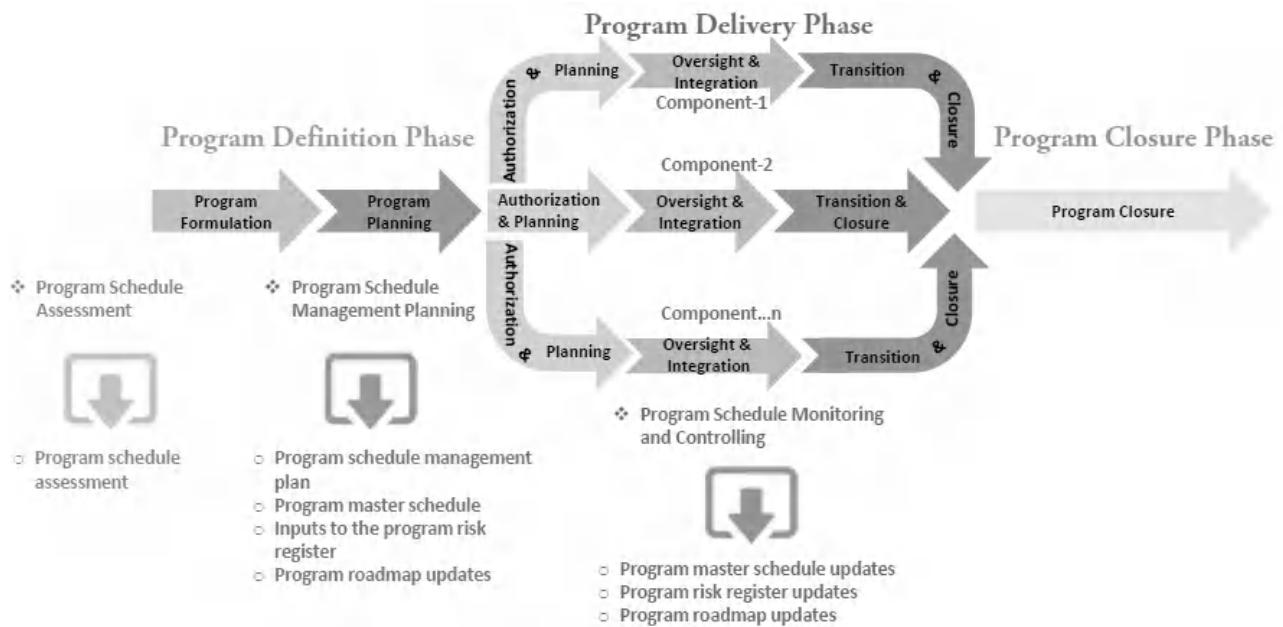
# Program Resource Management



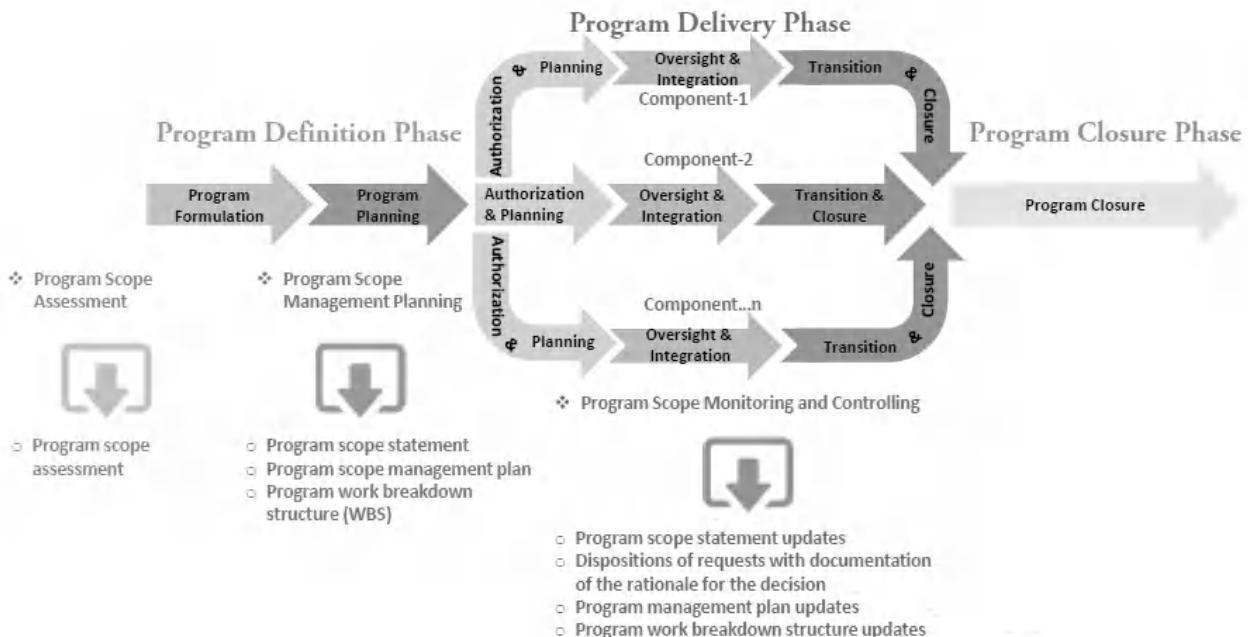
# Program Risk Management



# Program Schedule Management



# Program Scope Management



## Program Artifacts

- Program management plans
- Program issue and Risk registers
- Program master time schedule
- Program benefits realization
- Program work breakdown structure
- Program constraints and assumptions
- Program status reporting
- Program decision request

## 10. Program Management Glossary

**Benefit.** The gains and assets realized by the organization and other stakeholders as the result of outcomes delivered by the program.

**Benefits Management Plan.** The documented explanation defining the processes for creating, maximizing, and sustaining the benefits provided by a project or program.

**Benefits Analysis and Planning Phase.** Establishes the program benefits management plan and develop the benefits metrics and framework for monitoring and controlling both the components and the measurement of benefits within the program.

**Benefits Delivery Phase.** Ensures that the program delivers the expected benefits, as defined in the benefits management plan.

**Benefits Identification Phase.** Analyses the available information about organizational and business strategies, internal and external influences, and program drivers to identify and qualify the benefits that program stakeholders expect to realize.

**Benefits Sustainment Phase.** Ongoing maintenance activities performed beyond the end of the program by receiving organizations to assure continued generation of the improvements and outcomes delivered by the program.

**Benefits Transition Phase.** Program activities that ensure that benefits are transitioned to operational areas and can be sustained once they are transferred.

**Business Case.** A documented economic feasibility study used to establish validity of the benefits to be delivered by a program.

**Component.** A project, subsidiary programs, or other related activities conducted to support a program.

**Constraint.** A limiting factor that affects the execution of a project, program, portfolio, or process.

**Enterprise Environmental Factors.** Conditions, not under the immediate control of the team, that influence, constrain, or direct the project, program, or portfolio.

**Performing Organization.** An enterprise whose personnel are the most directly involved in doing the work of the project or program.

**Phase Gate.** A review at the end of a phase in which a decision is made to continue to the next phase, to continue with modification, or to end a project or program.

**Portfolio.** Projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives.

**Portfolio Management.** The centralized management of one or more portfolios to achieve strategic objectives.

**Procurement Management Plan.** A component of the project or program management plan that describes how a team will acquire goods and services from outside of the performing organization.

**Program.** Related projects, subsidiary programs, and program activities managed in a coordinated manner to obtain benefits not available from managing them individually.

**Program Activities.** Tasks and work conducted to support a program and which contribute throughout the program life cycle.

**Program Benefits Management.** Processes that clarify the program's planned benefits and intended outcomes and includes processes for monitoring the program's ability to deliver against these benefits and outcomes.

**Program Benefits Management Performance Domain.** Performance domain that defines, creates, maximizes, and delivers the benefits provided by the program.

**Program Change Management.** Activities to plan for, monitor, control, and administer changes during the course of the program.

**Program Charter.** A document issued by a sponsor that authorizes the program management team to use organizational resources to execute the program and links the program to the organization's strategic objectives.

**Program Closure Phase.** Program activities necessary to transition program benefits to sustaining organization and formally close the program in a controlled manner.

**Program Communications Management.** Activities necessary for the timely and appropriate generation, collection, distribution, storage, retrieval, and ultimate disposition of program information.

**Program Definition Phase.** Program activities conducted to authorize the program and develop the program roadmap required to achieve the expected results.

**Program Delivery Phase.** Program activities performed to produce the intended results of each component in accordance with the program management plan.

**Program Financial Framework.** A high-level initial plan for coordinating available funding, determining constraints, and determining how funding is allocated.

**Program Financial Management.** Activities related to identifying the program's financial sources and resources, integrating the budgets of the program components, developing the overall budget for the program, and controlling costs during the program.

**Program Governance.** The framework, functions, and processes by which a program is monitored, managed, and supported in order to meet organizational strategic and operational goals.

**Program Governance Framework.** The supporting structure, around which the decision making, supporting, and oversight practices are constructed, operated, and managed.

**Program Governance Performance Domain.** Performance domain that enables and performs program decision making, establishes practices to support the program, and maintains program oversight.

**Program Governance Plan.** A document that describes the systems and methods to be used to monitor, manage, and support a given program, and the responsibilities of specific roles for ensuring the timely and effective use of those systems and methods.

**Program Information Management.** Activities related to how the program's information assets are prepared, collected, organized, and secured.

**Program Information Management Plan.** A component of the program management plan that describes how the program's information assets will be prepared, collected, and organized.

**Program Integration Management.** Program activities conducted to identify, define, combine, unify, and coordinate multiple components into the program.

**Program Life Cycle Management.** Managing all program activities related to program definition, program delivery, and program closure.

**Program Life Cycle Management Performance Domain.** Performance domain that manages program activities required to facilitate effective program definition, program delivery, and program closure.

**Program Management.** The application of knowledge, skills, and principles to a program to achieve the program objectives and to obtain benefits and control not available by managing program components individually.

**Program Management Information Systems.** Tools used to collect, integrate, and communicate information critical for the effective management of one or more organizational programs.

**Program Management Office.** A management structure that standardizes the program-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques.

**Program Management Performance Domain.** Complementary groupings of related areas of activity or function that uniquely characterize and differentiate the activities found in one performance domain from the others within the full scope of program management work.

**Program Management Plan.** A document that integrates the program's subsidiary plans and establishes the management controls and overall plan for integrating and managing the program individual components.

**Program Manager.** The individual authorized by the performing organization to lead the team or teams responsible for achieving program objectives.

**Program Master Schedule.** An output of a schedule model that logically links components, milestones, and high-level activities necessary to deliver program benefits.

**Program Procurement Management.** The application of knowledge, skills, tools, and techniques necessary to acquire

products and services to meet the needs of the overall program and the constituent projects/components.

**Program Quality Assurance.** The activities related to the periodic evaluation of overall program quality to provide confidence that the program will comply with relevant quality policies and standards.

**Program Quality Control.** The monitoring of specific components or program deliverables and results to determine if they meet the quality requirements and lead to benefits realization.

**Program Quality Management.** The activities of the performing organization that determine program quality policies, objectives, and responsibilities so that the program will be successful.

**Program Resource Management.** Program activities that ensure all required resources (people, equipment, material, etc.) are made available to the component managers to enable the delivery of benefits for the program.

**Program Schedule Management.** An activity to determine the order and timing of the components needed to produce the program benefits, estimate the amount of time required to accomplish each one, identify significant milestones during the performance of the program, and document the outcomes of each milestone.

**Program Risk.** An uncertain event or condition that, if it occurs, has a positive or negative effect on the program.

**Program Risk Management.** Program activities related to actively identifying, monitoring, analysing, accepting, mitigating, avoiding, or retiring program risk.

**Program Risk Register.** A document in which risks are recorded together with the results of risk analysis and risk response planning.

**Program Roadmap.** A chronological representation of a program's intended direction that graphically depicts dependencies between major milestones and decision points and reflects the linkage between the business strategy and the program work.

**Program Scope Management.** Activities that define, develop, monitor, control, and verify program scope.

**Program Stakeholder Engagement Performance Domain.** Performance domain that identifies and analyses stakeholder needs and manages expectations and communications to foster stakeholder support.

**Program Strategy Alignment.** Activities associated with the integration and development of business strategies and organizational goals and objectives, and the degree to which operations and performance meet stated organizational goals and objectives.

**Program Strategy Alignment Performance Domain.** Performance domain that identifies program outputs and outcomes to provide benefits aligned with the organization's goals and objectives.

**Program Steering Committee.** Group of participants representing various program-related interests with the purpose of supporting the program under its authority by

providing guidance, endorsements, and approvals through the governance practices. This committee may also be referred to as Program Governance Board.

**Project.** A temporary endeavour undertaken to create a unique product, service, or result.

**Project Management.** The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

**Quality Management Plan.** A component of the project or program management plan that describes how an organization's quality policies will be implemented.

**Risk Management Plan.** A component of the project, program, or portfolio management plan that describes how risk management activities will be structured and performed.

**Schedule Management Plan.** A component of the project or program management plan that establishes the activities for developing, monitoring, and controlling the project or program.

**Scope Management Plan.** A component of the project or program management plan that describes how the scope will be defined, developed, monitored, controlled, and verified.

**Sponsor.** An individual or a group that provides resources and support for the project, program, or portfolio, and is accountable for enabling success.

**Stakeholder.** An individual, group, or organization that may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project, program, or portfolio.

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# Portfolio Management Excellence



## Sriram

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# Portfolio Management

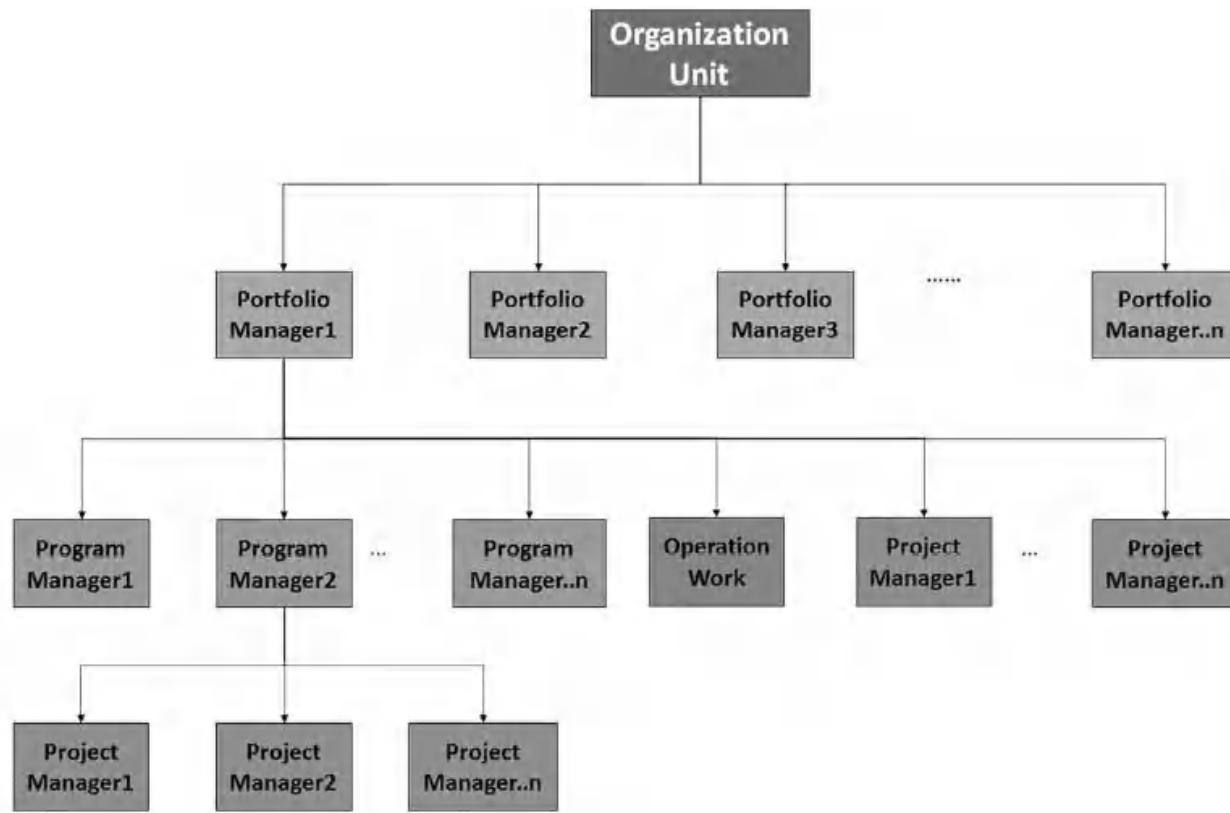
PROJECT MANAGEMENT INSTITUTE

## **THE STANDARD FOR PORTFOLIO MANAGEMENT – THIRD EDITION**

# 1. Introduction to Portfolio Management

## 1.1 Project, Program & Portfolios

- A Project is a temporary endeavor undertaken to create a unique product, service or result. Project management concentrates on achieving specific deliverables
- A Program is a group of related projects, subprograms, and program activities managed in a coordinated way to obtain benefits not obtainable from managing them individually. Programs management concentrates on realizing the expected benefits
- A Portfolio is a collection of projects, programs, and operations managed as a group to achieve strategic objectives. Portfolios management aims to maximize the value gained, optimize the resources, and accept risks as per the organizational limits



## 1.2 The Portfolio

- Should be aligned to its organizational strategy
- Should be a representation of an organization's intent, direction, and progress
- Has a parent-child relationship with its portfolio components

### Portfolio Management

Portfolio management is the coordinated management of one or more portfolios to achieve organizational strategies and objectives

- A governing body
- Portfolio components interrelationships
- Resources allocation
- Applied globally and across industry groups
- Generally accepted
- Should not be applied uniformly for all portfolios
- Portfolio manager determines which processes are appropriate

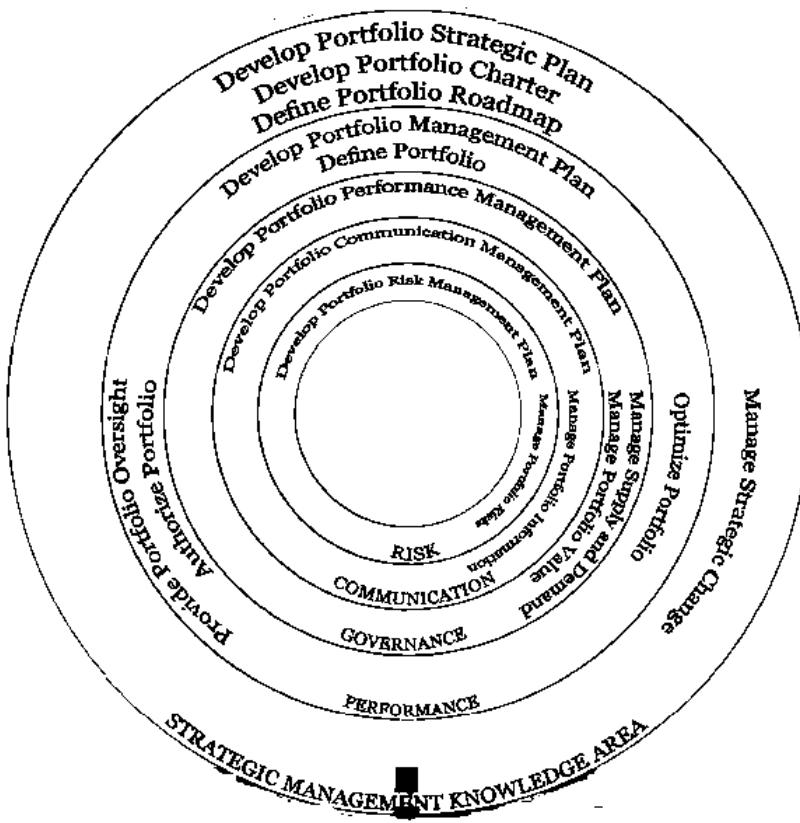
### Portfolio Components

- May be projects, programs or operations
- May be sub-portfolio; which is a special type of a portfolio that is managed under another portfolio
- Not necessarily be interdependent or have related objectives
- Quantifiable, so, they can be measured, ranked, and prioritized
- Are managed and are periodically measured according to frameworks

## Portfolio Management Knowledge Areas

	Defining Process Group	Aligning Process Group	Authorizing & Controlling	
Strategic Management	Develop Portfolio Strategic Plan Develop Portfolio Charter Define Portfolio Roadmap	Manage Strategic Change		Strategic Management
Governance Management	Develop Portfolio Management Plan Define Portfolio	Optimize Portfolio	Authorize Portfolio Provide Portfolio Oversight	Governance Management
Performance Management	Develop Portfolio Performance Management Plan	Manage Supply and Demand Manage Portfolio Value		Performance Management
Communication Management	Develop Portfolio Communication Management Plan	Manage Portfolio Information		Communication Management
Risk Management	Develop Portfolio Risk Management Plan	Manage Portfolio Risks		Risk Management
	Defining Process Group	Aligning Process Group	Authorizing & Controlling	

## Portfolio Management Process Groups



## 1.2 Portfolio Management Inputs and Outputs Dictionary

### Portfolio Process Template



### Portfolio Management I/O Dictionary

1. Common Inputs and Outputs
2. Key Deliverables
3. Other Inputs and Outputs

#### 1. Common Inputs and Outputs

- Make portfolio management complex
- They are:
  - Portfolio Process Assets
  - Portfolio Reports
  - Organization Process Assets
  - Enterprise Environmental Factors

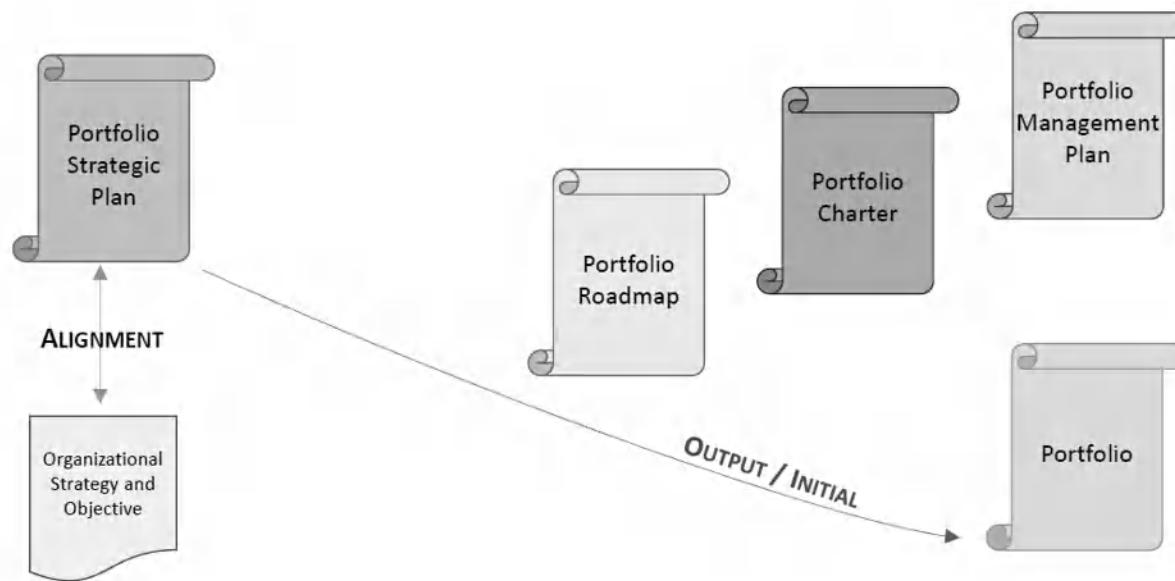
## Input / Output Table Chart

Name of the Input / Output [ No ]						
	Defining Process Group		Aligning Process Group		Authorizing & Controlling	
	In	Out	In	Out	In	Out
Strategic Management		Develop Portfolio Strategic Plan		Manage Strategic Change		
		Develop Portfolio Charter				
		Define Portfolio Roadmap				
Governance Management		Develop Portfolio Management Plan		Optimize Portfolio		Authorize Portfolio
		Define Portfolio				Provide Portfolio Oversight
Performance Management		Develop Portfolio Performance Management Plan		Manage Supply and Demand		
				Manage Portfolio Value		
Communication Management		Develop Portfolio Communication Management Plan		Manage Portfolio Information		
Risk Management		Develop Portfolio Risk Management Plan		Manage Portfolio Risks		

## 2. Key Deliverables

- Portfolio Strategic Plan
- Portfolio Charter
- Portfolio Roadmap
- Portfolio Management Plan

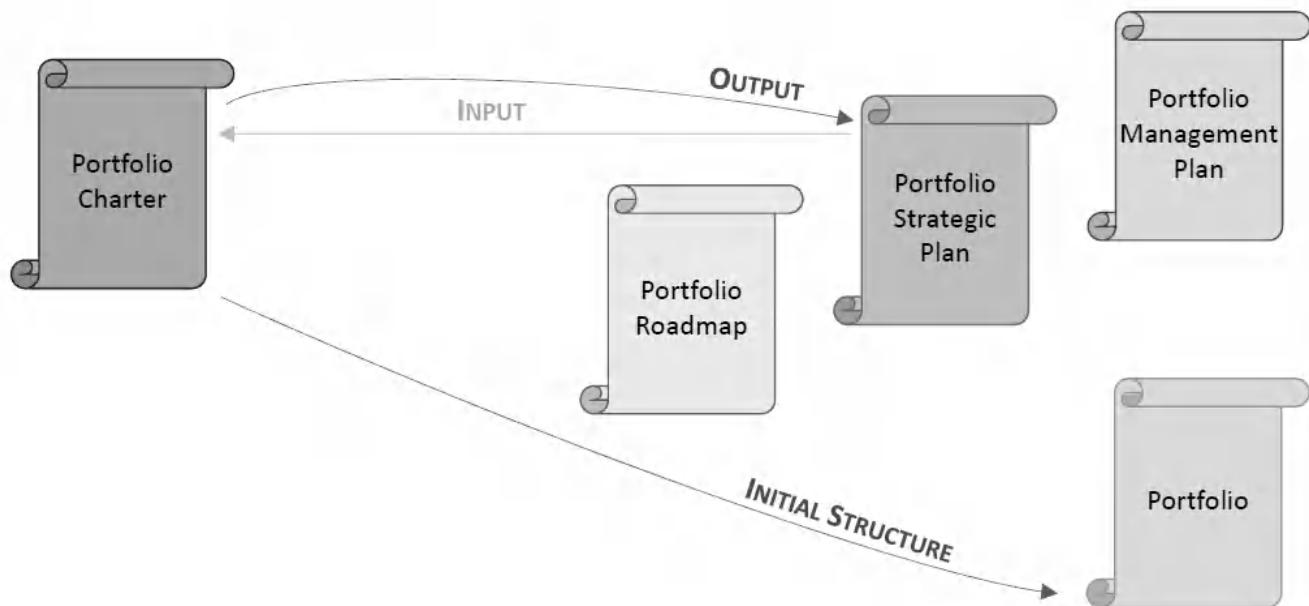
### Portfolio Strategic Plan



**Portfolio Strategic Plan [9]**

		Defining Process Group		Aligning Process Group		Authorizing & Controlling			
		In	Out	In	Out	In	Out	In	Out
Strategic Management			X	X	Manage Strategic Change	X			
	X	Develop Portfolio Charter	X						
	X	Define Portfolio Roadmap							
Governance Management	X	Develop Portfolio Management Plan	X		Optimize Portfolio			Authorize Portfolio	
	X	Define Portfolio						Provide Portfolio Oversight	
Performance Management		Develop Portfolio Performance Management Plan			Manage Supply and Demand				
					Manage Portfolio Value				
Communication Management		Develop Portfolio Communication Management Plan			Manage Portfolio Information				
Risk Management		Develop Portfolio Risk Management Plan			Manage Portfolio Risks				

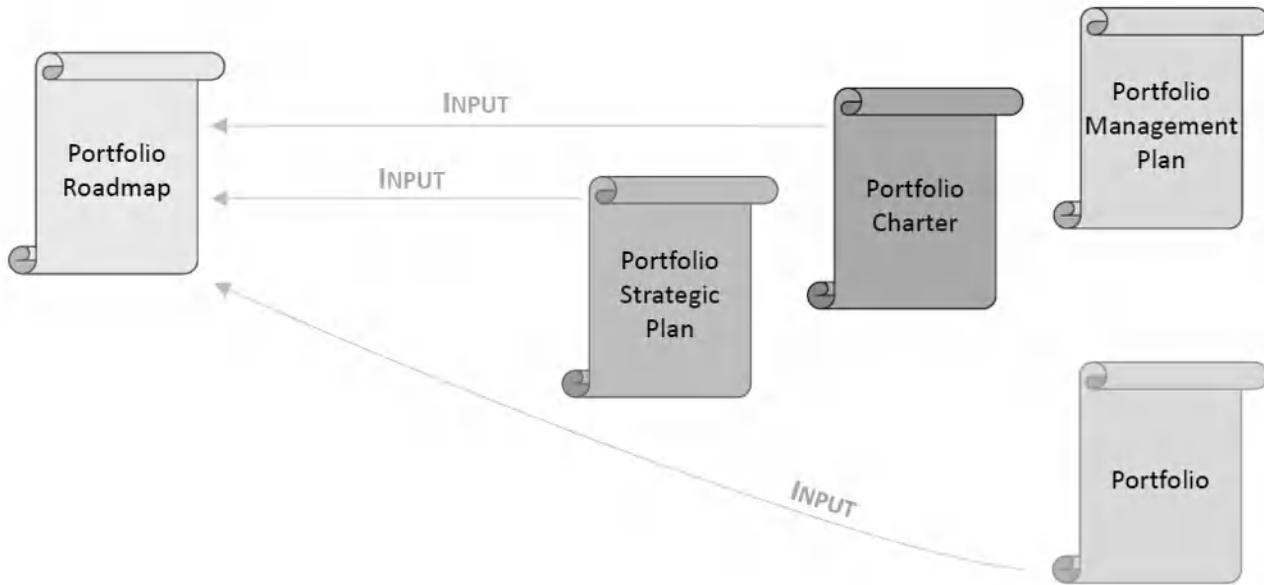
## Portfolio Charter



### Portfolio Charter [6]

Defining Process Group			Aligning Process Group			Authorizing & Controlling		
	In	Out		In	Out		In	Out
Strategic Management			Develop Portfolio Strategic Plan	X		X		
			Develop Portfolio Charter	X				
	X		Define Portfolio Roadmap					
Governance Management	X		Develop Portfolio Management Plan				Authorize Portfolio	
	X		Define Portfolio				Provide Portfolio Oversight	
Performance Management			Develop Portfolio Performance Management Plan			Manage Supply and Demand		
						Manage Portfolio Value		
Communication Management			Develop Portfolio Communication Management Plan			Manage Portfolio Information		
Risk Management			Develop Portfolio Risk Management Plan			Manage Portfolio Risks		

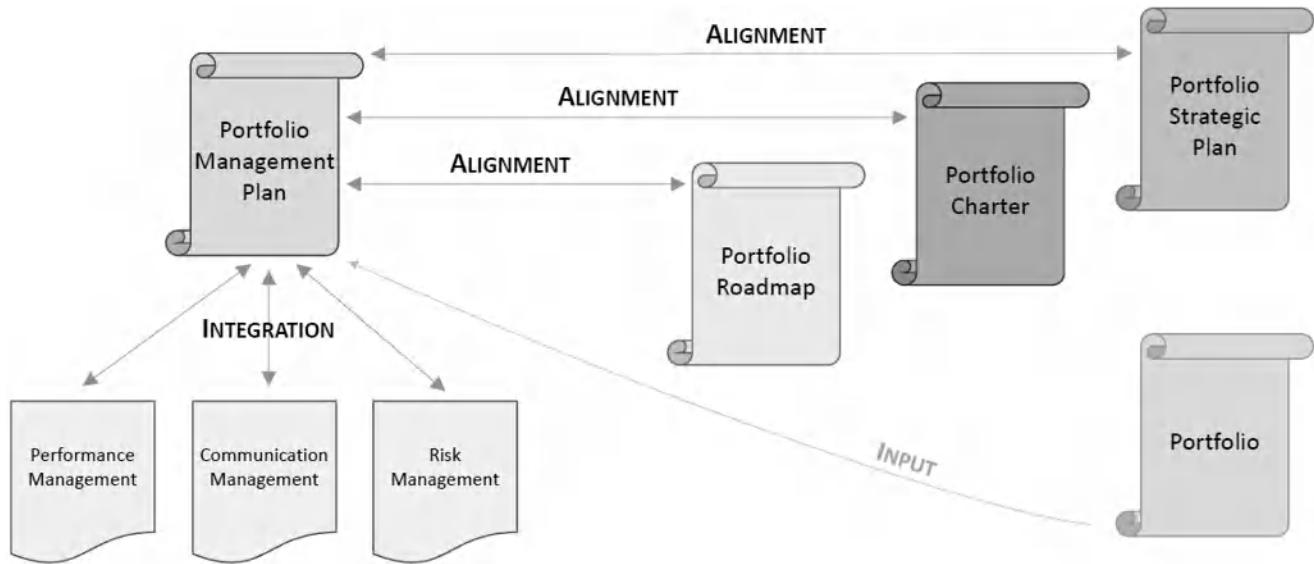
## Portfolio Roadmap



Portfolio Roadmap [11]

Defining Process Group			Aligning Process Group			Authorizing & Controlling		
	In	Out		In	Out		In	Out
Strategic Management			Develop Portfolio Strategic Plan	X		X	Manage Strategic Change	X
			Develop Portfolio Charter					
		X	Define Portfolio Roadmap					
Governance Management	X		Develop Portfolio Management Plan			X	Optimize Portfolio	X
	X		Define Portfolio	X				
Performance Management			Develop Portfolio Performance Management Plan			X	Manage Supply and Demand	
							Manage Portfolio Value	
Communication Management	X		Develop Portfolio Communication Management Plan				Manage Portfolio Information	
Risk Management			Develop Portfolio Risk Management Plan				Manage Portfolio Risks	

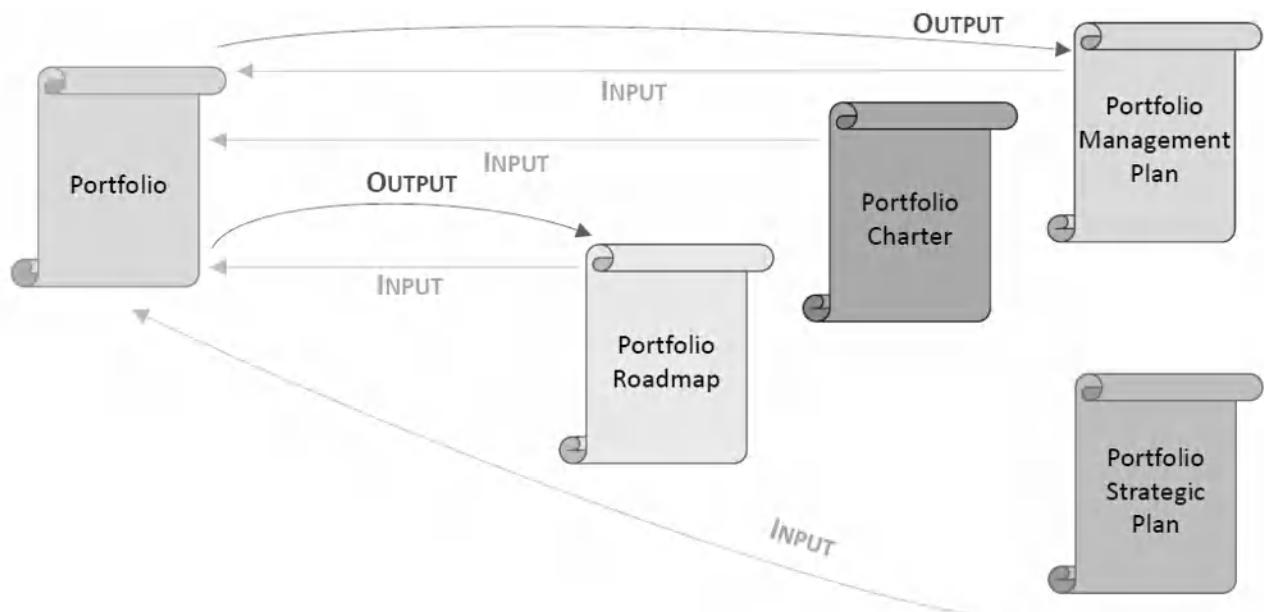
## Portfolio Management Plan



### Portfolio Management Plan [25]

Defining Process Group			Aligning Process Group			Authorizing & Controlling		
	In	Out		In	Out		In	Out
Strategic Management			X	Manage Strategic Change	X			
Governance Management			X	Optimize Portfolio	X	X	Authorize Portfolio	X
	X		X			X	Provide Portfolio Oversight	X
Performance Management	X		X	Manage Supply and Demand	X			
			X	Manage Portfolio Value	X			
Communication Management	X		X	Manage Portfolio Information	X			
Risk Management	X		X	Manage Portfolio Risks	X			

## Portfolio



**Portfolio [17]**

Defining Process Group			Aligning Process Group			Authorizing & Controlling		
	In	Out		In	Out		In	Out
Strategic Management		X	X	Manage Strategic Change	X			
	X							
Governance Management		Develop Portfolio Strategic Plan	X					
		Develop Portfolio Charter						
	X	Define Portfolio Roadmap						
Performance Management		Develop Portfolio Management Plan		X	Optimize Portfolio	X	X	Authorize Portfolio
	X	Define Portfolio	X				X	Provide Portfolio Oversight
Communication Management		Develop Portfolio Performance Management Plan		X	Manage Supply and Demand	X		
					Manage Portfolio Value			
	X	Develop Portfolio Communication Management Plan						
Risk Management		Develop Portfolio Risk Management Plan		X	Manage Portfolio Information			
				X	Manage Portfolio Risks			

### 3. Other Inputs and Outputs

- Organizational Strategy and objectives
- Inventory of Work

## 2. Portfolio Strategic Management

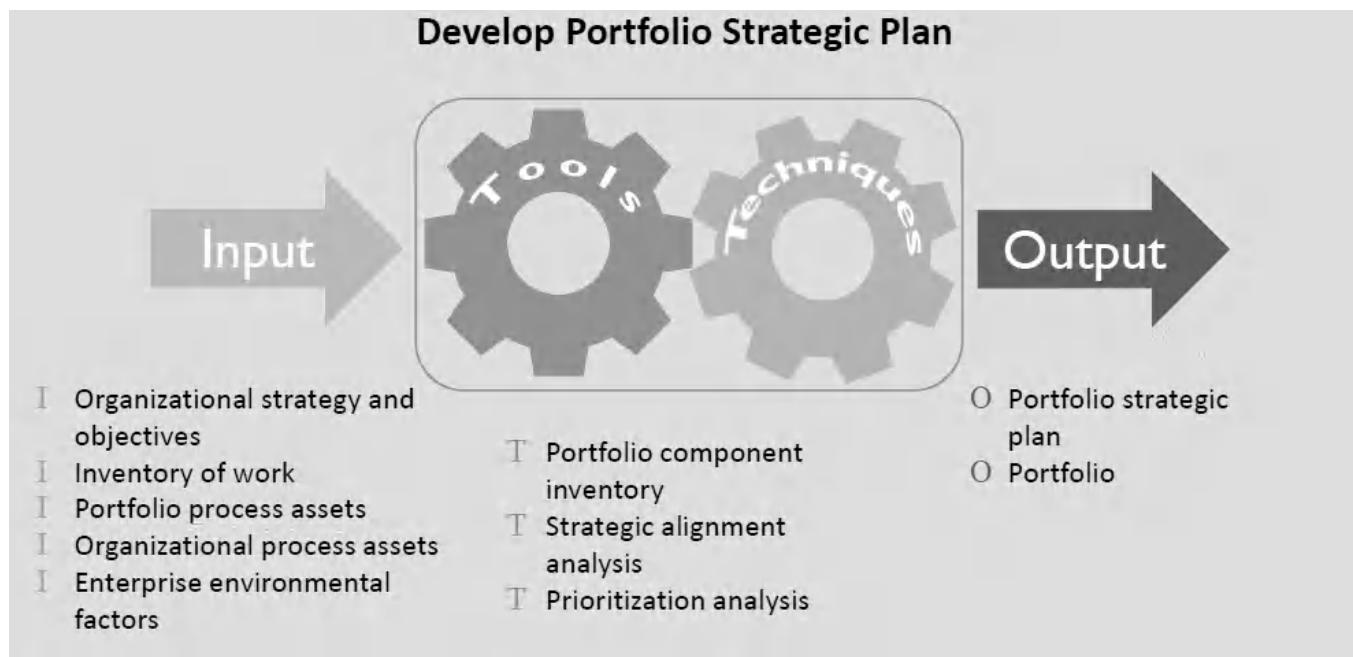
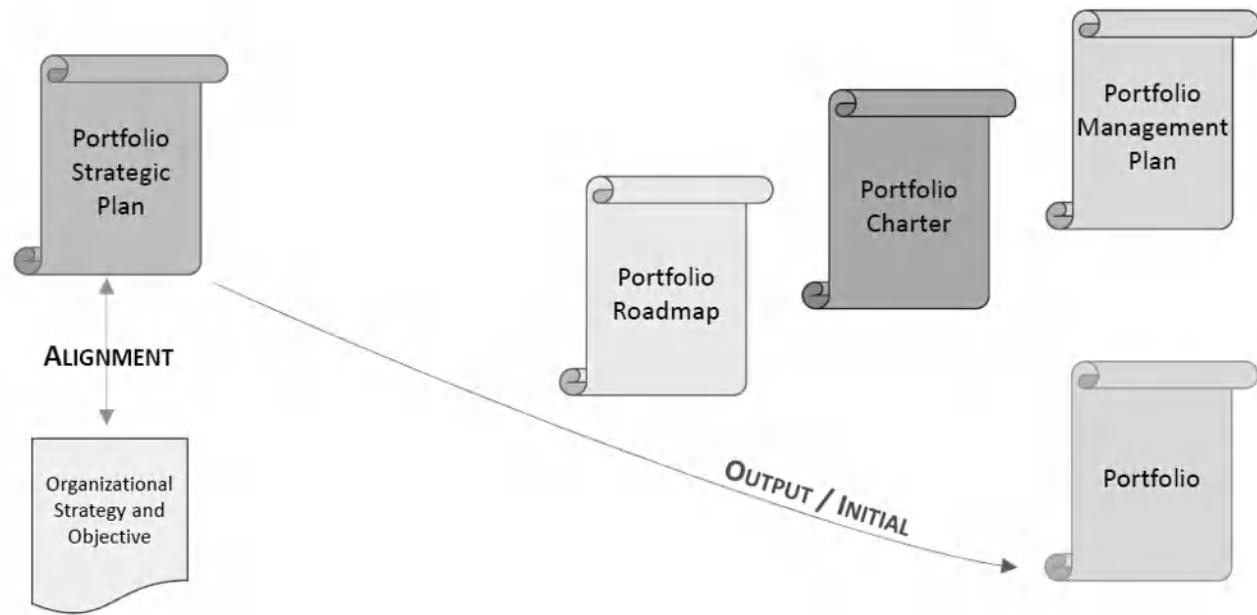
### Introduction to Strategic Management

- Portfolio Strategic Management Processes to develop:
  - Portfolio Strategic Plan
  - Portfolio Charter
  - Portfolio Roadmap
- Helps to Assess and manage the alignment of these three deliverables to the organizational strategy and objectives
- Managing, monitoring, and responding to ongoing changes in organizational strategy and in portfolio components

### Strategic Management Knowledge Area



## Section – I Develop Portfolio Strategic Plan



## Example: Strategic Plan Template

### Portfolio Vision

- Enable the organization technology to hold the first position in the mobile services market

### Portfolio Objectives

- Enhance the existing rules and financials to comply with the new regulation rules before the given deadline
- Implement the new technology to provide better mobile services to our customers
- Add new billing channels to increase the revenue and get more customer satisfaction
- Increase the organization market share

### Resources

- Funds: portfolio components budget should not exceed \$ 32.2 M in 2017 and 2018
- Functional managers will avail internal resources to contribute to this portfolio components
- Department heads will provide resources to support the planning and contracting phase

### Initiatives

- Comply with the new telecommunications regulation
- Open new billing channels in the Billing system
- Enhance the software and the hardware to be more competitive
- Penetrate new marketing

## **Portfolio Benefits**

- Increase the market share by 12%
- Open 3 new Billing Channels
- New regulation compliance

## **Portfolio Value Expected**

- Increase the Market Share by 12% by end of 2018
- Comply with the new regulations by Q2 2018

## **Communication Requirements**

- Hold Portfolio Review meeting monthly with the Board of Directors
- Establish steering committee for each program in the portfolio and to have at least one member of the Board of Directors

## **Assumptions**

- New regulations will not be changed before mid-2018
- Existing market surveys will be used to understand the customer requirements

## **Constraints**

- Compliance with the regulations should be completed before end of Q2 2018
- No overtime is accepted, but bonus on achieved objectives is allowed

## **Dependencies**

- Billing system enhancements will depend on the network enhancements
- Regulation compliance will mandate changes in the current financial system

## Risks

- New unproven technology may be unstable
- Regulation authority may add new rules before end of 2017
- Organization capacity problem because of the new initiatives

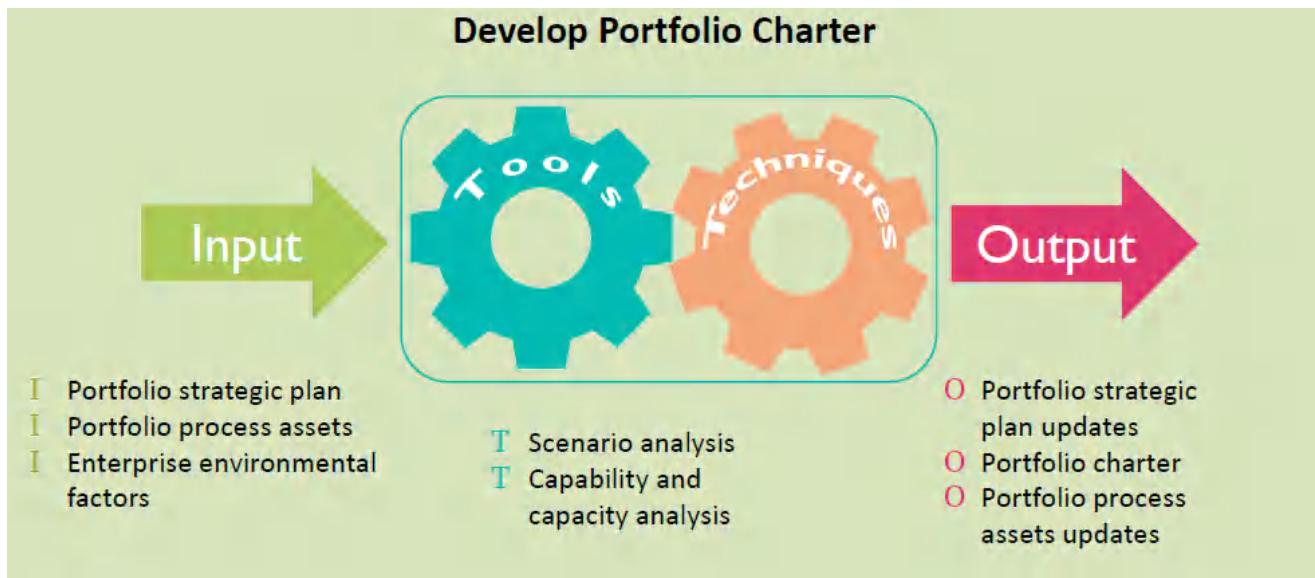
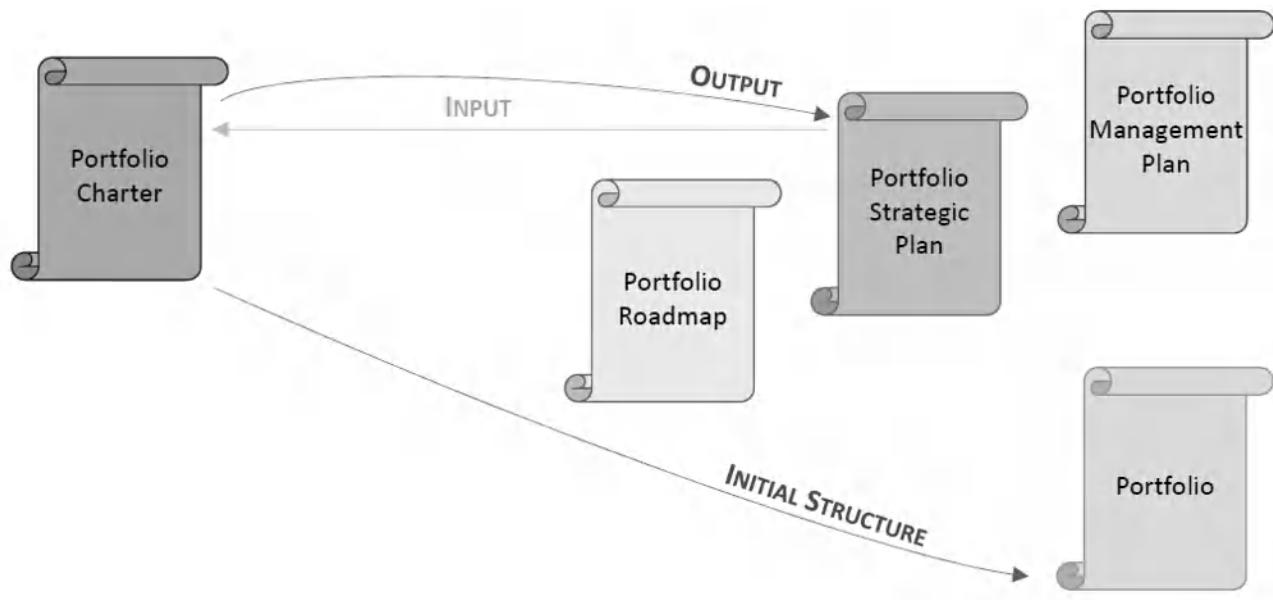
## Portfolio Structure

- Marketing Campaign Program
- New Billing Program
- New Network Devices Implementation Program
- Regulation Compliance Project
- Financial System Updates Project
- IT Operation Management

## Portfolio Prioritization Model

- Scoring techniques will be used in the Technology Portfolio
- The compliance with the regulation objective – Score Weight of 30%
- The time constraints of the related organization objectives – Score Weight of 25%
- Dependencies between the Portfolio Components – Score Weight of 15%
- Utilizing internal resources – Score Weight of 10%
- Saving funds to the Portfolio – Score Weight of 10%
- The customer Surveys – Score Weight of 10%

## Section 2 - Develop Portfolio Charter



## Example – Portfolio Charter Template

This document formally authorizes Mr. James as the portfolio manager to the Technology portfolio and allows him to allocate resources to the portfolio component.

### Portfolio Sponsor

- Mr. Allan, the CFO, is appointed as the Technology Portfolio Sponsor

### Portfolio Structure

The Technology portfolio has the following components:

- Marketing Campaign Program
- New Billing Program
- New Network Deceives Implementation Program
- Regulation Compliance Project
- Financial System Updates Project
- IT Operation Management

### Major Stakeholders

- Board of Directors members
- C-level managers
- Organization Heads of Departments
- Component sponsors
- Component managers

### Communication Requirements

- Bi-weekly portfolio component review with the portfolio manager
- Weekly status report for each portfolio component

## **Critical Success Factors**

- Team work
- Leadership and experience of the component manager
- On time and accurate status reporting for the portfolio and its components to support decision making

## **High Level Timelines**

- Billing Transformation Program to be completed by end of 2018
- Regulation Compliance to be live by Q2 2018
- New Network Devices Implementation to go live by Q2 2018
- Financial System Updates to be completed by Q2 2018
- IT Operation Management to comply with the ITIL by end of 2017

## **High Level Scope**

- Marketing Campaign to penetrate the market and increase the market share
- New Billing system with new billing channels (at least three new channels)
- New Network devices Implementation Program
- New Organization Regulations which are complied with the new regulations from the telecommunication authority
- Financial System enhancements as per the organization requirements
- IT Operation Management processes and procedures to comply with ITIL

## **Assumptions**

- New regulations will not be changed before mid-2018
- Existing market surveys will be used to understand the customer requirements

## Constraints

- Compliance with the regulations should be completed before end of Q2 2018
- No overtime is accepted, but bonus on achieved objectives is allowed

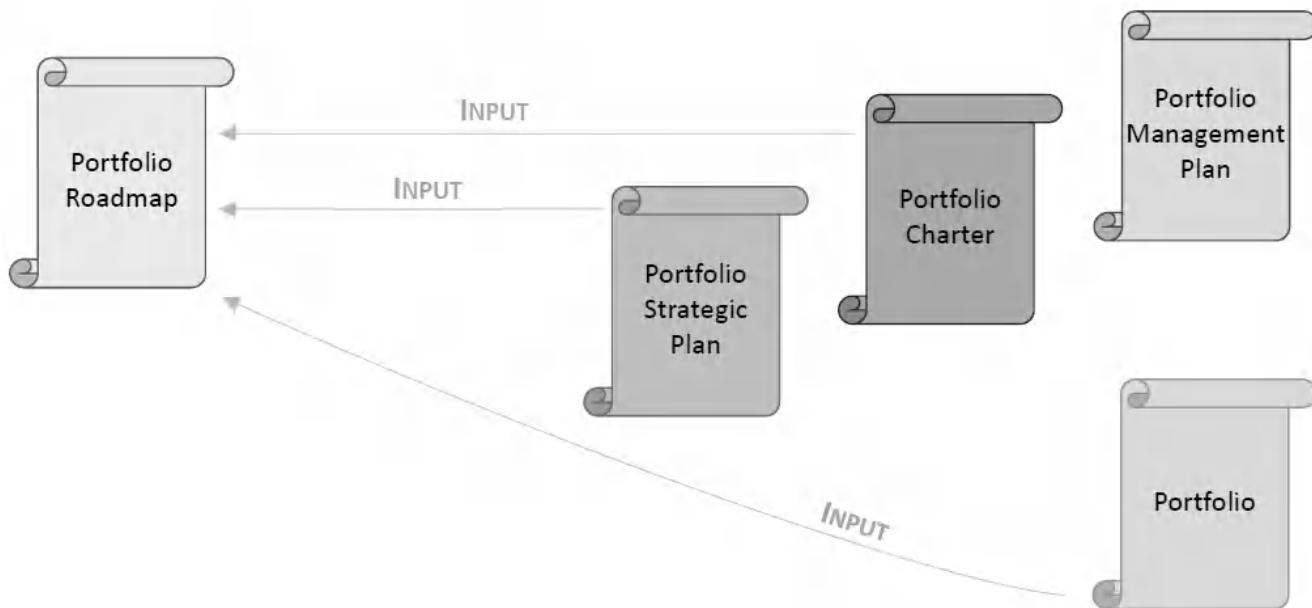
## Dependencies

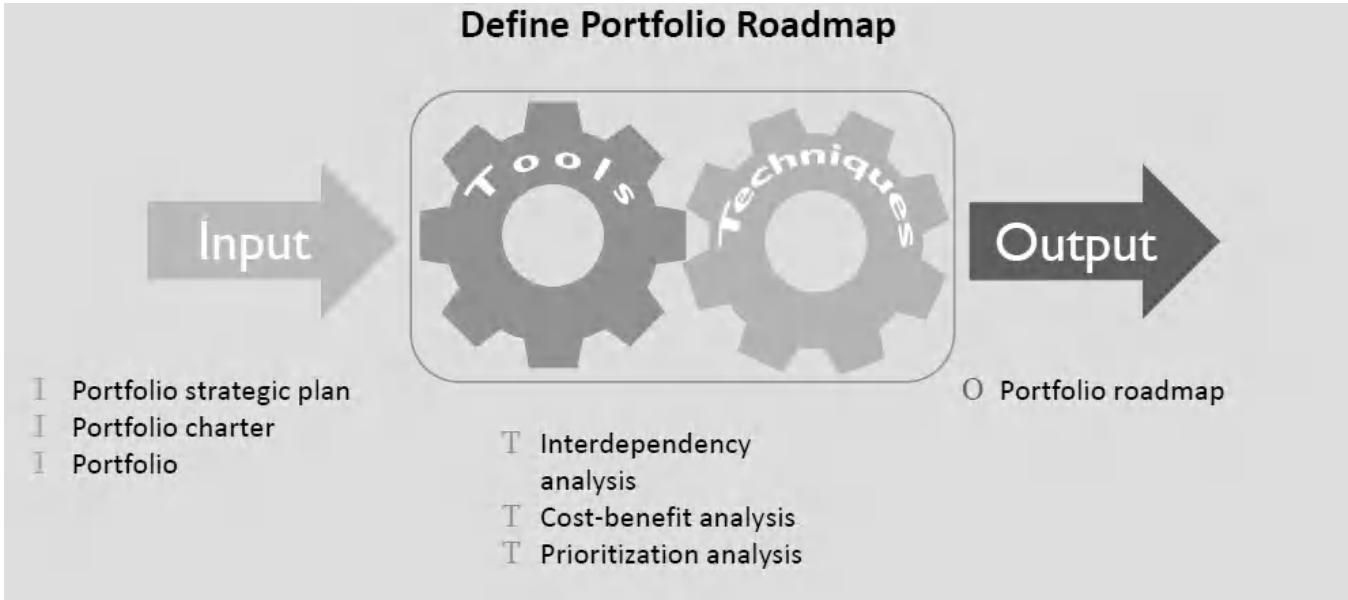
- Billing system enhancements will depend on the network enhancements
- Regulation compliance will mandate changes in the current financial system

## Risks

- New unproven technology may be unstable
- Regulation authority may add new rules before end of 2017
- Organization capacity problem because of the new initiatives Develop Portfolio

## Section – III Develop Portfolio Roadmap





## Portfolio Roadmap

- High-level strategic direction and information in a chronological fashion for portfolio management
- Graphically depicts all portfolio elements
- Program level and project level roadmaps
- Initial basis on which dependencies are established
- High-level prioritization mapping of the portfolio over time

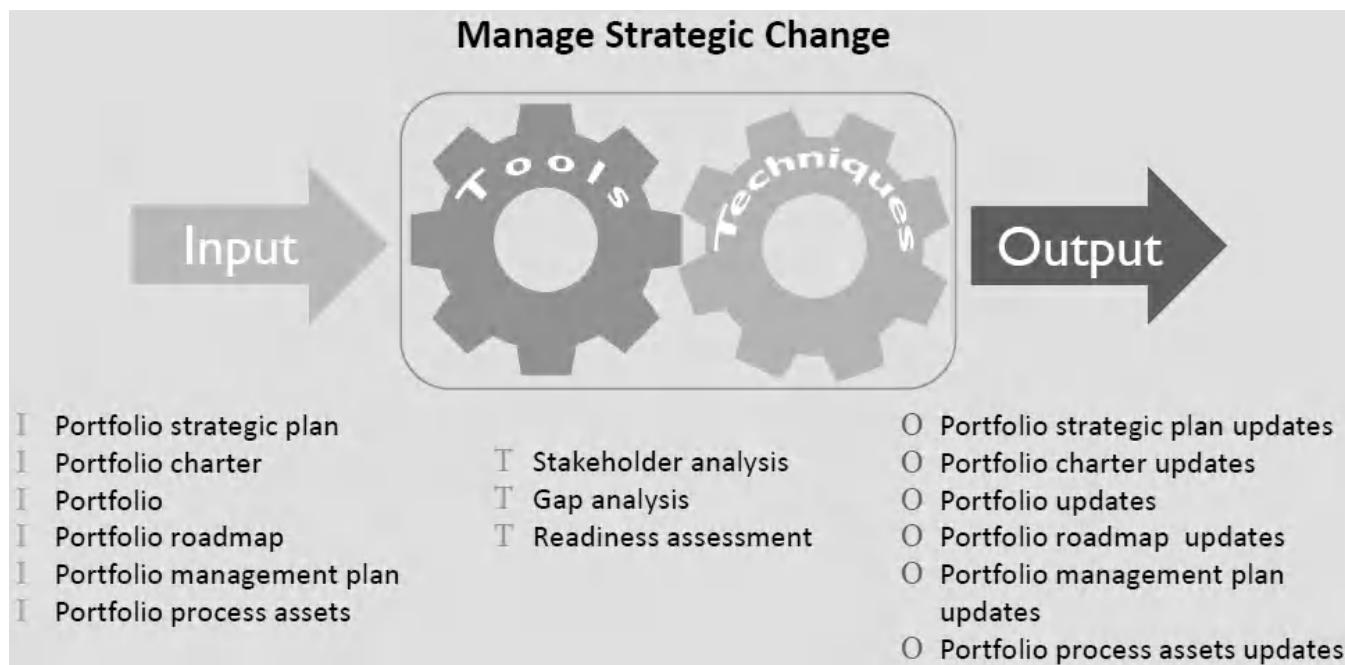
## Roadmap includes:

- List of components
- Components Dependencies and major risks
- Components High level timeline
- Key milestones and deliverables
- Components prioritization

## Example – Portfolio Roadmap

	Key Milestones					Major Deliverables				
	M1	M2	M3	M4	M5	D1	D2	D3	D4	D5
MC Program	Design Completed Oct-2017	Pilot Jan-2017	UAT May-2018	Go Live Aug-2018	Operation Handover Sep-2018	Analysis	Design	UAT Result	Audit Report	Go Live Assessment
Transformation Program	Requirements Gathered Sep-2017	New Design Completed Nov-2017	UAT1 Mar-2017	UAT2 Jun-2018	Go Live Oct-2018	New Design Testing Scenarios	UAT Result	Audit Report	Go Live Assessment	
NND Program	Architecture Completed Feb-2017	HW Delivery Aug-2017	Installation Oct-2017	Go Live Apr-2018	Operation Handover Apr-2018	Design	Prototype	Installation	Operation Book	
Regulation Compliance Project	Requirements Gathered Apr-2017	Legal Review Jul-2017	GAP Analysis Oct-2017	New Regulation Completed Mar-2018	Go Live Apr-2018	Regulation Requirements	Legal GAP	Financial GAP	New Regulations	
ERP Project	Requirements Gathered Oct-2017	Customization Completed Dec-2017	Training Completed Jan-2018	Acceptance Mar-2018	Go Live Apr-2018	Requirements	Full-Cycle Demo	Training	UAT Results	Go Live Assessment
IT Operation Management						Analyze Current Processes	ITIL Compliance GAP	ITIL Implementation	Update Monitoring Tools	

## Section IV Managing Strategic Change



### 3. Portfolio Governance Management

#### Portfolio Governance Management

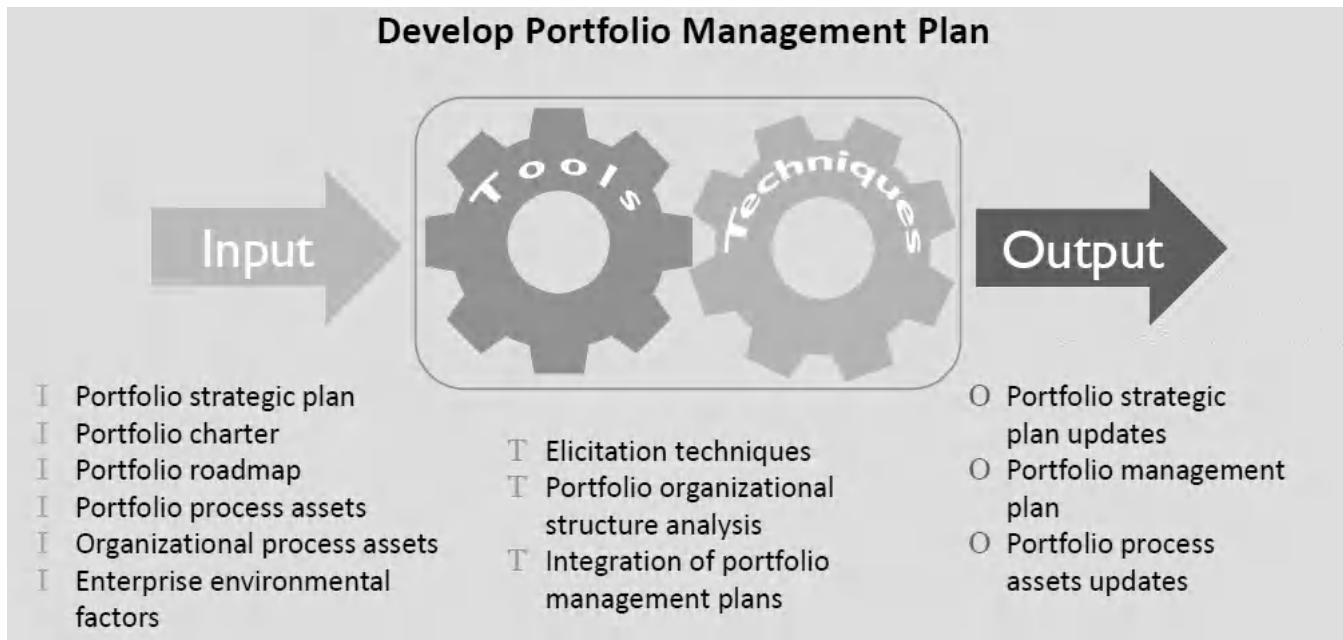
The processes in the Portfolio Governance Management are responsible for Developing the Portfolio Management Plan, allocating resources and authorizing the portfolio components

- Optimizing the portfolio
- Monitoring and reporting the progress

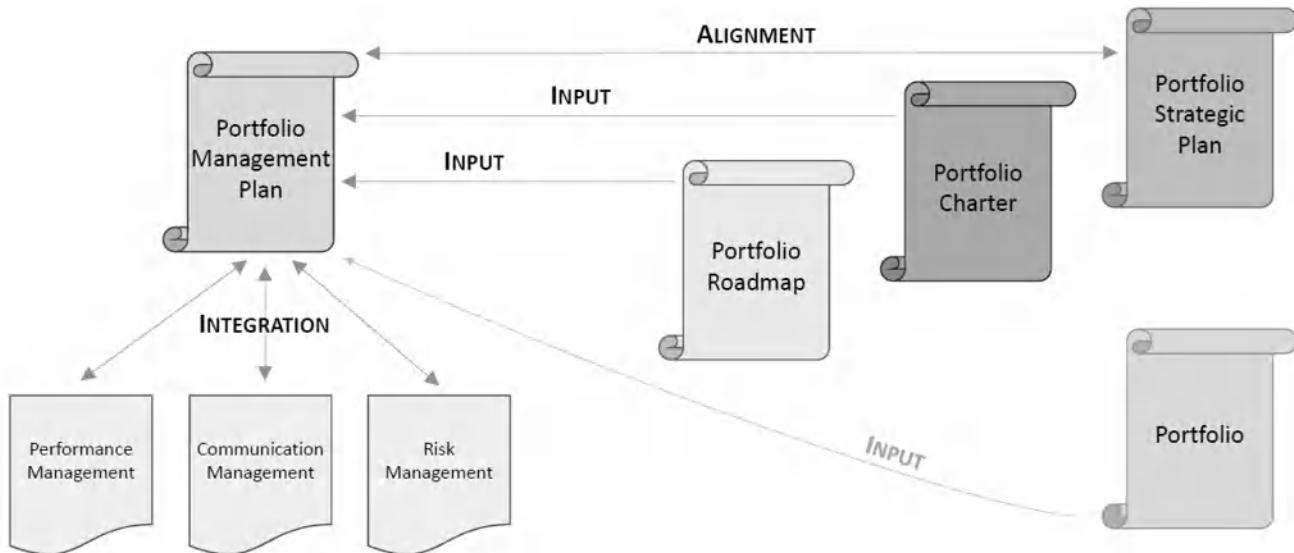
#### Governance Management Knowledge Area



## Develop Portfolio Management Plan



## Portfolio Management Plan



## Example - Management Plan

### Governance Model

- Component manager is direct reporting to the Portfolio Manager
- Component manager is getting portfolio sponsor support in organization resource allocation and in executing his component roadmap
- Internal resource allocation will be suggested by the functional manager and approved by the component manager
- Missing resources to be escalated to the Portfolio manager by the component manager
- Major component risks and issues will be escalated to the portfolio manager during the review meetings and status reporting

### Portfolio Oversight

- Portfolio KPI's are created by the portfolio management team, reviewed and agreed by the Organization Center of Excellence
- Portfolio external/internal audit will be executed on the agreed components
- Portfolio dashboard will be distributed to the portfolio sponsor to review the portfolio KPI's

### Managing Strategic Change

- Strategic change will lead to portfolio review to ensure compliance with the new strategic changes or to define the gap to be closed
- If gap found portfolio manager will assess the change and create implementation plan with the help and commitments of the component changes
- Portfolio sponsor will accept the strategic change plan before implementing it
- Details of the managing strategic change process is described in a separate document

## **Change Control and Management**

- Changes within the portfolio agreed scope, schedule and deliverables are controlled by the change control process
- Impact analysis is required for the change, then change approval is obtained as per the approval process
- Details are covered in the change control process which is described externally to this document

Three subsidiary plans are connected to the Portfolio Management Plan:

- Performance Management Plan
- Communication Management Plan
- Risk Management Plan

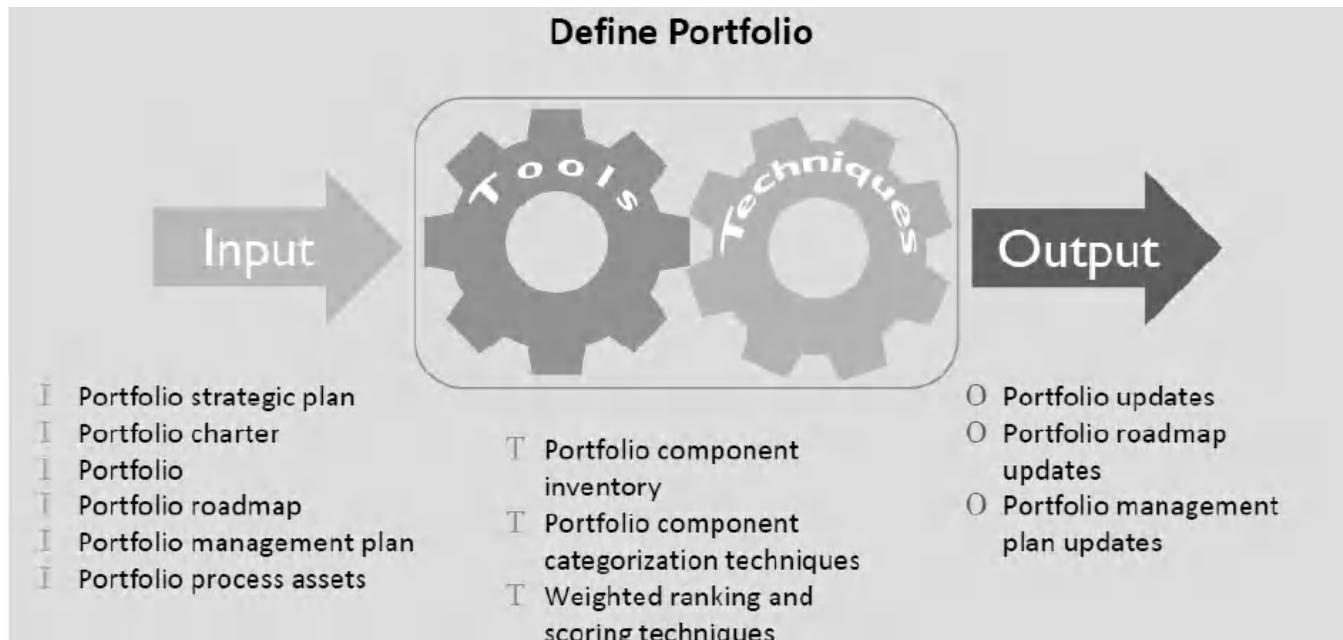
## **Procurement Planning**

- Portfolio procurement is executed as per the organization regular procurement process
- The portfolio is handled as a separate cost center which is managed by the portfolio manager and all procurements should be approved by him

## **Portfolio Prioritization Model**

- Scoring techniques will be used in the Technology Portfolio
- The compliance with the regulation objective – Score Weight of 30%
- The time constraints of the related organization objectives – Score Weight of 25%
- Dependencies between the Portfolio Components – Score Weight of 15%
- Utilizing internal resources – Score Weight of 10%
- Saving funds to the Portfolio – Score Weight of 10%
- The customer Surveys – Score Weight of 10%

## Define Portfolio



### Define Portfolio – Major Activities

- Identifying qualified portfolio components
- Categorizing portfolio components
- Evaluating portfolio components

### Portfolio Component Inventory

Key descriptors may include: -

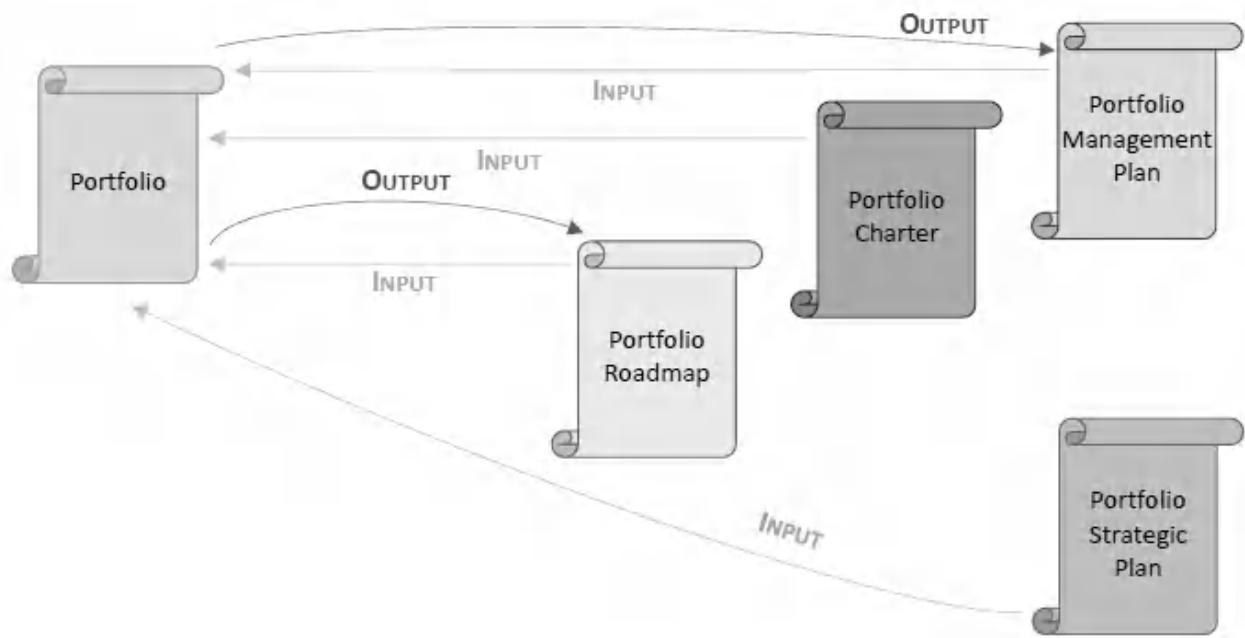
- Portfolio component number
- Portfolio component code
- Portfolio component description
- Type of portfolio component
- Strategic goals supported
- Quantitative benefits
- Qualitative benefits
- Portfolio component customer

- Portfolio component sponsor
- Key stakeholders
- Resources required

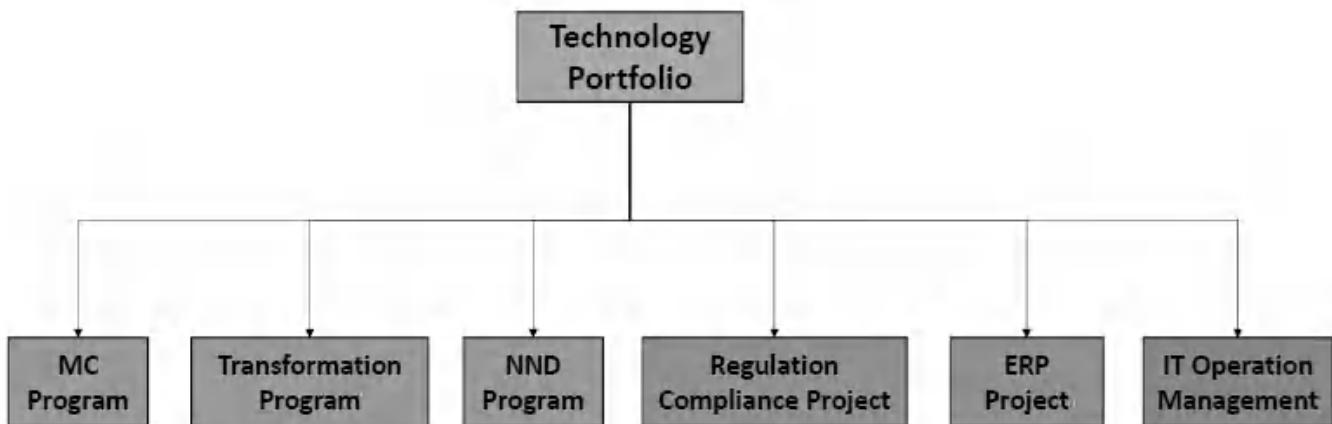
## **Portfolio Component Categorization Techniques**

- Evaluation criteria should be quantifiable
- Evaluation criteria examples:
  - Increased profitability
  - Risk reduction
  - Efficiency improvement
  - Regulatory/compliance
  - Market share increase
  - Process improvement
  - Continuous improvement
  - Foundational
  - Business imperatives
- Descriptors and criteria are used for filtering the portfolio components

## Portfolio

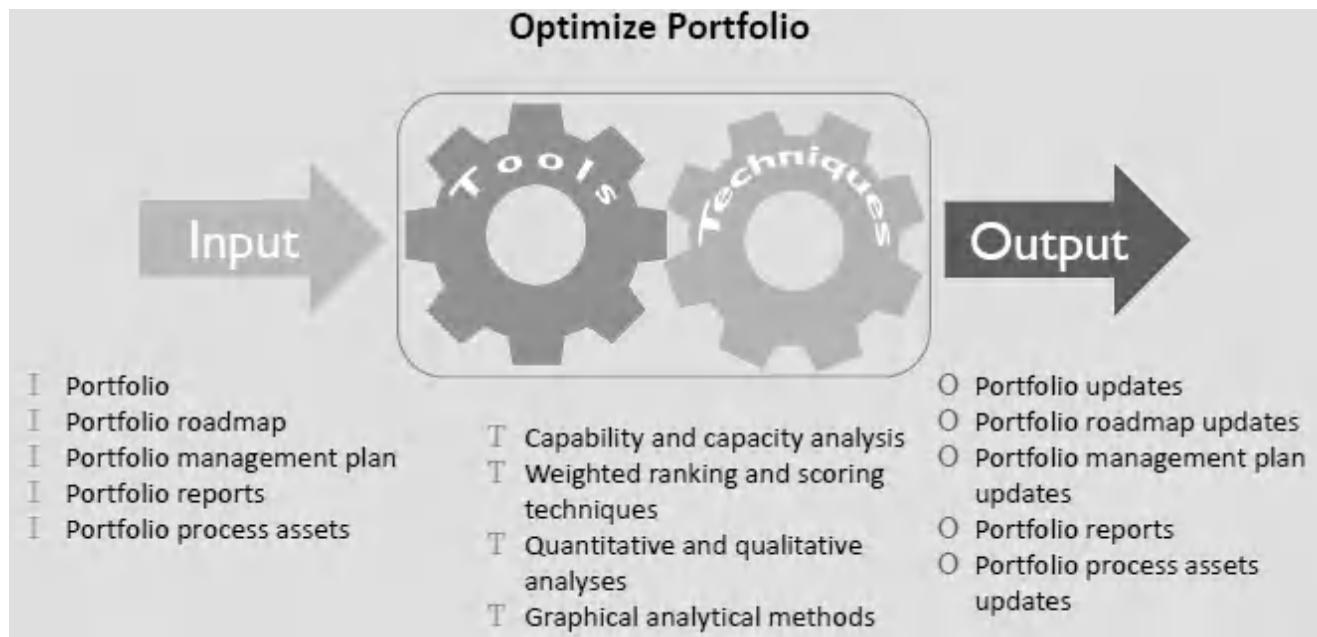


## Technology Portfolio Example



Technology Portfolio Component	Budget	Duration	Resources	Priority (1 is the highest)	Related Objectives
MC Program (Marketing Campaign Prog.)	\$ 10M	13 Months	5 Marketing Users Contractors Advertisements	3	Objective # 4
Transformation Program (Billing Transformation Prog.)	\$ 3M	15 months	5 SME Hardware 20 Contractors	2	Objective # 2 Objective # 3
NND Program (New Net Devices Program)	\$ 2M	16 Months	2 Network Engineer Hardware Devices 8 Contractors	2	Objective # 2
Regulation Compliance Project	\$ 700 K	14 Months	1 Legal User 3 Contractors	1	Objective # 1
ERP Project	\$ 2.1 M	7 Months	15 Business Users 1 DB Admin 1 System Admin 10 Contractors	4	Objective # 1
IT Operation Management	\$ 500 K / Month	Continue	2 Leaders 3 Administrators 10 Operators	1	Objective # 2

## Optimize Portfolio

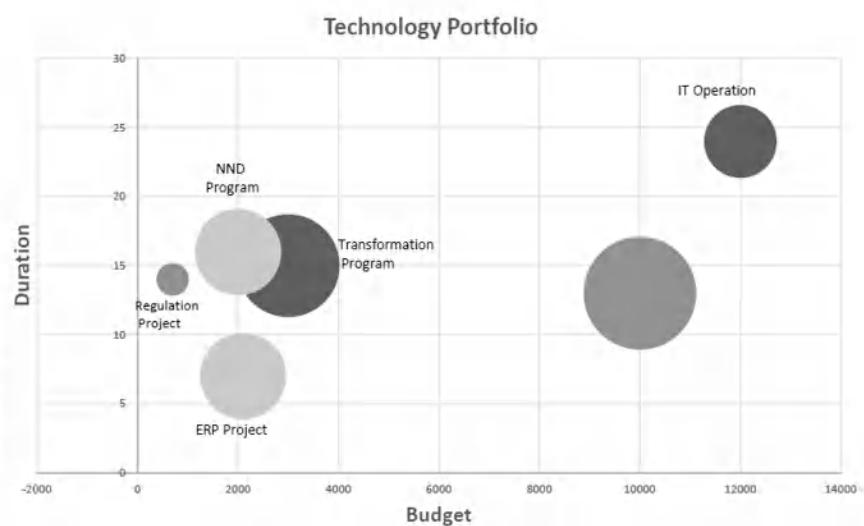


## Optimize Portfolio – Major Activities

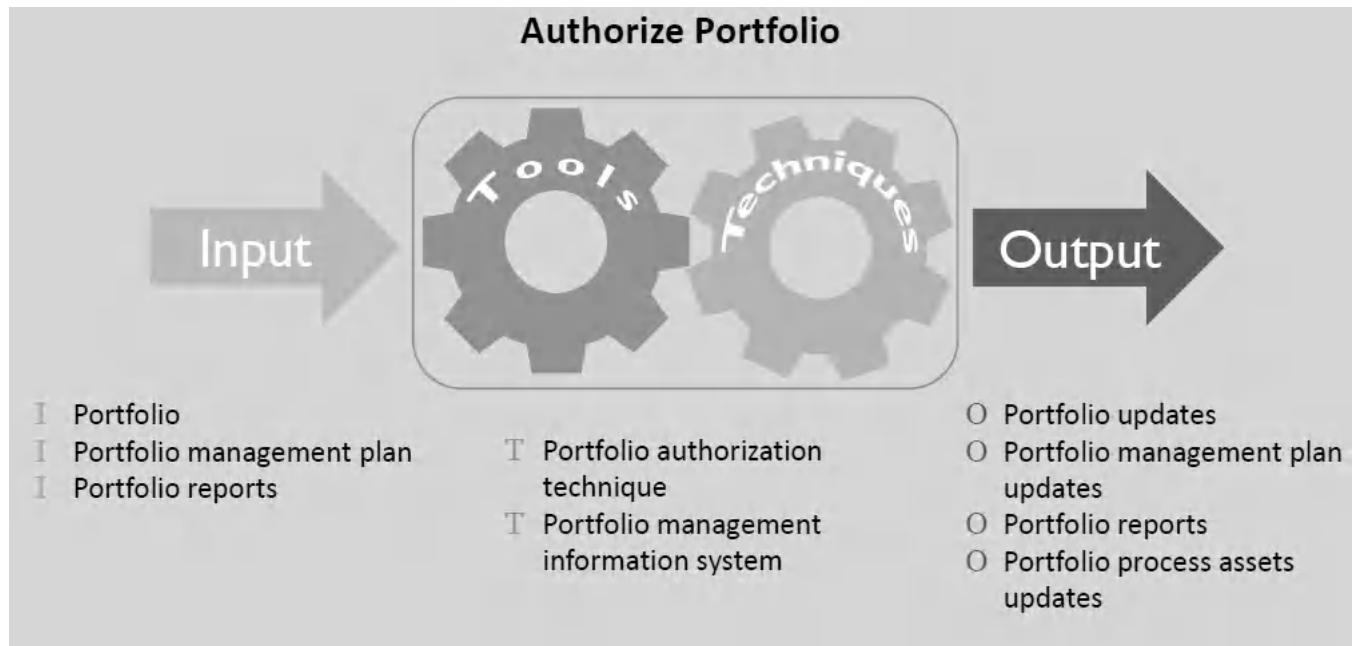
- Assigning or reassigning, scoring, or weighting criteria for ranking portfolio components
- Performing risk analysis on portfolio components
- Evaluating and determining performance and expected value of portfolio components
- Determining resource capability and resource capacity available
- Determining constraints for portfolio components
- Determining which portfolio components priority
- Identifying portfolio components to be suspended, reprioritized, or terminated

## Graphical Analytical Methods – Bubble Chart

	MC Program	Trans. Program	NND Program	Reg. Project	ERP Project	IT Opr.
Budget	10000	3000	2000	700	2100	12000
Duration	13	15	16	14	7	24
Risk	120	100	70	10	70	50
Process Improv.	[Grey]	[Dark Grey]	[Light Grey]	[Grey]	[Light Grey]	[Dark Grey]



## Authorize Portfolio

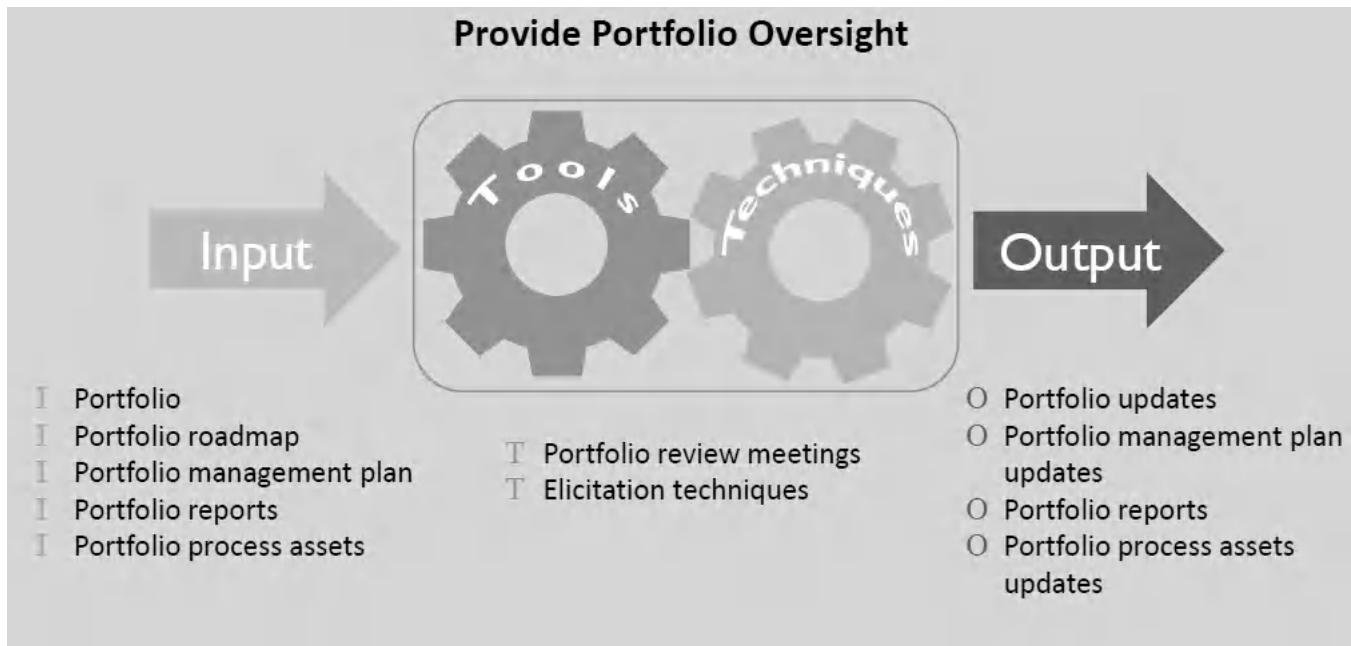


### Authorize Portfolio – Major Activities

- Authorizing portfolio component proposal development or portfolio component execution
- Allocating resources to authorized portfolio components
- Reallocating funding and resources from deactivated and terminated portfolio components
- Communicating changes and decisions for the authorized portfolio components

Authorize Portfolio

## Provide Portfolio Oversight



### Provide Portfolio Oversight – Major Activities

- Reviewing information
- Conducting governance meetings
- Ensuring compliance with organizational standards
- Reporting portfolio changes and information
- Communicating governance decisions

## 4. Portfolio Performance Management

Portfolio performance management plans, measures and monitors the organizational value of a portfolio in a systematic manner, based on the achievements against strategic goals. Part of the process of portfolio performance management is to manage how key resources, such as human resources, finances and assets are sourced to obtain optimal results.

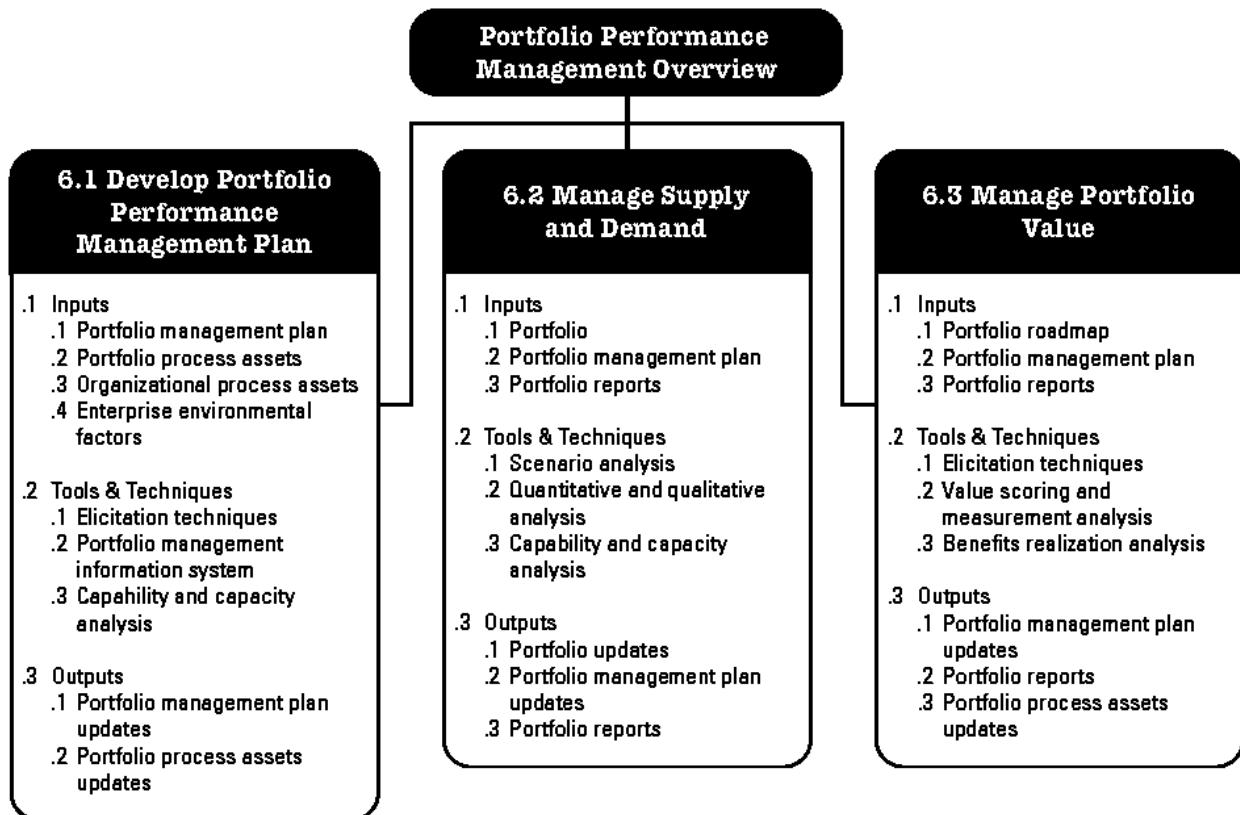
It must be linked to organizational strategy as well, which is expressed through its vision and mission, taking into account an organization's orientation to market, environmental factors and competition. Through an effective organizational strategy, an entity will be able to define directions for development and growth, and performance metrics for success.

For easy portfolio performance management, best practices for dashboards should be followed:

- A singular dashboard should not contain too many KPIs. Break them down into separate dashboards based on common performance metrics.
- Present a dashboard in a clutter-free and organized manner. When using chart tiles, for example, keep tile sizes uniformed.
- Highlight specific data point that need to stand out.
- Take advantage of all the tools you can integrate with a dashboard, such as drill down, tool tip, zoom, filter and color adjustment.

## Portfolio Management Process

- Develop Portfolio Management Plan: Developing the performance management plan as to how portfolio value is defined and realized through the portfolio measurements and targets, alignment to organizational strategy and objectives, and roles and responsibilities in executing the plan
- Manage Supply and Demand: Identifying and allocating the required portfolio resources capacity and capabilities according to each component proposal or plan
- Manage Portfolio Value: Measuring, capturing, validating and reporting portfolio value at an aggregate level delivered by the portfolio components with the goal of maximizing the return on investment



## 6.1 Develop Portfolio Management Plan



Portfolio Management Plan [25]								
	Defining Process Group			Aligning Process Group			Authorizing & Controlling	
	In		Out	In		Out	In	Out
		Develop Portfolio Strategic Plan		X	Manage Strategic Change	X		
Strategic Management		Develop Portfolio Charter						
		Define Portfolio Roadmap						
Governance Management		Develop Portfolio Management Plan	X	X	Optimize Portfolio	X	X	Authorize Portfolio
	X	Define Portfolio	X				X	Provide Portfolio Oversight
Performance Management	X	Develop Portfolio Performance Management Plan	X	X	Manage Supply and Demand	X		
				X	Manage Portfolio Value	X		
Communication Management	X	Develop Portfolio Communication Management Plan	X	X	Manage Portfolio Information	X		
Risk Management	X	Develop Portfolio Risk Management Plan	X	X	Manage Portfolio Risks	X		

### Portfolio Roadmap [11]

Defining Process Group			Aligning Process Group			Authorizing & Controlling		
	In	Out		In	Out		In	Out
Strategic Management		Develop Portfolio Strategic Plan		X	Manage Strategic Change	X		
		Develop Portfolio Charter						
		Define Portfolio Roadmap	X					
Governance Management	X	Develop Portfolio Management Plan		X	Optimize Portfolio	X		
	X	Define Portfolio	X				X	Provide Portfolio Oversight
Performance Management		Develop Portfolio Performance Management Plan			Manage Supply and Demand			
				X	Manage Portfolio Value			
Communication Management	X	Develop Portfolio Communication Management Plan			Manage Portfolio Information			
Risk Management		Develop Portfolio Risk Management Plan			Manage Portfolio Risks			

### Portfolio Process Assets [24]

Defining Process Group			Aligning Process Group			Authorizing & Controlling		
	In	Out		In	Out		In	Out
Strategic Management	X	Develop Portfolio Strategic Plan		X	Manage Strategic Change	X		
	X	Develop Portfolio Charter	X					
		Define Portfolio Roadmap						
Governance Management	X	Develop Portfolio Management Plan	X	X	Optimize Portfolio	X		
	X	Define Portfolio					X	Provide Portfolio Oversight
Performance Management	X	Develop Portfolio Performance Management Plan	X		Manage Supply and Demand			
					X	Manage Portfolio Value		
Communication Management	X	Develop Portfolio Communication Management Plan	X	X	Manage Portfolio Information	X		
Risk Management	X	Develop Portfolio Risk Management Plan	X	X	Manage Portfolio Risks	X		

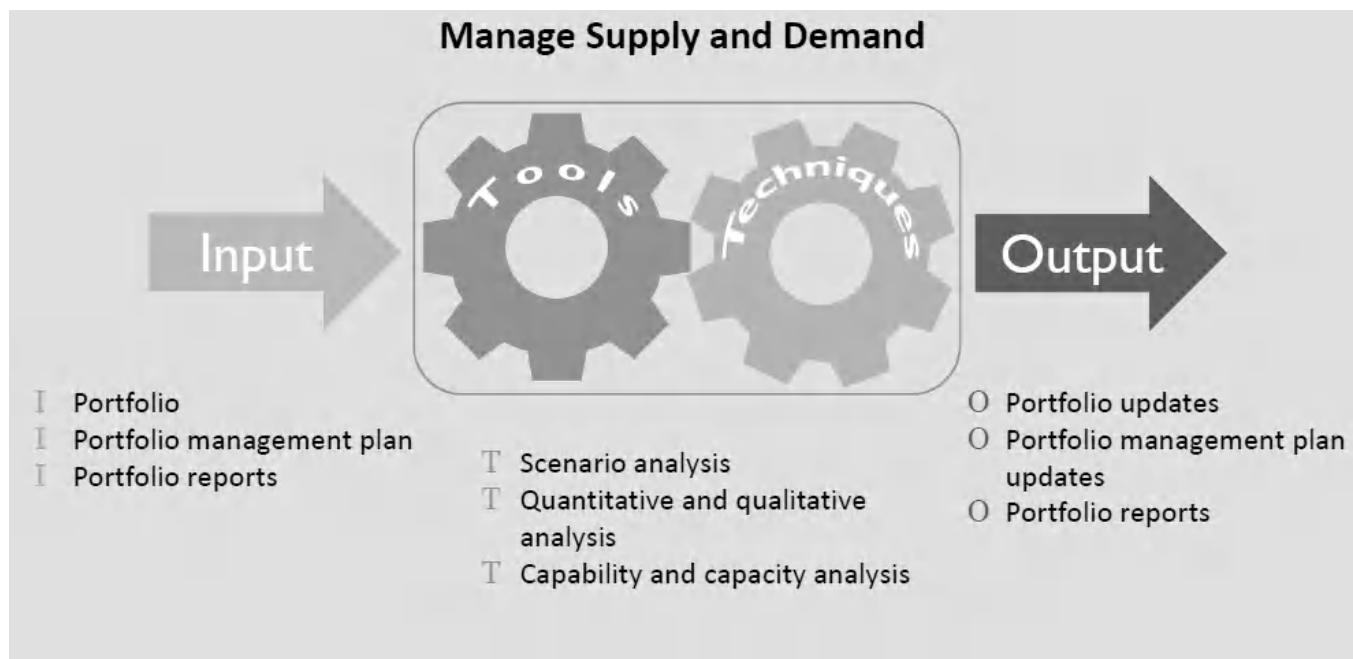
### Quantitative and Qualitative Analysis [4]

Defining Process Group		Aligning Process Group		Authorizing & Controlling		
	TT		TT		TT	
Strategic Management	Develop Portfolio Strategic Plan		Manage Strategic Change			Strategic Management
	Develop Portfolio Charter					
	Define Portfolio Roadmap					
Governance Management	Develop Portfolio Management Plan		Optimize Portfolio	X	Authorize Portfolio	Governance Management
	Define Portfolio				Provide Portfolio Oversight	
Performance Management	Develop Portfolio Performance Management Plan		Manage Supply and Demand	X		Performance Management
			Manage Portfolio Value			
Communication Management	Develop Portfolio Communication Management Plan		Manage Portfolio Information			Communication Management
Risk Management	Develop Portfolio Risk Management Plan	X	Manage Portfolio Risks	X		Risk Management

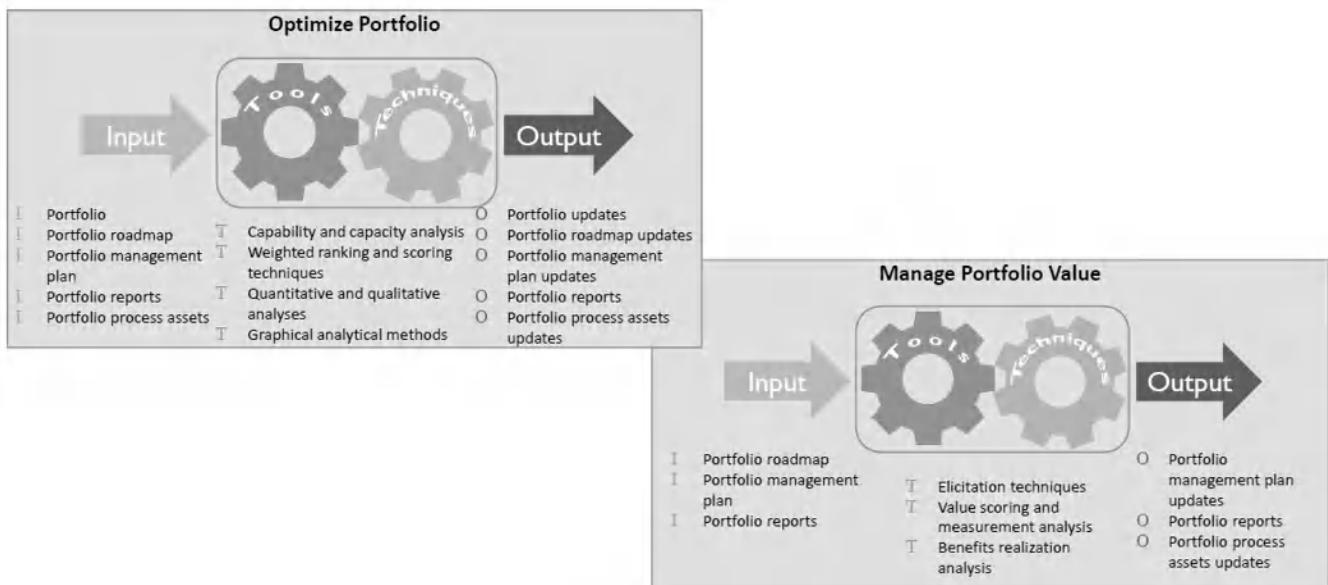
### Portfolio Reports [14]

Defining Process Group			Aligning Process Group		Authorizing & Controlling		
In		Out	In		Out		
Strategic Management	Develop Portfolio Strategic Plan		Manage Strategic Change				Strategic Management
	Develop Portfolio Charter						
	Define Portfolio Roadmap						
Governance Management	Develop Portfolio Management Plan		X	Optimize Portfolio		X	Governance Management
	Define Portfolio					X	
Performance Management	Develop Portfolio Performance Management Plan		X	Manage Supply and Demand	X		Performance Management
			X	Manage Portfolio Value	X		
Communication Management	X	Develop Portfolio Communication Management Plan		X	Manage Portfolio Information	X	Communication Management
Risk Management	Develop Portfolio Risk Management Plan		X	Manage Portfolio Risks	X		Risk Management
			X				

## 6.2 Manage Supply and Demand



## 6.3 Manage Portfolio Value



## Portfolio Success Through Effective Portfolio Performance Management



For portfolio performance management to be successful, sponsors, stakeholders and portfolio managers should well-versed on what portfolio management entails. The focus is to achieve organizational strategies and objectives, but the problem is that implementation could take months or years, and usually spans across the entire organization. So, measuring and achieving portfolio success is often complex, time-consuming and labor-intensive.

But there are ways to measure success. According to the Project Management Institute (PMI), the success of a portfolio is measured in terms of the performance of aggregate investment, and the benefits resulting from a portfolio. This means measurement happens over an extended period, depending on the lifespan of a portfolio. Benefits, on the other hand, refer to those that arise from a portfolio's associated business case that promise benefits. Most of the time, they are realized after a project or program is closed.

## Portfolio Success Criteria & Factors in Portfolio Performance Management

### What better way to measure a portfolio's success than to use a set of criteria?

In a seminal paper written in 1952, Harry Markowitz laid down the foundation for the Modern Portfolio Theory (MPT) that helps determine the specific mix of investments that will generate the highest return, given an acceptable level of risk.

The four criteria are:

- Financial value of a portfolio
- Strategic success
- Selecting and Balancing
- Project success

Together they create a portfolio performance management plan that is designed to maximize a portfolio's financial value, link its success to organizational strategy, create a balance between the projects within a portfolio and an organization's capacity, and to achieve as much as the average single project success.

While a success criterion matters in portfolio performance management, nothing is more critical than a portfolio's success factor that, according to Bolles & Hubbard (2007), influences a portfolio's successful implementation within an organization. If all success factors are addressed and followed, portfolio success is guaranteed.

Portfolio success factors include, but not limited to:

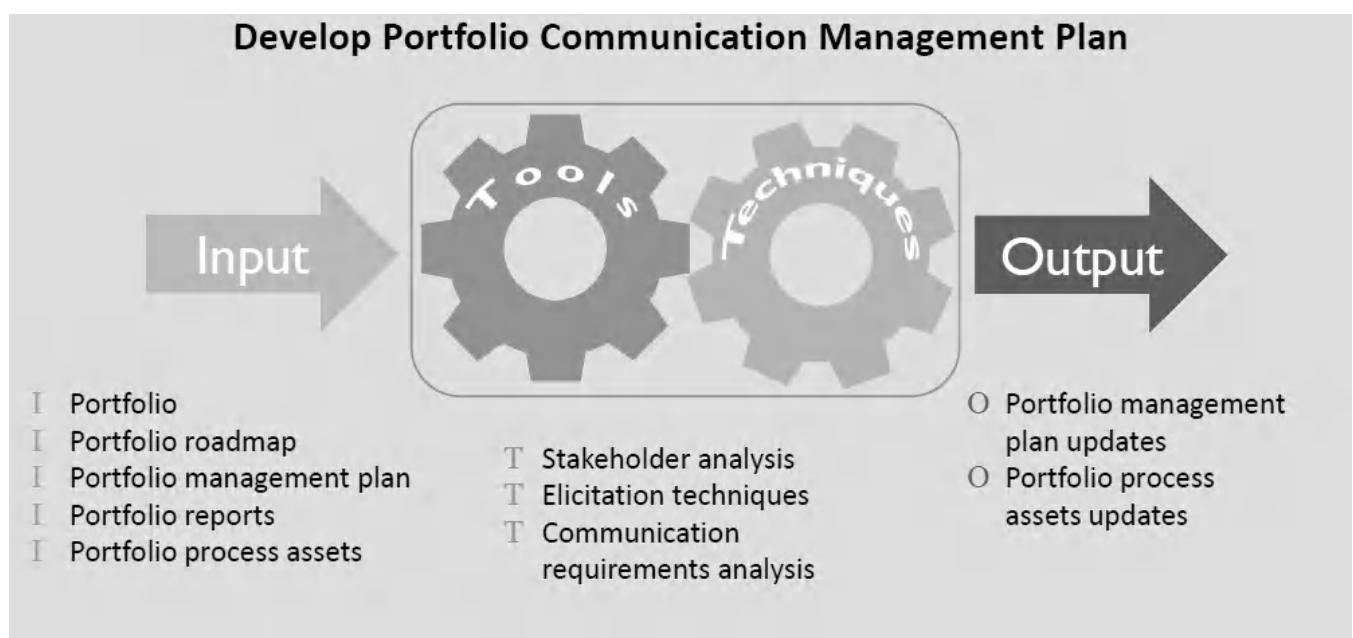
- Total support and commitment from top executives, particularly in decision-making approach.
- Effective and clear communication of strategic objectives, so everyone across the organization is well-aware of the decision-making process and organizational goals.
- Strategic alignment of the investment selected with the framework to be used.
- An institutionalized management process to facilitate constant evaluation.
- Align decision-making with governance framework.
- Create an integrated discipline of program/project management
- Risk and performance measurement at a consistent and continuous level
- Review portfolios in support of realigning investment priorities
- Balance investments effectively
- Turn strategy into operational excellence
- Components prioritization is also a key success factor in the Portfolio performance management process. There is a positive relation among portfolio selection, strategy success and project portfolio performance.

# 5. Portfolio Communication Management

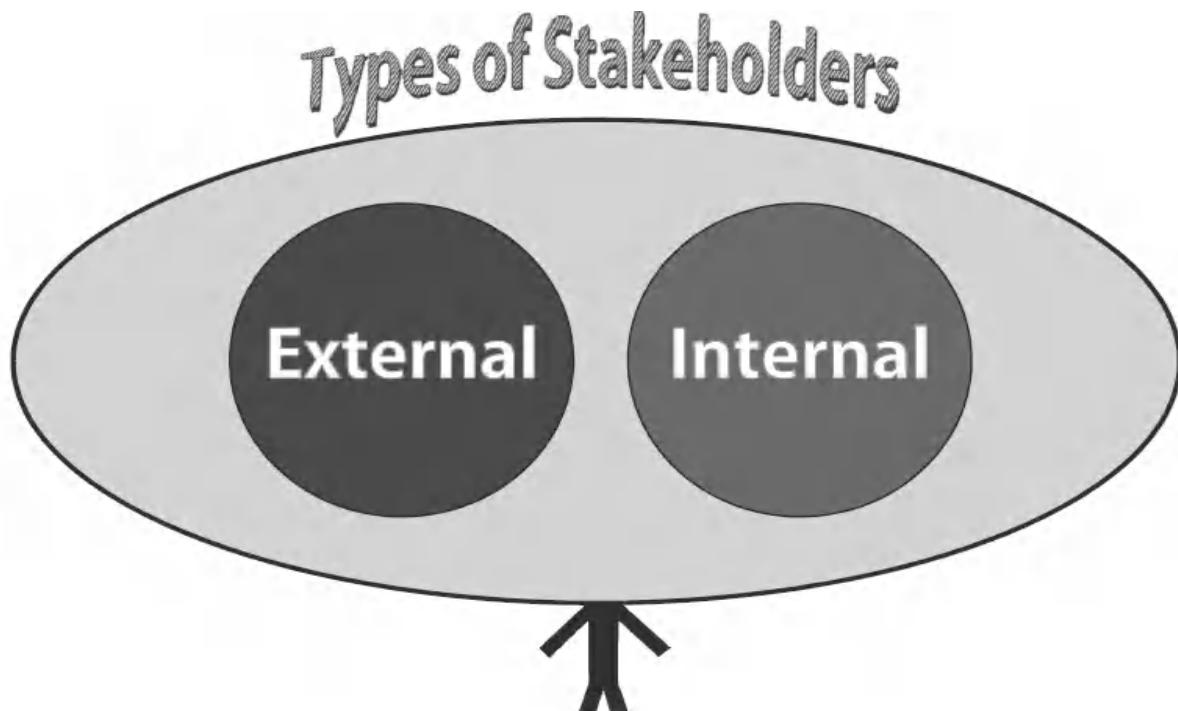
## Portfolio Communication Management Knowledge Area



### Develop Portfolio Communication Management Plan

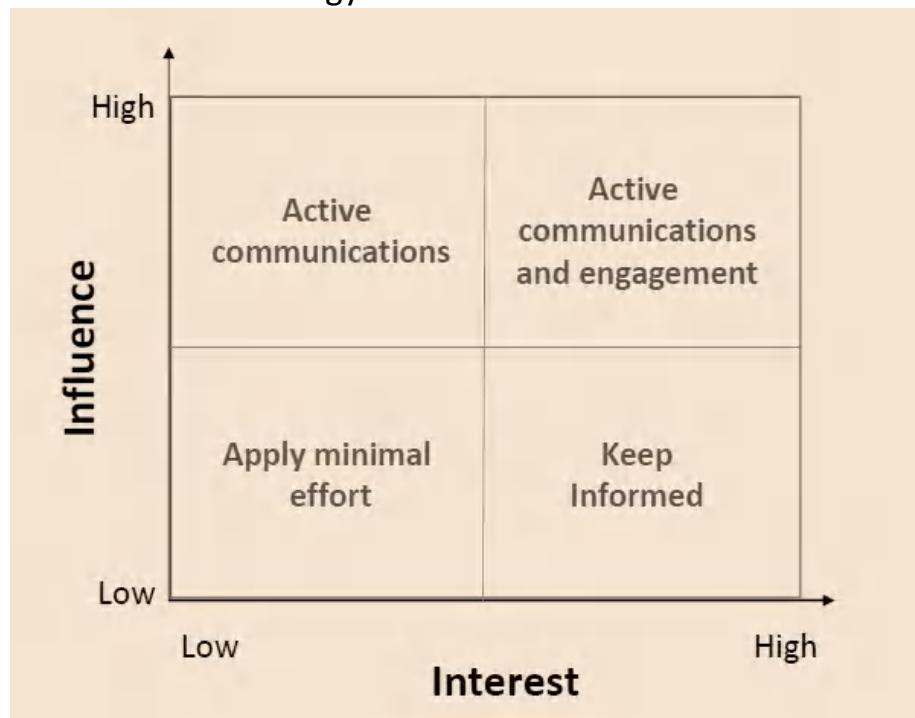


## Stakeholder Analysis



## Stakeholder Communication Strategy Matrix

Stakeholder Communication Strategy Matrix



## Stakeholder Matrix Example

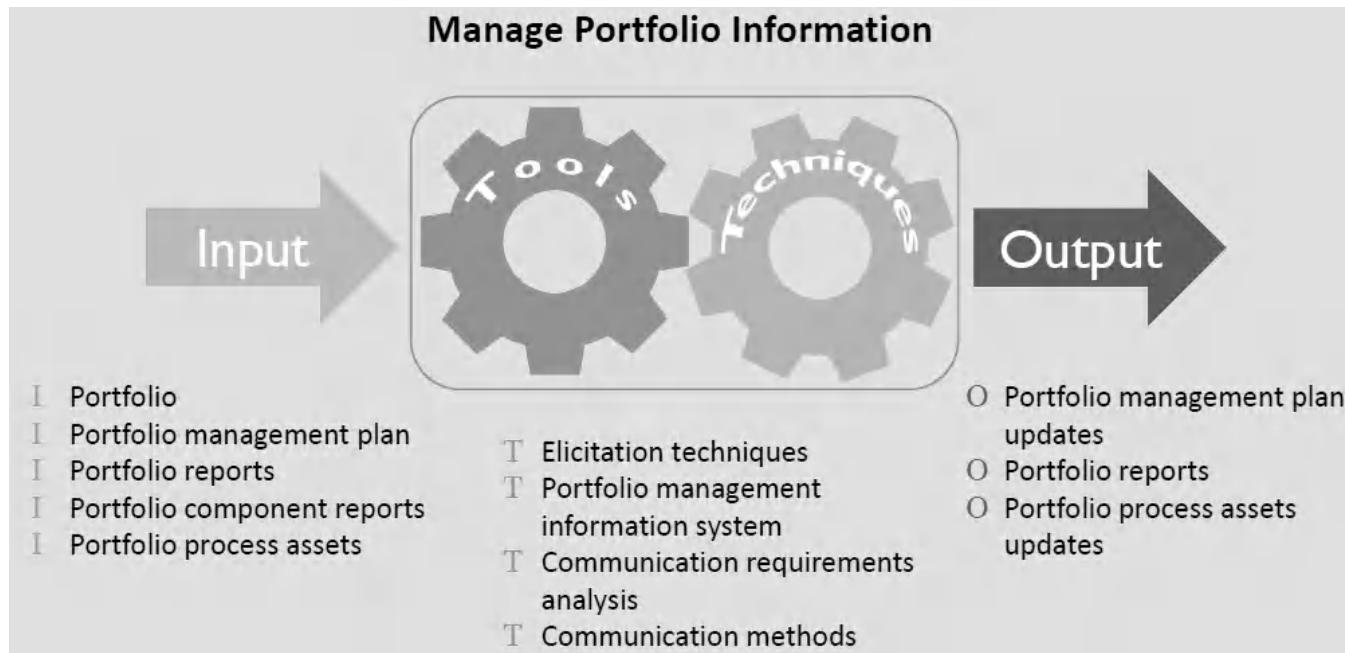
Stakeholder Groups	Stakeholder Roles	Stakeholder Interests	Stakeholder Expectations
Board of Directors members	<ul style="list-style-type: none"> <li>Provides directions and strategy changes</li> </ul>	<ul style="list-style-type: none"> <li>Aligned with Organization objectives and strategies</li> </ul>	<ul style="list-style-type: none"> <li>Portfolio Monthly review meeting</li> <li>Organization strategies alignment issues</li> </ul>
Portfolio Sponsor	<ul style="list-style-type: none"> <li>Provides portfolio funding</li> <li>Provides portfolio resources</li> <li>Provides portfolio high-level scoping</li> <li>Provides directions to the portfolio manager</li> </ul>	<ul style="list-style-type: none"> <li>Portfolio benefits and outcomes that meet the organization's goals</li> </ul>	<ul style="list-style-type: none"> <li>Weekly portfolio review meeting</li> <li>Bi-weekly portfolio component review meeting</li> <li>To be informed on ad-hoc issues outside the regular meetings</li> </ul>
Portfolio Manager	<ul style="list-style-type: none"> <li>Manage the portfolio and delivery it as per the charter</li> <li>Provides directions to the component manager</li> </ul>	<ul style="list-style-type: none"> <li>Portfolio progress</li> <li>Concerns of sponsors and board of directors</li> </ul>	<ul style="list-style-type: none"> <li>To receive all comments and requests from the other stakeholders</li> <li>To distribute the accurate information to the right stakeholders on time using suitable media</li> </ul>
Organization Heads of Departments	<ul style="list-style-type: none"> <li>Make required organization resources available to work in the portfolio</li> </ul>	<ul style="list-style-type: none"> <li>Organization resources utilized correctly within the portfolio and execute their jobs in the departments</li> </ul>	<ul style="list-style-type: none"> <li>Weekly component status report</li> <li>Issue related to organization resources</li> </ul>
Component sponsors	<ul style="list-style-type: none"> <li>Provides component funding</li> <li>Provides component resources</li> <li>Provides component high-level scoping</li> <li>Provides directions to the component manager</li> </ul>	<ul style="list-style-type: none"> <li>Component benefits and outcomes that meet the portfolio objectives and organization's goals</li> </ul>	<ul style="list-style-type: none"> <li>Weekly component review meeting</li> <li>To be informed on ad-hoc issues outside the regular meetings</li> </ul>
Component managers	<ul style="list-style-type: none"> <li>Manage the component and deliver it as per the charter</li> </ul>	<ul style="list-style-type: none"> <li>Component progress</li> <li>Expected component benefits as per the component charter</li> </ul>	<ul style="list-style-type: none"> <li>To receive all comments and requests from the other stakeholders</li> <li>To distribute the accurate information to the right stakeholders on time using suitable media</li> </ul>

## Communication Management Plan

The Portfolio Communication Management Plan includes: -

- Communication objectives
- Roles and responsibilities for managing communication
- Stakeholders and their expectations
- Planned methods to collect and store communication
- Planned tools to access and deliver communication
- Planned frequency
- Communication policies/constraints
- Portfolio Stakeholder Engagement Plan Develop

## Manage Portfolio Information

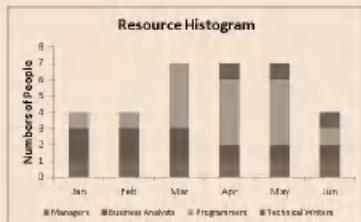


## Communication Methods

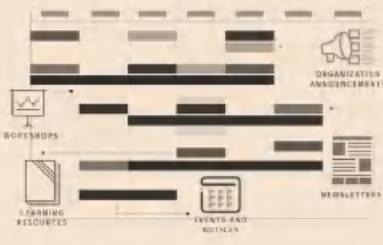
- Dashboards



- Resource Histograms



- Communication Calendar



## Technology Portfolio - Dashboard Example

Technology Portfolio Date: 31-Oct-2017		Start Date	Delivery		Major Risks		Decision Request	EVM		HR Management		Contract Manag.		Compliance %					
Component	Comp. Manager	Duration (Org Delay)	Component Plan Progress	Cost Progress	R	M	H	M	L	CPI	SPI	Current # Org.	Coming 2M Con.	CR T	T S R	CR T C R	CL Rep Oth		
MC Program	Mustafa Tech-0001	1-Sep-17 13 M	[Progress Bar]	[Progress Bar]	1	2	3	4	5	6	2	0.91	1.00	3	3	3	1	1	6 1 5 0 0 0 35% 30% 30%
Transformation Program	Sam Tech-0002	1-Oct-17 15 M   0	[Progress Bar]	[Progress Bar]	2	3	4	2	3	2	3	1.00	1.00	3	4	2	3	1	5 1 4 1 0 1 40% 30% 30%
NND Program	AnilKumar Tech-0003	1-Jan-17 16 M   0	[Progress Bar]	[Progress Bar]	2	2	1	1	4	1	1	1.00	0.90	5	3	1	1	1	4 2 2 2 1 1 30% 25% 20%
Regulation Compliance Project	Girish Tech-0004	20-Mar-17 14 M   0	[Progress Bar]	[Progress Bar]	1	2	3	4	5	6	1	1.00	1.00	5	2	2	2	2	7 4 3 4 2 2 40% 30% 30%
ERP Project	James Tech-0005	1-Oct-17 7 M	[Progress Bar]	[Progress Bar]	2	1					2	1.00	1.00	20	5				12 4 8 2 40% 30% 30%
IT Operation Management	Lee Tech-0006	1-Jan-17 24 M   0	[Progress Bar]	[Progress Bar]		2	1	1			1	1.00	1.00	20	5	2			12 4 8 2 40% 30% 30%
<b>Legend</b> <ul style="list-style-type: none"> <li>= 100% Completed</li> <li>= Plan progress, or OK status</li> <li>= Some deviation in relation to the original plan</li> <li>= Critical deviations in relation to the original plan</li> <li>= Baseline progress</li> <li>= Changes from the meeting before</li> </ul>																			

# 6. Portfolio Risk Management

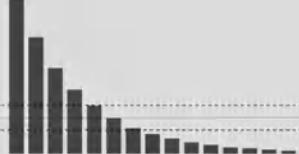
## Portfolio Risk Management Knowledge Area

- Has processes responsible for assessing and analyzing portfolio risks
- Risk management is critical where interdependencies exist or when risks from one portfolio component raise the risks in another
- Risk management may generate new portfolio components as well Portfolio Risk is concentrated on:
  - Maximizing financial value of the portfolio
  - Tailoring the fit of the portfolio to the organizational strategy and objectives
  - Determining how to balance the programs and projects within the portfolio given the organization's capacities and capabilities
- Portfolio risks are more than just the sum of the portfolio component risks

## Portfolio Risk Management Knowledge Area



## Risk Appetite, Tolerance, and Threshold?

	Risk Appetite	Risk Tolerance	Risk Threshold
Meaning	<p>It is the degree of uncertainty an entity is willing to take on in anticipation of a reward.</p>  <p>appetite</p>	<p>It is the degree or volume of risk that an organization or individual will withstand.</p> 	<p>It is the level of impact at which a stakeholder may have a specific interest.</p> 

## Develop Portfolio Risk Management Plan



## Graphical Analytical Methods

- Graphical Analytical Methods used to Measure the portfolio risks

Probability	Threats					Opportunities				
	Certain	0.9								
Likely	0.7									
Possible	0.5									
Unlikely	0.3									
Rare	0.1									
	0.05	0.10	0.20	0.40	0.80	0.80	0.40	0.20	0.10	0.05
	Very Low	Low	Moderate	High	Very High	Very High	High	Moderate	Low	Very Low

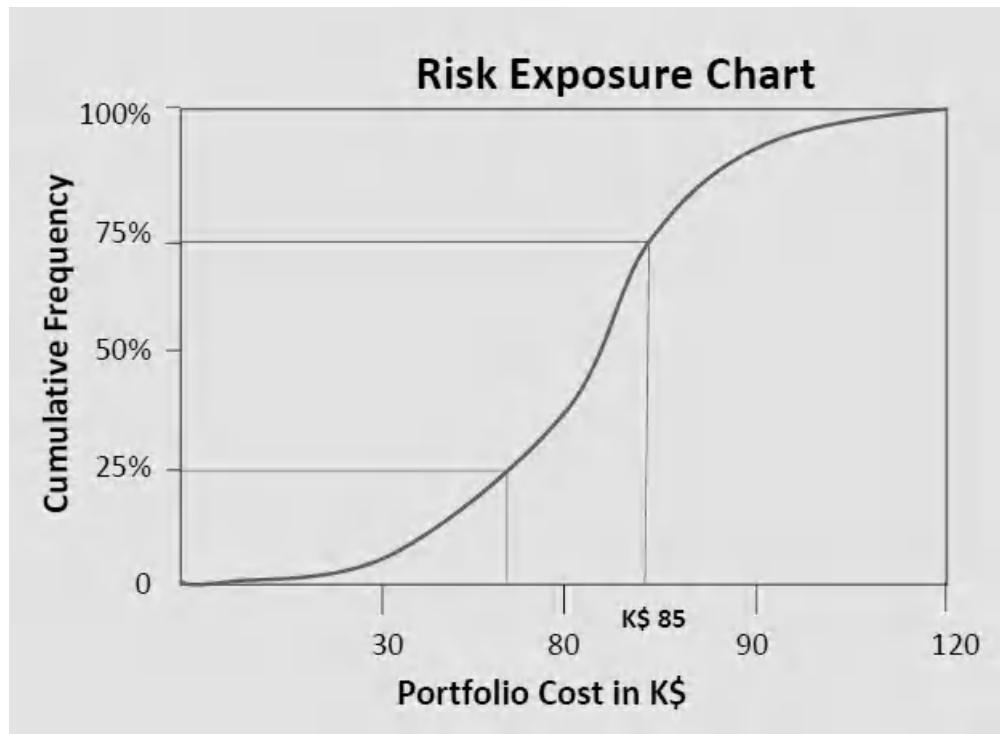
## Risk Terminology

- Secondary Risk
- Residual Risk
- Black Swan
- Watch list
- Response Plan

## Quantitative and Qualitative Analyses

- Status and trend analysis
- Rebalancing methods
- Investment choice tools:
  - Trade-off analysis
  - Market-payoff variability
  - Budget variability
  - Performance variability

- Market requirement variability
- Time-to-market variability
- Portfolio risk exposure charts
  - Outcome probability analysis of the portfolio
  - Probability of achieving portfolio objectives



## Risk Management Plan

- Portfolio management risks may be identified by anyone in the organization
- The portfolio risk management plan describes how risk management is structured and performed in the portfolio. It includes:
  - Methodology
  - Roles and responsibilities
  - Risk measures
  - Frequency

- Risk categories
- Risk response
- Risks may arise from either external or internal sources

## Risk Management Plan

Risk Rank = Impact Level X Probability

"Quantitative Example"

Impact Level	Meaning		Probability	Meaning	Description
5	Catastrophic	X	5	Certain	Will occur as described with further time slippage
4	Major		4	Likely	Will occur as described unless immediate action is taken
3	Moderate		3	Possible	Will occur if a number of contributing factors occur
2	Minor		2	Unlikely	Will not occur in most of the cases
1	Insignificant		1	Rare	Assumed not to happen

Risk Rank Value	Risk Rank Meaning	Risk Rank Action
20-25	Very High Risk	Reduce Urgently
15-20	High Risk	Reduce
10-15	Medium Risk	Monitor
1-10	Low Risk	Monitor

## Risk Management Plan

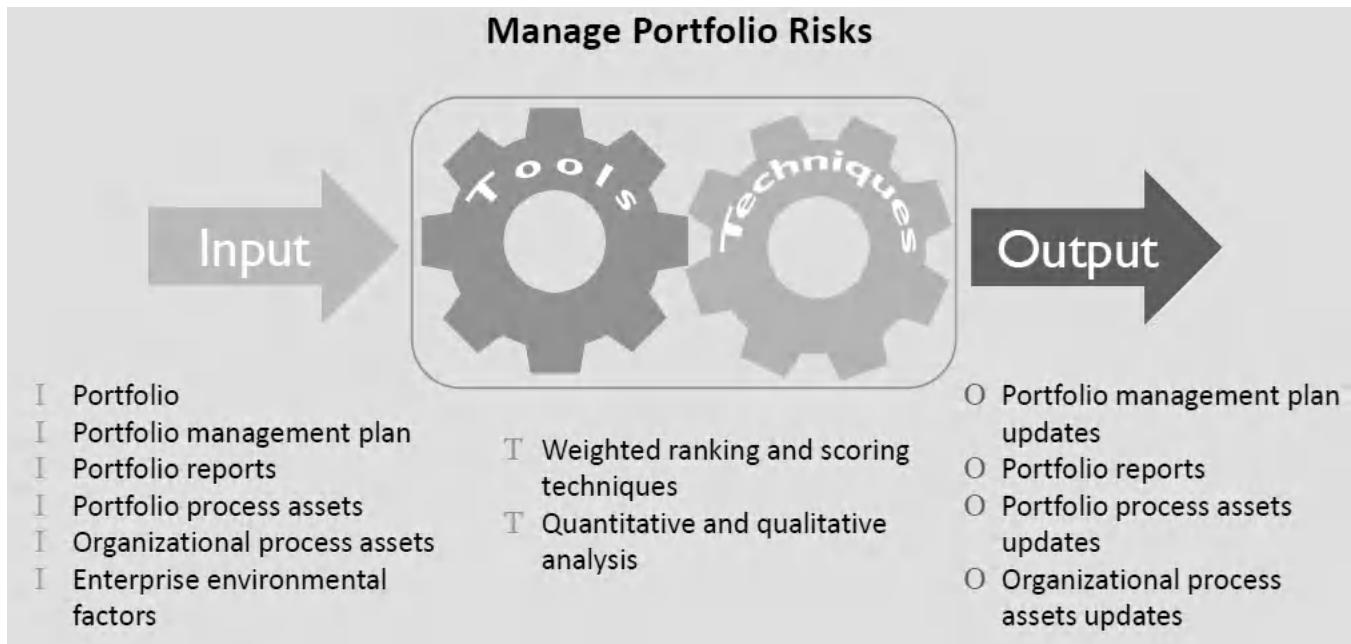
Risk Rank = Impact Level X Probability

"Qualitative Example"

Probability ►	Low	Medium	High
Impact ▼			
Low	Very Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	Very High

Probability and impact matrix

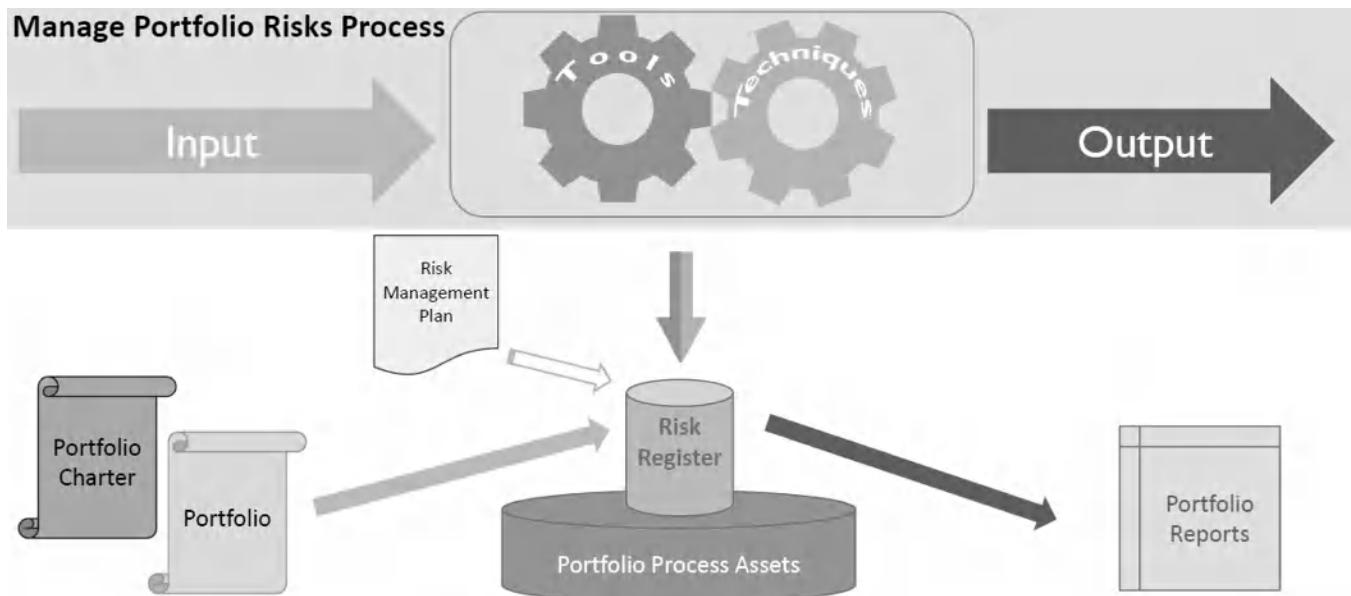
## Manage Portfolio Risks



## Portfolio Risks and Issues

- Portfolio risk register
- Identified risks
- Risk owner
- Risk category
- Probability and impact assessment
- Potential response
- Risk triggers
- Portfolio issues are documented in the issue register

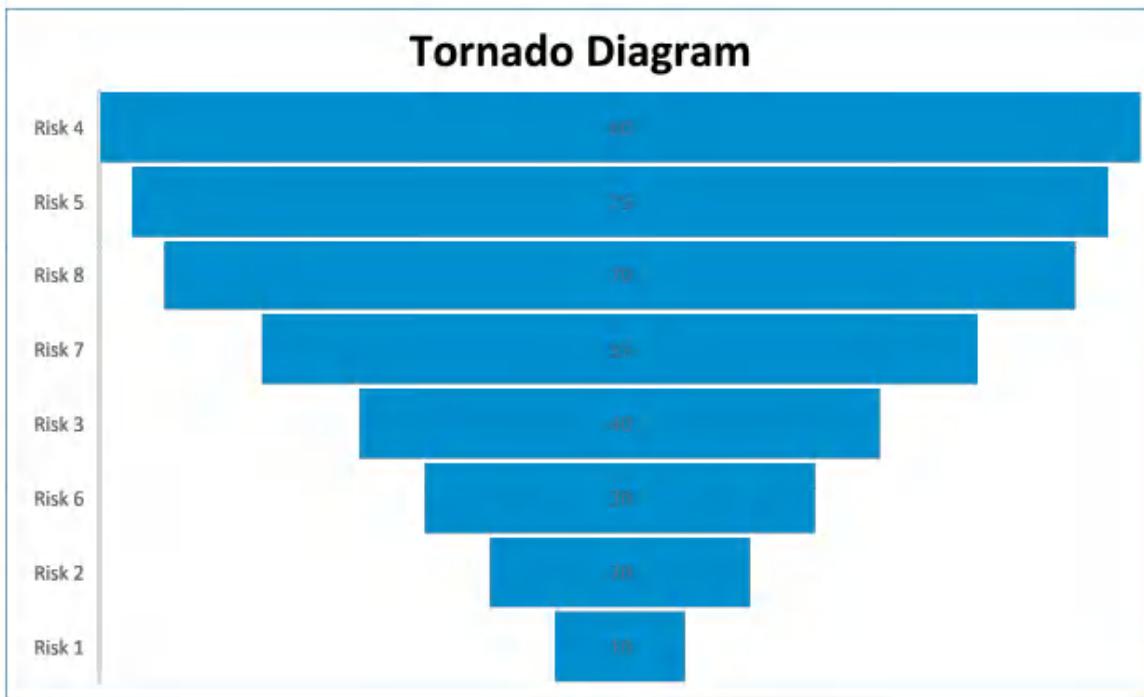
## Manage Portfolio Risks - Risk Register



## Quantitative and Qualitative Analyses

- Quantitative analysis
- Net present value (NPV), estimated net present value (ENPV)
- Payback or payback period (PBP)
- Return on investment (ROI)
- Internal rate of return (IRR)
- Qualitative analysis
- Sensitivity analysis
- Modeling and simulation
- Investment choice analysis

## Sensitivity analysis



## 7. Portfolio Glossary

**Aligning Processes [Process Group].** A Process Group to optimize the portfolio and manage strategic change, supply and demand, portfolio value, portfolio information, and portfolio risks.

**Authorization.** The process of approving, funding, and communicating the authorization for initiating work on a component included in a “balanced portfolio.”

**Authorize Portfolio [Process].** Process of allocating resources to execute selected portfolio components and to formally communicate portfolio-balancing decisions.

**Authorizing and Controlling Processes [Process Group].** A Process Group to authorize portfolio components and provide ongoing portfolio oversight.

**Benefit Realization Analysis [Technique].** A technique to analyze portfolio component achievement of planned benefits.

**Capability and Capacity Analysis [Technique].** A technique performed to understand the human, financial, and asset capacity and capability of the organization in order to select, fund, and execute portfolio components.

**Categorization of Components [Technique].** A technique to group portfolio components based on criteria.

**Category.** A predetermined key description used to group potential and authorized components to facilitate further decision making. Categories are linked to components with a common set of strategic goals.

**Communication Methods [Tool].** Tools that share and distribute information among portfolio stakeholders, such as email, video conferencing, web portals, etc.

**Communication Requirements Analysis [Technique].** A technique to determine the information needs of portfolio stakeholders and define the information type and format for delivery to stakeholders.

**Component [Portfolio].** A discrete element of a portfolio that is a program, project, or other work.

**Component Proposal.** A recommendation or plan, business case, or feasibility study, developed by stakeholders or sponsors, to introduce or change a portfolio component or components.

**Cost/Benefit Analysis [Technique].** A technique that weighs expected costs against expected financial and nonfinancial benefits (value) to determine the best (according to relevant criteria) course of action.

**Define Portfolio [Process].** Process of creating an up-to-date list of qualified components and organizing them into relevant business groups to which a common set of decision filters and criteria can be applied for evaluation, selection, prioritization, and balancing.

**Define Portfolio Roadmap [Process].** Process of defining the high-level portfolio components, multi-year milestones, and interdependences.

**Defining Processes [Process Group].** A Process Group to develop the portfolio strategic plan, charter, and the portfolio management plan and to define the portfolio and portfolio roadmap.

**Develop Portfolio Charter [Process].** Process of developing the Portfolio Charter to authorize the portfolio manager to develop portfolio management processes that supports the portfolio.

**Develop Portfolio Communication Management Plan [Process].** Process of developing the portfolio communication management plan, a subsidiary plan of the portfolio management plan, including engaging stakeholders and analyzing how the information and communications needs of the portfolio stakeholders will be met.

**Develop Portfolio Management Plan [Process].** Process of defining the overall portfolio management, including subsidiary plans for portfolio communication, performance, and risk.

**Develop Portfolio Performance Plan [Process].** Process of developing the portfolio performance management plan, a subsidiary plan of the portfolio management plan, including how portfolio value is defined and optimized through portfolio component allocation, targets, and results.

**Develop Portfolio Risk Management Plan [Process].** Process of developing the portfolio risk management plan, a subsidiary plan of the portfolio management plan, including methods for managing and reporting risks.

**Develop Portfolio Strategic Plan [Process].** Process of analyzing and developing the portfolio strategic plan to determine how the organizational strategy and goals will be carried out through the portfolio management processes.

**Elicitation Techniques [Technique].** Techniques to gather requirements for portfolio planning.

**Enterprise Environmental Factors [Output/Input].** Conditions, not under the immediate control of the team, that influence, constrain, or direct the project, program, or portfolio.

**Evaluation.** The process of scoring specific potential components using key indicators and their related weighted criteria for comparison purposes for further decision making.

**Gap Analysis [Technique].** A technique to evaluate the current portfolio mix of components and determine changes needed so components may be added, changed, or terminated to rebalance the portfolio.

**Governance Decisions [Output/Input].** Portfolio governing body decisions based on portfolio performance, component proposals, and risks as well as capability and capacity of resources, funding allocations, and future investment requirements.

**Governance Recommendations [Output/Input].** Portfolio governing body recommendations based on portfolio performance, component proposals, and risks as well as capability and capacity of resources, funding allocations, and future investment requirements.

**Graphical Analytical Methods (Tool).** Tools such as risk versus return charts, histograms, pie charts, and other methods to visualize portfolio information.

**Identification of Components (Technique).** A technique to identify the portfolio components from an inventory of work or proposed components based on prioritization, objectives, expected benefits, and performance criteria.

**Integration of Portfolio Management Plans (Technique).** A technique to align subsidiary portfolio plans with the portfolio management plan to ensure consistency.

**Interdependency Analysis (Technique).** A technique to identify dependencies between portfolios, portfolio components, or with external elements.

**Inventory of Work (Output/Input).** A list of active work that may be potential portfolio components and a starting point to develop a portfolio.

**Investment Choice Assessment (technique).** Technique to align the portfolio based on new and changing strategic objectives, evaluate responses to threats and opportunities, and indicate portfolio investment gaps.

**Key Criteria.** Predetermined measures, values, or conditions used in a scoring model to measure alignment with strategic goals.

**Key Descriptors.** A set of characteristics used to categorize and document a portfolio component for further decision making.

**Manage Portfolio Information (Process).** Process of collecting, distributing, and sharing required information available to portfolio stakeholders in a timely manner.

**Manage Portfolio Risks (Process).** Process of assessing and combining the probability of occurrence and impact of identified risks; numerically analyzing the overall effect of selected risks on the portfolio; and prioritizing risks for subsequent further analysis or action.

**Manage Portfolio Value (Process).** Process of identifying and managing how organizational benefits and value are defined and optimized through portfolio component allocation, targets, and results.

**Manage Strategic Change (Process).** Process of responding to changes in organizational strategy and environment to assess impacting the portfolio and enable changes, including rebalancing and other portfolio changes.

**Manage Supply and Demand (Process).** Process of identifying financial, human, and other resource availability and capability requirements; mapping against organizational and portfolio constraints and demands; and allocating resources according to portfolio allocation decisions.

**Modeling and Analysis Tools (Tool).** Tools to measure risk and include probability (likelihood) and impact (consequences).

**New Component.** A component that is being added to an existing project portfolio.

**Optimize Portfolio (Process).** Process of assessing the portfolio components based on the organization's selection and ranking processes in order to create the component mix with the greatest potential to collectively support the organization's strategy and goals.

**Organizational Governance.** The process by which an organization directs and controls its operational and strategic activities, and by which the organization responds to the legitimate rights, expectations, and demands of its stakeholders.

**Organizational Process Assets (Output/Input).** Plans, processes, policies, procedures, and knowledge bases specific to and used by the performing organization.

**Organizational Strategy and Objectives (Output/Input).** An organizational document that contains the mission and vision statements as well as goals, objectives, and strategies intended to achieve the vision.

**Phase Gate.** A review at the end of a phase in which a decision is made to continue to the next phase, to continue with modification, or to end a project or program.

**Planning Sessions [Technique].** A technique to structure collaboration for planning portfolio activities such as to define and manage risks.

**Portfolio.** Projects, programs, subportfolios, and operations managed as a group to achieve strategic objectives.

**Portfolio Authorization [Technique].** A technique to formally authorize portfolio components, allocate funding, and assign resources.

**Portfolio Balancing.** The process of optimizing the mix of portfolio components to further the strategic objectives of the organization.

**Portfolio Charter (Output/Input).** The document issued by the portfolio sponsor that formally authorizes the existence of a portfolio and provides the portfolio manager with the authority to apply portfolio resources to portfolio activities.

**Portfolio Communication Management (Knowledge Area).** A Knowledge Area that includes the processes required to develop the portfolio communication management plan and manage portfolio information.

**Portfolio Communication Management Plan.** A subsidiary plan or component of the portfolio management plan that defines all communication needs, establishes communication requirements, specifies frequency, and identifies recipients for information associated with the portfolio management process.

**Portfolio Component Reports (Output/Input).** Status reports from the portfolio's program and project managers.

**Portfolio Governance Management (Knowledge Area).** A Knowledge Area that includes the processes to develop the portfolio management plan; define, optimize, and authorize the portfolio; and provide ongoing portfolio oversight.

**Portfolio Management.** The centralized management of one or more portfolios to achieve strategic objectives.

**Portfolio Management Information System (Tool).** A tool, manual or automated, for information collection and distribution to support the portfolio management processes.

**Portfolio Management Plan.** A formal, approved document that defines how the portfolio will be executed, monitored, and controlled to meet organizational strategy and objectives.

**Portfolio Organizational Structure Analysis [Technique].** A technique to determine the portfolio management organizational structure and define the roles and responsibilities.

**Portfolio Performance Management (Knowledge Area).** A Knowledge Area that includes the processes to develop the portfolio performance management plan, manage supply and demand, and portfolio value.

**Portfolio Performance Management Plan.** A subsidiary plan or component of the portfolio management plan that describes performance measures, reporting (on scope, cost, schedule, and resources), resource optimization, and benefits realization.

**Portfolio Periodic Reporting and Review.** The process of reporting on the portfolio components as a whole using key indicators and reviewing the performance of the component mix by comparing actual with anticipated evolution, value, risk level, spending, and strategic alignment.

**Portfolio Process Assets (Output/Input).** Portfolio plans, processes, policies, procedures, and knowledge bases used by the portfolio manager and stakeholders.

**Portfolio Reports (Output/Input).** Reports that provide information on performance, risks, resources, and governance decisions.

**Portfolio Review Meetings [Technique].** A technique used by portfolio governance bodies to review the portfolio status and to make portfolio decisions.

**Portfolio Risk.** An uncertain event, set of events, or conditions that, if they occur, have one or more effects, either positive or negative, on at least one strategic business objective of the portfolio.

**Portfolio Risk Management Plan.** A subsidiary plan or component of the portfolio management plan that describes how risk management activities will be structured and performed.

**Portfolio Risk Management (Knowledge Area).** A Knowledge Area that includes the processes required to develop the portfolio risk management plan and manage portfolio risks.

**Portfolio Roadmap.** A document that provides the high-level strategic direction and portfolio information in a chronological fashion for portfolio management and ensures dependencies within the portfolio are established and evaluated.

**Portfolio Strategic Plan.** A formal, approved document that describes the portfolio vision, objectives, and goals to achieve organizational strategy and objectives.

**Portfolio Strategic Management (Knowledge Area).** A Knowledge Area that includes the processes required to develop the portfolio strategic plan, portfolio charter, portfolio roadmap, and manage strategic change.

**Prioritization Analysis [Technique].** A technique to compare and rank selected portfolio components, based on their evaluation scores and other management considerations, to ensure alignment with organizational strategy and objectives.

**Probability and Impact Matrix.** A grid for mapping the probability of each risk occurrence and its impact on project objectives if that risk occurs.

**Program.** A group of related projects, subprograms, and program activities that are managed in a coordinated way to obtain benefits not available from managing them individually.

**Program Management.** The application of knowledge, skills, tools, and techniques to a program to meet the program requirements and to obtain benefits and control not available by managing projects individually.

**Project.** A temporary endeavor undertaken to create a unique product, service, or result.

**Project Management.** The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

**Provide Portfolio Oversight [Process].** Process of providing governance in identifying, documenting, authorizing, and controlling changes to the project portfolio.

**Quantitative and Qualitative Analysis [Technique].** Techniques that include analyses to optimize the portfolio, such as scenario analysis, probability analysis, and cost/benefit analysis.

**Readiness Assessment [Tool].** A tool to assess stakeholders' willingness and ability to implement portfolio-related changes.

**Rewbalancing Assessments [Tool].** A tool to assess the portfolio and consider rebalancing portfolio components, resource requirements, and the portfolio budget to realign the portfolio risks.

**Risk.** An uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives.

**Risk Acceptance.** A risk response strategy whereby the project team decides to acknowledge the risk and not take any action unless the risk occurs.

**Risk Avoidance.** A risk response strategy whereby the project team acts to eliminate the threat or protect the project from its impact.

**Risk Mitigation.** A risk response strategy whereby the project team acts to reduce the probability of occurrence or impact of a threat.

**Risk Reviews [Technique].** A technique to evaluate existing risks and identify new risks.

**Risk Transference.** A risk response strategy whereby the project team shifts the impact of a threat to a third party, together with ownership of the response.

**Scenario Analysis (Technique).** A technique to evaluate scenarios in order to predict their effect on portfolio objectives.

**Scoring Model.** A set of weighted criteria and corresponding key indicators to measure and score components for comparison and prioritization purposes.

**Stakeholder.** An individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project, program, or portfolio.

**Stakeholder Analysis (Technique).** A technique to identify stakeholders by individual or group and determine their concerns, interests, influence, expectations, and requirements.

**Strategic Alignment Analysis (Technique).** A technique that focuses on new or changing strategic objectives and goals to determine portfolio gaps.

**Strategic Change.** Any change in the strategic intentions and plans of the organization that can impact the contents of component definition, categories, filters, key indicators, and other decision-making parameters used for portfolio management.

**Strategic Plan.** A high-level document that explains the organization's vision and mission, plus the approach that will be adopted to achieve this mission and vision, including the specific goals and objectives to be achieved during the period covered by the document.

**Strategy and Objectives.** The definition of an organization's intended achievements in terms of business results interpreted from various perspectives—financial, customer, infrastructure, products and services, or by cultural outcomes that are measurable.

**Subportfolio.** A collection of components which includes programs, projects, portfolios, and other work grouped together within a larger portfolio.

**Weighted Ranking and Scoring Techniques (Technique).** Techniques using a multiplication factor to rank and score portfolio components to convey the importance of criteria used