INTRODUCTION TO PROJECT MANAGEMENT IN ENGINEERING PROJECT STAKEHOLDERS LEADERSHIP

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Project Management Overview

- Defining a project
- Defining a program
- Defining project management
- The role of project manager
- Leadership in project management
- Project parameters
- Understanding the scope triangle
- Applying the scope triangle
- Project plan
- Watch out for the "Creeps"
- Establishing the rules for classifying projects
- Tailoring project management approach
- Project stakeholders

What is a Project?

- A project is a temporary endevour undertaken to create a unique product or service.

  PMBOK

- A problem scheduled for solution

  Dr. Joseph M. Juran

- Unique processes, consisting of a set of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective conforming to specific requirements, including the constraints of time, cost and resources

  ISO 10006 Standard

Distinctive Characteristics of a Project

- Unique
  - A one-time set of non-routine tasks performed in a specific sequence leading to a desired outcome
  - Resulting product or service is different in some distinguishing way from all other products or services

- Temporary
  - It has a distinct start and finish date

Defining a Project

- A project is a sequence of unique, complex, and connected activities having one goal or purpose and that must be completed by a specific time, within budget, and according to specification.
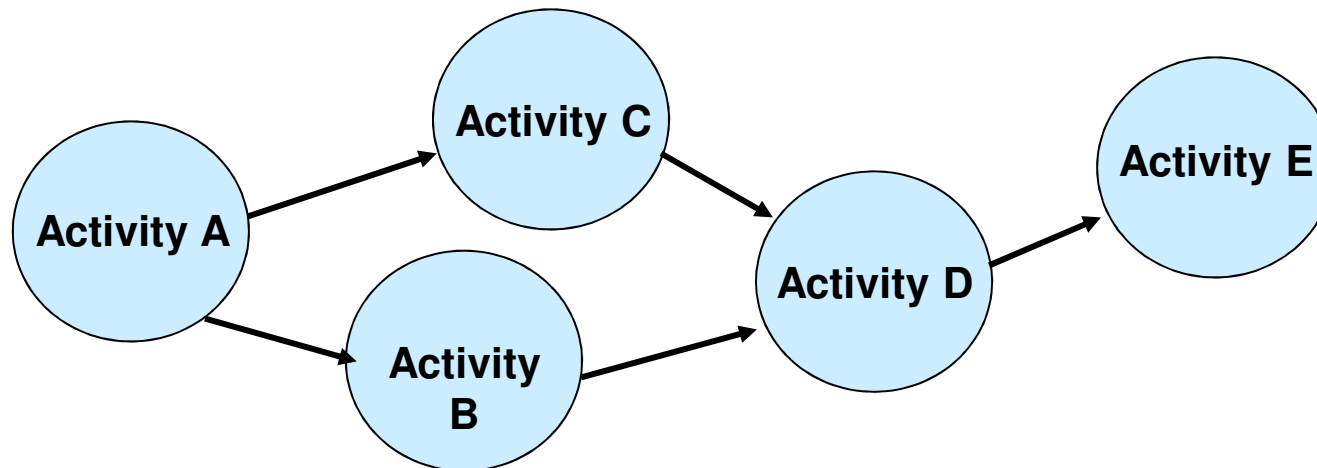
- **What's missing from this definition?**

Defining a Project contd

- Sequence of Activities
  - Based on technical requirements
  - Inputs and outputs

- Unique Activities
  - The project has never happened before and will never happen again under the same conditions.

- Complex Activities
  - Not simple, repetitive acts

- Connected Activities
  - Logical or technical relationship between pairs of activities

- Often includes various phase completion checkpoints and milestone dates prior to project closure

Defining a Project contd

- One Goal

- Specified Time
  - Projects have a specified start and completion date

- Within Budget
  - It uses a limited set of resources
  - It involves the time of one or many people to manage and accomplish the objectives

- According to Specification

Defining a Project contd

- A project is executed by an organized team.

- A project has a certain amount of complexity and is not "business as usual" (operations).

- Creation of Business Value – Important

- Fulfilling the Needs

Projects vs. Operations

- Operations and projects share many characteristics:
  - Performed by people
  - Constrained by limited resources
  - Planned, executed, and controlled

- Differences
  - Operations are ongoing and repetitive
  - Projects are temporary and unique

What is a Program?

- A program is a collection of projects that share a common goal or purpose.
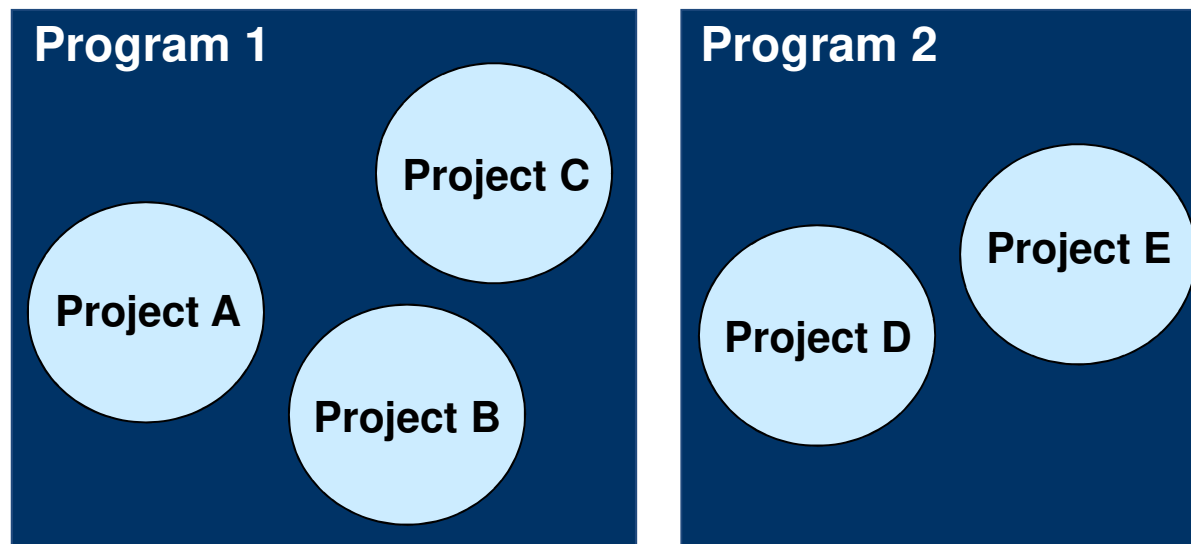
Defining a Program contd

- Programs can be
  - Coordinated management of a system of projects to achieve a set of business objectives.
  - A series of projects which make up one large project.

- Programs are larger in scope and comprise multiple projects.

Projects vs. Programs

- Projects have a single goal

- Programs have a common goal (big picture) but different set of objectives (per project)

- Example: US Space Program
  - Spans multiple decades
  - Has many projects (Spacecrafts, rockets, satellites, experiments)
  - Each project has a single objective (growing seeds in zero gravity environment)

What is a Project Portfolio?

- A project portfolio is a collection of projects that share some common link to one another.

- Common link can be that the projects
  - may all originate in the same business unit or functional area
  - may all be new product development
  - may all be funded out of the same budget or from the same resource pool

Project and Program Case Example

London 2012 Olympics

https://www.youtube.com/watch?v=elUwyKEH97U

What is Project Management?

- Project management is the art of skills, tools, and techniques to project activities to meet project requirements.

  PMBOK

- The art of directing and coordinating human and material resources throughout the life of a project by using modern management techniques to achieve predetermined objectives of scope, cost, time, quality, and participant satisfaction.

  PMI

- **Project Management Is Organized Common Sense**

Defining Project Management

- Project management is a total quality method that enables a project team to do the right things the right way at the right time to achieve full customer satisfaction

- Project management involves the defining, planning and executing of the tasks that must be completed to reach your goal
  - Scientific application of modern tools and techniques in planning, financing, implementing, monitoring, controlling and coordinating unique activities
  - Produce desirable outputs to meet pre-set objectives
  - Act within the constraints of **time**, **cost**, **quality**

Defining Project Management contd

- The work typically involves:
  - Competing demands for: scope, time, cost, risk, quality
  - Stakeholders with differing needs and expectations
  - Identified, and often progressive requirements

- The work product is a Project Plan
  - Defines the Process and Tasks to be conducted, the People who will do the work and the mechanism to assessing Risks, Controlling Change and Evaluating Quality.

- Many of the processes within project management are iterative in nature

Defining Project Management contd

- Project Management can be applied to any project regardless of size, budget or timeline.

- Some examples are:
  - Developing a new product or service
  - Running a political campaign
  - Sending a probe to Mars
  - Designing a compensation system
  - Negotiating a collective agreement
  - Setting up an e-commerce internet site

Project Outcomes vs. Outputs

- Organizations expect projects to deliver outcomes in addition to outputs and artifacts.
  - Project managers are expected to deliver projects that **create value** for the organization and stakeholders within the organization's system for value delivery.

- **Outcome** is an end result or consequence of a process or project.
  - Outcomes can include outputs and artifacts, but have a broader intent by focusing on the benefits and value that the project was undertaken to deliver.

Value

- **System for value delivery:** A collection of strategic business activities aimed at building, sustaining, and/or advancing an organization.
  - Portfolios, programs, projects, products, and operations can all be part of an organization's system for value delivery.

- **Value:** The worth, importance, or usefulness of something.
  - Different stakeholders perceive value in different ways: ability to use specific features, financial metrics, contribution to the environment…

Common Phases of Project Management

- Getting started
- Planning
- Performing the project
- Keeping things under control
- Gaining closure
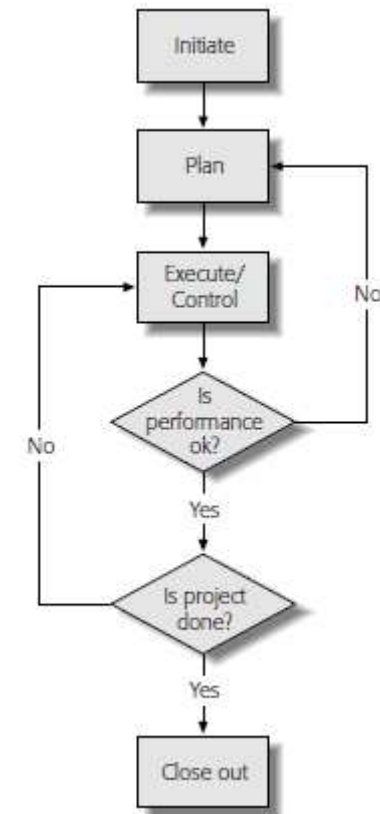
Project Management Goals

- What business situation is being addressed?

- What do you need to do?

- What will you do?

- How will you do it?

- How will you know you did it?

- How well did you do?

Why Project Management Needed

- Customers expectations:
  - Successful results
  - On time completion
  - Finished within budget
  - A product quality that meets their needs

- Management expectations:
  - Consistent performance
  - Repeatable results
  - Measurable activities
  - Customer satisfaction
  - Better financial performance
  - More productive, happier workers

Role of the Project Manager

- Coordinates project development

- Develops detailed plan at project inception
  - Activities that must take place
  - The deliverables that must be produced
  - Resources needed

- Accountable for success or failure

- Has both internal and external responsibilities

- Many career paths lead to project management

Project Manager Required Skills

- Strong written and oral communication skills
- Organizational skills
- General management skills
  - Budgeting skills
  - Team building skills
  - Negotiation skills
  - Problem resolution skills
  - People skills

Project Leadership

- The act of leading a team towards the successful completion of a project.
  - It is a soft skill; part art, part science.
  - It's about "**placing more emphasis on people**" as opposed to the tactical management of tasks.

- Managers are often more comfortable with process and methodologies.

- **A leader focuses on inspiring and empowering her team.**
  - Get buy-in and loyalty by asking rather than demanding help
  - Work to motivate and speak to the team's emotional core rather than offering a dry intellectualism that omits the human part
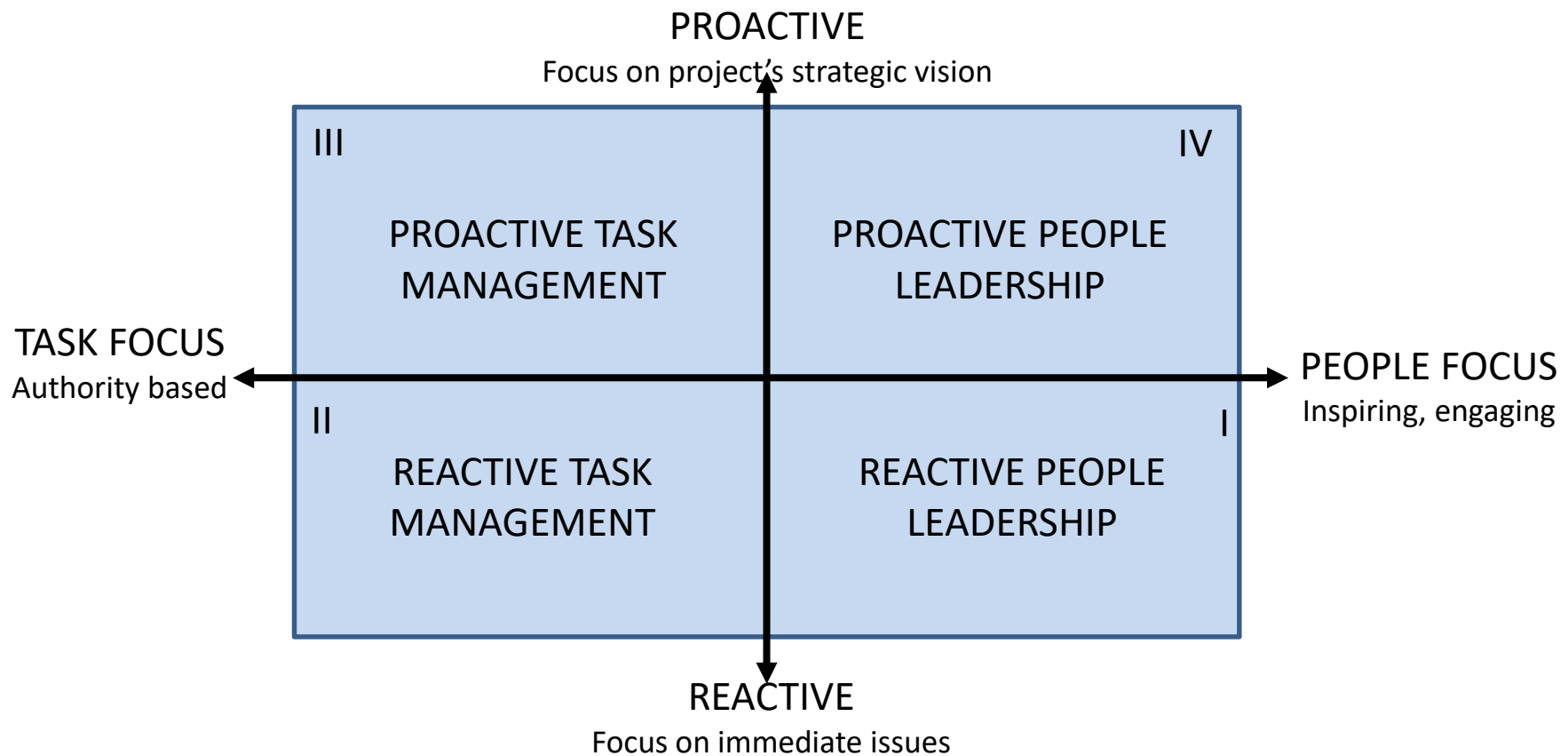
Importance of Leadership

- A project environment that prioritizes vision, creativity, motivation, enthusiasm, encouragement, and empathy can support better outcomes. These traits are often associated with leadership.

- Leadership is not *authority* – the right to exercise power.
  - Authority alone is insufficient. It takes leadership to motivate a group toward a common goal, influence them to align their individual interests in favor of collective effort, and achieve success as a project team rather than as individuals.

- Leadership is not exclusive to any specific role.
  - High-performing projects may feature multiple people exhibiting effective leadership skills, e.g. the project manager, sponsors, stakeholders, senior management, or even project team members.

- Effective leaders seek to be a role model in areas of honesty, integrity, and ethical conduct.

Different Leadership Styles

- ## The Project Leadership Matrix

PROACTIVE
Focus on project's strategic vision

| III | IV |
| PROACTIVE TASK MANAGEMENT | PROACTIVE PEOPLE LEADERSHIP |

TASK FOCUS
Authority based

PEOPLE FOCUS
Inspiring, engaging

| II | I |
| REACTIVE TASK MANAGEMENT | REACTIVE PEOPLE LEADERSHIP |

REACTIVE
Focus on immediate issues

Leadership Matrix Quadrants

- Reactive People Leadership
  - Drawn to helping out when there's interpersonal conflict, a natural mediator.

- Reactive Task Management
  - A lot of defect management, issue resolution, and firefighting.

- Proactive Task Management
  - Traditional project management disciplines. It's all about planning, managing risks, and quality assurance. We're looking ahead to mitigate items, but it's still with a task focus.

- Proactive People Leadership
  - Focused on strategic relationship building, on the project's vision, and providing direction to the team.

Leadership Matrix
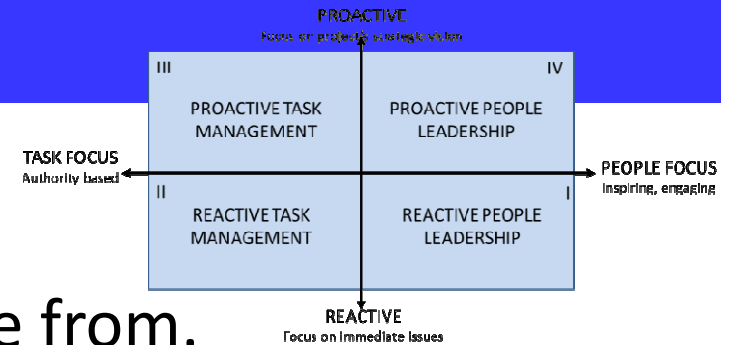
- Proactive is where the results come from.

- A lot of project managers spend a lot of time in quadrant II.
  - It can be a vicious circle, because when we're down here, we're not able to free ourselves up to be proactive.

- Ideally, we should be placed between quadrant III and IV.
  - People sometimes believe that quadrant IV is the best one but we can't just leave out the operational plans.

Why do organizations use Project Management?

- Improved communication among project participants
- Increased understanding of the project and its purpose
- Ability to define and control project scope
- Ability to identify, monitor, and track milestones
- Accurate projection of resource requirements
  - ensures that available resources are used in the most effective and efficient manner
- Improved assessment and mitigation of project risk events
- Identification and communication of problem areas
- Prioritization of functional and project activities
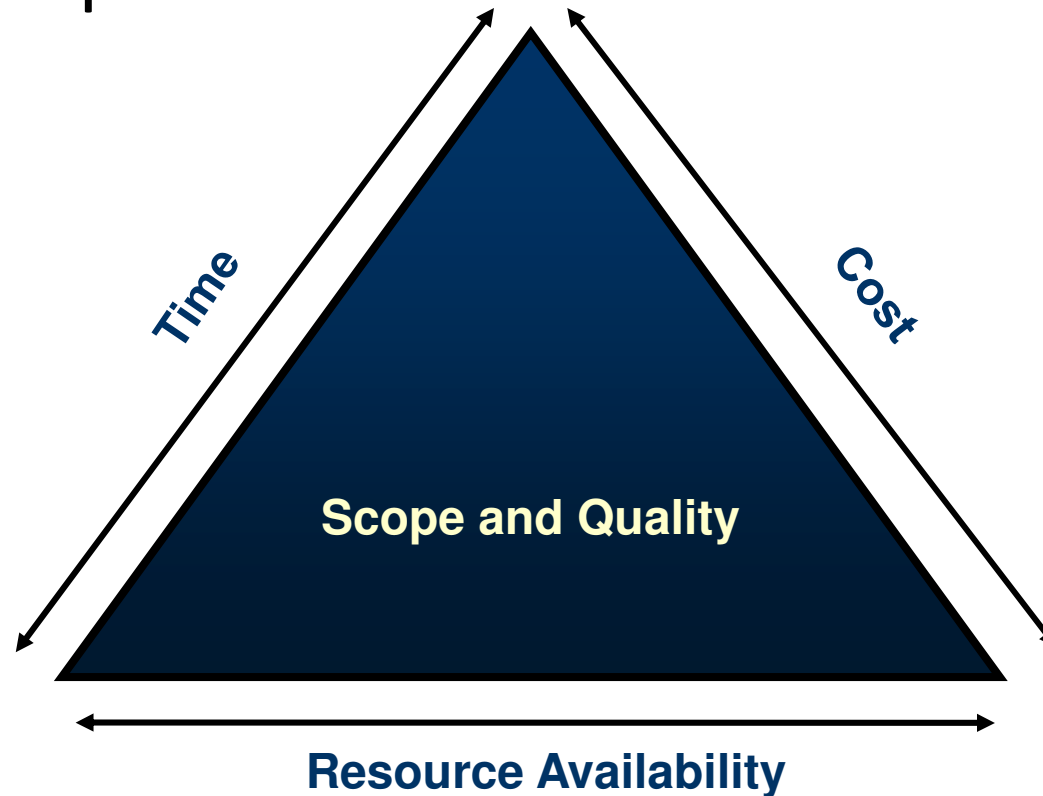- Clarification of and alignment with organizational goals

Project Parameters

- Scope
- Quality
- Cost
- Time
- Resource Availability

- A change in one constraint can require a change in another constraint in order to restore the equilibrium of the project.

The Scope Triangle

- Projects are dynamic systems that must be kept in equilibrium.

Applying the Scope Triangle

- The Scope Triangle is a system in balance.

- The lengths of the three sides exactly bound scope and quality.

- Change in the variables will cause the system to be out of balance

- In such cases use the scope triangle to
  - Build a problem escalation strategy
  - To structure the Project Impact Statement

Applying the Scope Triangle contd

- The scope triangle helps to answer the question: ''Who owns what?''
  - The answer is an escalation pathway from project team to resource manager to client.

- The scope triangle is an aid in the preparation of the Project Impact Statement.
  - Alternative ways of accommodating a particular scope change request of the client.

Project Plan

- The project plan will have identified the time, cost, and resource availability needed to deliver the scope and quality of a project.

- The project is in equilibrium when the plan is complete.

- Change is inevitable!
  - Review, revise, re-plan
  - Use scope triangle

Project Plan contd

- The project manager controls resource utilization and work schedules.

- Management controls cost and resource level.

- The client controls scope, quality, and delivery dates.

- Scope, quality, and delivery dates form an outline for the project manager to adapt the changes.

Be careful for the creeps

- Creeps are minute changes in the project due to the actions of team members

- Usually undetected until it becomes a problem
  - Scope Creep
  - Hope Creep
  - Effort Creep
  - Feature Creep

Project Classification

- There is no "one size fits all" approach

- Your approach to managing any project must adapt to the characteristics of the project.

- A classification rule can help you choose that approach.

Classification by Project Characteristics

- Risk

- Business Value

- Duration

- Complexity

- Technology used

- Number of departments affected

- Cost

Classification by Project Type

- Usually an organization repeats projects that are of the same type. These projects may be repeated several times each year and probably will follow a similar set of steps each time they are done.

- Examples
  - Installing software
  - Recruiting and hiring
  - Setting up a hardware system in a field office
  - Soliciting, evaluating and selecting vendors
  - Updating a corporate procedure
  - Developing application systems

Tailoring Project Management Approach

- 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.

- Many methodologies are available (e.g. waterfall, scrum, kanban) with clear instructions stating they should not be applied rigorously but should be subject to a process of tailoring to determine which elements are most useful given the particular type, size, and complexity of the project.

- Benefits of tailoring 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

What to tailor?

- Life cycle and development approach selection: Some large projects may use a combination of these approaches simultaneously.

- Processes: Add, modify, remove, blend for additional benefits or align to harmonize elements

- Engagement: Evaluate people, empower the team, integrate a diverse collection of contributors to create one project team

- Select the tools that best suit the situation

- Methods and artifacts: 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.

The Tailoring Process
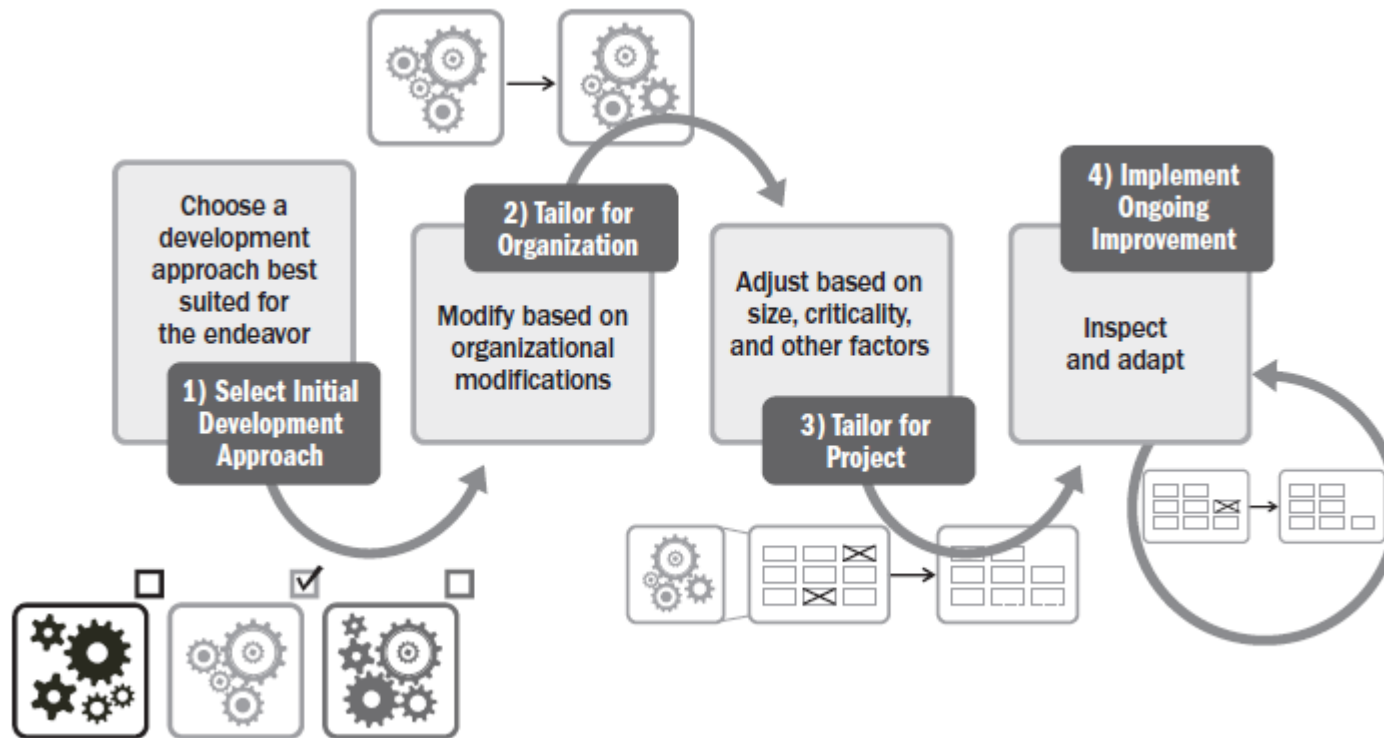
The Tailoring Process

- Many organizations have a project methodology, general management or development approach that is used as a starting point for their projects. Project teams may need to justify using a tailored approach to demonstrate that the decisions do not threaten the organization's larger strategic or stewardship goals.

- Tailoring for the project
  - Product/deliverable: criticality, compliance, technology, market, security, incremental delivery, …
  - Project team: size, geography, experience, …
  - Culture: acceptance & support, trust, empowerment, organizational culture
  - Implement ongoing improvement

- Periodic reviews (e.g. retrospectives, lessons learned) are effective ways to determine if approaches are working well and if improvements can be made

Project Stakeholders

- Any person or group that has a vested interest in the project is a stakeholder.

  - Can be actively involved

  - Their interests may be positively or negatively affected

  - May exert influence over the project

  - Play a part in project from proposal to closeout or may come and go throughout the life cycle of the project

Project Stakeholders

- 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

Project Key Stakeholders

- Project manager

- Customer

- Performing organization

- Project team members

- Sponsor who provides financial resources

Project Stakeholders Balancing Act

- Often competition for resources

- Not all stakeholders may support the project
  - Find out what stakeholders' issues are to find ways to appease them.

- Requires open communications

- Try to minimize negative impact on project

Stakeholder Categories

- PMI now classifies stakeholders as belonging to one of five categories:
  - Unaware
  - Resistant
  - Neutral
  - Supportive
  - Leading

- One would be trying to move a stakeholder from unaware to supportive.

Stakeholder Management Processes

- Identify Stakeholders
- Plan Stakeholder Management includes
  - Desired and current engagement level of stakeholders
  - Interrelationships between stakeholders
  - Information to be shared with stakeholders

- Manage Stakeholder Engagement - the process of communicating and working with stakeholders
  - to meet their needs/expectations
  - address issues as they occur
  - foster appropriate stakeholder engagement in project activities throughout the project life cycle
  - more proactive attempt to keep stakeholders engaged

- Control Stakeholder Engagement - the process of monitoring overall project stakeholder relationships and adjusting strategies and plans for engaging stakeholders
  - Reporting to stakeholders
  - Updating artifacts such as the issue log and the stakeholder register

Documenting Stakeholders

- ## Stakeholder analysis table
  - List names, types of stakeholders, people's roles, most important objectives, etc.

Name	Organization	Objectives	Contributions	Advisors
Hawn, Sean	Fundraising	1 Meet fundraising target 2 Retain major fundraisers 3 Increase donors	Approves plan and changes Acquires resources	Money, Penny (CFO) Hopper, Tippi (Engr)
Money, Penny	Finance	1 Decrease cost 2 Reduce expense percentage	Approves plan and changes Releases funds	Gotta, Pop (CEO)
Ratchet, Stan	Logistics	1 Improve performance 2 Prevent problems	Develops plans Monitors performance	Hopper, Tippi

Summary

- Defining a project
  - Unique and temporary
- Defining a program
  - Collection of projects
- Defining project management
  - Art and science
- The role of project manager
- Project parameters
  - Scope, Quality, Cost, Time, Resource Availability
- Understand and use the scope triangle
- Project plan
- Watch out for the "Creeps"
- Refer to the rules for classifying projects to adopt a methodology and tailor it
- Project stakeholders influence the project
  - Open communications is important
  - Try to minimize negative impact on project
- A leader focuses on inspiring and empowering her team.

Project Management Knowledge

- Project Management Institute (PMI)
  - Promotes project management
  - Provides extensive support material and training
  - Defines specialist's body of knowledge (BOK)
    - Organized into nine knowledge areas
  - http://www.pmi.org

- Industry Certifications
  - Project Management Professional (PMP®)
  - Certified Associate in Project Management (CAPM®)
  - CompTIA's Project+
  - Professional Scrum Master (PSM I) Certification
  - PRINCE2 (PRojects IN Controlled Environments)

The Big Book of Project Management

- The Project Management Institute (PMI) is a nonprofit organization with its hooks in all aspects of project management. It provides project management education and offers certifications to validate that project managers know what they're doing. PMI also supports research into new project management methods.

- PMI publishes the Project Management Body of Knowledge, also known as the PMBOK Guide. This document represents the collective knowledge of a slew of experienced project managers, boiled down into an overview of project management steps, why you perform them, and the results they produce.

- The PMBOK earlier versions were dry, formal, and didn't tell you exactly how to perform project management tasks (great as a reference, but useless as a how-to book). Newest version provides very good insight and refers to modern approaches which are especially useful for software projects.

PMBOK Guide 7 vs. Previous Versions

- PMBOK Guide 7th edition was released in August 2021.

- PMBOK Guide – 6th edition is grounded in technical processes, inputs, tools and techniques, and outputs for the project manager but the **PMBOK Guide 7th edition is driven by skills and resources for the team to deliver value-based outcomes**.

- **The most significant difference is the shift of focus from very technically driven processes and tools to more over-arching principles anyone involved with project management work can use to be successful.**

project manager and process-focused → project team and outcome-focused

Changes from PMBOK Guide 6 to 7

	PMBOK® Guide—Sixth Edition	PMBOK® Guide—Seventh Edition
Overall Approach	• Prescriptive, not descriptive • Emphasis on how, not what or why	• Principles to guide mindset, actions, and behaviors, reflected in bodies of knowledge for project delivery, agile, lean, customer-centered design, etc.
Basis for Design	• Specific processes convert inputs to outputs using tools and techniques • Process-focused and orientation more compliance driven	• Domains of interacting, interdependent areas of activity with performance outcomes as well as an overview of commonly used tools, techniques, artifacts, and frameworks • Focus on project outcomes in addition to deliverables
Project Environment	• Project environment—internal and external	• Project environment—internal and external
Project Application	• Most projects, most of the time	• Any project
Target Audience	• Primarily project managers	• Anyone involved in the project with a specific focus on team members and team roles, including project lead, sponsor, and product owner
Degree of Change	• Incremental revision based on previous editions	• Principle-based to reflect the full value delivery landscape
Tailoring Guidance	• References to tailoring, but no specific guidance	• Specific tailoring guidance provided