INTRODUCTION TO PROJECT MANAGEMENT IN ENGINEERING

Dr. SELİN METİN
Netaş Telekomünikasyon A.Ş.

Project Management Overview

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

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.
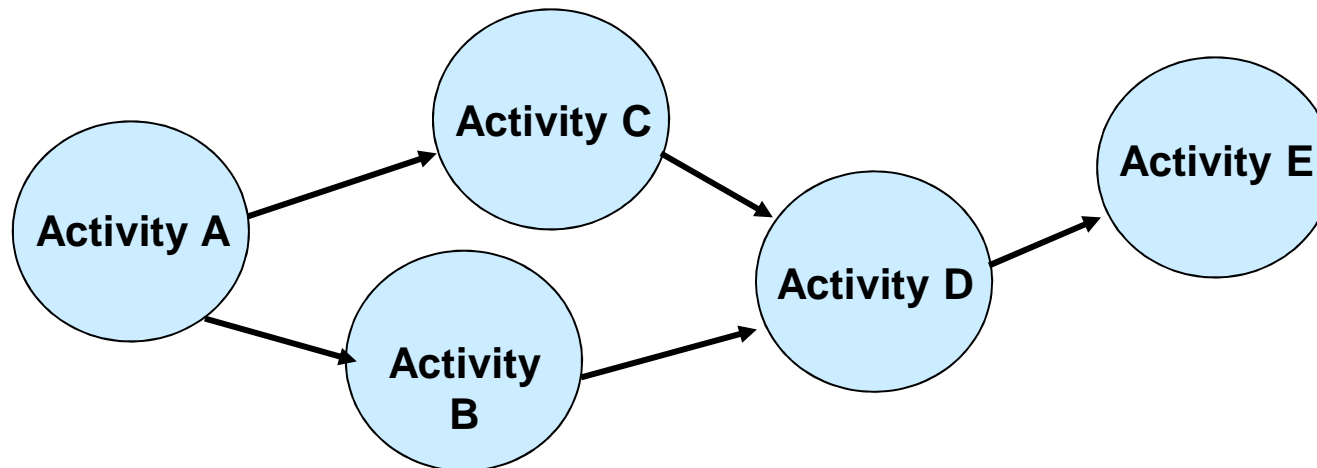
- **What's missing from this definition?**

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.
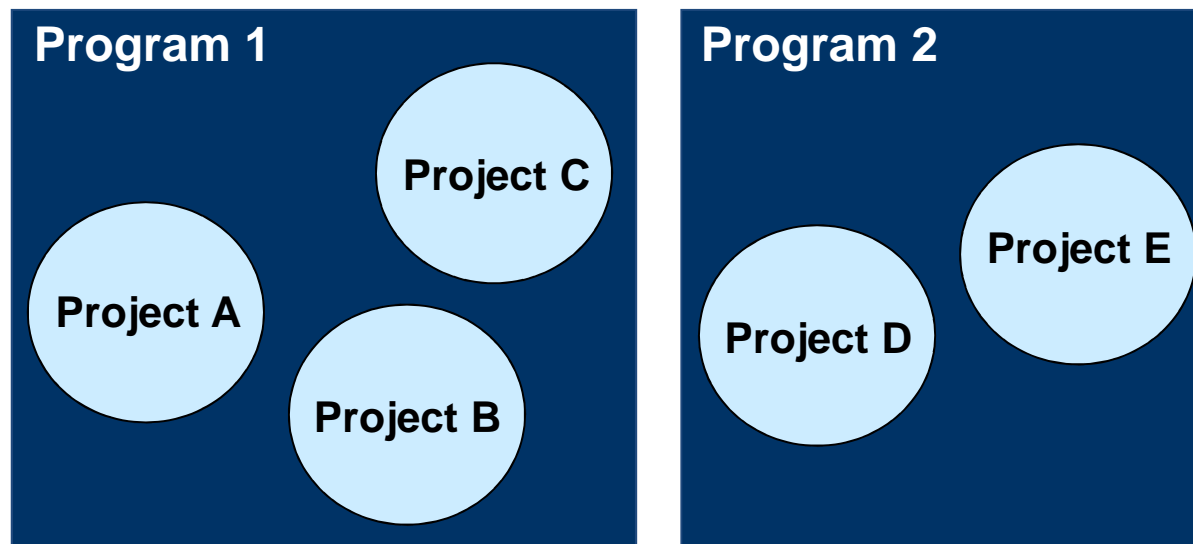
Defining a Program contd

- 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

Common Phases of Project Management

- Getting started

- Planning

- Performing the project

- Keeping things under control

- Gaining closure
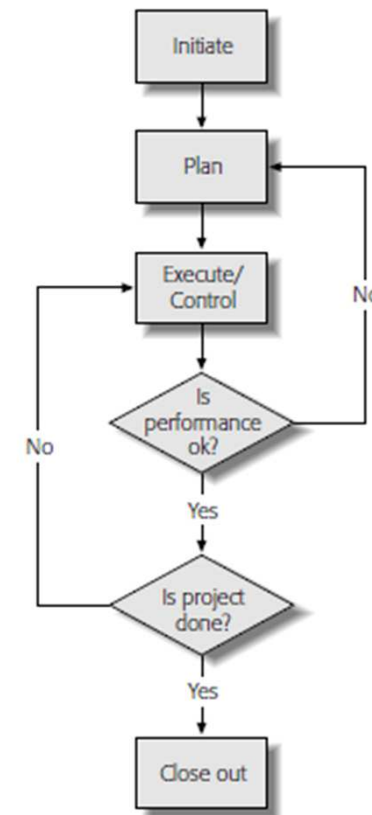
Project Management Goals

- 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

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.

Time

Cost

Scope and Quality

Resource Availability
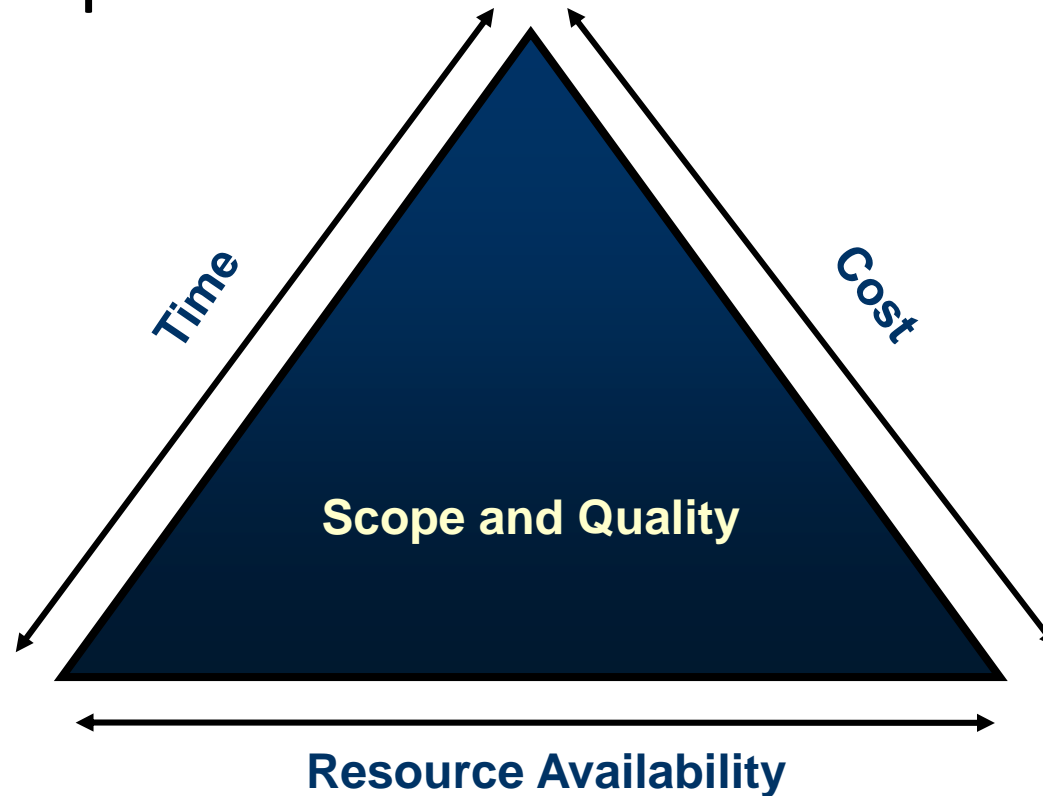
Applying the Scope Triangle

- 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

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

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+

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 is dry, formal, and doesn't tell you exactly how to perform project management tasks. It's great as a reference, but useless as a how-to book.