Electronics and
Computer Science

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Introduction To Project Management

COMP6204: Software Project Management and Secure Development

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Overview

- Motivation for taking up project management module
- Advantages of Using Formal Project Management
- What Is a Project?
- Project Vs. Operation
- Project Attributes & Constraints
- Project Management Framework, Tools and Techniques
- Project Selection and assessing Project Success
- Project Charter & Stakeholder Register

Motivation

Many organisations today have a new or renewed interest in project management (PM). Why?

- Demand for projects continues to increase. GDP contributions from project-oriented industries are forecasted to reach US$34.5 trillion by 2030.
  - Employers will need 25 million new individuals working in project management-oriented roles by 2030.
- 2020 pandemic proved that projects matter now more than ever. Agile organisations respond better to change.
- Good project management helps the bottom line. An average 11.4 percent of investment is wasted due to poor project performance.

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More Motivation to Study PM

- Project management salaries continue to grow. The average total compensation for project management workers in the U.S. in 2019 was $124,000.

- Certification is a good investment. People with the Project Management Professional PMP® credential reported salaries 22% higher on average than those without it.

- Project management is also a vital skill for personal success.

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What Is a Project?

- A project is "a temporary endeavor undertaken to create a unique product, service, or result"*
- Projects end when their objectives have been reached, or the project has been terminated.
- On the other hand, *operations* is work done to sustain the business.

*Project Management Institute, Inc., *The Standard for Project Management, Seventh Edition* (2021), p. 4.

Advantages of Using Formal Project Management

- Better control of financial, physical, and human resources
- Shorter development times & Improved productivity
- Lower costs & Higher profit margins
- Higher quality and increased reliability
- Better internal coordination & Higher worker morale
- Improved customer relations

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Examples of Projects

- Construction of a bridge
- Development of software for a new business process.
- Installation of machinery in a factory
- Relief efforts after a natural disaster
- Developing a cloud-based marketing platform for start-ups

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Project Vs. Operation

Project	Operation (Business as Usual)
New payroll system	Payroll processing each month
New buildings or extensions	Building maintenance
Designing a new car	The car production line operation
Developing a new version of software	Supporting the new software version e.g., answering support tickets.

Project Attributes

- A project:
  - Has a unique purpose
  - Is temporary
  - Drives change and enables value creation
  - Is developed using progressive elaboration or in an iterative fashion
  - Requires resources, often from various areas
  - Should have a primary customer or sponsor
    - The project sponsor usually provides the direction and funding for the project
  - Involves uncertainty
- Project managers work with the project sponsors, the project team, and the other people involved in a project to define, communicate, and meet project goals.

Project Constraints

- Every project is constrained in different ways.
- Some project managers focus on the triple constraint (meeting scope, time, and cost goals)
  - *Scope*: What work will be done as part of the project? What unique product, service, or result does the customer or sponsor expect from the project?
  - *Time*: How long should it take to complete the project? What is the timeline?
  - *Cost*: What should it cost to complete the project? What is the project's budget? What resources are needed?
- Other constraints include quality, risk, and resources

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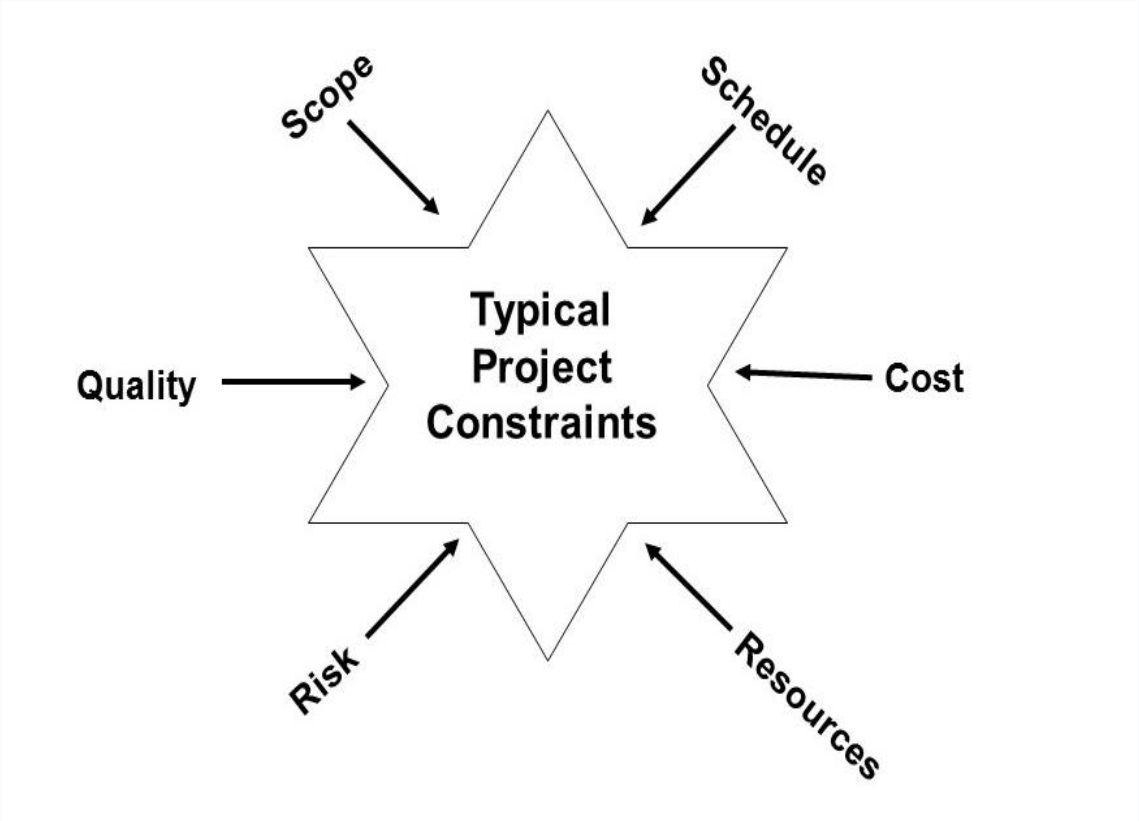
Typical Project Constraints



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What is Project Management?

- Project management is “the application of knowledge, skills, tools and techniques to project activities to meet project requirements.”*

*Project Management Institute, Inc., *The Standard for Project Management, Seventh Edition* (2021), p. 4.

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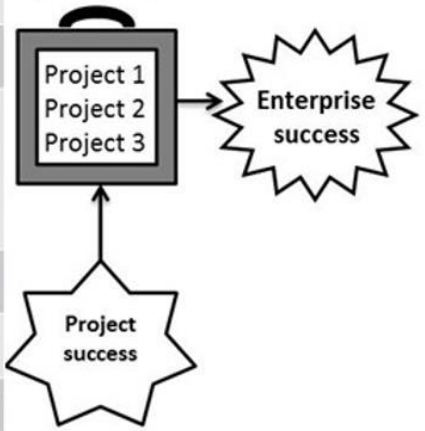
Project Management Framework

Stakeholder needs and expectations

Process groups	Knowledge areas	Tools and techniques
1. Initiating	1. Integration	
2. Planning	2. Scope	
3. Executing	3. Schedule	
4. Monitoring and controlling	4. Cost	
5. Closing	5. Quality	
	6. Resource	
	7. Communication	
	8. Risk	
	9. Procurement	
	10. Stakeholder	



Project Stakeholders

- Stakeholders are the people involved in or affected by project activities
- Stakeholders include:
  - The project sponsor
  - The project manager
  - The project team
  - Support staff
  - Customers
  - Suppliers
  - Opponents to the project

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Project Management Knowledge Areas

- Project integration management is an overarching function that coordinates the work of all other knowledge areas.
  - It affects and is affected by all the other knowledge areas.

- Project scope management involves working with all appropriate stakeholders to define, gain written agreement for, and manage all the work required to complete the project successfully.

Project Management Knowledge Areas – Cont.

- Project time management includes estimating how long it will take to complete the work, developing an acceptable project schedule given cost-effective use of available resources, and ensuring timely completion of the project.
- Project cost management consists of preparing and managing the budget for the project.
- Project quality management ensures that the project will satisfy the stated or implied needs for which it was undertaken.

Project Management Knowledge Areas – Cont.

- Project resource management is concerned with making effective use of the people and physical resources needed for the project.
- Project communications management involves generating, collecting, disseminating, and storing project information.
- Project risk management includes identifying, analysing, and responding to risks related to the project.

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Project Management Knowledge Areas – Cont.

- Project procurement management involves acquiring or procuring goods and services for a project from outside the performing organization.

- Project stakeholder management focuses on identifying project stakeholders, understanding their needs and expectations, and engaging them appropriately throughout the project.

Project Management Tools and Techniques

- Project management tools and techniques assist project managers and their teams in various aspects of project management.
- Note that a tool or technique is more than just a software package.
- Specific tools and techniques include:
  - Project charters, scope statements, and Work breakdown structure (Scope)
  - Gantt charts, network diagrams, critical path analyses (time)
  - Net present value, cost estimates, and earned value management (cost)
  - Agile projects often require product roadmaps, backlogs, burndown charts, retrospectives, etc.

Project Success

- There are different ways to define project success:
  - The project provided value. Value is "the worth, importance, or usefulness of something."*
  - The project met scope, time, and cost goals.
  - The project satisfied the customer/sponsor.
    - the customer's willingness to recommend a product or service to others.
  - The project produced the desired results.

*Project Management Institute, Inc., *The Standard for Project Management, Seventh Edition* (2021), p. 5.

Project Selection

- Projects are chosen using Project Selection Methods.
- Generally, more than one methods are applied.
- Some qualitative criteria:
  1. Brand Image
  2. Complementary Products/services
  3. Extension of existing portfolio of products/services
  4. Competitive Landscape
- Usually, a mix of qualitative and quantitative criteria are used

Project Selection – Cont.

- To use the quantitative methods, we need to estimate the cash flows that the product will need and generate over a period of time.
- Based on this data we need to calculate the discounted cash flow DCF of those future cash flows in today's terms and see if the returns are greater than the cost of capital.
- For example, if the project will need money to be borrowed from banks at 10%, then the cash flows should generate a return that is greater than 10%.
  - Otherwise, the project is going to lose money for the company.

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Quantitative Project Selection – Discounted Cash Flow

- Let's assume that the company has estimated the cash flows for this project as given below:

Year 0	Year 1	Year 2	Year 3
-$10 million	$2 million	$4 million	$6 million

- The raw total cash inflow is $2 million (-$10 + $2 + $4 + $6)
- But we need to discount these incomes to bring them to their current value using a discounting rate which is equal to the cost of capital.
- DCF = Cash flow / (1 + r)^n r is the cost of capital and n is the number of years

Year 0	Year 1	Year 2	Year 3
-$10 million	$1.818 million	$3.306 million	$4.508 million

- If we add the above cash flows the net cash flow of -$0.368 million
- The final net cash flow of -$0.368 is called the NPV (Net Present value) of the project

Quantitative Project Selection – Cont.

- The NPV (Net Present value) of the project is one of the most important parameters looked at when making project selection.
  - The higher the NPV, the better it is from a quantitative point of view.
  - An NPV of at least 0 is required to provide the returns expected by the company.
- A measure similar to NPV is called *Internal Rate of Return (IRR)* which gives the returns of the project in percentage terms.
  - A project will make money if the IRR is above the cost of capital.
- For example, if there are two projects – one with an IRR of 15% and the other with an IRR of 20% – and the cost of capital is 10% both projects will make money.
  - In such a case if the company wants to select only one project, it should select the second one as it brings in greater returns.

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Project Charter

- Once the company selects the projects to be undertaken, it gives authorisation for those projects.
- A Project Charter is providing that authorisation for a selected project.
- The project charter is a one-to-two-page document that is issued by the sponsor of the project.
  - Project Name and Description
  - Business need of the project
  - Justification for starting the project
  - High Level requirements
  - Deliverables & Constraints
  - Assumptions
  - High-level Risks
  - Project Manager & Stakeholders
- The PC authorises a project manager to use the company's resources to perform the project.

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A Sample Project Charter

Project Name	R&D Cost Optimization
Project Description	This project will identify the areas where costs can be optimized to bring about an overall cost reduction in the R&D department without affecting its operations.
Business Need	Due to a market slowdown, it is imperative that we reduce our costs.
Project Justification	Our company spends about 25% of its costs on the R&D department. A cost reduction in this department can help us increase our net income by a percentage that is higher than the increase in our revenue after removing the project costs. As per estimates, this project would bring us a cost reduction of about 5% and this would increase our net income by 10% with a 5% increase in revenue this year.
High-level Requirements	Identify areas of cost reduction in the R&D department Suggest ways of implementing cost reduction in the R&D department
Deliverables	Report on areas of cost reduction & ways of implementing them in the R&D department High-level implementation schedule
Constraints	The project should be completed within 2 months The total project cost should not exceed $20,000
Assumptions	All required data will be available from the R&D department The cost reduction will not reduce employee productivity
High-level Risks	Unavailability of relevant data Unwillingness to part with relevant data
Project Manager	Lan Pham
Stakeholders	R&D Functional Manager Marketing Director

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Identification of Stakeholders

- Once the Project Manager receives the Project Charter the next step is identification of Stakeholders.
- This stage is extremely important.
- A stakeholder register is prepared along with the strategy of managing the stakeholders as shown below:

ID	Name	Organization	Contact Info	Role	Main Expectations	Management Strategy

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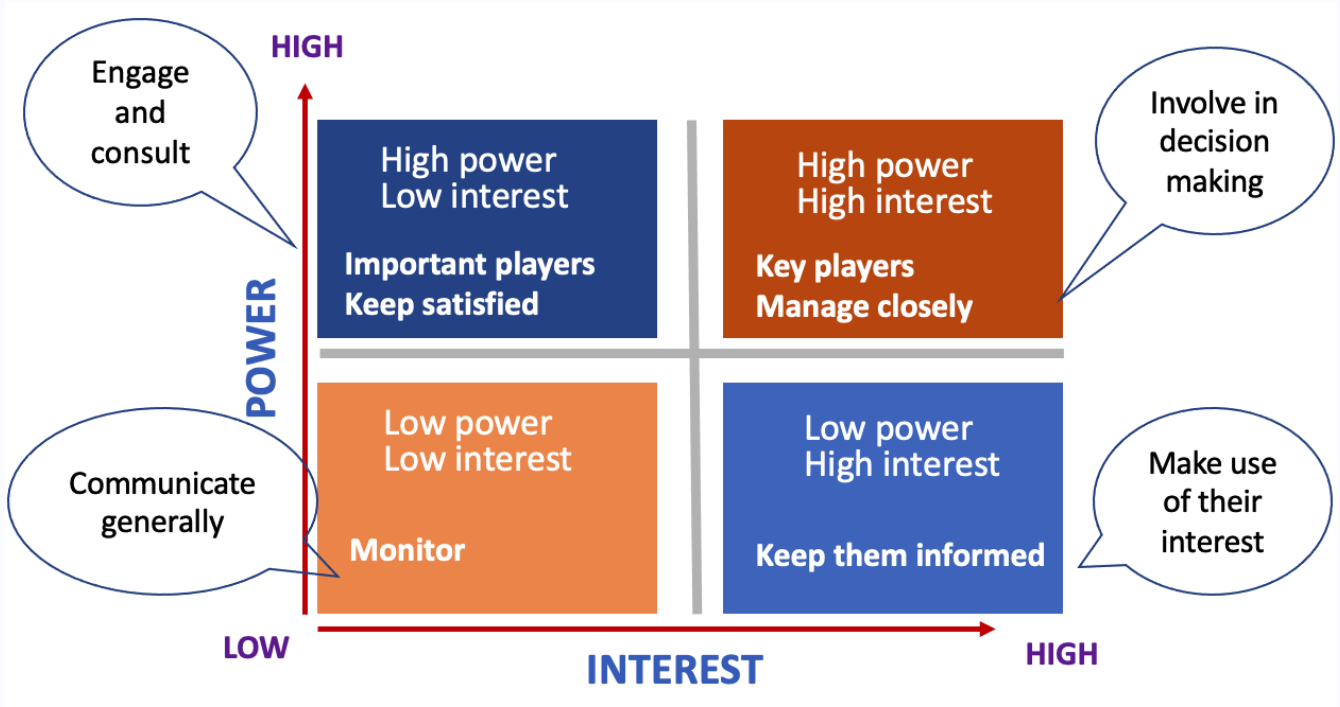
Power-Interest grid

A power interest grid also known as a Mendelow Matrix is a tool used in project stakeholder management to analyse the relationships between stakeholders and understand their power and interest in a project.

The strategy to manage a stakeholder depends upon two factors – interest in project and power to influence the project.



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YOUR QUESTIONS

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- Chapter 1 from:

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