

COMP313

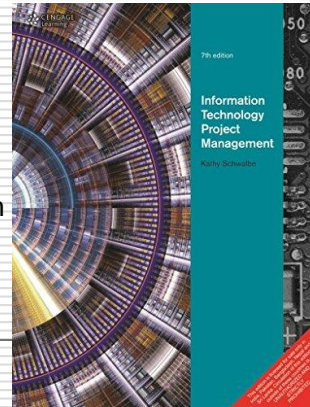
Project Management

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- ✧ Office hour:
 - ☞ Monday 9:30-13:00
 - ☞ Tuesday 9:30-10:00; 14:30-16:30

□ Textbook

Schwalbe, Kathy (2014). Information Technology Project Management (7th edition).

- ### □ Canvas - all lecture notes, and quizzes/exercises



□ Marks breakdown

1. 20% term project using MS project
 2. 5% class exercises
 3. 30% tests
 4. 45% exam
-

Chapter 1: **Introduction to Project Management**

What, Why, How, Who?

- What is Project and Project Management?
 - Why we need PM?
- How to carry out a Project?
- Who carries out Projects?

What Is a Project?

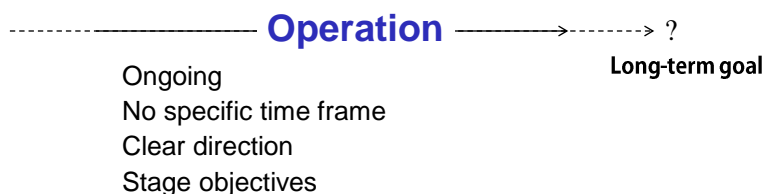
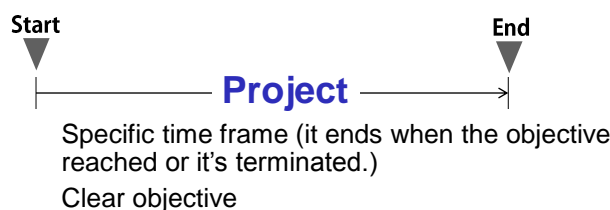
- A **project** is “a temporary endeavor undertaken to create a unique **product**, **service**, or **result**.”*
- **Operation** is a work done to sustain the on-going business and/or to produce repetitive products and services.
- A project ends when its objectives have been reached, or the project has been terminated.
- *There is no such thing as an Ongoing Project.*



*PMI, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* (2004), p. 5.

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Project vs Operation



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Is it a project?

1. Developing a smartphone app
2. Design a driverless car
3. Assembling cars in an assembly line
4. Undertaking a car manufacturing business
5. Adding a new feature to an internal software application for the finance department.
6. Maintaining an academic software system
7. Working on a survey research
8. Upgrading a college's technology infrastructure to provide wireless Internet access across the campus
9. Repairing a car

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Project Attributes

- A **project**:
 - Has a unique purpose -- creating a unique **product**, **service** or **result**.
 - Is temporary and has a time frame.
 - Should have a primary **customer** or **sponsor**.
 - Is developed using **progressive elaboration**.
 - Requires **resources**, often from various areas.
 - Involves uncertainty. (*so we need risk assessment*)

Is it a project? (*cont.*)

10. Organizing a trip to Hong Kong
11. Operating a railway transportation business
12. Making a financial statement by the end of each month
13. A bank teller services customers in line.
14. Launching a landing programme on Mars
15. Exploring the outer space
16. A government department develops a system to track child immunizations.
17. Peter writes a simple program for practicing programming skill.

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Is it a project? (*cont.*)

18. Health government department ensures the public health of the citizens.
19. Conducting a R&D for the UI of their new smartphone model
20. Handling daily customer complaints in sales department
21. Arranging a wedding ceremony
22. Investigating an accident
23. Constructing the Macao lite-railway facility
24. Operating the Macao lite-railway transportation business
25. Launching a rescue operation
26. Filming a movie

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We said that a project has a pre-defined time frame with a start and an end.

Why Starts a Project?

When to End a Project?

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Why Starts a Project?

- **Market Demand**
 - Building a more efficient car in response to fuel shortage
- **Strategic Opportunity or Business Need**
 - Creating a new App to increase revenue
 - Creating an inventory system to expedite the stocktaking process
- **Customer Request**
 - A corporate client requests to build a financial analytical software program
- **Technological Advance**
 - Developing a faster and more compact mobile phone by taking advantage of the newly developed technology
- **Legal Requirement**
 - Creating a new security software program for fulfilling government regulations
 - Government regulations require new reporting of business data for gaming industry.

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When to End a Project?

- The project's objectives have been achieved.
- Its objectives will not or cannot be met anymore.
- The need for the project no longer exists.
- The client (customer, sponsor or champion*) wishes to terminate the project.

** Champion – a project advocate, strong supporter.*

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Examples

- You are filming a movie. However, the main character suddenly quits and you don't think you could find anyone suitable for replacement.
- You are developing a Wei-Chi program with traditional algorithmic approach. However, a new approach has been adopted with AI technique, making the traditional approach obsolete.
- You develop a financial software system, but your company has been closed down.
- The project "Macao Int'l Firework Display Contest" has been cancelled because the gov't doesn't feel it a good time to do so due to the typhoon's aftermath.

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Why Project Management is needed?

- How to recruit and dismiss a team?
- Does it guarantee the bridge can be built as expected?
- To be built in an acceptable time period?
- With suitable amount of money?
- Acceptably satisfying the “people”? Who are those people?
- Does it consider the maintenance problems?
- What if some unexpected incidents occur, what should you do?

Just want to ensure the uncertainties turning to be certain as much as possible.

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Cases of Project Failure (1)

- Care Records Service of National Health Service (UK)
 - 2008
 - Centralizing health records of the UK
 - Cost: \$24B project (World’s largest civil IT project)
 - Causes of failure:
 - Original scope and cost of project was radically underestimated since underestimating its complexity. Original budget was \$4.6B, it has subsequently grown to \$24B, could grow to as much as \$40B.

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Cases of Project Failure (2)

- Transit Ticketing Authority (Australia) – 2008
 - Constructing Smart card system to allow bus, rail and tram travel on a single ticket
 - Cost: up to \$350M AUD
 - It had been delayed by as much as 5 years and over budget by between \$200M and \$350M.
 - Causes of failure:
 - Underestimation of complexity, schedule underestimation, “technical flaws” etc.

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Cases of Project Failure (3)

- Virtual Case File – FBI (US) – 2005
 - Ambitious program to replace paper based reporting of crimes and investigations with an online system is scrapped. System was intended to aid efficiencies and allow pieces of information gathered through different channels at different times to be connected up thereby allowing for more effective investigations through better flows of information.
 - Cost : \$170M USD
 - The project was in serious trouble and was eventually deemed unfit for use. The project was ultimately scrapped in 2005.
 - Causes of failure :
 - Poor requirements, continual changes in specifications, poor communications, lack of planning, lack of central architecture, lack of oversight.

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Cases of Project Failure (4)

- “Jetsmart” engineering parts management system - **Qantas – Australian airline**
 - Cost: \$40M
 - Failure to engage the engineers who would be the eventual users of the system into the requirements and design processes resulted in a system that the engineers deemed to be unusable once it was launched. After just a few years in operation (during which time some staff refused to use it and unions threatened industrial action), the system is dumped and a new system introduced.
 - Causes of failure :
 - Lack of stakeholder engagement; Requirements solicitation management failure; Change management failure.

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Cases of Project Failure (5)

- Payroll and benefits system - University of Wisconsin – (2006)
 - **Cost** :\$28M USD
 - Payroll and benefits system project is abandoned after 5 years of effort. Board of governors had not received a single report on the project in its 5 years and was unaware that the University was facing a large scale project failure.
 - Causes of failure :
 - Poor leadership; Lack of progressive elaboration; Lack of planning; Bureaucratic infighting.

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Macao Lite-Rail Construction

- Constructing a Lite-Rail system of 21 km
 - Original budget (2007): MOP4.2b ;
Original schedule: End of 2011
 - As of 2019, only 9.3km had been built (Taipa branch);
Estimated total cost: MOP40b
Estimated schedule to completion: 2026

(From Macao daily post, 2017)

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Causes of the Failure

- | | |
|---|---|
| ■ Original scope and cost of project was radically underestimated | ■ Failure to establish and stabilize requirements |
| ■ Underestimation of complexity | ■ Lack of risk management |
| ■ Schedule underestimation | ■ Lack of stakeholder engagement |
| ■ Poor requirements | ■ Requirements solicitation management failure |
| ■ Continual changes in specifications | ■ Change management failure |
| ■ Poor communications | ■ Poor leadership |
| ■ Lack of planning | ■ Lack of progressive elaboration |
| ■ Lack of central architecture | ■ Lack of planning |
| ■ Lack of oversight | ■ Bureaucratic infighting |
| ■ “technical flaws” | ■ Poorly planned and managed |
| ■ Programming errors | ■ Lack of staff training |
| ■ Failure to test the system with realistic load | ■ Poor staff morale |

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Statistics of Failure

- IT projects have a terrible track record.
 - A 1995 Standish Group study (CHAOS) found that only 16.2% of IT projects were successful in meeting scope, time, and cost goals.
 - Over 31% of IT projects were canceled before completion, costing over \$81 billion in the U.S. alone.*

**The Standish Group, “The CHAOS Report” (www.standishgroup.com) (1995). Another reference is Johnson, Jim, “CHAOS: The Dollar Drain of IT Project Failures,” Application Development Trends (January 1995).*

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Improved Project Performance

- The Standish Group’s CHAOS studies show improvements in IT projects in the past decade.*

Measure	1994 Data	2002 Data	Result
Successful projects	16%	34%	Doubled
Failed projects	31%	15%	Halved
Money wasted on challenged and failed projects	\$140 B out of \$250 B	\$55 B out of \$255 B	More than halved

**The Standish Group, “Latest Standish Group CHAOS Report Shows Project Success Rates Have Improved by 50%” (March 25, 2003).*

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Why the Improvements?

Better tools have been created to monitor and control progress

Better skilled project managers with better management processes are being used*

**The Standish Group, "CHAOS 2001: A Recipe for Success" (2001).*

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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.”*

**PMI, A Guide to the Project Management Body of Knowledge (PMBOK® Guide) (2004), p. 8.*

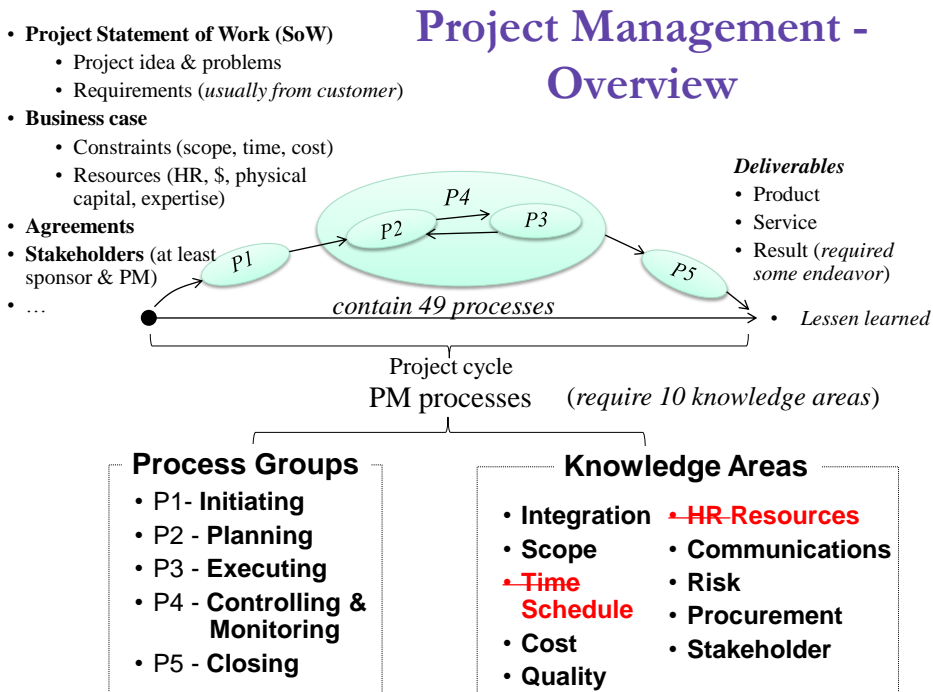


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Advantages of Using Project Management

- Helping meet strategic goals
- Better control of financial, physical, and human resources
- Meeting predetermined development times
- On-budget
- Higher quality and increased reliability
- Improved productivity
- Better internal coordination
- Improved customer relations
- Higher worker morale

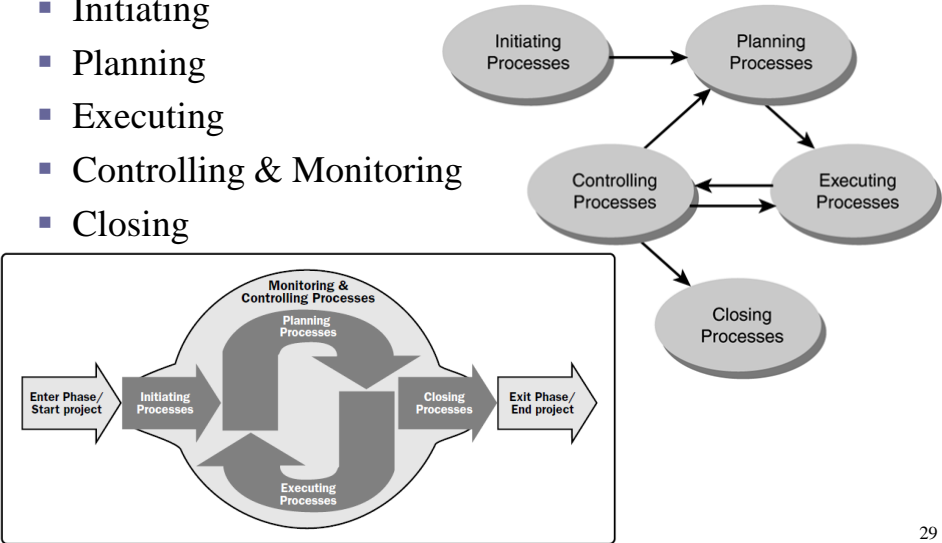
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5 Process Groups

- Initiating
- Planning
- Executing
- Controlling & Monitoring
- Closing

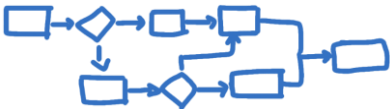


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Process Group

A **Process** is a series of actions directed toward a particular result.



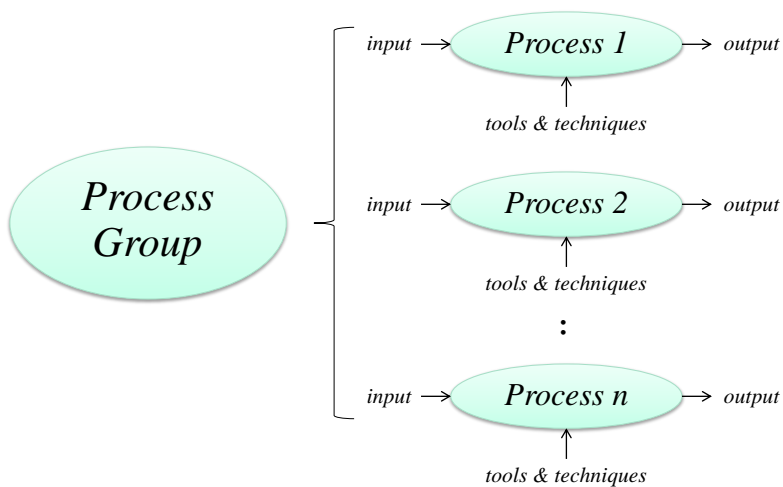
A **Process Group** is a group of related processes at a certain stage of project.

Process Groups

- **Initiating**
 - Defining and authorizing a project
 - Identifying important stakeholders
- **Planning**
 - Devising and maintaining a workable plan to ensure that the project addresses the organization's needs
- **Executing**
 - Coordinating people and other resources to carry out the various plans and create the products, service or results of the project
- **Monitoring and controlling**
 - Regularly measuring and monitoring progress to ensure that the project team meets the project objectives
- **Closing**
 - Formalizing acceptance of the project and ending it
 - Ex: closing out contracts, informing the relevant stakeholders of the closure, documenting lessons learned, and receiving formal acceptance of the delivered work, restoring everything for the next project, returning the resources to the original owners etc.

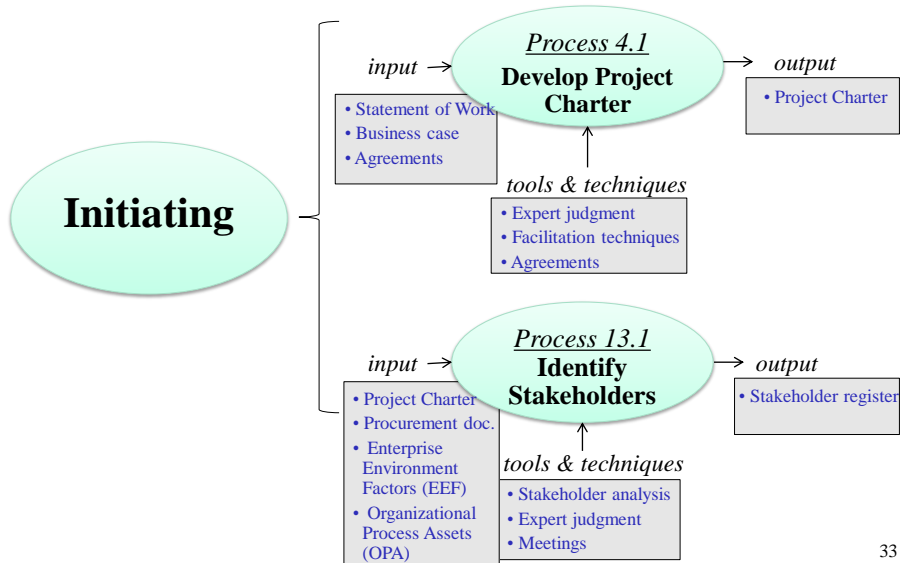
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Process Group & Processes



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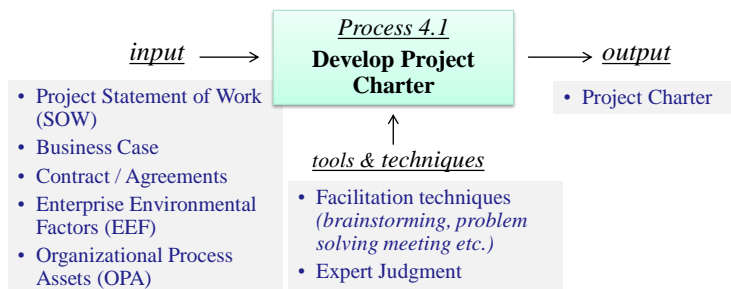
Process Group & Processes (Example: Process Group: “*Initiating*”)



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Process (example: Process 4.1)

- For developing the Project Charter:
 - formally authorizes a project or phase
 - documenting initial requirements that satisfy the stakeholders' needs and expectations
 - establishes partnership between performing group and requesting group and **formally initiates the project**.



Process Group Knowledge Area	Initiating	Planning	Executing	Monitoring & Controlling	Closing
Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.4 Monitor and Control Project Work 4.5 Perform Integrated Change Control	4.6 Close Project or Phase
Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Time Management Schedule		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Resources 6.5 Estimate Activity Duration 6.6 Develop Schedule	PMBOK v5	6.7 Control Schedule	
Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Quality Management		8.1 Plan Quality Management 9.1 Plan Human Resource Management		8.2 Perform Quality Assurance 9.2 Acquire Project Team 9.3 Develop Project Team 9.4 Manage Project Team	8.3 Control Quality
Human Resource Management				Control Resources	
Communications Management		10.1 Plan Communication Management	10.2 Manage Communications	10.3 Control Communications	
Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	Implement Risk Responses	11.6 Control Risks Monitor	
Procurement Management		12.1 Plan Procurement Management 13.2 Plan Stakeholder Management	12.2 Conduct Procurements 13.3 Manage Stakeholder Engagement	12.3 Control Procurement 13.4 Control Stakeholder Engagement	12.4 Close Procurements
Stakeholder Management	13.1 Identify Stakeholders				

PMBOK 5 – PMP (5 Process Groups, 10 Knowledge Areas, and 47 Processes)

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PROCESS GROUP AND KNOWLEDGE AREA MAPPING						PMBOK v6
Knowledge Areas	Project Management Process Groups					
	Initiating	Planning	Executing	Monitoring and Controlling	Closing	
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase	
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope		
6. Project Schedule Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule		
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs		
8. Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality		
9. Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources 10.1 Plan Communications Management	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources 10.2 Monitor Communications		
10. Project Communications Management						
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks		
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements		
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement		

<https://www.deepfriedbrainproject.com/assets/files/pmbok-guide-6th-edition-process-group-knowledge-area.pdf>

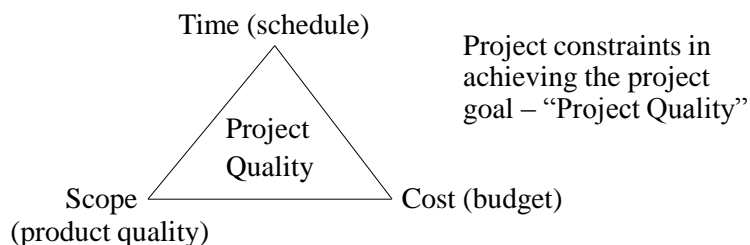
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The Triple Constraints

- Every project is constrained in different ways by its:
 - **Scope** goals: What work will be done?
 - **Time** goals: How long should it take to complete?
 - **Cost** goals: What should it cost?
- It is the project manager's duty to balance these three often-competing goals while satisfying the sponsors and end users.

Balancing the competing constraints

Project management involves in balancing the 6 3 competing constraints:



Ideal combination: Cheap, Fast, Good
= Good project management

Some questions

1. If the sponsor wants a program to be delivered on time with a lower Cost, how does it affect the Scope?
2. If the sponsor wants to add a few more functions in the program (bigger Scope), how does it affect the Time and Cost?
3. If the sponsor wants a program to be delivered much earlier, how does it affect the Scope and Cost?
What if he/she doesn't want to cut the Scope?

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Some questions

4. If you had planned for a project with a budget of \$1 mil and you ended up spending \$200,000 only (assuming that the Scope and Time didn't change), is it good?

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Project Stakeholders

- **Stakeholders** are the people involved in or affected by project activities.
- Stakeholders include:
 - Project sponsor
 - Project manager
 - Project team
 - Support staff
 - Customers/Users
 - Suppliers
 - Opponents to the project

Example – Home renovation

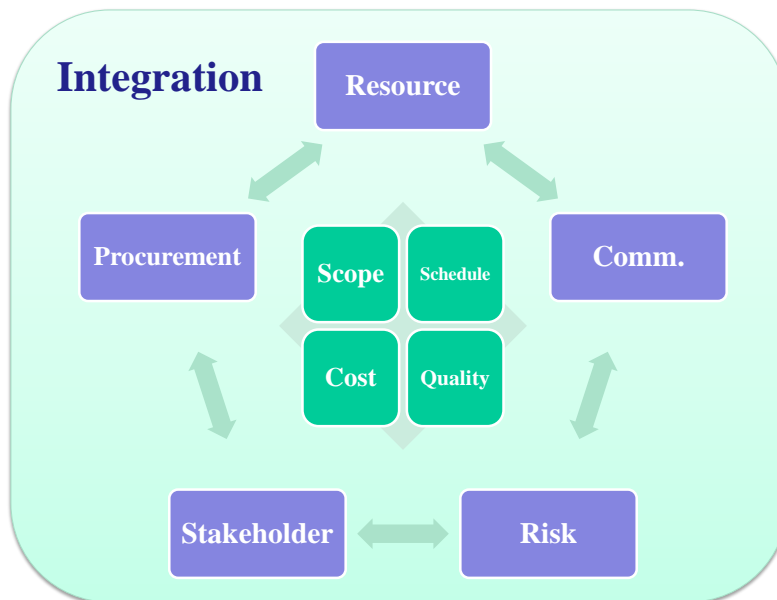
- Sponsor
 - You, your father (maybe)
- Customer/User
 - You & your family
- Project manager
 - General contactor
- Project team
 - construction staff, designers, electricians, carpenters, ...
- Support staff
 - Admin office assistants of general contractor who are responsible for coordinating the meeting, making doc., filing government applications

Example – Home renovation (*cont.*)

- Suppliers
 - who provide the materials (wood, windows, doors, floor, paint,...) for the renovation, and maybe deliver the materials to the construction site.
- Opponents
 - Your neighbors, property management office, home owners' committee, your landlord (if you rent the flat)
 - Government - construction works bureau, fire department, ...

10 Project Management Knowledge Areas

- Knowledge areas describe the key competencies that project managers must develop.
 - 4 core knowledge areas lead to specific project objectives (**scope**, **schedule (time)**, **cost**, and **quality**).
 - 5 facilitating knowledge areas are the means through which the project objectives are achieved (**resources**, **communication**, **risk**, **procurement**, and **stakeholder management**).
 - 1 connecting knowledge area (**project integration management**) affects and is affected by all of the other knowledge areas.



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10 Knowledge Areas

- **Project Scope Management**
 - Clear scope statement
 - Prevent scope creep
- **Project Schedule Management**
 - Planning time and schedule
 - Controlling schedule
- **Project Cost Management**
 - Budget estimating and planning
 - Budget control
- **Project Quality Management**
 - Planning quality
 - Enforcing quality
 - Checking quality control

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10 Knowledge Areas

- **Project **Resource** Management**
 - Planning the use of resources (people, equipment, machines ...)
 - Organizational planning
 - Making a team; motivating a team
- **Project **Communications** Management**
 - Communication plan
- **Project **Risk** Management**
 - Identifying and analyzing risks;
 - Planning risk responses
- **Project **Procurement** Management**
 - Acquisition of services and products
 - Contract management

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10 Knowledge Areas

- **Project **Integration** Management**
 - Fitting everything together
 - Making a master plan
- **Project **Stakeholder** Management** *(in new version)*
 - Identifying and Analyzing stakeholders
 - Managing and controlling their engagement throughout the life of the project

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Project Management Tools and Techniques

- Project management tools and techniques assist project managers and their teams to carry out processes.
- Specific tools and techniques include:
 - Project charters, scope statements, and WBS (scope).
 - Gantt charts, network diagrams, critical path analyses, critical chain scheduling (time).
 - Cost estimates and Earned Value Management (cost).
 - *See Table 1-1 (P.13) for more examples.*



Tools



Techniques

Information Technology Project Management, Seventh Edition

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Project Success

- There are several ways to define project success:
 - Meeting scope, time, and cost goals
 - Satisfying the customer/sponsor
 - Meeting the project's sponsors' objectives, such as:
 - Making or saving a certain amount of money
 - Providing a good return on investment
 - Simply making the sponsors happy

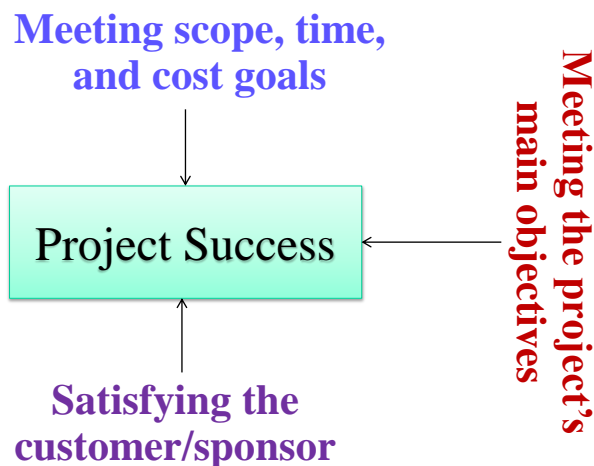
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Aligning Strategy and Project Management (by Michael Porter)

- Without the clarity of strategy,
 - we can't decide whether we have the right goals and specifications
 - We can't connect projects to the organizations' goals
 - Deliver the values needed by the organizations
- We need to identify the alignment between strategy and PM.

<https://www.youtube.com/watch?v=CKcSzH1SvCk>

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Examples of Meeting Sponsor's Objectives

- The Objectives of the project – “Repairing the car”:
 1. For good quality to run as long as it can (*a valuable antique car*)
 2. For passing the annual car quality check (*just use it for another year*)
 3. For increasing its bargaining power to sell out (*just make it looks nice*)

How does each of these affect the Scope, Time and Cost?

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Project Success Factors*

- | | |
|------------------------------|---------------------------------|
| 1. User involvement | 6. Agile process |
| 2. Executive support | 7. Project management expertise |
| 3. Clear business objectives | 8. Skilled resources |
| 4. Emotional maturity | 9. Execution |
| 5. Optimizing scope | 10. Tools and infrastructure |

*The Standish Group, “CHAOS Activity News” (2011).

Table 1-3. Fifteen Project Management Job Functions*

- | | |
|---|---|
| ▪ Define scope of project. | ▪ Evaluate project requirements. |
| ▪ Identify stakeholders, decision-makers. | ▪ Identify and evaluate risks. |
| ▪ Develop detailed task list (work breakdown structures). | ▪ Prepare contingency plan. |
| ▪ Estimate time requirements. | ▪ Identify interdependencies. |
| ▪ Identify required resources and budget. | ▪ Identify and track critical milestones. |
| ▪ Report project status. | ▪ Participate in project phase review. |
| | ▪ Secure needed resources. |
| | ▪ Manage the change control process. |

*Northwest Center for Emerging Technologies, "Building a Foundation for Tomorrow: Skills Standards for Information Technology," Bellevue, WA, 1999.

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Suggested Skills for Project Managers

- | | |
|---|----------------------|
| ▪ Communication skills: Listens, persuades. | } Soft skills |
| ▪ Team-building skills: Shows empathy, motivates, promotes <i>esprit de corps</i> . | |
| ▪ Leadership skills: Sets examples, provides vision (big picture), delegates, positive, energetic. | |
| ▪ Coping skills: Flexible, creative, patient, persistent. | } Hard skills |
| ▪ Organizational skills: Plans, sets goals, analyzes. | |
| ▪ Technical skills: Experience, project knowledge. | |

Portfolio, Program and Project



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Program and Portfolio

- **Program:** “A group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually.”*
 - Examples of common programs in the IT field include infrastructure, applications development, and user support
- **Portfolio:** “A group of related programs and projects managed as a portfolio of investments that contribute to the entire enterprise’s success – or meeting the enterprise’s strategic goals.”

*PMI, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* (2004), p. 16.

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Program and Portfolio Managers

- **Program managers** provide leadership and direction for the project managers heading the projects within the program
- **Portfolio managers** help their organizations make wise investment decisions by helping to select and analyze projects from a strategic perspective

Top 10 IT Skills in Demand for 2017

- **Software / Application Developers (with Python, Java, C#, PHP)**
- **Help Desk / Technical Support**
- **Security Analyst with a focus on Governance, Risk & Compliance (GRC)**
- **Cloud Skills with a focus on SaaS**
- **Business Intelligence (BI) / Data Analytics / Visualization**
- **Web Development**
- **Database Administration (DBA)**
- **Project Management (PM)**
- **Big Data**
- **Mobile Application Development**

10 hottest tech skills for 2016

1. IT architecture (42%)
2. Programming/application development (40%)
3. **Project management (39%)**
4. Big data (36%)
5. Business intelligence/analytics (34%)
6. Help desk/technical support (30%)
7. Database administration (25%)
8. Security/compliance/governance (25%)
9. Cloud/SaaS (25%)
10. Web development (24%)

The % of respondents with hiring plans said they will be seeking people with this skill in the next 12 months

* From Computerworld | Dec 7,2015.

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Project Management Office (PMO)

- A PMO is an organizational group responsible for coordinating the project management function throughout an organization.
- Possible goals include:
 - Manage shared resources across all projects administered by the PMO.
 - Coordinate communication across projects
 - Collect, organize, and integrate project data for the entire organization.
 - Develop and maintain policies, templates and standards for project documents.
 - Develop or coordinate training in various project management topics.
 - Develop and provide a formal career path for project managers.
 - Provide project management consulting and training services.
 - Provide a structure to house project managers while they are acting in those roles or are between projects.

The Project Management Profession (PMP)

- Professional societies such as the Project Management Institute (PMI) have grown significantly.
- There are specific interest groups in many areas, such as engineering, financial services, health care, and IT.
- Project management research and certification programs continue to grow.

Project Management Certification

- PMI provides certification as a Project Management Professional (PMP).
- A PMP has documented sufficient project experience, agreed to follow a code of ethics, and passed the PMP exam.
- The number of people earning PMP certification is increasing quickly.

Ethics in Project Management

- Ethics is an important part of all professions.
- Project managers often face ethical dilemmas.
- In order to earn PMP certification, applicants must agree to the PMP code of professional conduct.
- Several questions on the PMP exam are related to professional responsibility, including ethics.

(Refer to page 32-33 for some examples)

VALUE: Honesty, Responsibility, Respect and Fairness

Chapter Summary

- As the number and complexity of projects continue to grow, it is becoming even more important to practice good project management.
- A project has several attributes, such as being unique, temporary and developed incrementally.
- A framework for project management includes project stakeholders, the nine knowledge areas, tools and techniques, and creating project portfolios to ensure enterprise success.
- Successful project managers must possess and development many skills and lead their teams by example.
- The project management profession continues to mature as more people become certified and more tools are created.