

Software Project Management (SWPM)

Course Objectives

- Basic project management knowledge
- Enhance the ability for team work
- Enhance the ability to lead software development / IT teams
- Enhance the ability to effectively manage projects

Course Methodolgy

- ▶ Lectures will be available on LMS or my webpage
- ▶ Take notes. Very important.
- ▶ Tutorials
- ▶ QZ and HW

Grading Scheme

- ▶ Mid1: 20%
- ▶ Mid2: 20%
- ▶ QZ: $3 \times 3 = 9\%$
- ▶ HW: $2 \times 3 = 6\%$
- ▶ Lecture attendance: 5%
- ▶ Final: 40%

Recommended textbooks

- ▶ Kathy Schwalbe, *Information Technology Project Management*, 2nd Edition, Course Technology, 2002.
- ▶ Anita Rosen, *Effective IT Project Management*, Prentice–Hall, 2008.
- ▶ Ian Sommerville, *Software Engineering*, 7th Edition, Addison–Wesley, 2004.

Course outline

- ▶ 1. Introduction
- ▶ 2. Project Concept
- ▶ 3. Project Design
- ▶ 4. Project Development
- ▶ 5. Quality Assurance
- ▶ 6. Beta Release
- ▶ 7. GA and End of Life

Chap 1

Introduction to Project Management

Topics Covered

- ▶ Project management
- ▶ Organizational environment of a project
- ▶ Project management as profession
- ▶ SW / IT project management

1.1 PROJECT MANAGEMENT

Definitions

- ▶ Project: temporary endeavor to achieve some specific objectives in a defined time
- ▶ Project management
 - Dynamic process
 - Controlled and structured process
 - Use the organization's resources
 - Achieve clear objectives

Definitions

- ▶ Program
 - Collection of inter-dependent projects
 - Managed in a coordinated manner
- ▶ Portfolio management
 - Managing active and future projects

Why managing projects?

- ▶ Seeking success
- ▶ Success means
 - ▶ In time
 - ▶ In budget
 - ▶ Planned features (goals, deliverables)
- ▶ Responsibility and authority need to be clear

Why managing projects?

- ▶ Shorter time
- ▶ Lower costs
- ▶ Higher quality
- ▶ Higher profits
- ▶ Higher productivity
- ▶ Better communication and coordination
- ▶ Better control of financial, physical, and human resources
- ▶ Less worker stress

Project Life Cycle (PLC)

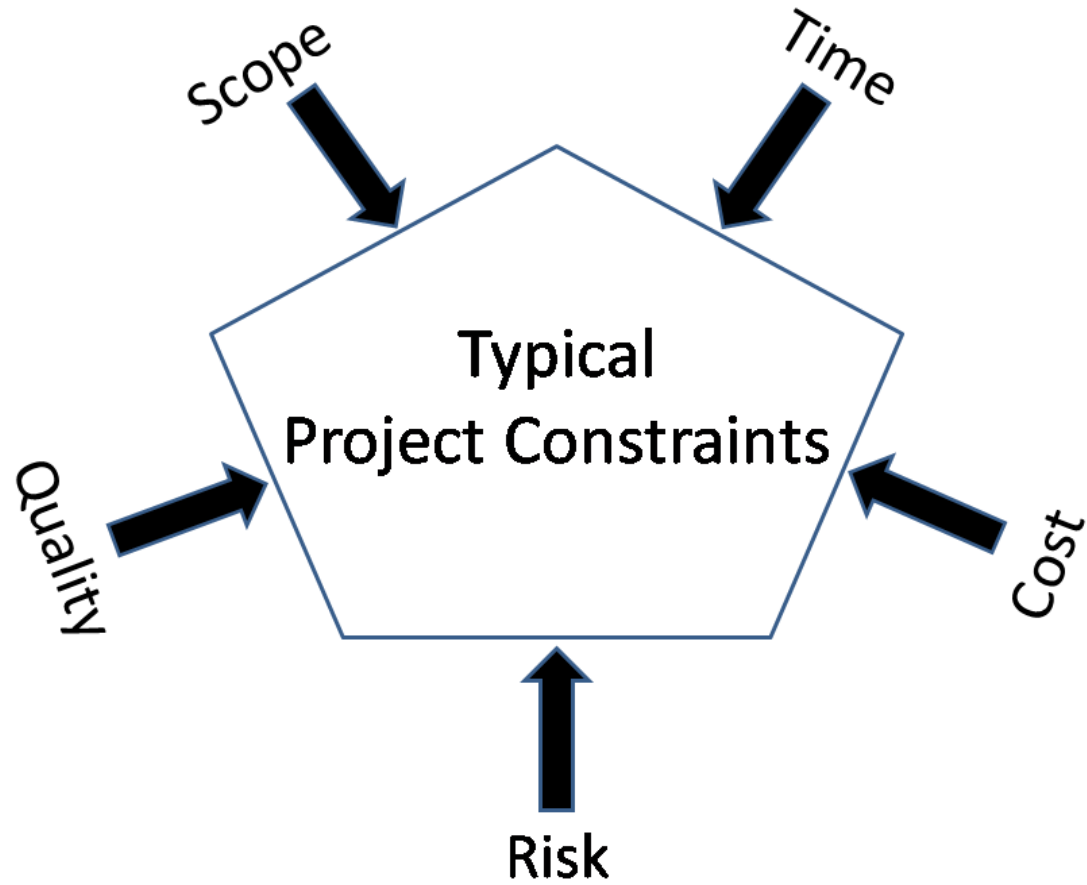
- ▶ Feasibility study
- ▶ Design and planning
- ▶ Launch and execution
- ▶ Termination
- ▶ Post-project evaluation

Uncertainties

- ▶ Time required to complete the project
- ▶ Availability and cost of key resources
- ▶ Technological problems
- ▶ New actions taken by competitors

Project Constraints

- ▶ Scope: What does the customer expect from the project?
- ▶ Time: What is the project's schedule?
- ▶ Cost: What is the project's budget? What resources are needed?
- ▶ Quality: How good does the quality of the product need to be to satisfy the customer?
- ▶ Risk: How much uncertainty are we willing to accept on the project?



PM's duties

- ▶ Proposal writing (RFP)
- ▶ Project planning and scheduling
- ▶ Project costing
- ▶ Project monitoring and reviews
- ▶ Personnel selection and evaluation
- ▶ Report writing and presentations
- ▶ Conflict resolution
- ▶ Adjust to change and risks

PM's knowledge and skills

- ▶ The application area: domain, industry, market, etc.
- ▶ The project environment: politics, culture, change management, etc.
- ▶ General management: financial management, strategic planning, etc.
- ▶ Human relations: sensitivity, credibility, leadership, motivation, negotiation, conflict management, style, integrity, ethics, etc.

Effective Project Managers	Ineffective Project Managers
Lead by example	Set bad examples
Are visionaries	Are not self-assured
Are technically competent	Lack technical expertise
Are decisive	Avoid or delay making decisions
Are good communicators	Are poor communicators
Are good motivators	Are poor motivators

Zimmerer, Thomas W. and Mahmoud M. Yasin, "A Leadership Profile of American Project Managers," Project Management Journal (March 1998), 31-38.

Top Ten Skills and Competencies for Effective Project Managers	
1. People skills	6. Verbal communication
2. Leadership	7. Strong at building teams
3. Listening	8. Conflict resolution/management
4. Integrity, ethical behavior, consistent	9. Critical thinking/problem solving
5. Strong at building trust	10. Understands and balances priorities

Jennifer Krahn, “Effective Project Leadership: A Combination of Project Manager Skills and Competencies in Context,” PMI Research Conference Proceedings (July 2006).

1.2 PROJECT ORGANIZATIONAL ENVIRONMENT

Roles and responsibilities

- ▶ A project realization needs to clarify:
 - Who needs the benefits?
 - Senior management
 - Who will use, influence or be affected by the outcomes?
 - Customer, stakeholders
 - Who is accountable for achieving the benefits?
 - Sponsor
 - Who is accountable for the project work?
 - Project manager
 - Who is responsible for the project work?
 - Project team

Roles and responsibilities

- ▶ Program steering team (PST)
 - Group of senior managers
 - Manage the total portfolio of projects
 - Ensure that projects are aligned with the business strategy. E.g. develop a media gateway?
 - Give strategic directions for future projects. E.g. stick with PBX.
 - Maintain focus on customer. E.g. vs. innovation.
 - Prioritize projects and resource allocation. E.g. change management.
 - Approve start-up, suspension and cancellation of projects
 - Resolve functional and human problems.

Roles and responsibilities

▶ Project sponsor

- Accountable to the PST for performance and benefits
- Ensure project objectives align with business needs
- Select the project manager
- Approve the project definition
- Approve project plan, changes and status reports
- Monitoring and control of the project process and budget
- Solve functional and human problems

Roles and responsibilities

▶ Project manager

- Accountable to the project sponsor for the day-to-day management activities
- Select the core team
- Manage the project stakeholders
- Define the project
- Plan the project
- Identify and manage risks
- Control changes
- Allocate resources
- Monitor and track progress

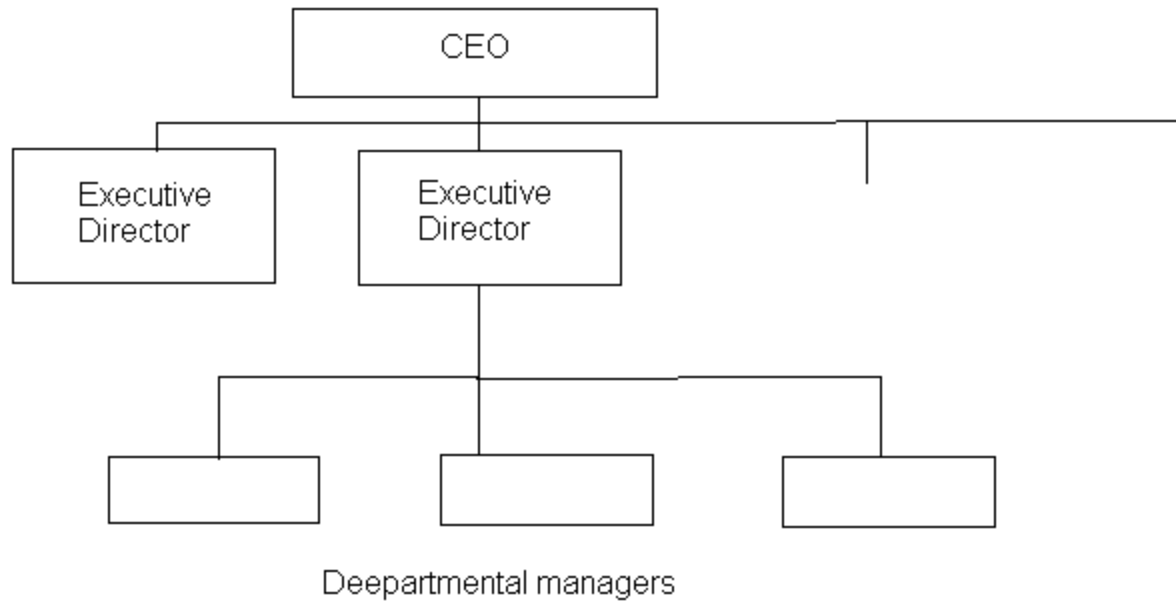
Roles and responsibilities

- ▶ Project manager
 - Solve functional and human problems
 - Control costs
 - Lead the project team
 - Report to stakeholders on progress
 - Provide deliverables
 - Manage human performance

Project organization

- ▶ 2 organization types:
 - Hierarchical organization
 - Matrix organization

Hiereachical organization



Hierarchical organization

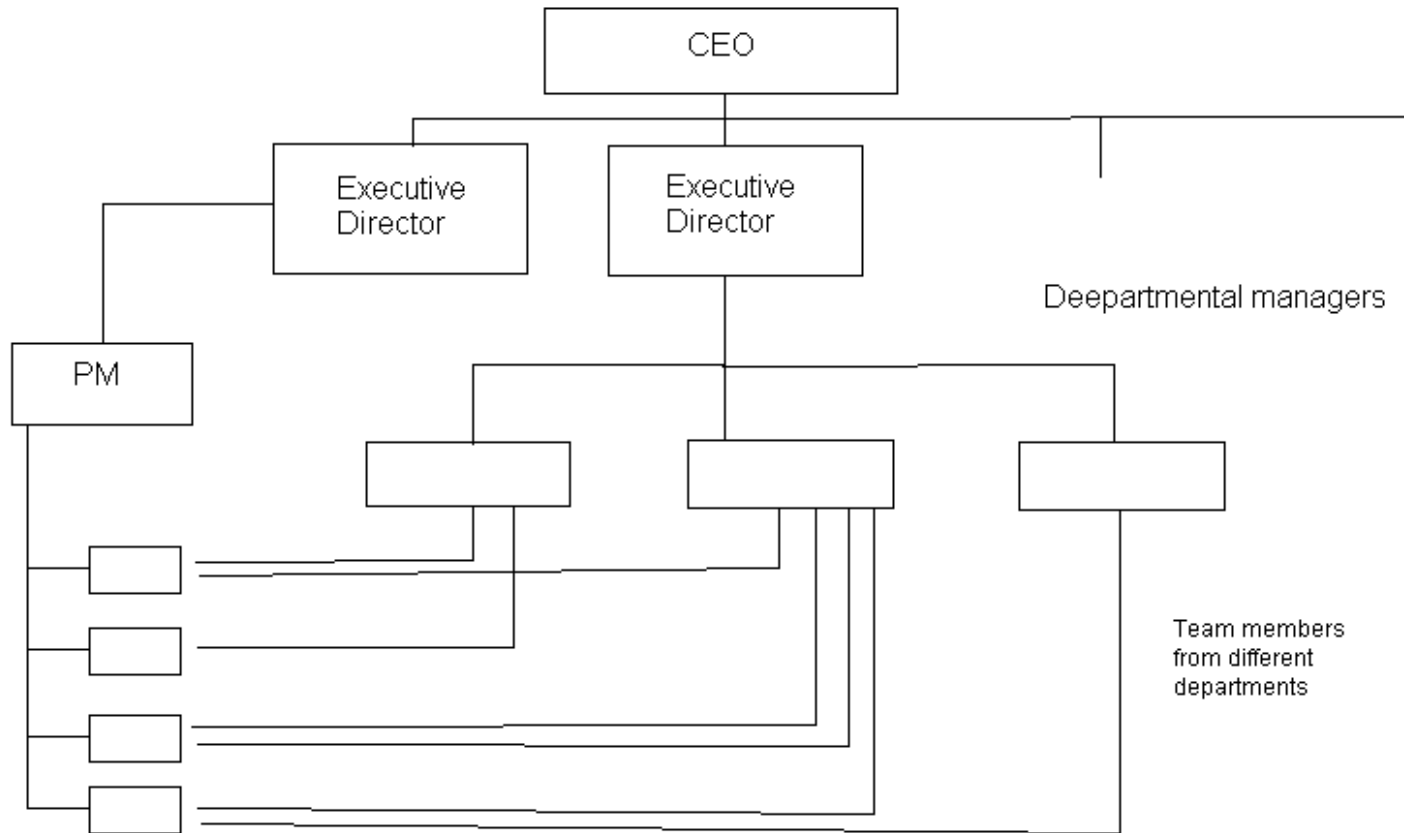
► Advantages

- Good for large projects
- Large number of experts
- Authority delegation
- Clear demarcation of responsibilities
- Allows career progression

► Drawbacks

- Vertical channels of change approval, decision, accountability
- Too expensive if small projects

Matrix organization



Matrix organization

▶ Advantages

- Flexibility in way it can interface with parent organization
- Strong focus on the project itself
- Ability to manage fundamental trade-offs across several projects

▶ Drawbacks

- Complexity of managing full set of projects

Roles and responsibilities

- ▶ *There must be a clear definition of ownership, roles and responsibilities at each level of the organization*

Ideal project cultural environment

- ▶ High morale
- ▶ Trust, support, respect for decision
- ▶ Integrity
- ▶ Optimism
- ▶ Participation in decision making
- ▶ Sense of belonging
- ▶ Clear responsibilities
- ▶ Collaboration
- ▶ Training (opportunity to learn)

1.3 THE PROFESSION OF PROJECT MANAGEMENT

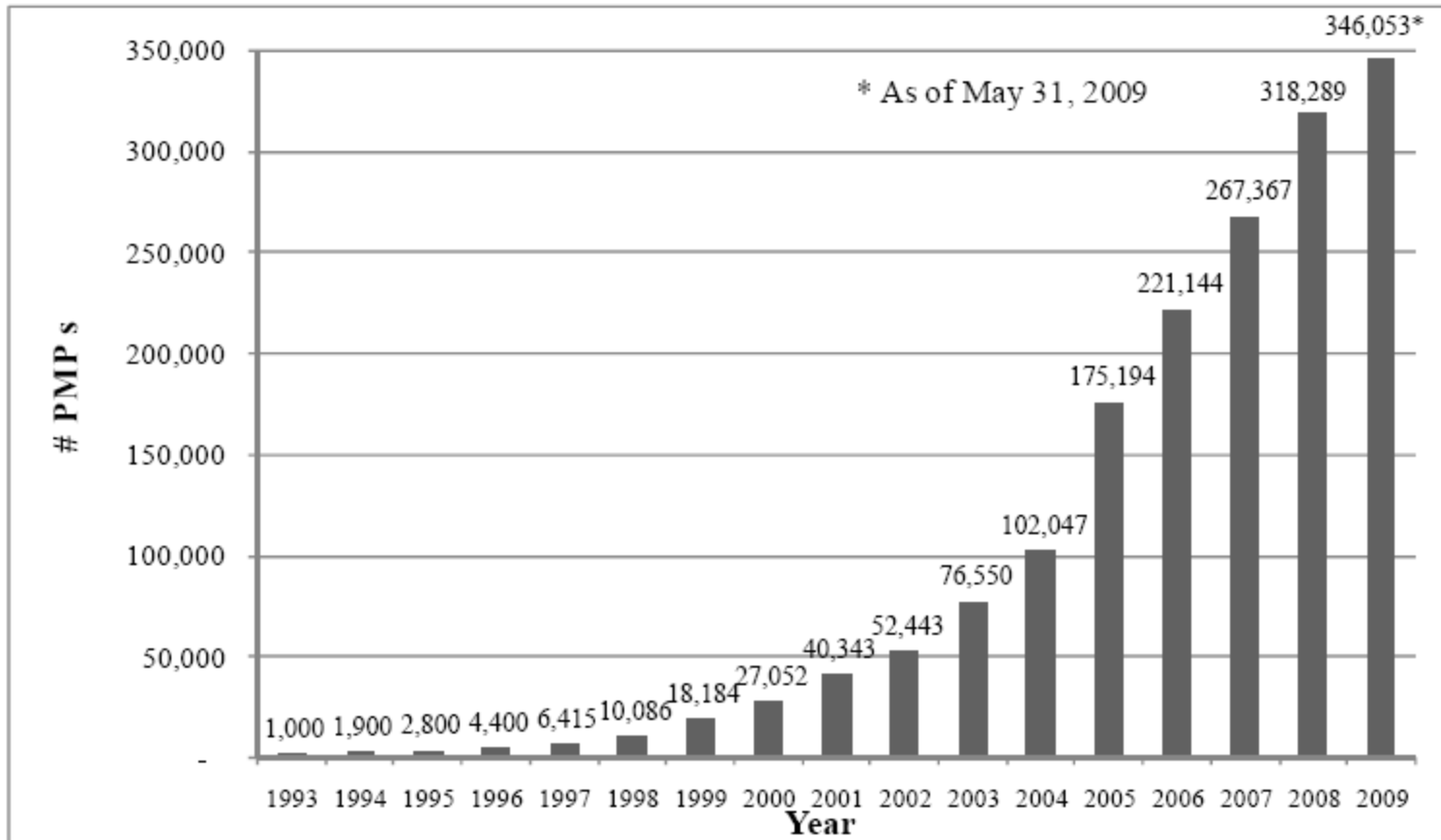
Professional rganzations

- ▶ Project Management Institute (PMI)
(<http://www.pmi.org>)
- ▶ Software Engineering Institute (SEI)
- ▶ IEEE: Software Engineering Group
- ▶ Certifications
 - PMI PMP
- ▶ The “PMBOK” –PMI Body of Knowledge

PMBOK

- ▶ PMBOK is approved by the American National Standards Institute (ANSI), recognized by the Institute of Electrical and Electronics Engineers (IEEE) as an IEEE standard, used as an underlying reference in the International Organization for Standardization (ISO) Technical Report on managing software projects.
- ▶ PMBOK Guide is similar to the IEEE's "Guide to the Software Engineering Body of Knowledge (SWEBOK)," which focuses on the software engineering profession.

Growth in PMP certification



1.4 SW / IT PROJECT MANAGEMENT

SW and IT

- ▶ We are interested in
 - SW projects
 - IT projects
- ▶ Role of IT: “IT deals with the use of computers and software to convert, store, protect, process, transmit, and securely retrieve information.”
[Wikipedia]

General PM vs. SW/IT PM

- ▶ Software is flexible
 - Changing requirements
 - Complex logic, subtle defects
 - Hard to accurately estimate effort and cost
 - Long new technology learning curve

Rational Unified Process (RUP) Roles

ABC Company Job Title	RUP Role
Project Manager	Project Manager Process Engineer Deployment Manager Requirements Reviewer Architecture Reviewer
ABC Company Executive	Project Reviewer Stakeholder Requirements Reviewer
Chief Programmer	System Analyst Requirements Specifier User Interface Designer Software Architect Design Reviewer Process Engineer Tool Specialist Configuration Manager Change Control Manager <i>and, to a lesser extent, the same roles as the Programmer</i>
Programmer	Designer Implementer Code Reviewer Integrator Test Designer Tester

IT/ SW PLC

- ▶ Project Concept
- ▶ Project Design
- ▶ Project Development
- ▶ Quality Assurance
- ▶ Beta Release
- ▶ GA and end of life

Project concept

- ▶ Discuss new project ideas
 - Fit the company strategy?
- ▶ Evaluate and report on costs
- ▶ Get approval to define the new project

Project design

- ▶ Project idea and costs have been approved
- ▶ Establish a core team
- ▶ Define schedule, feature list and release date
- ▶ Define cost baseline
- ▶ Freeze the requirements document

Project development

- ▶ Develop the requirements
- ▶ Verify that it works
- ▶ Pass the project to the QA to check against the company quality standards
- ▶ Pass the project to the technical documentation team to create manuals and help files

Quality assurance

- ▶ Test programs and documentation
- ▶ Check conformance to the design and requirements documents

Beta release

- ▶ Determine Beta sites
- ▶ QA team leads the Beta testing activities
- ▶ Development team fix defects
- ▶ Help desk should be ready for full support

GA and end of life

- ▶ Help desk assists end users
- ▶ IT team manages the daily use of the project
- ▶ Development fixes bugs
- ▶ Evaluate the effectiveness of estimation
- ▶ Evaluate the work process
- ▶ Product withdrawal