Methods of IT Project Management

Jeffrey L. Brewer | Kevin C. Dittman

Chapter 1

Introduction to Project Management

Objectives

- Define what a *project is and is not*

- Define *project management*

- Understand the **skills** necessary to lead projects

- Understand the **organizational structures** where projects exist

Project

What Is a Project?

- *A temporary sequence of related activities (tasks) that must be completed to create a unique product or service*

- **Key Characteristics:**
  - ➤ **Temporary** (it has a beginning and an end; with achieving a goal or not)
  - ➤ **Unique** (revolutionary, with uncertainty and risks)) or evolutionary
  - ➤ **Progressive (quantifiable) Elaboration** (steps, phases, increments)
  - ➤ **Single unique purpose or goal** (however, in general, any project may have several goals)

- **Secondary Characteristics:**
  - ➤ Each project must have a **primary sponsor or champion**
  - ➤ Projects usually **cut across organizational lines** requiring resources from several different sources
  - ➤ Projects **must do something**, deliver something of value
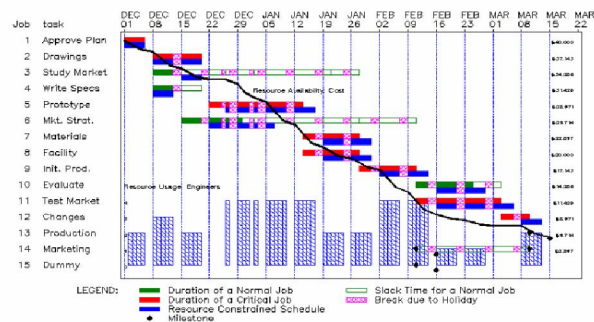
Software Development Projects

Key factors that influence the software project's outcomes (end results):

1. Project **size** (funding, outcomes, etc.)
2. Delivery **deadline** (project duration and timetable)
3. **Budgets** and costs
4. Application **domain** (high tech areas, low-tech areas, etc.)
5. **Technology** to be implemented (high tech or low-tech)
6. System **constraints**
7. User **requirements** (graphic user interface, usability, etc.)
8. Available **resources** (human, technical, experts, communication, organizational, buildings, labs, etc.)

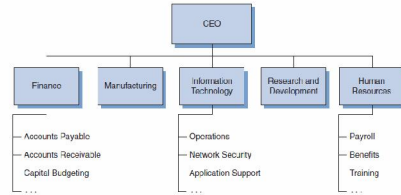All those factors have significant impact on **project organizational structure**

1-5

Project
Organizational Structures

1-6

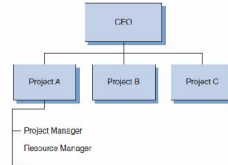# Organizational Structures

Functional (traditional)

    Organized around one of these characteristics or business functions: job function, end product, customer groups, a specific process, or geographic locations
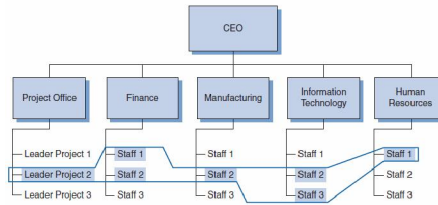
Project-based

    Organized completely around projects and sometimes its mere existence is only for one particular project (the Olympic games for example)
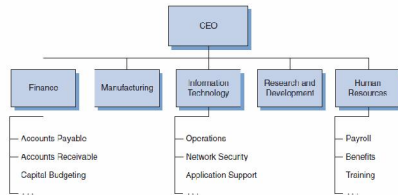
Matrix (Weak, Balanced, Strong)

    Combination of traditional and project

1-7

# Functional (Traditional) Structure of an Organization

Benefits (advantages)

- Individuals can specialize and become very proficient in one area
- Communication channels are well established
- Good control over resources since they only have one boss
- Easier budgeting and cost control because all budgets differentiated by defined department boundaries
- Traditional advancement within the functional department

Disadvantages (drawbacks):

- Project Manager holds the least amount of authority
- Potential underutilization of resources or misallocation of resources
- Economies of scale when sharing resources (people and materials) across projects
- Individual exposure outside of one's department limited
- Focus not always on the project

1-8
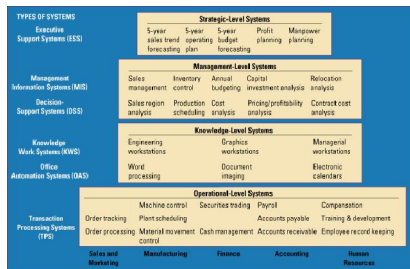
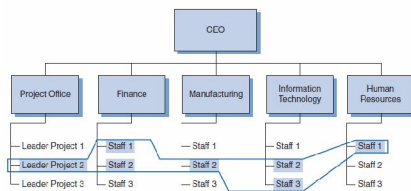# Project-Based Organizational Structure
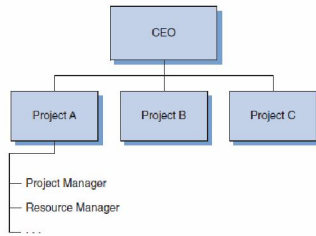
Benefits:

- One manager has authority and accountability
- Authority for work assignments and staff salary reviews
- Communication channels are direct and open
- Adaptability to changes is increased, decision making power is put in the hands of the project manager who is involved in the process daily
- Can build up considerable expertise from repetition of similar technologies

Drawbacks:

- Potential underutilization of resources or misallocation of resources
- Economies of scale when sharing resources (people and materials) across projects
- Project myopia, see only the project we are working on
- May be a lack of career progression possibilities (Flat structure)
- Support for administrative functions more difficult

1-9

Matrix Organizational Structure

Benefits:

- 'Formal' project accountability and visibility
- More dynamic and adaptable to change
- Sharing of knowledge across projects is enhanced
- Policies and procedures can vary across projects
- Less stress about the project ending

*3 forms:
- weak,
- strong,
- balanced

Drawbacks:

- Multiple supervisors with competing priorities
- Budget and cost control becomes more difficult
- Project Team motivation
  - *who do I listen to*…my boss who controls my salary or to the project manager who is giving me work assignments
- Policies and procedures can vary across projects

1-10

Organizational Structure's Influences on IT Projects

Organizational Structure / Project Characteristics	Functional	Matrix			Projectized
		Weak Matrix	Balanced Matrix	Strong Matrix	
Project manager's authority	Little or none	Limited	Low to moderate	Moderate to high	High to almost total
Resource availability	Little or none	Limited	Low to moderate	Moderate to high	High to almost total
Who controls the project budget	Functional manager	Functional manager	Mixed	Project manager	Project manager
Project manager's role	Part time	Part time	Full time	Full time	Full time
Project management administrative staff	Part time	Part time	Part time	Full time	Full time

Choosing the correct organizational structure depends on:
- ➢ The history of the organization
- ➢ The industry the organization is in
- ➢ Project characteristics

The tendency of many organizations today: Moving toward a matrix structure

1-11
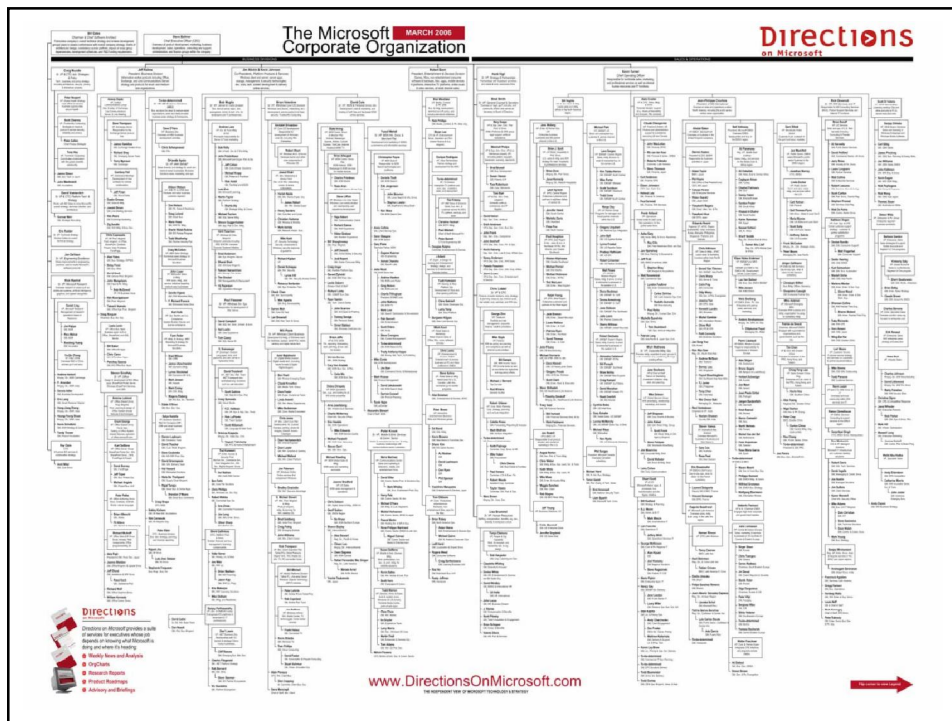
Constraints (Limits)
of Real-World Project

Project Management: "Triple Constraint" Reality

Every project is constrained by a list of

1) Scope:
   customer-requested requirements,

2) Time:
   the amount of time available to produce the
      system in support of the requirements,

3) Cost:
   the limit of money available.

Every project is constrained differently,
   according to the goals of the system owner
   (sponsor) and the project team

Slide 1-15
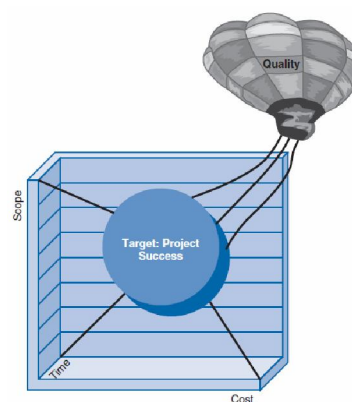
Software (Information Technology – IT) project success rate

TABLE 1-1 Standish Group Study Results	1995	2001	2003
Successful IT projects	16.2%	28%	34%
Percentage of projects cancelled	31%	23%	18%
Average time overruns	222%	63%	82%
Average cost overruns	185%	45%	43%
Delivery of required features	61%	67%	52%

Project Category	Project Description	2000 Results	2009 Results
Project Success	The project is completed on-time and on-budget, with all features and functions as initially specified	16.2%	32%
Project Challenged	The project is completed and operational but over-budget, over the time estimate, and offers fewer features and functions than originally specified	52.7%	44%
Project Impaired	The project is cancelled at some point during the development cycle	31.1%	24%

Note – In 2000 in the US, the spend on IT application development is approximately $250 billion and represents some 175000 projects. The average cost of a development project for a large company is $2,322,000; for a medium company, it is $1,331,000; and for a a small company, it is $434,000

	Project Success Factors	% Responses
1.	User Involvement	15.9%
2	Executive Management Support	13.9%
3	Clear Statement of Requirements	13.0%
4	Proper Planning	9.6%
5	Realistic Expectations	8.2%
6	Smaller Project Milestones	7.7%
7	Competent Staff	7.2%
8	Ownership	5.3%
9	Clear Vision & Objectives	2.9%
10	Hard-Working, Focused Staff	2.4%
	Other	13.9%

Source: http://www.claretyconsulting.com/it/comments/project-and-programme-failure-rates/2009-06-27/

Slide 1-16

Why SW Development Projects Fail?
(with financial losses – billions of dollars!)

65-80 % of SW development projects fail (!). There may be many possible reasons.

However, the key reasons are:

1. Failure in project management

2. Problems with Time Management -- unrealistic deadlines and/or timetable -- time overrun

3. Problems with Cost Management – cost overrun

4. Predictable and unpredictable risks

5. Honest underestimate of effort

6. Technical difficulties (Internet, servers, computers, etc.)

7. Changing customer requirements (in the middle of the project)

8. Miscommunication among project members and groups (problems with communication)

Project and Programme Failure Rates

Posted by Kevin Brady on Sat 27th June 2009 at 04:26 PM, Filed in Programme Management, Project Management, Project/Programme Failures, Industry News

During a recent trip to the British Library I thought I would take a quick look at the recently published Standish CHAOS Survey to see if we are improving our project and programme delivery failure rates.

I have to say the results of my investigation were very positive:-

Project Category	Project Description	2000 Results	2009 Results
Project Success	The project is completed on-time and on-budget, with all features and functions as initially specified	16.2%	32%
Project Challenged	The project is completed and operational but over-budget, over the time estimate, and offers fewer features and functions than originally specified	52.7%	44%
Project Impaired	The project is cancelled at some point during the development cycle	31.1%	24%

Note – In 2000 in the US, the spend on IT application development is approximately $250 billion and represents some 175000 projects. The average cost of a development project for a large company is $2,322,000; for a medium company, it is $1,331,000; and for a a small company, it is $434,000

Cost Overruns	% Responses	Time Overruns	% Responses	% of Features /functions	% Responses
Under 20%	15.5%	Under 20%	13.9%	Less than 25%	4.6%
21 – 50%	31.5%	21 – 50%	18.3%	25-49%	27.2%
51 – 100%	29.6%	51 – 100%	20.0%	50 – 74%	21.8%
101 – 200%	10.2%	101 – 200%	35.5%	75 – 99%	39.1%
201 – 400%	8.8%	201 – 400%	11.2%	100%	7.3%
Over 400%	4.4%	Over 400%	1.1%		

Source: http://www.claretyconsulting.com/it/comments/project-and-programme-failure-rates/2009-06-27/

Project Manager

Main Groups of PM Skills

- **Analytical Skills**
  ability to see things as systems, identify, analyze, and solve problems in an optimal way for a specific organization.

- **Technical Skills**
  ability to understand how computers, data networks, software, operating systems, etc. work together, as well as their potentials and limitations.

- **Management Skills**
  include organization's recourse management, project management (people and money), risk management, and change management.

- **Communication Skills**
  include effective interpersonal communication (written, verbal, visual, electronic, face-to-face conversations, presentations in front of groups), listening, group facilitation skills.

Before 2000-2001: the only requirement: **100% technical skills**

After 2001: the compound requirement: **25% - analytical skills**

                                                      25% - technical skills

                                                      25% - management skills

                                                      25% - communication skills

Conclusion: CS/CIS degree with Mngt skills vs a degree in Management

Top 7 Competencies of Project Manager

1. Communications Skills - verbal and written

2. Leadership Skills

3. Organizational Skills - planning, time management

4. Interpersonal Skills

5. Negotiation Skills - diplomacy and mediating

6. Team Building Skills

7. Technical Skills

Source: *"Positive Leadership In Project Management"* by Rachael Miletkov

---

SE Project Manager's Activities

1.	Leadership	Influencing the activities of other members of project team
2.	Management (time, cost, HR, technology etc.)	Getting project completed.
3.	Customer Relations	Working closely with customers to assure project deliverables meet expectations
4.	Technical problem solving	Designing and sequencing activities to attain project goals
5.	Conflict management	Managing conflict within a project team
6.	Team Management	Managing the project team for effective performance
7.	Risk and change management	Identifying, assessing, and managing the risks and day-to-day changes

The Software Project Management / IT Project Management Profession:
Positions available at Illinois or Chicago, IL

(987 positions open just in Illinois)

Software Project Manager:
An Example of Open Position
(Chicago area)

Theory and special tools

Requirements for SPM: Microsoft Project, Primavera, …

Software Project Manager: An Example of Open Position (Chicago area)

PMP Certificate

Project Management Professional (PMP) Certification: Significant Growth in 1993 – 2010

Trend of PMPs
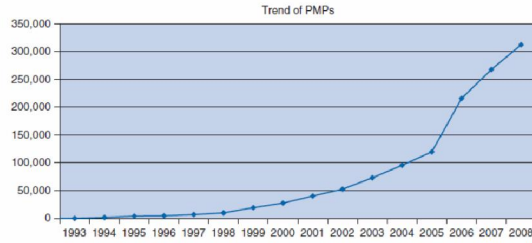
PMI provides certification as a Project Management Professional (PMP)

A PMP has documented sufficient project experience (3 years), agreed to follow a code of ethics, and passed the PMP exam (200 questions in 4 hours)

More on certification found in Appendix C

Total PMI members and PMP certifications worldwide
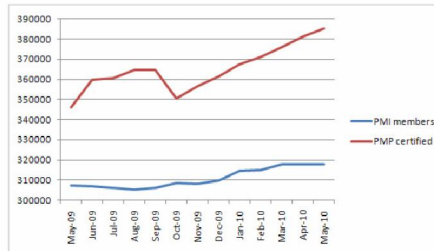
PMI members
PMP certified

Methods of **IT** Project Management

Jeffrey L. Brewer | Kevin C. Dittman

Chapter 1

Introduction to Project Management
(additional information)

Importance of Software Project Management

- **Due to the size, complexity, and number of information technology (IT) projects, organizations face ever-increasing challenges**

- **Global U.S. government IT spending topped $150 billion in 2007**

- **Forrester Research estimates that global IT spending—purchases of computers, software, and services by companies and governments—was about $ 1.66 trillion = $ 1,600 billion in 2009**
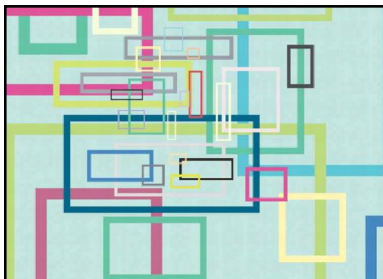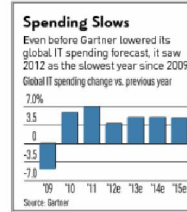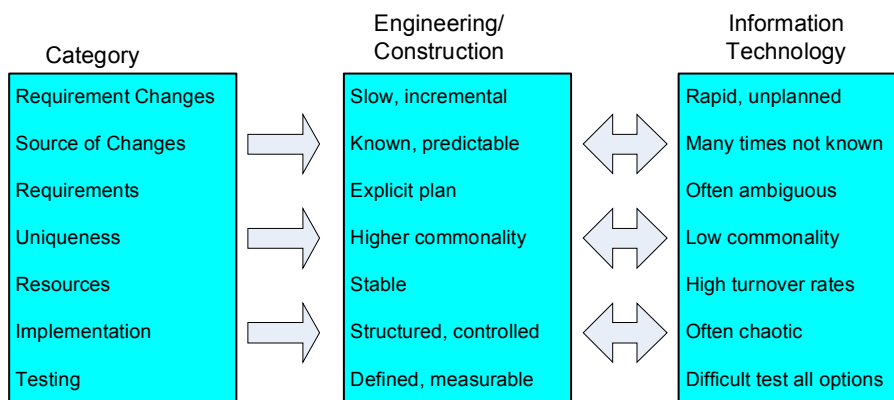
- **Forrester Research estimates that about 20 percent of current IT budgets are going into project management/development**

Source:
http://news.investors.com/Article/596855/201201051757/2012-information-technology-spending-outlook-lowered.htm

---

IT Projects Are Different (from traditional projects)

Category	Engineering/Construction	Information Technology
Requirement Changes	Slow, incremental	Rapid, unplanned
Source of Changes	Known, predictable	Many times not known
Requirements	Explicit plan	Often ambiguous
Uniqueness	Higher commonality	Low commonality
Resources	Stable	High turnover rates
Implementation	Structured, controlled	Often chaotic
Testing	Defined, measurable	Difficult test all options

Advantages of Using
Formal Project Management Practices

- Improvement in customer satisfaction
- Tracking of project activities by a customer, stakeholders, …
- Increased quality of project activities and solutions
- Better cost performance, higher return on investment

- Better schedule performance
- Better allocation of time commitments
- Better utilization of time, human, technology and other type of resources
- Higher productivity
- Increased quality reducing re-work
- Increase in delivering required features

- Will make everyone happier (stakeholders, team members, management…)

Software Project Management Success Rates (2009).
Why SW/IT Projects Fail (with financial losses – billions of dollars!) ?

Boston, Massachusetts, April 23, 2009 - New Standish Group report shows more project failing and less successful projects.

The Standish Group's just-released report, "CHAOS Summary 2009," "This year's results show a marked decrease in project success rates, with 32% of all projects succeeding which are delivered on time, on budget, with required features and functions" says Jim Johnson, chairman of The Standish Group, "44% were challenged which are late, over budget, and/or with less than the required features and functions and 24% failed which are cancelled prior to completion or delivered and never used."

"These numbers represent a downtick in the success rates from the previous study, as well as a significant increase in the number of failures", says Jim Crear, Standish Group CIO, "They are low point in the last five study periods. This year's results represent the highest failure rate in over a decade"

In the "CHAOS Summary 2009" report The Standish Group has re-examined 10 the CHAOS Success Factors. Each Success factor is supported by one of the Laws of CHAOS. The Standish Group's "CHAOS Summary 2009" report is available free of charge to Standish Group subscribers. Non-subscribers may obtain copies directly from The Standish Group for $99.00 per copy and the offer also includes Jim Johnson's book "My Life is Failure".

TABLE 1-1 Standish Group Study Results

	1995	2001	2003
Successful IT projects	16.2%	28%	34%
Percentage of projects cancelled	31%	23%	18%
Average time overruns	222%	63%	82%
Average cost overruns	185%	45%	43%
Delivery of required features	61%	67%	52%

There may be many possible reasons. However, the **key reasons** are:

1. **Failure in project management**

2. **Unrealistic deadlines** and/or timetable

3. **Miscommunication** among project members and groups
   (problems with communication)

4. **Technical difficulties** (Internet, servers, computers, etc.)

5. Honest **underestimate of effort**

6. **Predictable and unpredictable risks**

7. **Changing customer requirements** (in the middle of the project)

Software (IT, CIS) Project Management as a Profession
(U.S. Department of Labor, Bureau of Labor and Statistics)
http://www.bls.gov/oco/ocos258.htm

Computer and information systems managers direct the work of other IT professionals, such as computer software engineers and computer programmers, computer systems analysts, and computer support specialists

1-31