CMSC5713 Course Info

- Teacher:
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CMSC5713 Course Info

- Objectives:
  - To complement students' technical skills with project management skills. Upon completion, students should:
    - Have a clear understanding of the unique risks, issues, and critical success factors associated with technology projects.
    - Demonstrate knowledge of various techniques for planning and managing a technology project.
    - Gain experiences in applying project management concepts by working on a group project.
    - Know how to use Microsoft Project to help plan and manage a project.

CMSC5713 Course Info

- Topics:
  - Introduction to Project Management
  - Project Management Framework
  - Project Selection and Initiation
  - Project Planning, Execution, Monitoring & Controlling:
    - Estimation, Budgeting and Scheduling
    - Risk and Change Control
    - Quality Management
    - Human Resources Management
    - Communications Management
    - Stakeholder Management

CMSC5713 Course Info

- Topics:
  - Microsoft Project
  - Procurement Management
  - Project Closing
  - Agile Project Management
- Methods:
  - Lectures
  - Case studies

CMSC5713 Course Info

- Reference books:
  - K. Schwalbe. *Information Technology Project Management*, 7/e, Course Technology, 2013.
  - A Guide to the Project Management Body of Knowledge, 5/e, PMI, 2013.
  - B. Hughes and M. Cotterell, *Software Project Management*, 5/e, McGraw-Hill, 2009.
  - S. Ambler and M. Lines, Disciplined Agile Delivery: A Practitioner's Guide to Agile Software Delivery in the Enterprise, IBM Press, 2012.
- Software:
  - Microsoft Project

CMSC5713 Course Info

- Assessment:
  - Course Project (60%):
    - Project Charter (15%)
    - Initial WBS (5%)
    - Risk Analysis (5%)
    - Project Plan (25%)
    - Presentation (10%)
  - Final exam (40%).

Lecture 1: Introduction to Project Management

- Introduction to Project Management:
  - Project Fundamentals
  - Project Statistics: Successes and Failures
  - Project Management Fundamentals
    - Principles, techniques, tools
  - Project Management Profession
    - Project manager skills
    - Associations and certifications

1.1. Project Fundamentals

- Project definitions
- Project lifecycles
- Project goals
- IT Projects
- Project vs Program vs Portfolio

1.1.1. Project Definitions

- A project is “a temporary endeavor undertaken to create a unique product, service, or result.”*
  - Cf. Operations is work done to sustain the business.
- A project can be large or small and takes a short or long time to complete.
- A project ends when its objectives have been reached, or the project has been terminated.

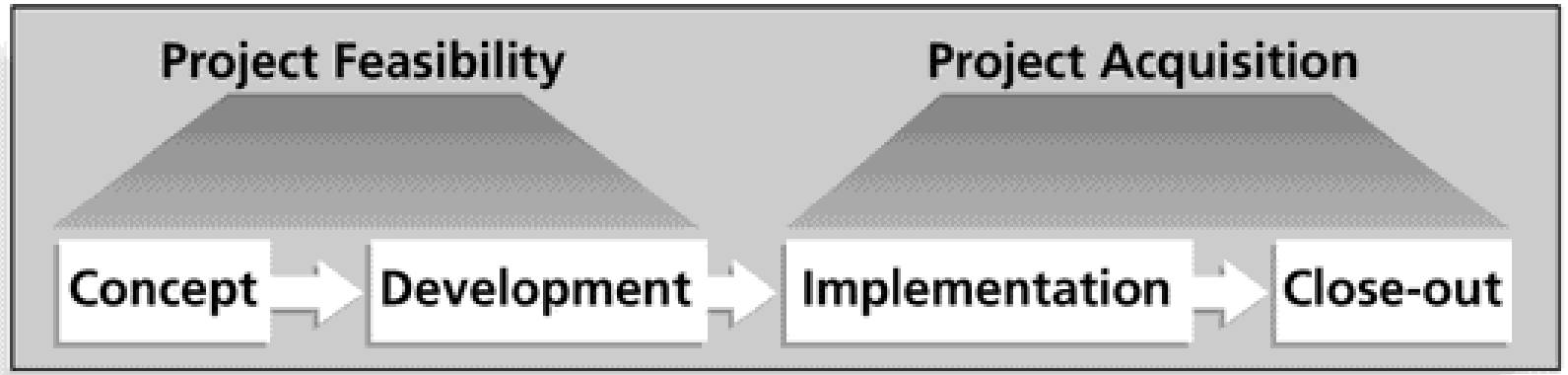
*PMI, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*

1.1.1. Project Definitions

- Other project attributes:
  - Should have a primary customer or sponsor.
    - The project sponsor usually provides the direction and funding for the project.
  - Is developed using progressive elaboration.
    - All projects are divided into phases.
    - All phases together are known as the Project Life Cycle.
    - Each phase is marked by completion of deliverables.
  - Requires resources, often from various areas.
  - Involves uncertainty.

1.1.2. Project Lifecycles

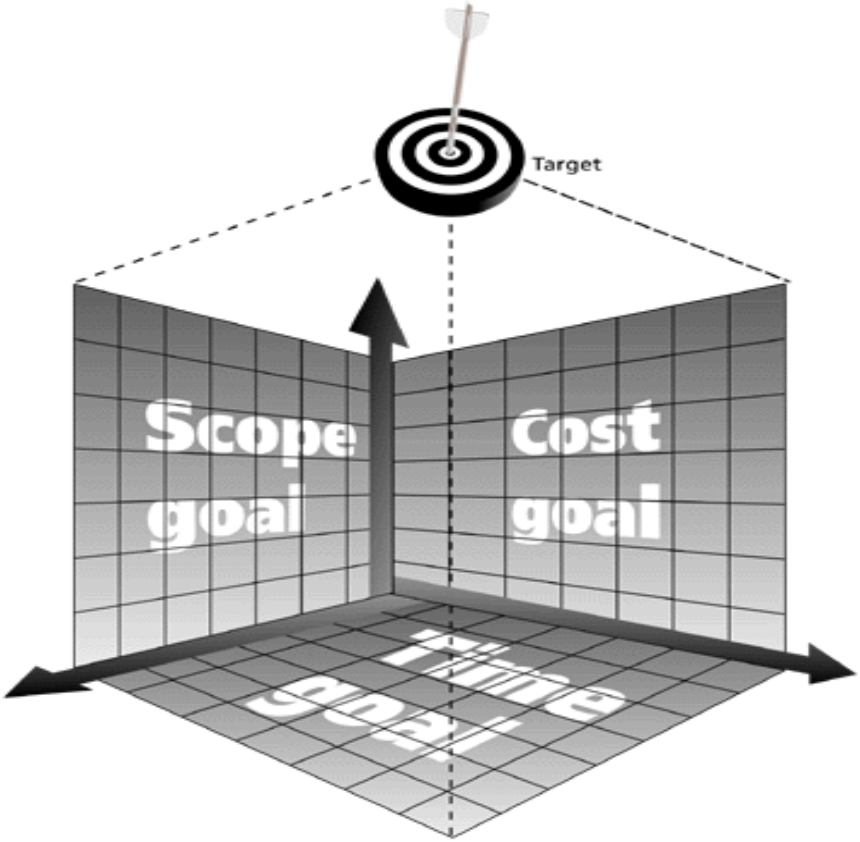
- Traditional project lifecycle or phases:



Sample deliverables for each phase				
	Management plan	Project plan	Last work package	Completed work
	Preliminary cost estimate	Budgetary cost estimate	Definitive cost estimate	Lessons learned
	3-level WBS	6+-level WBS	Performance reports	Customer acceptance

1.1.3. Basic Project Goals

- Three constraints of every project:
  - Scope goals: What work will be done?
  - Time goals: How long should it take to complete?
  - Cost goals: What should it cost?



1.1.3. Basic Project Goals

- It is the project manager's duty to balance these three often-competing goals.
- Project managers work with project sponsors, project teams, and other people involved in projects to meet project goals.
- Successful project management means:
  - meeting all three goals (scope, time, and cost)
  - and satisfying the project's sponsor!

1.1.4. IT Projects

- The context of IT projects:
  - IT projects can be very diverse in terms of size, complexity, products produced, application area, and resource requirements.
  - IT project team members often have diverse backgrounds and skill sets.
  - IT projects use diverse technologies that change rapidly. Even within one technology area, people must be highly specialized.

1.1.4. IT Projects

Project Component	Non–IT Project	IT Project
Project	Not integrated with most business functions	Usually linked with business processes and organizations systems
Project structure	Often stand alone	Usually multiple projects with numerous interdependencies
Scope	Well defined	Less defined and subject to change
Change control	Well defined	Definable change control process but more difficult to track
Stakeholders	Fewer; easier to identify	More; more difficult to identify
Staffing/resources	Often full-time (depends upon organizational structure)	Usually part-time; skill sets used as task progress dictates

1.1.4. IT Projects

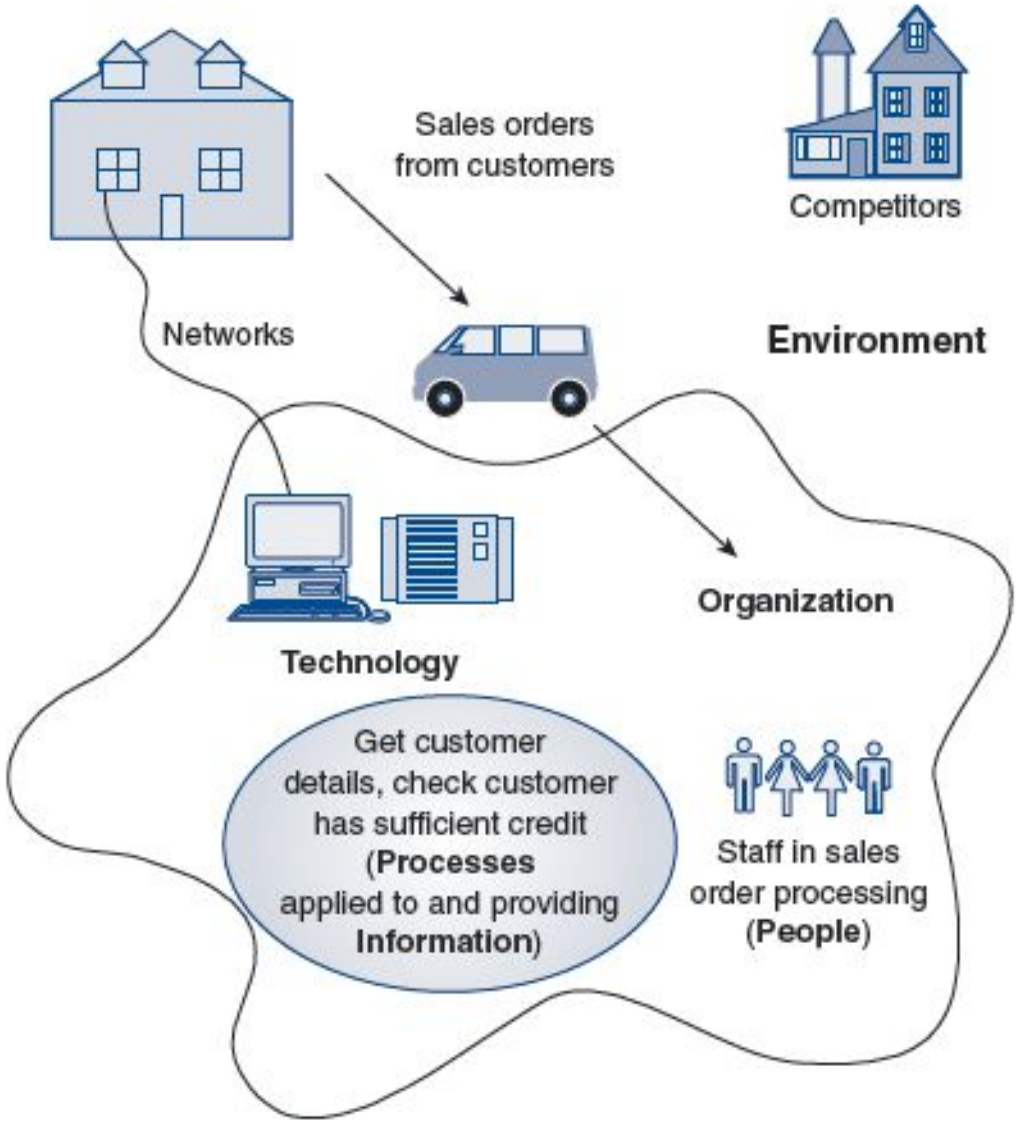
Project Component	Non–IT Project	IT Project
Staffing	Best people in critical skill sets; average in others; more generalists	Best people available; mostly specialists
Large projects	Divide by organization or establish stand-alone unit	Allocated by specialty (risk areas) across organizational lines
Risk	More easily identified; poorly managed but usually with less negative impact	Not easily identified; poorly managed with high project/organizational impact
Metrics documentation	Poor to fair	Moderately good, but poorly applied
Lessons learned	Poor to fair	Poor
Budget and schedule estimation	Good	Poor

1.1.4. IT Projects

- Examples of IT Projects:
  - A government group develops a system to track child immunizations.
  - A small software development team adds a new feature to an internal software application.
  - A help desk or technical worker replaces laptops for a small department.
  - A college campus upgrades its technology infrastructure to provide wireless Internet access.
  - A cross-functional task force in a company decides what software to purchase and how it will be implemented.

1.1.4. IT Projects

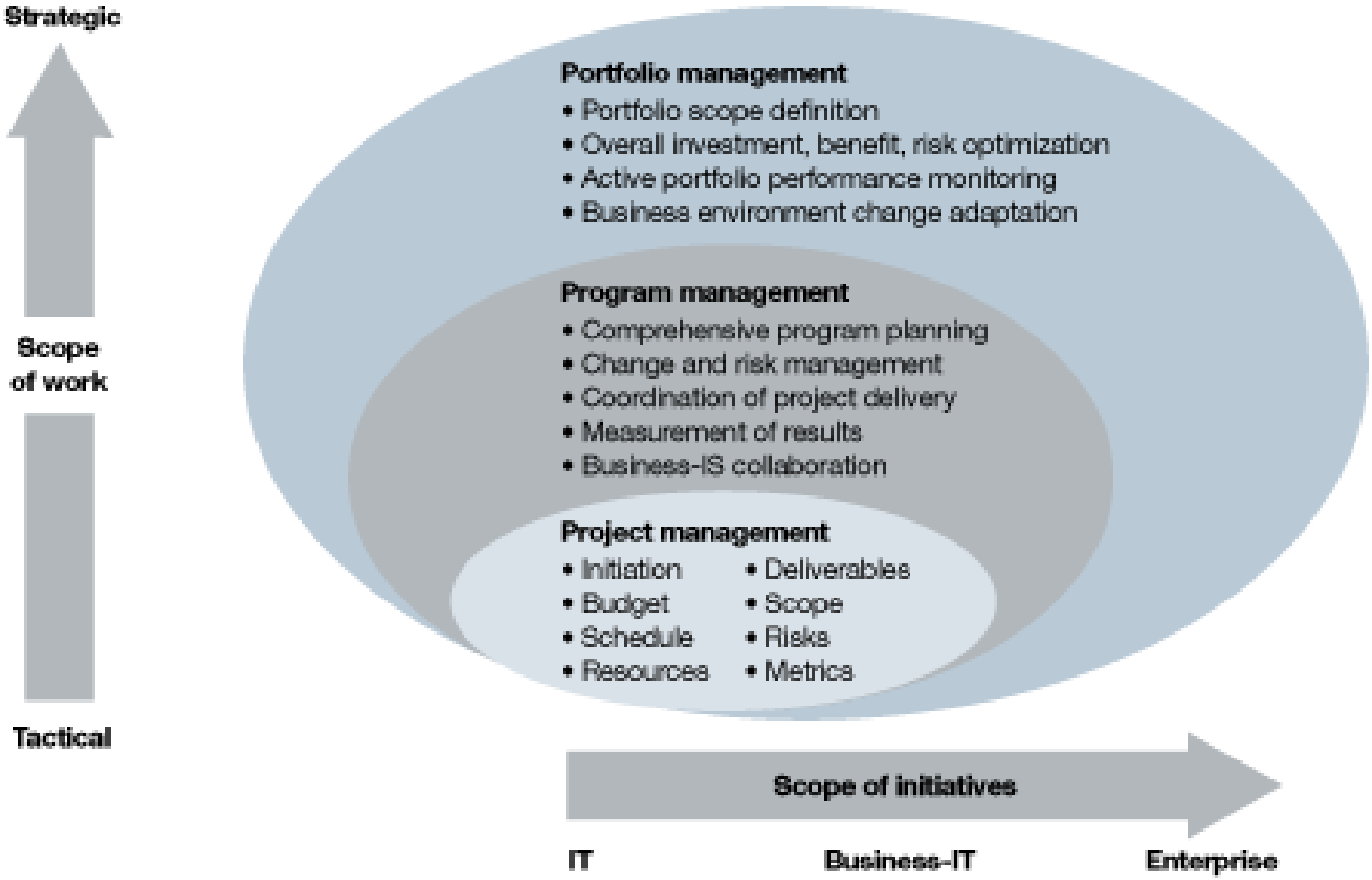
- An information system supporting sales order processing:



1.1.5. Project vs Program vs Portfolio

- Program:
  - is a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually. (PMI)
  - may include elements of related work outside of the scope of discrete projects in the program.
  - should have a clearly defined charter indicating the strategic goals that the stakeholders are trying to meet and the planned solution (projects) to meet those goals.
    - The specific deliverables of each project would be defined when each project starts and should align with the strategic goals of the program.

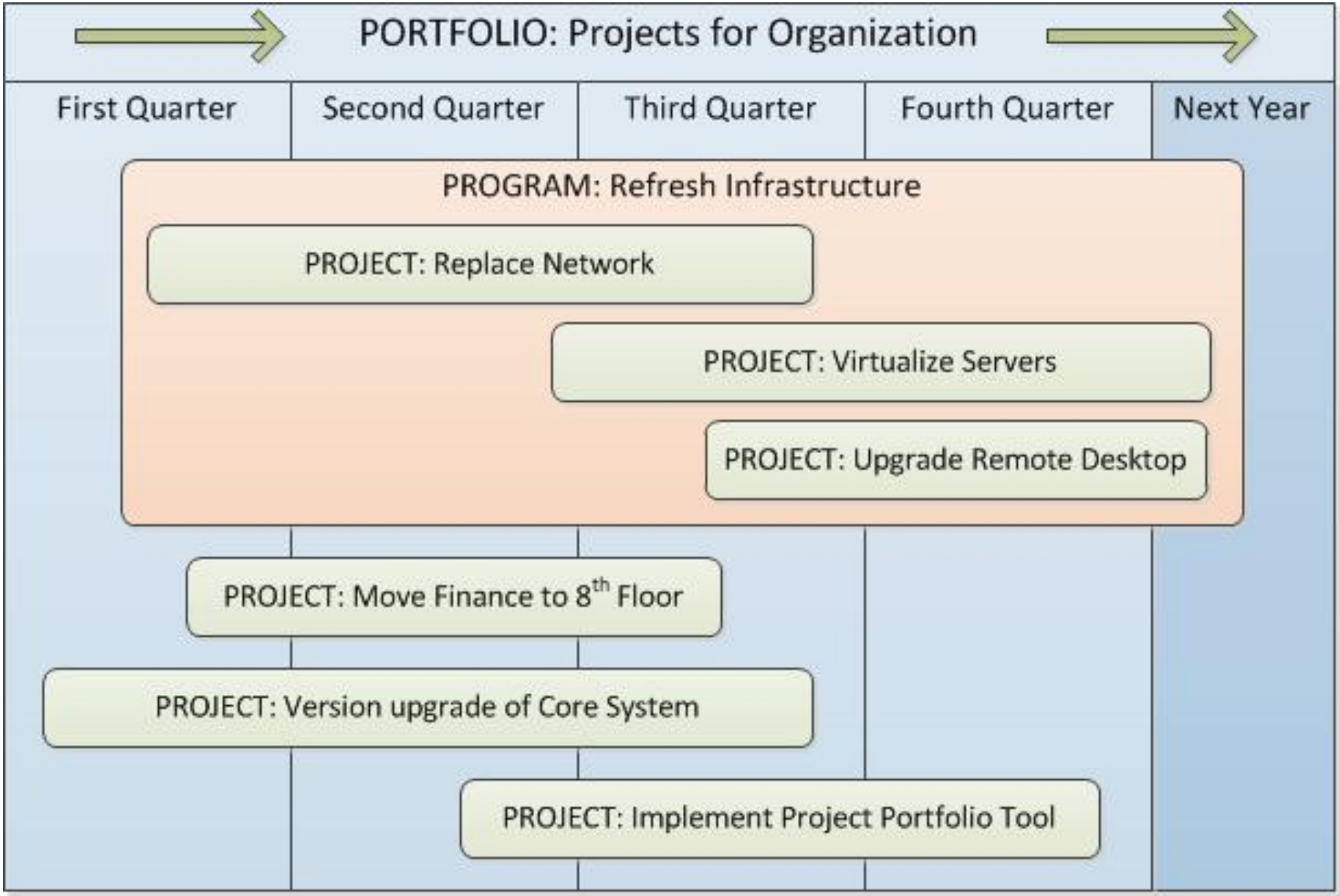
1.1.5. Project vs Program vs Portfolio



1.1.5. Project vs Program vs Portfolio

- Program can exist in different forms:
  - Strategic programs
  - Business cycle programs
  - Infrastructure programs
  - R&D programs
  - Innovative partnerships

1.1.5. Project vs Program vs Portfolio



1.1.5. Project vs Program vs Portfolio

- Program managers vs. project managers:

Program manager	Project manager
Many simultaneous projects	One project at a time
Projects tend to be similar	Projects tend to be dissimilar
Personal relationship with skilled resources	Impersonal relationship with resource type
Need to maximize utilization of resources	Need to minimize demand for resources

1.1.5. Project vs Program vs Portfolio

- Program managers vs. project managers:

Project managers

Program management

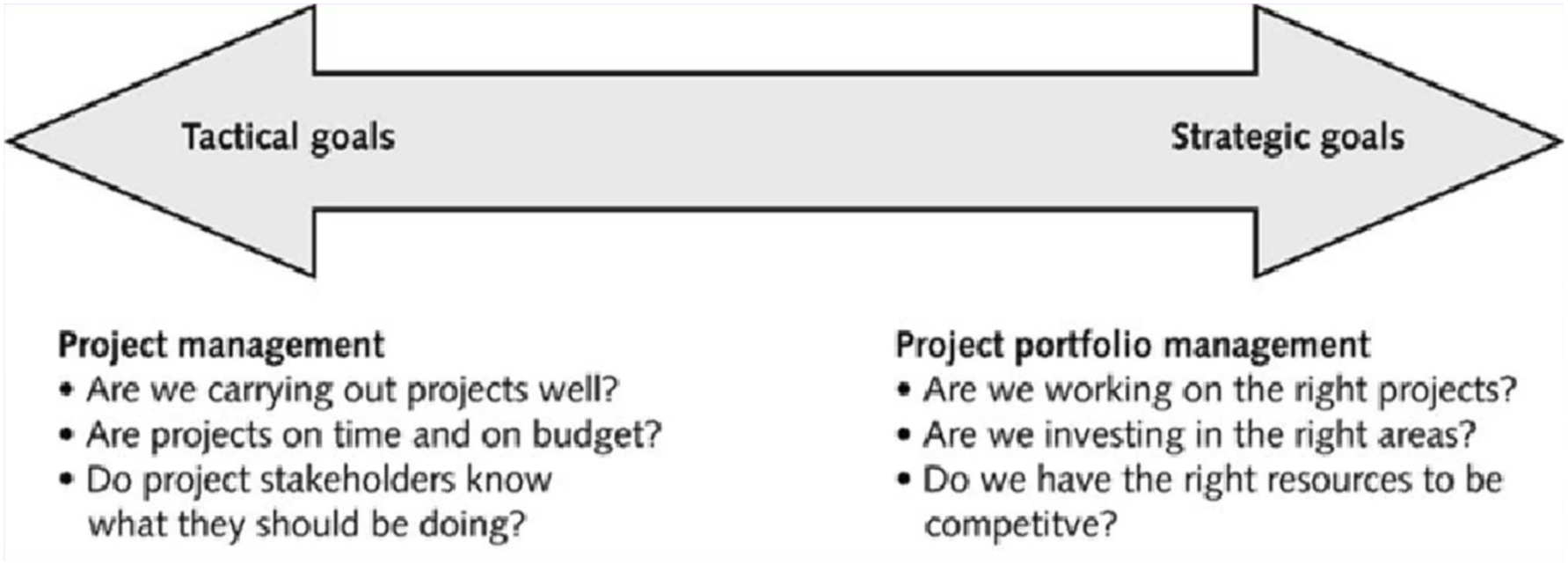
	Project A	Project B	Project C	Project D
Resource 1	X	X		
Resource 2		X		
Resource 3			X	X
Resource 4	X	X		X

1.1.5. Project vs Program vs Portfolio

- Portfolio:
  - is a collection of projects or programs and other work that are grouped together to facilitate effective management of that work to meet strategic business objectives.
  - This could be all the projects for an entire company or all the projects for a division or business in a large corporation.
  - The projects or programs of the portfolio may not necessarily be interdependent or directly related.
  - Example: George Mason University's PMO https://pmo.gmu.edu/

1.1.5. Project vs Program vs Portfolio

- Project Management vs Portfolio Management:



1.1.5. Project vs Program vs Portfolio

- A Project Management Office (PMO):
  - is an organizational group responsible for coordinating the project management function throughout an organization.
- Possible goals include:
  - Collect, organize, and integrate project data for the entire organization.
  - Develop and maintain templates for project documents.
  - Develop or coordinate training in various project management topics.
  - Provide project management consulting services.
- Guidelines for developing a PMO:
  - https://www.divurgent.com/wp-content/uploads/pdf/KonschakPMO.pdf

1.1.5. Project vs Program vs Portfolio

- Enterprise project management software:
  - integrates information from multiple projects to show the status of active, approved, and future projects across an entire organization.
  - provides links to more detailed information on each project.
  - E.g. VPMi Enterprise Online (www.vcsonline.com).

1.1.5. Project vs Program vs Portfolio

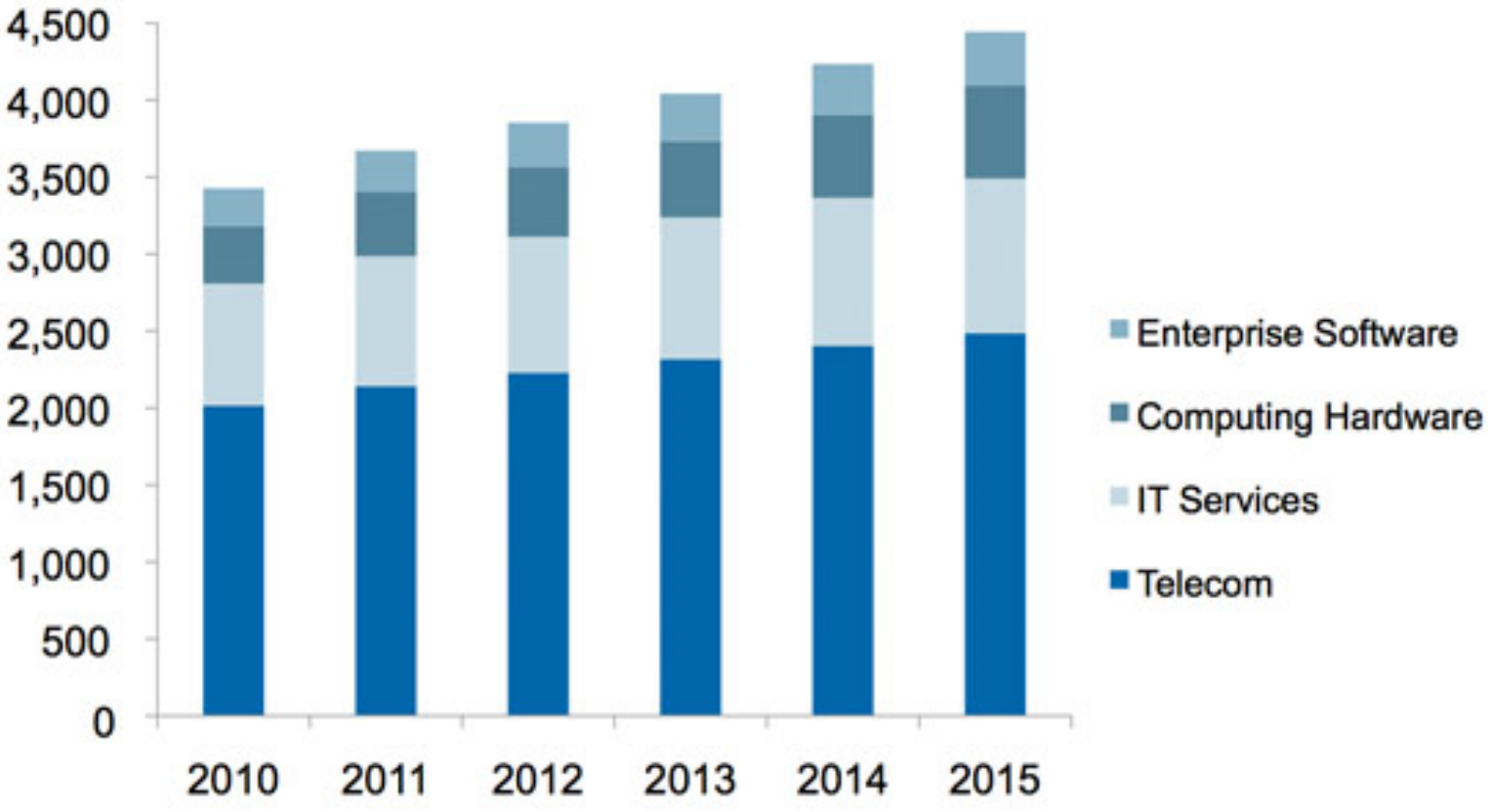
- Sample enterprise project management tool:

Company ABC Project Portfolio				
Project Name	**Scope**	**Schedule**	**Budget**	**Links**
Active Projects				
Project 1	○	●	●	
Project 2	●	●	●	
Project 3	○	○	○	
Project 4	○	●	●	
Approved Projects				
Project 10	○	○	○	
Project 11	○	○	○	
Project 12	○	○	○	
Project 13	○	○	○	
Project 14	○	○	○	
Opportunities				
Project 100				
Project 200				
○	White = going well			
●	Gray = some problems			
●	Black = major problems			

1.1.5. Project vs Program vs Portfolio

1.2. Project Statistics

- U.S. spends about a quarter of its GDP on IT project.



http://www.gartner.com/technology/research/quarterly-it-forecast

1.2. Project Statistics

- Hong Kong spends on IT projects:

	2014 (HKD bn)	2015 (HKD bn)
Enterprise Software	12.2	13
Computing Hardware	13.7	13.9
IT Services	14.7	16.4
Others (e.g. Telecom)	0.7	0.8
Total	**41.3**	**44.1**

1.2.1. IT Projects Has Terrible Track Record

- Standish Group's CHAOS Reports published yearly since 1994 provides a snapshot of the state of the software development industry.
- 1995 CHAOS Report found that
  - Only 16.2 percent of IT projects were successful in meeting scope, time, and cost goals.
  - Over 31 percent of IT projects were canceled before completion, costing over $81 billion in the U.S. alone.*
- Most common reasons for project shortcomings:
  - Lack of skills and proven approach to project management and risk management.

1.2.1. IT Projects Has Terrible Track Record

- Examples of failed projects:
  - McDonald's "Innovate" digital network for creating real-time enterprise
    - Conceived in January 2001, Innovate was the most expensive ($ 1 billion planned over five years) and intensive IT project in company history. Eventually, executives in company headquarters would have been able to see how soda dispensers and frying machines in every store were performing, at any moment. After two years and $ 170 million, the fast food giant threw in the towel.
    - Source: http://www.baselinemag.com/c/a/Projects-Supply-Chain/McDonalds-McBusted

1.2.1. IT Projects Has Terrible Track Record

- Nike's Integrated enterprise software
  - Nike spent $ 400 million to overhaul its supply chain infrastructure, installing ERP, CRM, and SCM— the full complement of analyst-blessed integrated enterprise software. Post-implementation (3rd quarter, 2000), the Beaverton, Oregon-based sneaker maker saw profits drop by $ 100 million, thanks, in part, to a major inventory glitch (it over-produced some shoe models and under-produced others). "This is what I get for our $ 400 million?" said CEO Phil Knight.
  - Source: http://www.cio.com/archive/081502/roi.html

1.2.1. IT Projects Has Terrible Track Record

- Examples of successful projects:
  - British Automobile Association (AA)'s AAHELP
    - The AA provides roadside assistance to its 9 million members and has the world's largest patrol force of 3,600 people. To support members who require assistance, it developed a PC system known as AAHELP at a cost of 35 million British pounds (US $ 70 million). The system has delivered quicker help to members, improved customer satisfaction, and led to better resource planning.
    - The system won the British Computer Society's Information Systems Management award.
    - Much of its success can be attributed to the change management program.

1.2.2. Improved Project Performance

- 2002 CHAOS Report:
  - 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).

1.2.2. Improved Project Performance

"The reasons for the increase in successful projects vary. First, the average cost of a project has been more than cut in half. Better tools have been created to monitor and control progress and better skilled project managers with better management processes are being used. The fact that there are processes is significant in itself."*

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

1.2.2. Improved Project Performance

- Project success factors:*

1. Executive support
2. User involvement
3. Experienced project manager
4. Clear business objectives
5. Minimized scope
6. Standard software infrastructure
7. Firm basic requirements
8. Formal methodology
9. Reliable estimates
10. Other criteria, such as small milestones, proper planning, competent staff, and ownership

*The Standish Group, “Extreme CHAOS” (2001).

1.2.2. Improved Project Performance

- 2015 CHAOS Report:
  - based on new definition of success factors (on time, on budget with a satisfactory result).

	2011	2012	2013	2014	2015
SUCCESSFUL	29%	27%	31%	28%	29%
CHALLENGED	49%	56%	50%	55%	52%
FAILED	22%	17%	19%	17%	19%

  - Smaller projects have a much higher likelihood of success than larger ones

	Grand	Large	Medium	Moderate	Small	TOTAL
SUCCESSFUL	2%	6%	9%	21%	62%	100%
CHALLENGED	7%	17%	28%	32%	16%	100%
FAILED	17%	24%	31%	17%	11%	100%

1.2.2. Improved Project Performance

- Project success factors:
  - Executive support
  - Emotional maturity
  - User involvement

- Good people:
  - who know what they are trying to achieve
  - with good involvement and communication with who they're achieving it for
  - when well-supported
  - will succeed, if success is possible

1.2.2. Improved Project Performance

- What the winners do?*
  - Use an integrated project management toolbox that includes standard and advanced tools and lots of templates.
  - Grow project leaders, emphasizing business and soft skills.
  - Develop a streamlined project delivery process.
  - Measure project health using metrics, including customer satisfaction and return on investment.

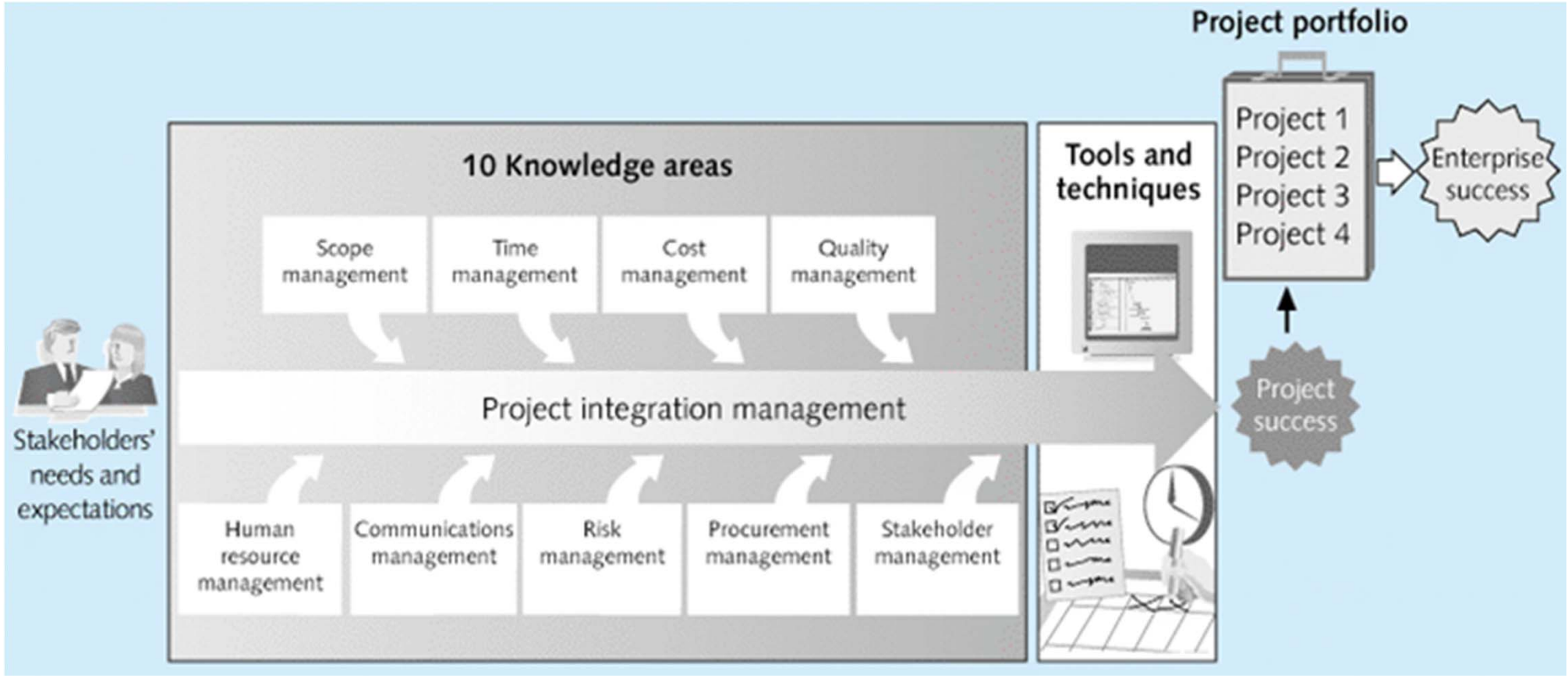
*Milosevic, Dragan and And Ozbay, “Delivering Projects: What the Winners Do,” Proceedings of the Project Management Institute Annual Seminars & Symposium (November 2001).

- 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)*.

1.3. Project Management Fundamentals

- Project management framework:



1.3.1. Project Stakeholders

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

1.3.2. PM Knowledge Areas

- Knowledge areas are the key competencies that project managers must develop.
- PMI's 10 knowledge areas:
  - Four core knowledge areas lead to specific project objectives (scope, time, cost, and quality).
  - Five facilitating knowledge areas are the means through which the project objectives are achieved (human resources, communication, stakeholder management, risk, and procurement management).
  - One knowledge area (project integration management) affects and is affected by all of the other knowledge areas.
  - All knowledge areas are important!

1.3.3. PM Tools and Techniques

- Project management tools and techniques assist project managers and their teams in various aspects of project management.
- 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).

1.3.3. PM Tools and Techniques

Knowledge Area/Category	Tools and Techniques
Integration management	Project selection methods, project management methodology, stakeholder analysis, project charters, project management plans, project management software, change control boards, configuration management, project review meetings, work authorization systems
Scope management	Project scope statements, work breakdown structures, statements of work, scope management plan, requirements analysis, scope change control
Time management	Gantt charts, project network diagrams, critical path analysis, program evaluation review technique (PERT), critical chain scheduling, crashing, fast tracking, milestone reviews
Cost management	Net present value, return on investment, payback analysis, business cases, earned value management, project portfolio management, cost estimates, cost management plan, financial software

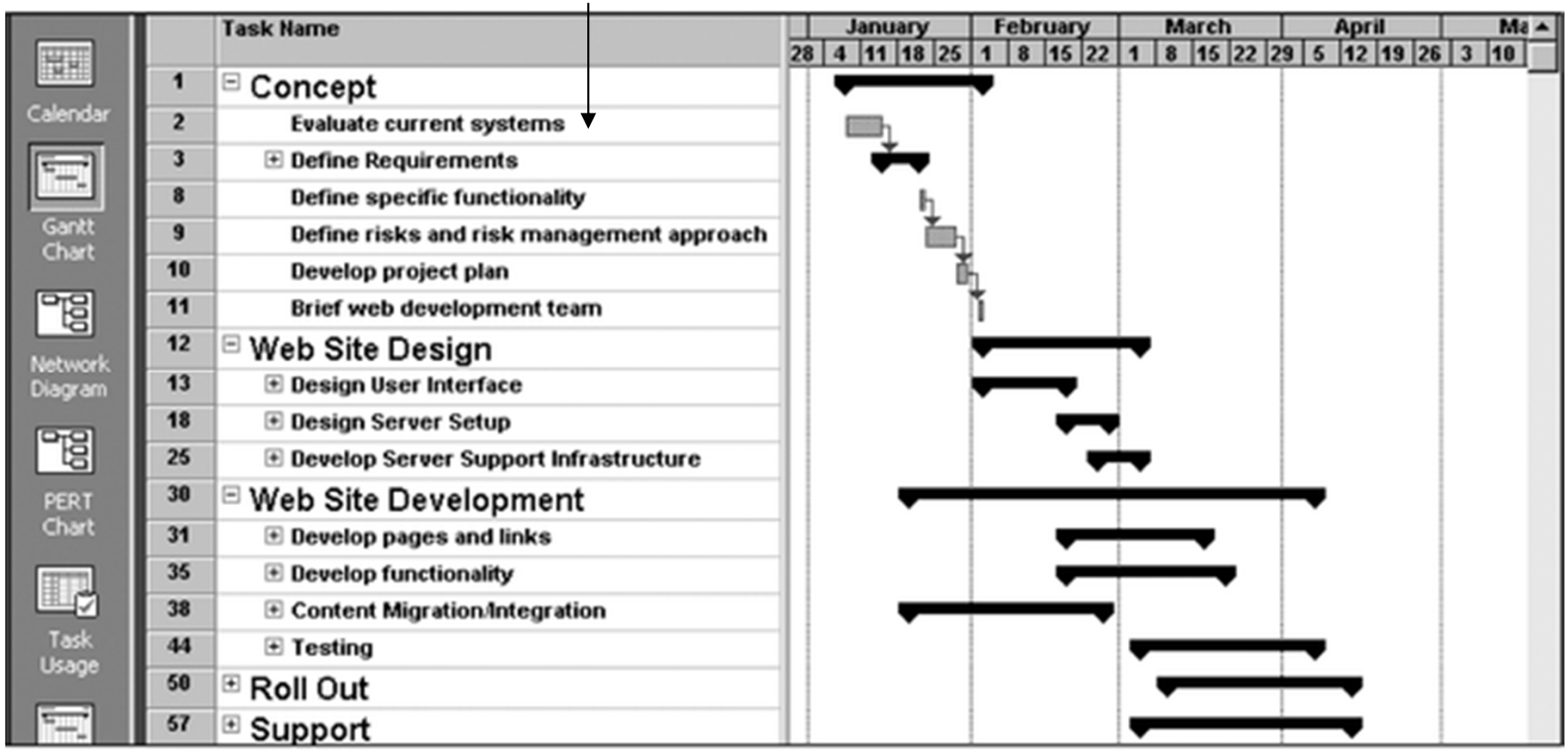
1.3.3. PM Tools and Techniques

Knowledge Area/Category	Tools and Techniques
Communications management	Communications management plan, conflict management, communications media selection, communications infrastructure, status reports, virtual communications, templates, project Web sites
Procurement management	Make-or-buy analysis, contracts, requests for proposals or quotes, source selection, negotiating, e-procurement
Risk management	Risk management plan, probability/impact matrix, risk ranking, Monte Carlo simulation, top-ten risk item tracking
Quality management	Six Sigma, quality control charts, Pareto diagrams, fishbone or Ishikawa diagrams, quality audits, maturity models, statistical methods
Human resource management	Motivation techniques, empathic listening, team contracts, responsibility assignment matrices, resource histograms, resource leveling, team building exercises

1.3.3. PM Tools and Techniques

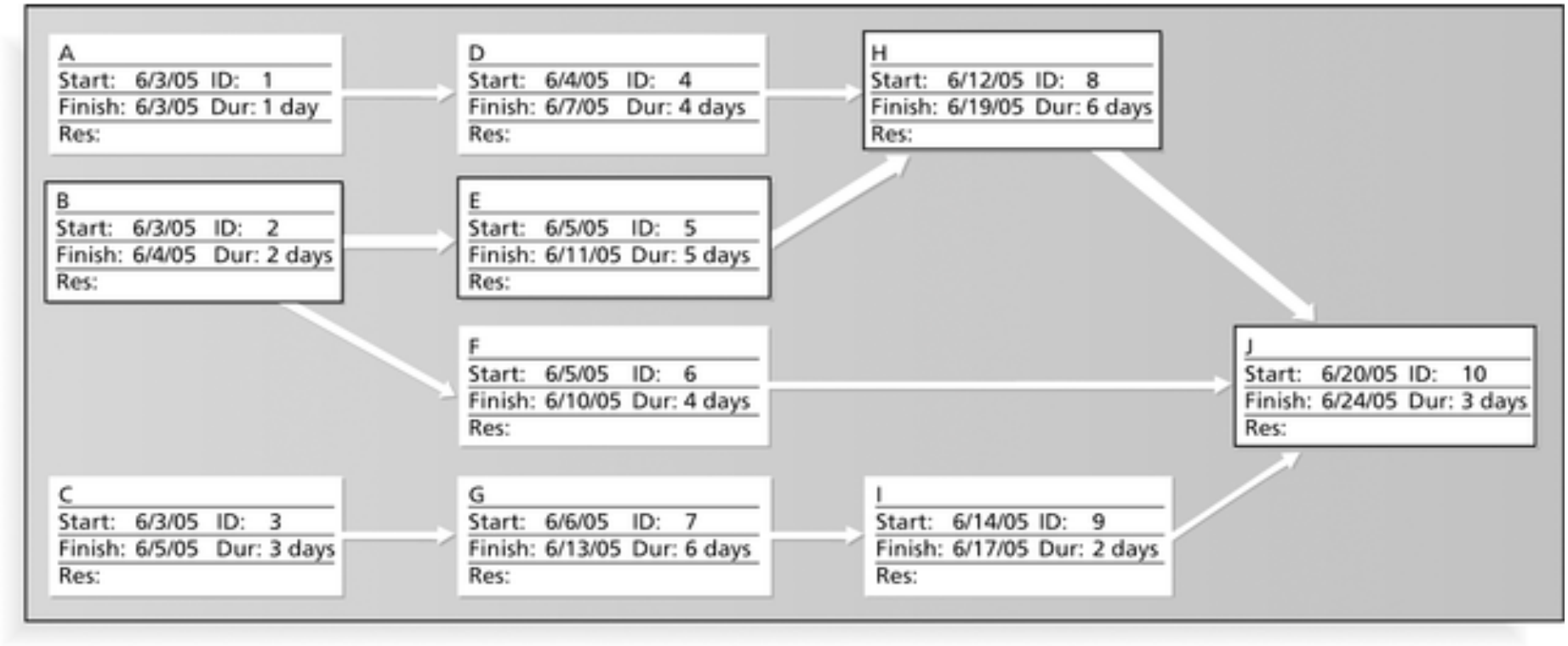
- Sample Gantt Chart:

Work Breakdown Structure (WBS)



1.3.3. PM Tools and Techniques

- Sample Network Diagram:



1.3.3. PM Tools and Techniques

- Three main categories of tools:
  - **Low-end tools**: Handle single or smaller projects well, cost under $200 per user.
    - MS Excel, Kidasa Milestones Simplicity
    - iPad Apps: Projector, Project Planner
  - **Midrange tools**: Handle multiple projects and users, cost $200-500 per user.
    - MS Project 2003, 2010 most popular.
  - **High-end tools**: Handle very large projects and specialized needs.
    - AMS Realtime, Primavera Project Manager

1.3.4. Benefits of Formal Project Management

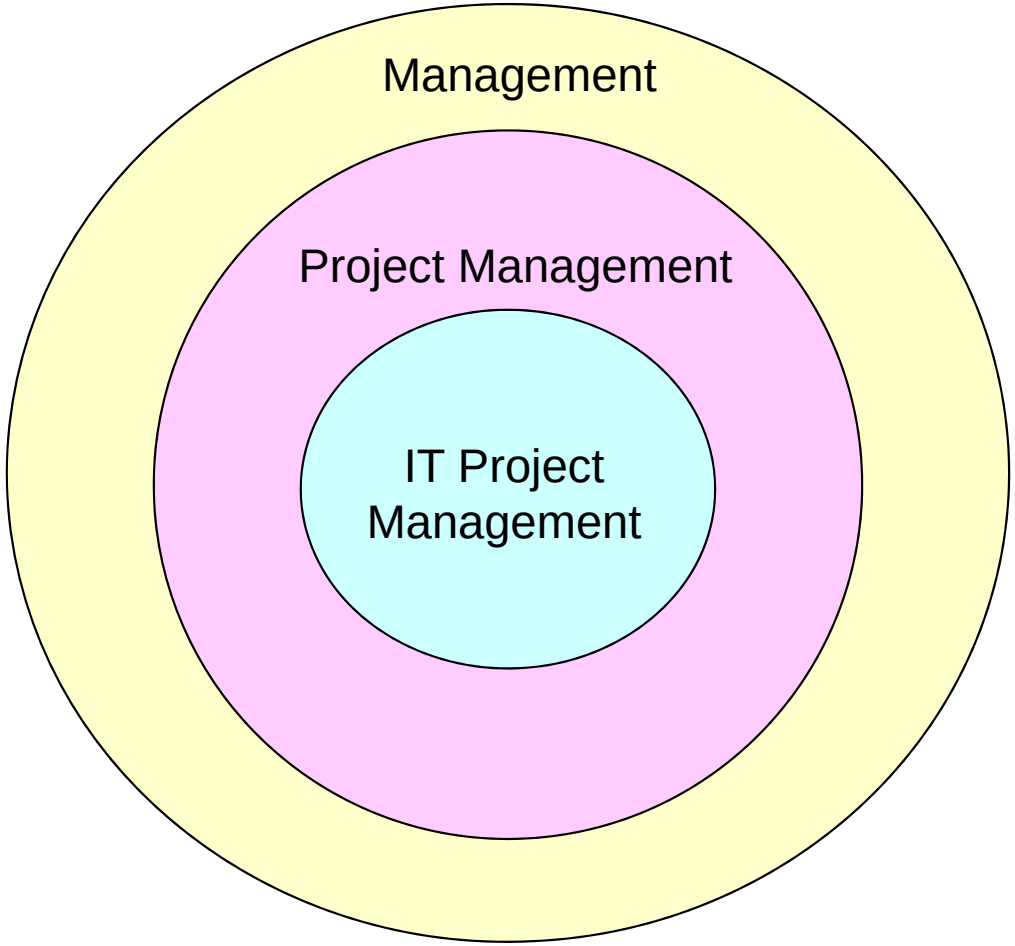
- Advantages of formal project management:
  - Better control of financial, physical, and human resources.
  - Shorter development times.
  - Lower costs.
  - Higher quality and increased reliability.
  - Improved customer relations.
  - Improved productivity.
  - Higher worker morale (less stress).
  - Better internal coordination.
  - Higher profit margins.

1.4. Project Management Profession

- Project Management History:
  - Birth of modern PM: Manhattan Project (the bomb)
  - 1970's: military, defense, construction industry were using PM software
  - 1990's: large shift to PM-based models
    - 1985: TQM
    - 1990-93: Re-engineering, self-directed teams
    - 1996-99: Risk mgmt, project offices
    - 2000: M&A, global projects

1.4. Project Management Profession

- IT project management:



1.4. Project Management Profession

- IT Career Path:

Title	Experience	Monthly Salary Range (HK$)
Chief Information Officer	12 years+	$ 125,000 - $ 300,000
IT Director/Manager	8 years+	$ 65,000 - $ 100,000
Project Manager	6 years+	$ 65,000 - $ 85,000
System Analyst	4 years+	$ 30,000 - $ 60,000
Analyst Programmer	0 – 5 years	$ 20,000 - $ 40,000
Programmer	0 – 3 years	$ 10,000 - $ 20,000

Source: SCMP Classified Post

1.4. Project Management Profession

- Fifteen project management job functions:
  - Define scope of project.
  - Identify stakeholders, decision-makers, and escalation procedures.
  - Develop detailed task list (WBS).
  - Estimate time requirements.
  - Develop initial project management flow chart.
  - Identify required resources and budget.
  - Evaluate project requirements.
  - Identify and evaluate risks.
  - Prepare contingency plan.
  - Identify interdependencies.
  - Identify and track critical milestones.
  - Participate in project phase review.
  - Secure needed resources.
  - Manage the change control process.
  - Report project status.

1.4.1. Suggested Skills for Project Manager

- Project managers need both “hard” and “soft” skills.
  - Hard skills include product knowledge and knowing how to use various project management tools and techniques.
  - Soft skills include being able to work with various types of people.

1.4.1. Suggested Skills for Project Manager

- **Organizational skills**: Plans, sets goals, analyzes.
- **Communication skills**: Listens, persuades.
- **Team-building skills**: Shows empathy, motivates, promotes esprit de corps.
- **Leadership skills**: Sets examples, provides vision (big picture), delegates, positive, energetic.
- **Coping skills**: Flexible, creative, patient, persistent.
- **Technology skills**: Experience, project knowledge.

1.4.2. Project Managers in Action

- The Apprentice:

1.4.3. Characteristics of Competence PM

- Most significant characteristics:

Effective Project Managers	Ineffective Project Managers
• Leadership by example • Visionary • Technically competent • Decisive • Good communicator • Good motivator • Stands up to upper management when necessary • Supports team members • Encourages new ideas	• Sets bad example • Not self-assured • Lacks technical expertise • Poor communicator • Poor motivator

1.4.3. Characteristics of Competence PM

- Summary:
  - Effective project managers provide leadership by example.
  - A leader focuses on long-term goals and big-picture objectives while inspiring people to reach those goals.
  - A manager deals with the day-to-day details of meeting specific goals.
  - Project managers often take on both leader and manager roles.

1.4.4. Project Management Associations

- Professional organizations:
  - Project Management Institute (PMI)
  - International Project Management Association (IPMA)
- Certifications:
  - PMI PMP (Project Management Professional)
    - PMI certs: 1,000 (1993), 52,000 (2002), 410,000 (2010)
    - PMP certification adds average 14% to salary.
  - PRINCE2
  - CompTIA Project+
  - IPMA Certified Project Manager

1.5. Concluding Remarks

- Three monkeys joke:

£ 5,000

C programmer

£ 10,000

C++ programmer

£ 50,000

Project Manager

Good project managers do make the differences and they worth the high price tag !!!