

Chapter 1: Introduction to Project Management

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Learning Objectives

1. Understand the growing need for better project management, especially for information technology (IT) projects
2. Explain what a *project* is, provide examples of IT projects, list various *attributes* of projects, and describe the *triple constraint* of project management
3. Describe project management and discuss *key elements* of the project management framework, including project stakeholders, the project management knowledge areas, common tools and techniques, and project success

Learning Objectives

4. Discuss the relationship between *project, program, and portfolio management* and the contributions each makes to enterprise success
5. Understand the role of *project managers* by describing what they do, what skills they need, and career opportunities for IT project managers
6. Describe the project management profession, including its history, the role of professional organizations like the Project Management Institute (PMI), the importance of certification and ethics, and the advancement of project management software

Main Contents

1. What is a project ?
2. What is project management ?
3. Program and project portfolio management
4. The role of the project manager

Introduction

- The overall IT market grew by 6 percent every year
- In the U.S, the size of the IT workforce topped 4 million workers in 2008, and the unemployment rate for IT professionals is half the rate for the overall labor market
- Project management is a popular specialty, the number of people earning their Project Management Professional (PMP) certification continues to increase.
- Roger Sessions “The global economic loss caused by failed projects is about \$6.2 trillion a year”

Introduction

- 1995年，斯坦迪什集团公布了一项被经常引用的题为“混沌”的研究报告。这家咨询公司在美国调查了365位IT高级经理人员，他们管理超过8380个不同的IT应用项目。正如题目所含的意思那样，这些IT项目正处在一个混沌的状态。在20世纪90年代初期，美国公司每年要在大约17.5万多个IT应用开发项目上花费2500多亿美元。研究表明，所有IT项目的平均成功率只有16.2%。
- 他们把成功定义为在计划的时间和预算内实现项目目标。研究还发现，有超过31%的IT项目在完工之前就被取消了，这花掉了美国公司和政府有关部门810亿美元。报告的作者坚持认为IT项目管理有改进的必要。他们说：“软件开发项目正处于混沌状态，我们再也不能效仿这三个愚蠢的行为了：听不到失败、看不见失败、说不出失败。”
- 最新研究表明，普华永道会计事务所调查来自30个不同国家的200家公司的项目管理成熟度并发现超过一半的项目都失败了。该研究还发现只有2.5%的公司始终在所有类型的项目中满足了范围、时间和成本目标。



Advantages of Using Project Management

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

1. What is a project ?

Project: is a *temporary* endeavor undertaken to create a *unique* product, service, or result.

Operation: is work done in organizations to sustain the business.

The differences are :

Project end when its *objectives have been reached* or the project has been *terminated*.

1. What is a project ?

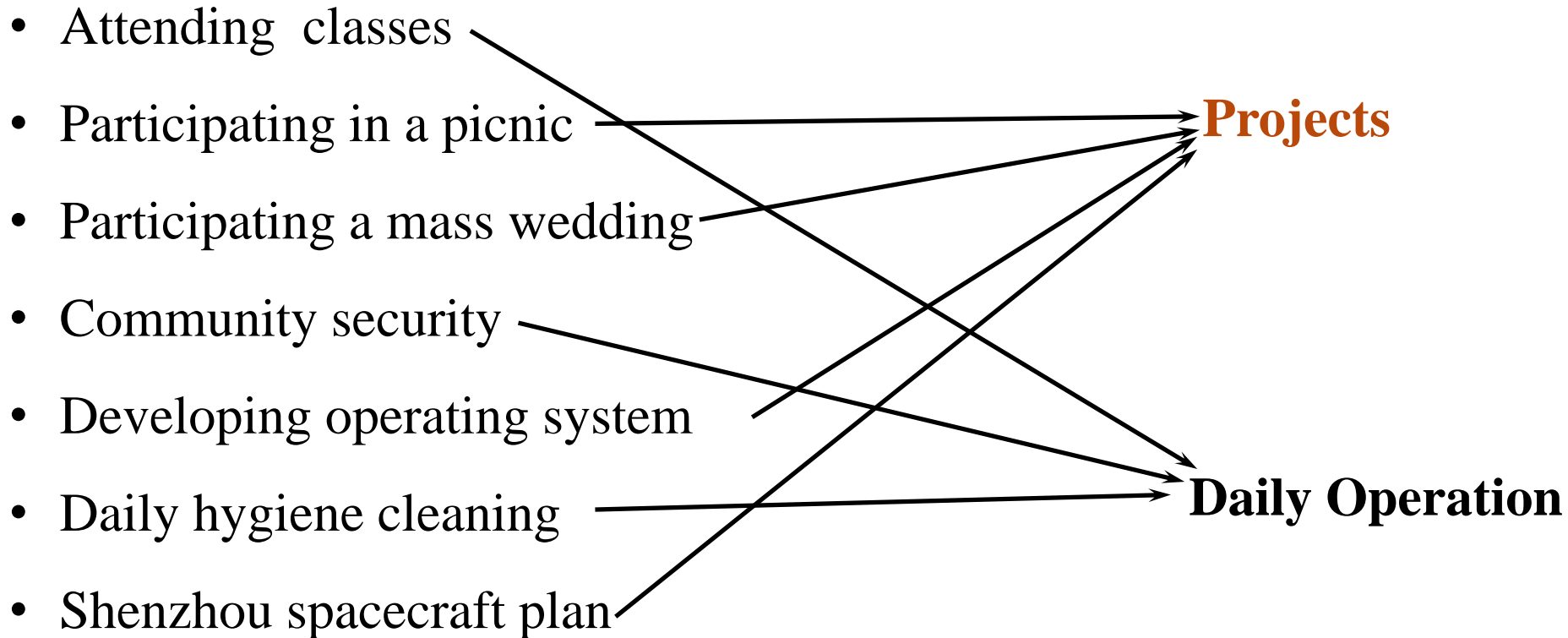
IT Project Examples

- A team of students *creates* a smartphone application and sells it online.
- A company *develops* a driverless car.
- A small software development team *adds* a new feature to an internal software application for the finance department
- A college *upgrades* its technology infrastructure to provide wireless Internet access across the whole campus



1. What is a project ?

Which are projects ? Which are not ? Why?



1. What is a project ?

Project vs Operation

工作性质：独特，创新
工作环境：开放，风险
管理组织：临时，变化
目的：结束项目

工作性质：常规，重复
工作环境：封闭，确定
管理组织：稳定，持久
目的：维持经营

比较项	项目	运营
负责人	项目经理	职能经理
实施组织	项目组	部门
时限性	一次性	持续不断
目标	独特性	重复性
目的	实现目标结束项目	维持运营
管理追求	效果	效率

1. What is a project ?

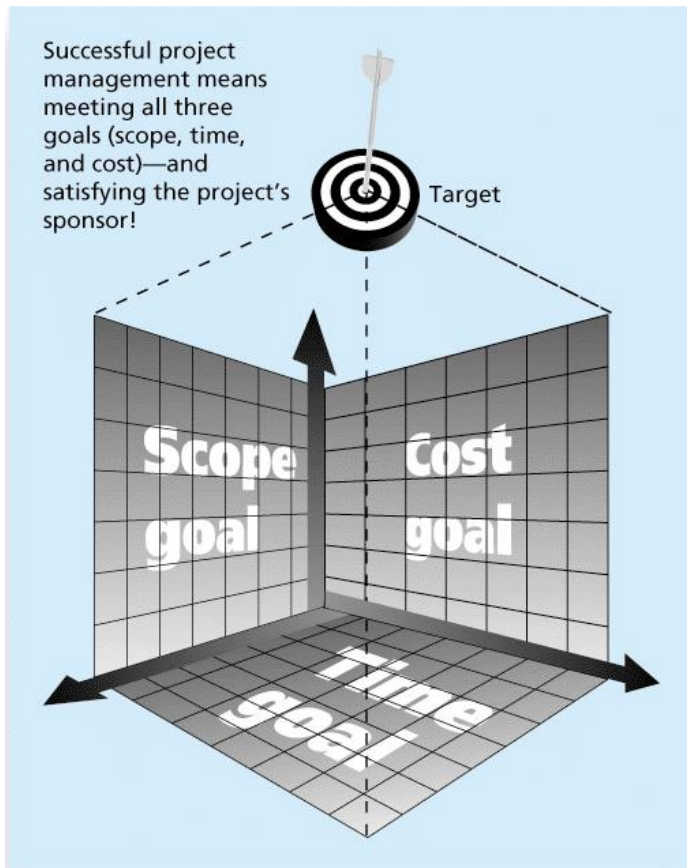
Project Attributes

Project is a *temporary* endeavor undertaken to create a *unique* product, service, or result.

- Has a unique purpose.
- Temporary.
- Developed using progressive elaboration.
- Requires resources, often from various areas.
- Have a primary customer or sponsor.
- Involves uncertainty.

1. What is a project ?

Project Constraints – quadruple constraint.



triple constraint

- Scope
- Time
- Cost
- Quality
- Resources
- Risk

quadruple
constraint

1. What is a project ?

Project Constraints - triple constraint.

- A project manager must/should consider the three constraints?
- Which one is the most important?
- The three constraints are exclusive or simultaneous?
- If they are exclusive, how should the manager do to meet them.
- *To create a successful project, a project manager must consider these three often-competing goals and meanwhile, balance them.*
- *Instead of discrete target goals, it is more realistic to set a range of goals.*

1. What is a project ?

Project Constraints - triple constraint.

- Priorities should be based on the project's development strategy
- *trade-off matrix* is a useful tool to facilitate communication with stakeholders
 - establish areas in which stakeholders are willing to compromise
 - surface assumptions, constraints and risks
- Criteria in priority order
 - optimize - what is most important to the stakeholders
 - constrain - what conditions must be met
 - accept - the trade-off

1. What is a project ?

Project Constraints - triple constraint.

Blocks in the matrix represent product development strategies

Rule: Each row and each column must have exactly one check mark

	OPTIMIZE	CONSTRAIN	ACCEPT
COST/ RESOURCES	Minimum cost	Not to exceed	Time and materials
TIME/ SCHEDULE	Early to market	Time box	Don't ship before ready
SCOPE	Maximize benefits	Ship essential set	Drop features before ship date

1. What is a project ?

Example Strategies - 1

- Example product development strategy:
 - optimize the schedule in order to get to market early
 - constrain cost/resources to manage budget
 - accept delivery of features incrementally over multiple releases

Project Dimension	Optimize	Constrain	Accept
Cost/Resources		X	
Time/Schedule	X		
Scope			X

Rule: Each row and each column must have exactly one check mark

1. What is a project ?

Example Strategies - 2

- Example time and materials project strategy:
 - optimize features
 - constrain schedule to meet goals
 - accept cost/resources needed to develop features

Project Dimension	Optimize	Constrain	Accept
Cost/Resources			X
Time/Schedule		X	
Scope	X		

2. What is project management?

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

([PMBOK](#)® Guide, Fourth Edition, 2012)

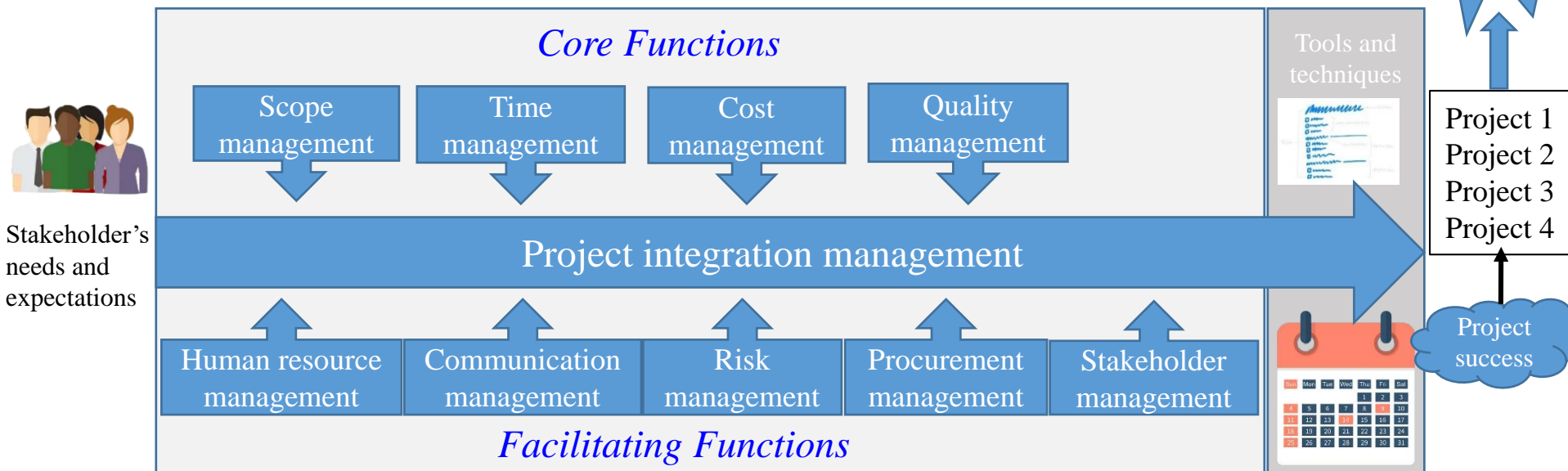


Figure 1-2 Project Management Framework



2. What is project management?

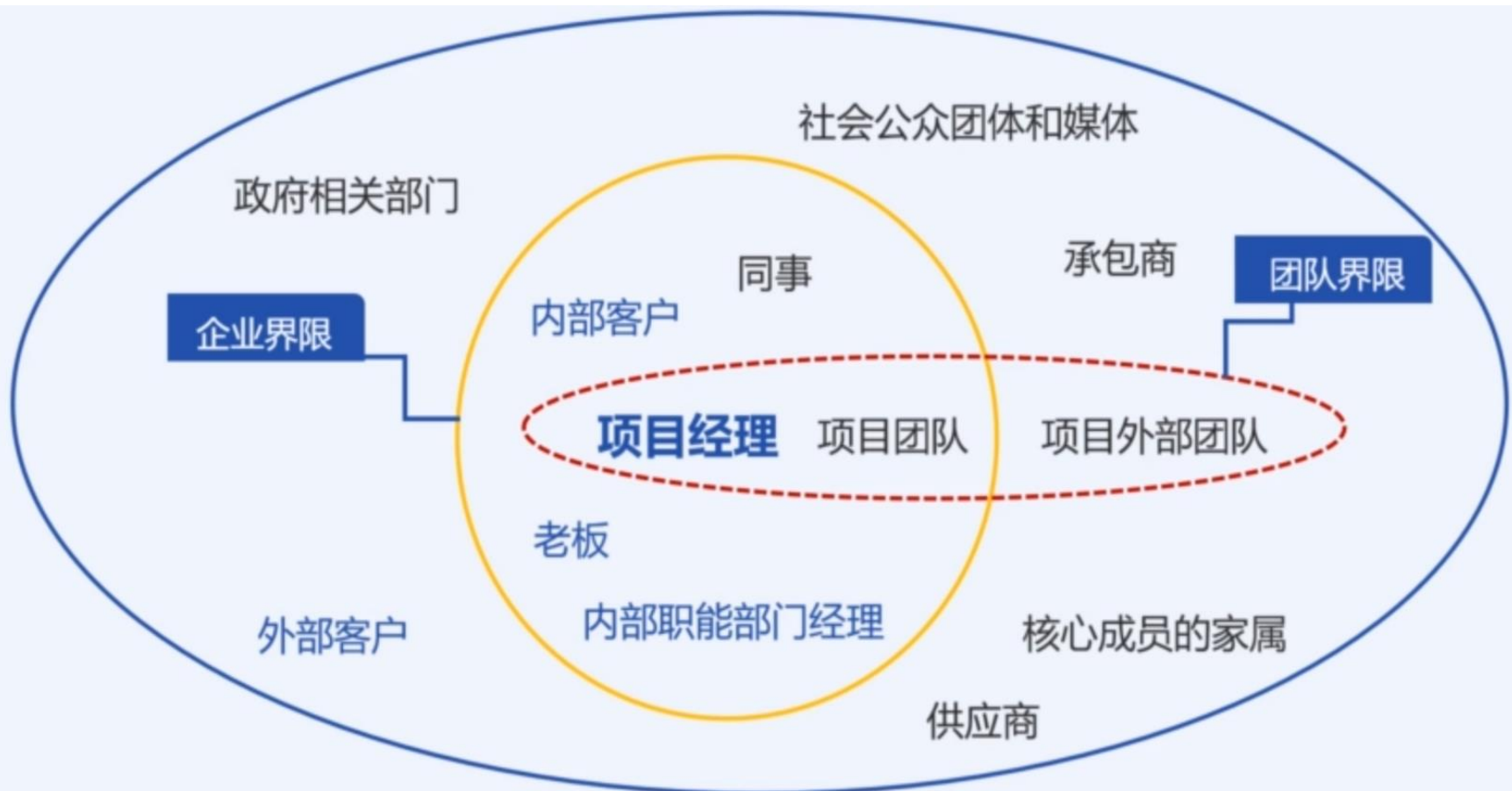
Stakeholders are the people *involved in* or *affected by* project activities.

Stakeholders include

- The project sponsor
- The project manager
- The project team
- Support staff
- Customers
- Users
- Suppliers
- Opponents to the project

2. What is project management?

Stakeholders are the people *involved in* or *affected by* project activities.



2. What is project management?

Project management knowledge areas: describe the key competencies that project managers must develop.

10 knowledge areas of project management:

- Scope management
- Time management
- Cost management
- Quality management
- Human resource management
- Communication management
- Risk management
- Procurement management
- Stakeholders management
- Integration management

2. What is project management?

Project management tools and techniques: assist project managers and their teams in carrying out work in all 10 knowledge areas.



- 1、数据收集技术
- 2、数据分析技术
- 3、数据表现技术
- 4、决策技术
- 5、沟通技巧
- 6、人际关系与团队技能
- 7、未分组的工具与技术

2. What is project management?

Table 1-1 Common tools and techniques

Knowledge Area/Category	Tools and Techniques
Integration management	Project selection methods, project management methodologies stakeholder analyses, work requests, project charters, project management plans, project management software, change requests, change control boards, project review meetings, lessons-learned reports
Scope management	Scope statements, work breakdown structures, statements of work, requirements analyses, scope management plans, scope verification techniques, scope change controls
Time management	Gantt charts, project network diagrams, critical path analysis, crashing, fast tracking, schedule performance measurements
Cost management	Project budgets, net present value, return on investment, payback analysis, earned value management, project portfolio management, cost estimates, cost management plans, cost baselines
Quality management	Quality metrics, checklists, quality control charts, Pareto diagrams, fishbone diagrams, maturity models, statistical methods, test plans
Human resource management	Motivation techniques, empathic listening, responsibility assignment matrices, project organizational charts, resource histograms, team building exercises
Communications management	Communications management plans, kick-off meetings, conflict management, communications media selection, status and progress, reports, virtual communications, templates, project Web sites
Risk management	Risk management plans, risk registers, probability/impact matrices, risk rankings
Procurement management	Make-or-buy analyses, contracts, requests for proposals or quotes, source selections, supplier evaluation matrices on

2. What is project management?

Project success.

- The project met scope, time, and cost goals.
- The project satisfied the customer/sponsor.
- The results of the project met its main *objective*.

Note:

- *The **objective** of a project must be clearly defined.*
- *Every project must have an authority, which is often called project steering committee.*
- ***An effective objective must be measurable**, which guarantees the project success could be judged.*



2. What is project management?

Table 1-2: What Helps Projects Succeed?*

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

2. What is project management?

Top Three Reasons Why Federal Technology Project Succeed

- Adequate funding
- Staff expertise
- Engagement from all stakeholders

The reasons are diverse due to the cultural environments.



2. What is project management?

Practical elements of successful project delivery

- Use an integrated toolbox
- Grow project leaders
- Develop a streamlined project delivery process
- Measure project health using metrics

3. Program and project portfolio management

A **program** is a group of related projects managed in a *coordinated way* to obtain benefits and control not available from managing them individually.

Program manager:

- *Provides leadership and direction for the project managers heading the projects within a program.*
- *Coordinate the efforts of project teams, functional groups, suppliers, and operations staff.*
- *Responsible for more than the delivery of project results.*
- *Software reusability*

3. Program and project portfolio management

A **portfolio** is a collection of projects and/or programs and other work grouped together to facilitate effective management of that work to meet strategic business objectives.

Main distinct:

Project management: tactical goals

Project portfolio management: strategic goals

项目组合	项目集	项目
战略目标	管理多个目标	某个具体目标
管理项目优先级	管理相互关联的项目	实现具体目标的临时性工作
指导层面	执行层面	交付层面
根据战略目标，管理项目 优先级 。	管理相互 关联 、协调的项目，产生收益。	实现具体目标的 临时性 工作。

3. Program and project portfolio management



Figure 1-3. Project Management Compared to Project Portfolio Management

3. Program and project portfolio management

A **portfolio** is a collection of projects and/or programs and other work grouped together to facilitate effective management of that work to meet strategic business objectives.

Main distinct:

Project management: *tactical goals*

Project portfolio management: *strategic goals*

Attributes:

- A continuous process of selecting and managing projects
- View and manage all projects at an enterprise level
- *Top managers* instead of project managers

3. Program and project portfolio management

Best Practice

- A **best practice** is “an optimal way recognized by industry to achieve a stated goal or objective”*
- Robert Butrick *suggests that organizations* need to follow basic principles of project management, including these two mentioned earlier in this chapter:
 - **Make sure your projects are driven by your strategy.** Be able to demonstrate how each project you undertake fits your business strategy, and screen out unwanted projects as soon as possible
 - **Engage your stakeholders.** Ignoring stakeholders often leads to project failure. Be sure to engage stakeholders at all stages of a project, and encourage teamwork and commitment at all times

3. Program and project portfolio management

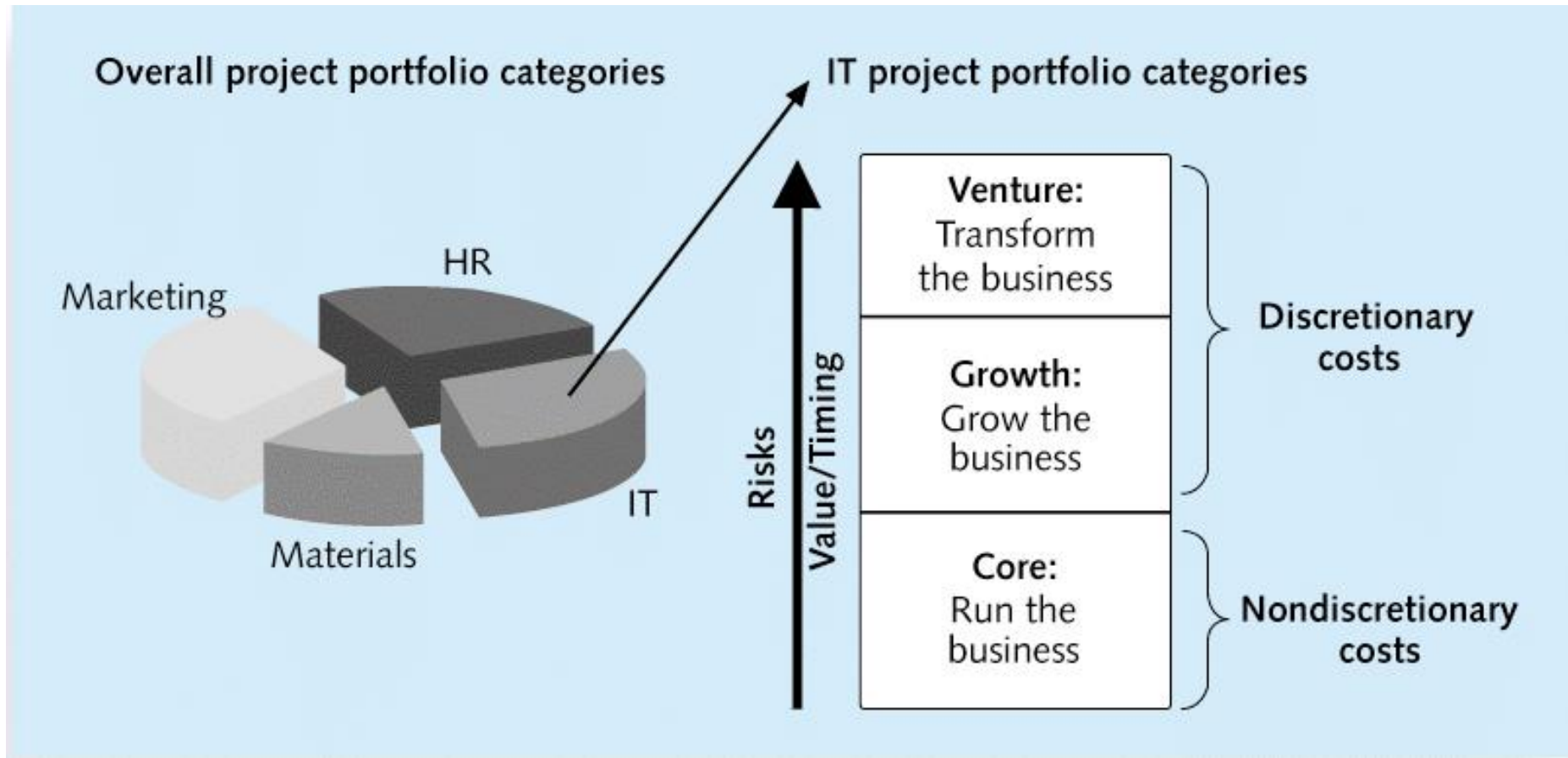


Figure 1-4. Sample Project Portfolio Approach

3. Program and project portfolio management

组织项目管理			
	项目	项目集	项目组合
定义	项目是为创造独特的产品、服务或成果而进行的临时性工作。	项目集是一组相互关联且被协调管理的项目、子项目集和项目集活动,以便获得分别管理所无法获得的效益。	项目组合是为实现战略目标而组合在一起管理的项目、项目集、子项目组合和运营工作的集合。
范围	项目具有明确的目标。范围在整个项目生命周期中是渐进明细的。	项目集的范围包括其项目集组件的范围。项目集通过确保各项目集组件的输出和成果协调互补,为组织带来效益。	项目组合的组织范围随着组织战略目标的变化而变化。
变更	项目经理对变更和实施过程做出预期,实现对变更的管理和控制。	项目集的管理方法是,随着项目集各组件成果和/或输出的交付,在必要时接受和适应变更,优化效益实现。	项目组合经理持续监督更广泛内外部环境的变更。
规划	在整个项目生命周期中,项目经理渐进明细高层级信息,将其转化为详细的计划。	项目集的管理利用高层级计划,跟踪项目集组件的依赖关系和进展。项目集计划也用于在组件层级指导规划。	项目组合经理建立并维护与总体项目组合有关的必要过程和沟通。
管理	项目经理为实现项目目标而管理项目团队。	项目集由项目经理管理,其通过协调项目集组件的活动,确保项目集效益按预期实现。	项目组合经理可管理或协调项目组合管理人员或对总体项目组合负有报告职责的项目集和项目人员。
监督	项目经理监控项目开展中生产产品、提供服务或成果的工作。	项目集经理监督项目集组件的进展,确保整体目标、进度计划、预算和项目集效益的实现。	项目组合经理监督战略变更以及总体资源分配、绩效成果和项目组合风险。
成功	成功通过产品和项目的质量、时间表、预算的依从性以及客户满意度水平进行衡量。	项目集的成功通过项目集向组织交付预期效益的能力以及项目集交付所述效益的效率和效果进行衡量。	成功通过项目组合的总体投资效果和实现的效益进行衡量。

4. The Role of the Project Manager

- Job descriptions vary, but most include responsibilities like planning, scheduling, coordinating, and working with people to achieve project goals
- Remember that 97% of successful projects were led by experienced project managers, who can often help influence success factors



4. The Role of the Project Manager

责任与能力	<p>项目经理有责任满足以下需求：任务需求、团队需求和个人需求。</p> <p>■知识能力——项目经理对项目管理了解多少。</p> <p>■实践能力——项目经理能够应用所掌握的项目管理知识做什么、完成什么。</p> <p>■个人能力——项目经理在执行项目或相关活动时的行为方式。个人态度、主要性格特征和领导力，决定着项目经理指导项目团队平衡项目制约因素、实现项目目标的能力，决定着项目经理的行为的有效性。</p>	
职责	<p>计划、组织、领导和控制是项目经理最重要的四个职能</p> <p>(1) 计划编制、进度安排、成本估算;</p> <p>(2) 进行绩效、趋势分析;</p> <p>(3) 编写进展报告;</p> <p>(4) 维持良好的客户关系;</p>	<p>(5) 后勤保障管理;</p> <p>(6) 进度控制和成本控制;</p> <p>(7) 编写管理规程和进行行政管理;</p> <p>(8) 界面管理(对与项目相关的人际、组织和系统界面进行管理);</p> <p>(9) 对项目各子系统工作进行综合</p>
角色	<p>(1) 综合集成者(integrator): 项目经理是惟一可以总览项目的人, 是项目的计划者和项目的组织者, 负责把项目的各个方面进行综合管理, 并与组织战略相一致。</p> <p>(2) 沟通促进者(communicator): 项目经理要获取、处理和传输项目活动所需要的信息。项目经理要与管理高层、团队成员、职能经理、其他项目经理、客户等几方面人进行沟通</p> <p>(3) 团队领导者(team leader): 项目经理是项目团队的领导, 负责对项目团队成员的激励和指导, 把项目团队成员的个人发展和项目的目标结合起来, 促进项目工作的有效开展。项目经理必须能够指导来自不同职能部门的成员, 在问题出现时予以解决, 同时要协调整个项目。</p> <p>(4) 决策制定者(decision maker): 在项目管理的过程中, 项目经理是项目工作的决策者。项目经理必须在资源分配、执行成本和进度的权衡、项目范围的变更等方面做出决策。</p> <p>(5) 气氛营造者(climate creator): 项目经理有责任营造一种团队成员相互合作、共同发展的氛围。</p>	
权力	<p>(1) 法定权力: 来自于项目经理在组织中的正式地位</p> <p>(2) 奖励权力: 对在项目中做出贡献的人们进行奖励的权力</p> <p>(3) 专家权力: 项目经理在专业领域的知识和经验受到人们的尊敬, 拥有很高的声望</p> <p>(4) 惩罚权力: 指对不服从安排的项目团队成员进行解雇、降职和减薪的权力。这种权力虽然有力, 但会在团队中造成不良气氛</p> <p>(5) 暗示权力: 项目经理会依仗一个更有权威的人行使权力。</p>	



4. The Role of the Project Manager

Project team Suggested skills:

- The Project Management Body of Knowledge
- Application area knowledge, standards, and regulations
- Project environment knowledge
- General management knowledge and skills
- Soft skills or human relations skills

Project Manager Suggested skills:

- project management knowledge
- performance competency
- personal competency

4. The Role of the Project Manager

10 most important skills :

- People skills
- Leadership
- Listening
- Integrity, ethical behavior, consistency
- Strength at building trust
- Verbal communication
- Strength at building teams
- Conflict management
- Problem solving
- Balancing of priorities

4. The Role of the Project Manager

Different Skills Needed in Different Situations:

- **Large projects:** Leadership, relevant prior experience, planning, people skills, verbal communication, and team-building skills were most important
- **High uncertainty projects:** Risk management, expectation management, leadership, people skills, and planning skills were most important
- **Very novel projects:** Leadership, people skills, having vision and goals, self confidence, expectations management, and listening skills were most important

4. The Role of the Project Manager

Importance of Leadership Skills:

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

Managers do things right, and leaders do the right things.

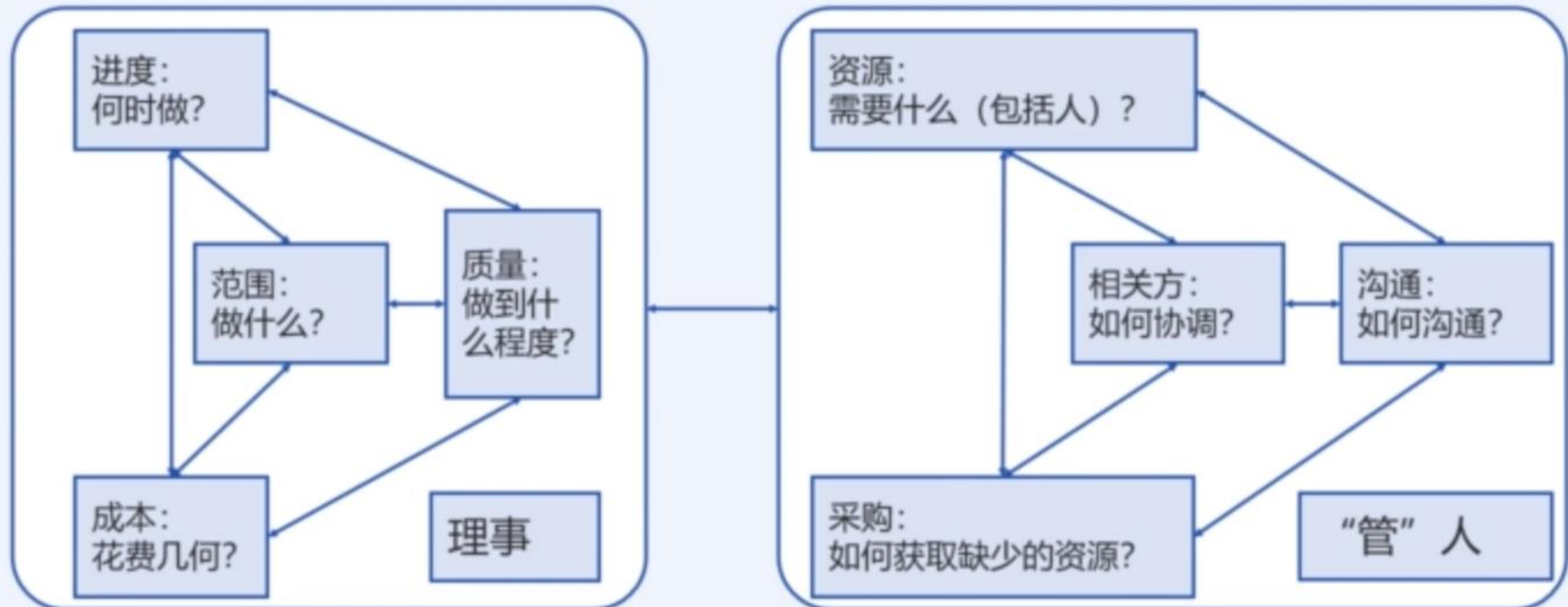
管理	领导力
直接利用职位权力	利用关系的力量指导、影响与合作
维护	建设
管理	创新
关注系统和架构	关注人际关系
依赖控制	激发信任
关注近期目标	关注长期愿景
了解方式和时间	了解情况和原因
关注赢利	关注范围
接受现状	挑战现状
做正确的事	做正确的事情
关注可操作的问题和问题的解决	关注愿景、一致性、动力和激励

4. The Role of the Project Manager

Importance of Leadership Skills:

Project managers often take on the role *of both leader and manager*.

Project managers lead people and manage things.



4. The Role of the Project Manager

Table 1-4. Nine Hottest Skills*

Skill	Percentage of Respondents
Programming and application development	60%
Project management	44%
Help desk/technical support	35%
Networking	35%
Business intelligence	23%
Data center	18%
Web 2.0	18%
Security	17%
Telecommunications	9%

*Source: Rick Saia, “9 Hot IT Skills for 2012,” Computerworld, September 26, 2011.

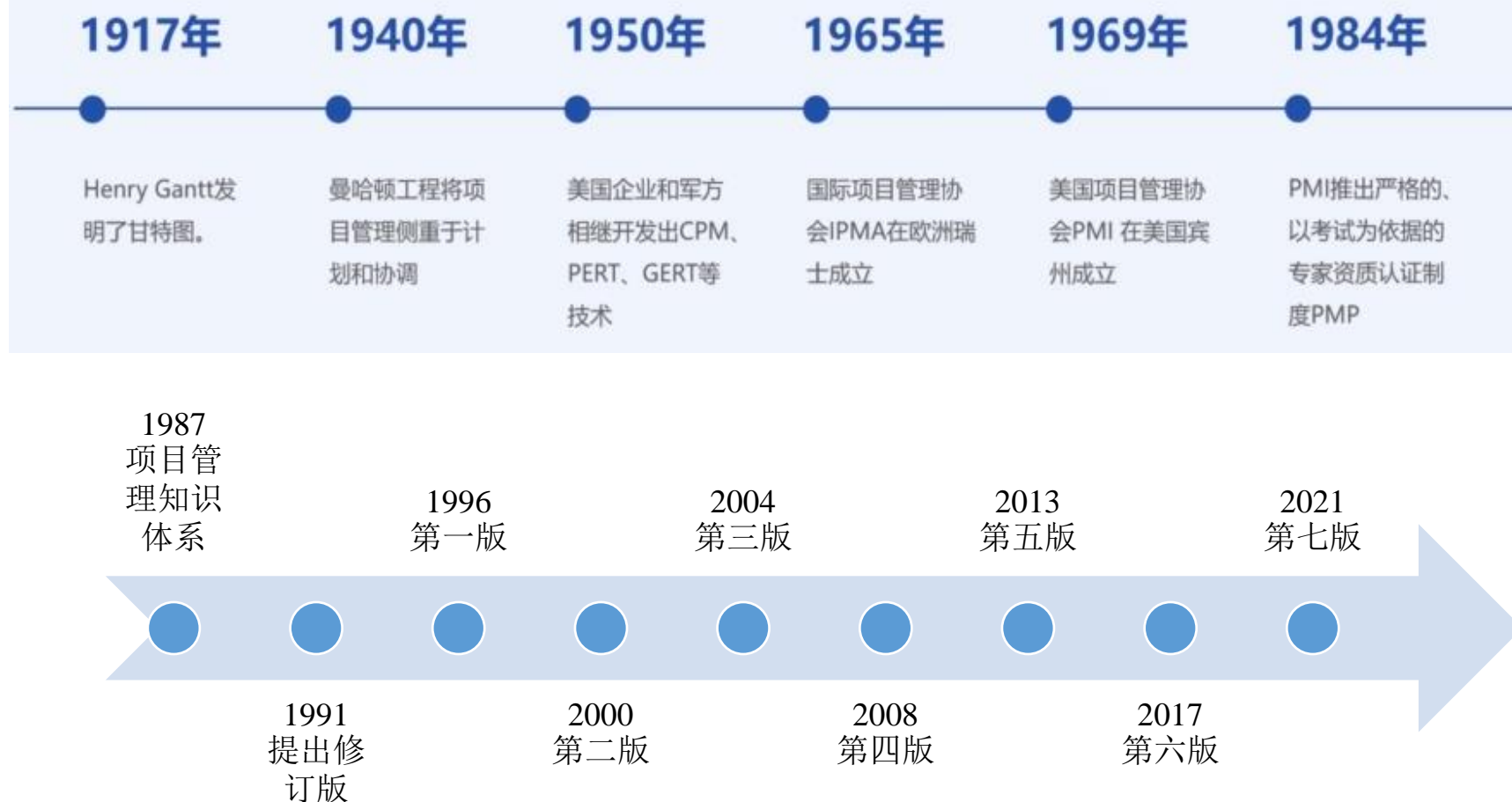
5. History of Project Management

- Ancient time, i.e. building the Egyptian pyramids and building the Great Wall of China
- Most people consider the *Manhattan Project* to be the first project to use “modern” project management
- This three-year, \$2 billion (in 1946 dollars) project had a separate project manager and a technical manager



5. History of Project Management

二十世纪，现代项目管理
从“萌芽”到“成熟”到广泛传播的发展过程。



5. History of Project Management

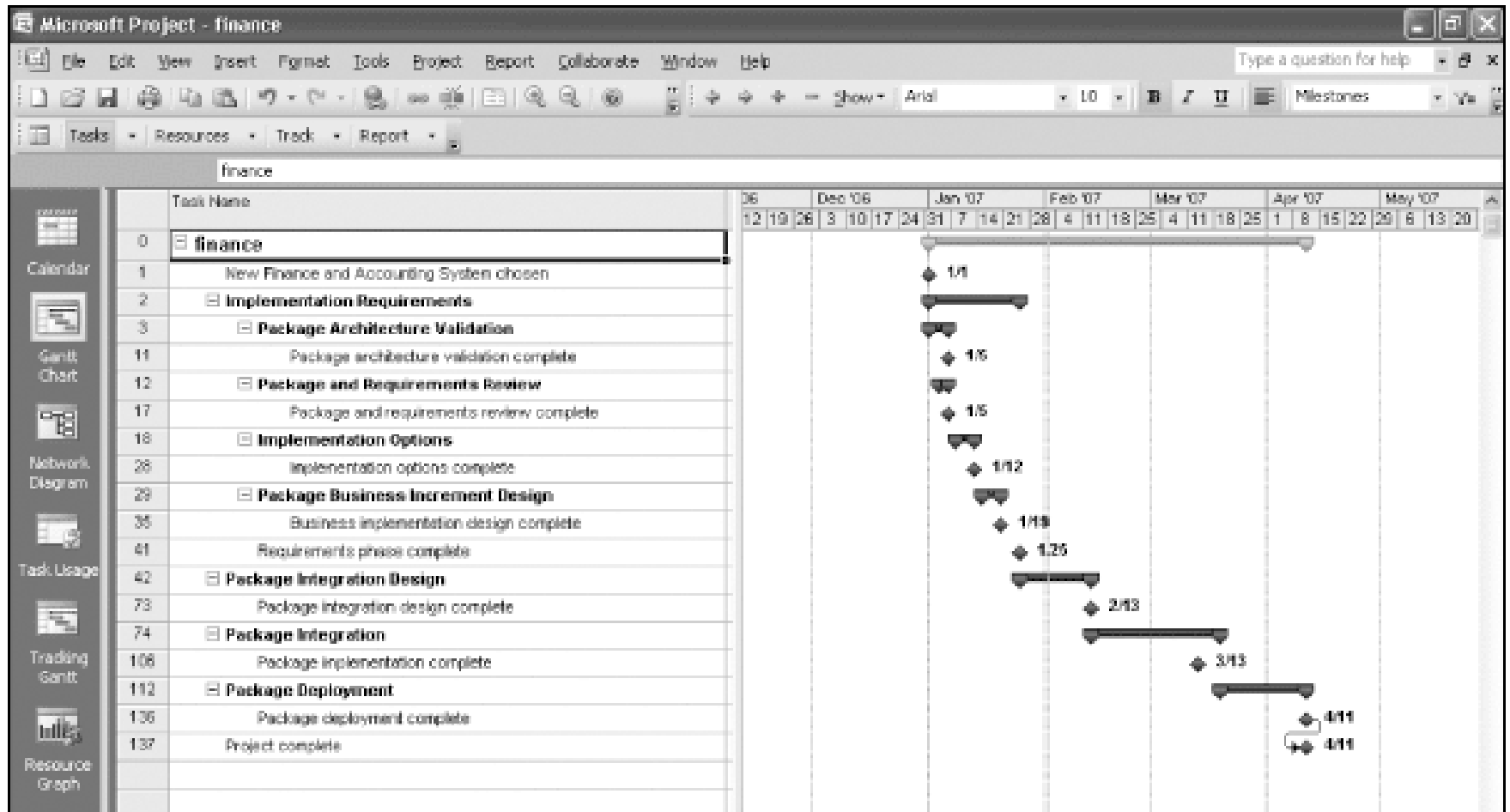


Figure 1-6. Sample Gantt Chart Created with Project 2010

5. History of Project Management

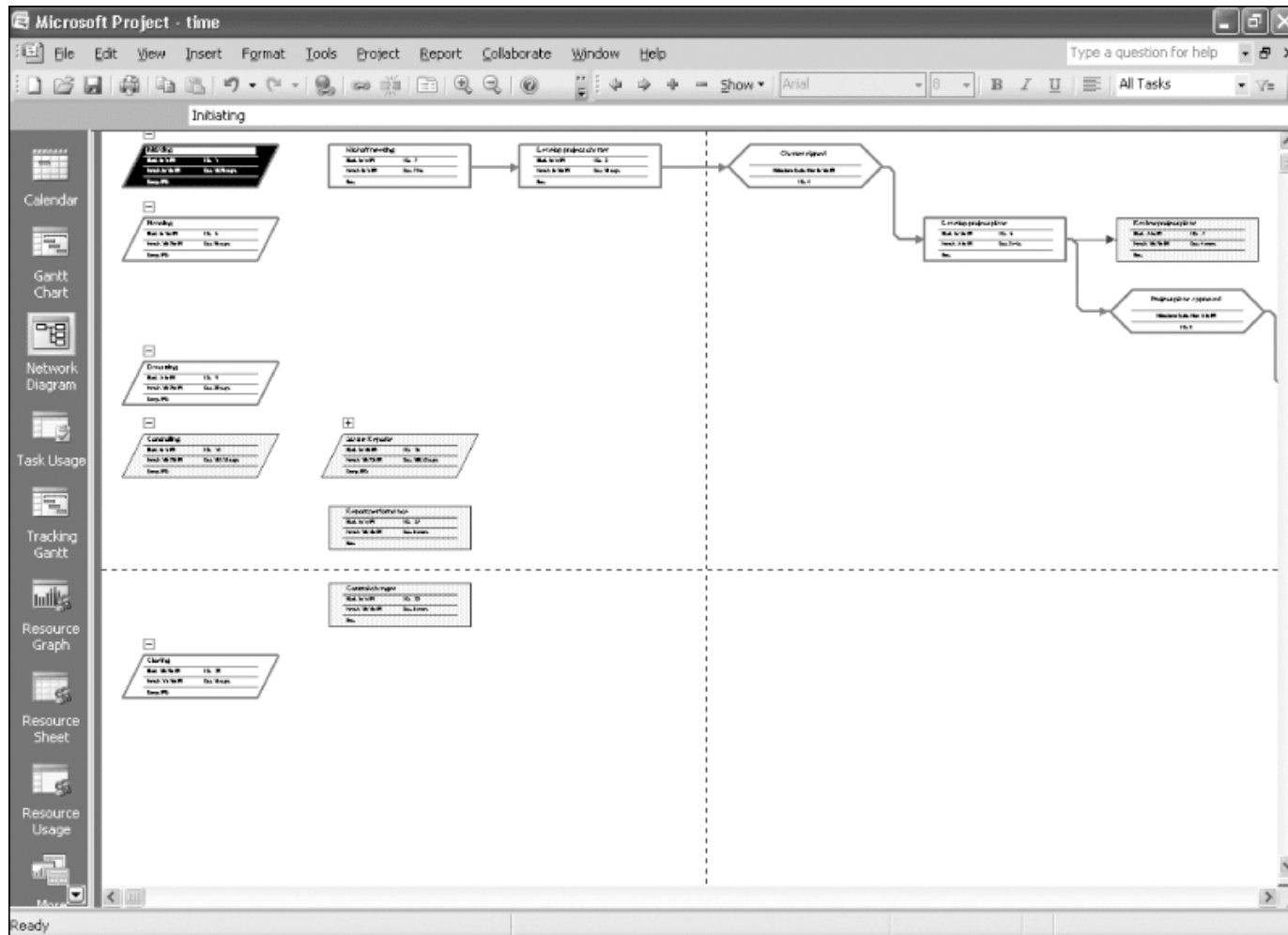


Figure 1-7. Sample Network Diagram Created with Project 2010

5. History of Project Management

Project Management Offices

- Today, more and more companies began creating PMOs to help them handle the increasing number and complexity of projects
- A Project Management Office (PMO) is an organizational group responsible for coordinating the project management function throughout an organization

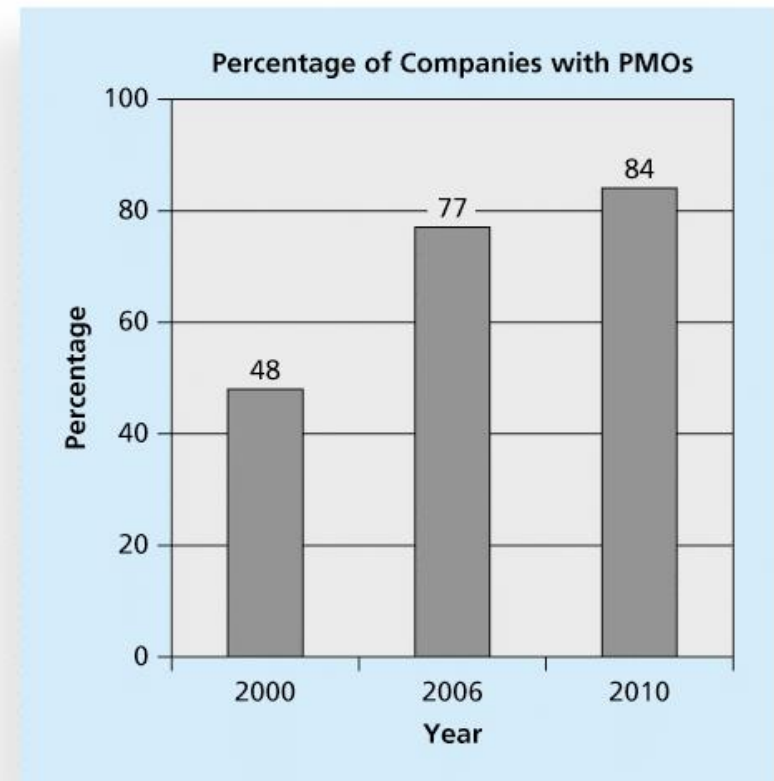


Figure 1-8. Growth in the Number of Project Management Offices

5. History of Project Management

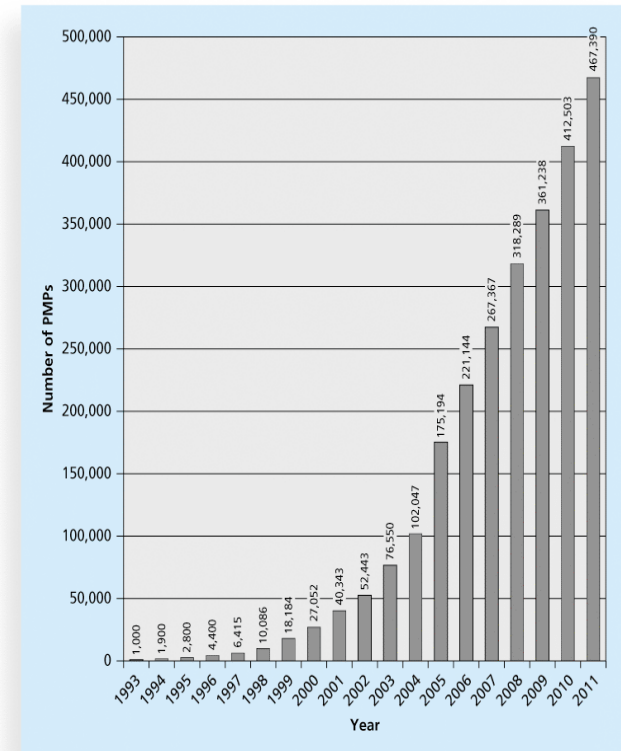
Project Management Institute

- The Project Management Institute (PMI) is an international professional society for project managers founded in 1969
- PMI has continued to attract and retain members, reporting more than 380,000 members worldwide by 2012
- There are communities of practices in many areas, like information systems, financial services, and health care
- Project management research and certification programs continue to grow
- Students can join PMI at a reduced fee and earn the Certified Associate in Project Management (CAPM) certification(see www.pmi.org for details)

5. History of Project Management

Project Management Institute

- 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
- PMI and other organizations offer additional certification programs



5. History of Project Management

- PDU是英文Professional Development Units，PDU是一个考核单位。
- 在取得PMP证书后，为加强PMP的专业持续发展，鼓励和认可个人学习机会，维持PMP的国际证书品质，PMP必须满足PMI制定的专业发展计划的要求，以保持其资格的有效性。
- PMP每三年必须重新进行认证
 - 至少60个PDU；
 - 保证继续遵守PMI的职业道德标准。
- PDU的积累方式
 - 院校的项目管理课程；
 - 专业活动和自我指导的学习；
 - 注册教育提供者提供的培训；
 - 非PMI注册教育提供者提供的教育活动；
 - 专业组织或社团的志愿者

5. History of Project Management

计算机软件资格考试

	计算机软件	计算机网 络	计算机应用技术	信息系统	信息服务
高级资格	信息系统项目管理师 系统分析师 系统架构设计师 网络规划设计师 系统规划与管理师				
中级资格	软件评测师 软件设计师 软件过程能力评估师	网络工程师	多媒体应用设计师 嵌入式系统设计师 计算机辅助设计师 电子商务设计师	系统集成项目管理工程师 信息系统监理师 信息安全工程师 数据库系统工程师 信息系统管理工程师	计算机硬件工程师 信息技术支持工程师
初级资格	程序员	网络管理员	多媒体应用制作技术员 电子商务技术员	信息系统运行管理员	网页制作员 信息处理技术员

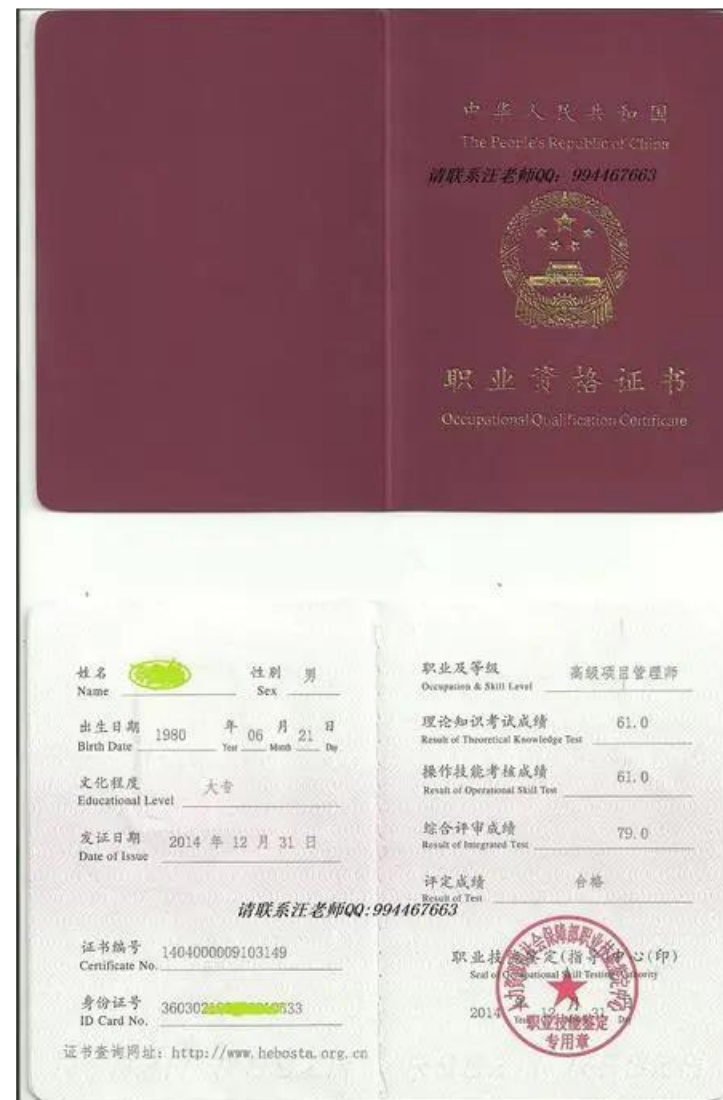
5. History of Project Management

• 中国项目管理师（CPMP）

中国项目管理师是由中华人民共和国劳动和社会保障部在全国范围内推行的国家职业资格认证体系，具有广泛的代表性和权威性，代表了当今国内项目管理专业资质认证的最高水平。

该职业共设四个等级

- 项目管理员（国家职业资格四级）；
- 助理项目管理师（国家职业资格三级）；
- 项目管理师（国家职业资格二级）
- 高级项目管理师（国家职业资格一级。



5. History of Project Management

对比项目	CPMP	PMP	IPMP
颁证机构	国家人力资源和社会保障部	美国项目管理学会（PMI）	国际项目管理协会（IPMA）
认证级别	高级项目管理师（一级） 项目管理师（二级） 助理项目管理师（三级） 项目管理员（四级）	PMP CAPM	特级项目经理（A级） 高级项目经理（B级） 项目经理（C级） 助理项目经理（D级）
认证体系	PMBOOK+国内外项目管理最新研究成果+ISO10006+国家职业标准制定技术规程	PMBOOK+ PMP认证体系	PMBOOK+ IPMP认证体系
考试形式	理论+技能+综合评审	笔试	笔试+案例+面试
是否需要续期	证书终身有效，无需续期	证书每4年审核一次，在4年里要积攒60个PDU	无需续期
国家政策待遇	职称对接，入户城市，专项退休津贴，培训补贴等	无	无

5. History of Project Management

Project Management Software

- There are hundreds of different products to assist in performing project management
- Three main categories of tools:
 - ✓ Low-end tools: Handle single or smaller projects well, cost under \$200 per user
 - ✓ Midrange tools: Handle multiple projects and users, cost \$200-\$1,000 per user, Project 2010 most popular
 - ✓ High-end tools: Also called enterprise project management software, often licensed on a per-user basis, like Microsoft Enterprise Project Management solution

Chapter Summary

- A *project* is a temporary endeavor undertaken to create a unique product, service, or result
- *Project management* is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements
- A *program* is a group of related projects managed in a coordinated way
- *Project portfolio management* involves organizing and managing projects and programs as a portfolio of investments
- *Project managers* play a key role in helping projects and organizations succeed
- The *project management profession* continues to grow and mature