

# Introduction to Project Management

# Learning Objectives

- ▶ Understand the growing need for better project management, especially for information technology (IT) projects
- ▶ Explain what a project is, provide examples of IT projects, list various attributes of projects, and describe the triple constraint of project management
- ▶ 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

- ▶ Discuss the relationship between project, program, and portfolio management and the contributions each makes to enterprise success
- ▶ Understand the role of project managers by describing what they do, what skills they need, and career opportunities for IT project managers
- ▶ 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

# Introduction

- ▶ Many organizations today have a new or renewed interest in project management
- ▶ Computer hardware, software, networks, and the use of interdisciplinary and global work teams have radically changed the work environment
- ▶ The world as a whole spends nearly \$10 trillion of its \$40.7 trillion gross product on projects of all kinds
- ▶ More than 16 million people regard project management as their profession

# Project Management Statistics

- ▶ The overall information and communications technology market grew by 6 percent to almost \$3 trillion in 2010
- ▶ 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
- ▶ In 2011 the total compensation for the average senior project manager in U.S. dollars was \$105,000 per year in the United States and \$160,409 in Switzerland.
- ▶ The number of people earning their Project Management Professional (PMP) certification continues to increase. 44 percent of employers listed project management as a skill they looked for in new college grads, behind only communication and technical skills

# Motivation for Studying Information Technology (IT) Project Management

- ▶ IT Projects have a terrible track record
- ▶ A 1995 Standish Group study 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
- ▶ A PricewaterhouseCoopers study found that overall half of all projects fail and only 2.5% of corporations consistently meet their targets for scope, time, and cost goals for all types of project.

# Advantages of Using Formal 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

# What Is a Project?

- ▶ A **project** is “a temporary endeavor undertaken to create a unique product, service, or result” (PMBOK® Guide, Fifth Edition, 2012)
- ▶ Operations is work done to sustain the business
- ▶ Projects end when their objectives have been reached or the project has been terminated
- ▶ Projects can be large or small and take a short or long time to complete

# Project Attributes

- ▶ A project
  - has a unique purpose
  - is temporary
  - is developed using progressive elaboration
  - requires resources, often from various areas
  - should have a primary customer or sponsor
    - The **project sponsor** usually provides the direction and funding for the project
  - involves uncertainty

# Examples of IT Projects

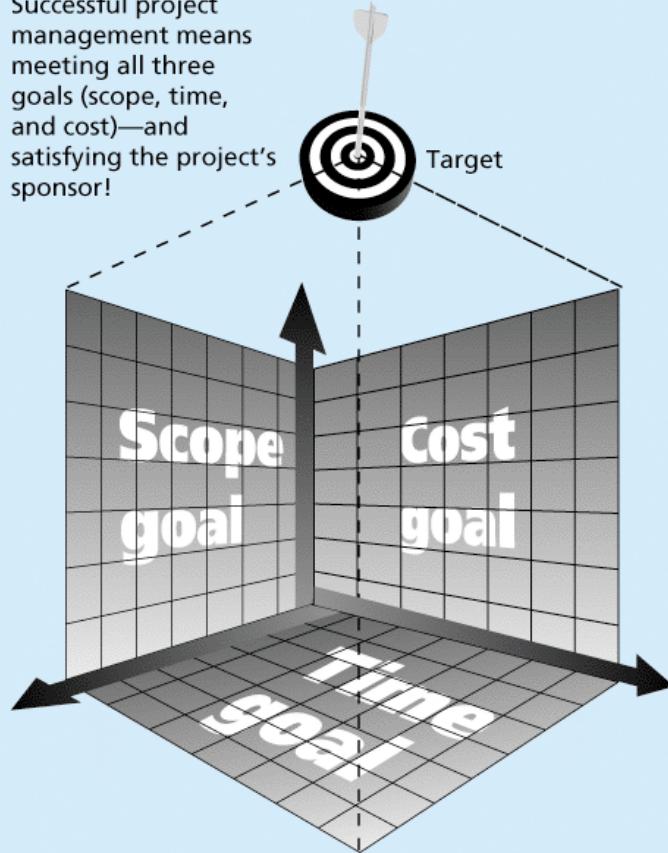
- ▶ A team of students creates a smartphone application and sells it online
- ▶ A company develops a driverless car
- ▶ A small software development team adds a new feature to an internal software application for the finance department
- ▶ A college upgrades its technology infrastructure to provide wireless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

# Project and Program Managers

- ▶ **Project managers** work with project sponsors, project team, and other people involved in a project to meet project goals
- ▶ **Program:** group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually  
(PMBOK® Guide, Fifth Edition, 2012)
- ▶ Program managers oversee programs; often act as bosses for project managers

# The Triple Constraint of Project Management

Successful project management means meeting all three goals (scope, time, and cost)—and satisfying the project's sponsor!



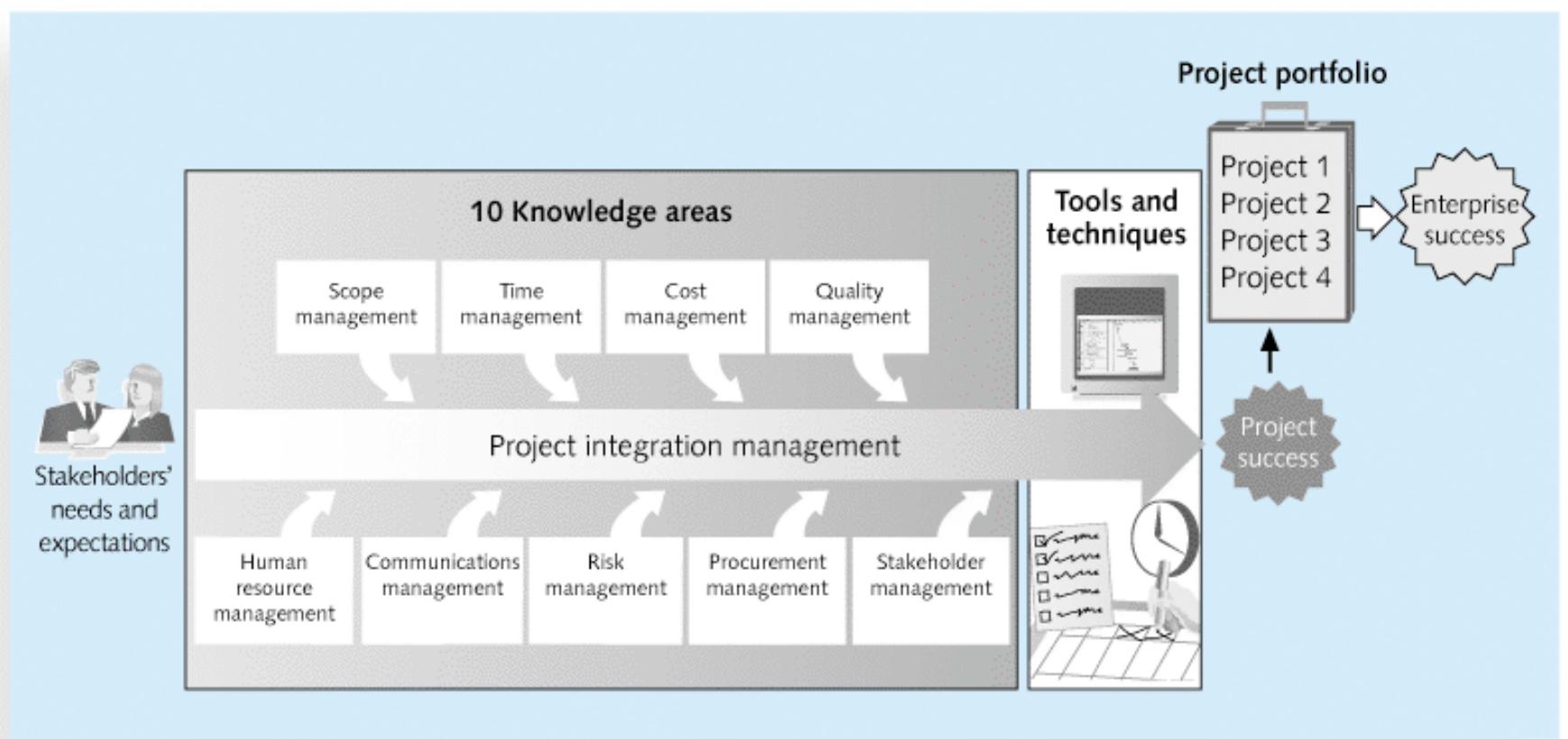
# What is Project Management?

- ▶ **Project management** is “the application of knowledge, skills, tools and techniques to project activities to meet project requirements” (PMBOK® Guide, Fourth Edition, 2012)
- ▶ Project managers strive to meet the **triple constraint** (project scope, time, and cost goals) and also facilitate the entire process to meet the needs and expectations of project stakeholders

# Project Stakeholders

- ▶ **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

# Project Management Framework



# 10 Project Management Knowledge Areas

- ▶ **Knowledge areas** describe the key competencies that project managers must develop
- ▶ Project managers must have knowledge and skills in all 10 knowledge areas (project integration, scope, time, cost, quality, human resource, communications, risk, procurement, and stakeholder management)
- ▶ This course covers all the knowledge areas

# **Project Management Tools and Techniques**

- ▶ **Project management tools and techniques** assist project managers and their teams in various aspects of project management
- ▶ Some specific ones include
  - Project charter, scope statement, and WBS (scope)
  - Gantt charts, network diagrams, critical path analysis, critical chain scheduling (time)
  - Cost estimates and earned value management (cost)

# Super Tools

- ▶ “**Super tools**” are those tools that have high use and high potential for improving project success, such as:
  - Software for task scheduling (such as project management software)
  - Scope statements
  - Requirements analyses
  - Lessons-learned reports
- ▶ Tools already extensively used that have been found to improve project importance include:
  - Progress reports
  - Kick-off meetings
  - Gantt charts
  - Change requests

# Project Success

- ▶ There are several ways to define 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, such as making or saving a certain amount of money, providing a good return on investment, or simply making the sponsors happy

# 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

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

# Top Three Reasons Why Technology Project Succeed

- ▶ Adequate funding
- ▶ Staff expertise
- ▶ Engagement from all stakeholders

# What the Winners Do...

- ▶ Recent research findings show that companies that excel in project delivery capability:
  - Use an integrated project management toolbox (use standard/advanced PM tools, lots of templates)
  - Grow project leaders, emphasizing business and soft skills
  - Develop a streamlined project delivery process
  - Measure project health using metrics, like customer satisfaction or return on investment

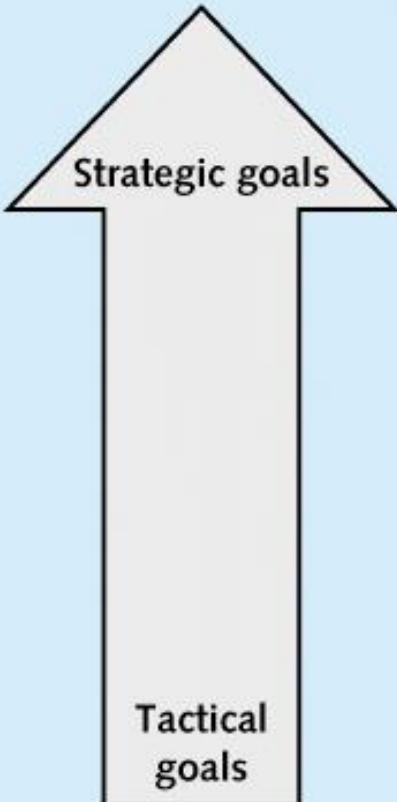
# Program and Project Portfolio Management

- ▶ A **program** is “a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually” (PMBOK® Guide, Fifth Edition, 2012)
- ▶ A **program manager** provides leadership and direction for the project managers heading the projects within the program
- ▶ Examples of common programs in the IT field include infrastructure, applications development, and user support

# Project Portfolio Management

- ▶ As part of **project portfolio management**, organizations group and manage projects and programs as a portfolio of investments that contribute to the entire enterprise's success
- ▶ Portfolio managers help their organizations make wise investment decisions by helping to select and analyze projects from a strategic perspective

# *Project Management Compared to Project Portfolio Management*



## **Project portfolio management**

- Are we working on the right projects?
- Are we investing in the right areas?
- Do we have the right resources to be competitive?

## **Project management**

- Are we carrying out projects well?
- Are projects on time and on budget?
- Do project stakeholders know what they should be doing?

# 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:
  - 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

\*Project Management Institute, *Organizational Project Management Maturity Model (OPM3) Knowledge Foundation* (2003), p. 13.

# 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 are led by experienced project managers, who can often help influence success factors

# Suggested Skills for Project Managers

- ▶ 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

# Ten Most Important Skills and Competencies for Project Managers

1. People skills
2. Leadership
3. Listening
4. Integrity, ethical behavior, consistent
5. Strong at building trust
6. Verbal communication
7. Strong at building teams
8. Conflict resolution, conflict management
9. Critical thinking, problem solving
10. Understands, balances priorities

# 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

# Importance of Leadership Skills

- ▶ 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 the role of both leader and manager

# Careers for IT Project Managers

- ▶ In a 2011 survey, IT executives listed the “nine hottest skills” they planned to hire for in 2012
- ▶ Project management was second only to programming and application development

# 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.

# The Project Management Profession

- ▶ The profession of project management is growing at a very rapid pace
- ▶ It is helpful to understand the history of the field, the role of professional societies like the Project Management Institute, and the growth in project management software

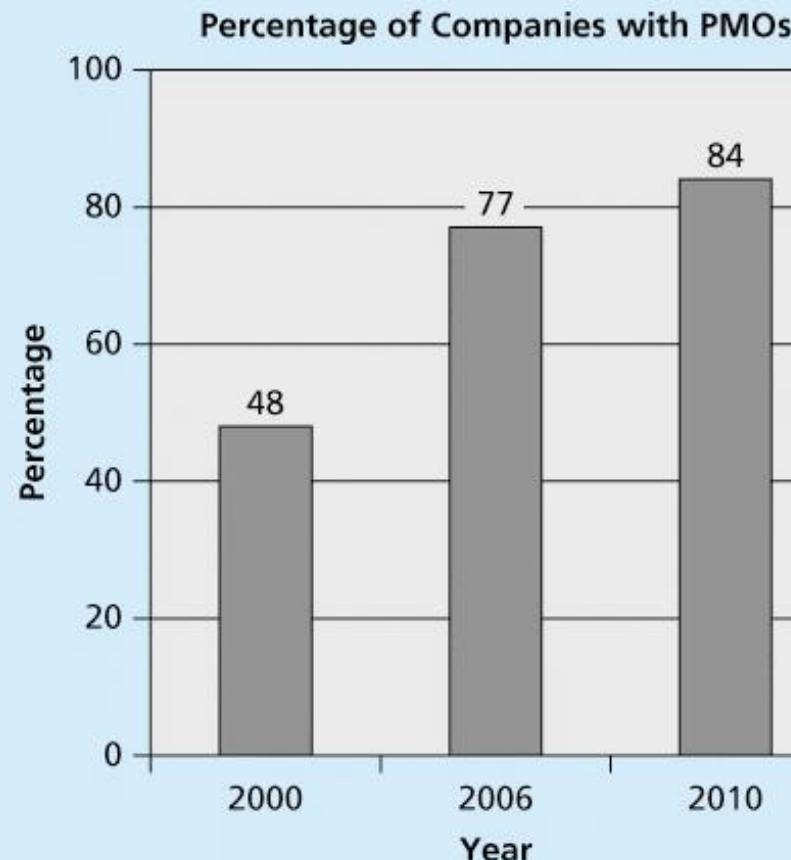
# History of Project Management

- ▶ Some people argue that building the Egyptian pyramids was a project, as was 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

# Project Management Offices

- ▶ In the 100s, many 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

# Growth in the Number of Project Management Offices



# Global Issues

- ▶ Several global dynamics are forcing organizations to rethink their practices:
  - Talent development for project and program managers is a top concern
  - Good project portfolio management is crucial in tight economic conditions
  - Basic project management techniques are core competencies
  - Organizations want to use more agile approaches to project management
  - Benefits realization of projects is a key metric

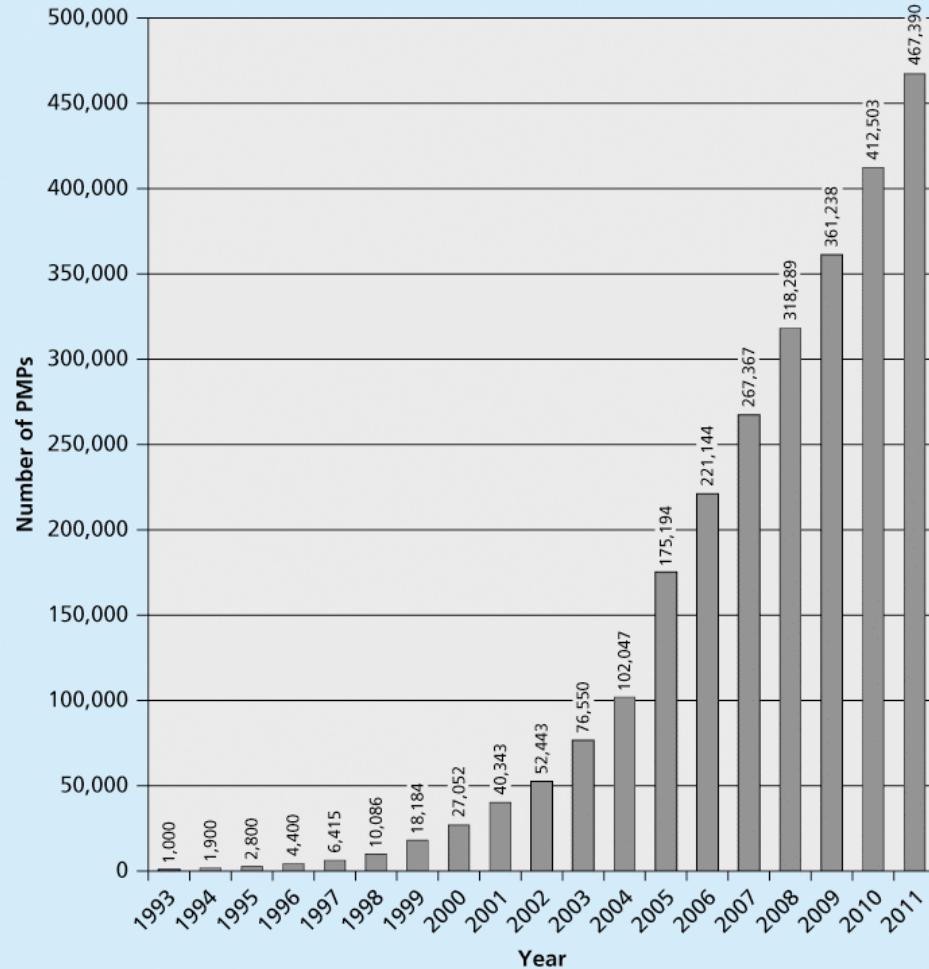
# The Project Management Institute

- ▶ 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](http://www.pmi.org) for details)

# 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
- ▶ PMI and other organizations offer additional certification programs

# Growth in PMP Certification, 1993-2011



# Ethics in Project Management

- ▶ **Ethics**, loosely defined, is a set of principles that guide our decision making based on personal values of what is “right” and “wrong”
- ▶ Project managers often face ethical dilemmas
- ▶ In order to earn PMP certification, applicants must agree to PMI’s Code of Ethics and Professional Conduct
- ▶ Several questions on the PMP exam are related to professional responsibility, including ethics

# 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

# The Project Management and Information Technology Context

# Learning Objectives

- ▶ Describe the systems view of project management and how it applies to information technology (IT) projects
- ▶ Understand organizations, including the four frames, organizational structures, and organizational culture
- ▶ Explain why stakeholder management and top management commitment are critical for a project's success

# Learning Objectives

- ▶ Understand the concept of a project phase and the project life cycle, and distinguish between project development and product development
- ▶ Discuss the unique attributes and diverse nature of IT projects
- ▶ Describe recent trends affecting IT project management, including globalization, outsourcing, virtual teams, and agile project management

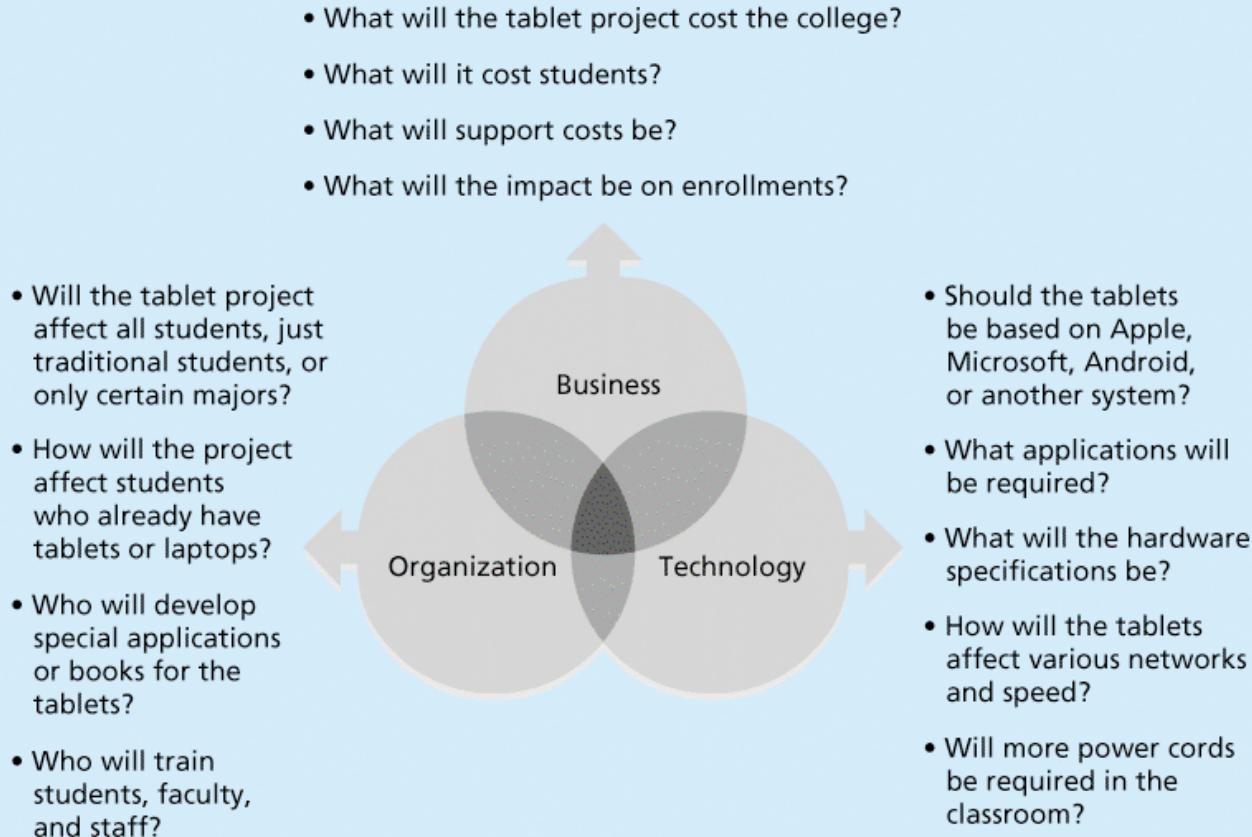
# Projects Cannot Be Run In Isolation

- ▶ Projects must operate in a broad organizational environment
- ▶ Project managers need to use **systems thinking**:
  - taking a holistic view of carrying out projects within the context of the organization
- ▶ Senior managers must make sure projects continue to support current business needs

# A Systems View of Project Management

- ▶ A **systems approach** emerged in the 1950s to describe a more analytical approach to management and problem solving
- ▶ Three parts include:
  - **Systems philosophy**: an overall model for thinking about things as systems
  - **Systems analysis**: problem-solving approach
  - **Systems management**: address business, technological, and organizational issues before making changes to systems

# Three Sphere Model for Systems Management



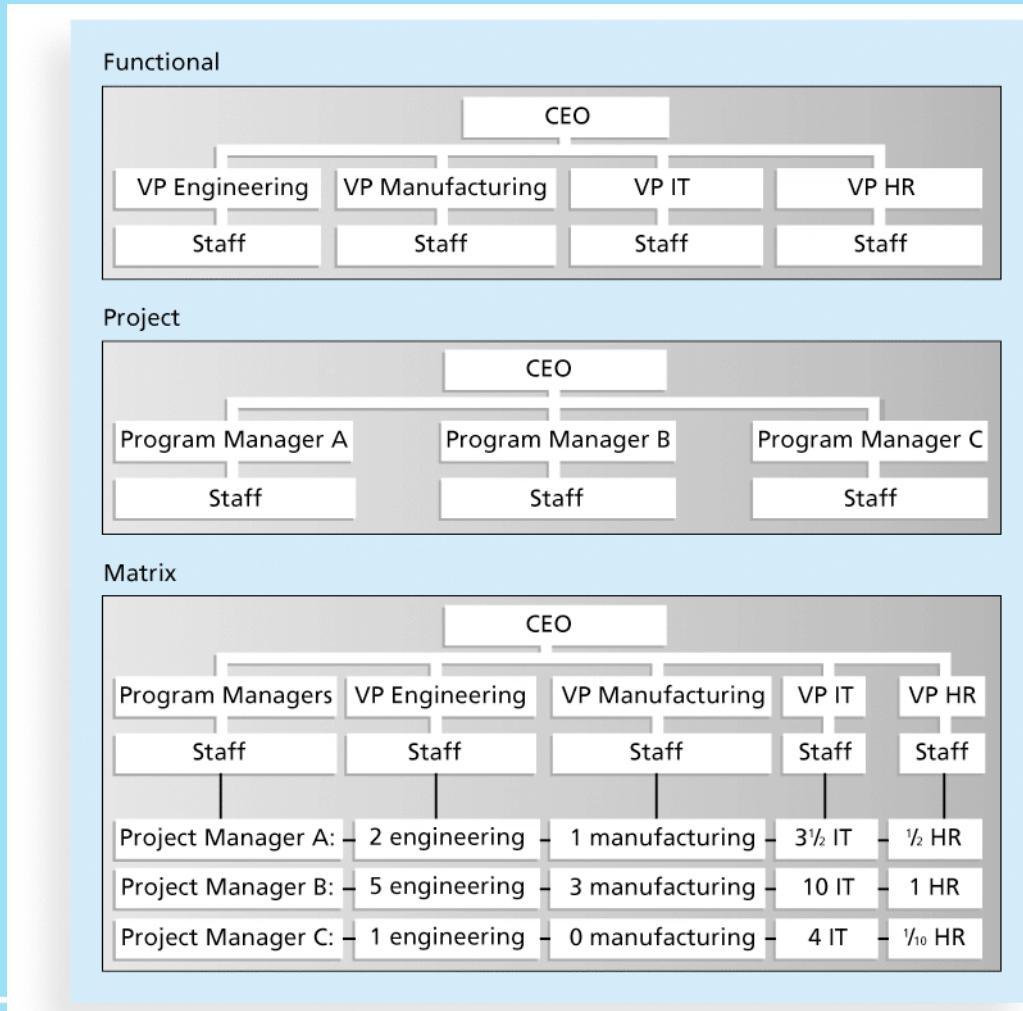
# Perspectives on Organizations

<b>Structural frame:</b> Roles and responsibilities, coordination, and control. Organizational charts help describe this frame.	<b>Human resources frame:</b> Providing harmony between needs of the organization and needs of people.
<b>Political frame:</b> Coalitions composed of varied individuals and interest groups. Conflict and power are key issues.	<b>Symbolic frame:</b> Symbols and meanings related to events. Culture, language, traditions, and image are all parts of this frame.

# Organizational Structures

- ▶ 3 basic organization structures
  - **Functional:** functional managers report to the CEO
  - **Project:** program managers report to the CEO
  - **Matrix:** middle ground between functional and project structures; personnel often report to two or more bosses; structure can be weak, balanced, or strong matrix

# Functional, Project, and Matrix Organizational Structures



# Organizational Structure Influences on Projects

Project Characteristics	Organizational Structure Type				
	Functional	Matrix	Project	Weak Matrix	Balanced Matrix
Project manager's authority	Little or none	Limited	Low to moderate	Moderate to high	High to almost total
Percent of organization's personnel assigned full-time to project work	Virtually none	0–25%	15–60%	50–95%	85–100%
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
Common title for project manager's role	Project coordinator/ project leader	Project coordinator/ project leader	Project manager/ project officer	Project manager/ program manager	Project manager/ program manager
Project management administrative staff	Part-time	Part-time	Part-time	Full-time	Full-time

# Organizational Culture

- ▶ **Organizational culture** is a set of shared assumptions, values, and behaviors that characterize the functioning of an organization
- ▶ Many experts believe the underlying causes of many companies' problems are not the structure or staff, but the culture

# Ten Characteristics of Organizational Culture

- ▶ Member identity\*
- ▶ Group emphasis\*
- ▶ People focus
- ▶ Unit integration\*
- ▶ Control
- ▶ Risk tolerance\*
- ▶ Reward criteria\*
- ▶ Conflict tolerance\*
- ▶ Means-ends orientation
- ▶ Open-systems focus\*

\*Project work is most successful in an organizational culture where these items are strong/high and other items are balanced.

# Stakeholder Management

- ▶ Project managers must take time to identify, understand, and manage relationships with all project stakeholders
- ▶ Using the four frames of organizations can help meet stakeholder needs and expectations
- ▶ Senior executives/top management are very important stakeholders

# The Importance of Top Management Commitment

- ▶ People in top management positions are key stakeholders in projects
- ▶ A very important factor in helping project managers successfully lead projects is the level of commitment and support they receive from top management
- ▶ Without top management commitment, many projects will fail.
- ▶ Some projects have a senior manager called a **champion** who acts as a key proponent for a project.

# How Top Management Can Help Project Managers

- ▶ Providing adequate resources
- ▶ Approving unique project needs in a timely manner
- ▶ Getting cooperation from other parts of the organization
- ▶ Mentoring and coaching on leadership issues

# Need for Organizational Commitment to Information Technology (IT)

- ▶ If the organization has a negative attitude toward IT, it will be difficult for an IT project to succeed
- ▶ Having a Chief Information Officer (CIO) at a high level in the organization helps IT projects
- ▶ Assigning non-IT people to IT projects also encourage more commitment

# Need for Organizational Standards

- ▶ Standards and guidelines help project managers be more effective
- ▶ Senior management can encourage
  - the use of standard forms and software for project management
  - the development and use of guidelines for writing project plans or providing status information
  - the creation of a project management office or center of excellence

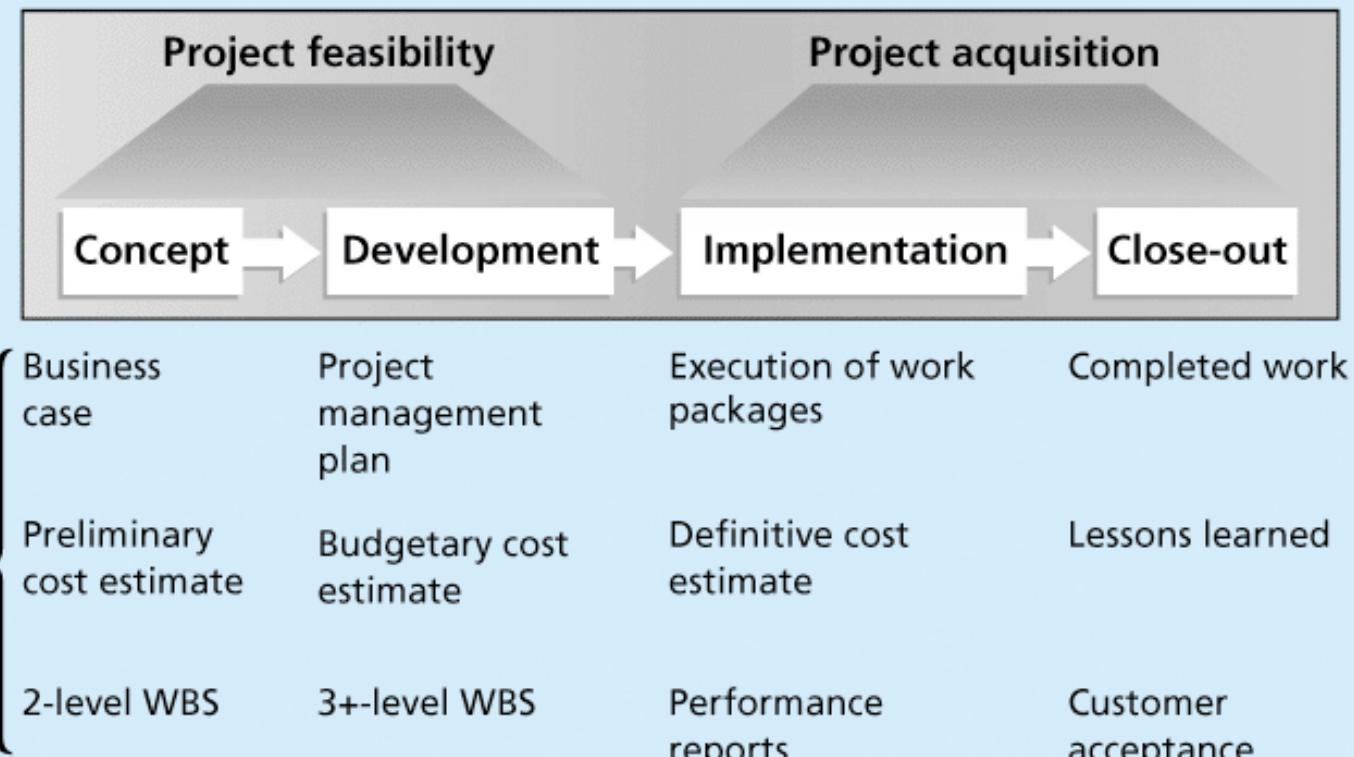
# Project Phases and the Project Life Cycle

- ▶ A **project life cycle** is a collection of project phases that defines
  - what work will be performed in each phase
  - what deliverables will be produced and when
  - who is involved in each phase, and
  - how management will control and approve work produced in each phase
- ▶ A **deliverable** is a product or service produced or provided as part of a project

# More on Project Phases

- ▶ In early phases of a project life cycle
  - resource needs are usually lowest
  - the level of uncertainty (risk) is highest
  - project stakeholders have the greatest opportunity to influence the project
- ▶ In middle phases of a project life cycle
  - the certainty of completing a project improves
  - more resources are needed
- ▶ The final phase of a project life cycle focuses on
  - ensuring that project requirements were met
  - the sponsor approves completion of the project

# Phases of the Traditional Project Life Cycle



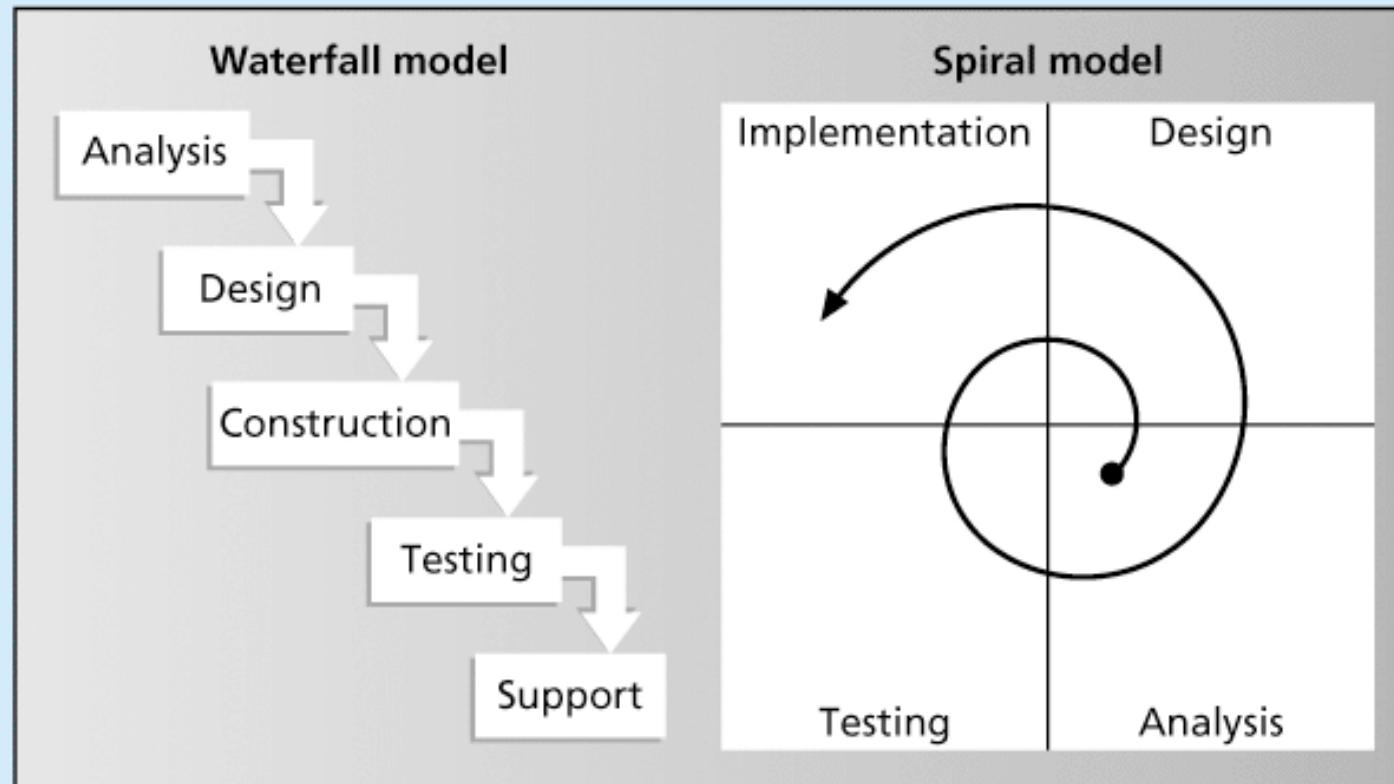
# Product Life Cycles

- ▶ Products also have life cycles
- ▶ The **Systems Development Life Cycle (SDLC)** is a framework for describing the phases involved in developing and maintaining information systems
- ▶ Systems development projects can follow
  - **Predictive life cycle:** the scope of the project can be clearly articulated and the schedule and cost can be predicted
  - **Adaptive Software Development (ASD) life cycle:** requirements cannot be clearly expressed, projects are mission driven and component based, using time-based cycles to meet target dates

# Predictive Life Cycle Models

- ▶ Waterfall model: has well-defined, linear stages of systems development and support
- ▶ Spiral model: shows that software is developed using an iterative or spiral approach rather than a linear approach
- ▶ Incremental build model: provides for progressive development of operational software
- ▶ Prototyping model: used for developing prototypes to clarify user requirements
- ▶ Rapid Application Development (RAD) model: used to produce systems quickly without sacrificing quality

# Waterfall and Spiral Life Cycle Models



# Agile Software Development

- ▶ Agile software development has become popular to describe new approaches that focus on close collaboration between programming teams and business experts

# The Importance of Project Phases and Management Reviews

- ▶ A project should successfully pass through each of the project phases in order to continue on to the next
- ▶ Management reviews, also called **phase exits** or **kill points**, should occur after each phase to evaluate the project's progress, likely success, and continued compatibility with organizational goals

# 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

# Recent Trends Affecting IT Project Management

- ▶ Globalization
- ▶ Outsourcing: **Outsourcing** is when an organization acquires goods and/or sources from an outside source. **Offshoring** is sometimes used to describe outsourcing from another country
- ▶ Virtual teams: A **virtual team** is a group of individuals who work across time and space using communication technologies
- ▶ Agile project management

# Important Issues and Suggestions Related to Globalization

## ▶ Issues

- Communications
- Trust
- Common work practices
- Tools

## ▶ Suggestions

- Employ greater project discipline
- Think global but act local
- Keep project momentum going
- Use newer tools and technology

# Outsourcing

- ▶ Organizations remain competitive by using outsourcing to their advantage, such as finding ways to reduce costs
- ▶ Their next challenge is to make strategic IT investments with outsourcing by improving their enterprise architecture to ensure that IT infrastructure and business processes are integrated and standardized
- ▶ Project managers should become more familiar with negotiating contracts and other outsourcing issues

# **Virtual Teams Advantages**

- ▶ Increasing competitiveness and responsiveness by having a team of workers available 24/7
- ▶ Lowering costs because many virtual workers do not require office space or support beyond their home offices.
- ▶ Providing more expertise and flexibility by having team members from across the globe working any time of day or night
- ▶ Increasing the work/life balance for team members by eliminating fixed office hours and the need to travel to work.

# Virtual Team Disadvantages

- ▶ Isolating team members
- ▶ Increasing the potential for communications problems
- ▶ Reducing the ability for team members to network and transfer information informally
- ▶ Increasing the dependence on technology to accomplish work

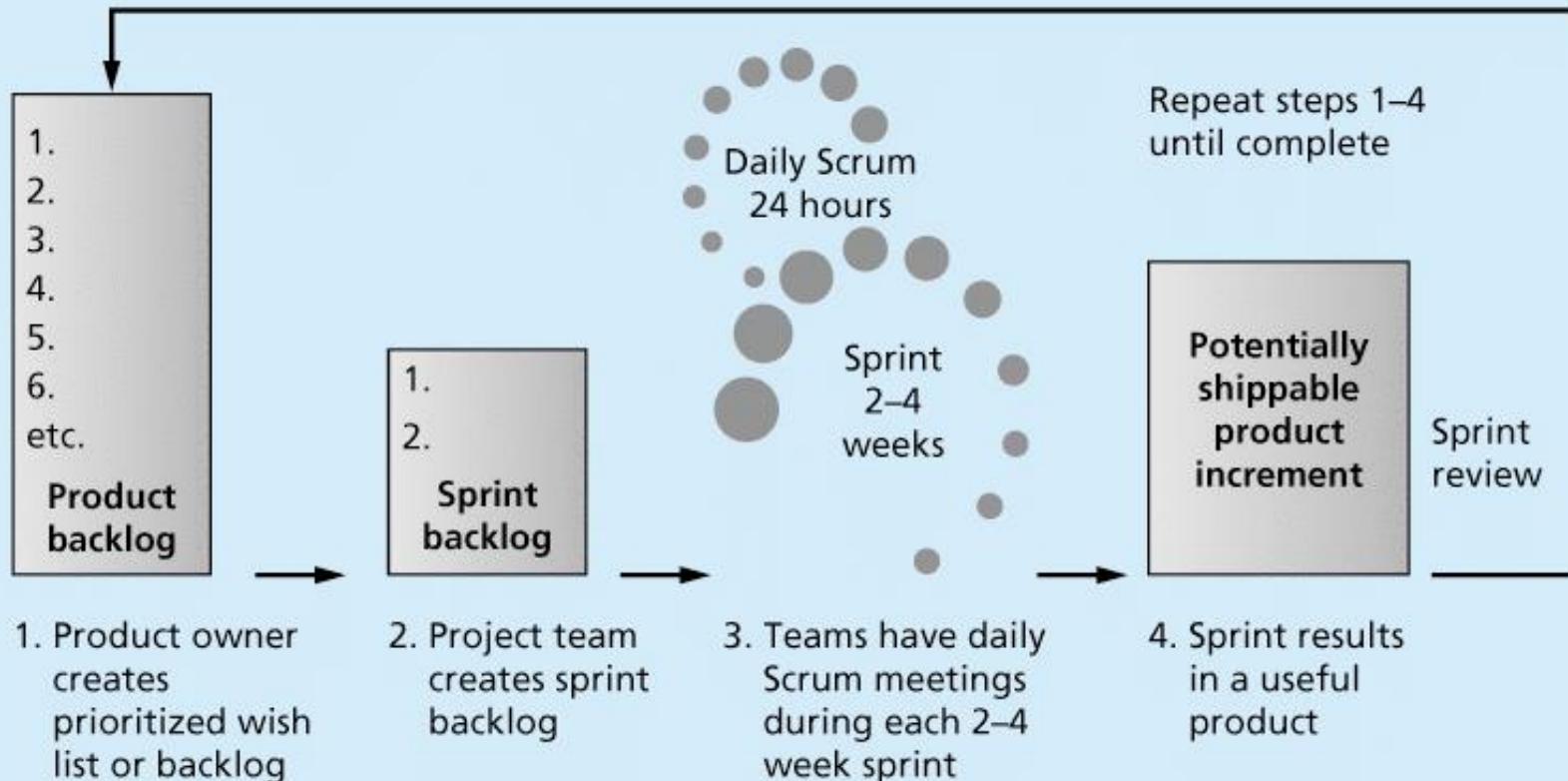
# Agile Project Management

- ▶ Agile means being able to move quickly and easily, but some people feel that project management, as they have seen it used, does not allow people to work quickly or easily.
- ▶ Early software development projects often used a waterfall approach. As technology and businesses became more complex, the approach was often difficult to use because requirements were unknown or continuously changing.
- ▶ Agile today means using a method based on iterative and incremental development, in which requirements and solutions evolve through collaboration.

# Scrum

- ▶ According to the Scrum Alliance, Scrum is the leading agile development method for completing projects with a complex, innovative scope of work.
- ▶ The term was coined in 1986 in a Harvard Business Review study that compared high-performing, cross-functional teams to the scrum formation used by rugby teams.

# Scrum Framework



# Summary

- ▶ Project managers need to take a systems approach when working on projects
- ▶ Organizations have four different frames: structural, human resources, political, and symbolic
- ▶ The structure and culture of an organization have strong implications for project managers
- ▶ Projects should successfully pass through each phase of the project life cycle
- ▶ Project managers need to consider several factors due to the unique context of information technology projects
- ▶ Recent trends affecting IT project management include globalization, outsourcing, virtual teams, and Agile