Chapter 4:
Project Integration Management

Information Technology Project Management,

Learning Objectives

- Describe an overall framework for project integration management as it relates to the other PM knowledge areas and the project life cycle
- Explain the strategic planning process and apply different project selection methods
- Explain the importance of creating a project charter to formally initiate projects
- Discuss the process of creating a preliminary project scope statement

Learning Objectives (continued)

- Describe project management plan development, including content, using guidelines and templates for developing plans, and performing a stakeholder analysis to help manage relationships
- Explain project execution, its relationship to project planning, the factors related to successful results, and tools and techniques to assist in project execution
- Describe the process of monitoring and controlling project work

Learning Objectives (continued)

- Understand the integrated change control process, planning for and managing changes on information technology projects, and developing and using a change control system
- Explain the importance of developing and following good procedures for closing projects
- Describe how software can assist in project integration management

The Key to Overall Project Success: Good Project Integration Management

- Project managers must coordinate all of the other knowledge areas throughout a project's life cycle
- Many new project managers have trouble looking at the "big picture" and want to focus on too many details (See opening case for a real example)
- Project integration management is *not* the same thing as software integration

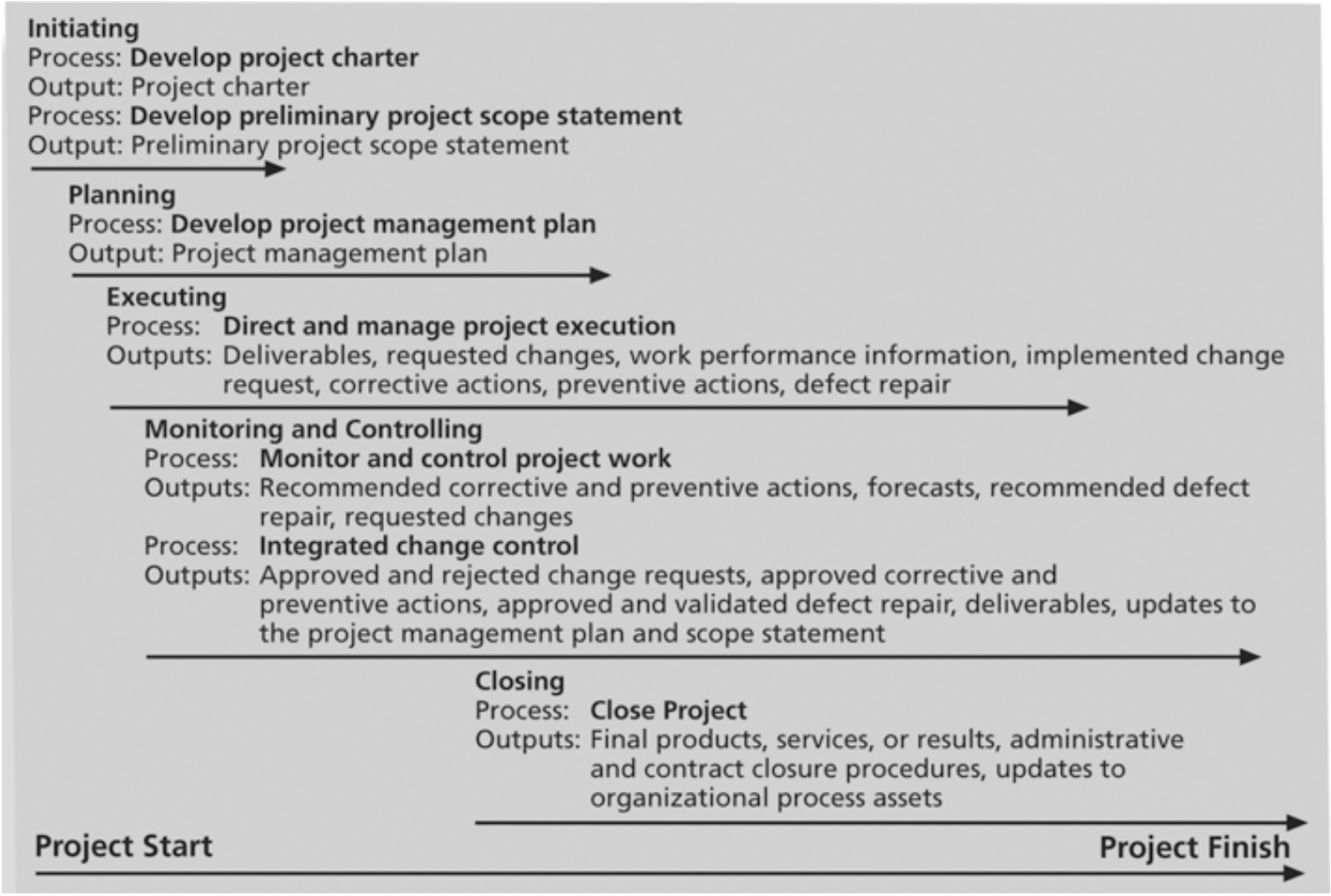
Project Integration Management Processes

- **Develop the project charter**: working with stakeholders to create the document that formally authorizes a project—the charter
- **Develop the preliminary project scope statement**: working with stakeholders, especially users of the project's products, services, or results, to develop the high-level scope requirements and create a preliminary project scope statement
- **Develop the project management plan**: coordinating all planning efforts to create a consistent, coherent document—the project management plan

Project Integration Management Processes (continued)

- **Direct and manage project execution**: carrying out the project management plan by performing the activities included in it
- **Monitor and control the project work**: overseeing project work to meet the performance objectives of the project
- **Perform integrated change control**: coordinating changes that affect the project's deliverables and organizational process assets
- **Close the project**: finalizing all project activities to formally close the project

Figure 4-1: Project Integration Management Summary



What Went Wrong?

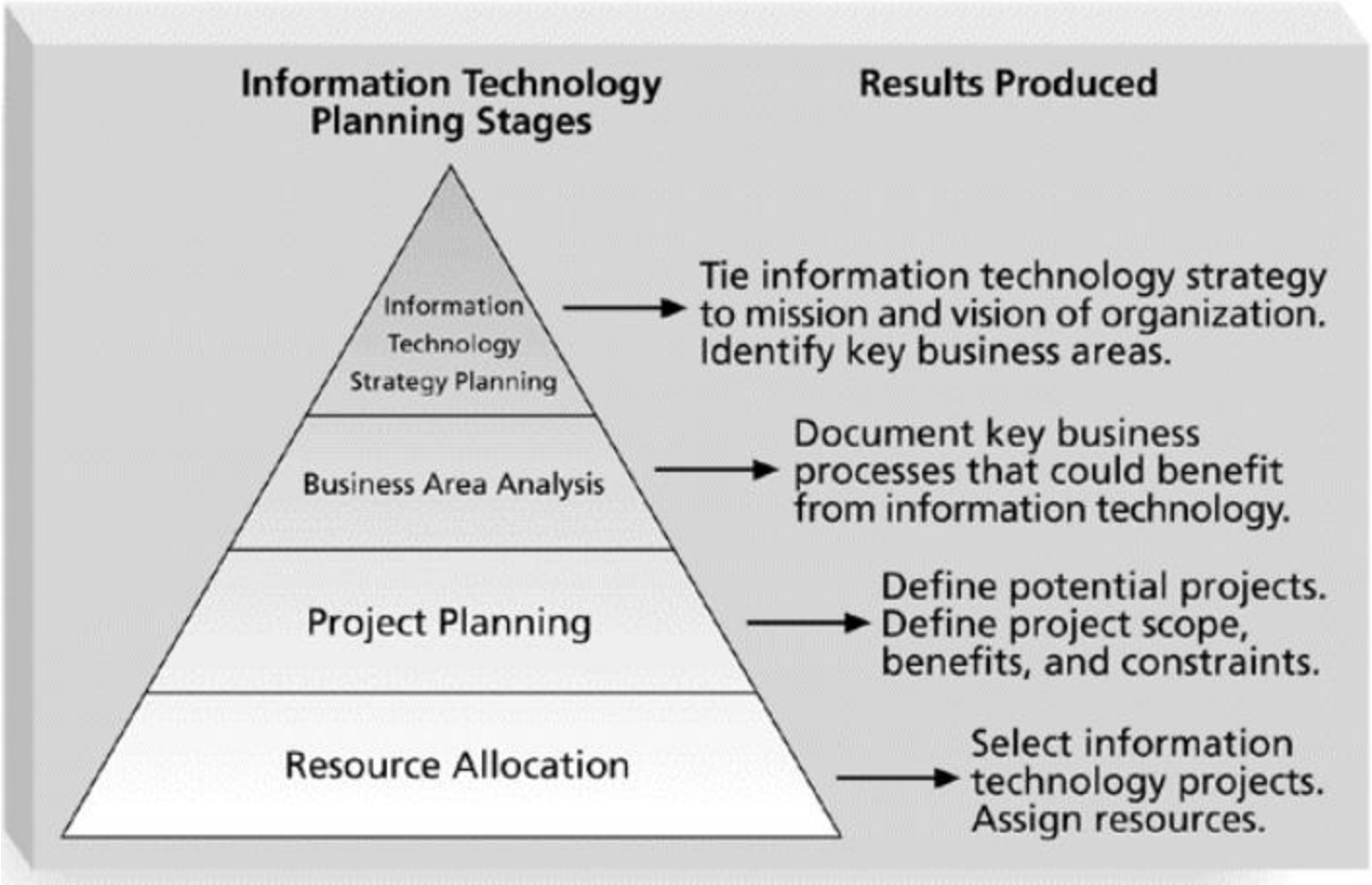
- The Airbus A380 megajet project was two years behind schedule in Oct. 2006, causing Airbus' parent company to face an expected loss of $6.1 billion over the next four years
- The project suffered from severe integration management problems, or "integration disintegration... Early this year, when pre-assembled bundles containing hundreds of miles of cabin wiring were delivered from a German factory to the assembly line in France, workers discovered that the bundles, called harnesses, didn't fit properly into the plane. Assembly slowed to a near-standstill, as workers tried to pull the bundles apart and re-thread them through the fuselage. Now Airbus will have to go back to the drawing board and redesign the wiring system."*

*Matlack, Carol. "First, Blame the Software," *BusinessWeek Online (October 5, 2006).*

Strategic Planning and Project Selection

- **Strategic planning** involves determining long-term objectives, predicting future trends, and projecting the need for new products and services
- Organizations often perform a **SWOT analysis**
  - Analyzing **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats
- As part of strategic planning, organizations:
  - Identify potential projects
  - Use realistic methods to select which projects to work on
  - Formalize project initiation by issuing a project charter

Figure 4-2: Information Technology Planning Process



Best Practice

- Only one in seven product concepts comes to fruition
  - Companies like Proctor & Gamble, Johnson and Johnson, Hewlett Packard, and Sony are consistently successful in NPD because they use a disciplined, systematic approach to NPD projects based on best practices
- Four important forces behind NPD success include the following:
  1. A product innovation and technology strategy for the business
  2. Resource commitment and focusing on the right projects, or solid portfolio management
  3. An effective, flexible and streamlined idea-to-launch process
  4. The right climate and culture for innovation, true cross-functional teams, and senior management commitment to NPD

Methods for Selecting Projects

- There are usually more projects than available time and resources to implement them
- Methods for selecting projects include:
  - Focusing on broad organizational needs
  - Categorizing information technology projects
  - Performing net present value or other financial analyses
  - Using a weighted scoring model
  - Implementing a balanced scorecard

Focusing on Broad Organizational Needs

- It is often difficult to provide strong justification for many IT projects, but everyone agrees they have a high value
- "It is better to measure gold roughly than to count pennies precisely"
- Three important criteria for projects:
  - There is a ***need*** for the project
  - There are ***funds*** available
  - There's a strong ***will*** to make the project succeed

Categorizing IT Projects

- One categorization is whether the project addresses:
  - A problem
  - An opportunity
  - A directive
- Another categorization is how long it will take to do and when it is needed
- Another is the overall priority of the project

Financial Analysis of Projects

- Financial considerations are often an important consideration in selecting projects
- Three primary methods for determining the projected financial value of projects
  - Net present value (NPV) analysis
  - Return on investment (ROI)
  - Payback analysis

Net Present Value Analysis

- **Net present value** (NPV) analysis is a method of calculating the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time
- Projects with a positive NPV should be considered if financial value is a key criterion
- The higher the NPV, the better

Figure 4-3: Net Present Value Example

	A	B	C	D	E	F	G
1	Discount rate	10%					
2							
3	PROJECT 1	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
4	Benefits	$0	$2,000	$3,000	$4,000	$5,000	$14,000
5	Costs	$5,000	$1,000	$1,000	$1,000	$1,000	$9,000
6	Cash flow	($5,000)	$1,000	$2,000	$3,000	$4,000	$5,000
7	NPV →	$2,316					
8		Formula =npv(b1,b6:f6)					
9							
10	PROJECT 2	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
11	Benefits	$1,000	$2,000	$4,000	$4,000	$4,000	$15,000
12	Costs	$2,000	$2,000	$2,000	$2,000	$2,000	$10,000
13	Cash flow	($1,000)	$0	$2,000	$2,000	$2,000	$5,000
14	NPV →	$3,201					
15		Formula =npv(b1,b13:f13)					
16							

Note that totals are equal, but NPVs are not because of the time value of money

Figure 4-4: JWD Consulting NPV Example

Multiply by the discount factor each year, then take cum. benefits – costs to get NPV

Discount rate	**8%**					
Assume the project is completed in Year 0			**Year**			
	0	**1**	**2**	**3**	**Total**	
Costs	140,000	40,000	40,000	40,000		
Discount factor	1	0.93	0.86	0.79		
Discounted costs	**140,000**	**37,200**	**34,400**	**31,600**	**243,200**	
Benefits	0	200,000	200,000	200,000		
Discount factor	1	0.93	0.86	0.79		
Discounted benefits	**0**	**186,000**	**172,000**	**158,000**	**516,000**	
Discounted benefits - costs	(140,000)	148,800	137,600	126,400	**272,800**	← **NPV**
Cumulative benefits - costs	(140,000)	8,800	146,400	272,800		
ROI →	**112%**					
	Payback In Year 1					

Note: See the template called business_case_financials.xls

NPV Calculations

- Determine estimated costs and benefits for the life of the project and the products it produces
- Determine the discount rate (check with your organization on what to use)
- Calculate the NPV (see text for details)
- Note: Some organizations consider the investment year as year 0, while others start in year 1; some people enter costs as negative numbers, while others do not
  - Check with your organization for their preferences

Return on Investment

- **Return on investment** (ROI) is calculated by subtracting the project costs from the benefits and then dividing by the costs

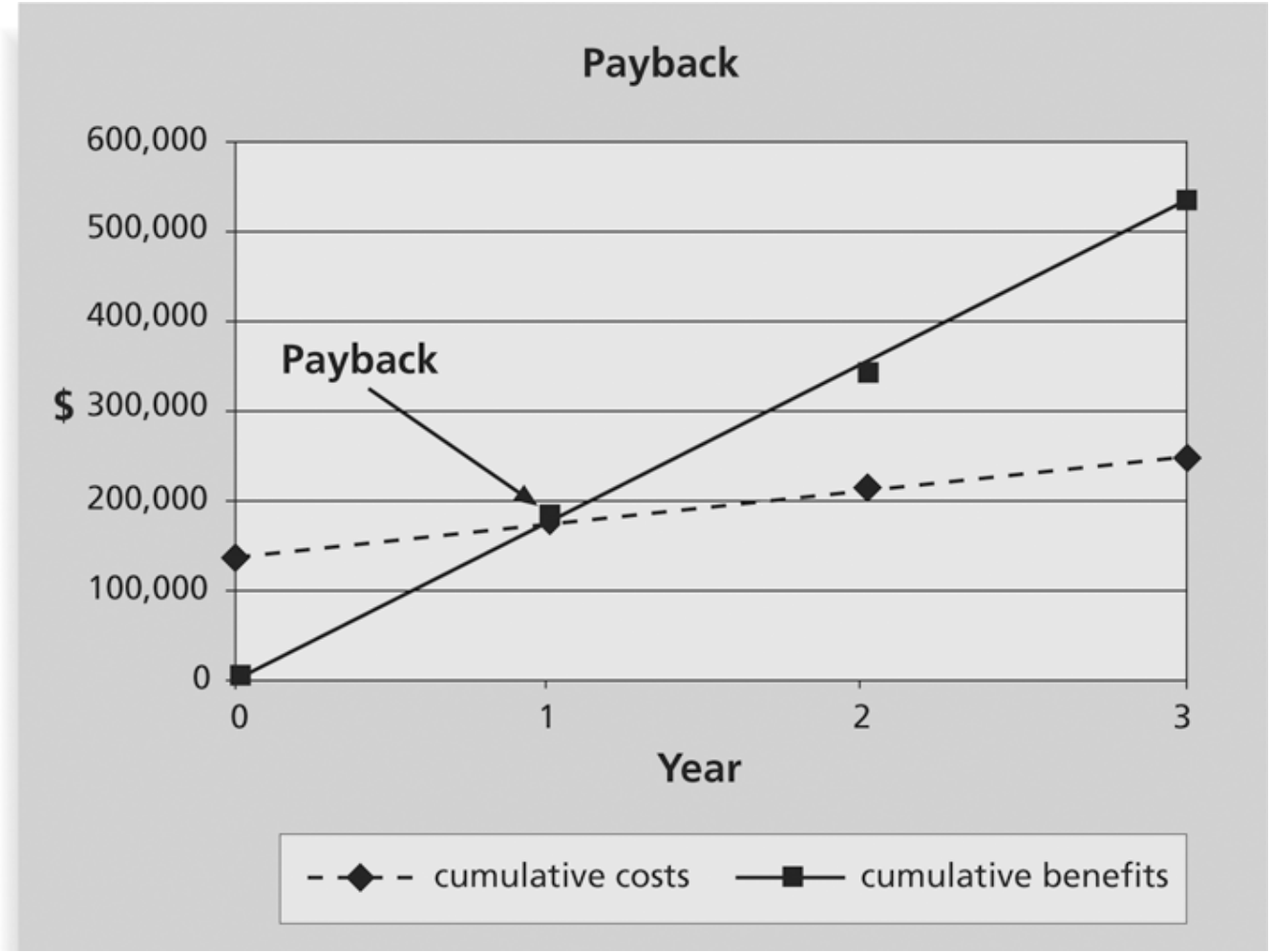
  ROI = (total discounted benefits - total discounted costs) / discounted costs

- The higher the ROI, the better
- Many organizations have a **required rate of return** or minimum acceptable rate of return on investment for projects
- **Internal rate of return** (IRR) can by calculated by finding the discount rate that makes the NPV equal to zero

Payback Analysis

- Another important financial consideration is payback analysis
- The **payback period** is the amount of time it will take to recoup, in the form of net cash inflows, the total dollars invested in a project
- Payback occurs when the net cumulative discounted benefits equals the costs
- Many organizations want IT projects to have a fairly short payback period

Figure 4-5: Charting the Payback Period

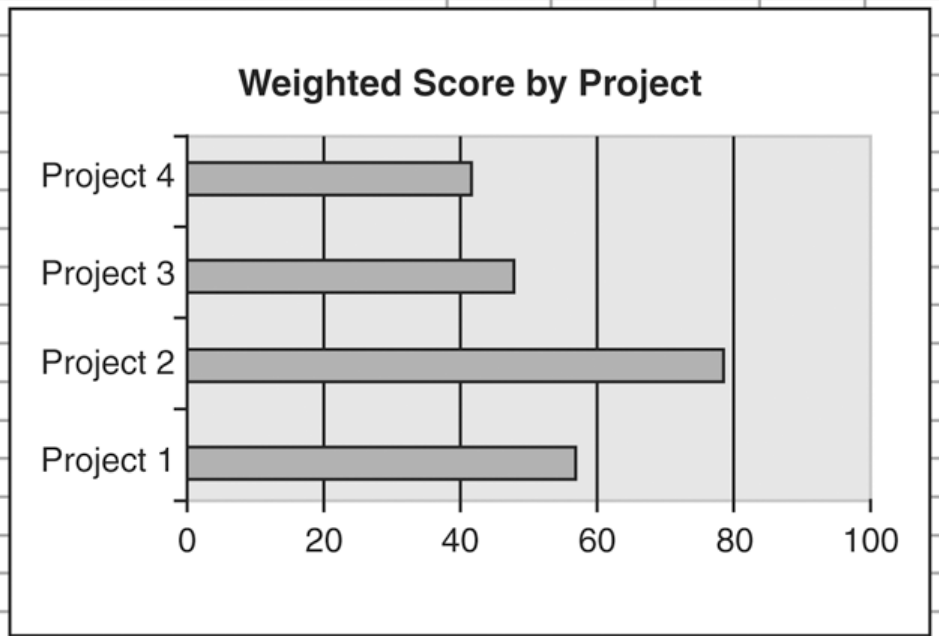


Weighted Scoring Model

- A weighted scoring model is a tool that provides a systematic process for selecting projects based on many criteria
  1. Identify criteria important to the project selection process
  2. Assign weights (percentages) to each criterion so they add up to 100%
  3. Assign scores to each criterion for each project
  4. Multiply the scores by the weights and get the total weighted scores
- The higher the weighted score, the better

Figure 4-6: Sample Weighted Scoring Model for Project Selection

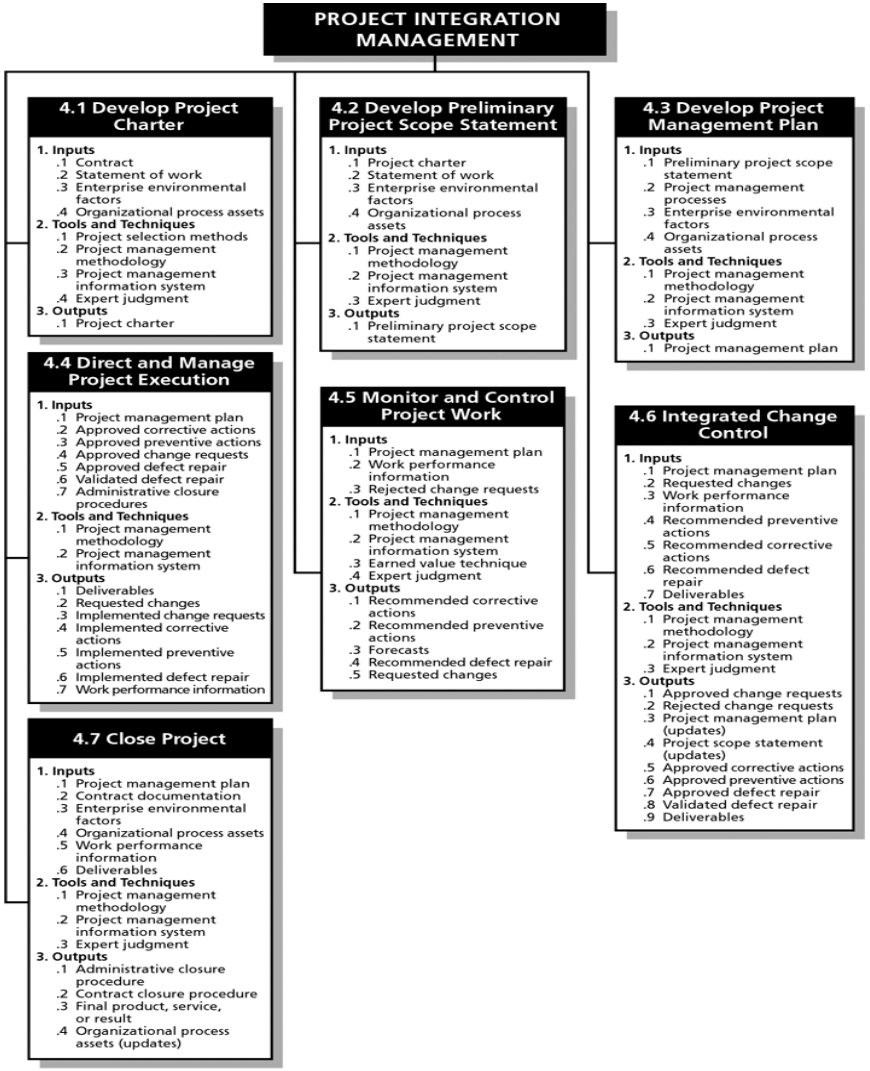
	A	B	C	D	E	F
1	**Criteria**	**Weight**	**Project 1**	**Project 2**	**Project 3**	**Project 4**
2	Supports key business objectives	25%	90	90	50	20
3	Has strong internal sponsor	15%	70	90	50	20
4	Has strong customer support	15%	50	90	50	20
5	Uses realistic level of technology	10%	25	90	50	70
6	Can be implemented in one year or less	5%	20	20	50	90
7	Provides positive NPV	20%	50	70	50	50
8	Has low risk in meeting scope, time, and cost goals	10%	20	50	50	90
9	**Weighted Project Scores**	**100%**	**56**	**78.5**	**50**	**41.5**



Project Charters

- After deciding what project to work on, it is important to let the rest of the organization know
- A **project charter** is a document that formally recognizes the existence of a project and provides direction on the project's objectives and management
- Key project stakeholders should sign a project charter to acknowledge agreement on the need and intent of the project; a signed charter is a key output of project integration management

Figure 4-6: Project Integration Management Overview



PMBOK® Guide Third Edition, 2004, p. 79.

Preliminary Scope Statements

- A **scope statement** is a document used to develop and confirm a common understanding of the project scope
- It's important for preventing **scope creep**
  - The tendency for project scope to keep getting bigger
- It's good practice to develop a preliminary or initial scope statement during project initiation and a more detailed scope statement as the project progresses

Project Management Plans

- A **project management plan** is a document used to coordinate all project planning documents and help guide a project's execution and control
- Plans created in the other knowledge areas are subsidiary parts of the overall project management plan

Common Elements of a Project Management Plan

- Introduction or overview of the project
- Description of how the project is organized
- Management and technical processes used on the project
- Work to be done, schedule, and budget information

Table 4-1: Sample Contents for a Software Project Management Plan (SPMP)

MAJOR SECTION HEADINGS	SECTION TOPICS
Overview	Purpose, scope, and objectives; assumptions and constraints; project deliverables; schedule and budget summary; evolution of the plan
Project Organization	External interfaces; internal structure; roles and responsibilities
Managerial Process Plan	Start-up plans (estimation, staffing, resource acquisition, and project staff training plans); work plan (work activities, schedule, resource, and budget allocation); control plan; risk management plan; closeout plan
Technical Process Plans	Process model; methods, tools, and techniques; infrastructure plan; product acceptance plan
Supporting Process Plans	Configuration management plan; verification and validation plan; documentation plan; quality assurance plan; reviews and audits; problem resolution plan; subcontractor management plan; process improvement plan

IEEE Standard 1058-1998.

What the Winners Do

"The winners clearly spell out what needs to be done in a project, by whom, when, and how. For this they use an integrated toolbox, including PM tools, methods, and techniques…If a scheduling template is developed and used over and over, it becomes a repeatable action that leads to higher productivity and lower uncertainty. Sure, using scheduling templates is neither a breakthrough nor a feat. But laggards exhibited almost no use of the templates. Rather, in constructing schedules their project managers started with a clean sheet, a clear waste of time."*

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

Stakeholder Analysis

- A **stakeholder analysis** documents important (often sensitive) information about stakeholders such as:
  - Stakeholders' names and organizations
  - Roles on the project
  - Unique facts about stakeholders
  - Level of influence and interest in the project
  - Suggestions for managing relationships

Table 4-2: Sample Stakeholder Analysis

	KEY STAKEHOLDERS				
	Ahmed	**Susan**	**Erik**	**Mark**	**David**
Organization	Internal senior management	Project team	Project team	Hardware vendor	Project manager for other internal projects
Role on project	Project sponsor and one of the company's founders	DNA sequencing expert	Lead programmer	Supplier of some instrument hardware	Competitor for company resources
Unique facts	Quiet, demanding, likes details, business-focused, Stanford MBA	Ph.D. in biology, easy to work with, has toddler	Very smart, best programmer I know, weird sense of humor	Head of a start-up company, he knows we can make him rich if this works	Nice guy, one of the oldest people at company, has three kids in college
Level of interest	Very high	Very high	High	Very high	Low to medium
Level of influence	Very high; can call the shots	Subject matter expert; critical to success	High; hard to replace	Low; other vendors available	Low to medium
Suggestions on managing relationship	Keep informed, let him lead conversations, do as he says and quickly	Make sure she reviews specifications and leads testing; can do some work from home	Keep him happy so he stays; emphasize stock options; likes Mexican food	Give him enough lead time to deliver hardware	He knows his project takes a back seat to this one, but I can learn from him

Project Execution

- Project execution involves managing and performing the work described in the project management plan
- The majority of time and money is usually spent on execution
- The application area of the project directly affects project execution because the products of the project are produced during execution

Coordinating Planning and Execution

- Project planning and execution are intertwined and inseparable activities
- Those who will do the work should help to plan the work
- Project managers must solicit input from the team to develop realistic plans

Providing Leadership and a Supportive Culture

- Project managers must lead by example to demonstrate the importance of creating and then following good project plans
- Organizational culture can help project execution by:
  - Providing guidelines and templates
  - Tracking performance based on plans
- Project managers may still need to break the rules to meet project goals, and senior managers must support those actions

Important Skills for Project Execution

- General management skills like leadership, communication, and political skills
- Product, business, and application area skills and knowledge
- Use of specialized tools and techniques

Project Execution Tools and Techniques

- **Project management methodology**: many experienced project managers believe the most effective way to improve project management is to follow a methodology that describes not only what to do in managing a project, but how to do it
- **Project management information systems**: there are hundreds of project management software products available on the market today, and many organizations are moving toward powerful enterprise project management systems that are accessible via the Internet
- See the "What Went Right?" example of Kuala Lumpur's Integrated Transport Information System on p. 161

Monitoring and Controlling Project Work

- Changes are inevitable on most projects, so it's important to develop and follow a process to monitor and control changes
- Monitoring project work includes collecting, measuring, and disseminating performance information
- Two important outputs of monitoring and controlling project work include recommended corrective and preventive actions

Media Snapshot

The 2002 Olympic Winter Games and Paralympics took five years to plan and cost more than $1.9 billion. PMI awarded the Salt Lake Organizing Committee (SLOC) the Project of the Year award for delivering world-class games.

Four years before the Games began, the SLOC used a Primavera software-based system with a cascading color-coded WBS to integrate planning… The SLOC also used an Executive Roadmap, a one-page list of the top 100 Games-wide activities, to keep executives apprised of progress. Activities were tied to detailed project information within each department's schedule. A 90-day highlighter showed which managers were accountable for each integrated activity.

Fraser Bullock, SLOC Chief Operating Officer and Chief, said, "We knew when we were on and off schedule and where we had to apply additional resources. The interrelation of the functions meant they could not run in isolation—it was a smoothly running machine."*

*Foti, Ross, "The Best Winter Olympics, Period," PM Network (January 2004) 23.

Integrated Change Control

- Three main objectives are:
  - Influencing the factors that create changes to ensure that changes are beneficial
  - Determining that a change has occurred
  - Managing actual changes as they occur
- A **baseline** is the approved project management plan plus approved changes

Change Control on Information Technology Projects

- Former view: the project team should strive to do exactly what was planned on time and within budget
- Problem: stakeholders rarely agreed up-front on the project scope, and time and cost estimates were inaccurate
- Modern view: project management is a process of constant communication and negotiation
- Solution: changes are often beneficial, and the project team should plan for them

Change Control System

- A formal, documented process that describes when and how official project documents and work may be changed
- Describes who is authorized to make changes and how to make them

Change Control Board (CCB)

- A formal group of people responsible for approving or rejecting changes on a project
- CCBs provide guidelines for preparing change requests, evaluate change requests, and manage the implementation of approved changes
- Includes stakeholders from the entire organization

Making Timely Changes

- Some CCBs only meet occasionally, so it may take too long for changes to occur
- Some organizations have policies in place for time-sensitive changes
  - "48-hour policy" allows project team members to make decisions, then they have 48 hours to reverse the decision pending senior management approval
  - Delegate changes to the lowest level possible, but keep everyone informed of changes

Configuration Management

- Ensures that the descriptions of the project's products are correct and complete
- Involves identifying and controlling the functional and physical design characteristics of products and their support documentation
- Configuration management specialists identify and document configuration requirements, control changes, record and report changes, and audit the products to verify conformance to requirements
- See www.icmhq.com for more information

Table 4-3: Suggestions for Performing Integrated Change Control

View project management as a process of constant communication and negotiation.
Plan for change.
Establish a formal change control system, including a change control board (CCB).
Use effective configuration management.
Define procedures for making timely decisions on smaller changes.
Use written and oral performance reports to help identify and manage change.
Use project management and other software to help manage and communicate changes.
Focus on leading the project team and meeting overall project goals and expectations.

Closing Projects

- To close a project, you must finalize all activities and transfer the completed or cancelled work to the appropriate people
- Main outputs include:
  - Administrative closure procedures
  - Contract closure procedures
  - Final products, services, or results
  - Organizational process asset updates

Using Software to Assist in Project Integration Management

- Several types of software can be used to assist in project integration management
  - Documents can be created with word-processing software
  - Presentations are created with presentation software
  - Tracking can be done with spreadsheets or databases
  - Communication software like e-mail and Web authoring tools facilitate communications
  - Project management software can pull everything together and show detailed and summarized information
  - Business Service Management (BSM) tools track the execution of business process flows

Chapter Summary

- Project integration management includes:
  - Developing a project charter
  - Developing a preliminary project scope statement
  - Developing a project management plan
  - Directing and managing project execution
  - Monitoring and controlling project work
  - Performing integrated change control
  - Closing the project