Chapter 4:
Project Integration Management

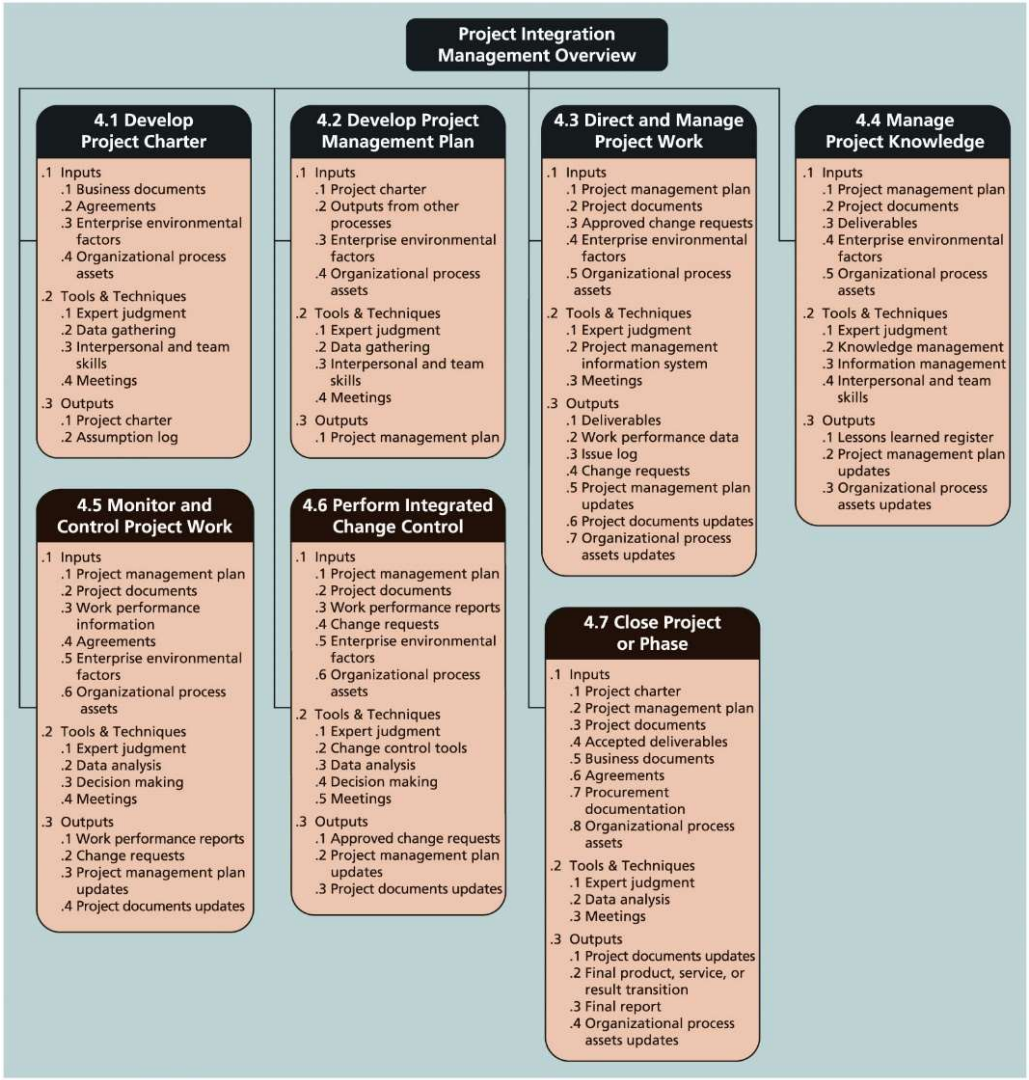
Information Technology Project Management, Ninth Edition. © 2019 Cengage. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

Learning Objectives

- Describe an overall framework for project integration management as it relates to the other project management knowledge areas and the project life cycle
- Discuss the strategic planning process and apply different project selection methods
- Explain the importance of creating a project charter to formally initiate projects
- Describe project management plan development, understand the content of these plans, and describe approaches for creating them
- Explain project execution, its relationship to project planning, the factors related to successful results, and tools and techniques to assist in directing and managing project work
- Apply the principles of knowledge management to the various aspects of project integration
- Describe the process of monitoring and controlling a project
- Define the integrated change control process, relate this to the steps for planning for and managing changes on information technology (IT) projects, and create an appropriate change control system for a project that incorporates both
- Explain the importance of developing and following good procedures for closing projects
- Describe how software can assist in project integration management
- Discuss considerations for agile/adaptive environments

What is Project Integration Management? (1 of 2)

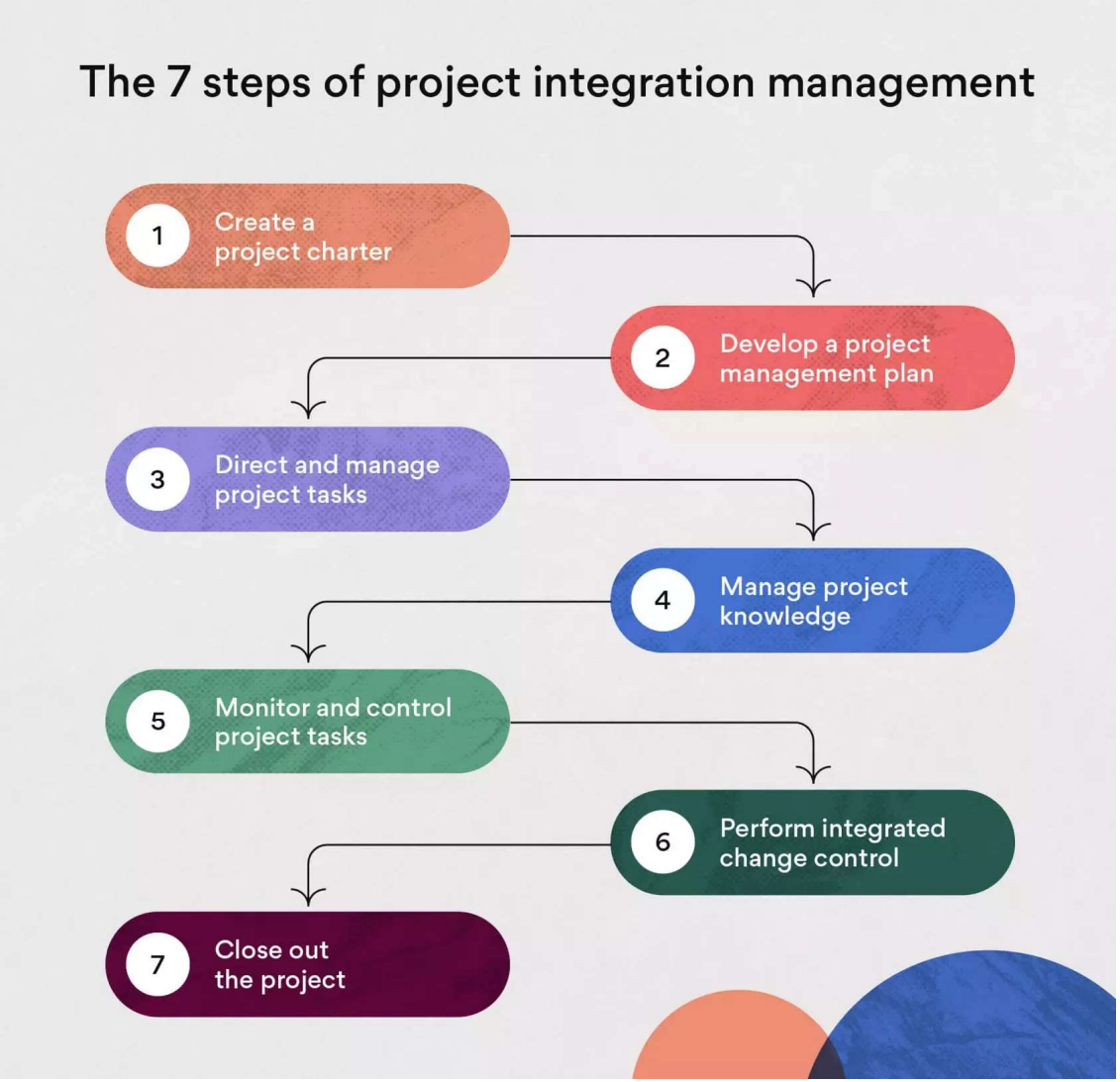
- To schedule tasks of multiple teams from different departments and manage the deliverables for various project activities.
- Project managers must coordinate all of the other knowledge areas throughout a project's life cycle
- Many new project managers have trouble looking at the "big picture" and want to focus on too many details,
- Project integration management is not the same thing as software integration
- Main processes
  - Developing the project charter
  - Developing the project management plan
  - Directing and managing project work
  - Monitoring and controlling project work
  - Performing integrated change control
  - Closing the project or phase



Source: Project Management Institute, Inc. *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition* (2017), Figure 4-1, Page 71.

FIGURE 4-1 Project integration management summary

What is Project Integration Management? (2 of 3)



Strategic Planning and Project Selection (1 of 2)

Strategic planning involves determining long-term objectives	• Analyzing the strengths and weaknesses of an organization • Studying opportunities and threats in the business environment • Predicting future trends • Projecting the need for new products and services
SWOT analysis	• Strengths, Weaknesses, Opportunities, and Threats
Identifying potential projects	• Start of project initiation
Aligning IT with business strategy	• Organization must develop a strategy for using IT to define how it will support the organization's objectives

Strategic Planning and Project Selection (2 of 2)

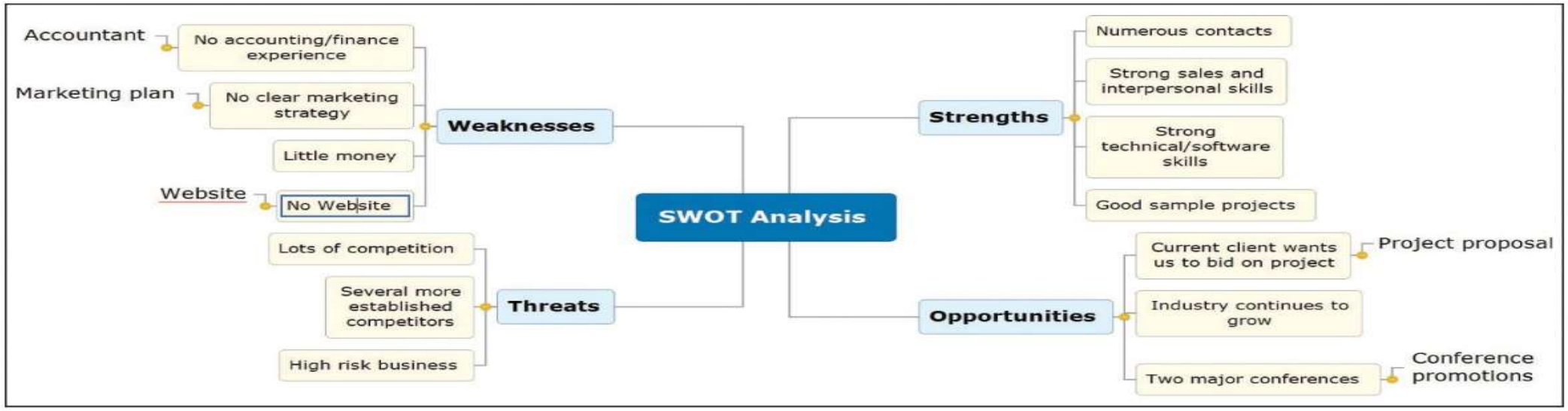


FIGURE 4-2 Mind map of a SWOT analysis to help identify potential projects

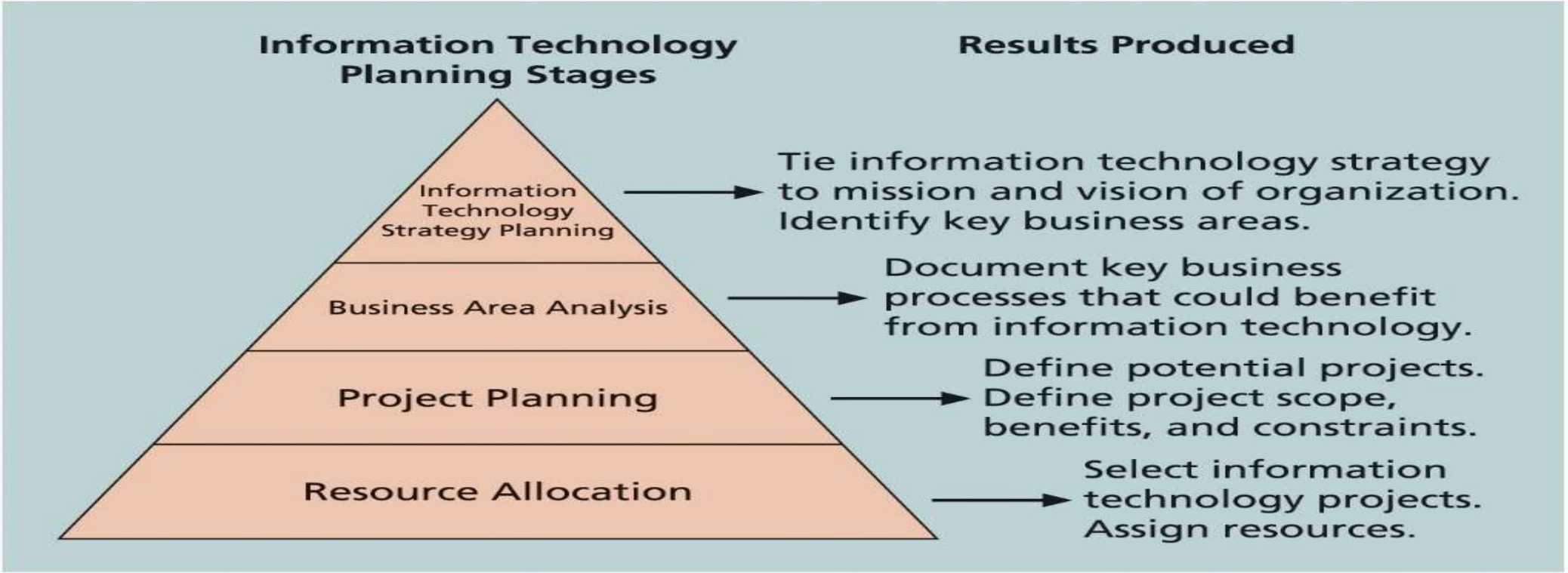


FIGURE 4-3 Planning process for selecting IT projects

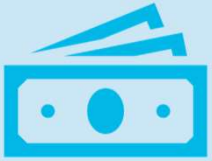
Methods for Selecting Projects

- Potential projects must be narrowed down
  - Methods for selecting projects
    - 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 (The name "balanced scorecard" comes from the idea of looking at strategic measures in addition to traditional financial measures to get a more "balanced" view of performance.)

Focusing on Broad Organizational Needs

Projects that address broad organizational needs are much more likely to be successful because they will be important to the organization

Examples: improve safety or increase morale



Important criteria for selecting projects

Need

Funding

Will

Categorizing IT Projects

- Selecting projects is based on various categorizations, such as the force for the project, the time window for the project, and the general priority for the project. The force for a project is often the need to respond to a problem, an opportunity, or a directive.
- **Categorizations**
  - Respond to a problem, opportunity, or directive
  - How long it will take to do and when it is needed
  - Overall priority of the project

Performing Financial Analyses

Financial considerations are often an important consideration in selecting projects

- Regardless of current economics

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 (1 of 2)

- 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
  - Projects with higher NPVs are preferred

	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							
17							

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

FIGURE 4-4 Net present value example

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					

FIGURE 4-5 JWD Consulting net present value and return on investment example

Net Present Value Analysis (2 of 2)

NPV calculations

- Determine estimated costs and benefits for the life of the project and the products it produces
- Determine the discount rate
- Calculate the net present value

Important considerations

- Some organizations refer to the investment year or years for project costs as Year 0 and do not discount costs in Year 0
- Discount rate can vary, often based on the prime rate and other economic considerations
- Costs can be entered as negative numbers and can be listed first (and then benefits)

- **Discounted cash flows are used to compare the present value of all cash inflows and outflows for the project in today's currency term**

$$PV = \frac{\text{Cash flow amount}}{(1 + \text{rate of return})^n}$$

$$NPV = \sum \text{PV of Total Benefits} - \sum \text{PV of Total Costs}$$

https://www.investopedia.com/ask/answers/021115/what-formula-calculating-net-present-value-npv-excel.asp

Return on Investment

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

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

$$\text{ROI} = \frac{\text{Total Benefits} _ \text{Total Costs}}{\text{Total Costs}}$$

Payback Analysis (1 of 2)

- 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
  - Determines how much time will elapse before accrued benefits overtake accrued and continuing costs
  - Payback occurs when the net cumulative discounted benefits equals the costs
  - Many organizations have requirements for the length of the payback period of an investment

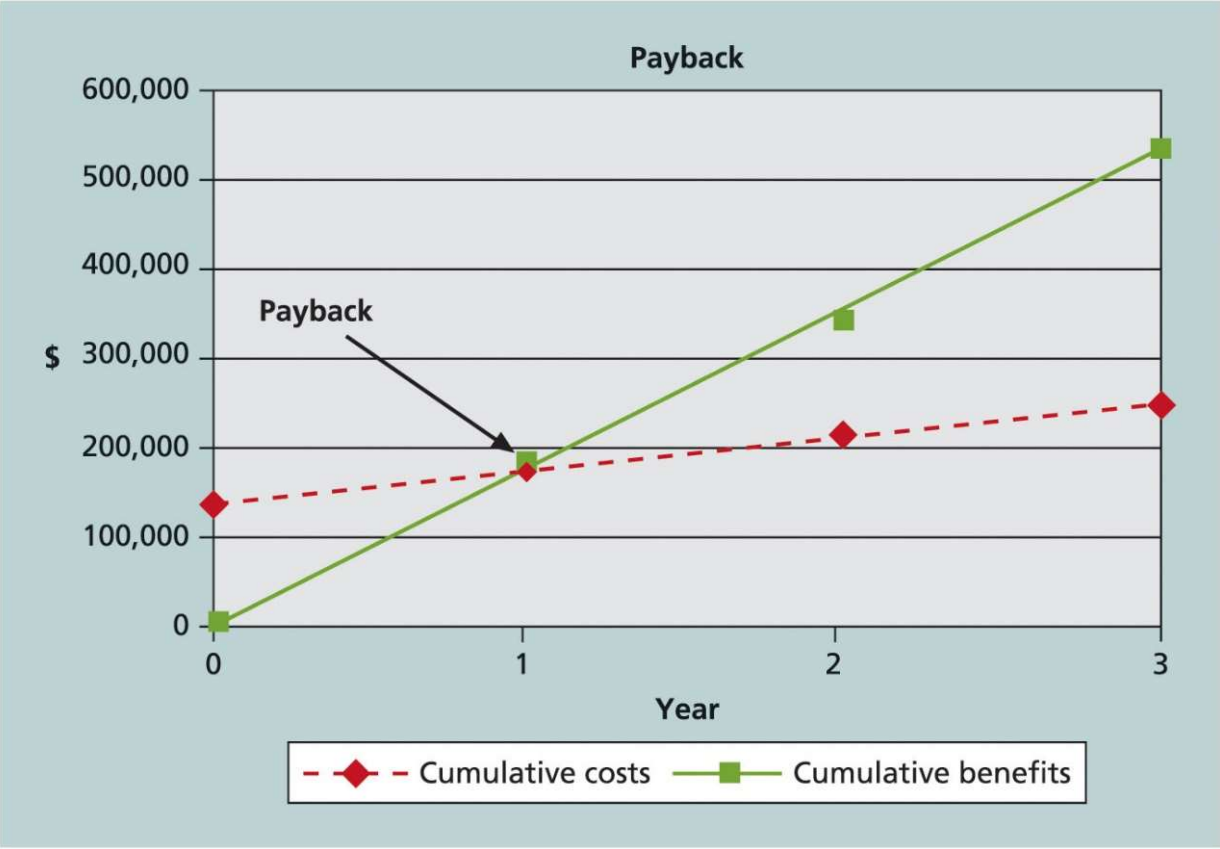


FIGURE 4-6 Charting the payback period for the JWD Consulting project

$$BEP = \begin{matrix}\text{Number of}\\ \text{years of}\\ \text{negative}\\ \text{cash flow}\end{matrix} + \frac{\text{That year's Net Cash Flow} - \text{That year's Cumulative Cash Flow}}{\text{That year's Net Cash Flow}}$$

Using a Weighted Scoring Model

Weighted Scoring is a model used to prioritize the **actions**, **tasks**, **decisions**, **features**, and **other initiatives by assigning a numerical value** based on the cost advantage or the effort value of the particular activity.

- Provides a systematic process for selecting projects based on many criteria
  - Identify criteria important to the project selection process
  - Assign weights (percentages) to each criterion so they add up to 100%
  - Assign scores to each criterion for each project
  - Multiply the scores by the weights and get the total weighted scores

	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**

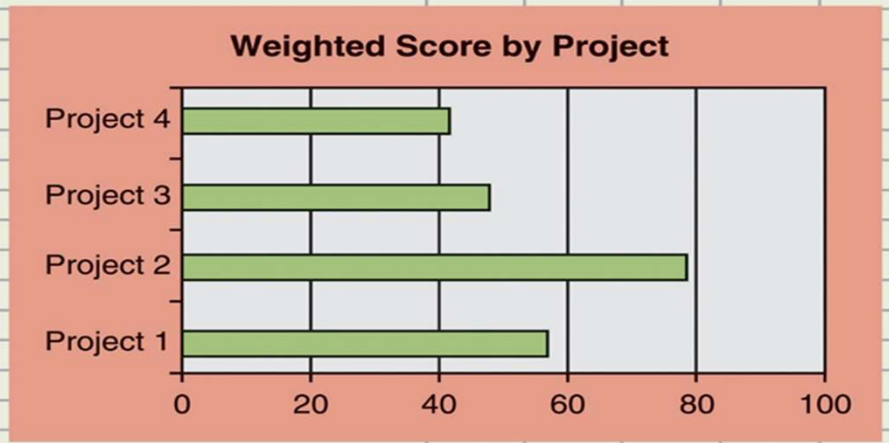


FIGURE 4-7 Sample weighted scoring model for project selection

Implementing a Balanced Scorecard

- *Drs. Robert Kaplan and David Norton developed this approach to help select and manage projects that align with business strategy*
  - A balanced scorecard is a strategic planning and management system that helps organizations align business activities to strategy, improve communications, and monitor performance against strategic goals

Developing a Project Charter

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 project charter is a key output of the initiation process

Inputs for developing a project charter

- Business case
- Benefits management plan
- Agreements
- Enterprise environmental factors
- Organizational process assets

Developing a Project Management Plan

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/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
- References to other project planning documents

Using Guidelines to Create Project Management Plans

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

Source: IEEE Standard 1058–1998.

Table 4-3 Sample contents for the IEEE software project management plan (SPMP)

Directing and Managing Project Work

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	• Products of the project are produced during the execution phase
The project manager needs to focus on leading the project team and managing stakeholder relationships to execute the project management plan successfully	• Project resource management, communications management, and stakeholder management are crucial to a project's success

Coordinating Planning and Execution

Project planning and execution are intertwined and inseparable activities

- The main function of creating a project management plan is to guide project execution

Those who will do the work should help to plan the work

- All project personnel need to develop both planning and executing skills, and they need experience in these areas

Providing Strong Leadership and a Supportive Culture

1

Project managers must lead by example

- Demonstrate the importance of creating and then following good project plans and following them in project execution

2

Organizational culture can help project execution

- Providing guidelines and templates
- Tracking performance based on plans

3

Project managers may still need to break the rules to meet project goals

- Senior managers must support those actions

What Went Right?

- Organizations must make major cultural changes to improve
  - Make sure everyone fully understands the value of project management
  - Require executive sponsors are fully engaged on projects and programs
  - Align projects to the organization's strategy

Capitalizing on Product, Business, and Application Area Knowledge

- It is often helpful for IT project managers to have prior technical experience
  - **Small projects**: the project manager may be required to perform some of the technical work or mentor team members to complete the projects
  - **Large projects**: the project manager must understand the business and application area of the project

Project Execution Tools and Techniques

- Project managers can use specific tools and techniques to perform activities that are part of execution processes
  - Expert judgment
  - Meetings
  - Project management information systems

Managing Project Knowledge

Basic types of knowledge

- **Explicit knowledge**: easily explained using words, pictures, or numbers and is easy to communicate, store, and distribute
- **Tacit knowledge**: difficult to express and highly personal

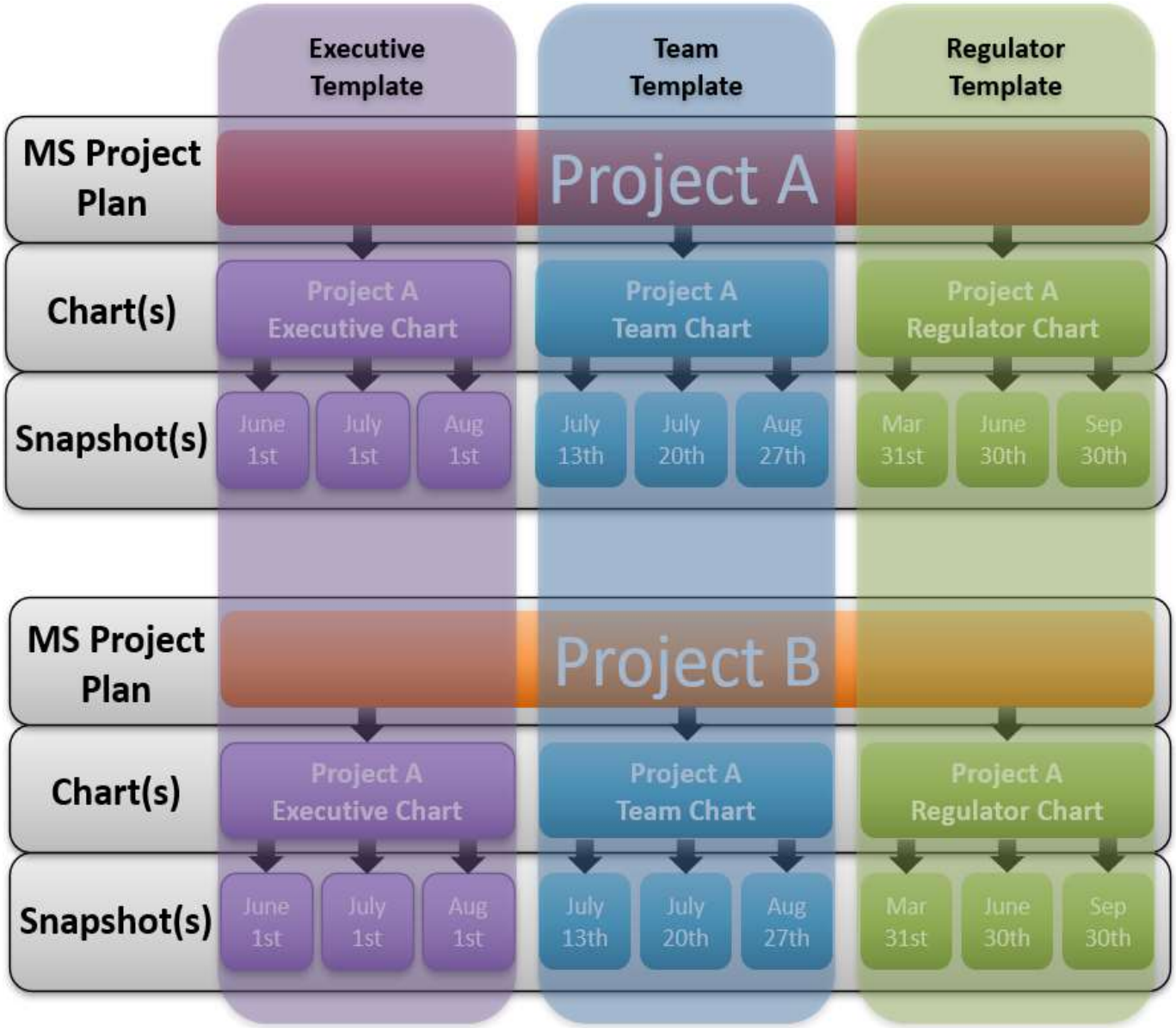
Knowledge management should be done before, during, and after projects are completed

- Often very difficult to accomplish

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
  - The project management plan provides the baseline for identifying and controlling project changes
    - A baseline is a starting point, a measurement, or an observation that is documented so that it can be used for future comparison.

Media Snapshot



Snapshot is a new instance of an existing project. Some key points to remember about snapshots are as follows:

A snapshot is a separate project. Making a change to one snapshot in a snapshot set does not affect the other snapshots in the set.

A snapshot is an executable project.

Performing Integrated Change Control

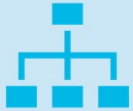
Main objectives

1. Influencing the factors that create changes to ensure that changes are beneficial
2. Determining that a change has occurred
3. Managing actual changes as they occur

Change Control on IT Projects

Former view: the project team should strive to do exactly what was planned on time and within budget

Problem: project teams could rarely meet original project goals



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 (1 of 2)

Formal, documented process that describes when and how official project documents and work may be changed

Describes who is authorized to make changes, paperwork required for these changes, and any automated or manual tracking systems the project will use

Change control board (CCB) is a formal group of people responsible for approving or rejecting changes on a project

Provide guidelines for preparing change requests, evaluate change requests, and manage the implementation of approved 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

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

Change Control System 2 of 2)

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) and IT steering committee.
Use effective configuration management.
Define procedures for making timely decisions about smaller changes.
Use written and oral performance reports to help identify and manage change.
Use project management software and other software to help manage and communicate changes.
Focus on leading the project team and meeting overall project goals and expectations.

Table 4-4 suggestions for performing integrated change control

Information Technology Project Management, Ninth Edition. © 2019 Cengage. May not be copied, scanned, or duplicated, in whole or in part, except for use as permitted in a license distributed with a certain product or service or otherwise on a password-protected website for classroom use.

Closing Projects or Phases

To close a project or phase, you must finalize all activities and transfer the completed or cancelled work to the appropriate people

- Main inputs are the project charter, project management plan, project documents, accepted deliverables, business documents, agreements, procurement documentation, and organizational process assets
- Main tools and techniques are expert judgment, data analysis, and meetings

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 can facilitate communications
- Project management software can pull everything together and show detailed and summarized information

Source: www.projectmanager.com

FIGURE 4-8 Sample portfolio management software screens

Considerations for Agile/Adaptive Environments

Iterative and agile approaches promote the engagement of team members

Expectations of the project manager do not change in an adaptive environment, but control of the detailed product planning and delivery is delegated to the team

Project managers using any product life cycle should focus on creating a collaborative decision-making environment and providing opportunities for team members to develop additional skills

Chapter Summary

Project integration management ties together all the other areas of project management

Primary focus should be on project integration management

Main processes

Develop the project charter	Create an assumption log	Develop the project management plan	Direct and manage project execution	Manage project knowledge	Monitor and control project work	Perform integrated change control	Close the project or phase