

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:** Work with stakeholders to create the document that formally authorizes a project—the charter.
- **Develop the preliminary project scope statement:** Work 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:** Coordinate all planning efforts to create a consistent, coherent document—the project management plan.

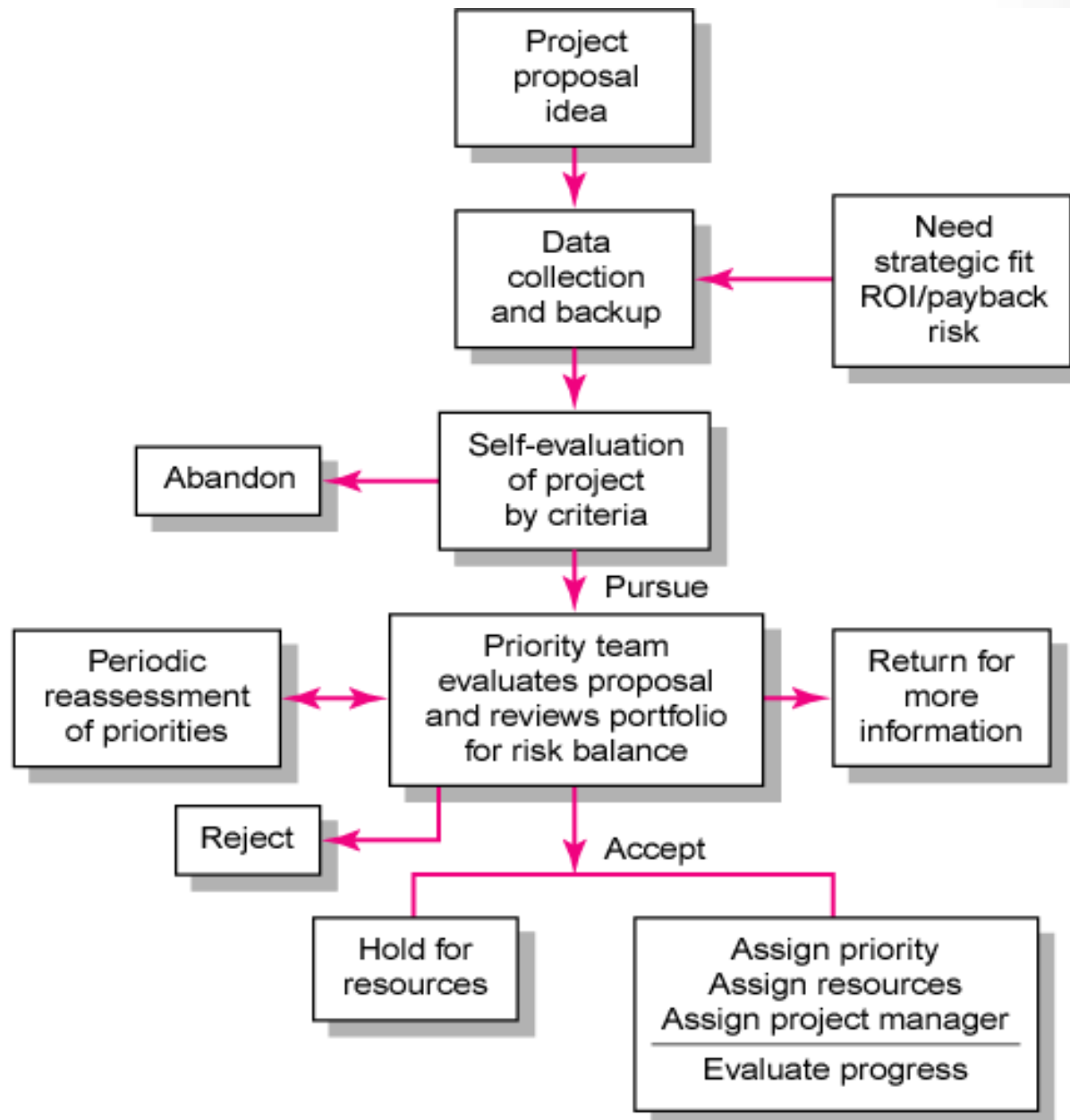
Project Integration Management Processes (cont'd)

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

A Portfolio Management System

- Selection Criteria
 - **Financial:** payback, net present value (NPV), internal rate of return (IRR)
 - **Non-financial:** projects of strategic importance to the firm.
- Multi-Weighted Scoring Models
 - Use several weighted selection criteria to evaluate project proposals.

Project Screening Process



Project number

Must objectives		Must meet if impacts	...26	27	28	29
All activities meet current legal, safety, and environmental standards		Yes-Meets objective No-Does not meet obj N/A-No impact	n/a			
All new products will have a complete market analysis		Yes-Meets objective No-Does not meet obj N/A-No impact	yes			
Want objectives	Relative Importance 1-100	Single project impact definitions	Weighted score	Weighted score	Weighted score	Weighted score
Provides immediate response to field problems (30)	99	0 ≤ Does not address ① = Opportunity to fix 2 ≥ Urgent problem	99			
Create \$5 million in new sales by 20xx (15)	88	① < \$100,000 1 = \$100,000–500,000 2 > \$500,000	0			
Improve external customer service (18)	83	0 ≤ Minor impact 1 = Significant impact ② ≥ Major impact	166			
Total weighted score						
Priority						

Priority Analysis

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**:
 - **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats
- As part of strategic planning, organizations should:
 - Identify potential projects.
 - Use realistic methods to select which projects to work on.
 - Formalize project initiation by issuing a project charter.

Methods for Selecting Projects

- There is usually not enough time or resources to implement all projects.
- 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 for the project.
 - There is a strong **will** to make the project succeed.

Financial Analysis of Projects

- Financial considerations are often an important aspect of the project selection process.
- 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 4-2. 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 4-3. JWD Consulting NPV Example

Multiply
by the
discount
factor each
year, then
subtract costs
from
cumulative
benefits 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).
- Some organizations consider the investment year as year 0, while others consider it year 1. Some people enter costs as negative numbers, while others do not. Make sure to identify your organization's preferences.

Financial Models (cont'd)

- The Net Present Value (NPV) model
 - Uses management's minimum desired rate-of-return (discount rate) to compute the present value of all net cash inflows.
 - Positive NPV: the project meets the minimum desired rate of return and is eligible for further consideration.
 - Negative NPV: project is rejected.

$$\text{Project NPV} = I_0 + \sum_{t=1}^n \frac{F_t}{(1+k)^t} \quad \text{where}$$

I_0 = Initial investment (since it is an outflow, the number will be negative)

F_t = net cash inflow for period t

k = required rate of return

Return on Investment

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

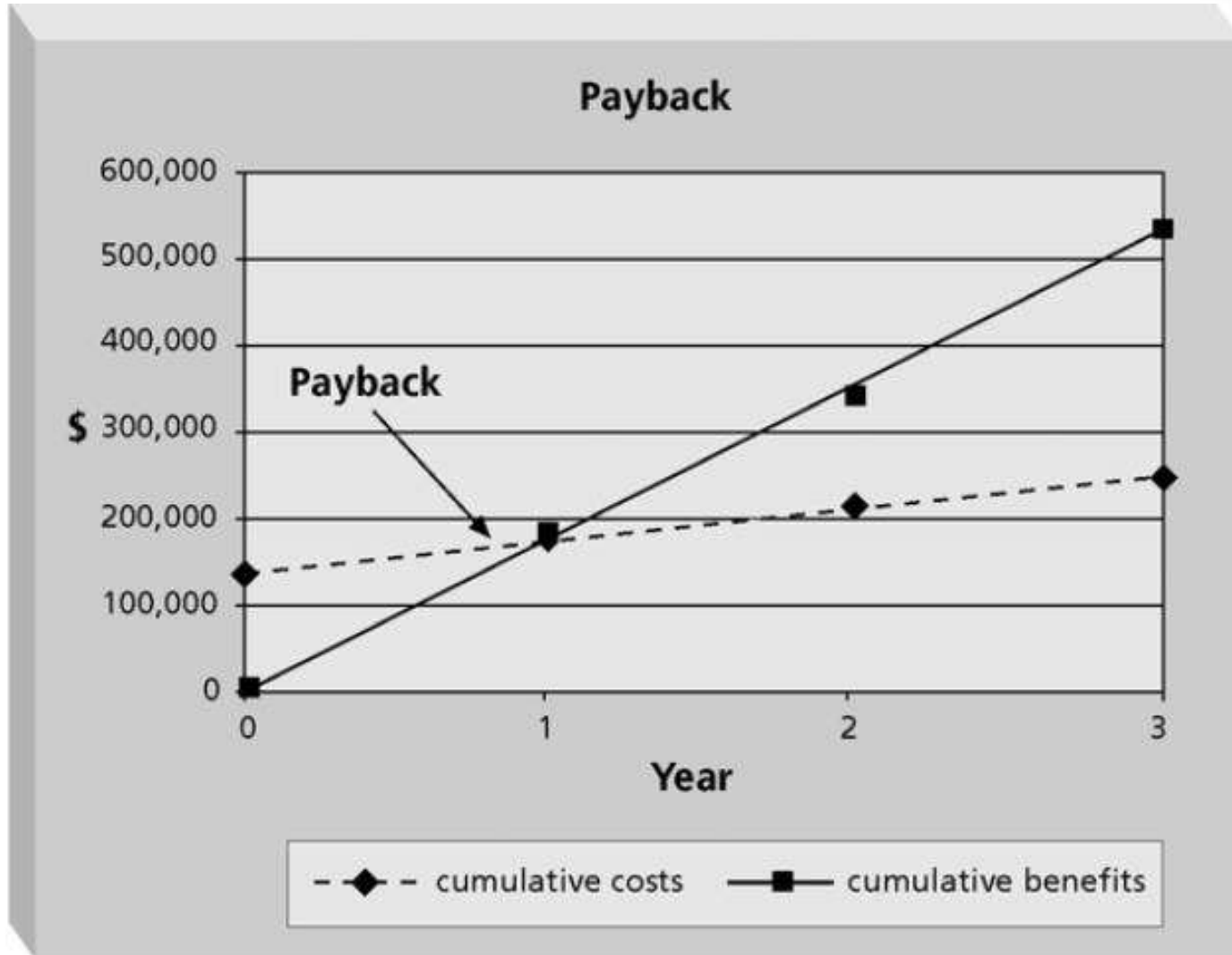
$$\text{ROI} = (\text{total discounted benefits} - \text{total discounted costs}) / \text{discounted costs}$$

- 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 be calculated by setting the NPV 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 cumulative discounted benefits and costs are greater than zero.
- Many organizations want IT projects to have a fairly short payback period.

Figure 4-4. Charting the Payback Period

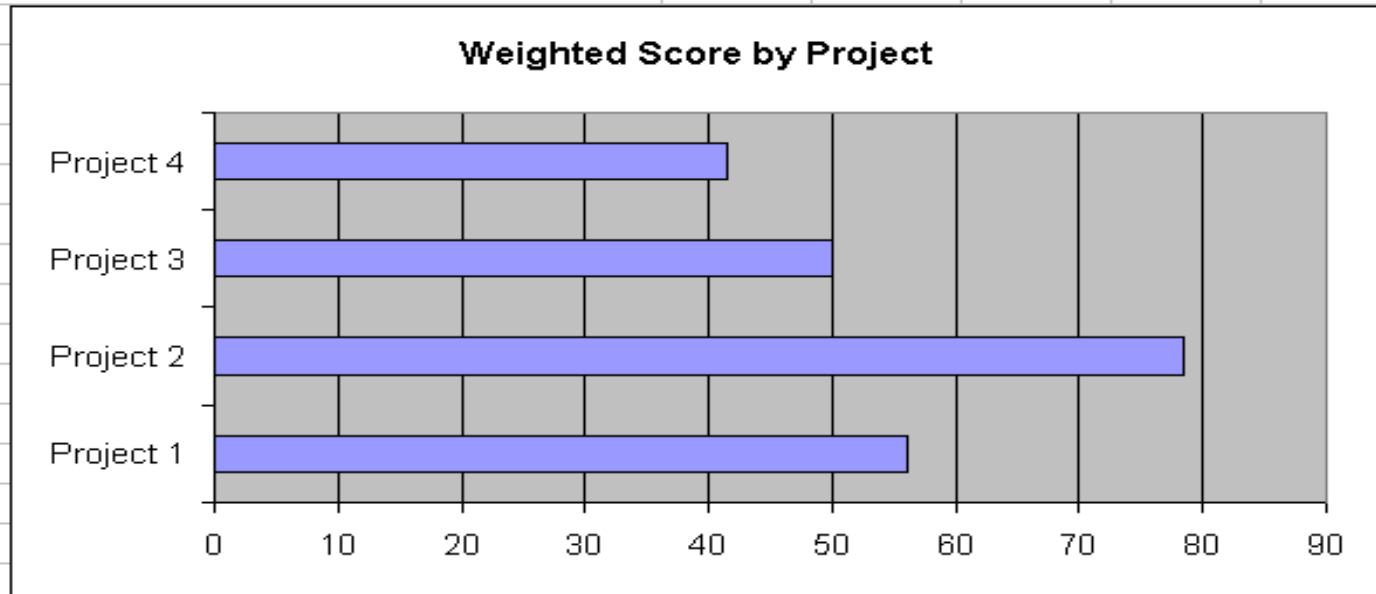


Weighted Scoring Model

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

Figure 4-5. 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	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
10						



Project Screening Matrix

Criteria Weight	Stay within core competencies	Strategic fit	Urgency	25% of sales from new products	Reduce defects to less than 1%	Improve customer loyalty	ROI of 18% plus	Weighted total
	2.0	3.0	2.0	2.5	1.0	1.0	3.0	
Project 1	1	8	2	6	0	6	5	66
Project 2	3	3	2	0	0	5	1	27
Project 3	9	5	2	0	2	2	5	56
Project 4	3	0	10	0	0	6	0	32
Project 5	1	10	5	10	0	8	9	102
Project 6	6	5	0	2	0	2	7	55
⋮								
Project <i>n</i>	5	5	7	0	10	10	8	83

FIGURE 2.3

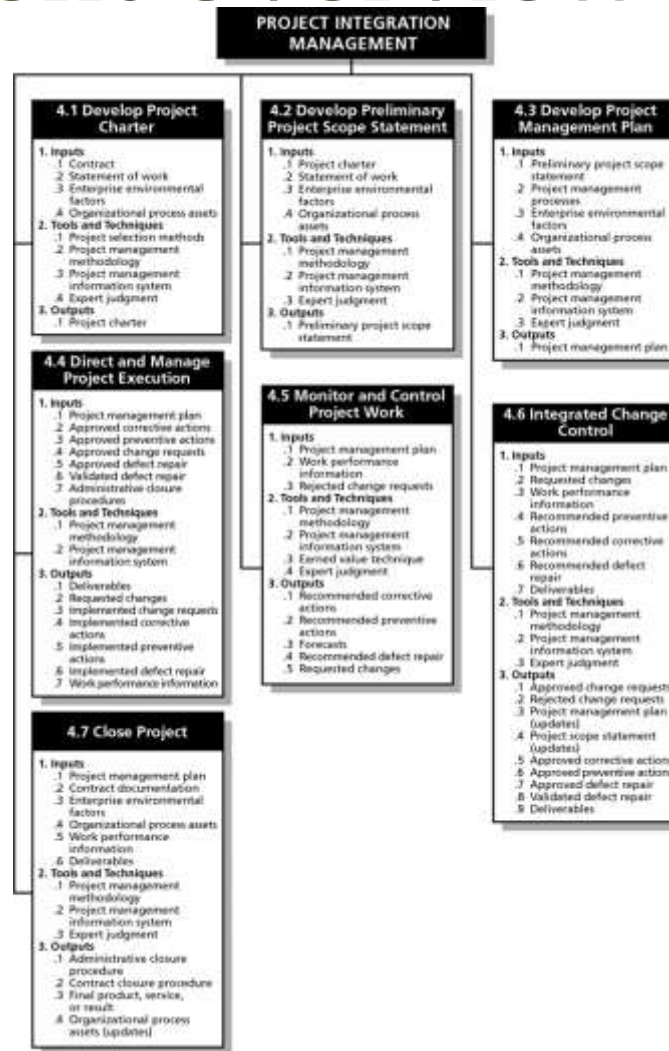
Implementing a Balanced Scorecard

- 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 methodology that converts an organization's value drivers, such as customer service, innovation, operational efficiency, and financial performance, to a series of defined metrics.
- See www.balancedscorecard.org for more information.

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



Preliminary Scope Statements

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

Contents of a Preliminary Scope Statement

- Project objectives
- Product or service requirements and characteristics
- Project boundaries
- Deliverables
- Product acceptance criteria
- Project assumptions and constraints
- Organizational structure
- Initial list of defined risks
- Summary of schedule milestones
- Rough order of magnitude cost estimate
- Configuration management requirements
- Description of approval requirements

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.

Attributes of Project Plans

- Just as projects are unique, so are project plans.
- Plans should be:
 - Dynamic
 - Flexible
 - Updated as changes occur
- Plans should first and foremost guide project execution by helping the project manager lead the project team and assess project status.

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

MAJOR PROJECT MANAGEMENT PLAN SECTIONS

	OVERVIEW	PROJECT ORGANIZATION	MANAGERIAL PROCESS PLANS	TECHNICAL PROCESS PLANS	SUPPORTING PROCESS PLANS
Section Topics	Purpose, scope, and objectives; assumptions and constraints; project deliverables; schedule and budget summary; evolution of the plan	External interfaces; internal structure; roles and responsibilities	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	Process model; methods, tools, and techniques; infrastructure plan; product acceptance plan	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.

Stakeholder Analysis

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

Table 4-2. Sample Stakeholder Analysis

	KEY STAKEHOLDERS				
	AHMED	SUSAN	ERIK	MARK	DAVID
<i>Organization</i>	Internal senior management	Project team	Project team	Hardware vendor	Project manager for other internal projects
<i>Role on project</i>	Project sponsor and one of the company's founders	DNA sequencing expert	Lead programmer	Supplier of some instrument hardware	Competitor for company resources
<i>Unique facts</i>	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
<i>Level of interest</i>	Very high	Very high	High	Very high	Low to medium
<i>Level of influence</i>	Very high; can call the shots	Subject matter expert; critical to success	High; hard to replace	Low; other vendors available	Low to medium
<i>Suggestions on managing relationship</i>	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 project 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.

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 such as 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:** Hundreds of project management software products are available on the market today, and many organizations are moving toward powerful enterprise project management systems that are accessible via the Internet.

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.

Integrated Change Control

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

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 Boards (CCBs)

- 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.
- CCBs include stakeholders from the entire organization.

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.

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:
 - Word processing software creates documents.
 - Presentation software creates presentations.
 - Spreadsheets or databases perform tracking.
 - Communication software such as e-mail and Web authoring tools facilitate communications.
 - Project management software can pull everything together and show detailed and summarized information.