

SOFTWARE PROJECT MANAGEMENT

LECTURE # 10

PROJECT INTEGRATION MANAGEMENT

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Course Information

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- **Course Name: Software Project Management**
- **Course Code: SE-401**
- **CMS Link:** <http://web.uettaxila.edu.pk/CMS/AUT2011/seSPMbs/index.asp>

Project Integration Management

- ❑ Introduction
- ❑ Project Integration Management Process
- ❑ Strategic Planning & Process Selection
- ❑ Methods for Selecting Projects
 - ✓ Focusing on broad organizational needs
 - ✓ Categorizing IT Needs
 - ✓ Financial Methods
- ❑ Project Charter
- ❑ Preliminary Project Scope Statement
- ❑ Project Management Plan
- ❑ Direct & Manage Project Execution
- ❑ Monitor & Control Project
- ❑ Perform Integrated Change Control
- ❑ Close Project

Integration Management

- ❑ “Integration Management means making sure that all of the processes work together seamlessly to make your project successful” – *OReilly Head First PMP*
- ❑ Project integration management ensures that the project is properly planned, executed, and controlled, including the exercise of formal project change control. As the term implies, every activity must be coordinated or integrated with every other one in order to achieve the desired project outcomes.
- ❑ PIM Processes
 - ✓ Develop the project charter
 - ✓ Develop the preliminary project scope statement
 - ✓ Develop the project management plan
 - ✓ Direct and manage project execution
 - ✓ Monitor and control the project work
 - ✓ Perform integrated change control
 - ✓ Close the project

Strategic Planning & Project Selection

- ❑ **Strategic planning** involves determining long-term objectives, predicting future trends, and projecting the need for new products and services.
- ❑ 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.
- ❑ Organizations often perform a **SWOT analysis**:^[5]
 - ✓ **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats

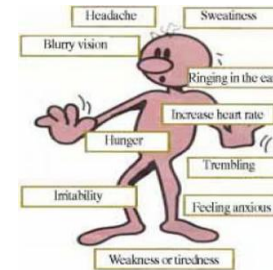


SWOT Analysis [5] [8]

- ❑ SWOT analysis (alternately SLOT analysis) is a strategic planning method used to evaluate the Strengths, Weaknesses/Limitations, Opportunities, and Threats involved in a project or in a business venture.
- ❑ It involves specifying the objective of the business venture or project and identifying the internal and external factors that are favorable and unfavorable to achieve that objective.
- ❑ The technique is credited to Albert Humphrey, who led a convention at Stanford University in the 1960s and 1970s using data from Fortune 500 companies.
- ❑ Setting the objective should be done after the SWOT analysis has been performed. This would allow achievable goals or objectives to be set for the organization.

SWOT Analysis [5] [8]

- Strengths: characteristics of the business, or project team that give it an advantage over others
- Weaknesses (or Limitations): are characteristics that place the team at a disadvantage relative to others
- Opportunities: external chances to improve performance (e.g. make greater profits) in the environment
- Threats: external elements in the environment that could cause trouble for the business or project



SWOT Analysis [5][8]

❑ Matching and converting

- ✓ One way of utilizing SWOT is matching and converting. Matching is used to find competitive advantages by matching the strengths to opportunities.
- ✓ Converting is to apply conversion strategies to convert weaknesses or threats into strengths or opportunities. An example of conversion strategy is to find new markets. If the threats or weaknesses cannot be converted a company should try to minimize or avoid them.[1]



❑ Internal and external factors

- ✓ The aim of any SWOT analysis is to identify the key internal and external factors that are important to achieving the objective. SWOT analysis groups key pieces of information into two main categories:
- ✓ Internal factors – The strengths and weaknesses internal to the organization.
- ✓ External factors – The opportunities and threats presented by the external environment to the organization.



SWOT Analysis [9]


❑ Swot Analysis is Useful for Analyzing:

- ✓ The prospects for a new business
- ✓ The current situation of an existing business

❑ Swot Analysis is often recommended for companies as a regular practice

❑ Steve Jobs' 12 Rules of Success [4. Make SWOT analysis. As soon as you join/start a company, make a list of strengths and weaknesses of yourself and your company on a piece of paper]

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 **Smart Business Leader**

Steve Jobs' 12 Rules of Success Best practices

1	Do what you love to do	7	Strive to become a market leader
2	Be different	8	Focus on the outcome
3	Do your best	9	Ask for feedback
4	Make SWOT analysis	10	Innovate
5	Be entrepreneurial	11	Learn from failures
6	Start small, think big	12	Learn continually



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Methods for selecting projects

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- ❑ 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 analysis.
 - ✓ Using a weighted scoring model.
 - ✓ Payback Analysis
 - ✓ ROI

Focusing on broad organizational needs

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- ❑ It is often difficult to provide strong justification for many IT projects, but everyone agrees they have a high value.
- ❑ 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.



Categorizing IT Projects

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- ❑ One categorization assesses whether the project provides a solution to a problem
- ❑ Another categorization is based on the time it will take to complete a project or the date by which it must be done.
- ❑ Another categorization is the overall priority of the project.



Net Present Value Analysis

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- ❑ **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.
- ❑ The NPV is the difference between total present value of future cash inflows and the total present value of future cash outflows.
- ❑ Projects with a positive NPV should be considered
- ❑ The higher the NPV, the better.



Net Present Value Analysis

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- Each cash inflow/outflow is discounted [6] back to its present value (PV). Then they are summed. Therefore NPV is the sum of all terms,

$$\frac{R_t}{(1 + i)^t}$$

where

- ✓ t - the time of the cash flow
- ✓ i - the discount rate (the rate of return that could be earned on an investment in the financial markets with similar risk.)
- ✓ R_t - the net cash flow (the amount of cash, inflow minus outflow) at time t.

Figure 4-2. Net Present Value Example

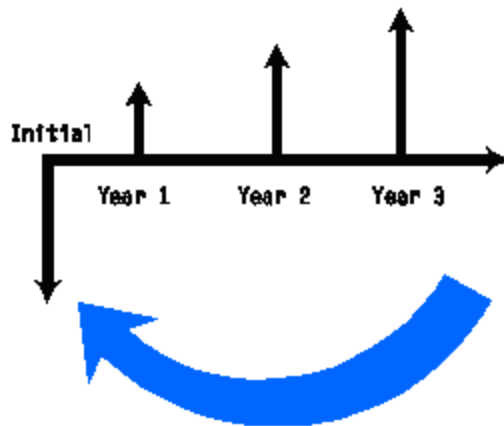
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	A	B	C	D	E	F	G
1	Discount rate	10%					
2							
3	PROJECT 1	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
4	Benefits	\$0	\$2,000	\$3,000	\$4,000	\$5,000	\$14,000
5	Costs	\$5,000	\$1,000	\$1,000	\$1,000	\$1,000	\$9,000
6	Cash flow	(\$5,000)	\$1,000	\$2,000	\$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							

NPV Calculations

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- 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.



Decision Making in NPV

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- NPV is an indicator of how much value an investment or project adds to the firm.
- With a particular project, if R_t is a positive value, the project is in the status of discounted cash inflow in the time of t .
- If R_t is a negative value, the project is in the status of discounted cash outflow in the time of t . Appropriately risked projects with a positive NPV could be accepted.
- In financial theory, if there is a choice between two mutually exclusive alternatives, the one yielding the higher NPV should be selected.

If...	It means...	Then...
$NPV > 0$	the investment would add value to the firm	the project may be accepted
$NPV < 0$	the investment would subtract value from the firm	the project should be rejected
$NPV = 0$	the investment would neither gain nor lose value for the firm	We should be indifferent in the decision whether to accept or reject the project. This project adds no monetary value. Decision should be based on other criteria

Return on Investment

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- ❑ The simplest definition of **Return on investment (ROI)** is the difference between the cost of the project and the financial benefits this project provides.
 - ✓ $\text{ROI} = (\text{project benefits} - \text{project costs})$
- ❑ The higher the ROI, the better.



Return on Investment percentage

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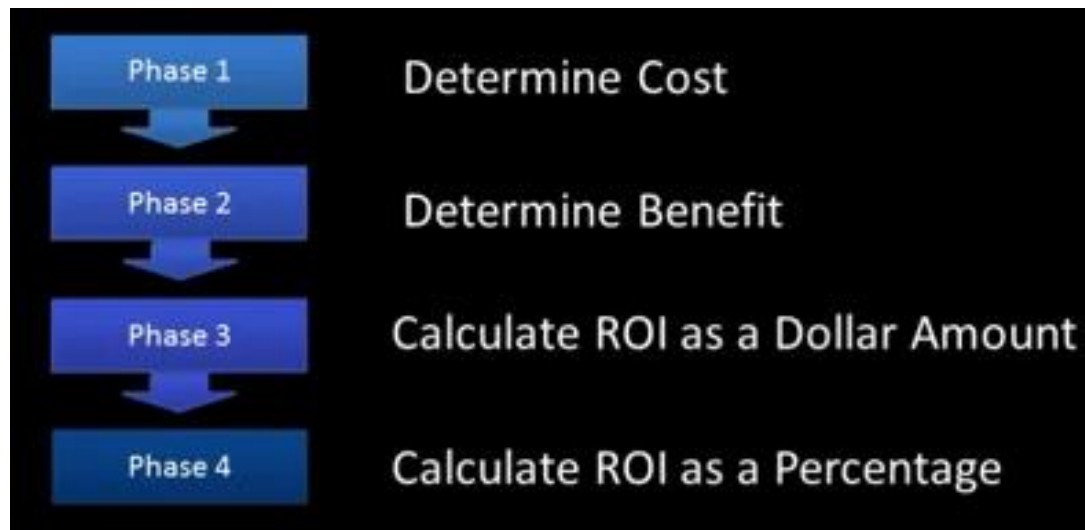
- Return on investment (ROI) is often expressed as a percentage which is calculated by subtracting the project costs from the benefits and then dividing by the costs.

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

Cash Flow Example on \$1,000 Investment

	Year 1	Year 2	Year 3	Year 4
Dollar Return	\$100	\$55	\$60	\$50
ROI	10%	5.5%	6%	5%

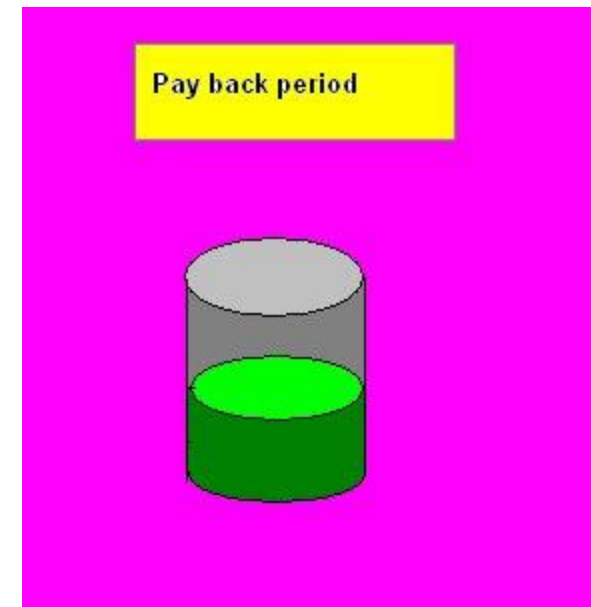
- Many organizations have a required rate of return or minimum acceptable rate of return on investment for projects.



Payback Analysis

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- ❑ Another important financial consideration is payback analysis.
- ❑ Payback analysis is simply a calculation of how long it will take to recover your investment. For example, if you buy a machine for \$30,000 and you expect that machine to produce \$10,000 a year in revenue, the payback period is 3 years. This helps provide a comparison between various investment choices. [1]
- ❑ The use of the Payback Period as a Capital Budgeting [7] decision rule specifies that all independent projects with a Payback Period less than a specified number of years should be accepted. [3]
- ❑ When choosing among mutually exclusive projects, the project with the quickest payback is preferred. [3]



Payback Analysis [3]

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- ❑ The calculation of the Payback Period is best illustrated with an example. Consider Capital Budgeting project A which yields the following cash flows over its five year life.

Year	Cash Flow
0	-1000
1	500
2	400
3	200
4	200
5	100

Payback Analysis [3]

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- To begin the calculation of the Payback Period for project A let's add an additional column to the above table which represents the Net Cash Flow (NCF) for the project in each year.
- Notice that after two years the Net Cash Flow is negative ($-1000 + 500 + 400 = -100$) while after three years the Net Cash Flow is positive ($-1000 + 500 + 400 + 200 = 100$). Thus the Payback Period, or breakeven point, occurs sometime during the third year.

Year	Cash Flow	Net Cash Flow
0	-1000	-1000
1	500	-500
2	400	-100
3	200	100
4	200	300
5	100	400

Payback Analysis [3]

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- If we assume that the cash flows occur regularly over the course of the year, the Payback Period can be computed using the following equation:

$$\text{Payback Period} = \left(\begin{array}{c} \text{Last year with a} \\ \text{negative NCF} \end{array} \right) + \left(\begin{array}{c} \text{Absolute Value of} \\ \text{NCF in that year} \\ \hline \text{Total Cash Flow} \\ \text{in the following year} \end{array} \right)$$

- Thus, the Payback Period for project A can be computed as follows:
- $\text{Payback Period} = 2 + (100)/(200) = 2.5 \text{ years}$
- Thus, the project will recoup its initial investment in 2.5 years.
- As a decision rule, the Payback Period suffers from several flaws. For instance, it ignores the Time Value of Money [4], does not consider all of the project's cash flows, and the accept/reject criterion is arbitrary.

Payback Analysis

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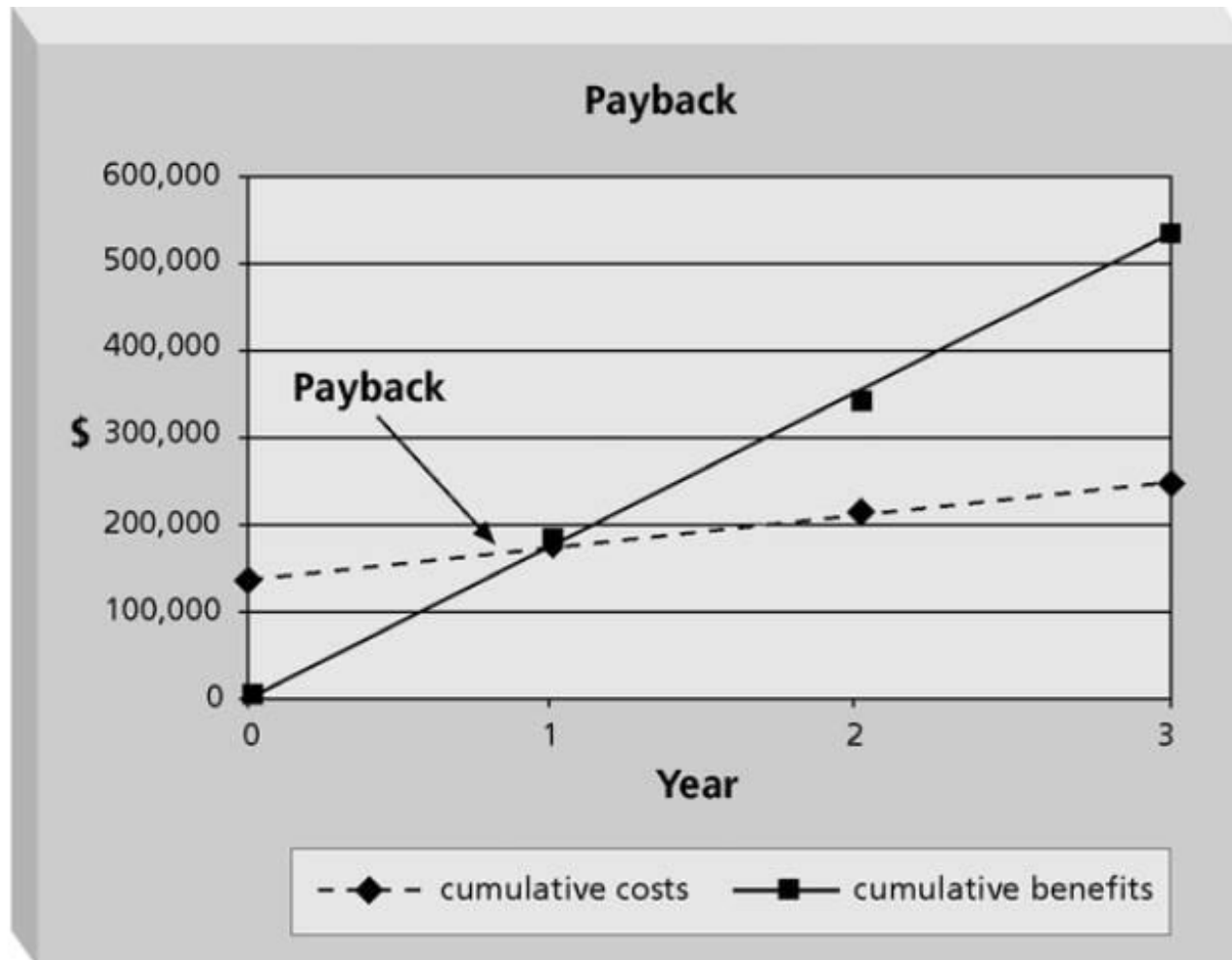
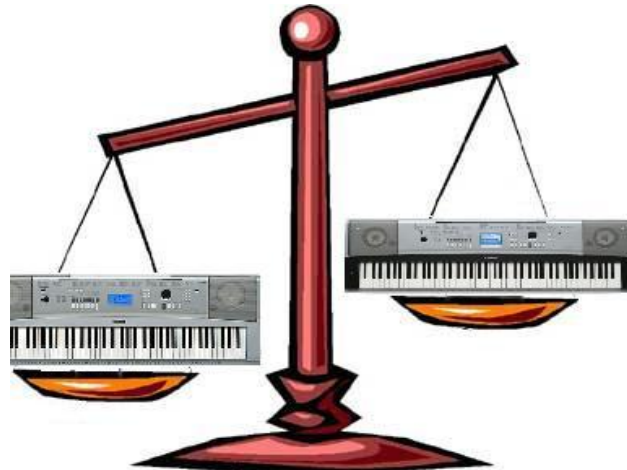


Figure 4-4. Charting the Payback Period

Weighted Scoring Model

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- ❑ 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:
 - ✓ Identify criteria important to the project selection process.
 - ✓ Assign weights (percentages) to each criterion so they add up to 100 percent.
 - ✓ Assign scores to each criterion for each project.
 - ✓ Multiply the scores by the weights to get the total weighted scores.
- ❑ The higher the weighted score, the better.



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Weighted Scoring Model

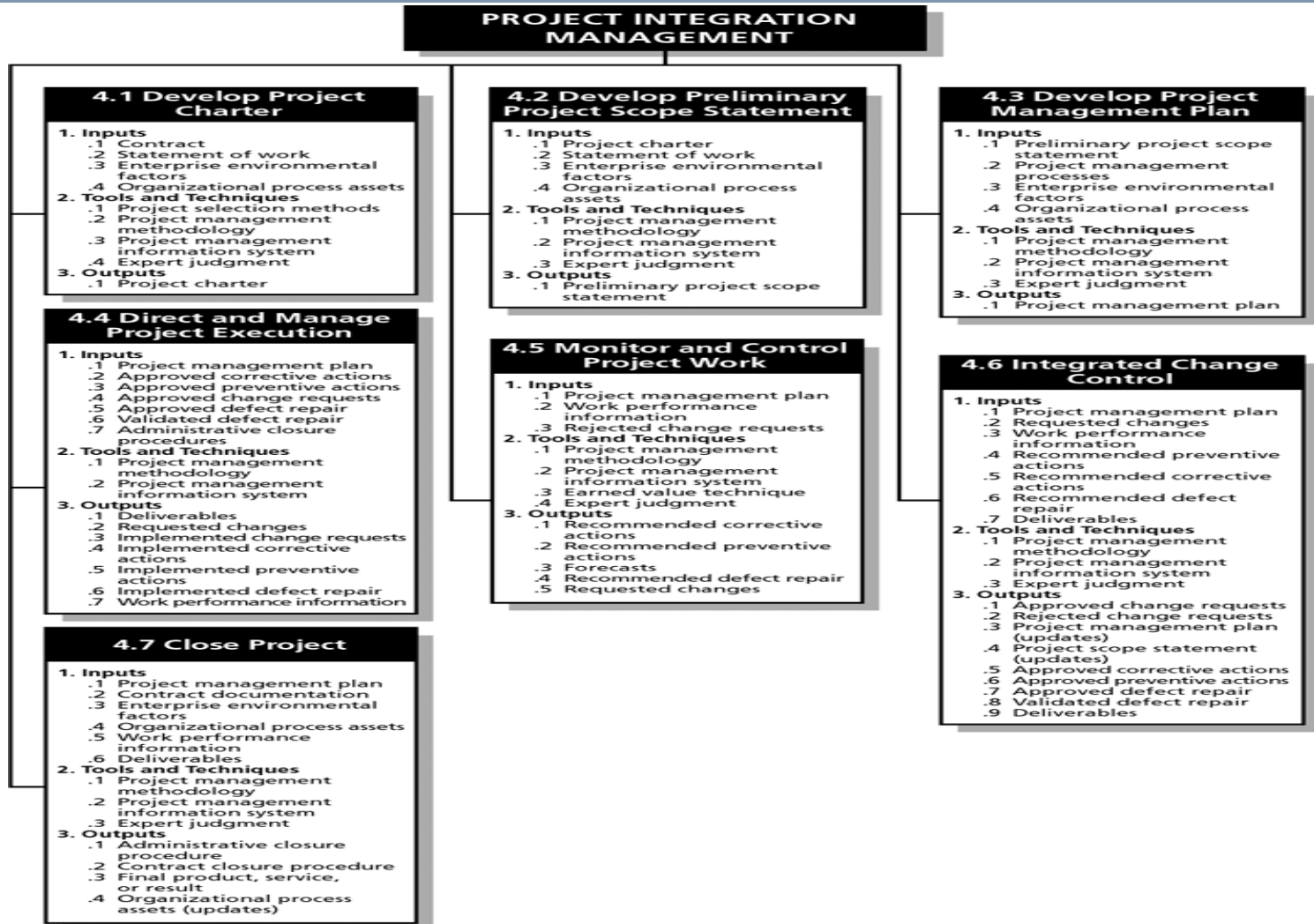
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	A	B	C	D	E	F
1	Criteria	Weight	Project 1	Project 2	Project 3	Project 4
2	Supports key business objectives	25%	90	90	50	20
3	Has strong internal sponsor	15%	70	90	50	20
4	Has strong customer support	15%	50	90	50	20
5	Realistic level of technology	10%	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 Integration Management Overview

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Project Charter

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- ❑ 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.
- ❑ Allows PM to spend and time and money on a project
- ❑ PM is assigned prior to planning
- ❑ Defines the high level project requirements
- ❑ 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.

Project Charter

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- ❑ Project Description
- ❑ Business Objectives and Success Criteria
- ❑ Stakeholders
- ❑ Project Scope
- ❑ Assumptions and Dependencies
- ❑ Constraints
- ❑ Milestones
- ❑ Business Risks
- ❑ Resources

Project Management Plan

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- ❑ A project management plan, as defined in the PMBOK Guide Third Edition, is a formal, approved document that defines how the project is executed, monitored and controlled.
- ❑ It may be summary or detailed and may be composed of one or more subsidiary management plans and other planning documents.
- ❑ The objective of a project management plan is to define the approach to be used by the Project team to deliver the intended project management scope of the project.
- ❑ The project manager creates the project management plan following input from the project team and key stakeholders. The plan should be agreed and approved by at least the project team and its key stakeholders.

Project Management Plan

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- The project management plan typically covers topics used in the project execution system and includes the following main aspects:
 - ✓ Scope Management
 - ✓ Requirements Management
 - ✓ Schedule Management
 - ✓ Financial Management
 - ✓ Quality Management
 - ✓ Resource Management
 - ✓ Communications management
 - ✓ Project Change Management
 - ✓ Risk Management
 - ✓ Procurement Management

Stakeholder Analysis

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- ❑ 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

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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

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- ❑ 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

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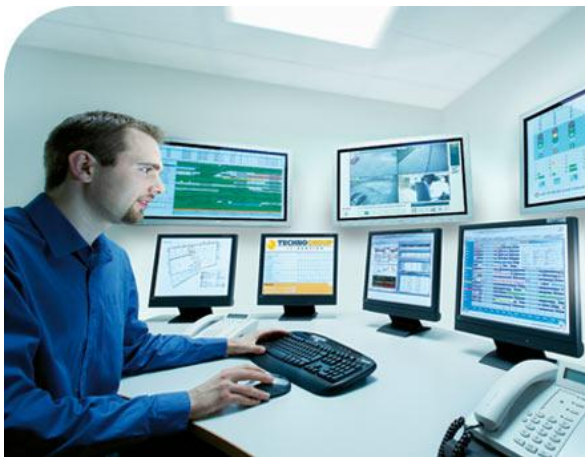
- ❑ Project planning and execution are intertwined and inseparable activities.
- ❑ Those who will do the work should help to plan the work.
- ❑ Project managers must solicit input from the team to develop realistic plans.



Monitoring and Controlling Project Work

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- ❑ Monitoring and controlling the processes used to initiate, plan, execute, and close a project to meet the performance objectives defined in the project management plan.
- ❑ 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

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- ❑ Reviewing all change requests, approving changes, and controlling changes to the deliverables and organizational process assets.
- ❑ Three main objectives are:
 - ✓ Identify the factors that create changes to ensure that changes are beneficial.
 - ✓ Determine that a change has occurred.
 - ✓ Manage actual changes as they occur.



Change Control System

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- ❑ 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 is 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.



Making Timely Changes

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- ❑ 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
 - ✓ A “48-hour policy” allows project team members to make a decision and have 48 hours to seek approval from top management. If the team decision cannot be implemented, management has 48 hours to reverse a decision; otherwise, the team’s decision is approved.
 - ✓ Another policy is to delegate changes to the lowest level possible, but keep everyone informed of changes.

Closing Projects

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



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