

CHAPTER 2

PROJECT INTEGRATION MANAGEMENT

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2.1 What is Project Integration Management?

- It involves coordinating all of the other project management knowledge areas throughout a project's life cycle. This integration ensures that all the elements of a project come together at the right times to complete a project successfully.
- Project integration management is usually the most important project management knowledge area, because it ties together all the other areas of project management.
- A project manager's primary focus should be on project integration management.



- Six main processes are involved in project integration management (PMBOK® Guide – Sixth Edition):
 - 1) Developing the project charter involves working with stakeholders to create the document that formally authorizes a project—the **charter**.
 - 2) Developing the project management plan involves coordinating all planning efforts to create a consistent, coherent document—the **project management plan**.
 - 3) Directing and managing project work involves carrying out the project management plan by performing the activities included in it.



- 4) Managing project knowledge involves using existing knowledge and creating new knowledge to achieve project objectives while also contributing to organizational learning.
- 5) Monitoring and controlling project work involves overseeing activities to meet the performance objectives of the project.
- 6) Performing integrated change control involves identifying, evaluating, and managing changes throughout the project life cycle.
- 7) Closing the project or phase involves finalizing all activities to formally close the project or phase.



2.2 Strategic Planning and Project Selection

- Successful leaders look at the big picture or strategic plan of the organization to determine what types of projects will provide the most value.

2.2.1 Strategic Planning

- Strategic planning involves determining long-term objectives by analysing the strengths and weaknesses of an organisation, studying opportunities and threats in the business environment, predicting future trends, and projecting the need for new products and services.
- Strategic planning provides important information to help organisations identify and then select potential projects.



- One of the tools that used in strategic planning is SWOT Analysis. That is analysing Strengths, Weaknesses, Opportunities, and Threats.
- To perform a SWOT analysis → using mind mapping
- A mind mapping is a technique that uses branches radiating from a core idea to structure thoughts and ideas.



Figure 2.1 A sample mind map of a SWOT analysis to help identify potential projects



2.2.2 Identifying Potential Projects

The first step in project management is deciding what projects to do in the first place. Therefore, project initiation starts with identifying potential projects, using realistic methods to select which projects to work on, and then formalizing their initiation by issuing some sort of project charter.



- Figure 2.2 shows a four-stage process for selecting IT projects. (Note the hierarchical structure of this model and the results produced from each stage.)

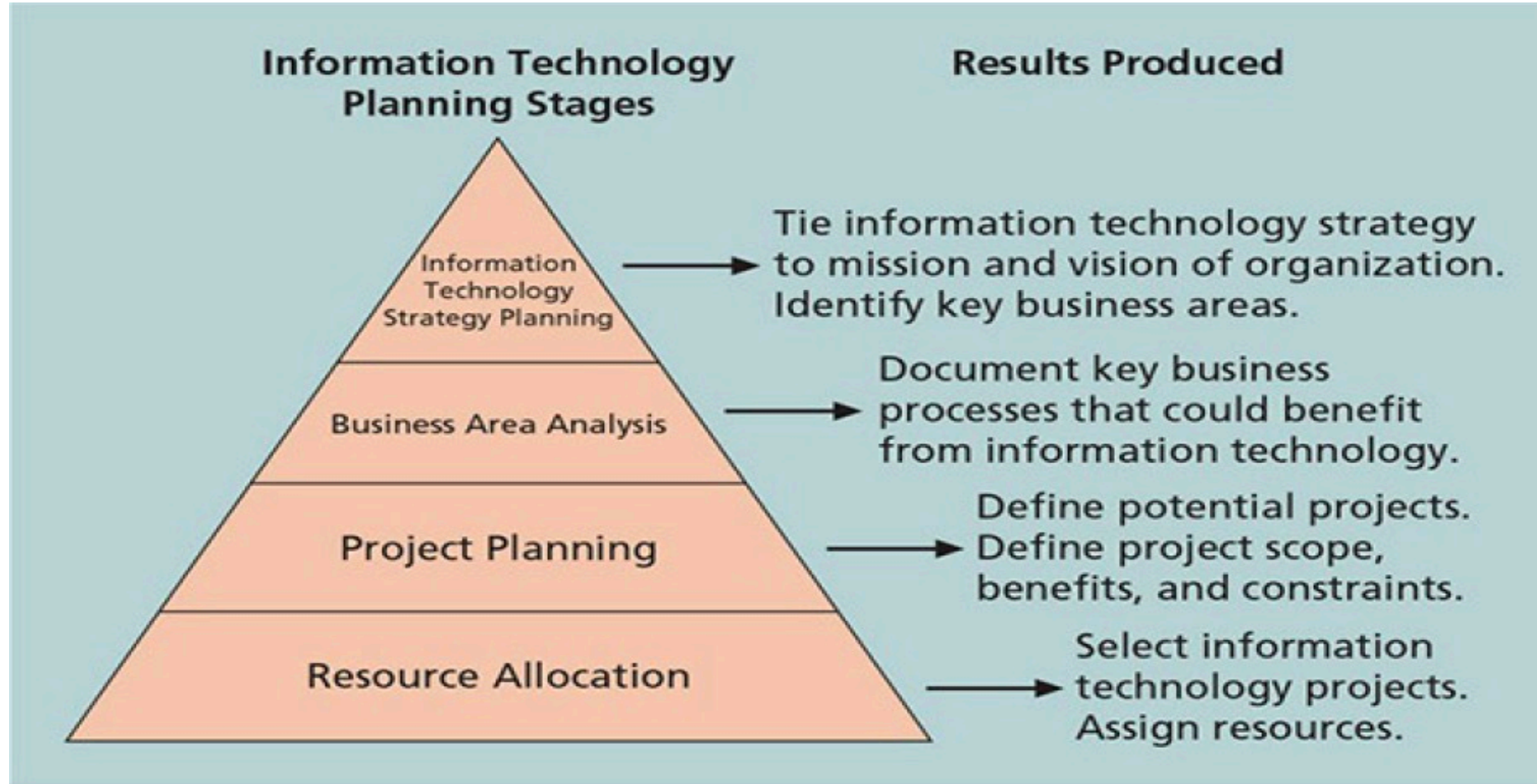


Figure 2.2 Planning process for selecting IT projects



- In the first stage of the selection process, starting at the top of the hierarchy, a steering committee develops an IT strategic plan that is tied to the organization's overall strategic plan.
- In many organizations, this steering committee consists of managers from departments throughout the company to ensure that all projects are selected in the best interests of the entire organization.
- The head of the Project Management Office (PMO) would be part of this committee because the PMO acts as the central location for keeping track of all project activities.



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- After identifying strategic goals, the next stage in the process for selecting IT projects is to perform a business area analysis.
- This analysis outlines business processes that are central to achieving strategic goals and helps determine which processes could most benefit from IT.
- In the next stage, the organization starts defining the scope, benefits, and constraints of potential IT projects.
- The last stage in the process for selecting IT projects is choosing which projects to do and assigning resources for working on them.



2.2.3 Aligning IT with Business Strategy

- Aligning IT projects with business strategy is at **the heart** of selecting IT projects.
- This is consistently a top concern for CIOs. It is often difficult to educate line managers on technology's possibilities and limitations and keep IT professionals in tune with changing business needs.
- Most organizations face thousands of problems and opportunities for improvement.
- To get the most value from technology, an organization's strategic plan should guide the IT project selection process.



- An organization must develop a strategy for using IT to define how it will support the organization's objectives. This IT strategy must align with the organization's strategic plans.
- In fact, research shows that supporting explicit business objectives is the top reason cited for why organizations invest in IT projects.
- Other top criteria for investing in IT projects include supporting implicit business objectives and providing financial incentives, such as a good internal rate of return (IRR) or net present value (NPV).



- Information systems often are central to business strategy.
- Author Michael Porter, who developed the concepts of the strategic value of competitive advantage and value chain, and many other experts have emphasized the importance of using IT to support strategic plans and provide a competitive advantage.
- Many information systems are classified as strategic because they directly support key business strategies.
- For example, information systems can support an organizational strategy of being a low-cost producer. As one of the largest retailers in the United States, Walmart's inventory control system is a classic example of such a strategic system. Information systems can support a strategy of providing specialized products or services that set a company apart from others in the industry.



- Consider the classic example of Federal Express's introduction of online package tracking systems. FedEx was the first company to provide this type of service, which gave it a competitive advantage until others developed similar systems. Information systems can also support a strategy of selling to a particular market or occupying a specific product niche.



2.3 Methods for Selecting Projects

- Organizations identify many potential projects as part of their strategic planning processes, and they need to narrow down the list of potential projects to the ones that will be of most benefit.
- Selecting projects is not an exact science, and many methods exist for selecting projects.



- Five common techniques are as follows:
 1. Focusing on broad organizational needs
 2. Categorizing IT projects
 3. Performing net present value or other financial analyses
 4. Using a weighted scoring model
 5. Implementing a balanced scorecard



2.3.1 Focusing on broad organizational needs

One method for selecting projects based on broad organizational needs is to determine whether they first meet three important criteria: **need, funding, and will**.

- Do people in the organization agree that the project needs to be done?
- Does the organization have the desire and capacity to provide adequate funds to perform the project?
- Is there a strong will to make the project succeed?



2.3. 2 Categorizing IT projects

Another method for selecting projects is based on various categorizations, such as the project's impetus, time window, and general priority. The impetus for a project is often to respond to a problem, an opportunity, or a directive.

- Problems are undesirable situations that prevent an organization from achieving its goals. These problems can be current or anticipated.



For example, users of an information system may be having trouble logging on to the system or getting information in a timely manner because the system has reached its capacity. In response, the company could initiate a project to enhance the current system by adding more access lines or upgrading the hardware with a faster processor, more memory, or more storage space.



- Opportunities are chances to improve the organization.

For example, the project described in the chapter's opening case involves creating a new product that can make or break the entire company.

- Directives are new requirements imposed by management, government, or some external influence.

For example, many projects that involve medical technologies must meet rigorous government requirements.



- Organizations select projects for any of these reasons. It is often easier to get approval and funding for projects that address problems or directives because the organization must respond to these categories to avoid hurting their business



2.3.3 Performing net present value or other financial analyses

- Financial considerations are an important aspect of the project selection process, whether economic times are tough or the economy is growing. As authors Dennis Cohen and Robert Graham put it, "Projects are never ends in themselves."
- Financially they are always a means to an end, cash. Many organizations require an approved business case before pursuing projects, and financial projections are a critical component of the business case.



- Three primary methods for projecting the financial value of projects include **net present value analysis, return on investment, and payback analysis.**



1. Net Present Value Analysis (NPV)

NPV \longrightarrow The time value of money.

In order to evaluate potential projects equally, you need to consider their net present value.

- Net present value (NPV) analysis is a method of calculating the expected net monetary gain or loss from a project by calculating the value of all expected future cash inflows and outflows at the present time.
- An organization should consider only projects with a positive NPV if financial value is a key criterion for project selection.



- A positive NPV means that the return from a project exceeds the cost of capital –the return available from investing the capital elsewhere.
- In other words, the cost of capital is the rate of return that could have been earned by putting the same money into a different investment with equal risk. Projects with higher NPVs are preferred to projects with lower NPVs, if all other factors are equal.



- To calculate NPV, you must assume a certain discount rate.
- The discount rate is the interest rate used to discount cash flows.
- It takes into account not just the time value of money but also the risk or uncertainty of future cash flows. The greater the uncertainty of future cash flows, the higher the discount rate. It is also called the capitalization rate or the opportunity cost of capital .



Illustration:

This concept in Microsoft Excel for two different projects.

Note that this example starts discounting immediately in Year 1 and uses a 10 percent discount rate. You can use the NPV function in Excel to calculate the NPV quickly.



| | 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 2.4 Net present value example



Figure 2.4 lists the projected benefits first, followed by the costs, and then the calculated cash flow amount.

Note that the sum of the cash flow –benefits minus costs or income minus expenses—is the same for both projects at \$5,000.

- The net present values are different, however, because they account for the time value of money.
- Project 1 has a negative cash flow of \$5,000 in the first year, while Project 2 has a negative cash flow of only \$1,000 in the first year.



- Although both projects have the same total cash flows without discounting, they are not of comparable financial value.
- Project 2's NPV of \$3,201 is better than Project 1's NPV of \$2,316.
- NPV analysis, therefore, is a method for making equal comparisons between cash flows for multiyear projects.



The Formula for NPV

$$NPV = \frac{\text{Cash flow}}{(1 + i)^t} - \text{initial investment}$$

Where,

i = *Required return or Discount Rate*

t = *Number of time periods*



- The result of the formula yields an NPV of \$2,316 for Project 1 and \$3,201 for Project 2. Because both projects have positive NPVs, they are good candidates for selection. However, because Project 2 has an NPV that is 38 percent higher than Project 1, it would be the better choice. If the two numbers are close, then other methods should be used to help decide which project to select.



If you cannot enter the data into spreadsheet software, you can perform the calculations by hand or with a calculator.

For example, the discount factors used in Figure 4-5 are calculated as follows:

$$\text{Year 0 : discount factor} = 1/(1 + 0.08)^0 = 1$$

$$\text{Year 1 : discount factor} = 1/(1 + 0.08)^1 = 0.93$$

$$\text{Year 2 : discount factor} = 1/(1 + 0.08)^2 = 0.86$$

$$\text{Year 3 : discount factor} = 1/(1 + 0.08)^3 = 0.79$$



- After determining the discount factor for each year, multiply the costs and benefits each year by the appropriate discount factor. (Note that the discount factor in this case is rounded to two decimal places.)
- For example, in Figure 2.5, the discounted cost for Year 1 is $\$40,000 \times 0.93 = \$37,200$.
- Next, sum all of the discounted costs and benefits each year to get a total. The total discounted costs in Figure 4-5 are \$243,200.



| | | | | | | |
|---|-------------------|---------|---------|---------|---------|-------|
| 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 2.5 JWD Consulting net present value and return on investment example



- To calculate the NPV, subtract the total discounted costs from the total discounted benefits. In this example, the NPV is $\$516,000 - \$243,200 = \$272,800$.
- When calculating NPV, some organizations refer to the investment year or years for project costs as Year 0 and do not discount costs in Year 0. Other organizations start discounting immediately based on their financial procedures; it's simply a matter of preference for the organization.



The discount rate can also vary, often based on the prime rate and other economic considerations. Some people consider it to be the rate at which the organization could borrow money for the project. Financial experts in the organization can tell you what discount rate to use.



- When calculating NPV, you can enter costs as negative numbers instead of positive numbers, and you can list costs first and then benefits.



2. Return on Investment

Another important financial consideration is return on investment. **Return on investment (ROI)** is the result of subtracting the project costs from the benefits and then dividing by the costs.

The higher the ROI is, the better.

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



- For example

If you invest \$100 today and next year it is worth \$110, your ROI is $(\$110 - 100)/100$ or 0.10 (10 percent).

Note

That the ROI is always a percentage. It can be positive or negative. For multiyear projects, it is best to use discounted costs and benefits when calculating ROI.



Figure 2.5 shows an ROI of 112 percent, which you calculate as follows:

$$\text{ROI} = (516,000 - 243,200) / 243,200 = 112\%$$

An ROI of 112 percent is outstanding.



Many organizations have a required rate of return for projects. The required rate of return is the minimum acceptable rate of return on an investment.

For example

An organization might have a required rate of return of at least 10 percent for projects. The organization bases the required rate of return on what it could expect to receive elsewhere for an investment of comparable risk.



You can also determine a project's **internal rate of return (IRR)** by finding what discount rate results in an NPV of zero for the project.

- You can use the Goal Seek function in Excel to set the cell that contains the formula for NPV to the value 0 by changing the cell that contains the discount rate. The resulting discount rate is the IRR. For example, in Figure 2.4, you could set cell b7 to zero while changing cell b1 to find that the IRR for Project 1 is 27 percent.



3. Payback Analysis

- Payback analysis is another important financial tool when selecting projects.
- Payback period is the amount of time it will take to recoup the total dollars invested in a project, in terms of net cash inflows. In other words, payback analysis determines how much time will elapse before accrued benefits overtake accrued and continuing costs.



- Payback occurs when the net cumulative benefits equal the net cumulative costs or when the net cumulative benefits minus costs equal zero.
- Figure 2.5 shows how to find the payback period. The cumulative benefits minus costs for Year 0 is \$140,000. Adding that number to the discounted benefits minus costs for Year 1 results in \$8,800. Because that number is positive, the payback occurs in Year 1.



- Creating a chart helps illustrate more precisely when the payback period occurs.
- Figure 2.6 charts the cumulative discounted costs and cumulative discounted benefits each year using the numbers from Figure 2.5.
- Note that the lines cross around Year 1. This is the point where the cumulative discounted benefits equal the cumulative discounted costs, so that the cumulative discounted benefits minus costs is zero.
- Beyond this point, discounted benefits exceed discounted costs and the project shows a profit. An early payback period, such as in the first or second year, is considered very good.

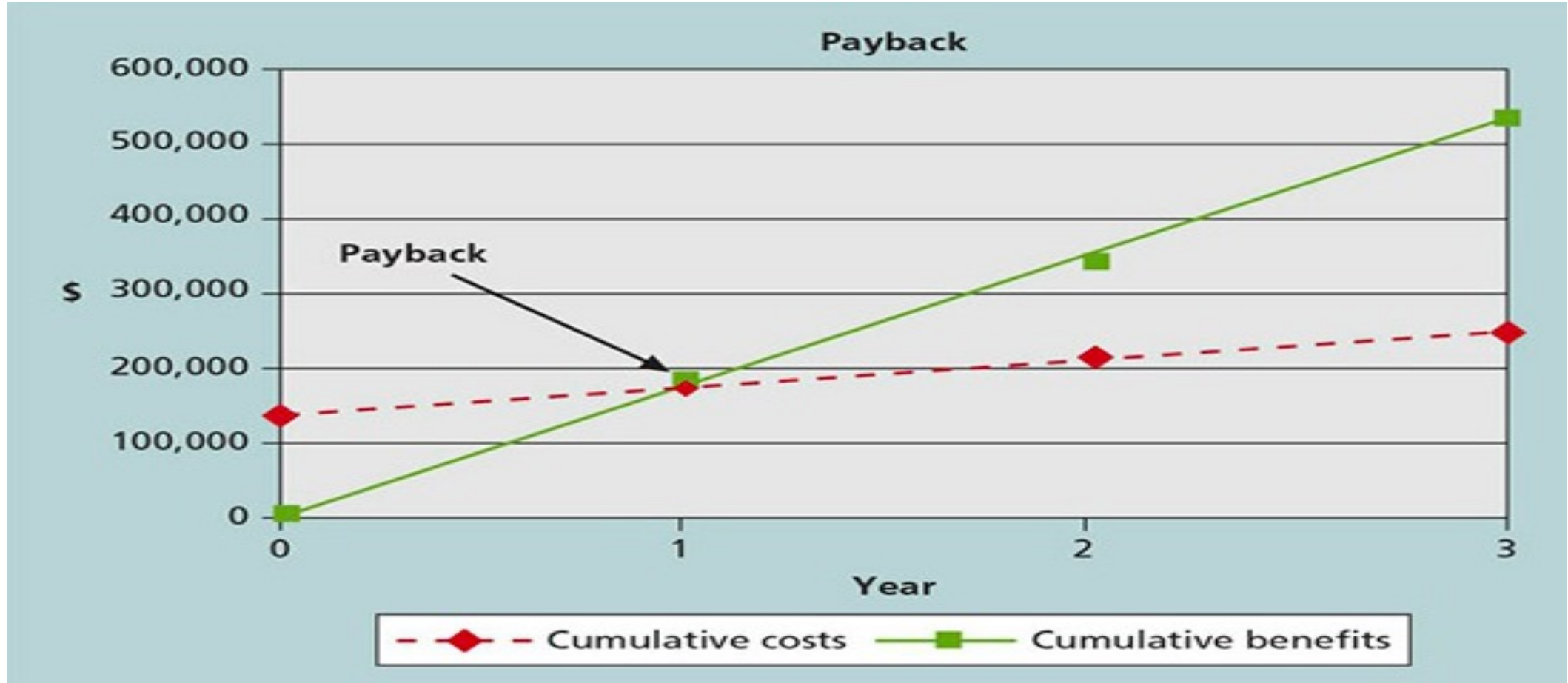


Figure 2.6 Charting the payback period for the JWD consulting project



- Many organizations have requirements for the length of the payback period of an investment.
- They might require all IT projects to have a payback period of less than two years or even one year, regardless of the estimated NPV or ROI.
- Dan Hoover, vice president and area director of Ciber Inc., an international systems integration consultancy, suggests that organizations, especially small firms, should focus on payback period when making IT investment decisions. "If your costs are recovered in the first year," Hoover said, "the project is worthy of serious consideration, especially if the benefits are high."



- If the payback period is more than a year, it may be best to look elsewhere. However, organizations must also consider long-range goals when making technology investments. Many crucial projects cannot achieve a payback so quickly or be completed in such a short time period.
- To aid in project selection, project managers must understand the organization's financial expectations for projects. Top management must also understand the limitations of financial estimates, particularly for IT projects. For example, it is very difficult to develop good estimates of projected costs and benefits for IT projects.



2.3.4 Using a weighted scoring model

- A weighted scoring model is a tool that provides a systematic process for selecting projects based on many criteria.
- These criteria can include factors such as meeting broad organizational needs; addressing problems, opportunities, or directives; the amount of time needed to complete the project; the overall priority of the project; and projected financial performance of the project.



- The first step in creating a weighted scoring model is to identify criteria that are important to the project selection process. It often takes time to develop and reach agreement on these criteria. Holding facilitated brainstorming sessions or using groupware to exchange ideas can aid in developing these criteria.



Possible criteria for IT projects include the following:

- Supports key business objectives or strategies
- Has strong internal sponsor
- Has strong customer support
- Uses realistic level of technology
- Can be implemented in one year or less
- Provides positive NPV
- Has low risk in meeting scope, time, and cost goals



- Next, you assign a weight to each criterion based on its importance. Once again, determining weights requires consultation and final agreement. You can assign weights based on percentages; the weights of the criteria must total 100 percent. You then assign numerical scores to each criterion (e.g., 0 to 100) for each project.
- The scores indicate how much each project meets each criterion. At this point, you can use a spreadsheet application to create a matrix of projects, criteria, weights, and scores.



- Figure 2.7 provides an example of a weighted scoring model to evaluate four different projects.
- After assigning weights for the criteria and scores for each project, you calculate a weighted score for each project by multiplying the weight for each criterion by its score and adding the resulting values.

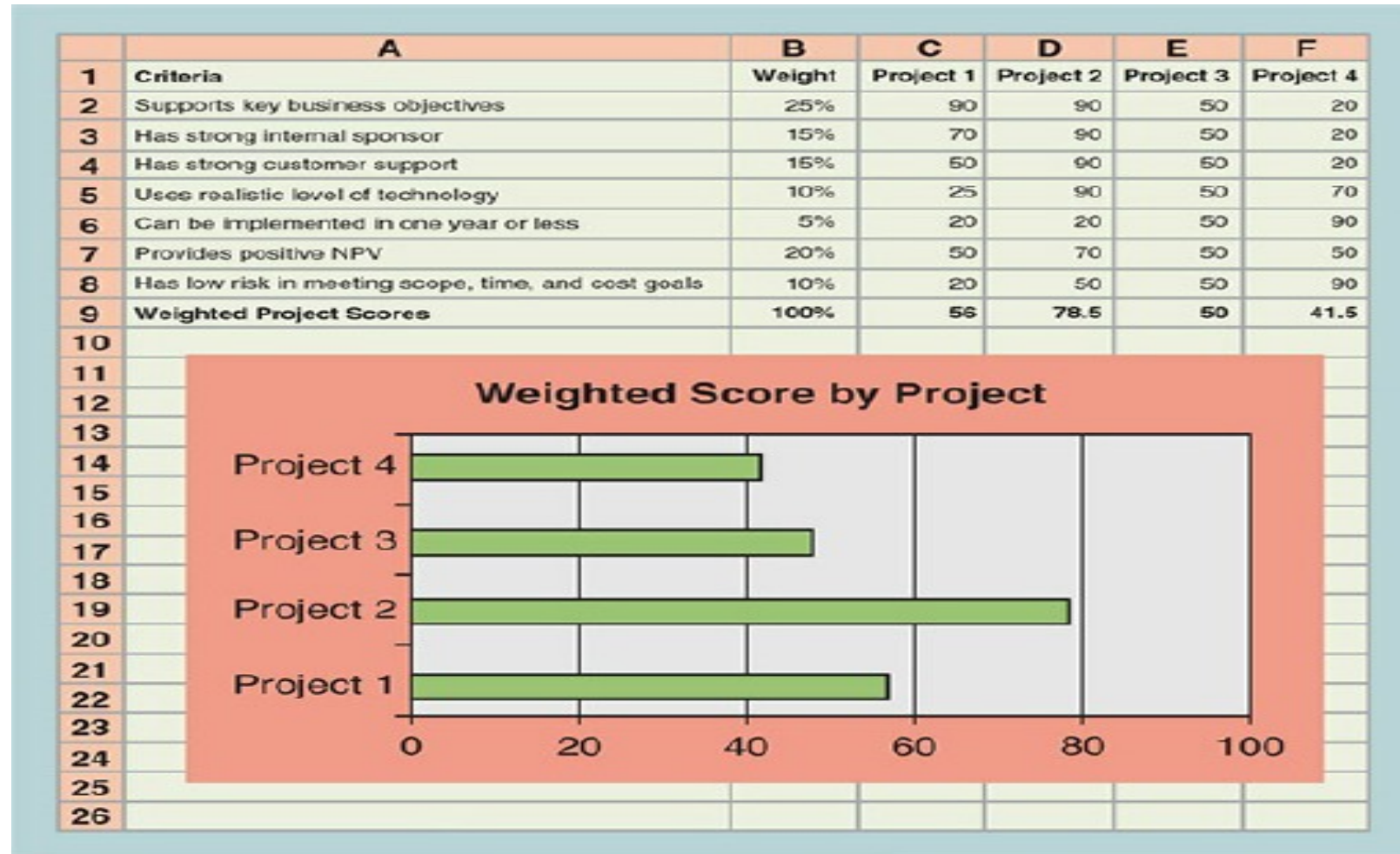


Figure 2.7 Sample weighted scoring model for project selection



For example, you calculate the weighted score for Project 1 in Figure 2.7 as

$$25\% * 90 + 15\% * 70 + 15\% * 50 + 10\% * 25 + 5 * 20 + 20\% * 50 + 10\% * 20 = 56$$



- If you create the weighted scoring model in a spreadsheet, you can enter the data, create and copy formulas, and perform a “what-if” analysis.
- For example, suppose that you want to change the weights for the criteria. By having the weighted scoring model in a spreadsheet, you can easily change the weights and update the weighted scores and charts automatically.
- This capability allows you to investigate various options for different stakeholders quickly. Ideally, the result should reflect the group’s consensus, and any major disagreements should be documented.



- You can also establish how well projects meet criteria by assigning points.
- For example, a project might receive 10 points if it definitely supports key business objectives, 5 points if it somewhat supports them, and 0 points if it is totally unrelated to key business objectives.
- With a point model, you can simply add all the points to determine the best projects for selection, without having to multiply weights and scores and sum the results.



- You can also determine minimum scores or thresholds for specific criteria in a weighted scoring model.
- For example, suppose that an organization should not consider a project if it does not score at least 50 out of 100 on every criterion. You can build this type of threshold into the weighted scoring model to reject projects that do not meet these minimum standards.
- As you can see, weighted scoring models can aid in project selection decisions.



2.3.5 Implementing a balanced scorecard

- Drs. Robert Kaplan and David Norton developed another 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.



- The Gartner Group estimates that over half of large U.S. organizations use this approach. The balanced scorecard has evolved over time. “The ‘new’ balanced scorecard transforms an organization’s strategic plan from an attractive but passive document into the ‘marching orders’ for the organization on a daily basis.
- It provides a framework that not only provides performance measurements but helps planners identify what should be done and measured. You can find several examples of balanced scorecards from manufacturing companies like Shat-R-Shield to non profits like the Kenya Red Cross at [www. Balancedscorecard.org](http://www.Balancedscorecard.org) .
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