OPERATIONS MANAGEMENT

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Operations Management (Hammond)

by Jamie Hammond

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La Crosse, WI

I developed the new Operations Management course for the Business Management program at Western Technical College to introduce students to the core concepts of operations management and its impact on organizational success. The course covers essential skills, from managing daily operations to planning and executing long-term projects, providing a comprehensive understanding of how businesses function efficiently.

Students will explore how organizations manage tasks, streamline processes, and gain a competitive edge. The course also introduces key topics such as project management, supply chain management, and inventory management, giving students a solid foundation in operational practices.

This course offers students a practical, cost-effective introduction to operational theories and hands-on experience with tools commonly used in business. By applying these principles, students will be able to enhance operational efficiency, lower costs, and contribute to long-term business strategies.

Jamie Hammond - Business Management program instructor

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1.1: Overview and Guiding Questions

Module 1: Overview and Guiding Questions

Within this module, students will be introduced to business operations and relate the four functions of management to the role of an Operations Manager.

Consider the following questions as you review the learning materials this week:

- What are the functional areas of business?
- Why is operations management important to an organization?
- How do goods and services differ?
- What does the transformation process consist of?
- How do the four functions of management relate to operations management?

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1.2: Functional Areas of Business

Four Functional Areas of a Business

A typical organization has four distinct basic functional areas; <u>operations</u>, <u>marketing and sales</u>, <u>finance</u>, and <u>human resources</u>.

- **Operations** is the area that is responsible for directly creating the product or service for which the customer will pay. The other three departments ensure that the operations of the business has everything needed in order to do the work.

- **Marketing & Sales** ensures that operations is producing the right product or service in a way that provides customers with all the features or characteristics that they value.

- **Finance** ensures that the funds for materials, supplies, payroll and equipment are available when needed.

- **Human Resources** ensures that the correct employees, with the adequate skills and experience are recruited, hired and trained. They are responsible for compensation, collection of income taxes, administration of benefits, succession planning and more. Without HR, there would be no employees in the operations department.
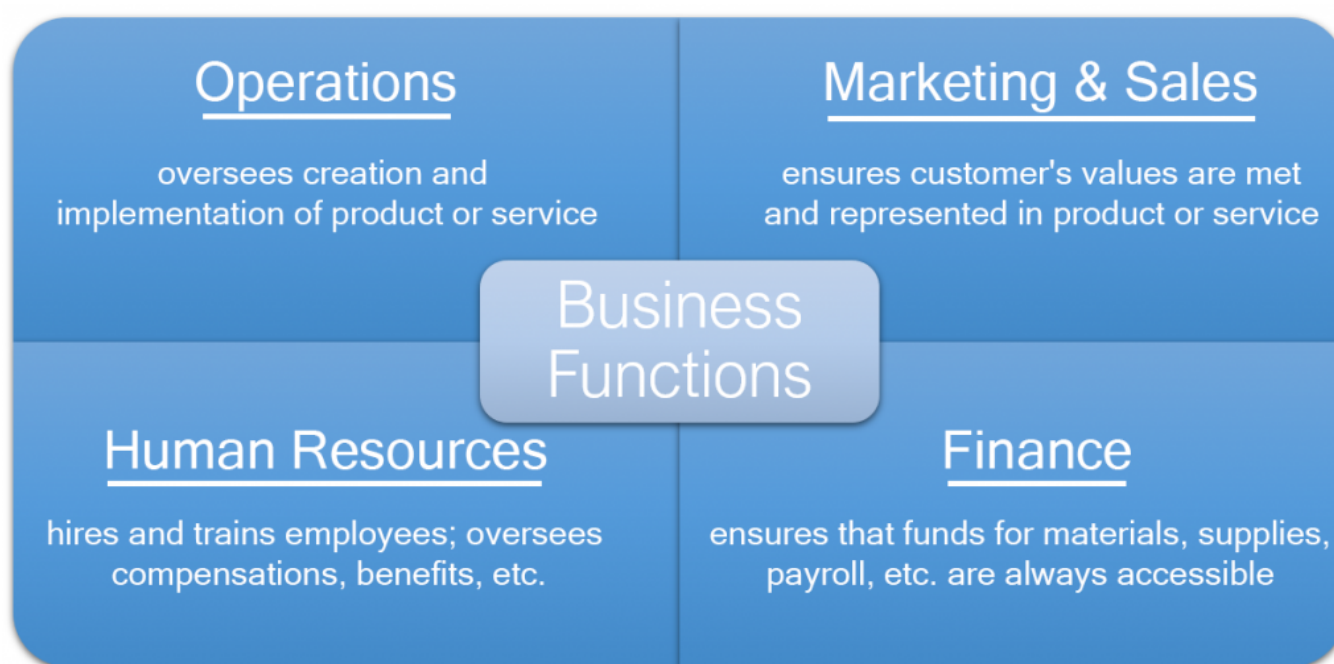
Figure 1.4: Business functions of departments.

The Operations Function

Every organization has an operations function, whether or not it is called 'operations'. The goal or purpose of most organizations involves the production of goods and/or services. To do this, they have to procure resources, convert them into outputs, and distribute them to their intended users. The term **operations** embraces all the activities required to create and deliver an organization's goods or services to its customers or clients.

Within large and complex organizations, operations is usually a major functional area, with people specifically designated to take responsibility for managing all or part of the organization's operations processes. It is an important functional area because it plays a crucial role in determining how well an organization satisfies its customers. In the case of private-sector companies, the mission of the operations function is usually expressed in terms of profits, growth and competitiveness; in public and voluntary organizations, it is often expressed in terms of providing value for money.

Corporate Hierarchy

The top manager of an operations department is usually called the **Director of Operations**.

Most operations departments will report to a **Chief Operating Officer** (COO), who reports to the **Chief Executive Officer** (CEO).

The COO is often considered the most important figure in a firm, next to the CEO.
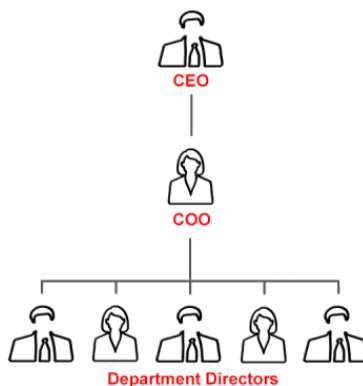
Figure 1.1: A diagram of corporate hierarchy.

The history of operations management can be traced back to the industrial revolution when production began to shift from small, local companies to large-scale production firms. One of the most significant contributions to operations management came in the early 20th century when Henry Ford pioneered the assembly line manufacturing process. This process drastically improved productivity and made automobiles affordable to the masses. Understanding the motivations behind innovations of the past can help us identify factors that may motivate individuals in the future of operations management.

1.3: Operations Management

What is Operations Management?

Operations management is the management of the processes that transform inputs into the goods and services that add value for the customer. Consider the ingredients of your breakfast this morning. Unless you live on a farm and produced them yourself, they passed through a number of different processing steps between the farmer and your table and were handled by several different organizations.

Every day, you use a multitude of physical objects and a variety of services. Most of the physical objects have been manufactured and most of the services have been provided by people in organizations. Just as fish are said to be unaware of the water that surrounds them, most of us give little thought to the organizational processes that produce these goods and services for our use. The study of operations deals with how the goods and services that you buy and consume every day are produced.

Why should I study Operations Management?

In most organizations, operations tends to be the largest department in terms of the number of employees. For a new graduate, you may be smart to look for a position within the operations of a business. In a larger company these jobs are far more plentiful than those in smaller departments. If you have a passion for working for a large organization, you might want to focus more on which organization you go to work for, and less focus on the actual job title. Soon enough, if you're punctual, energetic and proactive, you will likely apply or get promoted into the job you desire.

Operations is where the largest share of the firm's dollars are spent. It is a huge focus of top management.

All other departments in the organization are interrelated with operations. In finance, marketing and human resources, you will be interacting with operations on a regular basis. You should understand the businesses' core transformation process regardless of the department in which you work.

Major innovations are made through operations. If you look at successful companies such as Toyota, Amazon, or Dell, you will find that the keys to their success came from innovations to the operations processes of their businesses.

Operational innovation means coming up with entirely new ways of filling orders, developing products, providing customer service, or doing any other activity that an enterprise performs.

As a new grad in an organization, you will find that every business is looking for new ideas, tools, and improvement suggestions in order to improve on the effectiveness and the efficiency of the business.

- **Effectiveness** refers to making the right actions and plans in order to improve the business and add value for the customer. It is helping to get the business doing the right things for the customer.
- **Efficiency** is different. To be efficient means doing things well at the lowest cost possible. To be efficient, we look for ways to reduce unnecessary or redundant activities that add unnecessary cost and could be avoided.

Often, decisions that must be made will involve a trade-off between effectiveness and efficiency. Consider the decision to hire an extra full time server in a restaurant. The service may be faster and customers will feel as though their server was more attentive to their table. However, this comes at a higher cost, which is a reduction in efficiency.

We think of value as the relationship between quality and price. If we can provide the customer with a better quality product at the same price point, then that is adding value. If we are able to provide the same product but at a lower price, then the customer wins again.

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Now, watch this 4:13 video that provides further insight:
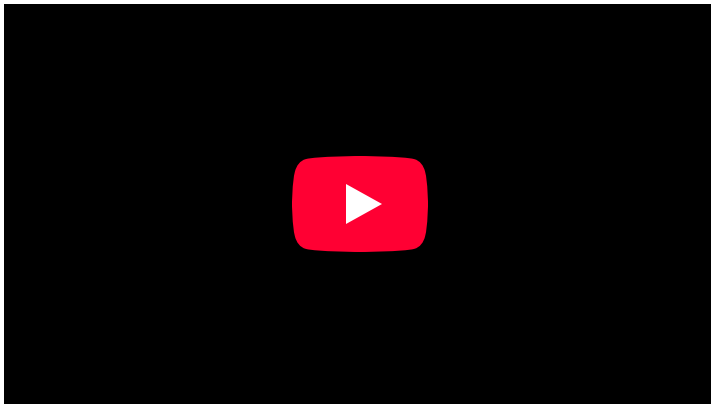
While watching the video, were you able to identify any opportunities for operational efficiencies where you work or have worked in the past?

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1.4: The Transformation Process

Transformation Processes

A **transformation process** is any activity or group of activities that takes one or more inputs, transforms and adds value to them, and provides outputs for customers or clients. Where the inputs are raw materials, it is relatively easy to identify the transformation involved, such as when milk is transformed into cheese or butter. Where the inputs are information or people, the nature of the transformation may be less obvious. For example, a hospital transforms ill patients (the input) into healthy patients (the output).

Examples of Transformation Processes:

· changes in the physical characteristics of materials or customers

· changes in the location of materials, information or customers

· changes in the ownership of materials or information

· storage or accommodation of materials, information or customers

· changes in the purpose or form of information

· changes in the physiological or psychological state of customers

Often all three types of **input** – materials, information and customers – must be transformed by a single organization. For example, withdrawing money from a bank account involves information about the customer's account, materials (such as checks and currency), and the customer. Treating a patient in hospital involves not only the "customer's" state of health, but also any materials used in treatment, as well as information about the patient.

As Figure 1.2 demonstrates, transformation processes can be categorized into four groups: **manufacture** (the physical creation of products, e.g. automobiles), **service** (the treatment of customers or storage of products, e.g. hospitals or warehouses), **supply** (a change in ownership of goods, e.g. retail), and **transport** (the movement of materials or customers, e.g. taxi service).
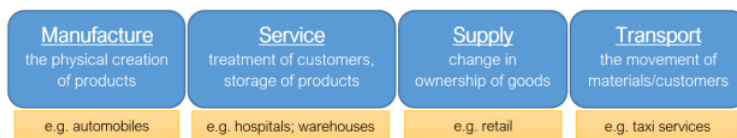
Figure 1.2: Categories of transformation processes.

Several different transformations are usually required to produce a good or service. The overall transformation can be described as the **macro operation**, and the more detailed transformations within this macro operation as **micro operations**. For example, the macro operation in a brewery is making beer (Figure 1.3). The micro operations include:

- milling the malted barley into grist
- mixing the grist with hot water to form wort
- cooling the wort and transferring it to the fermentation vessel
- adding yeast to the wort and fermenting the liquid into beer
- filtering the beer to remove the spent yeast
- decanting the beer into casks or bottles.
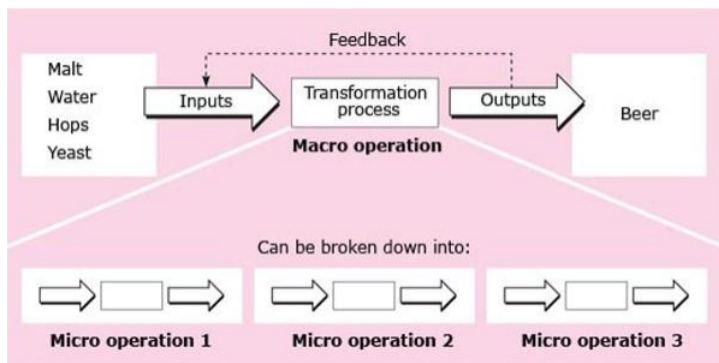
Figure 1.3: Macro and micro operations (transformation processes); Credit: The Open University / open.edu

Producing Goods and Services

The production and goods, and the performance of services are both part of operations management. There are however some key differences in the two.

In the production of goods the result is the creation of a tangible product such as a vehicle, an article of clothing, a cell phone or a shovel. A service on the other hand is an intangible such as a car repair, a haircut, or a medical treatment. There are some key differences in managing these two types of businesses.

1. Services have a much higher amount of customer contact. The customer will generally come to the service provider for the service to take place, or the service provider will come to the customer.
    - In manufacturing the customer rarely comes to our facility. The purchase generally takes place at a different location than the one where the manufacturing occurred. That simplifies matters quite a bit.
2. Services have a higher amount of labor content than manufacturing organizations.
3. Services have a much higher degree of input variability than do manufacturing companies. Each customer often arrives to a service with a unique set of circumstances that may require extra time and skills on the part of the service provider.
4. Measurement of quality is much more straight-forward in a manufacturing setting. There are many technical ways of deciding if manufactured goods have the required quality level.
    - In services many factors will affect the customers impression of the quality of the service received.
5. Measurement of productivity is very straight-forward in a manufacturing operation due to high degree of standardization in the inputs and outputs used.
    - In services it is more difficult to measure productivity.
6. Inventory can be stored in the case of a manufacturing organization. If goods are not sold in the intended week, then they can be put into storage to be sold at a later date.
    - In services, once the time period has passed, the opportunity to use that capacity is gone.

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The following 7:04 video illustrates the transformation process for both goods and services:

ions Systems –
Goods vs Services
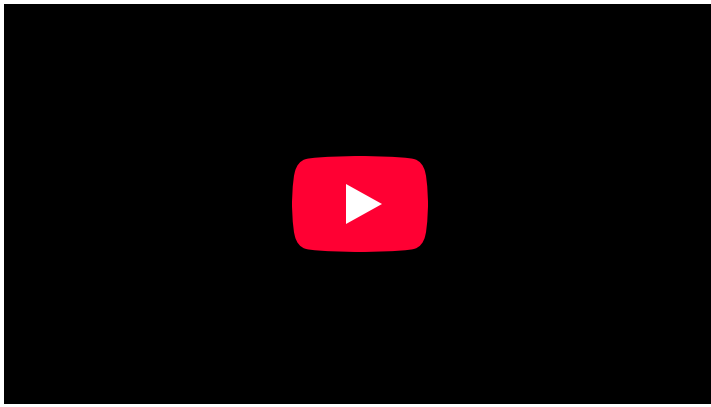
As you watch the video, pay close attention to how goods and services are differentiated.

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1.5: Understanding Operations Management

Important Concepts in Operations Management

Within this next section, you will be challenged to consider your understanding of the concepts related to operations management that you have learned about so far. Pay close attention to **Activity 1** and **Activity 2** within the reading. Each will help you gauge your level of understanding of the operation of a business and the role of an operations manager.

Operations, Operations Management, and Operations Managers

Operations management is concerned with the design, management, and improvement of the systems that create the organization's goods or services. The majority of most organizations' financial and human resources are invested in the activities involved in making products or delivering services. Operations management is therefore critical to organizational success.

Activity 1

Activity 1
For each of the following businesses, identify the main output of the operation:
- Brewery
- Publisher
- Hotel
- Insurance company
- Your organization

Discussion
You probably found it quite easy to identify the main output of a brewery as beer, and of a publisher as books or newspapers. However, the others are a bit trickier: a satisfied customer (hotel) and a customer bearing less financial risk (insurance company). Operations management deals with producing not only physical goods, but also satisfied customers. An understanding of the principles of operations management is important for all managers, because they provide a systematic way of looking at an organization's processes. The need to manage manufacturing and service operations efficiently and effectively has led to a considerable increase in interest in operations management in recent years. However, the concept of operations is not new.

Historical Development of Operations Management

Operations in some form have been around as long as human endeavor itself but, in manufacturing at least, it has changed dramatically over time, and there are three major phases - craft manufacturing, mass production and the modern period. Let's look at each of these briefly in turn.

Craft Manufacturing

Craft manufacturing describes the process by which skilled craftspeople produce goods in low volume, with a high degree of variety, to meet the requirements of their individual customers. Over the centuries, skills have been transmitted from masters to apprentices and journeymen, and controlled by guilds. Craftspeople usually worked at home or in small workshops. Such a system worked well for small-scale local production, with low levels of competition. Some industries, such as furniture manufacture and clockmaking, still include a significant proportion of craft working.

Mass Production

In many industries, craft manufacturing began to be replaced by mass production in the 19th century. Mass production involves producing goods in high volume with low variety – the opposite of craft manufacturing. Customers are expected to buy what is supplied, rather than goods made to their own specifications. Producers concentrated on keeping costs, and hence prices, down by minimizing the variety of both components and products and setting up large production runs. They developed aggressive advertising and employed sales forces to market their products.

An important innovation in operations that made mass production possible was the system of standardized and interchangeable parts known as the 'American system of manufacture' (Hounshell, 1984), which developed in the United States and spread to the United Kingdom and other countries. Instead of being produced for a specific machine or piece of equipment, parts were made to a

standard design that could be used in different models. This greatly reduced the amount of work required in cutting, filing and fitting individual parts, and meant that people or companies could specialize in particular parts of the production process.

A second innovation was the development by Frederick Taylor (1911) of the system of 'scientific management', which sought to redesign jobs using similar principles to those used in designing machines. Taylor argued that the role of management was to analyze jobs in order to find the 'one best way' of performing any task or sequence of tasks, rather than allowing workers to determine how to perform their jobs. By breaking down activities into tasks that were sequential, logical and easy to understand, each worker would have narrowly defined and repetitive tasks to perform, at high speed and therefore with low costs (Kanigel, 1999).

A third innovation was the development of the moving assembly line by Henry Ford. Instead of workers bringing all the parts and tools to a fixed location where one car was put together at a time, the assembly line brought the cars to the workers. Ford thus extended the ideas of scientific management, with the assembly line controlling the pace of production. This completed the development of a system through which large volumes of standardized products could be assembled by unskilled workers at constantly decreasing costs – the apogee of mass production.

The Modern Period

Mass production worked well as long as high volumes of mass-produced goods could be produced and sold in predictable and slowly changing markets. However, during the 1970s, markets became highly fragmented, product life cycles reduced dramatically, and consumers had far greater choice than ever before.

An unforeseen challenge to Western manufacturers emerged from Japan. New Japanese production techniques, such as total quality management (TQM), just-in-time (JIT) and employee involvement were emulated elsewhere in the developed world, with mixed results. More recently, the mass production paradigm has been replaced, but there is as yet no single approach to managing operations that has become similarly dominant. The different approaches for managing operations that are currently popular include:

- Flexible specialisation (Piore and Sabel, 1984) in which firms (especially small firms) focus on separate parts of the value-adding process and collaborate within networks to produce whole products. Such an approach requires highly developed networks, effective processes for collaboration and the development of long-term relationships between firms.
- Lean production (Womack et al., 1990) which developed from the highly successful Toyota Production System. It focuses on the elimination of all forms of waste from a production system. A focus on driving inventory levels down also exposes inefficiencies, reduces costs, and cuts lead times.
- Mass customisation (Pine et al., 1993) which seeks to combine high volume, as in mass production, with adapting products to meet the requirements of individual customers. Mass customisation is becoming increasingly feasible with the advent of new technology and automated processes.
- Agile manufacturing (Kidd, 1994) which emphasizes the need for an organization to be able to switch frequently from one market-driven objective to another. Again, agile manufacturing has only become feasible on a large scale with the advent of enabling technology.

In various ways, these approaches all seek to combine the high volume and low cost associated with mass production with the product customisation, high levels of innovation and high levels of quality associated with craft production.

The Role of the Operations Manager

Some people (especially those professionally involved in operations management!) argue that operations management involves everything an organization does. In this sense, every manager is an operations manager, since all managers are responsible for contributing to the activities required to create and deliver an organization's goods or services. However, others argue that this definition is too wide, and that the operations function is about producing the right amount of a good or service, at the right time, of the right quality and at the right cost to meet customer requirements.
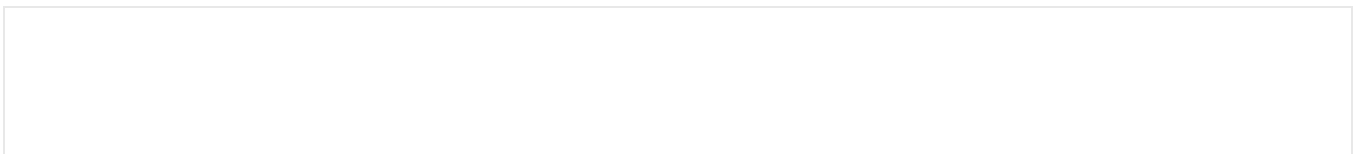
Activity 2

What do you think a typical operations manager does? Take a minute or so to consider.

Discussion

A stereotypical example of an operations manager would be a plant manager in charge of a factory, such as an automobile assembly plant. But other managers who work in the factory – quality managers, production and inventory control managers, and line supervisors – can also be considered to be working in operations management. In service industries, managers in hotels, restaurants, banks and stores are operations managers. In the not-for-profit sector, the manager of a nursing home or day centre for older people is an operations manager, as is the manager of a local government tax-collection office and the manager of a charity shop staffed entirely by volunteers.

So, operations managers are responsible for managing activities that are part of the production of goods and services. Their direct responsibilities include managing both the operations process, embracing design, planning, control, performance improvement, and operations strategy. Their indirect responsibilities include interacting with those managers in other functional areas within the organization whose roles have an impact on operations. Such areas include marketing, finance, accounting, personnel and engineering.

Operations managers' responsibilities include:

- Human resource management – the people employed by an organization either work directly to create a good or service or provide support to those who do. People and the way they are managed are a key resource of all organizations.
- Asset management – an organization's buildings, facilities, equipment and stock are directly involved in or support the operations function.
- Cost management – most of the costs of producing goods or services are directly related to the costs of acquiring resources, transforming them or delivering them to customers. For many organizations in the private sector, driving down costs through efficient operations management gives them a critical competitive edge. For organizations in the not-for-profit sector, the ability to manage costs is no less important.

Decision making is a central role of all operations managers. Decisions need to be made in:

- designing the operations system
- managing the operations system
- improving the operations system.

The five main kinds of decision in each of these relate to:

1. the processes by which goods and services are produced
2. the quality of goods or services
3. the quantity of goods or services (the capacity of operations)
4. the stock of materials (inventory) needed to produce goods or services
5. the management of human resources.

1.6: Primary Functions of Management

Learning Outcomes

- Explain the primary functions of management.
- Differentiate between the planning, organizing, leading, and controlling functions of management.

Effective management involves four primary functions and related skill sets: **planning**, **organizing**, **leading**, and **controlling**. Although there's a logical sequence to the functions, in practice the four functions are often performed in a dynamic manner.

For example, a manager would need to develop or reference a departmental or organizational plan prior to executing on it just as you would reference a map prior to embarking on a road trip. The proverb "if you fail to prepare you are preparing to fail" underscores the importance of this function. However, just as when road or airport closures or other factors might cause you to change your original route, unanticipated internal or external factors might cause a manager to revisit and revise the original plan, requiring a change in the other functions and associated tasks. Thus, achieving organizational goals—arriving at your intended destination—requires ongoing management of the process and an understanding of the interrelationship of the four functions.

As Figure 1 illustrates, a factor that impacts leading, for example, will have implications for controlling, planning and organizing. In summary, it is a management responsibility to ensure that unanticipated changes are factored in to the process and the integrity of the process is maintained.
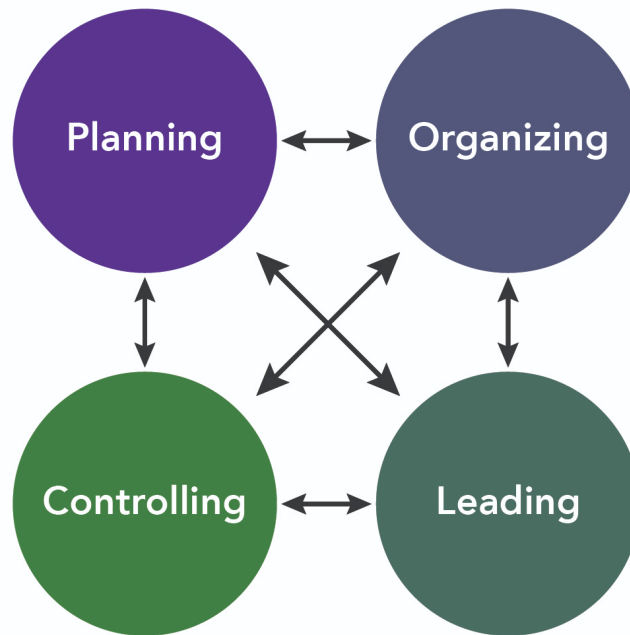
Figure 1. The key functions in the management process are connected, but not always linear.

Planning

Planning means defining performance goals for the organization and determining what actions and resources are needed to achieve the goals. Through planning, management defines what the future of the organization should be and how to get there. **Strategic plans** are long-term and affect the entire organization. A strategic plan bridges the gap between what an organization is and what it will become. **Tactical plans** translate strategic plans into specific actions that need to be implemented by departments throughout the organization. The tactical plan defines what has to be done, who will do it, and the resources needed to do it.

For instance, consider Company X who decided to become an elevator manufacturing and servicing company because of increased competition from Chinese steel. The management of the company set a goal of deriving the majority of its revenue from elevator-related activities. To do this, the management team made plans to create partnerships or take over existing elevator companies. The team devised plans to develop new human resources and to acquire other material resources. The company also had to divest

existing steel-related resources to raise capital for the new initiative. This example is a long-term strategic plan that will take years to complete and require many changes along the way. But it starts by defining a goal and a preliminary path to achieve it.

Organizing

Once plans are made, decisions must be made about how to best **implement** the plans. The **organizing** function involves deciding how the organization will be structured (by departments, matrix teams, job responsibilities, etc.). Organizing involves assigning authority and responsibility to various departments, allocating resources across the organization, and defining how the activities of groups and individuals will be coordinated.

In the case of Company X, the management had to determine how to support two very different sets of activities in order to achieve its long-term goal. Management needed to continue steel production activities to provide continuity of funds as the emphasis gradually shifted to elevator production. It also had to develop new skills and resources to build the company's elevator capabilities. A new organizational structure was needed that could support both business activities as one was downsized and the other built up.
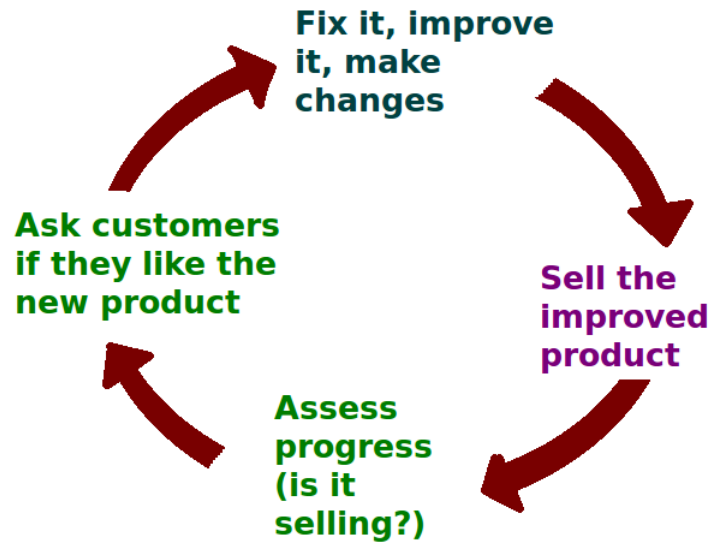
Leading

Nearly everything that is accomplished in an organization is done by people. The best planning and organizing will not be effective if the people in the organization are not willing to support the plan. **Leaders** use knowledge, character, and charisma to generate enthusiasm and inspire effort to achieve goals. Managers must also lead by communicating goals throughout the organization, by building commitment to a common vision, by creating shared values and culture, and by encouraging high performance. Managers can use the power of reward and punishment to make people support plans and goals. Leaders inspire people to support plans, creating belief and commitment. Leadership and management skills are not the same, but they can and do appear in the most effective people.

It is very difficult to motivate people when plans involve radical change, particularly if they include downsizing and layoffs. Many people are naturally resistant to change. When the change means loss of jobs or status, people will be very resistant. At Company X, the labor unions vehemently opposed the shift from steel production to elevator manufacturing. Although the people involved in the new business functions were excited by the plans, people involved with steel production felt abandoned and demotivated. Management would have been wise to get union support for its vision of the company's new future.

Controlling

There is a well-known military saying that says no battle plan survives contact with the enemy. This implies that planning is necessary for making preparations, but when it's time to implement the plan, everything will not go as planned. Unexpected things will happen. Observing and responding to what actually happens is called controlling. **Controlling** is the process of monitoring activities, measuring performance, comparing results to objectives, and making modifications and corrections when needed. This is often described as a **feedback loop**, as shown in the illustration of a product design feedback loop.

Fix it, improve it, make changes

Ask customers if they like the new product

Sell the improved product

Assess progress (is it selling?)

Product design feedback loop

Controlling may be the most important of the four management functions. It provides the information that keeps the corporate goal on track. By controlling their organizations, managers keep informed of what is happening; what is working and what isn't; and what needs to be continued, improved, or changed. Company X had little experience in elevator manufacturing when it was making plans. It was developing new products and processes and entering new markets. The management knew it could not anticipate all the difficulties it would encounter. Close monitoring as the plan progressed allowed the company to make changes and state-of-the-art innovations that have resulted in a very successful transition.

Who Directs Each Function?

Although these functions have been introduced in a particular order, it should be apparent that the different activities happen at the same time in any one organization. The control function ensures that new plans must be created. Leaders often step up as needed when a crisis or unexpected bump demands immediate action. All managers perform all of these functions at different times, although a manager's position or level in the organization will affect how much of his or her time is spent planning as opposed to leading or to controlling.

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1.7: The Management Process

Four Functions of Management

Watch the 5:39 video and consider how the four functions of management are utilized collectively:
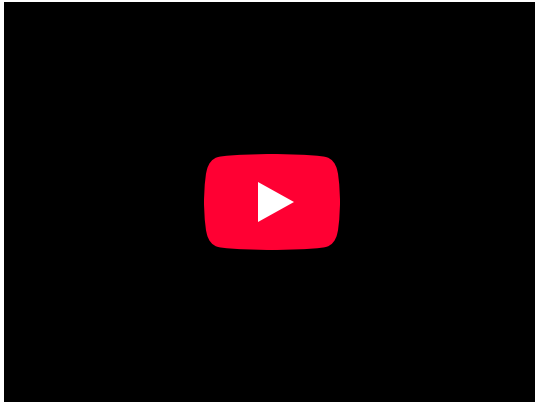
After reviewing the four functions and thinking about how they are interrelated, consider how an Operations Manager would utilize the four functions to transform inputs into outputs for both goods and services.

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CHAPTER OVERVIEW

2: Competitive Advantage

2.1: Overview and Guiding Questions

Module 2: Overview and Guiding Questions

Within this module, students will learn about strategies organizations employ to gain and maintain a competitive advantage.

Consider the following questions as you review the learning materials this week:

- What does an organization's mission represent?
- How does an organization's mission influence their strategic goals?
- Why is it important for an organization to gain a competitive advantage?
- What are business-level strategies?
- How is organizational performance measured?

2.2: The Strategy Hierarchy

Understanding the Strategy Hierarchy

In most corporations, there are several levels of management. Strategic management is the highest of these levels in the sense that it is the broadest and applies to all parts of the firm while also incorporating the longest time horizon. It gives direction to corporate values, corporate culture, corporate goals, and corporate missions. Under this broad corporate strategy there are typically business-level competitive strategies and functional unit strategies.[6]
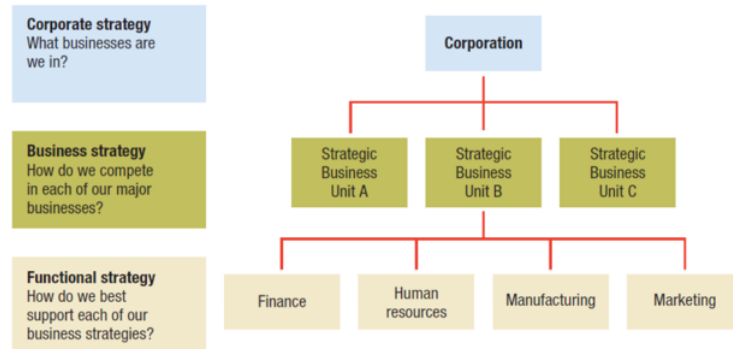

Figure 2.2: A hierarchical diagram detailing different strategies within a corporation; Credit: Abey Francis; https://www.mbaknol.com/strategic-management/business-strategy-hierarchy/

Corporate strategy refers to the overarching strategy of the diversified firm. Such a corporate strategy answers the questions of "in which businesses should we compete?" and "how does being in these businesses create synergy and/or add to the competitive advantage of the corporation as a whole?"

Business strategy refers to the aggregated strategies of a single business firm or a strategic business unit (SBU) in a diversified corporation. According to Michael Porter, a firm must formulate a business strategy that incorporates either cost leadership, differentiation or focus in order to achieve a sustainable competitive advantage and long-term success in its chosen arenas or industries.

Functional strategies include marketing strategies, new product development strategies, human resource strategies, financial strategies, legal strategies, supply-chain strategies, and information technology management strategies. The emphasis is on short- and medium-term plans and is limited to the domain of each department's functional responsibility. Each functional department attempts to do its part in meeting overall corporate objectives, and hence to some extent their strategies are derived from broader corporate strategies.

Many companies feel that a functional organizational structure is not an efficient way to organize activities, so they are reengineered according to processes or SBUs. A **strategic business unit** is a semi-autonomous unit that is usually responsible for its own budgeting, new product decisions, hiring decisions, and price setting. An SBU is treated as an internal profit centre by corporate headquarters.

An additional level of strategy called **operational strategy** was encouraged by Peter Drucker in his theory of Management By Objectives (MBO). It is very narrow in focus and deals with day-to-day operational activities such as scheduling criteria. Operational level strategies are informed by business level strategies which, in turn, are informed by corporate level strategies.[7]

Operations strategy categories can be broken down into many types of areas that must be addressed. The decisions made in these areas will determine whether the business strategy is executed. Below is a list of 10 critical decisions in operations management[8]:

1. **Design of Goods and Services** – The actual design of the product or service will have the largest impact on the cost to produce and the quality to achieve.

2. **Quality** – The way in which the organization will ensure that the product specifications are met. This may include the use of statistical process control, total quality management or Six Sigma.

3. **Process and Capacity Design** – The type of product along with its volume and variety will have the major impact on which type of process to be chosen.

4. **Location** – Important decisions such as how many locations and where to locate them are critical to organization success. This will be a major factor in terms of how quickly the transformation process can take place, and how quickly goods can be shipped to customers.

5. **Layout Design and Strategy** – Consider the placement of work centers, movement of goods, people and information How materials are delivered and used.

6. **Human Resources and Job Design** – Decisions regarding training for employees, how to motivate employees to achieve operational success.

7. **Supply Chain Decisions** – Decisions in terms of where suppliers are located and the level of supplier collaboration are major considerations that impact cost and delivery speed.

8. **Inventory** – How will inventories be used and controlled in the business and the supply chain

9. **Scheduling** – includes both how to schedule production, resources and employees in order to be effective, efficient and meet commitments to customers.

10. **Maintenance**– This involves maintaining equipment and machinery as well as keeping quality high and processes stable.

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2.3: Vision, Mission, and Goals

Learning Objectives

1. Define vision and mission and distinguish between them.
2. Know what the acronym SMART represents.
3. Be able to write a SMART goal.

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The Importance of Vision

"Good business leaders create a vision, articulate the vision, passionately own the vision, and relentlessly drive it to completion."

–Jack Welch, former CEO of General Electric

Many skills and abilities separate effective strategic leaders like Howard Schultz from poor strategic leaders. One of them is the ability to inspire employees to work hard to improve their organization's performance. Effective strategic leaders are able to convince employees to embrace lofty ambitions and move the organization forward. In contrast, poor strategic leaders struggle to rally their people and channel their collective energy in a positive direction.

As the quote from Jack Welch suggests, a vision is one key tool available to executives to inspire the people in an organization (Table 2.1). An organization's vision describes what the organization hopes to become in the future. Well-constructed visions clearly articulate an organization's aspirations. Avon's vision is "to be the company that best understands and satisfies the product, service, and self-fulfillment needs of women—globally." This brief but powerful statement emphasizes several aims that are important to Avon, including excellence in customer service, empowering women, and the intent to be a worldwide player. Like all good visions, Avon sets a high standard for employees to work collectively toward. Perhaps no vision captures high standards better than that of aluminum maker Alcoa. This firm's very ambitious vision is "to be the best company in the world—in the eyes of our customers, shareholders, communities and people." By making clear their aspirations, Alcoa's executives hope to inspire employees to act in ways that help the firm become the best in the world.

The results of a survey of one thousand five hundred executives illustrate how the need to create an inspiring vision creates a tremendous challenge for executives. When asked to identify the most important characteristics of effective strategic leaders, 98 percent of the executives listed "a strong sense of vision" first. Meanwhile, 90 percent of the executives expressed serious doubts about their own ability to create a vision (Quigley, 1994). Not surprisingly, many organizations do not have formal visions. Many organizations that do have visions find that employees do not embrace and pursue the visions. Having a well-formulated vision employees embrace can therefore give an organization an edge over its rivals.

Table 2.1 The Big Picture: Organizational Vision

An organization's vision describes what the organization hopes to become in the future. Visions highlight the values and aspirations that lay at the heart of the organization. Although visions statements have the potential to inspire employees, customers, and other stakeholders, vision statements are relatively rare and good visions are even rarer. Some of the visions being pursued by businesses today are offered below.

Company	Vision
Alcoa	To be the best company in the world–in the eyes of our customers, shareholders, communities and people.
Avon	To be the company that best understands and satisfies the product, service and self-fulfillment needs women–globally.
Chevron	To be the global energy company most admired for its people, partnership and performance.
Google	To develop a perfect search engine.
Kraft Foods	Helping people around the world eat and live better.

| Proctor and Gamble	Be, and be recognized as, the best consumer products and services company in the world.

*

Mission Statements

In working to turnaround Starbucks, Howard Schultz sought to renew Starbucks's commitment to its mission statement: "to inspire and nurture the human spirit—one person, one cup and one neighborhood at a time." A mission such as Starbucks's states the reasons for an organization's existence. Well-written mission statements effectively capture an organization's identity and provide answers to the fundamental question "Who are we?" While a vision looks to the future, a mission captures the key elements of the organization's past and present (Table 2.2).

Table 2.2 Missions

While a vision describes what an organization desires to become in the future, an organization's mission is grounded in the past and present. A mission outlines the reasons for the organization's existence and explains what role it plays in society. A well-written mission statement captures the organization's identity and helps to answer the fundamental question of "Who are we?" As a practical matter, a mission statement explains to key stakeholders why they should support the organization. The following examples illustrate the connections between organizations and the needs of their key stakeholders.

Company	Mission Statement
Harley Davidson	We ride with our customers and apply this deep connection in every market we serve to create superior value for all of our stakeholders.
Internal Revenue Service	Provide America's taxpayers top-quality srevice by helping them understand and meet their tax responsibilities and enforce the law with integrity and fairness to all.
Starbucks	To inspire and nurture the human spirit – one person, one cup and one neighborhood at a time.
The Estée Lauder Company	Bringing the best to everyone we touch and being the best in everything we do.
Limited Brands	Limited Brands is committed to building a family of the world's best fashion brands offering captivating customer experiences that drive long-term loyalty and deliver sustained growth for our shareholders.
Fender Musical Instruments	We will exceed the expectations of music enthusiasts worldwide and create a community for individual expression by focusing on our people, products, and business excellence.

Organizations need support from their key stakeholders, such as employees, owners, suppliers, and customers, if they are to prosper. A mission statement should explain to stakeholders why they should support the organization by making clear what important role or purpose the organization plays in society. Google's mission, for example, is "to organize the world's information and make it universally accessible and useful." Google pursued this mission in its early days by developing a very popular Internet search engine. The firm continues to serve its mission through various strategic actions, including offering its Internet browser Google Chrome to the online community, providing free e-mail via its Gmail service, and making books available online for browsing.
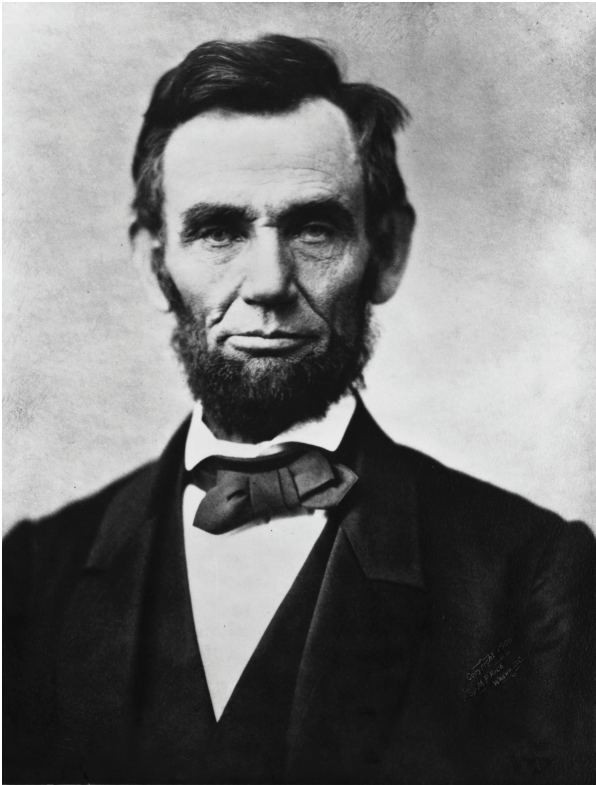
Many consider Abraham Lincoln to have been one of the greatest strategic leaders in modern history.

Wikimedia Commons – public domain.

One of Abraham Lincoln's best-known statements is that "a house divided against itself cannot stand." This provides a helpful way of thinking about the relationship between vision and mission. Executives ask for trouble if their organization's vision and mission are divided by emphasizing different domains. Some universities have fallen into this trap. Many large public universities were established in the late 1800s with missions that centered on educating citizens. As the twentieth century unfolded, however, creating scientific knowledge through research became increasingly important to these universities. Many university presidents responded by creating visions centered on building the scientific prestige of their schools. This created a dilemma for professors: Should they devote most of their time and energy to teaching students (as the mission required) or on their research studies (as ambitious presidents demanded via their visions)? Some universities continue to struggle with this trade-off today and remain houses divided against themselves. In sum, an organization is more effective to the extent that its vision and its mission target employees' effort in the same direction.

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Pursuing the Vision and Mission through SMART Goals

An organization's vision and mission offer a broad, overall sense of the organization's direction. To work toward achieving these overall aspirations, organizations also need to create goals—narrower aims that should provide clear and tangible guidance to employees as they perform their work on a daily basis. The most effective goals are those that are specific, measurable, aggressive, realistic, and time-bound. An easy way to remember these dimensions is to combine the first letter of each into one word: SMART (Table 2.3). Employees are put in a good position to succeed to the extent that an organization's goals are SMART.

Table 2.3 Creating SMART Goals

While missions and visions provide an overall sense of the organization's direction, goals are narrower aims that should provide clear and tangible guidance to employees. The most effective goals are those that are SMART (specific, measurable, aggressive, realistic, and time-bound). SMART goals help provide clarity, transparency, and accountability. As detailed below, one SMART goal is Coca-Cola's aim to "by 2012, improve our water efficiency by 20%, compared with a 2004 baseline."

Specific	Coca-Cola is seeking to improve its water efficiency by a specific amount–20%. In contrast, goals such as "do your best" are vague, making it difficult to decide if a goal is actually reached.
Measurable	Water efficiency can be calculated, so Coca-Cola is able to track its progress relative to its 20% target. If progress is slow, more resources can be devoted to achieving the goal.
Aggressive	A series of research studies have established that performance is strongest when goals are challenging but attainable. Reaching a 20% improvement will requires aggressive work by Coke, but the goal can be reached.
Realistic	If Coca Cola's water efficiency goal was 95% improvement, Coca Cola's employees would probably react with surprise. Reaching a goal must be feasible in order for employees to embrace it. Unrealistic goals make most people give up. And basing goals on impossible clichés, such as "give 110%" creates confusion.
Time-bound	Coca Cola is seeking to achieve its 20% improvement by 2012. Some universities, such as Texas Tech University, provide incentives, including preferred scheduling for students who sign contracts agreeing to graduate on a four-year schedule. Deadlines such as these are motivating and they create accountability.

A goal is **specific** if it is explicit rather than vague. In May 1961, President John F. Kennedy proposed a specific goal in a speech to the US Congress: "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth (National Aeronautics and Space Administration)." Explicitness such as was offered in this goal is helpful because it targets people's energy. A few moments later, Kennedy made it clear that such targeting would be needed if this goal was to be reached. Going to the moon, he noted, would require "a major national commitment of scientific and technical manpower, materiel and facilities, and the possibility of their diversion from other important activities where they are already thinly spread." While specific goals make it clear how efforts should be directed, vague goals such as "do your best" leave individuals unsure of how to proceed.

A goal is **measurable** to the extent that whether the goal is achieved can be quantified. President Kennedy's goal of reaching the moon by the end of the 1960s offered very simple and clear measurability: Either Americans would step on the moon by the end of 1969 or they would not. One of Coca-Cola's current goals is a 20 percent improvement to its water efficiency by 2012 relative to 2004 water usage. Because water efficiency is easily calculated, the company can chart its progress relative to the 20 percent target and devote more resources to reaching the goal if progress is slower than planned.

A goal is **aggressive** if achieving it presents a significant challenge to the organization. A series of research studies have demonstrated that performance is strongest when goals are challenging but attainable. Such goals force people to test and extend the limits of their abilities. This can result in reaching surprising heights. President Kennedy captured this theme in a speech in September 1962: "We choose to go to the moon. We choose to go to the moon in this decade…not because [it is] easy, but because [it is] hard, because that goal will serve to organize and measure the best of our energies and skills."

In the case of Coca-Cola, reaching a 20 percent improvement will require a concerted effort, but the goal can be achieved. Meanwhile, easily achievable goals tend to undermine motivation and effort. Consider a situation in which you have done so well in a course that you only need a score of 60 percent on the final exam to earn an A for the course. Understandably, few students would study hard enough to score 90 percent or 100 percent on the final exam under these circumstances. Similarly, setting organizational goals that are easy to reach encourages employees to work just hard enough to reach the goals.

It is tempting to extend this thinking to conclude that setting nearly impossible goals would encourage even stronger effort and performance than does setting aggressive goals. People tend to get discouraged and give up, however, when faced with goals that have little chance of being reached. If, for example, President Kennedy had set a time frame of one year to reach the moon, his goal would have attracted scorn. The country simply did not have the technology in place to reach such a goal. Indeed, Americans did not even orbit the moon until seven years after Kennedy's 1961 speech. Similarly, if Coca-Cola's water efficiency goal was 95

percent improvement, Coca-Cola's employees would probably not embrace it. Thus goals must also be **realistic**, meaning that their achievement is feasible.

You have probably found that deadlines are motivating and that they help you structure your work time. The same is true for organizations, leading to the conclusion that goals should be **time-bound** through the creation of deadlines. Coca-Cola has set a deadline of 2012 for its water efficiency goal, for example. The deadline for President Kennedy's goal was the end of 1969. The goal was actually reached a few months early. On July 20, 1969, Neil Armstrong became the first human to step foot on the moon. Incredibly, the pursuit of a well-constructed goal had helped people reach the moon in just eight years.

Americans landed on the moon eight years after President Kennedy set a moon landing as a key goal for the United States.

Wikimedia Commons – public domain.

The period after an important goal is reached is often overlooked but is critical. Will an organization rest on its laurels or will it take on new challenges? The US space program again provides an illustrative example. At the time of the first moon landing, *Time* magazine asked the leader of the team that built the moon rockets about the future of space exploration. "Given the same energy and dedication that took them to the moon," said Wernher von Braun, "Americans could land on Mars as early as 1982 (Time, 1969)." No new goal involving human visits to Mars was embraced, however, and human exploration of space was de-emphasized in favor of robotic adventurers. Nearly three decades after von Braun's proposed timeline for reaching Mars expired, President Barack Obama set in 2010 a goal of creating by 2025 a new space vehicle capable of taking humans beyond the moon and into deep space. This would be followed in the mid-2030s by a flight to orbit Mars as a prelude to landing on Mars (Amos, 2010). Time will tell whether these goals inspire the scientific community and the country in general (Table 2.4).

Table 2.4 Be SMART: Vision, Mission, Goals, and You

Many of the principles for effective organizational vision, missions, and goals apply to individuals too. Here are some ideas that might help you think differently about your own aspirations and how you are working to reach them.

Vision	Young children often have grandiose visions, such as "I want to be the president of the United States." Now that you are in college, what do you aspire to become? Is your education setting the stage for you to reach this vision?
Mission	Is your mission in life simply to accumulate as much wealth as you can? Or do you also place value on your role in a family and as a member of society?

Specific	Do you create explicit rather than vague goals for yourself? This can help you to target your energy toward what is important.
Measurable	Quantifying your goals allows you to track your accomplishments over time and can help reduce stress. For example, meeting a goal of "write a page every day" might prevent panic the night before an important project is due.
Aggressive	Creating aggressive educational goals (e.g. maintain a 3.5 GPA) is likely to lead to higher performance than minimal goals (e.g., pass all my classes).
Realistic	To better understand your prospects in the job market, consider researching what kinds of jobs are common for your major and experience level.
Time-Bound	Time management is a challenge in today's world. If you tend to procrastinate, setting interim deadlines for yourself might help you to stay on schedule.

Key Takeaway

- Strategic leaders need to ensure that their organizations have three types of aims. A vision states what the organization aspires to become in the future. A mission reflects the organization's past and present by stating why the organization exists and what role it plays in society. Goals are the more specific aims that organizations pursue to reach their visions and missions. The best goals are SMART: specific, measurable, aggressive, realistic, and time-bound.

Exercises

1. Take a look at the website of your college or university. What is the organization's vision and mission? Were they easy or hard to find?
2. As a member of the student body, do you find the vision and mission of your college or university to be motivating and inspirational? Why or why not?
3. What is an important goal that you have established for your career? Could this goal be improved by applying the SMART goal concept?
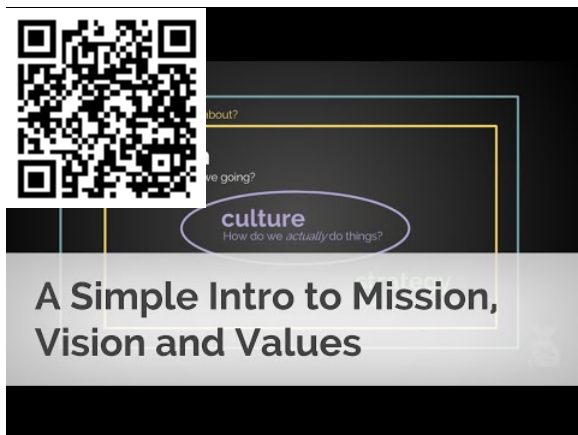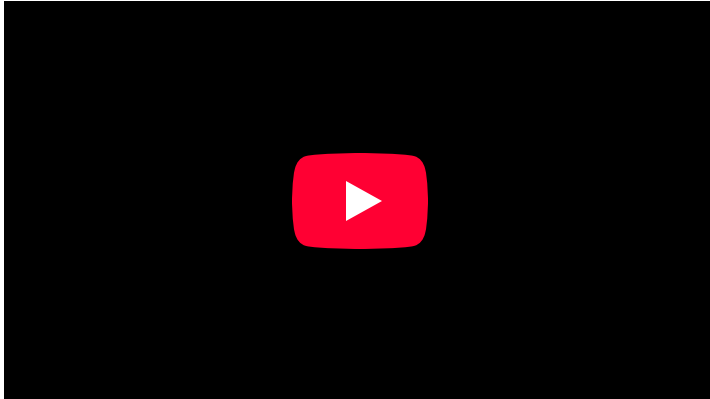
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2.4: Vision, Mission, and Values (Video)

Understanding the Purpose of Vision, Mission, and Values

To be successful, organizations need to know where they are headed and devise goals for getting there. Watch the following 3:09 video, which provides context for visualizing the important concepts and how they work together.

2.5: Competitive Advantage and Strategy

What is Competitive Advantage?

The concept of **competitive advantage** came into popular usage in the 1980s as an attempt to identify and define the strategic goals of the firm. In his now famous work *Competitive Advantage: Creating and Sustaining Superior Performance*, Michael Porter showed that the goal of all firms is to achieve a **competitive advantage in relation to their rivals**. This they do either by selling at a **lower cost/price** or by **differentiating their product** from those of their rivals (Porter 1985).

Text Source: Reinert, Kenneth A., and Ramkishen S. Rajan, editors. "Competitive Advantage." *The Princeton Encyclopedia of the World Economy*, by Nigel S. Grimwade, 1st ed., Princeton University Press, 2010. *Credo Reference*, search.credoreference.com/articles/Qm9va0FydGljbGU6MzE0MDIx. Accessed 1 Sept. 2023.

Take some time to review the following graphic that depicts Porter's ideas:

Figure 1: Porter's Generic Strategies: Cost Leadership, Differentiation and Focus

Image Source: "Porter's Generic Strategies: Differentiation, Cost Leadership and Focus," B2U (Website)

In addition to the strategies identified within the above graphic, a fifth strategy called 'best-cost' will be introduced in the 2:57 video that follows:
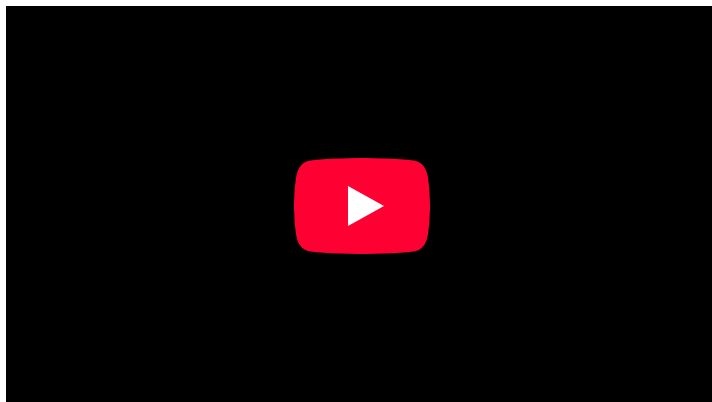
Where do you think the 'best-cost' strategy would be visible if it were included on the above graphic?

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SECTION OVERVIEW

2.6: Selecting Business-Level Strategies

2.6.1: Selecting Business-Level Strategies

Learning Objectives

After reading this chapter, you should be able to understand and articulate answers to the following questions:

1. Why is an examination of generic strategies valuable?
2. What are the four main generic strategies?
3. What is a best-cost strategy?
4. What does it mean to be "stuck in the middle"?

The Competition Takes Aim at Target

Mike Mozart – Target – CC BY 2.0.

On January 13, 2011, Target Corporation announced its intentions to operate stores outside the United States for the first time. The plan called for Target to enter Canada by purchasing existing leases from a Canadian retailer and then opening 100 to 150 stores in 2013 and 2014.(Target, 2011) The chain already included more than 1,700 stores in forty-nine states. Given the close physical and cultural ties between the United States and Canada, entering the Canadian market seemed to be a logical move for Target.

In addition to making its initial move beyond the United States, Target had several other sources of pride in early 2011. The company claimed that 96 percent of American consumers recognized its signature logo, surpassing the percentages enjoyed by famous brands such as Apple and Nike. In March, *Fortune* magazine ranked Target twenty-second on its list of the "World's Most Admired Companies." In May, Target reported that its sales and earnings for the first quarter of 2011 (sales: $15.6 billion; earnings: $689 million) were stronger than they had been in the first quarter of 2010 (sales: $15.2 billion; earnings: $671 million). Yet there were serious causes for concern, too. News stories in the second half of 2010 about Target's donations to political candidates had created controversy and unwanted publicity. And despite increasing sales and profits, Target's stock price fell about 20 percent during the first quarter of 2011.

Concern also surrounded Target's possible vulnerability to competition within the retail industry. Since its creation in the early 1960s, Target executives had carved out a lucrative position for the firm. Target offers relatively low prices on brand-name consumer staples such as cleaning supplies and paper products, but it also offers chic clothing and household goods. This unique combination helps Target to appeal to fairly affluent customers. Although Target counts many college students and senior citizens among its devotees, the typical Target shopper is forty-one years old and has a household income of about $63,000 per year. Approximately 45 percent of Target customers have children at home, and about 48 percent have a college degree.[1] Perhaps the most tangible reflection of Target's upscale position among large retailers is the tendency of some customers to jokingly pronounce its name as if it were a French boutique: "Tar-zhay."

Target's lucrative position was far from guaranteed, however. Indeed, a variety of competitors seemed to be taking aim at Target. Retail chains such as Kohl's and Old Navy offered fashionable clothing at prices similar to Target's. Discounters like T.J. Maxx, Marshalls, and Ross offered designer clothing and chic household goods for prices that often were lower than Target's. Closeout stores such as Big Lots offered a limited selection of electronics, apparel, and household goods but at deeply discounted prices. All these stores threatened to steal business from Target.

Walmart was perhaps Target's most worrisome competitor. After some struggles in the 2000s, the mammoth retailer's performance was strong enough that it ranked well above Target on *Fortune*'s list of the "World's Most Admired Companies" (eleventh vs. twenty-second). Walmart also was much bigger than Target. The resulting economies of scale meant that Walmart could undercut Target's prices anytime it desired. Just such a scenario had unfolded before. A few years ago, Walmart's victory in a price war over Kmart led the latter into bankruptcy.

One important difference between Kmart and Target is that Target is viewed by consumers as offering relatively high-quality goods. But this difference might not protect Target. Although Walmart's products tended to lack the chic appeal of Target's, Walmart had begun offering better products during the recession of the late 2000s in an effort to expand its customer base. If Walmart executives chose to match Target's quality while charging lower prices, Target could find itself without a unique appeal for customers. As 2011 continued, a big question loomed: could Target maintain its unique appeal to customers or would the competitive arrows launched by Walmart and others force Target's executives to quiver?

[1]Target fact card. 2007, January 2007. Retrieved from sites.target.com/images/corpo...ard_101107.pdf

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Target, Target Corporation to acquire interest in Canadian real estate from Zellers Inc., a subsidiary of Hudson's Bay Company, for C$1.825 billion [Press release]. 2011, January 13. Target Stores. Retrieved from http://pressroom.target.com/pr/news/...al-estate.aspx

2.6.2: Understanding Business-Level Strategy through "Generic Strategies"

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Why Examine Generic Strategies?

Business-level strategy addresses the question of how a firm will compete in a particular industry (Table 5.1). This seems to be a simple question on the surface, but it is actually quite complex. The reason is that there are a great many possible answers to the question. Consider, for example, the restaurants in your town or city. Chances are that you live fairly close to some combination of McDonald's, Subway, Chili's, Applebee's, Panera Bread Company, dozens of other national brands, and a variety of locally based eateries that have just one location. Each of these restaurants competes using a business model that is at least somewhat unique. When an executive in the restaurant industry analyzes her company and her rivals, she needs to avoid getting distracted by all the nuances of different firm's business-level strategies and losing sight of the big picture.

The solution is to think about business-level strategy in terms of generic strategies. A generic strategy is a general way of positioning a firm within an industry. Focusing on generic strategies allows executives to concentrate on the core elements of firms' business-level strategies. The most popular set of generic strategies is based on the work of Professor Michael Porter of the Harvard Business School and subsequent researchers that have built on Porter's initial ideas (Porter, 1980; Zeng, 2009).

Table 5.1 Business-Level Strategies

Firms compete on two general dimensions — the source of competitive advantage (cost or uniqueness) and the scope of operations (broad or narrow). Four possible generic business-level strategies emerge from these decisions. An example of each generic business-level strategy from the retail industry is illustrated below.

	Competitive Advantage: Cost	Competitive Advantage: Uniqueness
Scope of Operations: Broad Target	Walmart's **cost leadership** strategy depends on attracting a large customer base and keeping prices low by buying massive quantities of goods from suppliers.	Nordstrom builds its **differentiation** strategy around offering designer merchandise and providing exceptional service.
Scope of Operations: Narrow Target	In using a **focused cost leadership**, Dollar General does not offer a full array of consumer goods, but those that it does offer are priced to move.	Anthropologie follows a **focused differentiation** strategy by selling unique (and pricey) women's apparel, accessories, and home furnishings.

According to Porter, two competitive dimensions are the keys to business-level strategy. The first dimension is a firm's source of competitive advantage. This dimension involves whether a firm tries to gain an edge on rivals by keeping costs down or by offering something unique in the market. The second dimension is firms' scope of operations. This dimension involves whether a firm tries to target customers in general or whether it seeks to attract just a segment of customers. Four generic business-level strategies emerge from these decisions: (1) cost leadership, (2) differentiation, (3) focused cost leadership, and (4) focused differentiation. In rare cases, firms are able to offer both low prices and unique features that customers find desirable. These firms are following a best-cost strategy. Firms that are not able to offer low prices or appealing unique features are referred to as "stuck in the middle."

Understanding the differences that underlie generic strategies is important because different generic strategies offer different value propositions to customers. A firm focusing on cost leadership will have a different value chain configuration than a firm whose strategy focuses on differentiation. For example, marketing and sales for a differentiation strategy often requires extensive effort while some firms that follow cost leadership such as Waffle House are successful with limited marketing efforts. This chapter presents each generic strategy and the "recipe" generally associated with success when using that strategy. When firms follow these recipes, the result can be a strategy that leads to superior performance. But when firms fail to follow logical actions associated with

each strategy, the result may be a value proposition configuration that is expensive to implement and that does not satisfy enough customers to be viable.

Analyzing generic strategies enhances the understanding of how firms compete at the business level.

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Limitations of Generic Strategies

Examining business-level strategy in terms of generic strategies has limitations. Firms that follow a particular generic strategy tend to share certain features. For example, one way that cost leaders generally keep costs low is by not spending much on advertising. Not every cost leader, however, follows this path. While cost leaders such as Waffle House spend very little on advertising, Walmart spends considerable money on print and television advertising despite following a cost leadership strategy. Thus a firm may not match every characteristic that its generic strategy entails. Indeed, depending on the nature of a firm's industry, tweaking the recipe of a generic strategy may be essential to cooking up success.

Key Takeaway

- Business-level strategies examine how firms compete in a given industry. Firms derive such strategies by executives making decisions about whether their source of competitive advantage is based on price or differentiation and whether their scope of operations targets a broad or narrow market.

Exercises

1. What are examples of each generic business-level strategy in the apparel industry?
2. What are the limitations of examining firms in terms of generic strategies?
3. Create a new framework to examine generic strategies using different dimensions than the two offered by Porter's framework. What does your approach offer that Porter's does not?

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2.6.3: Cost Leadership

Learning Objectives

1. Describe the nature of cost leadership.
2. Understand how economies of scale help contribute to a cost leadership strategy.
3. Know the advantages and disadvantages of a cost leadership strategy.

Table 5.2 Cost Leadership

Firms that compete based on price and target a broad target market are following a cost leadership strategy. Several examples of firms pursuing a cost leadership strategy are illustrated below.

Despite its name, Dunkin' Donuts makes more money selling inexpensive coffee than it does from selling donuts. The coffee is often advertised as costing under a dollar, making Dunkin' Donuts a low-priced alternative to Starbucks.	Payless ShoeSource is a discount retailer tha sells inexpensive shoes for men, women, and children. Their advertising slogans such as "Why pay more when you can Payless?" and "You could pay more, buy why?" consistently preach a low-price message.
Supercuts' website makes clear their longstanding cost leadership strategy by noting, "A Supercut is a haircut that has kept people looking their best, while keeping money in their pockets, since 1975."	Little Debbie snack cakes began when O.D. McKee started selling treats for five cents each in the early 1930s. Little Debbie cakes cost a lot more than five cents today, but they remain cheaper than similar offerings from Entenmann's, Tastykake, and other snack cake rivals.

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The Nature of the Cost Leadership Strategy

It is tempting to think of cost leaders as companies that sell inferior, poor-quality goods and services for rock-bottom prices. The Yugo, for example, was an extremely unreliable car that was made in Eastern Europe and sold in the United States for about $4,000. Despite its attractive price tag, the Yugo was a dismal failure because drivers simply could not depend on the car for transportation. Yugo exited the United States in the early 1990s and closed down entirely in 2008.

In contrast to firms such as Yugo whose failure is inevitable, cost leaders can be very successful. A firm following a cost leadership strategy offers products or services with acceptable quality and features to a broad set of customers at a low price (Table 5.2). Payless ShoeSource, for example, sells name-brand shoes at inexpensive prices. Its low-price strategy is communicated to customers through advertising slogans such as "Why pay more when you can Payless?" and "You could pay more, but why?" Little Debbie snack cakes offer another example. The brand was started in the 1930s when O. D. McKee began selling sugary treats for five cents. Most consumers today would view the quality of Little Debbie cakes as a step below similar offerings from Entenmann's, but enough people believe that they offer acceptable quality that the brand is still around eight decades after its creation.

Listeners of the popular radio show *Car Talk* voted the Yugo as the "worst car of the millennium."

Perhaps the most famous cost leader is Walmart, which has used a cost leadership strategy to become the largest company in the world. The firm's advertising slogans such as "Always Low Prices" and "Save Money. Live Better" communicate Walmart's emphasis on price slashing to potential customers. Meanwhile, Walmart has the broadest customer base of any firm in the United States. Approximately one hundred million Americans visit a Walmart in a typical week (Zimmerman & Hudson, 2006). Incredibly, this means that roughly one-third of Americans are frequent Walmart customers. This huge customer base includes people from all demographic and social groups within society. Although most are simply typical Americans, the popular website http://www.peopleofwalmart.com features photos of some of the more outrageous characters that have been spotted in Walmart stores.

Cost leaders tend to share some important characteristics. The ability to charge low prices and still make a profit is challenging. Cost leaders manage to do so by emphasizing efficiency. At Waffle House restaurants, for example, customers are served cheap eats quickly to keep booths available for later customers. As part of the effort to be efficient, most cost leaders spend little on advertising, market research, or research and development. Waffle House, for example, limits its advertising to billboards along highways. Meanwhile, the simplicity of Waffle House's menu requires little research and development.

Many cost leaders rely on economies of scale to achieve efficiency. Economies of scale are created when the costs of offering goods and services decreases as a firm is able to sell more items. This occurs because expenses are distributed across a greater number of items. Walmart spent approximately $2 billion on advertising in 2008. This is a huge number, but Walmart is so large that its advertising expenses equal just a tiny fraction of its sales. Also, cost leaders are often large companies, which allows them to demand price concessions from their suppliers. Walmart is notorious for squeezing suppliers such as Procter & Gamble to sell goods to Walmart for lower and lower prices over time. The firm passes some of these savings to customers in the form of reduced prices in its stores.

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Advantages and Disadvantages of Cost Leadership

Each generic strategy offers advantages that firms can potentially leverage to enhance their success as well as disadvantages that may undermine their success. In the case of cost leadership, one advantage is that cost leaders' emphasis on efficiency makes them well positioned to withstand price competition from rivals (Table 5.3). Kmart's ill-fated attempt to engage Walmart in a price war ended in disaster, in part because Walmart was so efficient in its operations that it could live with smaller profit margins far more easily than Kmart could.

Table 5.3 Executing a Low-Cost Strategy

Using a cost leadership strategy offers firms important advantages and disadvantages. Below we illustrate a few examples in relation to entertainment and leisure.

Advantages	High profits can be enjoyed if a cost leader has a high market share. An example is Kampgrounds of America, a chain of nearly 500 low cost camping franchises in the United States. Low-cost firms such as many municipal golf courses can withstand price wars because high-priced competitors will not want to compete directly with a more efficient rival.
Disadvantages	If perceptions of quality become too low, business will suffer. Large volumes of sales are a must because margins are slim. The need to keep expenses low might lead cost leaders to be late in detecting key environment trends. Low-cost firms' emphasis on efficiency makes it difficult for them to change quickly if needed.

Beyond existing competitors, a cost leadership strategy also creates benefits relative to potential new entrants. Specifically, the presence of a cost leader in an industry tends to discourage new firms from entering the business because a new firm would struggle to attract customers by undercutting the cost leaders' prices. Thus a cost leadership strategy helps create barriers to entry that protect the firm—and its existing rivals—from new competition.

Challenging a cost leader in a price war may end up destroying a company.

WFIU Public Radio – Closed Sign – CC BY-NC 2.0.

In many settings, cost leaders attract a large market share because a large portion of potential customers find paying low prices for goods and services of acceptable quality to be very appealing. This is certainly true for Walmart, for example. The need for efficiency means that cost leaders' profit margins are often slimmer than the margins enjoyed by other firms. However, cost leaders' ability to make a little bit of profit from each of a large number of customers means that the total profits of cost leaders can be substantial.

In some settings, the need for high sales volume is a critical disadvantage of a cost leadership strategy. Highly fragmented markets and markets that involve a lot of brand loyalty may not offer much of an opportunity to attract a large segment of customers. In both the soft drink and cigarette industries, for example, customers appear to be willing to pay a little extra to enjoy the brand of their choice. Lower-end brands of soda and cigarettes appeal to a minority of consumers, but famous brands such as Coca-Cola, Pepsi, Marlboro, and Camel still dominate these markets. A related concern is that achieving a high sales volume usually requires significant upfront investments in production and/or distribution capacity. Not every firm is willing and able to make such investments.

Cost leaders tend to keep their costs low by minimizing advertising, market research, and research and development, but this approach can prove to be expensive in the long run. A relative lack of market research can lead cost leaders to be less skilled than other firms at detecting important environmental changes. Meanwhile, downplaying research and development can slow cost leaders' ability to respond to changes once they are detected. Lagging rivals in terms of detecting and reacting to external shifts can prove to be a deadly combination that leaves cost leaders out of touch with the market and out of answers.

Key Takeaway

- Cost leadership is an effective business-level strategy to the extent that a firm offers low prices, provides satisfactory quality, and attracts enough customers to be profitable.

Exercises

1. What are three industries in which a cost leadership strategy would be difficult to implement?
2. What is your favorite cost leadership restaurant?
3. Name three examples of firms conducting a cost leadership strategy that use no advertising. Should they start advertising? Why or why not?

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2.6.4: Differentiation

Table 5.4 Differentiation

Firms that compete on uniqueness and target a broad market are following a differentiation strategy. Several examples of firms pursuing a differentiation strategy are illustrate below.

| |
|---|
| Although salt is a commodity, Morton has differentiated its salt by building a brand around its iconic umbrella girl and its trademark slogan of "When it rains, it pours." |
| FedEx's former slogan "When it absolutely, positively has to be there overnight" highlights the commitment to very speedy delivery that differentiates them from competitors such as UPS and the U.S. Postal Service. |
| Offering such as Hot Wheels cars and the Barbie line of dolls highlight toy maker Mattel's differentiation strategy. Both are updated regularly to reflect current trends and tastes. |
| Nike differentiates its athletic shoes through its iconic "swoosh" as well as an intense emphasis on product innovation through research and development. |
| The Walt Disney Company has developed numerous well-known characters such as Mickey Mouse, the Little Mermaid, and Captain Jack Sparrow that help differentiate their movies, theme parks, and merchandise. |

> **Learning Objectives**
>
> 1. Describe the nature of differentiation.
> 2. Know the advantages and disadvantages of a differentiation strategy.

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The Nature of the Differentiation Strategy

A famous cliché contends that "you get what you pay for." This saying captures the essence of a differentiation strategy. A firm following a differentiation strategy attempts to convince customers to pay a premium price for its good or services by providing unique and desirable features (Table 5.4). The message that such a firm conveys to customers is that you will pay a little bit more for our offerings, but you will receive a good value overall because our offerings provide something special.

In terms of the two competitive dimensions described by Michael Porter, using a differentiation strategy means that a firm is competing based on uniqueness rather than price and is seeking to attract a broad market (Porter, 1980). Coleman camping equipment offers a good example. If camping equipment such as sleeping bags, lanterns, and stoves fail during a camping trip, the result will be, well, unhappy campers. Coleman's sleeping bags, lanterns, and stoves are renowned for their reliability and durability. Cheaper brands are much more likely to have problems. Lovers of the outdoors must pay more to purchase Coleman's goods than they would to obtain lesser brands, but having equipment that you can count on to keep you warm and dry is worth a price premium in the minds of most campers.

Fig. 1.
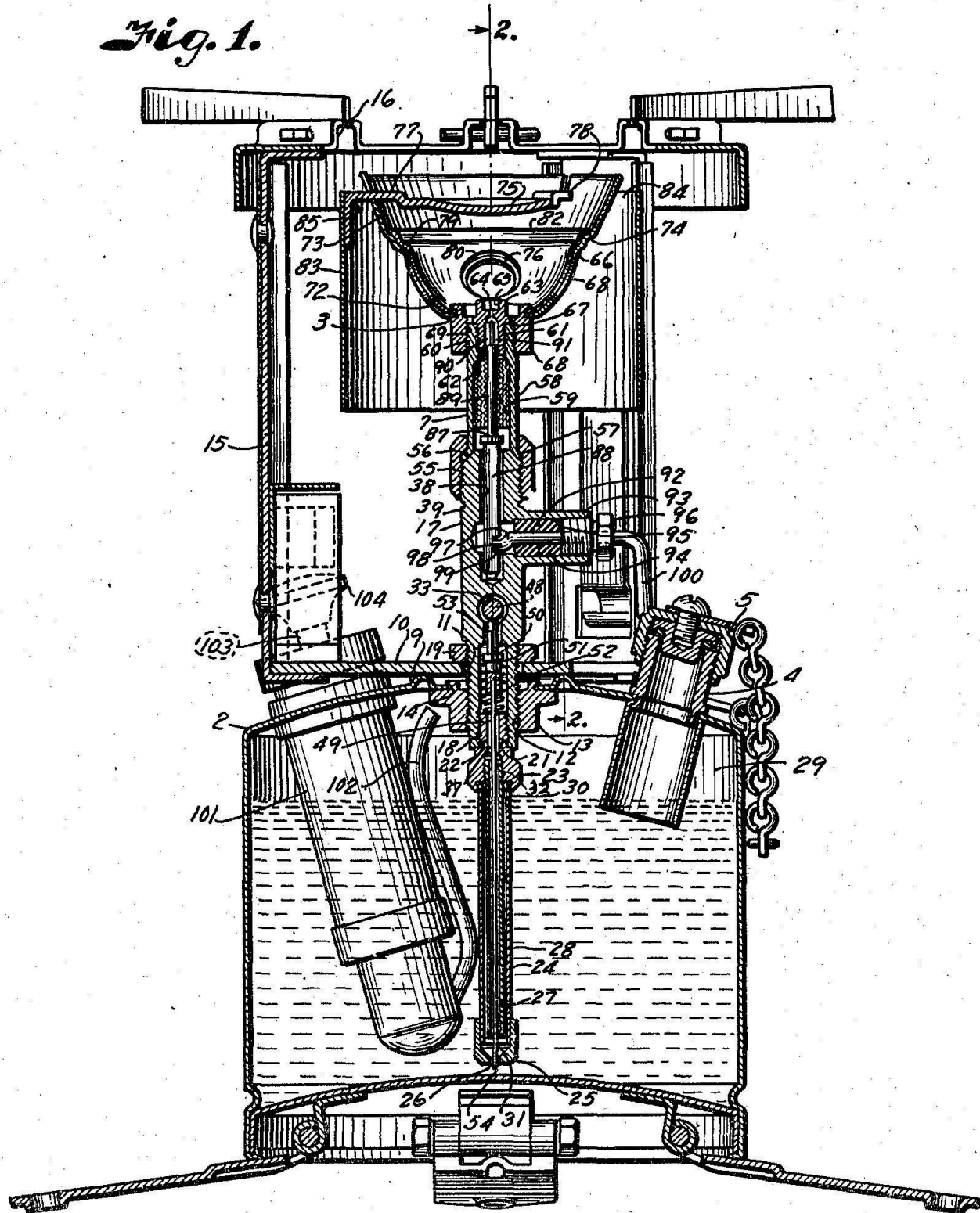
Coleman's patented stove was originally developed for use by soldiers during World War II. Seven decades later, the Coleman Stove remains a must-have item for campers.

Successful use of a differentiation strategy depends on not only offering unique features but also communicating the value of these features to potential customers. As a result, advertising in general and brand building in particular are important to this strategy. Few goods are more basic and generic than table salt. This would seemingly make creating a differentiated brand in the salt business next to impossible. Through clever marketing, however, Morton Salt has done so. Morton has differentiated its salt by building a brand around its iconic umbrella girl and its trademark slogan of "When it rains, it pours." Would the typical consumer be able to tell the difference between Morton Salt and cheaper generic salt in a blind taste test? Not a chance. Yet Morton succeeds in convincing customers to pay a little extra for its salt through its brand-building efforts.

FedEx and Nike are two other companies that have done well at communicating to customers that they provide differentiated offerings. FedEx's former slogan "When it absolutely, positively has to be there overnight" highlights the commitment to speedy delivery that sets the firm apart from competitors such as UPS and the US Postal Service. Nike differentiates its athletic shoes and apparel through its iconic "swoosh" logo as well as an intense emphasis on product innovation through research and development.

Developing a Differentiation Strategy at Express Oil Change

Express Oil Change and Service Centers is a chain of auto repair shops that stretches from Florida to Texas. Based in Birmingham, Alabama, the firm has more than 170 company-owned and franchised locations under its brand. Express Oil Change tries to provide a unique level of service, and the firm is content to let rivals offer cheaper prices. We asked an Express Oil Change executive about his firm (Ketchen & Short, 2010).

Question:
The auto repair and maintenance business is a pretty competitive space. How is Express Oil Change being positioned relative to other firms, such as Super Lube, American LubeFast, and Jiffy Lube?

Don Larose, Senior Vice President of Franchise Development:
Every good business sector is competitive. The key to our success is to be more convenient and provide a better overall experience for the customer. Express Oil Change and Service Centers outperform the industry significantly in terms of customer transactions per day and store sales, for a host of reasons.

In terms of customer convenience, Express Oil Change is faster than most of our competitors—we do a ten-minute oil change while the customer stays in the car. Mothers with kids in car seats especially enjoy this feature. We also do mechanical work that other quick lube businesses don't do. We change and rotate tires, do brake repairs, air conditioning, tune ups, and others. There is no appointment necessary for many mechanical services like tire rotation and balancing, and checking brakes. So, overall, we are more convenient than most of our competitors.

In terms of staffing our stores, full-time workers are all that we employ. Full-time workers are better trained and typically have less turnover. They therefore have more experience and do better quality work.

We think incentives are very important. We use a payroll system that provides incentives to the store staff on how many cars are serviced each day and on the total sales of the store, rather than on increasing the average transactions by selling the customer items they did not come in for, which is what most of the industry does. We don't sell customers things they don't yet need, like air filters and radiator flushes. We focus on building trust, by acting with integrity, to get the customer to come back and build the daily car count. This philosophy is not a slogan for us. It is how we operate with every customer, in every store, every day.

The placement of our outlets is another key factor. We place our stores in A-caliber retail locations. These are lots that may cost more than our competitors are willing or able to pay. We get what we pay for though; we have approximately 41% higher sales per store than the industry average.

Question:
What is the strangest interaction you've ever had with a potential franchisee?

Larose:
I once had a franchisee candidate in New Jersey respond to a request by us for proof of his liquid assets by bringing to the interview about $100,000 in cash to the meeting. He had it in a bag, with bundles of it wrapped in blue tape. Usually, folks just bring in a copy of a bank or stock statement. Not sure why he had so much cash on hand, literally, and I didn't want to know. He didn't become a franchisee.

Express Oil Change sets itself apart through superior service and great locations.

Dystopos – Express Oil Change – CC BY-NC 2.0.

Table 5.5 Executing a Differentiation Strategy

A differentiation strategy offers important advantages and disadvantages for firms that adopt it. Below we illustrate a few examples in relation to an often differentiated product–women's handbags.

Advantages	*Buyer loyalty* is common among handbag buyers. Many individuals enjoy seeing–and being seen with–a designer logo on the products they buy such as the iconic C that is shown on Coach bags.	Chanel enjoys *strong margins* because their well-known name allows them to charge a premium for their handbags.
Disadvantages	Less-expensive bags from retailers such as Target provide enough of a trendy look to satisfy many *price-sensitive buyers*. These individuals will choose to save their money by avoiding expensive bags from top-end designers.	*Imitations* may steal customers, such as is common with knock-off handbags sold by street vendors.

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Advantages and Disadvantages of Differentiation

Each generic strategy offers advantages that firms can potentially leverage to enjoy strong performance, as well as disadvantages that may damage their performance. In the case of differentiation, a key advantage is that effective differentiation creates an ability to obtain premium prices from customers (Table 5.5). This enables a firm to enjoy strong profit margins. Coca-Cola, for example, currently enjoys a profit margin of approximately 33 percent, meaning that about thirty-three cents of every dollar it collects from customers is profit. In comparison, Walmart's cost leadership strategy delivered a margin of under 4 percent in 2010.

In turn, strong margins mean that the firm does not need to attract huge numbers of customers to have a good overall level of profit. Luckily for Coca-Cola, the firm does attract a great many buyers. Overall, the firm made a profit of just under $12 billion on sales of just over $35 billion in 2010. Interestingly, Walmart's profits were only 25 percent higher ($15 billion) than Coca-Cola's while its sales volume ($421 billion) was twelve times as large as Coca-Cola's.[1] This comparison of profit margins and overall profit levels illustrates why a differentiation strategy is so attractive to many firms.

To the extent that differentiation remains in place over time, buyer loyalty may be created. Loyal customers are very desirable because they are not price sensitive. In other words, buyer loyalty makes a customer unlikely to switch to another firm's products if that firm tries to steal the customer away through lower prices. Many soda drinkers are fiercely loyal to Coca-Cola's products. Coca-Cola's headquarters are in Atlanta, and loyalty to the firm is especially strong in Georgia and surrounding states. Pepsi and other brands have a hard time convincing loyal Coca-Cola fans to buy their beverages, even when offering deep discounts. This helps keep Coca-Cola's profits high because the firm does not have to match any promotions that its rivals launch to keep its customers.

Meanwhile, Pepsi also has attracted a large set of brand-loyal customers that Coca-Cola struggles to steal. This enhances Pepsi's profits. In contrast, store-brand sodas such as Sam's Choice (which is sold at Walmart) seldom attract loyalty. As a result, they must be offered at very low prices to move from store shelves into shopping carts.

Beyond existing competitors, a differentiation strategy also creates benefits relative to potential new entrants. Specifically, the brand loyalty that customers feel to a differentiated product makes it difficult for a new entrant to lure these customers to adopt its product. A new soda brand, for example, would struggle to take customers away from Coca-Cola or Pepsi. Thus a differentiation strategy helps create barriers to entry that protect the firm and its industry from new competition.

The big risk when using a differentiation strategy is that customers will not be willing to pay extra to obtain the unique features that a firm is trying to build its strategy around. In 2007, department store Dillard's stopped carrying men's sportswear made by Nautica because the seafaring theme of Nautica's brand had lost much of its cache among many men (Kapner, 2007). Because Nautica's uniqueness had eroded, Dillard's believed that space in its stores that Nautica had been occupying could be better allocated to other brands.

In some cases, customers may simply prefer a cheaper alternative. For example, products that imitate the look and feel of offerings from Ray-Ban, Tommy Bahama, and Coach are attractive to many value-conscious consumers. Firms such as these must work hard at product development and marketing to ensure that enough customers are willing to pay a premium for their goods rather than settling for knockoffs.

In other cases, customers desire the unique features that a firm offers, but competitors are able to imitate the features well enough that they are no longer unique. If this happens, customers have no reason to pay a premium for the firm's offerings. IBM experienced the pain of this scenario when executives tried to follow a differentiation strategy in the personal computer market. The strategy had worked for IBM in other areas. Specifically, IBM had enjoyed a great deal of success in the mainframe computer market by providing superior service and charging customers a premium for their mainframes. A business owner who relied on a mainframe to run her company could not afford to have her mainframe out of operation for long. Meanwhile, few businesses had the skills to fix their own mainframes. IBM's message to customers was that they would pay more for IBM's products but that this was a good investment because when a mainframe needed repairs, IBM would provide faster and better service than its competitors could. The customer would thus be open for business again very quickly after a mainframe failure.

This positioning failed when IBM used it in the personal computer market. Rivals such as Dell were able to offer service that was just as good as IBM's while also charging lower prices for personal computers than IBM charged. From a customer's perspective, a person would be foolish to pay more for an IBM personal computer since IBM did not offer anything unique. IBM steadily lost market share as a result. By 2005, IBM's struggles led it to sell its personal computer business to Lenovo. The firm is still successful, however, within the mainframe market where its offerings remain differentiated.

Firms following a differentiation strategy must "watch" out for counterfeit goods such as the faux Rolexes shown here.

Wikimedia Commons – public domain.

Key Takeaway

- Differentiation can be an effective business-level strategy to the extent that a firm offers unique features that convince customers to pay a premium for their goods and services.

Exercises

1. What are two industries in which a differentiation strategy would be difficult to implement?
2. What is an example of a differentiated business near your college or university?
3. Name three ways businesses that provide entertainment that might better differentiate their services. How might they do this?

[1]Profit statistics drawn from Standard & Poor's stock reports on Coca-Cola and Walmart.

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2.6.5: Focused Cost Leadership and Focused Differentiation

Learning Objectives

1. Describe the nature of focused cost leadership and focused differentiation.
2. Know the advantages and disadvantages of focus strategies.

Companies that use a cost leadership strategy and those that use a differentiation strategy share one important characteristic: both groups try to be attractive to customers in general. These efforts to appeal to broad markets can be contrasted with strategies that involve targeting a relatively narrow niche of potential customers. These latter strategies are known as focus strategies (Porter, 1980).

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The Nature of the Focus Cost Leadership Strategy

Focused cost leadership is the first of two focus strategies. A focused cost leadership strategy requires competing based on price to target a narrow market (Table 5.6). A firm that follows this strategy does not necessarily charge the lowest prices in the industry. Instead, it charges low prices relative to other firms that compete within the target market. Redbox, for example, uses vending machines placed outside grocery stores and other retail outlets to rent DVDs of movies for $1. There are ways to view movies even cheaper, such as through the flat-fee streaming video subscriptions offered by Netflix. But among firms that rent actual DVDs, Redbox offers unparalleled levels of low price and high convenience.

Table 5.6 Focused Cost Leadership

Firms that compete based on price and target a narrow market are following a focused cost leadership strategy. Several examples of firms pursuing a focused cost leadership strategy are illustrated below.

Redbox rents DVDs and video games through vending machines for only $1.	Papa Murphy's targets its inexpensive take-and-bake pizzas at value-conscious families. Because the pizzas are baked at home rather than in the store, Papa Murphy's is permitted to accept food stamps. This allows the firm to attract customers that might not otherwise be able to afford a restaurant-quality pizza.
Claire's three thousand+ locations target young women with inexpensive jewelry, accessories, and ear piercings. The strategy has worked: Claire's has over three thousand locations and has stores in 95 percent of U.S. shopping malls.	Providing indoor seating creates expenses for fast-food restaurants. Checkers Drive In keeps its costs low by not offering indoor seating. Checkers targets drive-thru customers and offers them big burgers at rock-bottom prices.

Another important point is that the nature of the narrow target market varies across firms that use a focused cost leadership strategy. In some cases, the target market is defined by demographics. Claire's, for example, seeks to appeal to young women by selling inexpensive jewelry, accessories, and ear piercings. Claire's use of a focused cost leadership strategy has been very successful; the firm has more than three thousand locations and has stores in 95 percent of US shopping malls.

Redbox machines are available on university campuses nationwide.

Valerie Everett – A big mac and saving private ryan please – CC BY-SA 2.0.

In other cases, the target market is defined by the sales channel used to reach customers. Most pizza shops offer sit-down service, delivery, or both. In contrast, Papa Murphy's sells pizzas that customers cook at home. Because these inexpensive pizzas are baked at home rather than in the store, the law allows Papa Murphy's to accept food stamps as payment. This allows Papa Murphy's to attract customers that might not otherwise be able to afford a prepared pizza. In contrast to most fast-food restaurants, Checkers Drive In is a drive-through-only operation. To serve customers quickly, each store has two drive-through lanes: one on either side of the building. Checkers saves money in a variety of ways by not offering indoor seating to its customers—Checkers' buildings are cheaper to construct, its utility costs are lower, and fewer employees are needed. These savings allow the firm to offer large burgers at very low prices and still remain profitable.

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The Nature of the Focused Differentiation Strategy

Focused differentiation is the second of two focus strategies. A focused differentiation strategy requires offering unique features that fulfill the demands of a narrow market (Table 5.7). As with a focused low-cost strategy, narrow markets are defined in different ways in different settings. Some firms using a focused differentiation strategy concentrate their efforts on a particular sales channel, such as selling over the Internet only. Others target particular demographic groups. One example is Breezes Resorts, a company that caters to couples without children. The firm operates seven tropical resorts where vacationers are guaranteed that they will not be annoyed by loud and disruptive children.

While a differentiation strategy involves offering unique features that appeal to a variety of customers, the need to satisfy the desires of a narrow market means that the pursuit of uniqueness is often taken to the proverbial "next level" by firms using a

focused differentiation strategy. Thus the unique features provided by firms following a focused differentiation strategy are often specialized.

Table 5.7 Focused Differentiation

Firms that compete based on uniqueness and target a narrow market are following a focused differentiations strategy. Several examples of firms pursuing a focused differentiation strategy are illustrated below.

Whole Foods Market focuses on selling natural and organic products. The supermarket's reputation for high prices has led to a wry nickname — "Whole Paycheck" — but a sizable number of consumers are willing to pay a premium in order to feel better about the food they are buying. After all, you are what you eat!	At Build-A-Bear Workshop, customers enjoy an interactive process of designing and assembling teddy bears. Build-A-Bear customers are willing to pay a premium price because they receive a unique, hands-on experience rather than simply buying a stuffed toy.
You can buy a cinnamon roll cheaper elsewhere, but Cinnabon's pricey pastries are so delicious that sugar-obsessed snackers line up to buy them. Perhaps in a nod to Cinnabon's strategy, the brand is owned by a parent company name Focus Brands.	The dedication of Mercedez-Benz to cutting-edge technology, styling, and safety innovations has made the firm's vehicles prized by those who are rich enough to afford them.

When it comes to uniqueness, few offerings can top Kopi Luwak coffee beans. High-quality coffee beans often sell for $10 to $15 a pound. In contrast, Kopi Luwak coffee beans sell for hundreds of dollars per pound (Cat's Ass Coffee). This price is driven by the rarity of the beans and their rather bizarre nature. As noted in a 2010 article in the *New York Times*, these beans

are found in the droppings of the civet, a nocturnal, furry, long-tailed catlike animal that prowls Southeast Asia's coffee-growing lands for the tastiest, ripest coffee cherries. The civet eventually excretes the hard, indigestible innards of the fruit—essentially, incipient coffee beans—though only after they have been fermented in the animal's stomach acids and enzymes to produce a brew described as smooth, chocolaty and devoid of any bitter aftertaste (Onishi, 2010).

Although many consumers consider Kopi Luwak to be disgusting, a relatively small group of coffee enthusiasts has embraced the coffee and made it a profitable product. This illustrates the essence of a focused differentiation strategy—effectively serving the specialized needs of a niche market can create great riches.

Larger niches are served by Whole Foods Market and Mercedes-Benz. Although most grocery stores devote a section of their shelves to natural and organic products, Whole Foods Market works to sell such products exclusively. For customers, the large selection of organic goods comes at a steep price. Indeed, the supermarket's reputation for high prices has led to a wry nickname —"Whole Paycheck"—but a sizable number of consumers are willing to pay a premium to feel better about the food they buy.

The dedication of Mercedes-Benz to cutting-edge technology, styling, and safety innovations has made the firm's vehicles prized by those who are rich enough to afford them. This appeal has existing for many decades. In 1970, acid-rocker Janis Joplin recorded a song called "Mercedes Benz" that highlighted the automaker's allure. Since then Mercedes-Benz has used the song in several television commercials, including during the 2011 Super Bowl.

Janis Joplin's musical tribute to Mercedes-Benz underscores the allure of the brand.

Wikimedia Commons – CC BY-SA 2.0.

Developing a Focused Differentiation Strategy at Augustino LoPrinzi Guitars and Ukuleles

Augustino LoPrinzi Guitars and Ukuleles in Clearwater, Florida, builds high-end custom instruments. The founder of the company, Augustino LoPrinzi, has been a builder of custom guitars for five decades. While a reasonably good mass-produced guitar can be purchased elsewhere for a few hundred dollars, LoPrinzi's handmade models start at $1,100, and some sell for more than $10,000. The firm's customers have included professional musicians such as Dan Fogelberg, Leo Kottke, Herb Ohta (Ohta-San), Lyle Ritz, Andrés Segovia, and B. J. Thomas. Their instruments can be found at http://www.augustinoloprinzi.com. We asked Augustino about his firm (Short, 2007).

Question:
Were there other entrepreneurial opportunities you considered before you began making guitars?

Augustino Loprinzi:
I originally thought of pursuing a career in commercial art, but I found my true love was in classical guitar building. I was trained by my father to be a barber from a very young age, and after my term in the service, I opened a barbershop.

Question:
What is the most expensive guitar you've ever sold?

Loprinzi:
$17,500.

Question:
How old were you when you started your first business in the guitar industry?

Loprinzi:
I was in my early twenties.

Question:
How did you get your break with more famous customers?

Loprinzi:

I think word of mouth had a lot do with it.

Question:

You have been active in Japan. Do the preferences of Japanese customers differ from those of Americans?

Loprinzi:

Yes. The Japanese want only high-end instruments. Aesthetics are very important to the Japanese along with high-quality materials and workmanship. The US market seems to care in general less about ornamentation and more about quality workmanship, tone, and playability.

Question:

How do you stay ahead in your industry?

Loprinzi:

Always try to stay abreast on what the music industry is doing. We do this by reading several music industry publications, talking with suppliers, and keeping an eye on the trends going on in other countries because usually they come full circle. Also, for the past several years by following the Internet forums and such has been extremely beneficial.

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Advantages and Disadvantages of the Focused Strategies

Each generic strategy offers advantages that firms can potentially leverage to enhance their success as well as disadvantages that may undermine their success. In the case of focus differentiation, one advantage is that very high prices can be charged. Indeed, these firms often price their wares far above what is charged by firms following a differentiation strategy (Table 5.8). REI (Recreational Equipment Inc.), for example, commands a hefty premium for its outdoor sporting goods and clothes that feature name brands, such as The North Face and Marmot. Nat Nast's focus differentiation strategy centers on selling men's silk camp shirts with a 1950s retro flair. These shirts retail for more than $100. Focused cost leaders such as Checkers Drive In do not charge high prices like REI and Nat Nast do, but their low cost structures enable them to enjoy healthy profit margins.

A second advantage of using a focus strategy is that firms often develop tremendous expertise about the goods and services that they offer. In markets such as camping equipment where product knowledge is important, rivals and new entrants may find it difficult to compete with firms following a focus strategy.

Table 5.8 Executing a Focus Strategy

Using one of the focus strategies offers firms important advantages and disadvantages. Below we illustrate a few examples in relation to an industry where many different types of focus exist–sporting goods.

Advantages	Disadvantages
High prices can be charged. Recreational Equipment Incorporated (REI), for example, commands a premium for their outdoor sporting goods and clothes that feature name brands such as The North Face and Marmot. Firms using a focus strategy often develop great expertise about the good or service being sold. Thus, customers may gravitate toward a specialty camping shop in order to learn how to best take advantage of limited vacation time.	Limited demands exist for specialized goods and services, so every potential sale counts. The area of focus may be taken over by others or even disappear over time. Many gun stores went out of business after large retailers such as Walmart started carrying an array of firearms. Other firms may provide an even narrower focus. An outdoor sporting goods store, for example, might lose business to a store that focuses solely on ski apparel because the latter can provide more guidance about how skiers can stay warm and avoid broken bones.

In terms of disadvantages, the limited demand available within a niche can cause problems. First, a firm could find its growth ambitions stymied. Once its target market is being well served, expansion to other markets might be the only way to expand, and this often requires developing a new set of skills. Also, the niche could disappear or be taken over by larger competitors. Many gun stores have struggled and even gone out of business since Walmart and sporting goods stores such as Academy Sports and Bass Pro Shops have started carrying an impressive array of firearms.
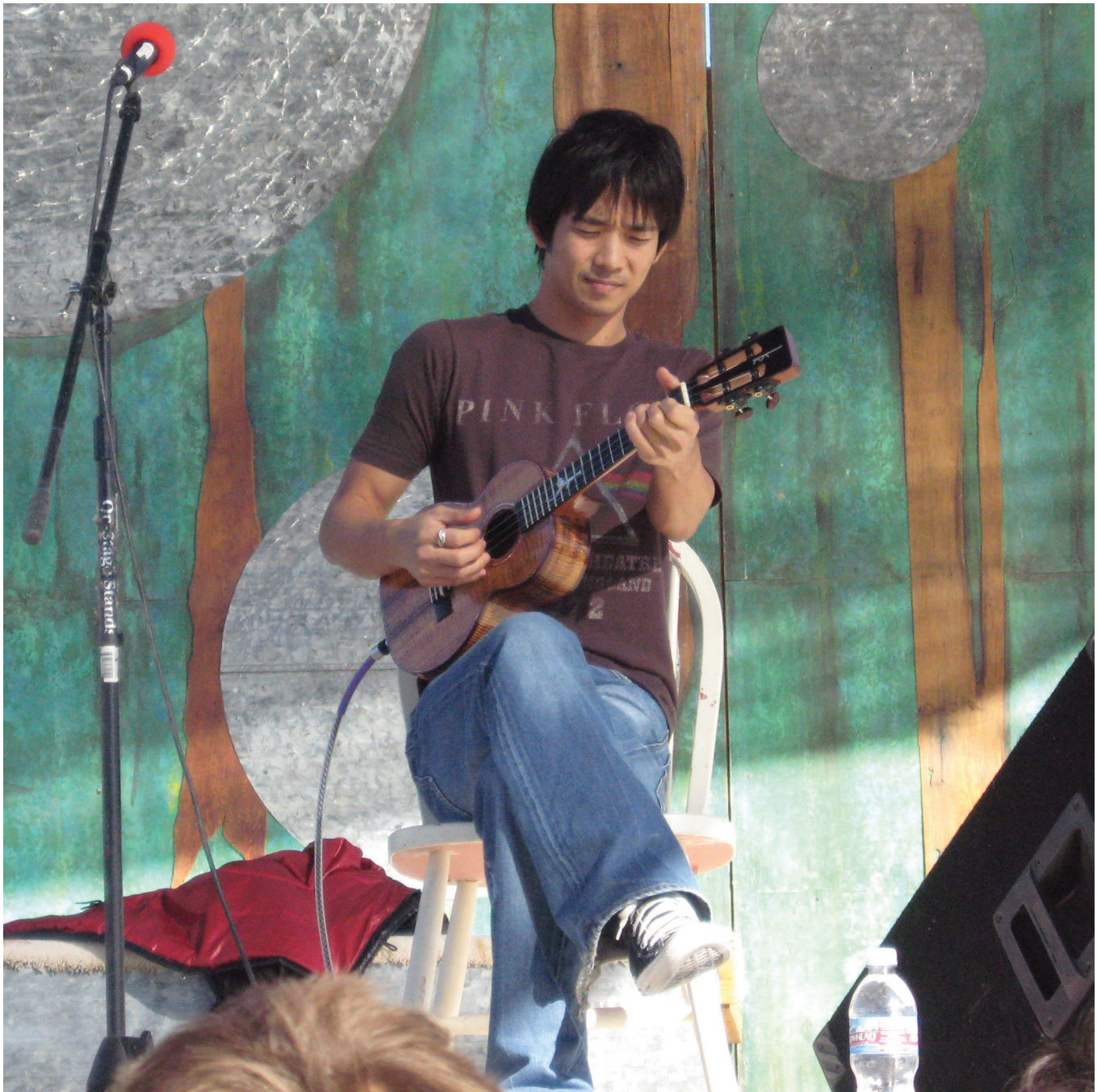
In contrast to tacky Hawaiian souvenirs, the quality of Kamaka ukuleles makes them a favorite of ukulele phenom Jake Shimabukuro and others who are willing to pay $1,000 or more for a high-end instrument.

Wikimedia Commons – public domain.

Finally, damaging attacks may come not only from larger firms but also from smaller ones that adopt an even narrower focus. A sporting goods store that sells camping, hiking, kayaking, and skiing goods, for example, might lose business to a store that focuses solely on ski apparel because the latter can provide more guidance about how skiers can stay warm and avoid broken bones.

Strategy at the Movies

Zoolander

One man's trash is another man's fashion? That's what fashion mogul Jacobim Mugatu was counting on in the 2001 comedy *Zoolander*. In his continued effort to be the most cutting-edge designer in the fashion industry, Mugatu developed a new line of

clothing inspired "by the streetwalkers and hobos that surround us." His new product line, Derelicte, characterized by dresses made of burlap and parking cones and pants made of garbage bags and tin cans, was developed for customers who valued the uniqueness of his…eclectic design. Emphasizing unique products is typical of a company following a differentiation strategy; however, Mugatu targeted a very specific set of customers. Few people would probably be enticed to wear garbage for the sake of fashion. By catering to a niche target market, Mugatu went from a simple differentiation strategy to a focused differentiation. Mugatu's Derelicte campaign in *Zoolander* is one illustration of how a particular firm might develop a focused differentiation strategy.

Key Takeaway

- Focus strategies can be effective business-level strategies to the extent that a firm can match their goods and services to specific niche markets.

Exercises

1. What are three different demographics that firms might target to establish a focus strategy?
2. What is an example of a business that you think is focused in too narrow a fashion to be successful? How might it change to be more successful?

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2.6.6: Best-Cost Strategy

> **Learning Objectives**
>
> 1. Describe the nature of a best-cost strategy.
> 2. Understand why executing a best-cost strategy is difficult.

Table 5.9 Best-Cost Strategy

Firms that charge relatively low prices and offer substantial differentiation are following a best-cost strategy. This strategy is difficult to execute, but it is also potentially very rewarding. Several examples of firms pursuing a best-cost strategy are illustrated below.

Southwest Airlines provides low cost flights to vacations destinations such as San Antonio, San Diego, and Orland. While many airlines make passengers feel like cattle loaded on to a truck, Southwest creates fun by, for example, getting children excited about visiting Sea World when they see this custom Shamu plane design.	Chipotle Mexican Grill relies on organic ingredients to create very tasty burritos that are sold at prices comparable to those of fast-food restaurants. When noon arrives, many hungry people prefer to spend their lunch dollars on a top-shelf burrito rather than a greasy burger combo meal.
Target offers extremely competitive prices, but the firm also differentiates itself from other discount retailers by carrying products from trendy designers such as Michael Graves, Isaac Mizrahi, Fiorruci, and Liza Lange.	Pabst Blue Ribbon is offered at an extremely low price and its taste (or lack thereof) is comparable that to other inexpensive beers. "PBR" enjoys brand loyalty, however, due to its high name recognition. The frequent appearance of PBR's well-known logo on signs, T-shirts, and other merchandise has helped make PBR an enduring favorite among beer consumers with light wallets.

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The Challenge of Following a Best-Cost Strategy

Some executives are not content to have their firms compete based on offering low prices or unique features. They want it all! Firms that charge relatively low prices *and* offer substantial differentiation are following a best-cost strategy (Table 5.9). This strategy is difficult to execute in part because creating unique features and communicating to customers why these features are useful generally raises a firm's costs of doing business. Product development and advertising can both be quite expensive. However, firms that manage to implement an effective best-cost strategy are often very successful.

Target appears to be following a best-cost strategy. The firm charges prices that are relatively low among retailers while at the same time attracting trend-conscious consumers by carrying products from famous designers, such as Michael Graves, Isaac Mizrahi, Fiorucci, Liz Lange, and others. This is a lucrative position for Target, but the position is under attack from all sides. Cost leader Walmart charges lower prices than Target. This makes Walmart a constant threat to steal the thriftiest of Target's customers. Focus differentiators such as Anthropologie that specialize in trendy clothing and home furnishings can take business from Target in those areas. Deep discounters such as T.J. Maxx and Marshalls offer another viable alternative to shoppers because they offer designer clothes and furnishings at closeout prices. A firm such as Target that uses a best-cost strategy also opens itself up to a wider variety of potentially lethal rivals.

Developing a Best-Cost Strategy at Plain Ivey Jane

According to government statistics, women are 60 percent less likely than men to become entrepreneurs. Meanwhile, succeeding within the specialty fashion retailing market is notoriously difficult. These trends do not worry Sarah Reeves, a young entrepreneur and 2007 graduate of Auburn University who is rapidly becoming a key player within the Austin, Texas, retail scene by offering high-end fashion at low prices.

On her website (http://www.plainiveyjane.com), Sarah describes Plain Ivey Jane as "the go-to place for women who want to elevate their wardrobes. We offer high end designer names at a discount, and the new overstocked apparel is handpicked from over 70 different brands to offer exactly what Austin needs at a price every girl can afford. To pair with your fabulous new wardrobe, Plain Ivey Jane carries accessories from undiscovered local artisans." We asked Reeves to discuss her firm (Ketchen & Short).

Question:

Can you tell us a little about your Plain Ivey Jane concept?

Sarah Reeves, Owner:

Plain Ivey Jane sells overstock from Anthropologie, Urban Outfitters, Bloomingdales, and other high-end and small designers. Although I buy from the same designers as the big and famous retailers, our dresses and accessories are sold at a fraction of their prices.

Question:

What differentiates your boutique from competitors?

Reeves:

I'm one of the lowest-priced retailers in the shopping district that people in Austin call the Second Street area. My niche in the fashion retailing business is that my merchandise is overstock from great brands. There's maybe one other business in Austin that sells overstock. What makes my concept different is that it has the feel of a high-end retail store versus a basement feel of the typical discount retailer.

Question:

Do have a lot of regular customers?

Reeves:

Yes. Once people find out what I offer, they're in here all the time. I see the same group of people every few months, but getting in new faces is the challenge. I think a lot of people walk by and assume that our clothes are expensive, but nothing could be further from the truth.

Question:

Were you fearful of starting your own business so young?

Reeves:

No, I figured this was a great time since I had nothing to lose. I thought getting it out of my system now was a good idea, and it was a good time since I was able to get a great deal on my lease. With the downturn in the economy, the time was right for my lower-priced strategy.

Question:

What would you say is the biggest key to success for small business?

Reeves:

Flexibility. Rolling with the punches and definitely the ability to follow up with people. I thought that people who owned their own business must know what they are doing, but many people don't. At this point, I prefer to do everything myself. At least I can blame myself when things go wrong.

Another key is networking with other small-business owners. A lot of the other boutique owners nearby have become close friends. I learn what works for them and what might possibly apply to my concept.

The success that 2007 college graduate Sarah Reeves has enjoyed with Plain Ivey Jane may inspire other young women to become entrepreneurs.

Nit Ng – Clothes Store – CC BY-NC-ND 2.0.

Table 5.10 Driving toward a Best-Cost Strategy by Reducing Overhead

Many firms would like to use a best cost strategy but struggle to meet the strategy's dual requirements of charging low prices and providing differentiation features. One way to help make best cost a reality is to use a business model that slashes fixed costs. Amazon.com, for example, can charge low prices in part because it does not have to absorb the overhead involved in operating stores. Similarly, some talented chefs are pursuing a best cost strategy by operating food trucks and thereby avoiding the overhead required to run a restaurant such as rent and utilities. SEveral examples are illustrated below.

For about the same price as a Subway or Jimmy John's sandwich, Counter Culture in Austin, Texas, provides vegan offerings such as their Garbonzo "Tuna" sandwich.	Owners Kahala and Kat founded Ninja Plate Lunch in Portland, Oregon, to offer large portions of delectable Hawaiian foods cub as pulled pork for only around $5.
PBJ's offer unique sandwiches with organic peanut butter at the heart of many of their creations. The traditional PB and J is a staple nationwide, but customers will travel far to get the "Hot Hood" with Challah bread, black cherry jam, jalapeño, apple wood-somked bacon, and PBJ's peanut butter for only $5.50.	In the smash hit graphic novel *Tales of Garcón: The Franchise Players*, the Tapas Taxi takes the concept of a cheap taxi ride to a new level by also offering passengers a variety of "tapas." These Spanish snacks are top shelf, of course!

-

Pursuing the Best-Cost Strategy through a Low-Overhead Business Model

One route toward a best-cost strategy is for a firm to adopt a business model whose fixed costs and overhead are very low relative to the costs that competitors are absorbing (Table 5.10). The Internet has helped make this possible for some firms. Amazon, for example, can charge low prices in part because it does not have to endure the expenses that firms such as Walmart and Target do in operating many hundreds of stores. Meanwhile, Amazon offers an unmatched variety of goods. This combination has made Amazon the unquestioned leader in e-commerce.

Another example is Netflix. This firm is able to offer customers a far greater variety of movies and charge lower prices than video rental stores by conducting all its business over the Internet and via mail. Netflix's best-cost strategy has been so successful that $10,000 invested in the firm's stock in May 2006 was worth more than $90,000 five years later.[1]

Hey Cupcake! in Austin, Texas, is a low-overhead bakery that has become a delicious success.

Evan Bench – Hey Cupcake! – CC BY 2.0.

Moving toward a best-cost strategy by dramatically reducing expenses is also possible for firms that cannot rely on the Internet as a sales channel. Owning a restaurant requires significant overhead costs, such as rent and utilities. Some talented chefs are escaping these costs by taking their food to the streets. Food trucks that serve high-end specialty dishes at very economical prices are becoming a popular trend in cities around the country. In Portland, Oregon, a food truck called the Ninja Plate Lunch offers large portions of delectable Hawaiian foods such as pulled pork for around $5. Another Portland food truck is PBJ's, whose unique and inexpensive sandwiches often center on organic peanut butter. Beyond keeping costs low, the mobility of food trucks offers important advantages over a traditional restaurant. Some food trucks set up outside big-city nightclubs, for example, to sell partygoers a late-night snack before they head home.

Key Takeaway

- A best-cost strategy can be an effective business-level strategy to the extent that a firm offers differentiated goods and services at relatively low prices.

Exercises

1. What is an example of an industry that you think a best-cost strategy could be successful? How would you differentiate a company to achieve success in this industry?

2. What is an example of a firm following a best-cost strategy near your college or university?

[1]Statistics drawn from Standard & Poor's stock report on Netflix.

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2.6.7: Stuck in the Middle

> **Learning Objectives**
>
> 1. Describe the problem of being stuck in the middle of different generic strategies.
> 2. Understand why trying to please everyone often creates problems when crafting a business-level strategy.

Table 5.11 Stuck in the Middle

A firm is said to be stuck in the middle if it does not offer features that are unique enough to convince customers to buy its offerings and its prices are too high to effectively compete on based on price. Firms that are stuck in the middle generally perform poorly because they lack a clear market or competitive pricing. Several examples of such firms are illustrated below.

Arby's signature roast beef sandwiches are neither cheaper than other fast food nor are they standouts in taste. Perhaps not surprisingly, parent company Wendy's has been trying to sell Arby's.	Electronics retailer Circuit City found itself squeezed by the superior service offer by rival Best Buy and the cheaper prices charged on electronics by Walmart and Target. The firm went bankrupt in 2009 after sixty years in business.
Sears and their famous catalog once dominated U.S. retailing, but the failure to cultivate customers among newer generations and prices that are higher than those of rivals have severely wounded the company.	Kmart's "Blue Light Specials" that alert shoppers to a deeply discounted item reflect the firm's long-running effort to be a cost leader. But emerging on the losing end of a price war with Walmart sent the firm into bankruptcy. Although Kmart escaped bankruptcy, it may be a matter of time until the lights go out permanently for Kmart.

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Stuck in the Middle: Neither Inexpensive nor Differentiated

Some firms fail to effectively pursue one of the generic strategies. A firm is said to be stuck in the middle if it does not offer features that are unique enough to convince customers to buy its offerings, and its prices are too high to compete effectively based on price (Table 5.11). Arby's appears to be a good example. Arby's signature roast beef sandwiches are neither cheaper than other fast-food sandwiches nor standouts in taste. Firms that are stuck in the middle generally perform poorly because they lack a clear market or competitive pricing. Perhaps not surprisingly, parent company Wendy's has been trying to sell Arby's despite having recently acquired the company in 2008. Stockholders apparently agreed with the plan to cut Arby's loose—the price of Wendy's stock rose 7 percent the day the plan was announced (McWilliams, 2011).

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Doing Everything Means Doing Nothing Well

Michael Porter has noted that strategy is as much about executives deciding what a firm *is not* going to do as it is about deciding what the firm *is* going to do (Porter, 1996). In other words, a firm's business-level strategy should not involve trying to serve the varied needs of different segment of customers in an industry. No firm could possibly pull this off.

This illustration from 1887 captures the lesson of Aesop's fable "The Miller, His Son, and Their Ass"—a lesson that executives need to follow.

Wikimedia Commons – public domain.

The fable "The Miller, His Son, and Their Ass" told by the ancient Greek storyteller Aesop helps illustrate this idea. In this tale, a miller and his son were driving their ass (donkey) to market for sale. They soon encountered a group of girls who mocked them for walking instead of riding. The father then told his son to ride the animal. Not long after, father and son overheard a man claim that young people had no respect for the elderly. On hearing this opinion, the father told the boy to dismount the animal and he began to ride. They progressed a short distance farther and met a company of women and children. Several of the women suggested that it was both ridiculous and lazy for the father to ride while the young son was forced to walk alone; once again the two changed positions. Another bystander suggested that they could not believe that the man was the owner of the beast, judging from the way it was weighted down. In fact, it would make more sense for the man and his son to carry the ass. On hearing this, the father and his son tied the animal's legs together and carried it on a pole. As they crossed a bridge near town, the townspeople began to gather and

laugh at the unorthodox sight. The noise and the chaos frightened the beast, leading it to thrash around until it tumbled into the river. With tongue in cheek, we note that the moral of the story is that if you try to please everyone, you may lose your ass (Short & Ketchen, 2005).

-

Getting Outmaneuvered by Competitors

In many cases, firms become stuck in the middle not because executives fail to arrive at a well-defined strategy but because firms are simply outmaneuvered by their rivals. After six decades as an electronics retailer, Circuit City went out of business in 2009. The firm had simply lost its appeal to customers. Rival electronics retailer Best Buy offered comparable prices to Circuit City's prices, but the former offered much better customer service. Meanwhile, the service offered by discount retailers such as Walmart and Target on electronics were no better that Circuit City's, but their prices were better.

The results were predictable—customers who made electronics purchases based on the service they received went to Best Buy, and value-driven buyers patronized Walmart and Target. Circuit City's demise was probably inevitable because it lacked a competitive advantage within the electronics business. Although Target was on the winning end of this battle, Target executives need to worry that their firm could become stuck in the middle between Walmart's better prices on one side and the trendiness of specialty shops on the other.

IBM's personal computer business offers another example. IBM tried to position its personal computers via a differentiation strategy. In particular, IBM's personal computers were offered at high prices, and the firm promised to offer excellent service to customers in return. Unfortunately for IBM, rivals such as Dell were able to provide equal levels of service while selling computers at lower prices. Nothing made IBM's computers stand out from the crowd, and the firm eventually exited the business.

At its peak in the mid-2000s, Movie Gallery operated approximately 4,700 video rental stores. By 2010, the firm was dead. This rapid demise can be traced to the firm becoming outmaneuvered by Netflix. When Netflix began offering inexpensive DVD rentals through the mail, customers defected in droves from Movie Gallery and other video rental stores such as Blockbuster. Netflix customers were delighted by the firm's low prices, vast selection, and the convenience of not having to visit a store to select and return videos. Movie Gallery was stuck in the middle—its prices were higher than those of Netflix, and Netflix's service was superior. Once individuals lacked a compelling reason to be Movie Gallery customers, the firm's fate was sealed.

Netflix and Redbox have left video rental stores such as Movie Gallery and Blockbuster stuck in the middle. Blockbuster filed for bankruptcy in late 2010.

Wikimedia Commons – CC BY-SA 3.0.

Key Takeaway

- When executing a business-level strategy, a firm must not become stuck in the middle between viable generic business-level strategies by neither offering unique features nor competitive pricing.

Exercises

1. What is an example of a firm that you would consider to be "stuck in the middle"? What would your advice be to the executives in charge of this firm?
2. Research a company that has gone bankrupt or otherwise stopped operations in the past decade because their strategy was "stuck in the middle" of otherwise viable generic business-level strategies. Could its demise have been prevented?

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2.7: Measuring Performance

Measuring the Effectiveness of Strategies

To know how effective our strategies are, we need to measure performance. First, watch this 5:16 video about measuring performance:
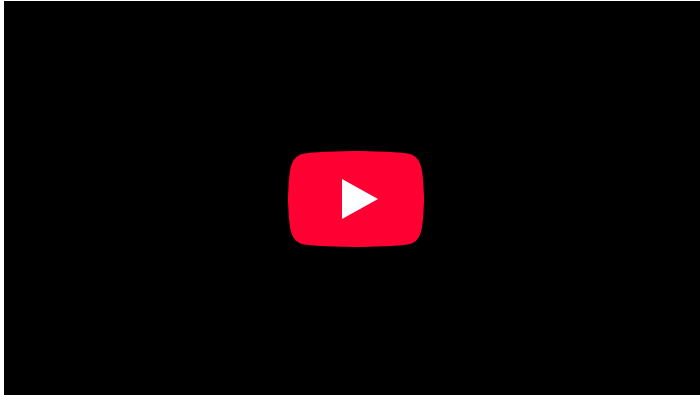
Then, read the following article (and watch the embedded video) that discusses how organizations measure performance using key performance indicators (KPIs): Key Performance Indicator(opens in new window)

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3: Process Planning

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3.1: Overview and Guiding Questions

Module 3: Overview and Guiding Questions

Within this module, students will be introduced to types of business processes and the importance of process planning.

Consider the following questions as you review the learning materials this week:

- What are common types of processes in business?
- Why is it important to identify the steps involved in a business process?
- What are process bottlenecks?
- Why is it important to resolve process bottlenecks?
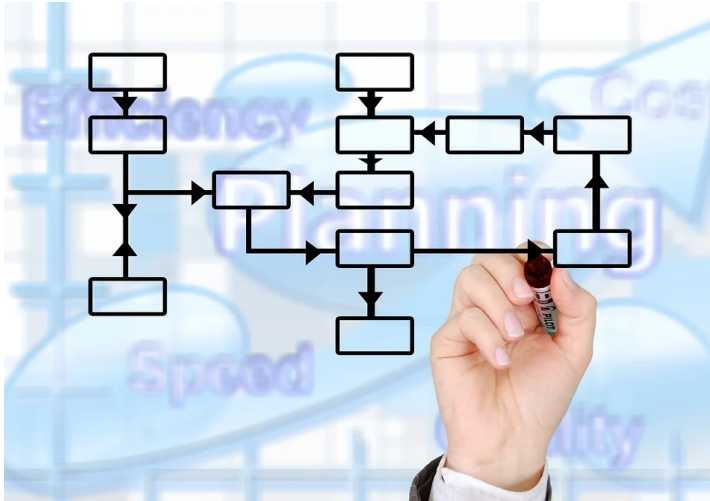
Process Design

Every firm that produces a good or a service will do so by the use of a process. This process will use the firm's resources in order to transform the primary inputs into some type of output. In designing the actual process, particularly the number and sequence of steps, several important factors need to be considered.

1. Product variety – Is the product highly standardized, or is the product highly customized?
2. Volume of output – Is the business created to produce large volumes or a small amount of output?
3. Is the technology to be used general purpose or specialized? Is it capital intensive?
4. The skill level of employees, it is very high or low?
5. What is the expected duration?
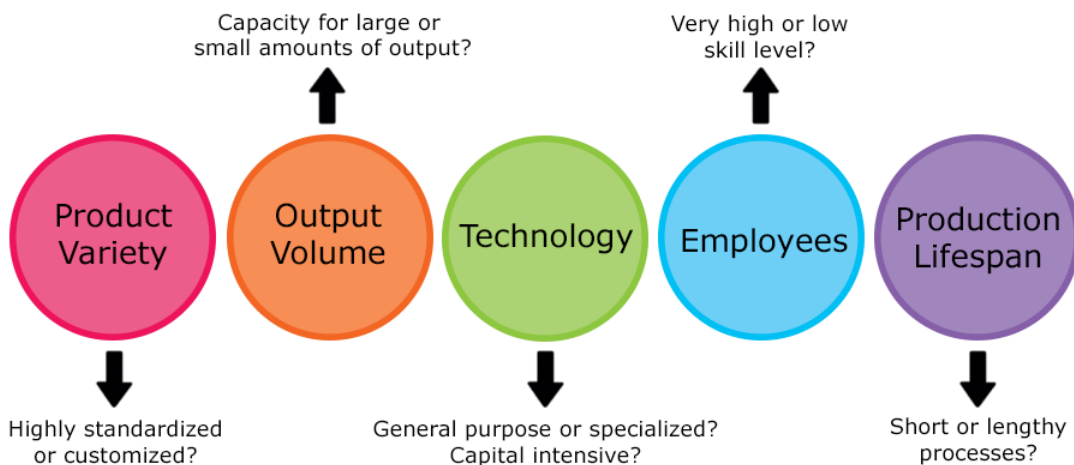
Make-to-order and Make-to-stock

It is useful to categorize processes as either make-to-order or make-to-stock.

In a **make-to-order** business, the customer's order is not manufactured until the order is received. This allows customization to the exact specifications that the customer requires. It may also be referred to as build-to-order. This type of production is considered a pull type system. The work is "pulled" through the process when customer demand is present.

The disadvantage of this type of system is that it takes time for the firm to acquire any materials and needed components, and then to schedule and produce the customers order. Goods are made in small amounts, and may be more expensive.

The advantage of this type of process is that inventory is lower than in a typical make-to-stock system. There is not any uncertainty about what the customer desires and there is no obsolete stock to be disposed of. Dell Computer has utilized this type of system to produce personal computers very successfully.

In a **make-to-stock** process, goods are produced in anticipation of customer demand, usually from a sales forecast. These products are generally made in larger amounts and put into storage to wait for customer orders. Although the unit cost may be lower due to large production volumes, there may be losses due to forecast error, excess inventory, obsolescence and theft. Lead times however are short because goods are available when the customer places the order. These goods are not customized, but standardized.

Process Types

Project

A one-time event, such as construction of an apartment building, implementation of a new ERP system, or writing a book, would all be considered a project type of process. Each of these projects have a high degree of customization, substantial use of resources, and a complex set of related activities. There is only a single output at the end of the project.

Job Shop

Many businesses have a job shop type of process. This is most commonly used when the product being produced is unique for each customer. It is a make-to-order type of business where production is intermittent (i.e. rather than one entire product being completed at a time, work will continue on multiple products as time permits). Often the product has unique characteristics for each customer. The workers in this type of business are very highly skilled in their craft or trade. Often they are referred to as craftsmen or makers. The volume of output is low in a job shop. The equipment used is quite general purpose. Examples include a small bakery that produces beautiful custom wedding cakes, or a business that makes custom guitars or bicycles based on the customers measurements and preferences of materials and components.

Batch

Some businesses are in the situation where they make groups of identical products on a regular basis. These groups are referred to as a batch. The batch will progress through a set of steps to be completed from the start to the end. An organization may have multiple batches at different stages coming through the process. This type of processing is also intermittent. (start, stop, start) There is less variety in this type of business (compared to a job shop) and the equipment used will be relatively general purpose and suited to the industry that they are in. Employees need to be skilled and experienced at operating that equipment and producing

these products. Examples of products made using batch production are baked goods, aircraft parts, clothing, and vaccines. An important decision by these firms is how big the batch should be.

Repetitive

This type of business produces products that are more standardized in nature. Usually the output is high. Since the goods are quite standardized, the equipment used tends to be quite specialized and often highly customized for that process. The skill level of the employees is usually low because the steps are highly standardized. Although these types of jobs may not require a trade or extensive experience, they often do require skills such as multi-tasking, concentration, problem solving, and teamwork. Often, these processes use flexible automation that allows for customization such as the addition of upgraded features. Examples of a repetitive process include assembly lines such as assembling automobiles or electronics, a carwash, or a cafeteria line.

Attribution: Tansiis / Wikimedia Commons

Continuous

A continuous process is when a very high volume of standardized product is produced. The type of product being made is described as non-discrete. This means that these businesses do not produce individual products, rather a product that is often a liquid or a product such as sugar, gasoline, or steel. An example of this type of process is an oil refinery. There are not separate individual workstations, rather the product flows from one step to the next within the system. The equipment in this type of process is highly complex and designed solely for that product at that facility. There are very few workers except for those that are responsible for process monitoring, maintenance, and cleaning.

Hybrids

There are many firms using mixtures of process types. One such common exception is the **Mass Customization** model of production. In mass customization, a company combines low-cost high volume of output, but each and every customer order is customized to the customers specifications. Usually the use of computer-aided manufacturing systems is what permits this customization. Examples include furniture makers who wait to produce the exact model of sofa based on the customers dimensions and fabric choice, or the vehicle manufacturer that has dozens of customization packages and paint options such that each vehicle is custom for the purchaser. A key requirement for successful mass customization is a modular design to allow fast seamless change from each product to the next.

Facility Layout

Layout refers to the way in which organizations position their equipment, departments, or work centers. Having an effective layout can streamline production activities, eliminate wasted or redundant movement and improve safety. The general types of layouts are: a fixed position layout, a process layout (functional), a product (line) layout, and a cellular layout, which is considered a hybrid. Other common layouts include office layouts, retail layouts, and warehouse layout.

Fixed Position Layout

When producing a product that is not easily able to be moved, it may require that the worker, their tools and equipment are brought to the site where the production is taking place. This is a common layout in manufacturing a building, a ship or performing repairs to major equipment.

Process Layout

A process layout is a layout in which departments, equipment, or work centers are arranged according to their function. In a manufacturing environment, all of the milling machines may be in one area or "department," the lathes may be in another area, and the drilling machines all in another area. This layout is also common in services. In a department store, similar goods are arranged together such as footwear, jewelry, and housewares. At a hospital, cardiology is in one area, maternity in another location, and pediatrics elsewhere. The specific dedicated equipment and skilled practitioners work in each of these areas.

An advantage to a process layout is that equipment tends to be quite general-purpose. If one particular piece of equipment breaks down, it will not halt the entire process. This type of process gives flexibility to handle a variety of products or customers. It is ideal for job shops or small batch manufacturing.

A disadvantage of a process layout is that a particular product will likely have to travel from department to department to get the set of processes completed. This often leads to lots of material handling and movement of goods throughout the facility. A flexible material-handling system is needed such as forklifts. Inventory will sit in each area waiting for its turn to be processed. This waiting inventory is referred to as **queue.** When examining the total throughput time of jobs through the system, it is often discovered that each order spends much more time waiting in queue than it does actually being processed. For that reason, this type of layout is generally very inefficient. A major consideration in a process layout is to ensure that departments with a large amount of interaction are located nearby one another.

Below is an example of a machinery plant with a process layout:
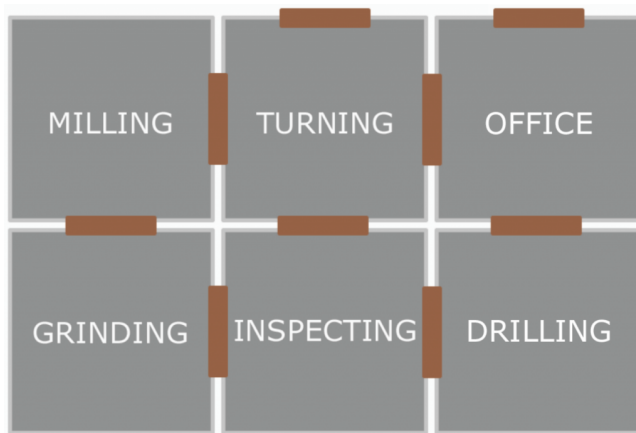
Product (Line) Layout

These are used in businesses that use assembly lines or production lines. If the product has high volume an assembly line might be the best option. The equipment in these types of layouts are often very capital intensive and are laid out according to the progressive steps of the process. Each work station is located along the line and may consist of a worker with equipment, or robots. Often each work station is adding components (assembly line) or modifying a product (production line). It is important to note that it is not necessarily a straight line, often assembly lines zig zag or are in a shape to use the maximum amount of space available. Some services may use a line layout, such as preparing hospital meals, or a cafeteria line. Due to considerable cost involved with setting up an assembly line, a large volume of product needs to be produced. Demand that is steady and consistent is ideal.

The goods produced in a line layout are generally very standardized, and the work processes are also highly standardized. Each product follows the same set of steps so that a fixed path material handling system is used such as a conveyor belt. This conveyor belt may be manual or automatic. It may operate at a pre determined speed, or it may be worker paced. It may run continuously or pulsed. The speed of the conveyor will determine the amount of product that will be produced per shift.

In contrast to a process layout a product layout is <u>very efficient</u>**.** There are a number of reasons for this.

1. Because of the division of labour and the repetition, there is less variability in the work performed
2. There is no build up of inventory, and no waiting. When completed at one work station, the job automatically moves to the next workstation. Only the inventory that is in process is in the system. Goods tend to be shipped when they are completed.
3. Due to the material handling system, goods move quickly and not very far.
4. Changeovers are not necessary so very little time is lost in changing between products.

It is important that assembly lines are <u>balanced</u>**.** The amount of time required at a preceding work station should be relatively similar to the amount of time required at the following work station.

Challenges in a product (line) layout include:

1. The fact that the line may be susceptible to shut downs if there are equipment malfunctions so preventative maintenance is critical. Preventative maintenance involves the inspection and replacement of any parts that have a high probability of failures, as well as holding ample spare parts in stock and having a detailed maintenance schedule for each piece of equipment.
2. Training and job rotation are critical activities to make sure employees are capable of completing the work tasks and that there are multiple people that can work at each individual job
3. With repetitive standardized jobs, it is critical that good ergonomic job design is performed. Organizations that ensure the health, safety and comfort of their employees reap rewards in terms of the quality of work they receive from employees.

Here is a fun video; see Rick Mercer on the Assembly line in GM Oshawa:

Cellular Layout

Cellular layouts are considered a "hybrid" type of layout because it includes characteristics of both a Process layout and a product (line) layout. It is very common that a business may have multiple product lines, with far too much variety in order to take advantage of one assembly line. Often these businesses may have been using a process layout, with all of the associated product movement and waiting times. An alternative that became popular beginning in the late 1980s is the Cellular layout type. This type of production layout is still heavily utilized today.

This type of layout begins with the company performing a thorough analysis of their products and deciding which products are similar to one another and often share common geometry and processing requirements in terms of equipment, machinery, technology and employee skills. These products are grouped together and manufactured in a work cell. This is referred to as group technology.

Each work cell will contain a unique set of equipment to manufacture this family of parts in an assembly line type of layout. The equipment is laid out in a U shape with equipment located close together so jobs do not have to move very far.

Advantages of a cellular layout include:

1. Reduced set up times for each piece of equipment because each machine is making products that are very similar, often set-ups are very fast or non-existent.
2. Speed is greatly enhanced because batches can now be small and goods that enter the system will continue until they are complete. Small batches means fast run times and short wait times.
3. Inventory investment is now reduced due to small batch sizes enabled because of the low set up times required.
4. Quality is enhanced because employees work only within that cell on a narrow range of products. Cross training of employees ensures good and thorough knowledge of the entire production process.
5. Employee morale is improved due to working as part of a team that has responsibility for the throughput and quality of the cell. The U-shaped design heightens collaboration among workers.
6. Less floor space is required due to machines being placed close together and less movement of product.

An example of a U-shaped layout can be found below:
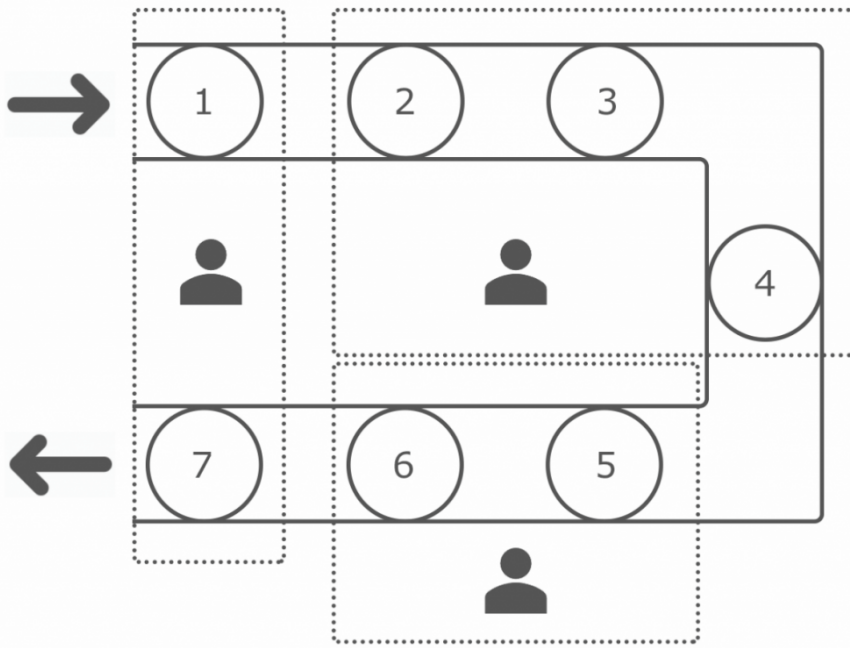
Here is a video on cellular manufacturing:

Other Layouts Include

Office Layout: In 2020 office spaces are a great deal different than in generations past. Floor space per employee has dropped significantly. There is far less worry about the flow of paperwork than in the past. Often employees are grouped according to the tasks they perform and the work teams they participate in. Workspaces now tend to be more flexible with less paper and less furniture to hold files and documents. Many organizations put more emphasis on having comfortable spaces for collaboration. Layouts are much more open concept with lower partitions to improve visibility of the workspace.[1]

Retail Layout: The overall goal when laying out a retail location is to try and maximize the amount of sales per square foot in the facility. This is done by careful study of traffic patterns in the store in order to try and maximize the amount of product to which each customer is exposed. That is why you will often find the milk at the far end of the store causing customers the need to walk past all other departments to reach it.

Warehouse Layout: Effective warehouse layout aims to make effective use of the total volume of space contained in the building. The relationship between the receipt of incoming goods, the storage space and the picking, packing and shipping of outbound goods is carefully analyzed. An important consideration is the placement of inventory items in order to minimize distance goods and employees are need to travel. Many warehouses have special holding requirements such as freezers, cold storage and high security areas.

Some important "Times" to be familiar with:

Throughput time is the time between the beginning – the very first operation in the process until the product is actually completed at the end of the process. Remember that this includes not only the process time, but also any waiting time, inspection time, time spent on rework and movement.

Lead time is the amount of time between when the customers order is received and when the product is completed and ready to ship.

Cycle time is the rate at which the operation is actually producing each unit. If you stood at the end of the process and measured the time between completion of each unit, that is the true cycle time.

Takt time is a calculated value which determines the rate at which a firm needs to process their product in order to meet customer demand. It can be calculated by:

$$\frac{\text{available production time}}{\text{demand}}$$

Example

A firm operates 8 hours per day (480 minutes). Their daily demand is 120 units. They can calculate their takt time required to meet this demand:

(8 hours x 60 min) / 120 = 4 min.

The firm must product **one product every 4 minutes.** This is also known as the drum beat of the operation. They must produce one product at least every 4 minutes to meet customer demand. If demand increases it may be required to use continuous Improvement tools to change the takt time or possibly add additional equipment.

The above calculation shows that an assembly line must have a takt time of 4 minutes in order to produce 120 units per day. What if customer demand rose sharply? What would need to happen to increase the output?
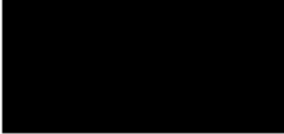
Solution

The takt time would need to decrease (actually run faster). A takt time of 3.0 minutes would produce an output of 480 min / 3 min = 160 units. A takt time of 2.0 minutes would produce 240 units per day.

Process Flowcharting

Any process improvement initiative will always begin with mapping out a visual representation of the current process. This is necessary so that all members of the team have a clear understanding of how current process is working. All of the steps and flows need to be identified and laid out in the proper sequence. It is important that the correct stakeholders are involved in this activity!

There are many different types of flowcharts, and many different softwares that can assist with this activity. Most practitioners tend to prefer using a large roll of paper on the wall where the group can collaborate rather than using a computer projected onto a screen. It is important to go out into the workplace and walk the process before beginning this task. This is a very standard activity that takes place in organizations around the globe. As an Operations Manager, there is a high likelihood that you will become involved in this at some point in your career. To map a process, a standard set of symbols are used. There are many different symbols, it is best not to get too caught up in all of them. The standard symbols include:

Symbol	Meaning
▭	Start / Stop
▭	Operation
◆	Decision
▽	Storage
→	Flow

Example Flowchart
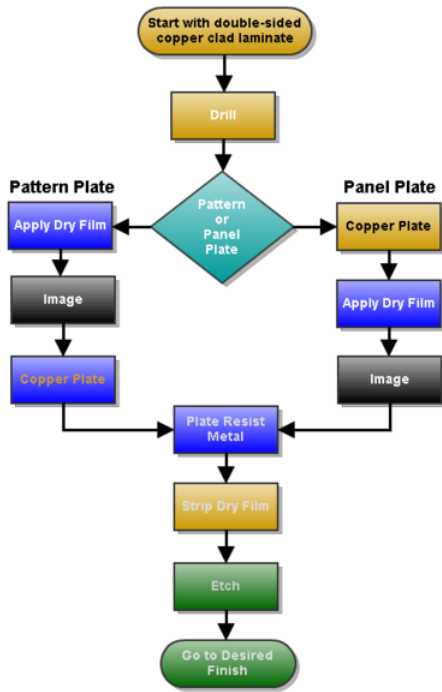
Image Source: Process Flowchart

Source: "Process Design" *Introduction to Operations Management* Copyright © by Hamid Faramarzi and Mary Drane is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, except where otherwise noted.

3.3: What is Process Planning?

Process Planning

Efficient processes are integral to every organization. To design an efficient process, we need to methodically plan and control the processes that are used.

Watch the following 5:35 video that provides insight into the necessity for planning out business processes:
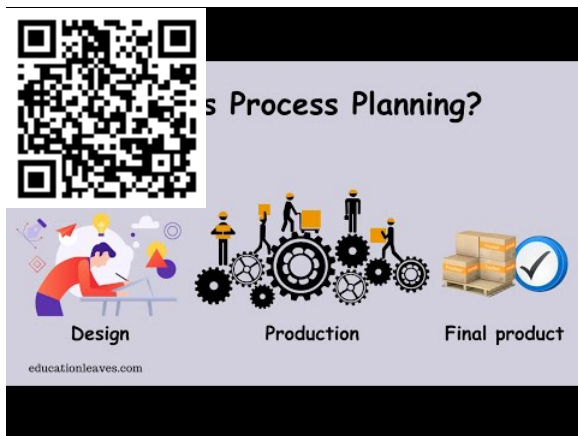
Note: While the video focuses on the need for planning out production-related processes, the need also exists for all service-related processes.

3.3: What is Process Planning? is shared under a CC BY 4.0 license and was authored, remixed, and/or curated by Jamie Hammond and Western Technical College.

3.4: Process Bottlenecks

Understanding Process Bottlenecks

Within the "What is Process Planning" video, the potential for process bottlenecks was referenced. There is potential for this in each and every process that we work with.

First, read the following article to learn more about bottlenecks in both production and service industries: Bottleneck: A Point of Congestion in a Production System(opens in new window)

Then, watch the following 2:02 video that discusses the analysis of process bottlenecks:
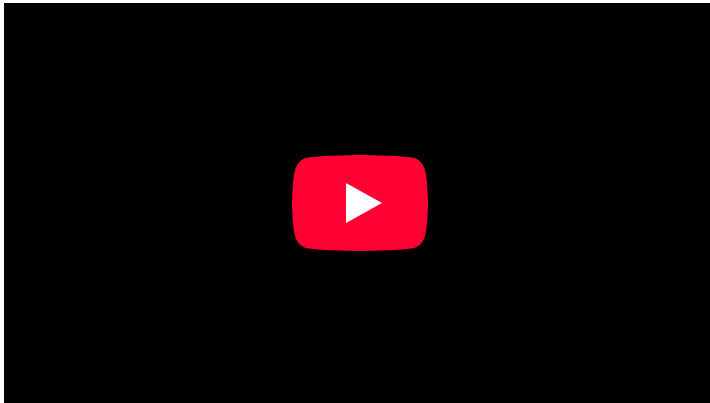
3.5: Process Logic Review

Review: Process Logic

Within this module, you were introduced to process flowcharts. Before you learn how to construct a flowchart, it can be helpful to study the logical ordering of common tasks.

Click on the following link to assess your skill in deciphering the logic related to common tasks: Flow Charts for Practical Tasks(opens in new window)

Self-evaluate your skills:

1. REVIEW the examples provided at the beginning of the webpage.
2. PRACTICE your skills by COMPLETING each of the practice exercises available.

3.6: Identify the Steps Activity

Process Planning Activity

Consider a process that is familiar to you. For example, think about the steps required to make a peanut butter and jelly sandwich.

How would you plan the steps?

Image Source: PBJ Sandwich

1. List the steps required to make the sandwich.
2. Make the sandwich based on the steps you identified.
3. Ask another person to follow the steps that you identified.
   - Did they have any questions while following the steps?
   - Did they make the sandwich exactly as you did?

Then, consider:

1. Why is planning the process important?

2. Why is it important to identify your intended audience when planning a process?

3. What are two potential bottlenecks that could occur within this process and how would you resolve them?

Image Source: PBJ Sandwich

CHAPTER OVERVIEW

4: Operational Processes

4.1: Overview and Guiding Questions

Module 4: Overview and Guiding Questions

Within this module, students will explore how flowcharts are utilized to efficiently communicate processes and examine common continuous improvement methodologies.

Consider the following questions as you review the learning materials this week:

- Why is process analysis important?
- How are flowcharts used in business?
- Why is it important to use standard shapes when communicating a process via a flowchart?
- Why are continuous improvements important for operational processes?

4.2: Introduction to Flowcharts

Understanding Flowcharts

Flowcharts are process models that are commonly utilized to communicate operational processes. Watch the following 11:22 video that explains how flowcharts are used and provides a demonstration for constructing one:
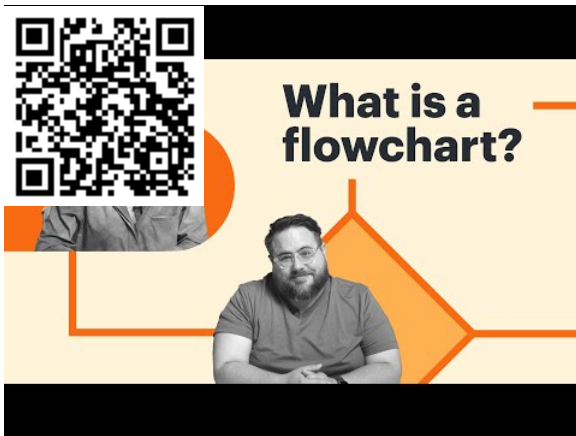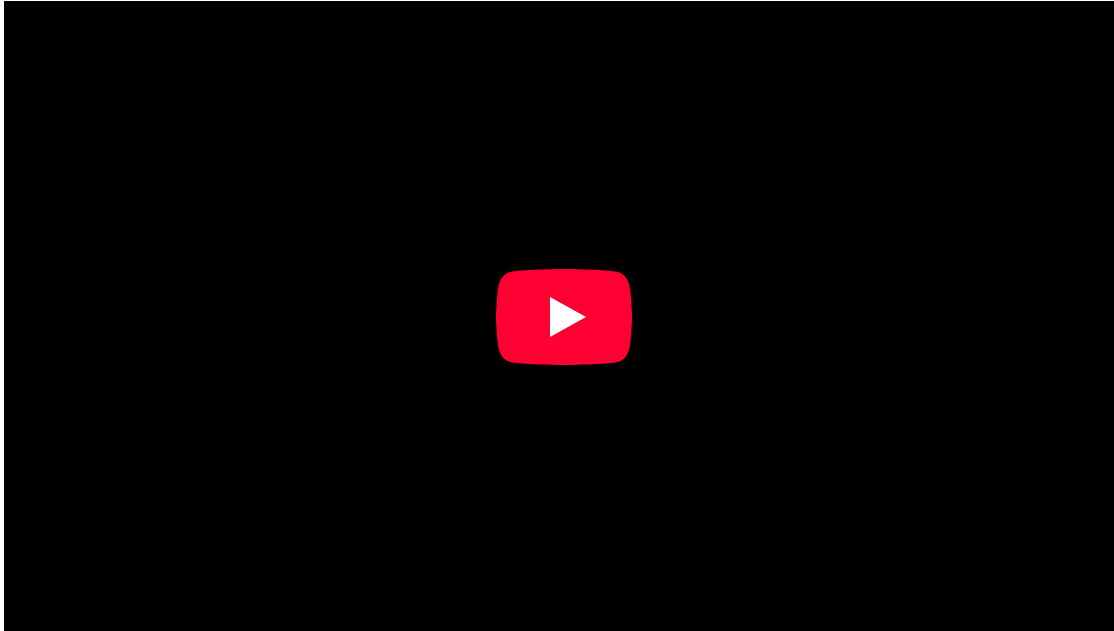
Note: The video demonstrates the use of Lucid Software, however, you may utilize any process modeling software that you prefer.

4.2: Introduction to Flowcharts is shared under a CC BY 4.0 license and was authored, remixed, and/or curated by Jamie Hammond and Western Technical College.
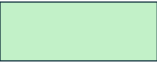
4.3: Basic Flowchart Symbols

Flowchart Symbols

One reason why flowcharts are so popular is because they use standardized shapes that almost anyone can instantly recognize.

Here are the five most common shapes used in a flowchart.

- **Oval** (Terminal symbol)
- **Rectangle** (Process symbol)
- **Arrow** (Arrow Symbol)
- **Diamond** (Decision symbol)
- **Parallelogram** (Input/Output symbol)

Symbol	Name	Function
	Oval	Represents the start or end of a process
	Rectangle	Denotes a process or operation step
→	Arrow	Indicates the flow between steps
	Diamond	Signifies a point requiring a yes/no
	Parallelogram	Used for input or output operations

List of flowchart symbols and their meanings

Every shape found in a flowchart has a use case (it's not just a design preference!)

In this section, I'll first name the shape, show it to you, and then describe its function.

1. Oval/Pill (Terminal symbol)

The oval shape, also known as the terminal symbol, is as an elongated circle or an ellipse.

Its function is to provide a visual reference of the start or end of a flowchart.

To make sure readers understand the start and endpoint correctly, you should verbally communicate "Start" and "End".

2. Rectangle (Process symbol)

A rectangle is used to highlight each specific task or action within a process.

Also known as the process symbol, the rectangle is fundamental to mapping out the sequence of actions or operations that take place from the start to the end of a process.

By placing tasks within a rectangle, flowcharts make it easy to understand, follow, and analyze individual tasks that contribute to the overall workflow.
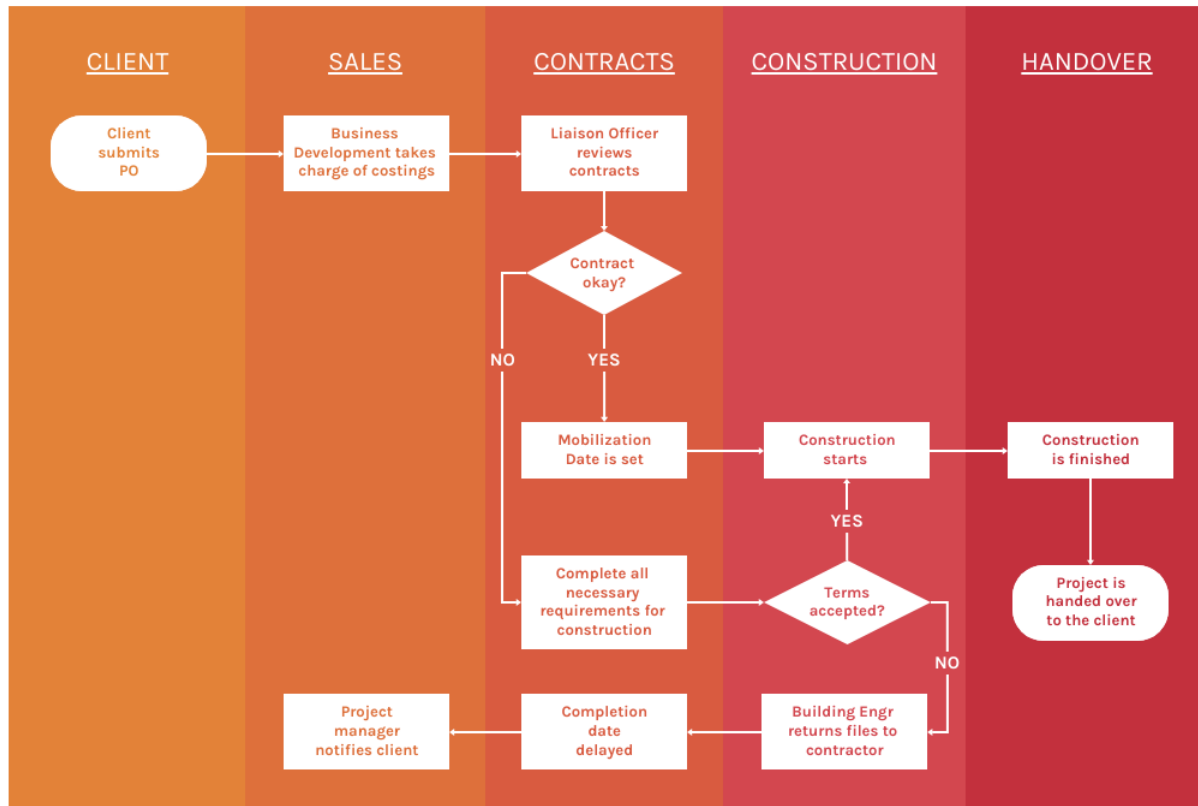
3. Diamond (Decision symbol)
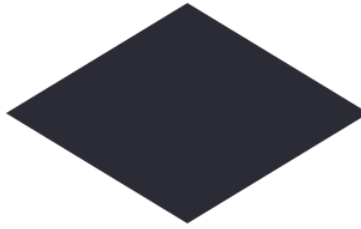
A diamond or a rhombus highlights a decision point in a flowchart and hence is also known as the decision symbol.

Diamonds are usually present when there is a conditional statement such as a "Yes" or "No" or "True" or "False" question.

As a result, two or more paths always branch out from this symbol.

Here's a great example:

SWIMLANE ACTIVITY DIAGRAM:
Engineering Workflow Distribution 2024

START / END	PROCESS	DECISION

CLIENT	SALES	CONTRACTS	CONSTRUCTION	HANDOVER
Client submits PO	Business Development takes charge of costings	Liaison Officer reviews contracts		
		Contract okay?		
		Mobilization Date is set	Construction starts	Construction is finished
		Complete all necessary requirements for construction	Terms accepted?	Project is handed over to the client
Project manager notifies client	Completion date delayed		Building Engr returns files to contractor	

(opens in new window)

CREATE THIS TEMPLATE

4. Parallelogram (Input/output symbol)

A parallelogram in flowchart represents both input and output processes within a system.

This means it marks the point in a process where a user has to enter data into a system, such as an online shopper entering their name, address, and payment details, into the system.

But the parallelogram can also also refer to a point when system generates data such as an order confirmation number from the example above.

Therefore, it's good practice to indicate whether the process is an input or an output using labels or arrows.

5. Arrow

An arrow usually connects two rectangles, parallelograms or diamond symbols to highlight a sequence flow between the two.

The sole purpose of arrows is to provide visual direction to your flowchart.

Source: Ramuthi, Danesh. "Flowchart Symbols and Meaning: A Complete Guide (2024)." Vengage.com, https://venngage.com/blog/flowchart-symbols/. 09/12/2024.

4.4: Process Modeling Software

Flowchart Software

It is important that you select software that you are comfortable using. If you have not used software to create flowcharts, take some time to **<u>explore</u>** a variety of options. Some examples include:

1. Creately (opens in new window)
2. Diagrams.net (opens in new window)
3. Lucidchart (opens in new window)
4. Miro (opens in new window)

There are many ways to add and connect shapes and those ways vary slightly based upon the software that you use. To learn common methods for constructing a flowchart, review the following tutorial and follow along to practice drawing a basic flowchart: Draw a Basic FlowChart (opens in new window)

4.4: Process Modeling Software is shared under a CC BY 4.0 license and was authored, remixed, and/or curated by Jamie Hammond and Western Technical College.

4.5: Practice Creating a Flowchart

Flowchart Practice

Practice using the software option that you selected to create the following flowchart:
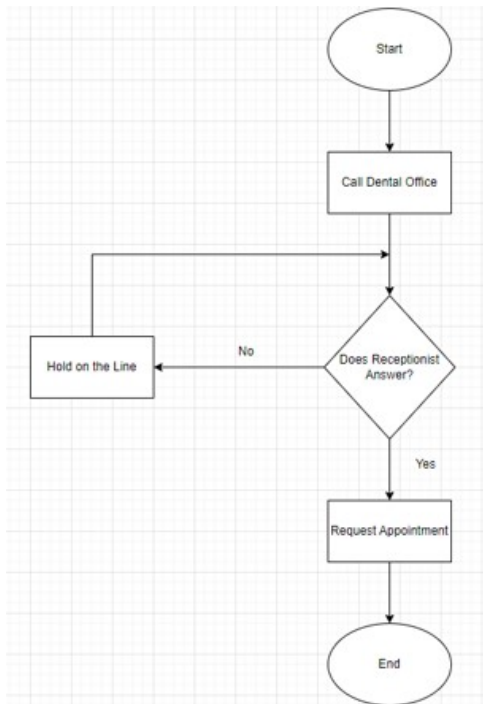
- Are you able to replicate the flowchart based on the image attached?
- Are you able to copy the flowchart that you created into a Word document?
  - An easy way to export the flowchart from Diagrams.net, into a Word document or a PowerPoint, is to:
    - Create the flowchart
    - Click on File
    - Click on 'Export as' and select "PNG" or "JPEG" to save the flowchart as an image
    - Insert the image within Word or PowerPoint by clicking on 'Insert' and then click on 'Pictures' to select the image of the flowchart that you exported.
- Can you also write the steps that are represented within the flowchart in sentence format?

4.6: Continuous Improvement - PDCA

Continuous Improvement Strategy

Continuous improvement is an important, ongoing business strategy. Recall the Deming cycle, a methodology for continuous improvement that consists of four key stages: (1) Plan, (2) Do, (3) Check, (4) Act.
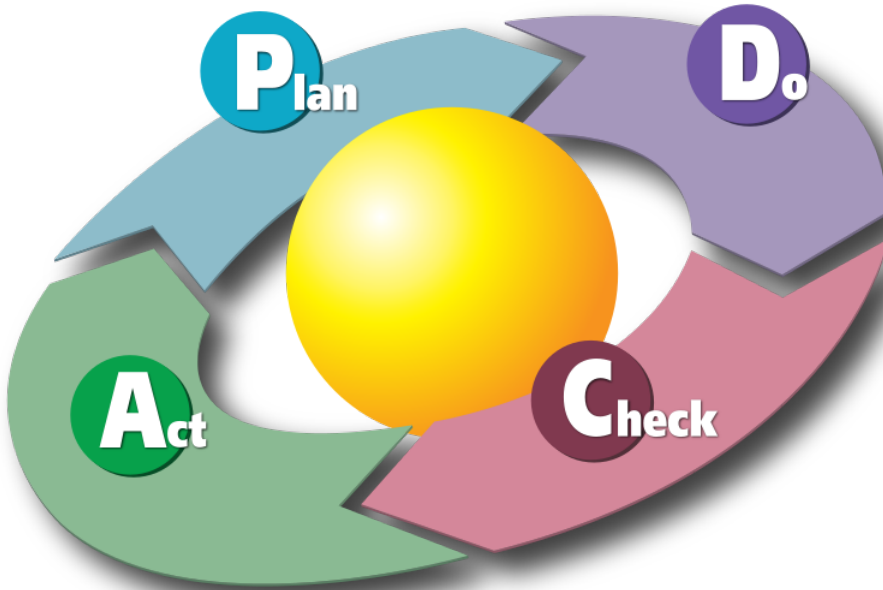
Image Source: "Diagram by Karn Bulsuk, http://www.bulsuk.com. Wikimedia Commons.

The Deming cycle, helps managers assess the effects of planned action by integrating organizational learning into the planning process. The cycle consists of four key stages: (1) Plan—create the plan using the model discussed earlier. (2) Do—implement the plan. (3) Check—monitor the results of the planned course of action; organizational learning about the effectiveness of the plan occurs at this stage. (4) Act—act on what was learned, modify the plan, and return to the first stage in the cycle, and the cycle begins again as the organization strives for continuous learning and improvement. Source: Deming Cycle (opens in new window)

- **17.2: The Planning Process** (opens in new window) by OpenStax is licensed CC BY 4.0. Original source: https://openstax.org/details/books/p...les-management.

4.7: Lean Six Sigma

Methodologies for Improvement

While it is important for all organizations to implement continuous improvement, the methodologies and tools one organization may use may differ from another organization. This week, we will look at two methodologies that are commonly used: **Lean and Six Sigma.** In addition, we will look at how they can be used together.

Lean and Six Sigma

Watch the following 3:57 video that provides an introduction to both Lean and Six Sigma and the benefit of using the two methodologies together:
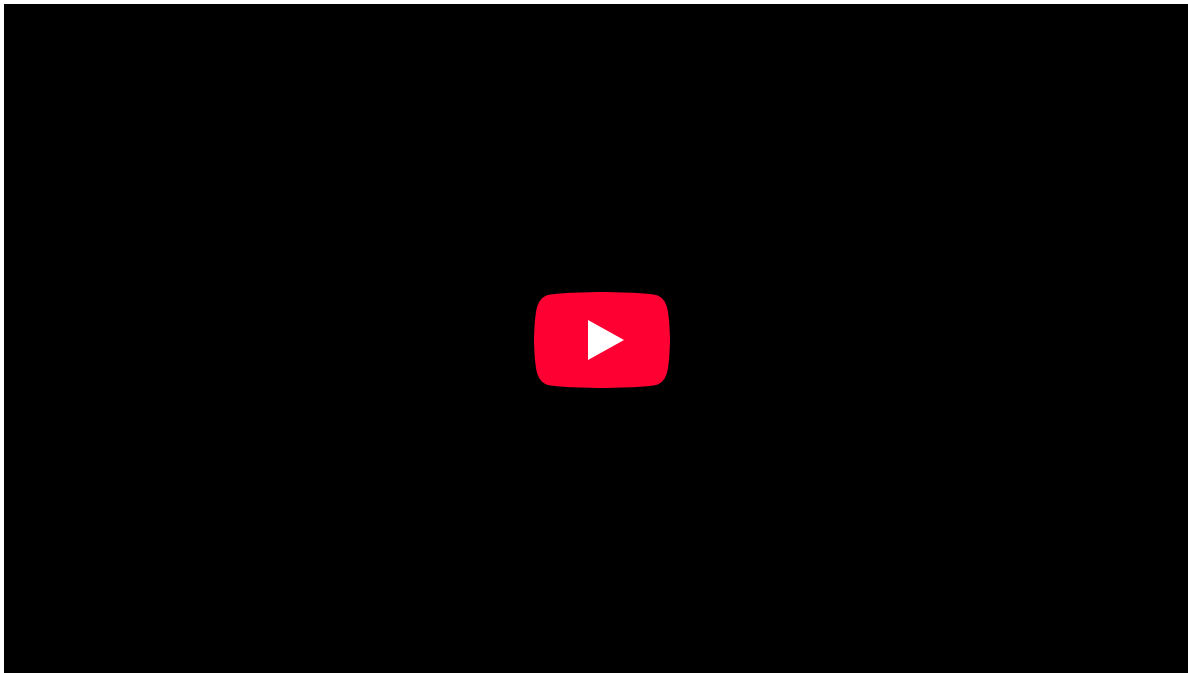
Read the following for additional insights into both Lean and Six Sigma and explore how they are utilized individually and combined: Lean Six Sigma (opens in new window)

Finally, **watch** the following 4:29 video that explores the use of flowcharts in **Lean Six Sigma:**
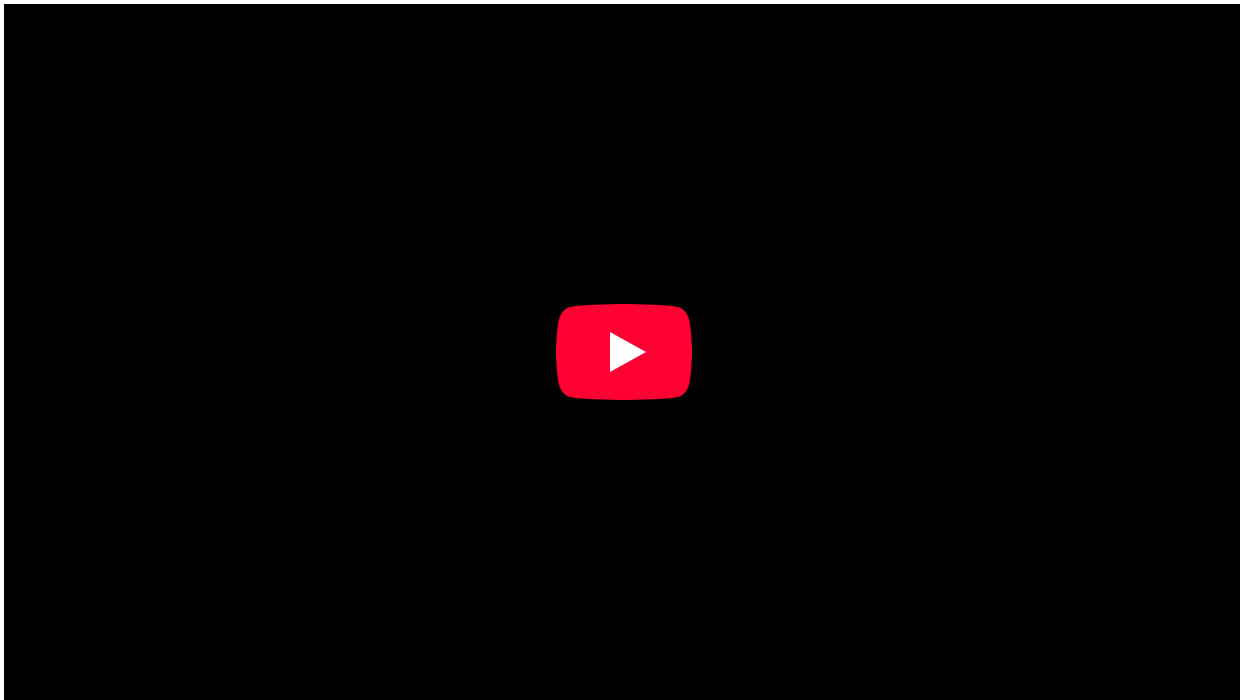
Note: Within the video, swimlane diagrams and standard operating procedure (SOP) documents are introduced. Both are often utilized by Operations Managers!

4.7: Lean Six Sigma is shared under a CC BY 4.0 license and was authored, remixed, and/or curated by Jamie Hammond and Western Technical College.

CHAPTER OVERVIEW

5: Project Management

5.1: Overview and Guiding Questions

Module 5: Overview and Guiding Questions

Within this module, students will explore concepts related to managing projects and examine the use of a Gantt chart.

Consider the following questions as you review the learning materials this week:

- What are the common phases of a project lifecycle?
- Who is a project stakeholder?
- What are project constraints?
- How are projects used to achieve organizational goals?
- Why is it important to effectively manage projects?

5.2: Introduction to Project Management

Careers Using Project Management Skills

Skills learned by your exposure to studying project management can be used in most careers as well as in your daily life. Strong planning skills, good communication, ability to implement a project to deliver the product or service while also monitoring for risks and managing the resources will provide an edge toward your success. Project managers can be seen in many industry sectors including agriculture and natural resources; arts, media, and entertainment; building trades and construction; energy and utilities; engineering and design; fashion and interiors; finance and business; health and human services; hospitality, tourism, and recreation; manufacturing and product development; public and private education services; public services; retail and wholesale trade; transportation; and information technology.

Below we explore various careers and some of the ways in which project management knowledge can be leveraged.

Business Owners

Business owners definitely need to have some project management skills. With all successful businesses, the product or service being delivered to the customer meets their needs in many ways. The product or service is of the quality desired, the costs are aligned with what the consumer expected, and the timeliness of the product or service meets the deadline for the buyer of that item.

The pillars of project management are delivering a product/service within schedule, cost, scope, and quality requirements. Business owners need planning, organizing, and scoping skills and the ability to analyze, communicate, budget, staff, equip, implement, and deliver.

Understanding the finances, operations, and expenses of the business are among the skills that project managers learn and practice. Some businesses may focus more on accounting, providing financial advice, sales, training, public relations, and actuary or logistician roles. Business owners may own a travel agency or provide hospitality. Business owners could be managing a storefront or a location in their town's marketplace.

Example: Restaurant Owner/Manager

Restaurant managers are responsible for the daily operations of a restaurant that prepares and serves meals and beverages to customers. Strong planning skills, especially coordinating with the various departments (kitchen, dining room, banquet operations, food service managers, vendors providing the supplies) ensure that customers are satisfied with their dining experience. Managers' abilities to recruit and retain employees, and monitor employee performance and training ensure quality with cost containment. Scheduling in many aspects, not only the staff but also the timing of the food service deliveries, is critical in meeting customer expectations.

Risk management is essential to ensure food safety and quality. Managers monitor orders in the kitchen to determine where delays may occur, and they work with the chef to prevent these delays. Legal compliance is essential in order for the restaurant to stay open, so restaurant managers direct the cleaning of the dining areas and the washing of tableware, kitchen utensils, and equipment. They ensure the safety standards and legality, especially in serving alcohol. Sensitivity and strong communication skills are needed when customers have complaints or employees feel pressured because more customers arrive than predicted.

Financial knowledge is needed for the soundness of running the restaurant, especially tracking special projects, events, and costs for the various menu selections. Catering events smoothly can be an outcome of using project plans and the philosophy of project management. The restaurant manager or the executive chef analyzes the recipes to determine food, labour, and overhead costs; determines the portion size and nutritional content of each serving; and assigns prices to various menu items, so that supplies can be ordered and received in time.

Planning is the key for successful implementation. Managers or executive chefs need to estimate food needs, place orders with distributors, and schedule the delivery of fresh food and supplies. They also plan for routine services (equipment maintenance, pest control, waste removal) and deliveries, including linen services or the heavy cleaning of dining rooms or kitchen equipment, to occur during slow times or when the dining room is closed. A successful restaurant relies on many skills that the project management profession emphasizes.

Outsourcing Services

Many businesses explore outsourcing for certain services. Below is a sample status and project plan that reflects the various tasks needed for a project. A review of finances, the importance of communicating to stakeholders, and the importance of time, cost, schedule, scope, and quality are reflected. Many companies may use these steps in their business. These plans show the need for the entire team to review the various proposals to choose the best plan. Figure 1.1 represents a sample project status report.
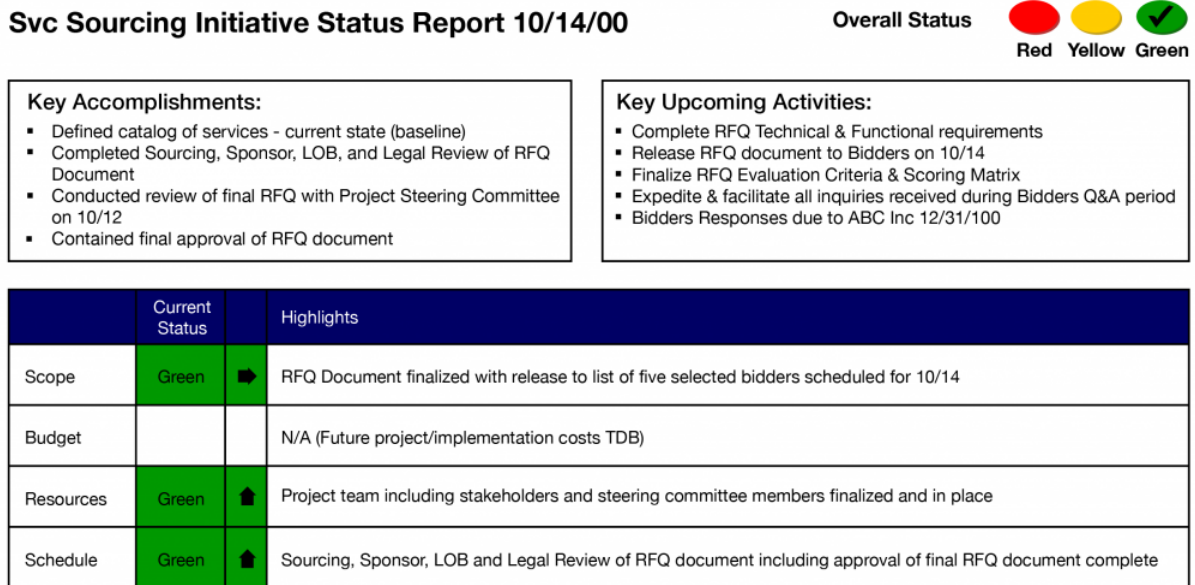

Svc Sourcing Initiative Status Report 10/14/00

Overall Status — Red, Yellow, Green

Key Accomplishments:
- Defined catalog of services - current state (baseline)
- Completed Sourcing, Sponsor, LOB, and Legal Review of RFQ Document
- Conducted review of final RFQ with Project Steering Committee on 10/12
- Contained final approval of RFQ document

Key Upcoming Activities:
- Complete RFQ Technical & Functional requirements
- Release RFQ document to Bidders on 10/14
- Finalize RFQ Evaluation Criteria & Scoring Matrix
- Expedite & facilitate all inquiries received during Bidders Q&A period
- Bidders Responses due to ABC Inc 12/31/100

	Current Status		Highlights
Scope	Green	➡	RFQ Document finalized with release to list of five selected bidders scheduled for 10/14
Budget			N/A (Future project/implementation costs TDB)
Resources	Green	⬆	Project team including stakeholders and steering committee members finalized and in place
Schedule	Green	⬆	Sourcing, Sponsor, LOB and Legal Review of RFQ document including approval of final RFQ document complete

Figure 1.1: Sample status chart, which is typical with the use of a red-yellow-green

Example: Construction Managers

Construction managers plan, direct, coordinate, and budget a wide variety of residential, commercial, and industrial construction projects including homes, stores, offices, roads, bridges, wastewater treatment plants, schools, and hospitals. Strong scheduling skills are essential for this role. Communication skills are often used in coordinating design and construction processes, teams executing the work, and governance of special trades (carpentry, plumbing, electrical wiring) as well as government representatives for the permit processes.

A construction manager may be called a project manager or project engineer. The construction manager ensures that the project is completed on time and within budget while meeting quality specifications and codes and maintaining a safe work environment. These managers create project plans in which they divide all required construction site activities into logical steps, estimating and budgeting the time required to meet established deadlines, usually utilizing sophisticated scheduling and cost-estimating software. Many use software packages such as Microsoft Project® or Procure® or online tools like BaseCamp®. Most construction projects rely on spreadsheets for project management. Procurement skills used in this field include acquiring the bills for material, lumber for the house being built, and more. Construction managers also coordinate labor, determining the needs and overseeing their performance, ensuring that all work is completed on schedule.

Values including sustainability, reuse, LEED-certified building, use of green energy, and various energy efficiencies are being incorporated into today's projects with an eye to the future. Jennifer Russell, spoke about project management and global sustainability" at the 2011 Silicon Valley Project Management Institute (PMI) conference. She informed the attendees of the financial, environmental, and social areas in expanding the vision of project management with the slide in Figure 1.2. These values are part of the PMI's code of ethics and professionalism. By adhering to this code, project managers include in their decisions the best interests of society, the safety of the public, and enhancement of the environment.
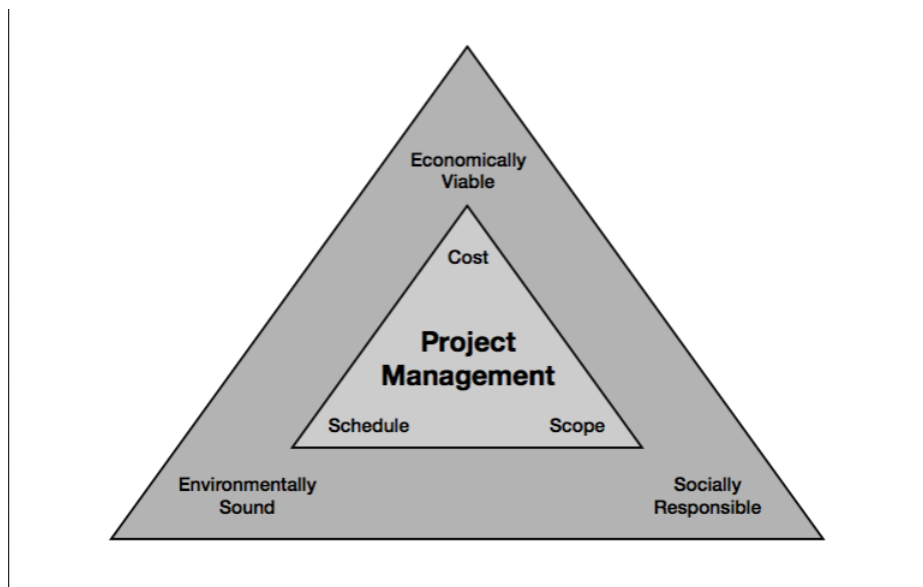
Figure 1.2: In addition to considering the cost, scope, and schedule of a project, a project manager should work to ensure the project is socially responsible, environmentally sound, and economically viable.

Creative Services

Creative service careers include graphic artists, curators, video editors, gaming managers, multimedia artists, media producers, technical writers, interpreters, and translators. These positions use project management skills, especially in handling the delivery channel and meeting clients' requirements.

Let us look at one example, graphic artists, to understand and identify some of the project management skills that aid in this career.

Example: Graphic Artists

Graphic artists plan, analyze, and create visual solutions to communication problems. They use many skills found in project management, especially communications. They work to achieve the most effective way to get messages across in print and electronic media. They emphasize their messages using colour, type, illustration, photography, animation, and various print and layout techniques. Results can be seen in magazines, newspapers, journals, corporate reports, and other publications. Other deliverables from graphic artists using project management skills include promotional displays, packaging, and marketing brochures supporting products and services, logos, and signage. In addition to print media, graphic artists create materials for the web, TV, movies, and mobile device apps.

Initiation in project management can be seen in developing a new design: determining the needs of the client, the message the design should portray, and its appeal to customers or users. Graphic designers consider cognitive, cultural, physical, and social factors in planning and executing designs for the target audience, very similar to some of the dynamics a project manager considers in communicating with various project stakeholders. Designers may gather relevant information by meeting with clients, creative staff, or art directors; brainstorming with others within their firm or professional association; and performing their own research to ensure that their results have high quality and they can manage risks.

Graphic designers may supervise assistants who follow instructions to complete parts of the design process. Therefore scheduling, resource planning, and cost monitoring are pillars of project management seen in this industry. These artists use computer and communications equipment to meet their clients' needs and business requirements in a timely and cost-efficient manner.

Educators

"Educator" is a broad term that can describe a career in teaching, maybe being a lecturer, a professor, a tutor, or a home-schooler. Other educators include gurus, mullahs, pastors, rabbis, and priests. Instructors also provide vocational training or teach skills like learning how to drive a car or use a computer. Educators provide motivation to learn a new language or showcase new products and services. Educators use project management skills including planning and communication.

Let us look at teachers, since we all have had teachers, and see if we can recognize the project management skills that are demonstrated in this profession.

Example: Teachers

Some teachers foster the intellectual and social development of children during their formative years; other teachers provide knowledge, career skill sets, and guidance to adults. Project management skills that teachers exhibit include acting as facilitators or coaches and communicating in the classroom and in individual instruction. Project managers plan and evaluate various aspects of a project; teachers plan, evaluate, and assign lessons; implement these plans; and monitor each student's progress similar to the way a project manager monitors and delivers goods or services. Teachers use their people skills to manage students, parents, and administrators. The soft skills that project managers exercise can be seen in teachers who encourage collaboration in solving problems by having students work in groups to discuss and solve problems as a team.

Project managers may work in a variety of fields with a broad assortment of people, similar to teachers who work with students from varied ethnic, racial, and religious backgrounds. These teachers must have awareness and understanding of different cultures.

Teachers in some schools may be involved in making decisions regarding the budget, personnel, textbooks, curriculum design, and teaching methods, demonstrating skills that a project manager would possess such as financial management and decision making.

Engineers

Engineers apply the principles of science and mathematics to develop economical solutions to technical problems. As a project cycles from an idea in the project charter to the implementation and delivery of a product or service, engineers link scientific discoveries to commercial applications that meet societal and consumer needs.

Engineers use many project management skills, especially when they must specify functional requirements. They demonstrate attention to quality as they evaluate a design's overall effectiveness, cost, reliability, and safety similar to the project manager reviewing the criteria for the customer's acceptance of delivery of the product or service.

Estimation skills in project management are used in engineering. Engineers are asked many times to provide an estimate of time and cost required to complete projects.

Health Care

There are many jobs and careers in health care that use project management skills. Occupations in the field of health care vary widely, such as athletic trainer, dental hygienist, massage therapist, occupational therapist, optometrist, nurse, physician, physician assistant, and X-ray technician. These individuals actively apply risk management in providing health care delivery of service to their clients, ensuring that they do not injure the person they are caring for. *Note: There is a section on nursing later in this chapter.*

Many of you may have had a fall while you were growing up, and needed an X-ray to determine if you had a fracture or merely a sprain. Let us look at this career as an example of a health care professional using project management skills.

Example: Radiology Technologists

Radiology technologists and technicians perform diagnostic imaging examinations like X-rays, computed tomography (CT), magnetic resonance imaging (MRI), and mammography. They could also be called radiographers, because they produce X-ray films (radiographs) of parts of the human body for use in diagnosing medical problems.

Project management skills, especially people skills and strong communication, are demonstrated when they prepare patients for radiologic examinations by explaining the procedure and what position the patient needs to be in, so that the parts of the body can be appropriately radiographed. Risk management is demonstrated when these professionals work to prevent unnecessary exposure to radiation by surrounding the exposed area with radiation protection devices, such as lead shields, or limiting the size of the X-ray beam. To ensure quality results, the health technician monitors the radiograph and sets controls on the X-ray machine to produce radiographs of the appropriate density, detail, and contrast.

Safety and regulations concerning the use of radiation to protect themselves, their patients, and their coworkers from unnecessary exposure is tracked in an efficient manner and reported as a control to ensure compliance. Project management skills are also used in preparing work schedules, evaluating equipment for purchase, or managing a radiology department.

Some radiological technologists specialize in CT scans; as CT technologists they too use project management skills. CT uses ionizing radiation to produce a substantial number of cross-sectional X-rays of an area of the body. Therefore, it requires the same precautionary measures that are used with X-rays, hence the need for risk management and monitoring for exposure.

Teamwork, not only with the patient that the radiological technologist supports and the doctor who ordered the request, but also with other health care providers, relies on strong communication, quality, work done in a timely manner, and wise use of hospital

resources. This all boils down to ensuring that the three elements of the project management triangle of cost, schedule, and scope with quality delivered remain the essentials that provide a cornerstone to project management and the skills needed to obtain the objective.

Example: Nurses

Nurses treat and educate patients and their families and the public about various medical conditions and provide advice and emotional support. Nurses establish a care plan for their patients that include activities like scheduling the administration and discontinuation of medications (e.g., intravenous (IV) lines for fluid, medication, blood, and blood products) and application of therapies and treatments. Communication with the patient, their family, physicians and other health care clinicians may be done in person or via technology. Telehealth allows nurses to provide care and advice through electronic communications media including videoconferencing, the Internet, or telephone.

Risk management is very important for a nurse, with some cases having a life or death consequence. Nurses monitor pain management and vital signs and provide status reports to physicians to help in responding to the health care needs of the patient.

The nursing field varies. Some nurses work in infection control. They identify, track, and control infectious outbreaks in health care facilities and create programs for outbreak prevention and response to biological terrorism. Others are educators who plan, develop, execute, and evaluate educational programs and curricula for the professional development of students and graduate nurses. Nurses may use project management skills while conducting health care consultations, advising on public policy, researching in the field, or providing sales support of a product or service.

Paralegal

Attorneys assume the ultimate responsibility for legal work but they often obtain assistance. Paralegals assume this role in law firms and perform many tasks to aid the legal profession. However, they are explicitly prohibited from carrying out duties considered to be the practice of law (e.g., giving legal advice, setting legal fees, presenting court cases).

Project management skills such as planning are used in helping lawyers prepare for closings, hearings, trials, and corporate meetings. Communication skills are used in preparing written reports that help attorneys determine how cases should be handled or drafts for actions such as pleading, filing motions, and obtaining affidavits.

Monitoring skills aid paralegals who may track files of important case documents, working on risk containment related to filing dates and responses to the court. Procurement skills, which a project manager uses, can also be seen from a paralegal perspective in negotiating terms of hiring expert witnesses as well as other services such as acquiring services from process servers.

Financial skills may be used as well, such as assisting in preparing tax returns, establishing trust funds, and planning estates or maintaining financial office records at the law firm.

Government, litigation, personal injury, corporate law, criminal law, employee benefits, intellectual property, labour law, bankruptcy, immigration, family law, and real estate are some of the many different law practices where a paralegal professional may use project management skills.

Software Developer

Computer software developers and computer programmers design and develop software. They apply the principles of computer science and mathematics to create, test, and evaluate software applications and systems that make computers come alive. Software is developed in many kinds of projects: computer games, business applications, operating systems, network control systems, and more. Software developers us project management skills to develop the requirements for the software, identify and track the product development tasks, communicate within the development team and with clients, test cases, and manage quality, the schedule, and resources (staff, equipment, labs, and more).

Science Technicians

Science technicians use principles and theories of science and mathematics to assist in research and development and help invent and improve products and processes. In their jobs, they are more practically oriented than scientists. Planning skills project managers use can be seen as science technicians set up, operate, and maintain labouratory instruments; monitor experiments; and observe, calculate, and record results. Quality is a factor here as it is in project management; science technicians must ensure that processes are performed correctly, with proper proportions of ingredients, for purity or for strength and durability.

There are different fields in which science technicians can apply project management skills. Agricultural and food science technicians test food and other agricultural products and are involved in food, fibre, and animal research, production, and processing. Control and risk management are important here in executing the tests and experiments, for example, to improve the yield and quality of crops, or the resistance of plants and animals to disease, insects, or other hazards. Quality factors are paramount when food science technicians conduct tests on food additives and preservatives to ensure compliance with government regulations regarding colour, texture, and nutrients.

Biological technicians work with biologists studying living organisms. Many assist scientists who conduct medical research or who work in pharmaceutical companies to help develop and manufacture medicines. Skills in scheduling, especially in incubation periods for the study of the impact on cells, could impact projects, such as exploring and isolating variables for research in living organisms and infectious agents. Biotechnology technicians apply knowledge and execution skills and techniques gained from basic research, including gene splicing and recombinant DNA, to product development. Project management skills are used in collaboration and communication among team members to record and understand the results and progress toward a cure or product.

Other kinds of technicians are chemical technicians who may work in labouratories or factories, using monitoring and control skills in the way they collect and analyze samples. Again, quality assurance is an important factor for most process technicians' work in manufacturing, testing packaging for design, ensuring integrity of materials, and verifying environmental acceptability.

Technicians use a project management skill set to assist in their initiation, planning, and executing tasks, while managing risks with some measure of reporting to determine if their objectives satisfy the constraints of cost, schedule, resource, and quality standards set.

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5.3: Project Characteristics and Constraints

The starting point in discussing how projects should be properly managed is to first understand what a project is and, just as importantly, what it is not.

People have been undertaking projects since the earliest days of organized human activity. The hunting parties of our prehistoric ancestors were projects, for example; they were temporary undertakings directed at the goal of obtaining meat for the community. Large complex projects have also been with us for a long time. The pyramids and the Great Wall of China were in their day of roughly the same dimensions as the Apollo project to send men to the moon. We use the term "project" frequently in our daily conversations. A husband, for example may tell his wife, "My main project for this weekend is to straighten out the garage." Going hunting, building pyramids, and fixing faucets all share certain features that make them projects.

Project Attributes

A project has distinctive attributes that distinguish it from ongoing work or business operations. Projects are temporary in nature. They are not an everyday business process and have definitive start dates and end dates. This characteristic is important because a large part of the project effort is dedicated to ensuring that the project is completed at the appointed time. To do this, schedules are created showing when tasks should begin and end. Projects can last minutes, hours, days, weeks, months, or years.

Projects exist to bring about a product or service that hasn't existed before. In this sense, a project is unique. Unique means that this is new; this has never been done before. Maybe it's been done in a very similar fashion before but never exactly in this way. For example, Ford Motor Company is in the business of designing and assembling cars. Each model that Ford designs and produces can be considered a project. The models differ from each other in their features and are marketed to people with various needs. An SUV serves a different purpose and clientele than a luxury car. The design and marketing of these two models are unique projects. However, the actual assembly of the cars is considered an operation (i.e., a repetitive process that is followed for most makes and models).

In contrast with projects, operations are ongoing and repetitive. They involve work that is continuous without an ending date and with the same processes repeated to produce the same results. The purpose of operations is to keep the organization functioning while the purpose of a project is to meet its goals and conclude. Therefore, operations are ongoing while projects are unique and temporary.

A project is completed when its goals and objectives are accomplished. It is these goals that drive the project, and all the planning and implementation efforts undertaken to achieve them. Sometimes projects end when it is determined that the goals and objectives cannot be accomplished or when the product or service of the project is no longer needed and the project is cancelled.

Definition of a Project

There are many written definitions of a project. All of them contain the key elements described above. For those looking for a formal definition of a project, the Project Management Institute (PMI) defines a project as a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates a definite beginning and end. The end is reached when the project's objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists.

Project Characteristics

When considering whether or not you have a project on your hands, there are some things to keep in mind. First, is it a project or an ongoing operation? Second, if it is a project, who are the stakeholders? And third, what characteristics distinguish this endeavor as a project?

Projects have several characteristics:

- Projects are unique.
- Projects are temporary in nature and have a definite beginning and ending date.
- Projects are completed when the project goals are achieved or it's determined the project is no longer viable.

A successful project is one that meets or exceeds the expectations of the stakeholders.

Consider the following scenario: The vice-president (VP) of marketing approaches you with a fabulous idea. (Obviously it must be "fabulous" because he thought of it.) He wants to set up kiosks in local grocery stores as mini-offices. These offices will offer

customers the ability to sign up for car and home insurance services as well as make their bill payments. He believes that the exposure in grocery stores will increase awareness of the company's offerings. He told you that senior management has already cleared the project, and he'll dedicate as many resources to this as he can. He wants the new kiosks in place in 12 selected stores in a major city by the end of the year. Finally, he has assigned you to head up this project.

Your first question should be, "Is it a project?" This may seem elementary, but confusing projects with ongoing operations happens often. Projects are temporary in nature, have definite start and end dates, result in the creation of a unique product or service, and are completed when their goals and objectives have been met and signed off by the stakeholders.

Using these criteria, let's examine the assignment from the VP of marketing to determine if it is a project:

- Is it unique? Yes, because the kiosks don't exist in the local grocery stores. This is a new way of offering the company's services to its customer base. While the service the company is offering isn't new, the way it is presenting its services is.
- Does the product have a limited timeframe? Yes, the start date of this project is today, and the end date is the end of next year. It is a temporary endeavor.
- Is there a way to determine when the project is completed? Yes, the kiosks will be installed and the services will be offered from them. Once all the kiosks are installed and operating, the project will come to a close.
- Is there a way to determine stakeholder satisfaction? Yes, the expectations of the stakeholders will be documented in the form of requirements during the planning processes. These requirements will be compared to the finished product to determine if it meets the expectations of the stakeholder.

If the answer is yes to all these questions, then we have a project.

The Process of Project Management

You've determined that you have a project. What now? The notes you scribbled down on the back of the napkin at lunch are a start, but not exactly good project management practice. Too often, organizations follow Nike's advice when it comes to managing projects when they "just do it." An assignment is made, and the project team members jump directly into the development of the product or service requested. In the end, the delivered product doesn't meet the expectations of the customer. Unfortunately, many projects follow this poorly constructed path, and that is a primary contributor to a large percentage of projects not meeting their original objectives, as defined by performance, schedule, and budget.

In the United States, more than $250 billion is spent each year on information technology (IT) application development in approximately 175,000 projects. The Standish Group (a Boston-based leader in project and value performance research) released the summary version of their 2009 CHAOS Report that tracks project failure rates across a broad range of companies and industries (Figure 2.1).
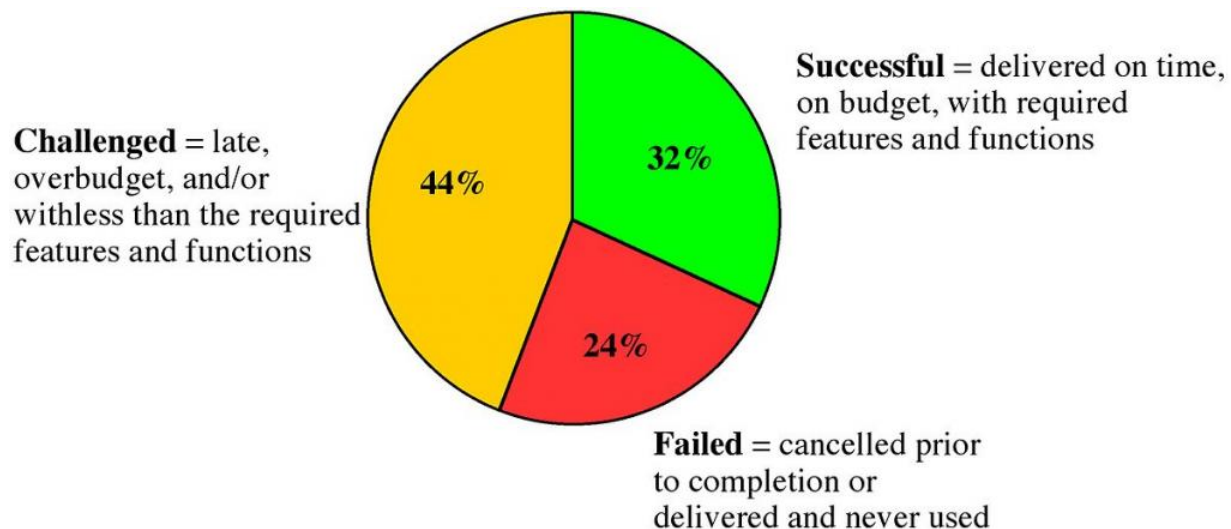
Figure 2.1: Summary of 2009 Standish Group CHAOS report.

Jim Johnson, chairman of the Standish Group, has stated that "this year's results show a marked decrease in project success rates, with 32% of all projects succeeding which are delivered on time, on budget, with required features and functions, 44% were

challenged-which are late, over budget, and/or with less than the required features and functions and 24% failed which are cancelled prior to completion or delivered and never used."

When are companies going to stop wasting billions of dollars on failed projects? The vast majority of this waste is completely avoidable: simply get the right business needs (requirements) understood early in the process and ensure that project management techniques are applied and followed, and the project activities are monitored.

Applying good project management discipline is the way to help reduce the risks. Having good project management skills does not completely eliminate problems, risks, or surprises. The value of good project management is that you have standard processes in place to deal with all contingencies.

Project management is the application of knowledge, skills, tools, and techniques applied to project activities in order to meet the project requirements. Project management is a process that includes planning, putting the project plan into action, and measuring progress and performance.

Managing a project includes identifying your project's requirements and writing down what everyone needs from the project. What are the objectives for your project? When everyone understands the goal, it's much easier to keep them all on the right path. Make sure you set goals that everyone agrees on to avoid team conflicts later on. Understanding and addressing the needs of everyone affected by the project means the end result of your project is far more likely to satisfy your stakeholders. Last but not least, as project manager, you will also be balancing the many competing project constraints.

Project Constraints

On any project, you will have a number of **project constraints** that are competing for your attention. They are cost, scope, quality, risk, resources, and time.

- **Cost** is the budget approved for the project including all necessary expenses needed to deliver the project. Within organizations, project managers have to balance between not running out of money and not underspending because many projects receive funds or grants that have contract clauses with a "use it or lose it" approach to project funds. Poorly executed budget plans can result in a last-minute rush to spend the allocated funds. For virtually all projects, cost is ultimately a limiting constraint; few projects can go over budget without eventually requiring a corrective action.
- **Scope** is what the project is trying to achieve. It entails all the work involved in delivering the project outcomes and the processes used to produce them. It is the reason and the purpose of the project.
- **Quality** is a combination of the standards and criteria to which the project's products must be delivered for them to perform effectively. The product must perform to provide the functionality expected, solve the identified problem, and deliver the benefit and value expected. It must also meet other performance requirements, or service levels, such as availability, reliability, and maintainability, and have acceptable finish and polish. Quality on a project is controlled through quality assurance (QA), which is the process of evaluating overall project performance on a regular basis to provide confidence that the project will satisfy the relevant quality standards.
- **Risk** is defined by potential external events that will have a negative impact on your project if they occur. Risk refers to the combination of the probability the event will occur and the impact on the project if the event occurs. If the combination of the probability of the occurrence and the impact on the project is too high, you should identify the potential event as a risk and put a proactive plan in place to manage the risk.
- **Resources** are required to carry out the project tasks. They can be people, equipment, facilities, funding, or anything else capable of definition (usually other than labour) required for the completion of a project activity.
- **Time** is defined as the time to complete the project. Time is often the most frequent project oversight in developing projects. This is reflected in missed deadlines and incomplete deliverables. Proper control of the schedule requires the careful identification of tasks to be performed and accurate estimations of their durations, the sequence in which they are going to be done, and how people and other resources are to be allocated. Any schedule should take into account vacations and holidays.

You may have heard of the term "triple constraint," which traditionally consisted of only time, cost, and scope. These are the primary competing project constraints that you have to be most aware of. The triple constraint is illustrated in the form of a triangle to visualize the project work and see the relationship between the scope/quality, schedule/time, and cost/resource (Figure 2.2). In this triangle, each side represents one of the constraints (or related constraints) wherein any changes to any one side cause a change in the other sides. The best projects have a perfectly balanced triangle. Maintaining this balance is difficult because projects are prone to change. For example, if scope increases, cost and time may increase disproportionately. Alternatively, if the amount of money you have for your project decreases, you may be able to do as much, but your time may increase.
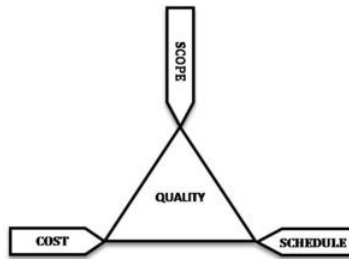
Figure 2.2: A schematic of the triple constraint triangle.

Your project may have additional constraints that you must face, and as the project manager, you have to balance the needs of these constraints against the needs of the stakeholders and your project goals. For instance, if your sponsor wants to add functionality to the original scope, you will very likely need more money to finish the project, or if they cut the budget, you will have to reduce the quality of your scope, and if you don't get the appropriate resources to work on your project tasks, you will have to extend your schedule because the resources you have take much longer to finish the work.

You get the idea; the constraints are all dependent on each other. Think of all of these constraints as the classic carnival game of Whac-a-mole (Figure 2.3). Each time you try to push one mole back in the hole, another one pops out. The best advice is to rely on your project team to keep these moles in place.
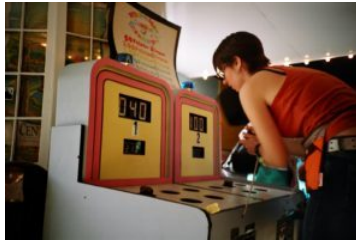
Figure 2.3: Whac-a-mole.

Here is an example of a project that cut quality because the project costs were fixed. The P-36 oil platform (Figure 2.4) was the largest footing production platform in the world capable of processing 180,000 barrels of oil per day and 5.2 million cubic metres of gas per day. Located in the Roncador Field, Campos Basin, Brazil, the P-36 was operated by Petrobras.

Figure 2.4.: The Petrobras P-36 oil platform sinking.

In March 2001, the P-36 was producing around 84,000 barrels of oil and 1.3 million cubic metres of gas per day when it became destabilized by two explosions and subsequently sank in 3,900 feet of water with 1,650 short tons of crude oil remaining on board, killing 11 people. The sinking is attributed to a complete failure in quality assurance, and pressure for increased production led to corners being cut on safety procedures. It is listed as one of the most expensive accidents with a price tag of $515,000,000.

The following quotes are from a Petrobras executive, citing the benefits of cutting quality assurance and inspection costs on the project.

"Petrobras has established new global benchmarks for the generation of exceptional shareholder wealth through an aggressive and innovative program of cost cutting on its P36 production facility."

"Conventional constraints have been successfully challenged and replaced with new paradigms appropriate to the globalized corporate market place."

"Elimination of these unnecessary straitjackets has empowered the project's suppliers and contractors to propose highly economical solutions, with the win-win bonus of enhanced profitability margins for themselves."

"The P36 platform shows the shape of things to come in the unregulated global market economy of the 21st century."

The dynamic trade-offs between the project constraint values have been humorously and accurately described in Figure 2.5.

"We can do GOOD, QUICK and CHEAP work.
You can have any two but not all three.
1. GOOD QUICK work won't be CHEAP.
2. GOOD CHEAP work won't be QUICK.
3. QUICK CHEAP work won't be GOOD."
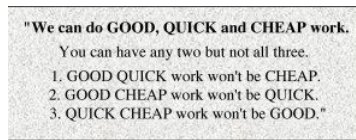
Figure 2.5: Good, Quick, Cheap: Choose two. A sign seen at an automotive repair shop. [Image Description]

Image Descriptions

Figure 2.5 image description: The sign says, "We can do good, quick, and cheap work. You can have any two but not all three. 1. Good, quick work won't be cheap. 2. Good, cheap work won't be quick. 3. Quick, cheap work won't be good." [Return to Figure 2.5]

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5.4: The Project Life Cycle (Phases)

The project manager and project team have one shared goal: to carry out the work of the project for the purpose of meeting the project's objectives. Every project has a beginning, a middle period during which activities move the project toward completion, and an ending (either successful or unsuccessful). A standard project typically has the following four major phases (each with its own agenda of tasks and issues): initiation, planning, implementation, and closure. Taken together, these phases represent the path a project takes from the beginning to its end and are generally referred to as the project "life cycle."

Initiation Phase

During the first of these phases, the initiation phase, the project objective or need is identified; this can be a business problem or opportunity. An appropriate response to the need is documented in a business case with recommended solution options. A feasibility study is conducted to investigate whether each option addresses the project objective and a final recommended solution is determined. Issues of feasibility ("can we do the project?") and justification ("should we do the project?") are addressed.

Once the recommended solution is approved, a project is initiated to deliver the approved solution and a project manager is appointed. The major deliverables and the participating work groups are identified, and the project team begins to take shape. Approval is then sought by the project manager to move onto the detailed planning phase.

Planning Phase

The next phase, the planning phase, is where the project solution is further developed in as much detail as possible and the steps necessary to meet the project's objective are planned. In this step, the team identifies all of the work to be done. The project's tasks and resource requirements are identified, along with the strategy for producing them. This is also referred to as "scope management." A project plan is created outlining the activities, tasks, dependencies, and timeframes. The project manager coordinates the preparation of a project budget by providing cost estimates for the labour, equipment, and materials costs. The budget is used to monitor and control cost expenditures during project implementation.

Once the project team has identified the work, prepared the schedule, and estimated the costs, the three fundamental components of the planning process are complete. This is an excellent time to identify and try to deal with anything that might pose a threat to the successful completion of the project. This is called risk management. In risk management, "high-threat" potential problems are identified along with the action that is to be taken on each high-threat potential problem, either to reduce the probability that the problem will occur or to reduce the impact on the project if it does occur. This is also a good time to identify all project stakeholders and establish a communication plan describing the information needed and the delivery method to be used to keep the stakeholders informed.

Finally, you will want to document a quality plan, providing quality targets, assurance, and control measures, along with an acceptance plan, listing the criteria to be met to gain customer acceptance. At this point, the project would have been planned in detail and is ready to be executed.

Implementation (Execution) Phase

During the third phase, the implementation phase, the project plan is put into motion and the work of the project is performed. It is important to maintain control and communicate as needed during implementation. Progress is continuously monitored and appropriate adjustments are made and recorded as variances from the original plan. In any project, a project manager spends most of the time in this step. During project implementation, people are carrying out the tasks, and progress information is being reported through regular team meetings. The project manager uses this information to maintain control over the direction of the project by comparing the progress reports with the project plan to measure the performance of the project activities and take corrective action as needed. The first course of action should always be to bring the project back on course (i.e., to return it to the original plan). If that cannot happen, the team should record variations from the original plan and record and publish modifications to the plan. Throughout this step, project sponsors and other key stakeholders should be kept informed of the project's status according to the agreed-on frequency and format of communication. The plan should be updated and published on a regular basis.

Status reports should always emphasize the anticipated end point in terms of cost, schedule, and quality of deliverables. Each project deliverable produced should be reviewed for quality and measured against the acceptance criteria. Once all of the deliverables have been produced and the customer has accepted the final solution, the project is ready for closure.

Closing Phase

During the final closure, or completion phase, the emphasis is on releasing the final deliverables to the customer, handing over project documentation to the business, terminating supplier contracts, releasing project resources, and communicating the closure of the project to all stakeholders. The last remaining step is to conduct lessons-learned studies to examine what went well and what didn't. Through this type of analysis, the wisdom of experience is transferred back to the project organization, which will help future project teams.

Example: Project Phases on a Large Multinational Project

A U.S. construction company won a contract to design and build the first copper mine in northern Argentina. There was no existing infrastructure for either the mining industry or large construction projects in this part of South America. During the initiation phase of the project, the project manager focused on defining and finding a project leadership team with the knowledge, skills, and experience to manage a large complex project in a remote area of the globe. The project team set up three offices. One was in Chile, where large mining construction project infrastructure existed. The other two were in Argentina. One was in Buenos Aries to establish relationships and Argentinian expertise, and the second was in Catamarca—the largest town close to the mine site. With offices in place, the project start-up team began developing procedures for getting work done, acquiring the appropriate permits, and developing relationships with Chilean and Argentine partners.

During the planning phase, the project team developed an integrated project schedule that coordinated the activities of the design, procurement, and construction teams. The project controls team also developed a detailed budget that enabled the project team to track project expenditures against the expected expenses. The project design team built on the conceptual design and developed detailed drawings for use by the procurement team. The procurement team used the drawings to begin ordering equipment and materials for the construction team; develop labour projections; refine the construction schedule; and set up the construction site. Although planning is a never-ending process on a project, the planning phase focused on developing sufficient details to allow various parts of the project team to coordinate their work and allow the project management team to make priority decisions.

The implementation phase represents the work done to meet the requirements of the scope of work and fulfill the charter. During the implementation phase, the project team accomplished the work defined in the plan and made adjustments when the project factors changed. Equipment and materials were delivered to the work site, labour was hired and trained, a construction site was built, and all the construction activities, from the arrival of the first dozer to the installation of the final light switch, were accomplished.

The closeout phase included turning over the newly constructed plant to the operations team of the client. A punch list of a few remaining construction items was developed and those items completed. The office in Catamarca was closed, the office in Buenos Aries archived all the project documents, and the Chilean office was already working on the next project. The accounting books were reconciled and closed, final reports written and distributed, and the project manager started on a new project.

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5.5: Life Cycle Phases Explained

Understanding Life Cycle Phases

Watch the following 9:14 video that provides additional insight into each phase and provides two applicable examples for you to examine:
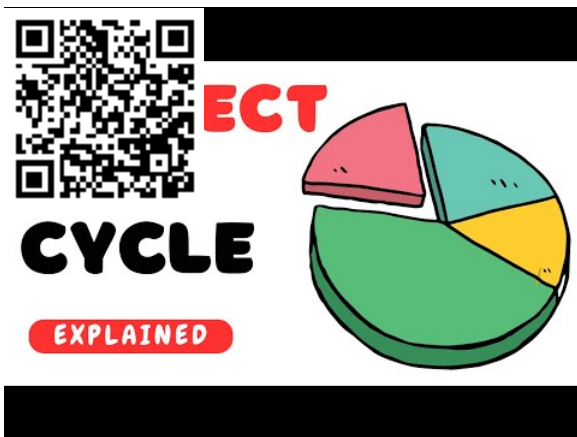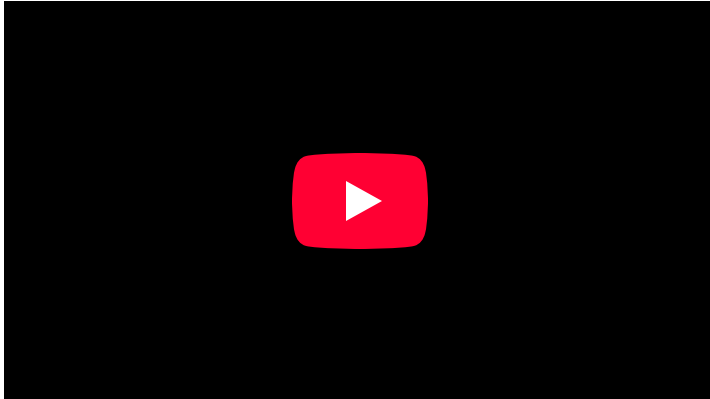
Note: The video includes an additional phase (Monitoring and Controlling). Within the corresponding reading for this week, the actions involved with monitoring and controlling the project are included in the Execution Phase.

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5.6: Project Stakeholders

A project is successful when it achieves its objectives and meets or exceeds the expectations of the stakeholders. But who are the stakeholders? Stakeholders are individuals who either care about or have a vested interest in your project. They are the people who are actively involved with the work of the project or have something to either gain or lose as a result of the project. When you manage a project to add lanes to a highway, motorists are stakeholders who are positively affected. However, you negatively affect residents who live near the highway during your project (with construction noise) and after your project with far-reaching implications (increased traffic noise and pollution).

NOTE: Key stakeholders can make or break the success of a project. Even if all the deliverables are met and the objectives are satisfied, if your key stakeholders aren't happy, nobody's happy.

The project sponsor, generally an executive in the organization with the authority to assign resources and enforce decisions regarding the project, is a stakeholder. The customer, subcontractors, suppliers, and sometimes even the government are stakeholders. The project manager, project team members, and the managers from other departments in the organization are stakeholders as well. It's important to identify all the stakeholders in your project upfront. Leaving out important stakeholders or their department's function and not discovering the error until well into the project could be a project killer.

Figure 5.1 shows a sample of the project environment featuring the different kinds of stakeholders involved on a typical project. A study of this diagram confronts us with a couple of interesting facts.

First, the number of stakeholders that project managers must deal with ensures that they will have a complex job guiding their project through the lifecycle. Problems with any of these members can derail the project.

Second, the diagram shows that project managers have to deal with people external to the organization as well as the internal environment, certainly more complex than what a manager in an internal environment faces. For example, suppliers who are late in delivering crucial parts may blow the project schedule. To compound the problem, project managers generally have little or no direct control over any of these individuals.
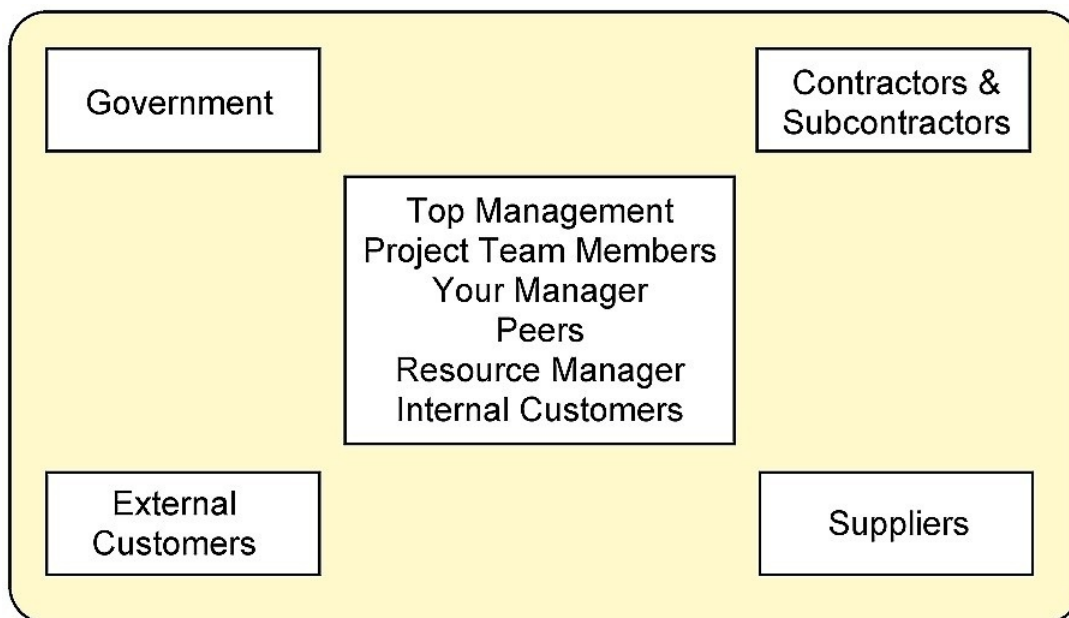
Figure 5.1: Project stakeholders. In a project, there are both internal and external stakeholders. Internal stakeholders may include top management, project team members, your manager, peers, resource manager, and internal customers. External stakeholders may include external customers, government, contractors and subcontractors, and suppliers.

Let's take a look at these stakeholders and their relationships to the project manager.

Project Stakeholders

Top Management

Top management may include the president of the company, vice-presidents, directors, division managers, the corporate operating committee, and others. These people direct the strategy and development of the organization.

On the plus side, you are likely to have top management support, which means it will be easier to recruit the best staff to carry out the project, and acquire needed material and resources; also visibility can enhance a project manager's professional standing in the company.

On the minus side, failure can be quite dramatic and visible to all, and if the project is large and expensive (most are), the cost of failure will be more substantial than for a smaller, less visible project.

Some suggestions in dealing with top management are:

- Develop in-depth plans and major milestones that must be approved by top management during the planning and design phases of the project.
- Ask top management associated with your project for their information reporting needs and frequency.
- Develop a status reporting methodology to be distributed on a scheduled basis.
- Keep them informed of project risks and potential impacts at all times.

The Project Team

The project team is made up of those people dedicated to the project or borrowed on a part-time basis. As project manager, you need to provide leadership, direction, and above all, the support to team members as they go about accomplishing their tasks. Working closely with the team to solve problems can help you learn from the team and build rapport. Showing your support for the project team and for each member will help you get their support and cooperation.

Here are some difficulties you may encounter in dealing with project team members:

- Because project team members are borrowed and they don't report to you, their priorities may be elsewhere.
- They may be juggling many projects as well as their full-time job and have difficulty meeting deadlines.
- Personality conflicts may arise. These may be caused by differences in social style or values or they may be the result of some bad experience when people worked together in the past.
- You may find out about missed deadlines when it is too late to recover.

Managing project team members requires interpersonal skills. Here are some suggestions that can help:

- Involve team members in project planning.
- Arrange to meet privately and informally with each team member at several points in the project, perhaps for lunch or coffee.
- Be available to hear team members' concerns at any time.
- Encourage team members to pitch in and help others when needed.
- Complete a project performance review for team members.

Your Manager

Typically the boss decides what the assignment is and who can work with the project manager on projects. Keeping your manager informed will help ensure that you get the necessary resources to complete your project.

If things go wrong on a project, it is nice to have an understanding and supportive boss to go to bat for you if necessary. By supporting your manager, you will find your manager will support you more often.

- Find out exactly how your performance will be measured.
- When unclear about directions, ask for clarification.
- Develop a reporting schedule that is acceptable to your boss.
- Communicate frequently.

Peers

Peers are people who are at the same level in the organization as you and may or may not be on the project team. These people will also have a vested interest in the product. However, they will have neither the leadership responsibilities nor the accountability for the success or failure of the project that you have.

Your relationship with peers can be impeded by:

- Inadequate control over peers
- Political maneuvering or sabotage
- Personality conflicts or technical conflicts
- Envy because your peer may have wanted to lead the project
- Conflicting instructions from your manager and your peer's manager

Peer support is essential. Because most of us serve our self-interest first, use some investigating, selling, influencing, and politicking skills here. To ensure you have cooperation and support from your peers:

- Get the support of your project sponsor or top management to empower you as the project manager with as much authority as possible. It's important that the sponsor makes it clear to the other team members that their cooperation on project activities is expected.
- Confront your peer if you notice a behaviour that seems dysfunctional, such as bad-mouthing the project.
- Be explicit in asking for full support from your peers. Arrange for frequent review meetings.
- Establish goals and standards of performance for all team members.

Resource Managers

Because project managers are in the position of borrowing resources, other managers control their resources. So their relationships with people are especially important. If their relationship is good, they may be able to consistently acquire the best staff and the best equipment for their projects. If relationships aren't good, they may find themselves not able to get good people or equipment needed on the project.

Internal Customers

Internal customers are individuals within the organization who are customers for projects that meet the needs of internal demands. The customer holds the power to accept or reject your work. Early in the relationship, the project manager will need to negotiate, clarify, and document project specifications and deliverables. After the project begins, the project manager must stay tuned in to the customer's concerns and issues and keep the customer informed.

Common stumbling blocks when dealing with internal customers include:

- A lack of clarity about precisely what the customer wants
- A lack of documentation for what is wanted
- A lack of knowledge of the customer's organization and operating characteristics
- Unrealistic deadlines, budgets, or specifications requested by the customer
- Hesitancy of the customer to sign off on the project or accept responsibility for decisions
- Changes in project scope

To meet the needs of the customer, client, or owner, be sure to do the following:

- Learn the client organization's buzzwords, culture, and business.
- Clarify all project requirements and specifications in a written agreement.
- Specify a change procedure.
- Establish the project manager as the focal point of communications in the project organization.

External Customer

External customers are the customers when projects could be marketed to outside customers. In the case of Ford Motor Company, for example, the external customers would be the buyers of the automobiles. Also if you are managing a project at your company for Ford Motor Company, they will be your external customer.

Government

Project managers working in certain heavily regulated environments (e.g., pharmaceutical, banking, or military industries) will have to deal with government regulators and departments. These can include all or some levels of government from municipal, provincial, federal, to international.

Contractors, subcontractors, and suppliers

There are times when organizations don't have the expertise or resources available in-house, and work is farmed out to contractors or subcontractors. This can be a construction management foreman, network consultant, electrician, carpenter, architect, or anyone

who is not an employee. Managing contractors or suppliers requires many of the skills needed to manage full-time project team members.

Any number of problems can arise with contractors or subcontractors:

- Quality of the work
- Cost overruns
- Schedule slippage

Many projects depend on goods provided by outside suppliers. This is true for example of construction projects where lumber, nails, bricks, and mortar come from outside suppliers. If the supplied goods are delivered late or are in short supply or of poor quality or if the price is greater than originally quoted, the project may suffer.

Depending on the project, managing contractor and supplier relationships can consume more than half of the project manager's time. It is not purely intuitive; it involves a sophisticated skill set that includes managing conflicts, negotiating, and other interpersonal skills.

Politics of Projects

Many times, project stakeholders have conflicting interests. It's the project manager's responsibility to understand these conflicts and try to resolve them. It's also the project manger's responsibility to manage stakeholder expectations. Be certain to identify and meet with all key stakeholders early in the project to understand all their needs and constraints.

Project managers are somewhat like politicians. Typically, they are not inherently powerful or capable of imposing their will directly on coworkers, subcontractors, and suppliers. Like politicians, if they are to get their way, they have to exercise influence effectively over others. On projects, project managers have direct control over very few things; therefore their ability to influence others – to be a good politician – may be very important

Here are a few steps a good project politician should follow. However, a good rule is that when in doubt, stakeholder conflicts should always be resolved in favour of the customer.

Assess the environment

Identify all the relevant stakeholders. Because any of these stakeholders could derail the project, you need to consider their particular interest in the project.

- Once all relevant stakeholders are identified, try to determine where the power lies.
- In the vast cast of characters, who counts most?
- Whose actions will have the greatest impact?

Identify goals

After determining who the stakeholders are, identify their goals.

- What is it that drives them?
- What is each after?
- Are there any hidden agendas or goals that are not openly articulated?
- What are the goals of the stakeholders who hold the power? These deserve special attention.

Define the problem

- The facts that constitute the problem should be isolated and closely examined.
- The question "What is the real situation?" should be raised over and over.

Culture of Stakeholders

When project stakeholders do not share a common culture, project management must adapt its organizations and work processes to cope with cultural differences. The following are three major aspects of cultural difference that can affect a project:

1. Communications
2. Negotiations
3. Decision making

Communication is perhaps the most visible manifestation of culture. Project managers encounter cultural differences in communication in language, context, and candor.

Language is clearly the greatest barrier to communication. When project stakeholders do not share the same language, communication slows down and is often filtered to share only information that is deemed critical.

The barrier to communication can influence project execution where quick and accurate exchange of ideas and information is critical.

The interpretation of information reflects the extent that context and candor influence cultural expressions of ideas and understanding of information. In some cultures, an affirmative answer to a question does not always mean yes. The cultural influence can create confusion on a project where project stakeholders represent more than one culture.

Example: Culture Affects Communication in Mumbai

A project management consultant from the United States was asked to evaluate the effectiveness of a U.S. project management team executing a project in Mumbai, India. The project team reported that the project was on schedule and within budget. After a project review meeting where each of the engineering leads reported that the design of the project was on schedule, the consultant began informal discussions with individual engineers and began to discover that several critical aspects of the project were behind schedule. Without a mitigating strategy, the project would miss a critical window in the weather between monsoon seasons. The information on the project flowed through a cultural expectation to provide positive information. The project was eventually canceled by the U.S. corporation when the market and political risks increased.

Not all cultural differences are related to international projects. Corporate cultures and even regional differences can create cultural confusion on a project.

Example: Cultural Differences between American Regions

On a major project in South America that included project team leaders from seven different countries, the greatest cultural difference that affected the project communication was between two project leaders from the United States. Two team members, one from New Orleans and one from Brooklyn, had more difficulty communicating than team members from Lebanon and Australia.

Managing Stakeholders

Often there is more than one major stakeholder in the project. An increase in the number of stakeholders adds stress to the project and influences the project's complexity level. The business or emotional investment of the stakeholder in the project and the ability of the stakeholder to influence the project outcomes or execution approach will also influence the stakeholder complexity of the project. In addition to the number of stakeholders and their level of investment, the degree to which the project stakeholders agree or disagree influences the project's complexity.

A small commercial construction project will typically have several stakeholders. All the building permitting agencies, environmental agencies, and labor and safety agencies have an interest in the project and can influence the execution plan of the project. The neighbors will have an interest in the architectural appeal, the noise, and the purpose of the building.

Example: Tire Plant in India

A U.S. chemical company chartered a project team to design and build a plant to produce the raw materials for building truck tires designed for unpaved roads. The plant was to be built in India a few years after an accident that killed several Indians and involved a different U.S. chemical company. When the company announced the new project and began to break ground, the community backlash was so strong that the project was shut down. A highly involved stakeholder can significantly influence your project.

Example: Wind Turbine on a College Campus

A small college in South Carolina won a competitive grant to erect and operate a wind turbine on campus. The engineering department submitted the grant as a demonstration project for engineering students to expose students to wind technology. The campus facilities department found only one location for the wind turbine that would not disrupt the flow of traffic on campus. The engineering department found that location unacceptable for students who had to maintain the wind turbine. The county construction permitting department had no policies for permitting a wind turbine and would not provide a building permit. The college had to go to the county council and get an exception to county rules. The marketing department wanted the wind turbine placed in a highly visible location to promote the innovative approach of the college.

Each of the college's stakeholders had a legitimate interest in the location of the wind turbine. The number of stakeholders on the project, multiplied by their passion for the subject and the lack of agreement on the location, increased the complexity of the project. Significant time and resources of a project will be dedicated to identifying, understanding, and managing client expectations.

Example: Stakeholders and a Bridge Project

The Department of Highways chartered a project to upgrade a number of bridges that crossed the interstate in one of the larger cities in South Carolina. The closing of these bridges severely impacted traffic congestion, including a large shopping mall. The contract included provisions for minimizing the impact on the traffic and communities near the construction areas. This provision allowed businesses or interested parties to review the project schedule and make suggestions that would lessen the impact of the construction. The project leadership invested significant time and resources in developing alignment among the various political stakeholders on the project approach and schedule.

Relationship Building Tips

Take the time to identify all stakeholders before starting a new project. Include those who are impacted by the project, as well as groups with the ability to impact the project. Then, begin the process of building strong relationships with each one using the following method.

- **Analyze stakeholders:** Conduct a stakeholder analysis, or an assessment of a project's key participants, and how the project will affect their problems and needs. Identify their individual characteristics and interests. Find out what motivates them, as well as what provokes them. Define roles and level of participation, and determine if there are conflicts of interest among groups of stakeholders.
- **Assess influence**: Measure the degree to which stakeholders can influence the project. The more influential a stakeholder is, the more a project manager will need their support. Think about the question, "What's in it for them?" when considering stakeholders. Knowing what each stakeholder needs or wants from the project will enable the project manager to gauge his or her level of support. And remember to balance support against influence. Is it more important to have strong support from a stakeholder with little influence, or lukewarm support from one with a high level of influence?
- **Understand their expectations**: Nail down stakeholders' specific expectations. Ask for clarification when needed to be sure they are completely understood.
- **Define "success"**: Every stakeholder may have a different idea of what project success looks like. Discovering this at the end of the project is a formula for failure. Gather definitions up front and include them in the objectives to help ensure that all stakeholders will be supportive of the final outcomes.
- **Keep stakeholders involved**: Don't just report to stakeholders. Ask for their input. Get to know them better by scheduling time for coffee, lunch, or quick meetings. Measure each stakeholder's capacity to participate and honour time constraints.
- **Keep stakeholders informed**: Send regular status updates. Daily may be too much; monthly is not enough. One update per week is usually about right. Hold project meetings as required, but don't let too much time pass between meetings. Be sure to answer stakeholders' questions and emails promptly. Regular communication is always appreciated – and may even soften the blow when you have bad news to share.

These are the basics of building strong stakeholder relationships. But as in any relationship, there are subtleties that every successful project manager understands – such as learning the differences between and relating well to different types stakeholders.

How to Relate to Different Types of Stakeholders

By conducting a stakeholder analysis, project managers can gather enough information on which to build strong relationships – regardless of the differences between them. For example, the needs and wants of a director of marketing will be different from those of a chief information officer. Therefore, the project manager's engagement with each will need to be different as well.

Stakeholders with financial concerns will need to know the potential return of the project's outcomes. Others will support projects if there is sound evidence of their value to improving operations, boosting market share, increasing production, or meeting other company objectives.

Keep each stakeholder's expectations and needs in mind throughout each conversation, report or email, no matter how casual or formal the communication may be. Remember that the company's interests are more important than any individual's – yours or a stakeholder's. When forced to choose between them, put the company's needs first.

No matter what their needs or wants, all stakeholders will respect the project manager who:

- Is always honest, even when telling them something they don't want to hear
- Takes ownership of the project
- Is predictable and reliable
- Stands by his or her decisions
- Takes accountability for mistakes

Supportive Stakeholders are Essential to Project Success

Achieving a project's objectives takes a focused, well-organized project manager who can engage with a committed team and gain the support of all stakeholders. Building strong, trusting relationships with interested parties from the start can make the difference between project success and failure.

References

Solera, J. (2009). Project Decelerators – Lack of Stakeholder Support. *Silicon Valley Project Management*. Retrieved from https://svprojectmanagement.com/proj...holder-support.

Image descriptions

Figure 5.2 Stakeholder Communication Template

The stakeholder analysis template has six fields plus a table to be filled out. The lines ask for: the project scope, key messages, communication goals, communication teams, project team, and other stakeholders. Then, there is a table with seven columns where you can track the communication plan. The column headers of this table are: communication date, deliverable, audience, message, action item or FYI (info?), plans, and status. [Return to Figure 5.2]

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5.7: Project Scheduling

Work Breakdown Structure (WBS) and the Gantt Charts

Projects have multiple and competing tasks. To effectively manage these, it is important that all tasks are planned and executed effectively.

This section will explore the Work Breakdown Structure (WBS) and the Gantt chart.

5.7.1: WBS

In order to develop a project schedule, we first need to define the activities, sequence them in the right order, estimate the resources needed, and estimate the time it will take to complete the tasks.

Defining Activities

The activity definition process is a further breakdown of the work package elements of the WBS. It documents the specific activities needed to fulfill the deliverables detailed in the WBS. These activities are not the deliverables themselves but the individual units of work that must be completed to fulfill the deliverables. Activity definition uses everything we already know about the project to divide the work into activities that can be estimated. You might want to look at all the lessons learned from similar projects your company has done to get a good idea of what you need to do on the current one.

Expert judgment in the form of project team members with prior experience developing project scope statements and WBS can help you define activities. If you are asked to manage a project in a new domain, you might also use experts in that particular field to help define tasks so you can understand what activities are going to be involved. You may want to create an activity list and then have the expert review it and suggest changes. Alternatively, you could involve the expert from the very beginning and ask to have an activity definition conversation with him or her before even making your first draft of the list.

Sometimes you start a project without knowing a lot about the work that you'll be doing later. Rolling-wave planning lets you plan and schedule only the portion that you know enough about to plan well. When you don't know enough about a project, you can use placeholders for the unknown portions until you know more. These are extra items that are put at high levels in the WBS to allow you to plan for the unknown.

Example: A Wedding Case Study (WBS)

Susan and Steve have decided to tie the knot, but they don't have much time to plan their wedding. They want the big day to be unforgettable. They want to invite many people and provide a great time. They've always dreamed of a June wedding, but it's already January. Just thinking about all of the details involved is overwhelming. Susan has been dreaming of the big day since she was 12, but it seems that there's so little time for all the tasks to be completed. When they were choosing the paper for the invitations, the couple realized that they needed help.

Susan: Steve, we need some help.
Steve: Don't worry. My sister's wedding planner was great. Let me give her a call. [Steve calls the wedding planner Sally.]
Wedding Planner: Hello, Susan and Steve.
Steve: We want everything to be perfect.
Susan: There is so much to do! Invitations, food, guests, and music.
Steve: Oh no, we haven't even booked a place!
Susan: And it has to be done right. We can't print the invitations until we have the menu planned. We can't do the seating arrangements until we have the RSVPs. We aren't sure what kind of band to get for the reception, or should it be a DJ? We're just overwhelmed.
Steve: My sister said you really saved her wedding. I know she gave you over a year to plan. But I've always dreamed of a June wedding, and I'm not willing to give that up. I know it's late, but Sally, can you help us?
Wedding Planner: Take it easy. I've got it under control. We've a lot of people and activities to get under control. You really should have called six months ago, but we'll still make this wedding happen on time.

Much work has to be done before June. First, Sally figures out what work needs to be done. She starts to put together a to-do list:

- Invitations
- Flowers
- Wedding cake
- Dinner menu
- Band

Since many different people are involved in the making of the wedding, it takes much planning to coordinate all the work in the right order by the right people at the right time. Initially, Sally was worried that she didn't have enough time to make sure that everything would be done properly. However, she knew that she had some powerful time management tools on her side when she took the job, and these tools would help her to synchronize all the required tasks.

To get started, Sally arranged all the activities in a work breakdown structure. The next exercise presents part of the WBS Sally made for the wedding.

WBS Exercise

Arrange the following activities into the WBS (Figure 10.1) to show how the work items decompose into activities.

- Shop for shoes
- Create guest list
- Have the tailoring and fitting done
- Shop for dress

- Find caterer
- Cater the wedding
- Wait for RSVPs
- Mail the invitations

- Finalize the menu
- Print the invitations
- Choose the bouquet
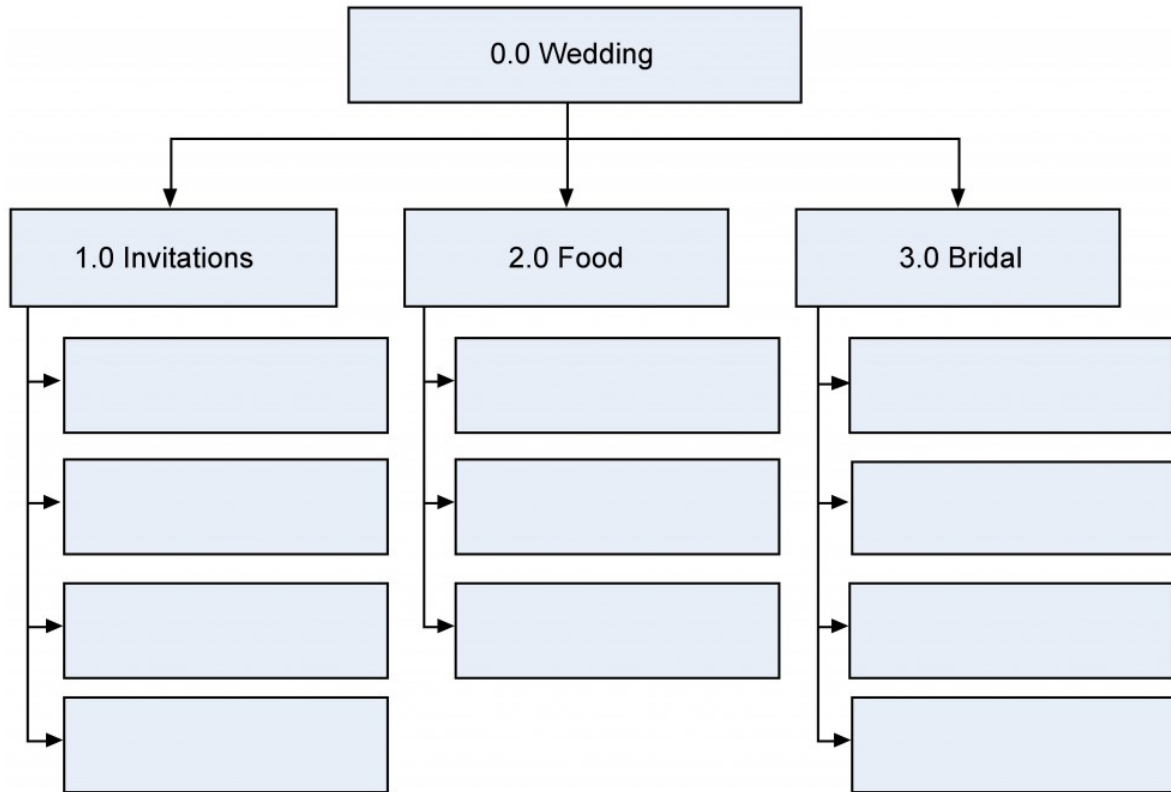
Figure 10.1 Work breakdown structure (WBS) based on the project phase.

Solution to Exercise:
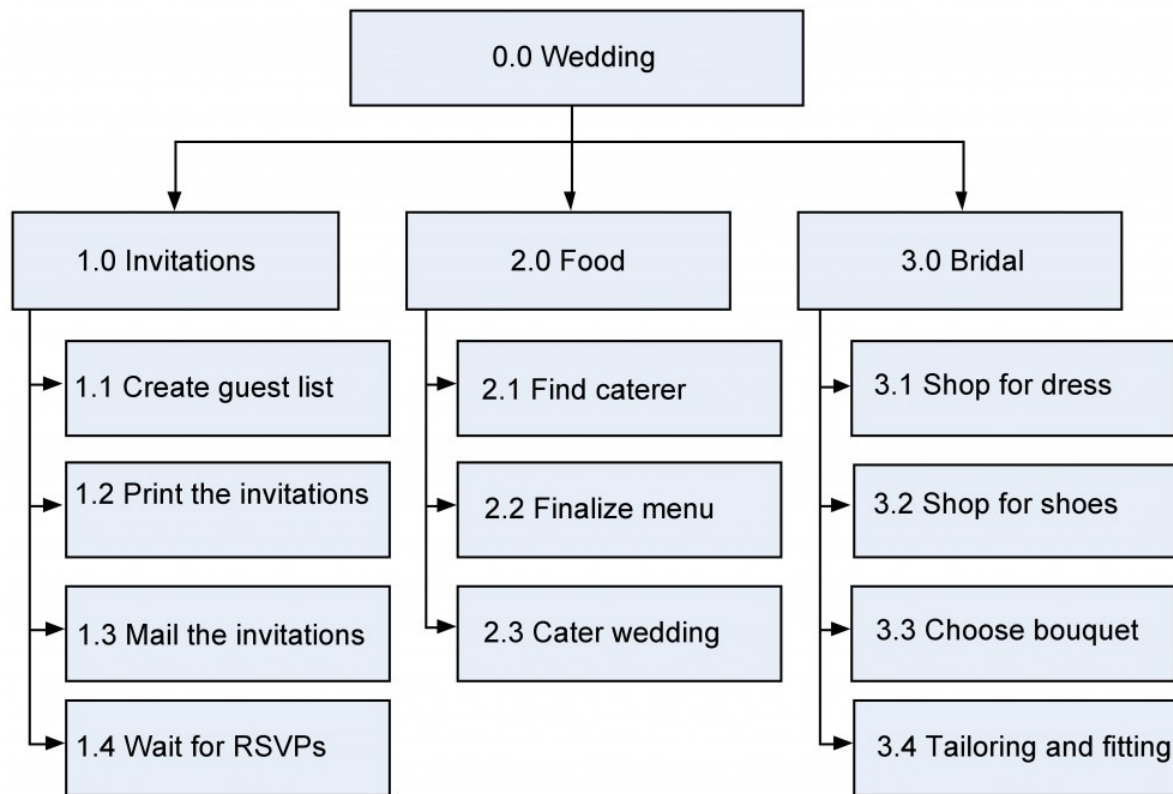
Figure 10.2 WSB Wedding Exercises Solution. [Image description]

Image Descriptions

Figure 10.2 image description:

0.0 Wedding

- 1.0 Invitations
    - 1.1 Create guest list
    - 1.2 Wait for RSVPs
    - 1.3 Mail the invitations
    - 1.4 Print the invitations
- 2.0 Food
    - 2.1 Find caterer
    - 2.2 Cater the wedding
    - 2.3 Finalize the menu
- 3.0 Bridal
    - 3.1 Shop for shoes
    - 3.2 Tailoring and fitting
    - 3.3 Shop for dress
    - 3.4 Choose the bouquet

[Return to Figure 10.2]

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5.7.2: Gantt Chart

Once we have identified the project tasks and their dependencies, we can create a Gantt chart.

A Gantt chart is a type of bar chart, developed by Henry Gantt, that illustrates a project schedule. Gantt charts are easy to read and are commonly used to display scheduled activities. These charts display the start and finish dates of project activities. Gantt charts also show the dependency relationships (i.e., precedence network) between activities.

Gantt charts show all the key stages of a project and their duration as a bar chart, with the time scale across the top. The key stages are placed on the bar chart in sequence, starting in the top left corner and ending in the bottom right corner. A Gantt chart can be drawn quickly and easily and is often the first tool a project manager uses to provide a rough estimate of the time that it will take to complete the key tasks. The detailed Gantt chart is usually constructed after all WBS activities are identified, an activity list is created, activity durations are estimated, and predecessors are determined.
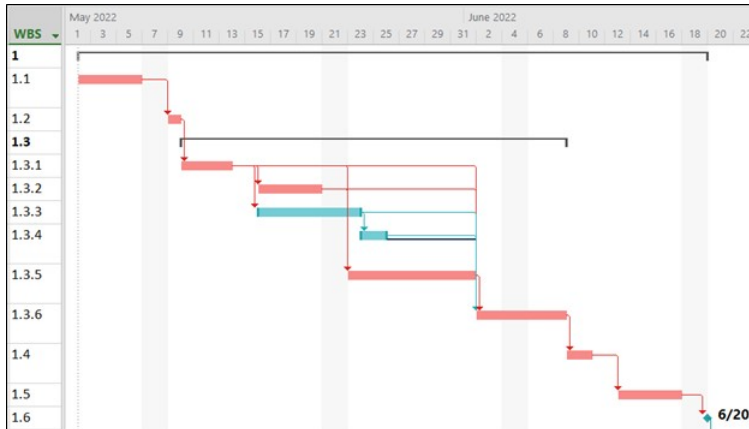
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Example: A Wedding Case Study (Gantt chart)

To create a Gantt chart for the provided Work Breakdown Structure (WBS), we can break down the tasks with their dependencies and estimated durations. Let's assume the following durations and dependencies:

WBS Breakdown:

1.0 Invitations

- **1.1 Create guest list**: 3 days
- **1.2 Print the invitations**: 2 days (depends on 1.1)
- **1.3 Mail the invitations**: 1 day (depends on 1.2)
- **1.4 Wait for RSVPs**: 14 days (depends on 1.3)

2.0 Food

- **2.1 Find caterer**: 5 days
- **2.2 Finalize menu**: 3 days (depends on 2.1)
- **2.3 Cater wedding**: 1 day (depends on 2.2 and 1.4)

3.0 Bridal

- **3.1 Shop for dress**: 4 days
- **3.2 Shop for shoes**: 2 days (can be done concurrently with 3.1)
- **3.3 Choose bouquet**: 1 day
- **3.4 Tailoring and fitting**: 5 days (depends on 3.1)

Dependencies:

- **1.2** depends on **1.1**
- **1.3** depends on **1.2**
- **1.4** depends on **1.3**
- **2.2** depends on **2.1**
- **2.3** depends on **2.2** and **1.4**
- **3.4** depends on **3.1**

Here's the Gantt chart for the wedding planning tasks based on the provided Work Breakdown Structure (WBS). Each bar represents the duration of a task, with dependencies reflected in the sequence of tasks. This chart helps visualize when each task starts, how long it takes, and how tasks overlap.

Gantt Chart for Wedding Planning
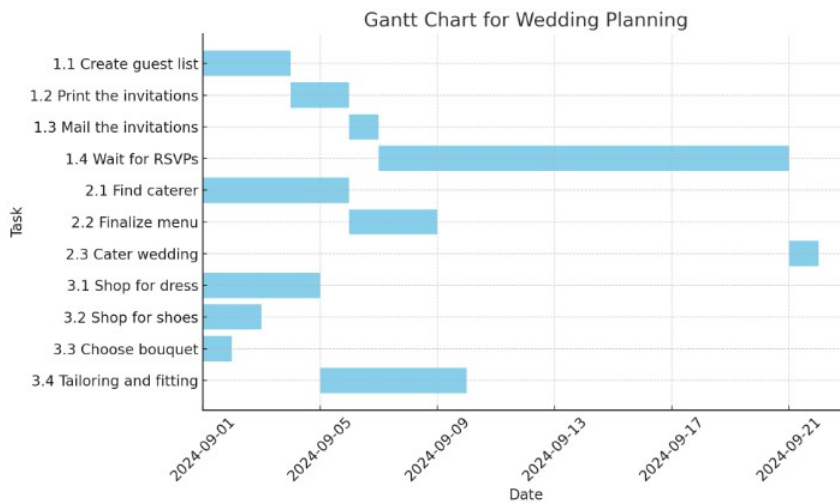
Source: "Create a Gantt chart for the following WBS" prompt for A Wedding Case Study (WBS). *ChatGPT*, GPT-4 version, OpenAI, 31 Aug. 2024, chatgpt.com.

5.7.2.1: How to Create a Gantt Chart

Creating Gantt Charts

The following videos provide examples for creating Gantt charts based on defined predecessors and duration estimates.

Example #1 (4:36)
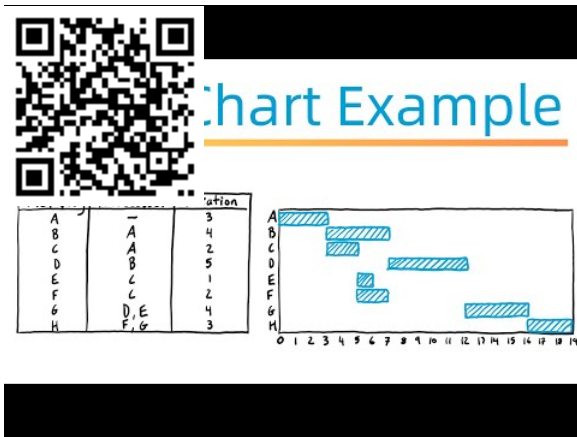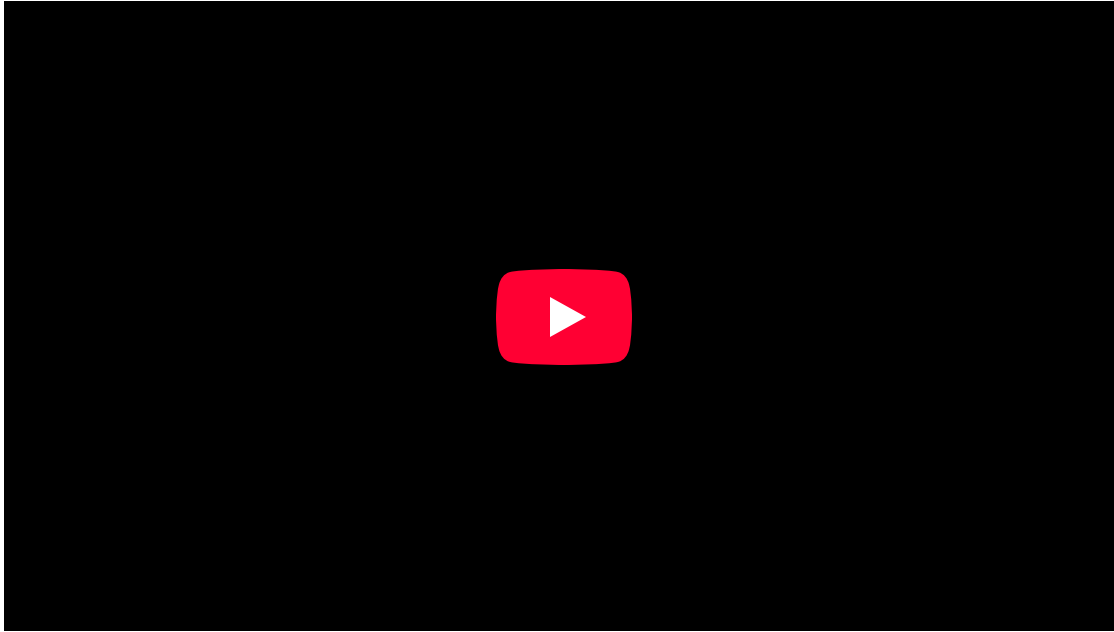
Example #2 (4:13)
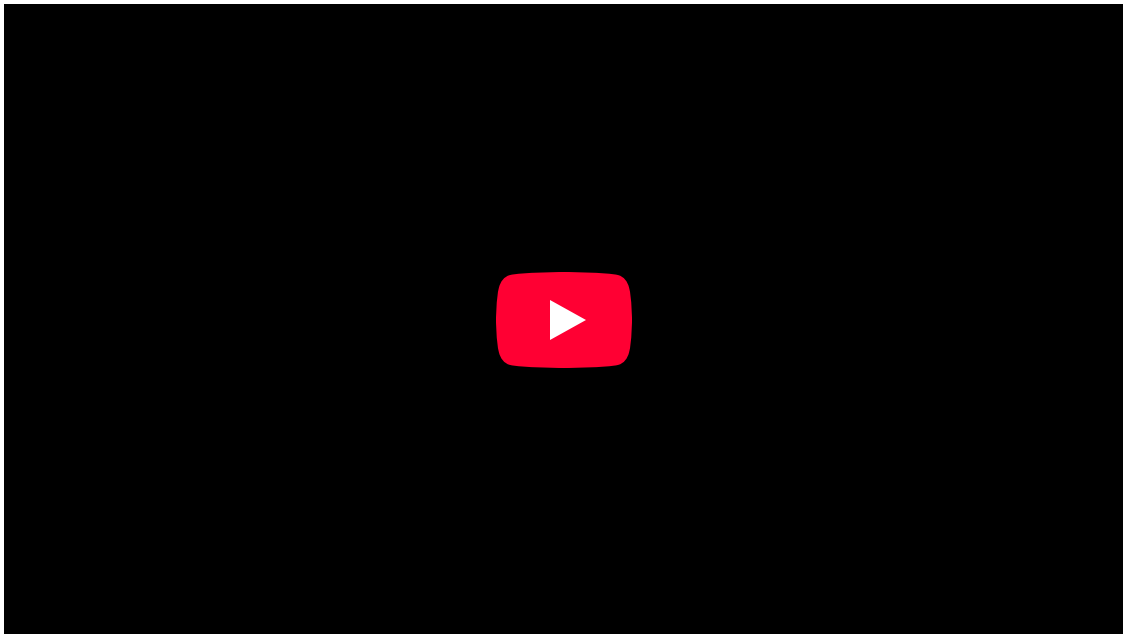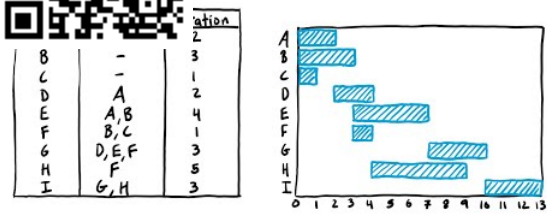
5.7.2.1: How to Create a Gantt Chart is shared under a CC BY 4.0 license and was authored, remixed, and/or curated by Jamie Hammond and Western Technical College.

5.8: Project Implementation

After you have carefully planned your project, you will be ready to start the project implementation phase, the third phase of the project management life cycle. The implementation phase involves putting the project plan into action. It's here that the project manager will coordinate and direct project resources to meet the objectives of the project plan. As the project unfolds, it's the project manager's job to direct and manage each activity, every step of the way. That's what happens in the implementation phase of the project life cycle: you follow the plan you've put together and handle any problems that come up.

The implementation phase is where you and your project team actually do the project work to produce the deliverables. The word "deliverable" means anything your project delivers. The deliverables for your project include all of the products or services that you and your team are performing for the client, customer, or sponsor, including all the project management documents that you put together.

The steps undertaken to build each deliverable will vary depending on the type of project you are undertaking, and cannot therefore be described here in any real detail. For instance engineering and telecommunications projects will focus on using equipment, resources, and materials to construct each project deliverable, whereas computer software projects may require the development and implementation of software code routines to produce each project deliverable. The activities required to build each deliverable will be clearly specified within the project requirements document and project plan.

Your job as project manager is to direct the work, but you need to do more than deliver the results. You also need to keep track of how well your team performs. The implementation phase keeps the project plan on track with careful monitoring and control processes to ensure the final deliverable meets the acceptance criteria set by the customer. This phase is typically where approved changes are implemented.

Most often, changes are identified by looking at performance and quality control data. Routine performance and quality control measurements should be evaluated on a regular basis throughout the implementation phase. Gathering reports on those measurements will help you determine where the problem is and recommend changes to fix it.

Change Control

When you find a problem, you can't just make a change, because it may be too expensive or take too long to do. You will need to look at how it affects the triple constraint (time, cost, scope) and how it impacts project quality. You will then have to figure out if it is worth making the change. If you evaluate the impact of the change and find that it won't have an impact on the project triple constraint, then you can make the change without going through change control. Change control is a set of procedures that lets you make changes in an organized way.

Any time you need to make a change to your plan, you must start with a change request. This is a document that either you or the person making the request must complete. Any change to your project must be documented so you can figure out what needs to be done, by when, and by whom.

Once the change request is documented, it is submitted to a change control board. A change control board is a group of people who consider changes for approval. Not every change control system has a board but most do. The change request could also be submitted to the project sponsor or management for review and approval. Putting the recommended changes through change control will help you evaluate the impact and update all the necessary documents. Not all changes are approved, but if the changes are approved, you send them back to the team to put them in place.

The implementation phase uses the most project time and resources, and as a result, costs are usually the highest during this phase. Project managers also experience the greatest conflicts over schedules in this phase. You may find as you are monitoring your project that the actual time it is taking to do the scheduled work is longer than the amount of time planned.

When you absolutely have to meet the date and you are running behind, you can sometimes find ways to do activities more quickly by adding more resources to critical path tasks. That's called *crashing*. Crashing the schedule means adding resources or moving them around to to bring the project back into line with the schedule. Crashing **always** costs more and doesn't always work. There's no way to crash a schedule without raising the overall cost of the project. So, if the budget is fixed and you don't have any extra money to spend, you can't use this technique.

Sometimes you've got two activities planned to occur in sequence, but you can actually do them at the same time. This is called *fast tracking* the project. On a software project, you might do both your user acceptance testing (UAT) and your functional testing at the same time, for example. This is pretty risky. There's a good chance you might need to redo some of the work you have done

concurrently. Crashing and fast tracking are schedule compression tools. Managing a schedule change means keeping all of your schedule documents up to date. That way, you will always be comparing your results to the correct plan.

After the deliverables have been physically constructed and accepted by the customer, a phase review is carried out to determine whether the project is complete and ready for closure.

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CHAPTER OVERVIEW

6: Supply Chain and Inventory Management

6.1: Overview and Guiding Questions

Module 6: Overview and Guiding Questions

Within this module, students will explore the components of an organization's supply chain and consider the impact of an organization having too much or not enough inventory.

Consider the following questions as you review the learning materials this week:

- Who are the stakeholders involved in a typical supply chain?
- How does disruption in one area of the supply chain impact the rest of it?
- What types of inventory exist within a supply chain?
- How does the management of the supply chain impact customer satisfaction?
- How can an organization monitor the performance of its supply chain?

6.2: Introduction to Supply Chain

Supply Chain

Supply Chain refers to the group of organizations that are linked together by their participation in order to fulfill a customer order from the sourcing of raw materials through the production of goods to distribution and sale. Each organization has a role to play in adding value for the final customer. The organizations that participate in a supply chain include suppliers, manufacturers, transporters (also known as carriers), distribution centres, wholesalers, retailers and end-consumers.

Every link in this chain of supply is very important. As they say, "a chain is only as strong as its weakest link." This has implications for the supply chain management in a sense that it is not enough for the companies just to focus on their own internal operations. They need to regularly check with their supply chain members to make sure that everybody is performing at their best. One weak member in any supply chain will impact everybody else.

For example, if a retail store is not doing a good job at replenishing their inventory on time, the product will not be available to some end-consumers when needed, and as a result, lost sales happen and that supply chain will be affected financially. Let's think about it for a second: fewer products had got ordered from the manufacturer, and thus, fewer raw materials were ordered (by the manufacturer) from higher tiered suppliers. This way, everybody in the supply chain sold less than what they could if the retailer had ordered the right quantity at the right time.

Watch this 8:05 video that provides a relatable example:

6.3: Flows in the Supply Chain

Managing Main Flows in the Supply Chain

There are three types of main flows that happen in any supply chains: <u>flow of materials/goods</u>, <u>flow of money/cash</u>, and <u>flow of information</u>. There is a forward flow of materials/goods for the regular flow that happens all the way from higher tier suppliers (upstream) to the end-consumer (downstream). In addition, if there is any returns for any reason, there will be a reverse flow of materials/goods in the opposite direction to the forward flow.

Flow of money (cash flow) happens from downstream to upstream. For example, the retailer needs to pay the distributor for the goods they have received from them.

Flow of information happens both ways in the supply chain since organizations will need to share different type of information with each other so that the whole supply chain can make better decisions to improve overall performance.

Upstream   **Downstream**

Tier 2 Supplier → Tier 1 Supplier
Tier 2 Supplier → Tier 1 Supplier
Tier 2 Supplier → Tier 1 Supplier
→ Manufacturer → Distributor → Retailer → End-consumer

The Forward Flow of Materials/Goods

The Reverse Flow of Returned Materials/Goods

The Flow of Money (Cash Flow)

The Flow of Information
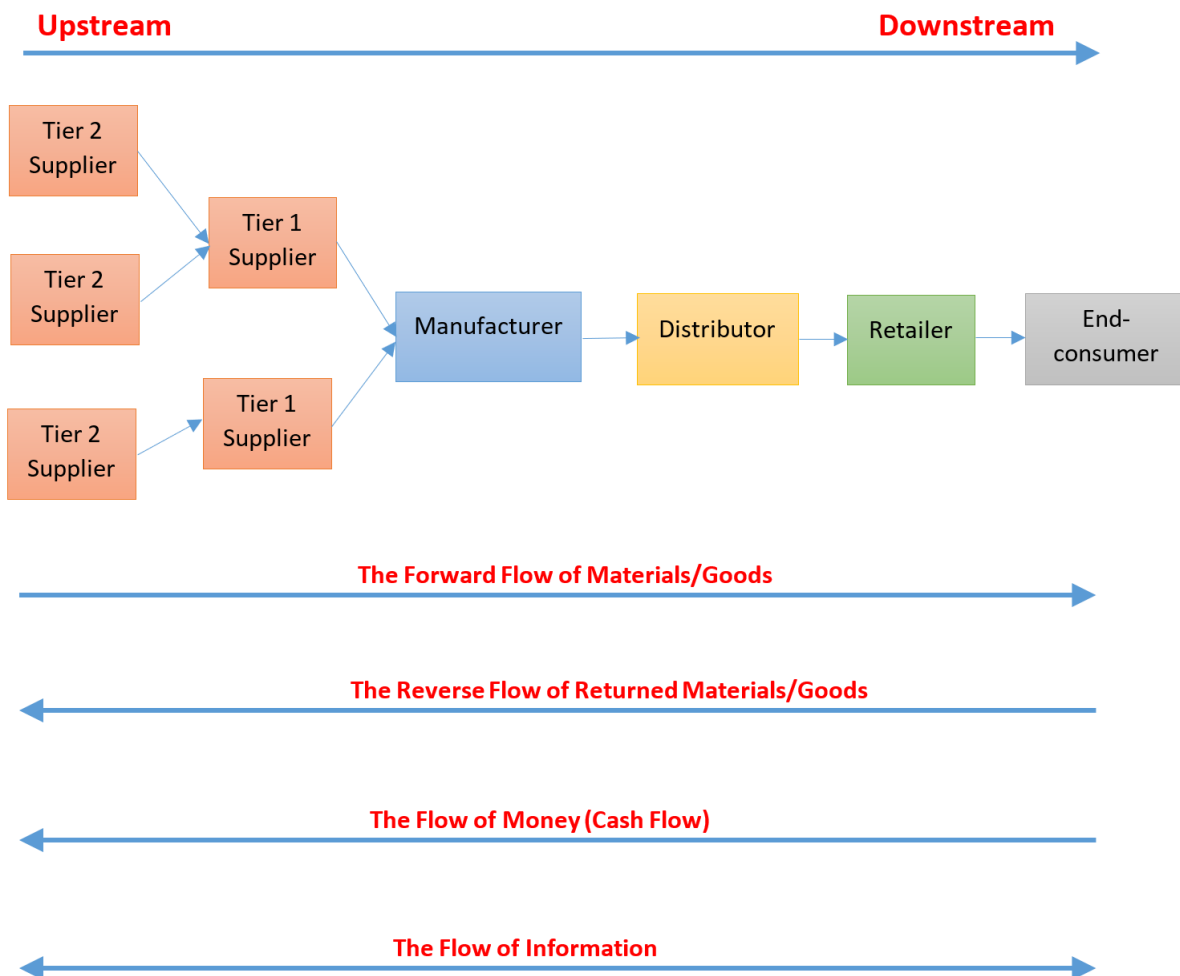
Figure 4.1: Upstream and downstream of a supply chain and its flows.

Supply Chain Design

Supply Chain Design is a strategic decision which determines who needs to take on what role or responsibility in the supply chain and where they should be located. Different companies choose different design or structure for their supply chains. For example, Walmart has always used traditional brick and mortar stores to serve its customers, while Amazon has been using an online platform to get customers' orders and then, ship them directly from their distribution/fulfillment centres.

When designing a supply chain, two main things to consider are Efficiency (cost reductions) and Responsiveness. The balance between these two could be different for different companies. That is, depending on the customers' preferences, the company

decides to have a certain structure for their supply chain. For example, if the customers for a particular company are willing to wait for 5-7 days to get their ordered products online, the company can store its inventory in fewer locations and use the longer time of transportation to serve its customers. However, if the customers want to have their products right away, the company may need to open quite a few stores and keep enough inventory in each one to be able to respond faster to its customers' needs.

A company may decide to use other companies for parts of their supply chain or to have their own entities. This includes Vertical and/or Horizontal integration. Vertical integration is a term that is used when a firm owns more than one portion of its supply chain. For example, for a manufacturer company, they may have their own distributors or even retail stores to sell their products to the end-consumers (forward integration) or they may choose to own one or more of the suppliers that provide the company with certain materials or components (backwards integration).

Horizontal Integration is a situation where a business chooses to increase their holdings by acquiring or merging with another firm in the same market. An example of this was the 2015 merger of Kraft foods and Heinz, or Marriott International's purchase of Starwood hotels in 2016.

Example

A complex surrounding the Highland Park Plant included a power plant, machine shop, and foundry. Ford was starting to bring together the various stages in the manufacture of automobiles, a strategy called vertical integration. By the 1920s, Ford had purchased a rubber plantation in Brazil, coal mines in Kentucky, acres of timberland and iron-ore mines in Michigan and Minnesota, a fleet of ships, and a railroad. These efforts to vertically integrate helped Ford make sure his company would have raw materials and parts when they were needed, guaranteeing a continuously operating assembly line. These efforts also enabled the company to profit from more of the processes involved in producing the automobile.[1]

Example

Netflix is one of the most significant backward vertical integration examples in the entertainment industry. In the past, Netflix was established at the end of the supply chain because it was a platform to distribute films and TV shows created by other content creators. Although this was a profitable means of doing business, Netflix leaders realized that they could generate greater revenue by creating their own original content. This would offset their reliance on outside content creators, and fill what Netflix discovered was a desire among their subscribers for original content. Netflix leaders understood that they could leverage their existing distribution platform to promote original content to a captive audience. This strategy has become vital to Netflix's continuing success because as more and more film studios end their licensing agreements with the streaming giant, the company's original content will become the main attractor for new subscribers.[2]

Supply Chain Strategies

Watch the following 12:08 video that provides additional insight into the concepts within this section and introduces three supply chain strategies:
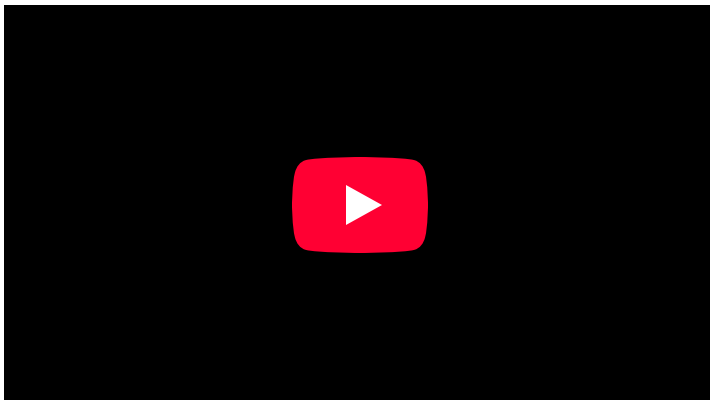
6.4: Types of Inventory

The Role of Inventory in the Supply Chain

Managing inventory is one of the most important activities in a supply chain. Materials/goods are needed to provide manufacturers with the exact items that they need, in the right order, the right quality, delivered to the right location, and at the right time. Without all of this happening, it will be impossible to produce high quality goods and meet commitments to our customers. In addition, when goods are ready for shipment, the outbound supply chain needs to be organized in such a way that customers receive their requested orders in a cost-efficient manner.

Types of Inventory in the Supply Chain:

- Finished goods
- Raw materials
- Purchased components and operating supplies
- Work-in-process

Watch the following 2:30 video, which illustrates the four types of inventory:
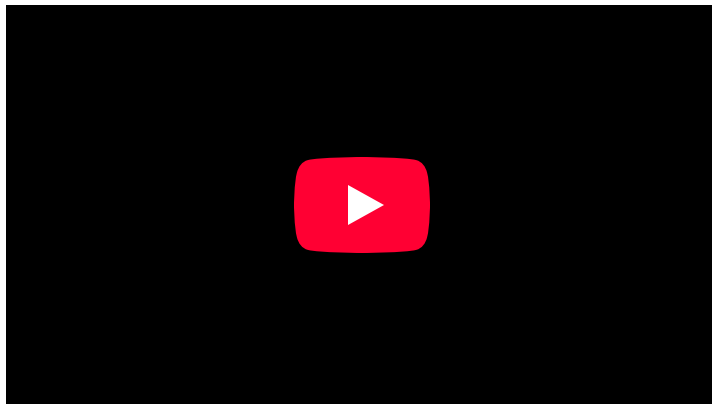
Reasons for holding inventories:

Many reasons exist for keeping stocks of inventory. Some of the most common include:

- Manufacturers often build up inventories throughout the year because of <u>seasonal demand</u>.
    - An example is a Chocolate manufacturer who does not have the capacity to produce all the product that is needed for Christmas. They may begin building inventory in late spring in order to have enough on hand for orders in November and December.
- At the same time, a manufacturer may carry large amounts of inventory if they have some <u>uncertainty or risk in their supply base</u>. If suppliers have some risk of shortages, work stoppages, poor quality or late deliveries then more stock may be carried.

- Firms may be tempted by <u>extra discounts</u> often provided by purchasing large order sizes. Perhaps they may want to minimize transportation costs. There may also be some worry about <u>future price increases</u> that can cause organizations to build up their inventories.
- Retailers carry inventory to ensure that they <u>do not run out</u> of what they anticipate their customers may want. Distributors and retailers may try and balance the cost of keeping large inventories on hand with providing excellent customer service with few or no disappointed customers. However, it is often a challenge to anticipate exact customer behaviour.
- It is a challenge to <u>synchronize incoming flow of materials and goods</u> in order to meet production schedules and ship to customers as promised. As a result, inventory may be stored at many locations along the supply chain. This causes extra cost and inefficiencies for each organization.

6.5: Inventory Management

Managing Inventory

The management of inventory is important, as having too much inventory can be just as disastrous as not having enough inventory. Watch this 8:37 video to understand the areas of the organization that are involved in determining the level of inventory:
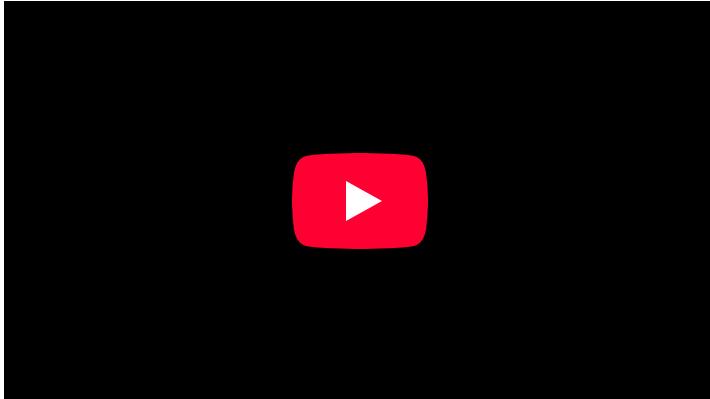
After watching the video, consider how careful management of the supply chain influences an organization's inventory and impacts customer satisfaction.

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6.6: The Bullwhip Effect

Fluctuations and The Bullwhip Effect

The bullwhip effect gets its name from the fluctuations evident in the movement of a bullwhip. You may have seen this type of whip used in some of the old cowboy movies. Basically, a bullwhip is about eight to ten feet long, made from braided strips of leather with a short (about 8-12 inches) wooden handle (think Indiana Jones). A small movement at the handle causes huge fluctuations in the end of the whip.

An example of a bullwhip can be seen in the following figure:

This analogy is applied to the supply chain where small movements in customer demand at one end of the supply chain leads to huge fluctuations at the other end of the supply chain. The better the flow of information in the supply chain, the less distortion or fluctuations in the information flow results in less inventory in the system to cover the huge fluctuations previously seen in the supply chain.

Causes of the Bullwhip Effect

The bullwhip effect relates to supply chain inefficiencies and changes in inventory levels as they relate to changes in consumer demand. Factors include demand forecasting, order batching, price fluctuations, rationing, and gaming.

The bullwhip effect is caused by demand forecast updating, order batching, price fluctuation, and rationing and gaming.

- **Demand forecast updating** is done individually by all members of a supply chain. Each member updates its own demand forecast based on orders received from its "downstream" customer. The more members in the chain, the less these forecast updates reflect actual end-customer demand.
- **Order batching** occurs when each member takes order quantities it receives from its downstream customer and rounds up or down to suit production constraints such as equipment setup times or truckload quantities. The more members who conduct such rounding of order quantities, the more distortion occurs of the original quantities that were demanded.
- **Price fluctuations** due to inflationary factors, quantity discounts, or sales tend to encourage customers to buy larger quantities than they require. This behavior tends to add variability to quantities ordered and uncertainty to forecasts.
- **Rationing and gaming** is when a seller attempts to limit order quantities by delivering only a percentage of the order placed by the buyer. The buyer, knowing that the seller is delivering only a fraction of the order placed, attempts to "game" the system by making an upward adjustment to the order quantity. Rationing and gaming create distortions in the ordering information that is being received by the supply chain.

Watch the 1:51 video that illustrates "the bullwhip effect":
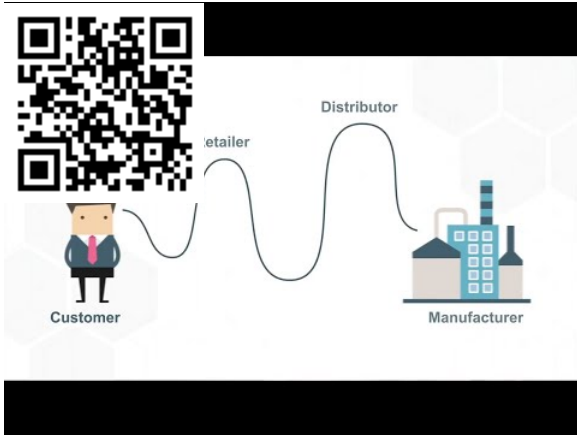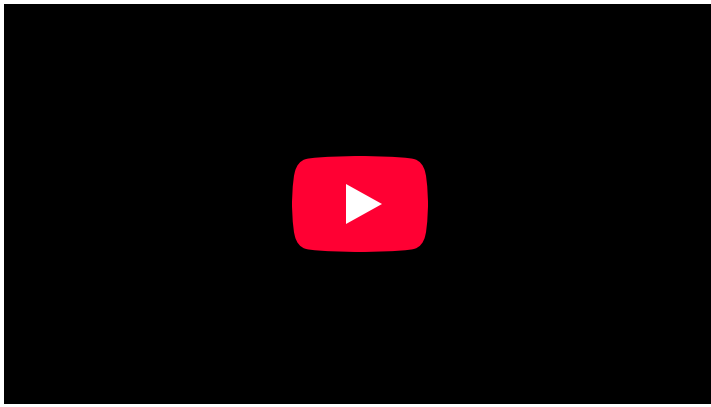
Sources:

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Saylor Academy, Operations Management http://www.opentextbooks.org.hk/ditatopic/7043

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6.7: Logistics and Communication

Logistics

Logistics refers to the activities of coordinating and moving resources, particularly inputs into the transformation process, and finished goods out to customers. Originally, the term logistics was from the military and referred to moving troops, equipment and supplies. Managing logistics involves making decisions such as the following:

- Choosing to operate and manage the firm's own transportation, or whether to outsource this activity
- Selecting suppliers that have the capability to ship goods safely and securely within the required time frame
- Choosing the correct mode of transportation and the most effective route
- Negotiating the shipping rate

Modes of Transportation

There are several modes of transportation available to companies. We discuss them in the following:

Trucking

The majority of goods are shipped by truck completely or at some point during the shipping. Trucking is the most flexible of all modes of transportation. Trucking is categorized by "truck-load" (TL) when the entire truck is hired and delivered directly, or "less-than-truckload" (LTL) which generally includes using several orders to increase the utilization of the truck. A serious issue facing Canada at this time is the expected shortage of qualified drivers. Demand for drivers continues to increase every year, and the average age of drivers is increasing. The trucking industry will face challenges to make driving more attractive to entice new workers into trucking jobs.[3]

Railroads

Rail can be a very cost effective means of transporting goods that need to travel long distances. Goods in containers, or products that are bulky and heavy are ideal for train transport. Canadian rail ships products including cars, fertilizer, food and beverages, forest products, grain, metals and minerals and petroleum products. Often, large manufacturers locate themselves near rail lines to make for easy shipment of raw material into, and finished goods out of their facilities. Compared to trucking, shipping by rail is very energy efficient, and removes many trucks from congested highways. Canada has a very old and well-established rail system. [4]

Airfreight

For goods that are expensive, small and light, air shipping may be a good choice. Air carriers charge by a combination of the weight and size of the shipment. This mode of transport is generally used when speed is more important than cost. Shipping by air is very reliable. Firms may want to consider the environmental impact of regular use of air shipping.

Waterway

This is a very common way of shipping goods. The goods that travel by water include chemicals, stone, cement, sugar, coal and other heavy commodities. Millions of containers travel by ship each year. Do you know what goods travel by ship? Read here.

The Great Lakes St. Lawrence Seaway System is a 3,700 kilometer marine highway that runs between Canada and the United States. Opening in 1959 the seaway is a major trade artery that serves many industries to ship iron ore, coal, limestone, steel, grain and cement. The cost for shipping by waterways is inexpensive. Most low-cost products are shipped by waterways.[5]

Pipelines

Crude oil, natural gas and other petroleum products are shipped by pipelines. Once the pipelines are built, the cost per kilometre for shipping is very inexpensive. There is a lot of opposition and concern over new pipelines because of worry over spills and leaks that may contaminate land and waterways.[6]

Multimodal/Intermodal shipping

This refers to the use of a combination of different types of transportation to move goods from origin to destination. A common example is a combination of truck/ship/train. The goal is to ship the goods as efficiently as possible. The goods are shipped under a single contract with a carrier, and can be easily tracked. It also uses several modes of transportation but also uses a container so that freight does not have to be handled each time it changes modes. Each mode will have a carrier responsible for the shipment. The use of containers increases the security, reduces loss and damage and increases the speed of shipment.

TRUCKING

- Flexible (truck load vs. less-than-truckload)
- Drivers in demand
- Creates highway congestion

RAILROADS

- Ideal for bulkier products or containers
- Cost effective over distances
- Energy efficient

AIRFREIGHT

- Ideal for small & light products
- Prioritizes speed over cost
- Reliable
- Air pollutant

WATERWAY

- Ideal for low cost, heavy products
- Very common
- Inexpensive

PIPELINE

- Used for crude oil, gas, petroleum
- Once built, very cost effective

MULTIMODAL

- Uses a combination of modes through a carrier
- Products secured


Figure 4.4: Diagram summarizing various modes of transportation.

Distribution Management

Distribution management refers to the process of overseeing the movement of goods from supplier or manufacturer to point of sale. Distribution management is an important part of the business cycle for distributors and wholesalers. The profit margins of businesses depend on how quickly they can turn over their goods. The more they sell, the more they earn, which means a better future for the business. Having a successful distribution management system is also important for businesses to remain competitive and to keep customers satisfied.

Distribution involves diverse functions such as customer service, shipping, warehousing, inventory control, private trucking-fleet operations, packaging, receiving, materials handling, along with plant, warehouse, store location planning, and the integration of information.

The goal is to achieve ultimate efficiency in delivering raw materials and parts, both partially and completely finished products to the right place and time in the proper condition.[7]

The combination of distribution and transportation is **logistics**. The most important factor in any logistics is quickly delivering product in perfect condition. Read here how Amazon has used its supply chain management to fuel its rise to the top.

Crossdocking

A broad definition of **crossdocking** is the transfer of goods and materials from an inbound carrier to an outbound carrier without the products actually entering the warehouse or being put away into storage. Thus, the products "cross the docks" from the receiving dock area to the shipping dock area. It can provide significant inventory savings, and the cost of holding inventory and the costs of handling the inventory are reduced. Crossdocking helps to provide excellent customer service by speeding up customer deliveries.[8]

Communication and Technology in the Supply Chain

Electronic Data Interchange (EDI)

Electronic Data Interchange (EDI) is the computer-to-computer exchange of business documents, such as purchase orders and invoices, in a standard electronic format between business partners, such as retailers and their suppliers, banks and their corporate clients, or car-makers and their parts suppliers.

EDI enables the companies to transfer the documents without having any people involved. The documents are automatically transferred from one computer (account) to another. As a result, there are many advantages to using EDI. The primary benefit is the speed and accuracy of the information transmitted. Information is made available in real time and errors that may have previously been caused during the data entry process are eliminated.

Common information exchanged using EDI include:

- Purchase orders
- Invoices
- Advance shipment notices (ASN)
- Customs documents
- Inventory information
- Shipping status
- Payment documents
- Bill of lading
- Sales/price catalogues
- Shipment status messages

Barcodes

Barcodes have been used extensively since the 1970s, and consist of data that is displayed in a machine-readable form that can be scanned by barcode readers. The information contained on the barcode is typically pricing information, product number and description and any other pertinent information. Barcodes have become the norm in retail operations allowing for pricing accuracy and easy price changes. This data provides point-of-sale information to allow retailers to track items being sold, update inventory, identify fast and slow moving products and assist in forecasting.

QR

Quick Response (known as QR) is using bar codes and EDI to make sales data available to vendors so that vendors can quickly replenish goods in the correct quantity. This is thought of as JIT in the retail industry. The goal is to reduce out-of stock incidents, as well as using smaller more frequent deliveries to reduce inventory and operating expenses.

Radio Frequency Identification Device (RFID)

This technology uses radio waves to communicate information contained on a tag attached to an object. The information contained on a tag may include things such as the products origin, date of production, shipment information, pricing info, and any other pertinent info. In order to transfer this info, both a tag and a reader are needed. There are two types of tags, active and passive. An active tag contains a power source such as a battery and can operate a great distance from the reader. Passive tags use energy from the reader. Unlike barcodes, the RFID tag and reader do not require line of site in order to transmit the information.

RFID applications include the following plus many more:

- Retail use to protect from theft
- Toll road payments
- Identification (i.e. tracking of animals and people)
- Passports
- Shipping tracking – to identify location and contents of orders
- Asset tracking (e.g. laptops, expensive tools, medical devices in hospitals)
- Race timing for marathons
- Tracking luggage during travel

Supply Chain Collaboration

Vendor Managed Inventory (VMI)

Vendor Managed Inventory (VMI) is an advanced supply chain relationship whereby a vendor (often a manufacturer) has access to their customer's inventory information and the vendor takes the responsibility for maintaining an agreed-upon level of product at the customers location. This arrangement can be used with manufacturers, distributors and retailers.

VMI has numerous benefits for both the supplier (vendor) and the customer. The vendor has strong motivation to ensure that shelves are fully stocked, any slow-moving stock is discontinued and that employees have full understanding of the product offerings. The customer benefits from these VMI relationships because less work is involved on the buyers' end. Due to EDI, there are few errors and goods flow quickly. Point-of-sale data updates the inventory and determines what items are needed. Salespeople from the vendor often provide assistance by training sales staff and assisting customers when possible.

Collaborative Planning, Forecasting and Replenishment (CPFR)

Collaborative Planning, Forecasting and Replenishment (CPFR) is an arrangement where two trading partners in a supply chain collaborate to agree on forecasts and orders between the manufacturer and distributor/retailer. The distributor/retailer will have collected POS data and added any additional information, such as promotion plans, inventory status or forecasts. That information gets shared with manufacturers who will then compare it with their own forecasts and capacity. Both teams can collaborate to solve any discrepancies, eliminate gaps and agree on a final set of numbers. Collaborating in this way will enable both firms to reduce inventory as well as reducing problems such as shortages and capacity problems.

6.8: Measuring Supply Chain Performance

Inventory Turnover

Key Performance Indicators (KPI) are measurements used to evaluate supply chain performance.

One of the ways to evaluate the supply chain performance is to calculate **inventory turnover** (inventory turns):

$$\text{Inventory Turnover} = \frac{\text{Cost of goods sold}}{\text{Average Aggregate Inventory Value}}$$

Figure 4.5: Inventory turnover formula (cost of goods sold divided by average aggregate inventory value).

"Average aggregate inventory value" is a term used to describe all of the inventory held in stock, which includes raw materials, work in process and finished goods, all valued at cost.

Inventory turnover is an indicator of the policies and practices of an organization. It represents their ability to purchase materials, produce and sell their products in a timely manner. A higher value for the inventory turnover means that the organization has been capable of replenishing and selling its inventory more number of times in any particular amount of time, and as a result, have a better cash flow.

It is important to keep in mind that high or low value of inventory turnover for each company is relative to its own industry. For example, dairy (milk) manufacturing has an annual inventory turnover of around 23, while this number is 14.7 for the grocery supermarkets, and 4.8 for the automotive industry.[9] Industries with higher volume, but lower margin, usually have the highest inventory turnovers.

Example

NED's Food Supply is a supplier to restaurants and institutions for frozen foods, meats, fish, canned and fresh fruits and vegetables. Here is an analysis from the past two years regarding their inventory management. In which year was their supply chain performance better?

cost of goods sold and average inventory value

	Last year	Two years ago
Cost of goods sold	17,550,000	16,255,000
Average aggregate inventory value	$1,650,000	$1,763,350

Solution

Inventory turns for last year = 17,550,000 / 1,650,000 = 10.64 turns

Inventory turns for two years ago = 16,255,000 / 1,763,350 = 9.22 turns

Last year, their inventory turnover was faster. If customer service was equivalent in both years, then their performance was better last year than it was two years ago. This may have resulted in customers receiving fresher foods as well.

Days of Supply

Another related performance measure is **days of supply**:

$$\text{Days of Supply} = \frac{\text{Average Aggregate Inventory Value}}{\text{Annual Cost of Goods Sold}} \times 365 \text{ days}$$

Figure 4.6: Days of supply formula (average aggregate inventory value divided by annual cost of goods sold, the sum of which is multiplied by 365 [days]).

Example

J's Custom Automotive Finishing has calculated that his annual cost of goods sold at 45,000,000. His average inventory value in 2019 is:

Calculation for days of supply

Production components	2,350,000
Production supplies	450,000
Finished goods	225,600
Total aggregate inventory value:	**3,025,600**

Solution

Days of supply = (3,025,600 / 45,000,000) x 365 = 24.54

This measure can be thought of as how much inventory is sitting in the building at any one time. In terms of measuring the efficiency of the inventory, a lower number is better. It would imply that goods are purchased more frequently and spend less time in the facility before being converted into sales.

There are other ways to measure supply chain performance as well. In a warehouse or distribution setting, **fill rate** is an important measure. It is the percentage of customer orders that are filled from on-hand stock. In a manufacturing setting, a measure such as the **percentage of orders delivered on time** is an important indicator of customer service level.

The following 3:11 video provides additional insights into important measurements throughout the supply chain process:
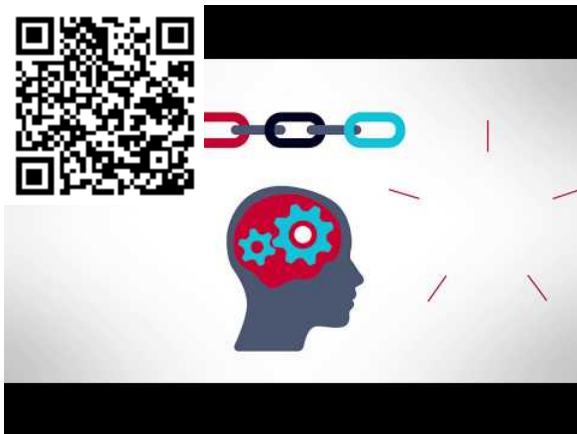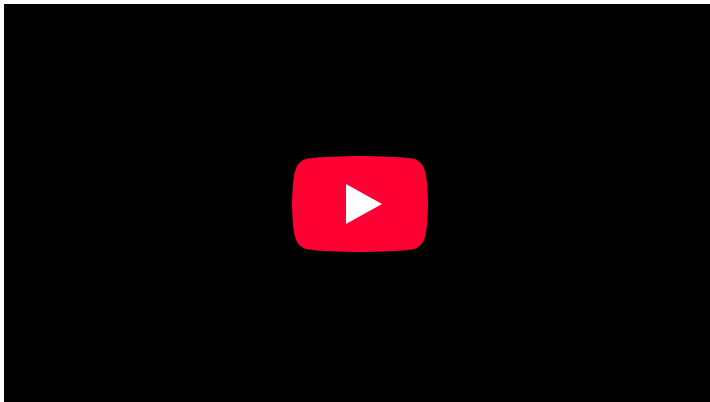
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