

# Smooth Operations

## Nature of Operations

### Let's Operate



**R**owe is running his own lawn-mowing business this summer. To do so, he takes resources, such as his time, abilities, and equipment, and turns them into a service he offers customers—a freshly cut lawn. Just like Rowe's business, all companies, big and small, take inputs (resources) and turn them into outputs (products and services). Managing this conversion process is called operations. As you can guess, a well-oiled operations function is essential for success! Let's take a closer look at the importance of operations and its impact on business.

### Objectives

- A** Describe the activities involved in the operations function.
- B** Discuss the impact of operations on business.

**W**hat little things do you do every day to keep yourself on track? Your list may include activities such as:

- Going to class
- Doing homework
- Doing laundry
- Eating healthy meals
- Exercising
- Hanging out with friends



▲ Everyday activities like doing homework are actually important operations that help you stay on track.

These tasks might not seem difficult, but they are important. If you don't take care of them, you'll fall behind and become less productive. Businesses also complete many activities to stay on track. The day-to-day activities for continued business functioning are known as **operations**.

Operations allows a business to keep doing what it needs to do—producing and providing goods and services for its customers. Every business takes inputs and uses them to make outputs. **Inputs** are things such as employees, raw materials, equipment, and capital. **Outputs** are goods and services. A day care center, for example, uses inputs such as its building, its playground and toys, and skilled teachers to provide an output of quality child care for working parents.

Operations managers oversee all the **processes** involved in converting inputs into outputs. They complete this job with two goals in mind—efficiency (keeping costs low) and effectiveness (keeping customers satisfied). When the operations function is performed well, it adds **value** to the company's product.

## Operations activities

Let's take a look at some of the many activities involved in operations.

**Production planning.** Since most other operations activities are based on decisions made during production planning, it can be considered the foundation of operations. How will a business manufacture a good or provide a service? Doing so requires a specific process made up of people, places, materials, equipment, and information. This process is called an **operating system**, and every business has one, no matter what it produces. Just like your smartphone requires a strong operating system to function properly, a business must also have a strong operating system to run efficiently and effectively. A business's operating system may be complex, such as an assembly line in a manufacturing plant, or simple, such as a car wash fundraiser in the grocery store parking lot. Whether complex or simple, operating systems must be planned before production can begin. And they must be regularly evaluated to ensure they're working efficiently. If not, managers should return to the production planning table and make necessary improvements to the process.



▲ Production planning is the foundation of operations and lays the groundwork for the entire production process.

### Think you have what it takes to start your own business?

Check out the article "Writing the Operations Plan Section of the Business Plan" from The Balance Small Business at <https://www.thebalancesmb.com/operating-section-of-business-plan-2947031> for tips on planning your business operations.

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**Site selection and layout.** Operations managers must determine the best location for the business. Sometimes, this means determining whether a business should have a physical location at all. Many companies today operate solely online, saving a lot of money in overhead costs. However, for a business that needs a physical location to operate, many factors should be considered:

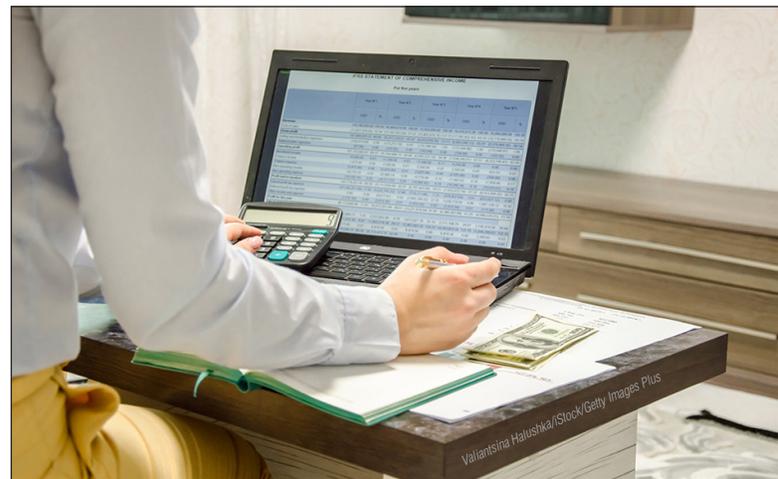
- **Costs.** How much will it cost to buy or rent the facility? How much will land and construction cost if a new facility must be built? How much will it cost to buy materials in this area or to have them shipped?
- **Labor.** What kind of workforce is available near the proposed location? Will it be enough to keep the business fully staffed? What are average wages and salaries there? Will labor unions be a factor?
- **Community.** What will the community's attitude be toward the business? If it's a retail establishment, will there be enough customers to support it? How close will the competition be? Are the taxes affordable? What local laws might affect business operations?

As you can see, choosing a business site requires careful research, consideration, and planning. Even climate can play a part. A business that produces snowmobiles would not be wise to build its testing facility in Miami. Nor would a producer of citrus fruit be wise to attempt to place its groves in northern Wisconsin!

After the site is chosen, operations managers must determine the layout of space within the facility. Where will the offices be? What about storage space, bathrooms, and production areas? Of course, the answers to these questions depend on what type of product the business creates. A **service business**, such as a tanning salon, requires more space for customers than a manufacturing plant that is not open to the public. Not all manufacturing plants have similar layouts, either. Different sizes and shapes of materials, as well as different production processes, dictate the layout of a plant. A plant that manufactures tiny computer microchips is likely to have a vastly different layout than a plant that manufactures industrial air conditioning units.

**Purchasing.** You've already considered the activities you must do to keep yourself on track each day—now consider the things you need to buy. Gas, lunch, school supplies, new shoes—these are just a few examples. And, you guessed it, businesses have a lot to buy as well. **Purchasing, or procurement**, is the buying of goods and services for a business. Businesses purchase:

- **Materials needed to produce goods and services.** This might include the raw materials needed to create a product. A carpenter, for instance, needs wood, nails, and varnish to produce bookshelves. Materials may also include equipment needed to create a product. A hairstylist needs scissors, combs, and razors to provide their service.
- **Products for resale.** Retailers don't produce goods; they resell them. Therefore, they must choose which products to resell and purchase those products from producers, wholesalers, or agents.
- **Day-to-day supplies and equipment needed to run the business.** This might include office supplies, printers, copiers, phones, cleaning supplies—even toilet paper!



▲ The purchasing department ensures that its business is receiving vital resources and products in a cost-efficient and timely manner.

Purchasers for businesses are concerned with obtaining materials, products, and supplies when they are needed, in the right amounts, and at the best available costs. To accomplish this task, they work with suppliers to find the best deals for the company. Let's say a manufacturing firm needs lumber to create its product. A purchaser for the firm does a lot of homework to find a lumber mill that offers:

- Good prices
- Reliable customer service
- Affordable shipping costs
- Quality materials
- Reasonable credit terms

Purchasers should constantly be on the lookout for better deals, and they should always have backup suppliers lined up as well. A supplier might go out of business, experience a workforce strike, or face a natural disaster that interrupts production or shipping. Purchasers can't let their own firms suffer if any of these problems occur.



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**D**oes purchasing sound fun to you? Many companies hire purchasers, buyers, and purchasing agents for the sole purpose of buying products for their business. Take a look at a purchaser's job responsibilities in this article by Aurelio Locsin: <https://careertrend.com/job-responsibilities-purchaser-11137.html>.

**Quality control.** Ensuring the degree of excellence of a good or service is known as **quality control**. Businesses want to make sure their products meet certain predetermined standards. Sometimes, these standards are internal, set by the company itself. Standards are also set by government laws and regulations; by standards-setting organizations, such as **ISO** (International Organization for Standardization); and by large manufacturers that require vendors to meet their company standards. Regardless of where the standards come from, businesses must take quality control very seriously. Some general standards that apply to **quality** include:

- Performance—Does the product do what it is supposed to do?
- Durability—Will the product last as long as it needs to?
- Serviceability—Can the product be repaired quickly and easily if necessary?
- Conformance—Does the product conform to all applicable laws and standards?

When you think of quality control, you might imagine assembly line workers picking bad or defective products off the line and throwing them away. Often, machines perform this job using automatic sensors. This aspect of quality control is called **quality inspection**. In quality inspection, products are checked for defects after they've already been produced. For some products, it's sufficient to check a sample only. Take dish soap, for instance. The consequences of one defective bottle of dish soap are relatively minor. The consequences of a defective piece of surgical equipment, however, could be tragic, so every individual unit may need to be inspected.

For many companies, quality inspection is simply not enough. These companies choose to build quality into every part of their operating systems, a process known as **quality assurance**. The goal of quality assurance is to prevent defective products from being created in the first place, not just to weed them out or correct them after they've already been produced. Quality assurance places the responsibility for quality on every employee, not just a few inspectors. It emphasizes the importance of each individual's contribution to the good or service along its way to the customer.

Let's say you take your car in for an oil change. You get to the auto shop and tell the clerk that you need a specific kind of oil in your car, but they don't write the information down. When you get your car back, you notice it's not performing well and call the shop for a refund. You learn that the mechanic used the wrong oil. If the clerk had written down your instructions and given them to the mechanic, the problem would have been avoided. This would have been an example of quality assurance built into the auto shop's service.

Quality control is a central focus for most businesses today. When a business produces quality products, it is better able to keep up with or outdo the competition. Lower costs and higher productivity also result from fewer wasted materials/resources, fewer returns, fewer lost sales from unhappy customers, and less time spent fixing faulty products.

**Inventory control.** At any given time, a business has a certain level of **inventory** on hand. The three main types of inventory are:

- **Raw materials inventory**  
This includes the materials a business uses to create a finished product. A restaurant, for example, has to stock all kinds of ingredients necessary to make its dishes.
- **Partially finished goods inventory**  
This includes works in progress. Think of an airplane manufacturer. It certainly doesn't roll thousands of its products off an assembly line each day! On a certain day, it may have several planes in various stages of production.
- **Finished goods inventory**  
This includes completed products that are ready to be sold to customers.



▲ Quality control means making sure that your product meets the standards set by the company itself and the standards set by government laws and organizations.



▲ A cafe may stock many different types of raw materials in its inventory such as coffee beans, sugar, coffee filters, and coffee pots.

Usually, inventory is a term that relates to producers, wholesalers, and retailers, but even service providers need to keep supplies in stock for their businesses to function on a day-to-day basis.

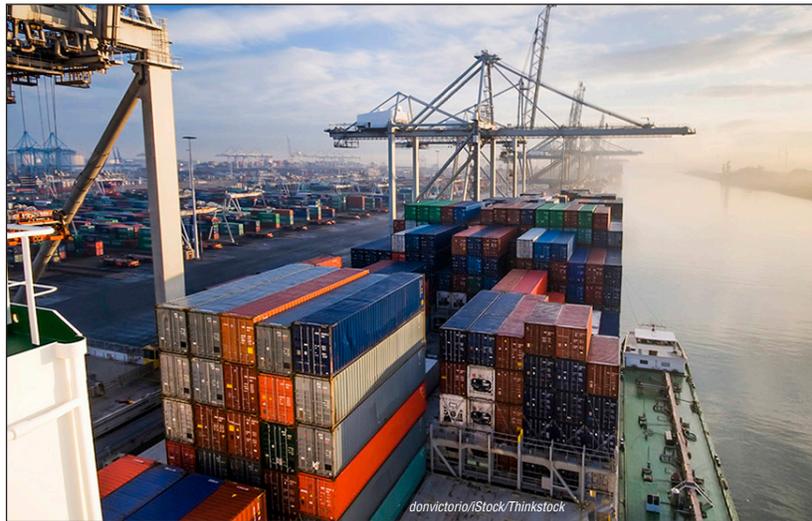
If inventory refers to what items a business possesses, then **inventory control** is tracking the amount, kind, and value of those items. It may sound as boring as watching paint dry, but don't be fooled—it's a tricky business that involves a lot of knowledge, planning, and work. The key to inventory control is making sure that inventory is high enough for the business to function but low enough to not incur unnecessary expenses.

A business needs enough raw materials and finished goods to keep production running and fill orders, but having too much inventory can cost a lot of money. The money it takes to keep inventory in stock is known as a **holding cost** or carrying cost, which is, on average, around 25% of the value of the inventory each year. That can really add up! Holding costs include storage, taxes, and insurance. The more a company can reduce holding costs, the more cost-effective its operations can be.

On the flip side, businesses want to avoid **stockout costs**—the costs associated with running out of needed inventory. These costs can accrue through lost money and sales, lost productivity, and lost customer satisfaction. Operations managers walk the fine line between holding costs and stockout costs. Fortunately, computer technology has made inventory control much easier. Software specially created for this operations activity can track inventory levels, create reports, and let managers know when holding costs are getting too high or inventory is getting too low.

**Logistics.** **Logistics** refers to managing the flow of goods and services from production to consumption. This includes all the people, information, and processes involved in storing and transporting goods. Operations managers must decide where and how to store goods as well as how and when to transport them to customers. Consider a producer of various food products. It must answer logistics questions such as:

- Will this product be stored in a warehouse or shipped directly after production?
- Where in the warehouse will this product be stored? At what temperature?
- What method(s) of transportation should be used to distribute this product to customers?



▲ Logistics is a huge and exciting field that requires proper planning and knowledge of every mode of transportation and storage.

**Routing.** Selecting the sequence in which the steps of production need to be carried out is called **routing**. You wouldn't seal and cap a gallon of milk before the milk was inside, right? Although this example seems obvious, many production processes are quite complicated (think intricate computer equipment or complicated machinery). Determining the most effective and efficient route for materials to follow is a very important part of operations and the production process.

**Scheduling.** When you hear the word “schedule,” you might think of your own schedule. Class at 9:00 a.m., work at 4:00 p.m., Grandpa's birthday dinner next Tuesday—that sort of thing. While scheduling in business does relate to the clock and the calendar, it's not exactly the same type of scheduling you're used to. **Scheduling** is an operations activity that establishes the timetable to be followed in production. It controls the flow of the entire production process by determining *when* materials will arrive at a certain destination and *how long* they will stay there. To make **timing** decisions, operations managers must have a thorough knowledge of each step in the production process and how long it takes. In a bottling plant, for instance, beverages might need to be heated or cooled for certain amounts of time before continuing on to the next step. When routing and scheduling work together, the entire production process flows smoothly.



▲ Scheduling is crucial to making sure the production process operates in a smooth and timely manner.

And don't count service businesses out of the need for routing and scheduling. Consider the postal service. How do routing and scheduling affect its product?

**Safety and security.** Operations managers are ultimately responsible for safety and security at the work site. Employees, customers, and visitors must be protected from hazardous materials (chemicals, acids, paints, etc.) and processes (welding, cutting, etc.). Ensuring safety requires compliance with internal rules/procedures and government standards. Certain types of businesses may also need to comply with laws and regulations regarding environmental safety. While every employee is responsible for doing their part to maintain a safe working environment, corporate responsibility falls to operations. Operations managers may also be responsible for the company's security needs (alarm systems, security guards, etc.).

**Maintenance and repairs.** Business facilities and equipment require routine maintenance and occasional repairs. If a door needs a new lock, if a copier breaks down, if a forklift needs engine work, operations managers must respond. The operations function also covers routine custodial work in the business facility.

**Expense control.** At the heart of operations is the **bottom line**, or the business's **net income**. Since operations managers control so many activities within a business and, therefore, so much of the business's money, their focus is on efficiency and keeping costs low across the board.



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▲ No matter the type of business or product, operations managers must be prepared for a wide array of maintenance needs.

## Summary

Day-to-day activities for continued business functioning are called operations. Operations managers are concerned with efficiency and effectiveness. Operations activities include production planning, site selection and layout, purchasing, quality control, inventory control, logistics, routing, scheduling, safety and security, maintenance and repairs, and expense control.

## THE GRAY ZONE

**M**odern operating systems use many different kinds of technology. In some cases, technology streamlines processes or tasks, making employees' jobs simpler and less time-consuming. In other cases, technology automates processes or tasks, eliminating the need for human workers altogether. Many companies find that using automated technology for certain jobs is cheaper than paying employees. Since every business wants to maximize productivity and minimize costs, this makes financial sense. However, it can result in layoffs. Do you think it is OK to replace people with computers or robots?

## TOTAL RECALL

1. Describe the operations function.
2. Describe the following operations activities:
  - a. Production planning
  - b. Site selection and layout
  - c. Purchasing
  - d. Quality control
  - e. Inventory control
  - f. Logistics
  - g. Routing
  - h. Scheduling
  - i. Safety and security
  - j. Maintenance and repairs
  - k. Expense control

# Operations at Work

## It's all about the product

You know what operations means, and you're familiar with operations activities. But how do these activities vary from business to business? The answer to this question usually depends on the product. The product a business makes or provides affects every aspect of operations. Here are a few examples:

- **Production process**—The process for producing kitchen chairs varies from the process for producing wedding bouquets.
- **Purchasing**—A small local boutique has different purchasing needs than a nationwide department store.
- **Quality control**—There are different quality standards for a refrigerator than for a microwave oven.
- **Inventory control**—A producer or retailer has bigger inventory control needs than a service business does.
- **Safety and security**—A hospital has different safety concerns than a fast-food restaurant does.

Can you think of more ways that products affect operations?



▲ A hospital has different safety and security needs than a manufacturing business.

## At your service

In decades past, manufacturing businesses dominated the economy. Today, however, service businesses play a vital role in the marketplace and employ millions of workers. The operations function is just as important for service businesses as it is for factories. Like manufacturers, service businesses convert inputs into outputs. The difference is that these outputs are intangible, meaning the customer can't touch, hold, or generally experience the physical presence of a service in the same way as a good.

Service businesses rely on operating systems just as producers and retailers do. Consider a doctor's office. It must:

- Have a system for taking in, treating, and following up with patients
- Choose a location and a layout (exam rooms, offices, reception area, etc.)
- Purchase equipment and supplies (and keep accurate inventories)
- Provide a quality experience (appropriate health care)
- Create schedules for employees and patients
- Assure safety and security
- Conduct routine maintenance and repairs
- Keep costs as low as possible

Can you think of more examples of service businesses and how they rely on the operations function?



▲ Although health care may not be a tangible output, this service requires an operating system much like a tangible product does.

## Getting technical

Technology affects every aspect of the business world, and operations is no exception. This function relies on technology in a number of ways. Purchasers order materials and supplies online. Managers control inventory using special software. Production schedules can be created on computers and sent to employees instantly over email. The emergence of smartphones, tablets, apps, and new software has enabled a completely new level of operating. In fact, many businesses are operated almost solely through technology. Here are just a few ways companies use technology in operations:

**Social media.** Social media is no longer used for the sole purpose of keeping in touch in our personal lives. Today, more and more companies are turning to social media for planning, quality control, and purchasing decisions. Many companies also use sites like LinkedIn and even Facebook to locate suppliers and receive customer feedback to improve efficiency and effectiveness. For example, restaurant owners and managers often turn to social media to gather customer feedback to fix common issues and adapt menus to current tastes—a very effective method of quality control.

From marketing to customer service, businesses are employing the power of social media in a variety of ways. Check out these articles from The Balance Small Business and Eternity to learn more about how today's social media platforms such as Twitter and TikTok are impacting businesses everywhere: <https://www.thebalancesmb.com/top-reasons-why-your-small-business-should-use-twitter-2948523> and <https://eternitymarketing.com/blog/why-you-should-be-using-tiktok-for-business-in-2022>.



▲ Many social media platforms are combining capabilities and providing new digital possibilities for businesses.

**Computer-aided design (CAD), computer-aided engineering (CAE), and building information modeling (BIM).**

Designing and testing products in the virtual world before trying them out in the real world can save companies a lot of time and money. Using computer software, a company can design, test, and redesign a product many times over until it's ready for production—all without wasting unnecessary resources.

**Computer-aided manufacturing (CAM) and computer-integrated manufacturing (CIM).** In CAM, computers store information about the production process and direct automated equipment (such as robots) to perform certain tasks. CIM refers to integrating computer technology throughout the entire manufacturing process, from design to production to marketing to customer support.

**3D printing.** Many companies are finding new ways to reduce costs through the use of technological advancements. 3D printers allow companies to create cheaper prototypes and products in smaller quantities. This technology is currently being used to produce apparel, automobile and aircraft parts, medical devices, and more. For a better understanding of how 3D printing is changing businesses, check out the video “What Is 3D Printing and How Does It Work?” from Mashable at <https://www.youtube.com/watch?v=Vx0Z6LplAMU>.



▲ New technologies like 3D printing are making operations cheaper and more efficient.



## Big impact

Because operations impacts every other business function, operations managers have numerous responsibilities. They must work closely with managers and employees in every other part of the company. Marketers don't have a quality product to promote if operations managers haven't overseen its creation. And, since operations managers can have control over the majority of a firm's assets, they certainly need to stay on the same page as top management and finance officers.

## Summary

The product a business creates affects every aspect of the operations function. Service businesses rely on operating systems just as producers and retailers do. Operations managers use a variety of different technologies to do their jobs more efficiently and effectively. Operations is an important function that impacts the entire business.

### TOTAL RECALL

1. How does a company's product affect operations?
2. What is the role of operations in service businesses?
3. What is the role of technology in operations?
4. How does the operations function relate to other business functions?

# Make It Pay!

**A**n operating system is a process made up of people, places, materials, equipment, and information. Businesses use operating systems to manufacture goods and provide services. Think about what operating systems are in place in your own life—at school, at work, and at home. What resources do you use, and what outputs are you producing?