OperationsÂ Management 14th edition Stevenson Solutions Manual

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CHAPTER 01
INTRODUCTION TO OPERATIONS MANAGEMENT

Teaching Notes

Many students come to this course with negative feelings, perhaps because they have heard that the course includes a certain amount of quantitative material (which many feel uncomfortable with), or perhaps because the course strikes them as "how to run a factory." Others seem to have very little idea about what operations management is. I view the initial meeting with my classes, and this first chapter, as opportunities to dispel some of these notions, and to generate enthusiasm for the course.

Highlights of the chapter include the following:

1. Operations as one of the three main functional concerns of most organizations.
2. The role and job of the operations manager as a planner and decision-maker.
3. Different ways of classifying (and understanding) production systems.
4. System design versus system operation.
5. Major characteristics of production systems.
6. Contemporary issues in operations management.
7. Operations as essentially managerial (planning, staffing, etc.)
8. The historical evolution of production/operations management.
9. Manufacturing operations versus service operations.
10. The need to manage the supply chain.

Reading: Why Manufacturing Matters

1. Given that the U.S. economy is becoming more service based, the percentage of employment in manufacturing is declining while the percentage of employment in the service industry is increasing. In addition, the loss of manufacturing jobs results in the loss of service jobs as well (a general estimate is that four service jobs are lost for each manufacturing job lost).
2. The government could offer companies tax incentives for purchasing new equipment or for hiring workers. In addition, the government could work with manufacturing companies to re-train workers in more advanced manufacturing processes.
3. Manufacturing innovation is important because it requires high value-added knowledge work that supports future innovation. Second, innovation generates high-paying jobs. Third, innovation is important because it improves productivity, thereby slowing the outsourcing of jobs to lower wage countries.

Reading: Agility Creates a Competitive Edge

The first solution could be for U.S. retailers to continue sourcing from China that part of demand that is certain and to source uncertain demand from the same low-cost producers in Romania and Turkey.

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This approach provides the advantages of low-cost manufacturing in China and the flexibility provided by the suppliers in Romania and Turkey. The disadvantage of this approach is that transportation times for U.S. retailers still will be longer than the transportation times faced by Zara's and H & M.

A second approach could be that U.S retailers find low-cost, flexible suppliers just across the border in Mexico. The advantages of this approach include low wages and shorter transportation times. The primary disadvantages to this approach involve the time and expense of locating new suppliers. Additionally, the U.S. retailers might have to lend considerable support developing the capabilities of these suppliers.

Reading: Sustainable Kisses

1. Hershey's and other companies engage in sustainable business practices because consumers prefer to do business with companies that practice sustainable sourcing and ethical treatment of workers. Many of the leaders in these businesses hold the same values. By educating farmers, Hershey's can also help to increase the longevity and yield of cocoa plants.
2. Hershey's actions may influence retailers and customers in its supply chain to become better-educated about sourcing, which may influence competitors to adopt similarly sustainable business practices.

Operations Tour: Wegmans Food Markets

1. Customers judge the quality of a supermarket based on:
   a. Quality of individual products.
   b. Exterior and interior physical look of the store.
   c. Effectiveness and efficiency of service personnel.
2. a. Customer satisfaction is the major key to the success of any operation; without it, the company cannot survive.
   b. Forecasting allows the company to plan the workforce levels, purchase quantities, inventory levels, and capacity.
   c. Capacity planning allows the company to balance the trade-off between shortages and excess inventories and between waiting lines and idle time.
   d. A good location can have a significant impact in attracting customers, thus improving sales.
   e. Planning and controlling levels of inventory will assist with avoiding stockouts and avoiding excess inventory levels.
   f. Good layout of the store can assist in maximizing customer service and sales by strategically directing customers through the store. An effective layout can also improve the efficiency of the operations.
   g. Effective scheduling of company workers and work hours can improve both customer service and efficiency. An effective schedule provides convenient store hours, minimal customer waiting lines, and minimal employee idle time.
3. Wegmans uses technology to track inventory and manage its supply chain, which lessen the risk of occurrences of out-of-stock events, and to maintain freshness in its meat and produce departments.

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Answers to Discussion and Review Questions

1. The term operations management relates to the management of systems or processes that create goods and/or provide services. These processes involve the planning, coordination, and execution of all activities within an organization that create goods and services. A supply chain is the sequence of organizations, including their facilities, functions, and activities, that are involved in producing and delivering a product or service. This sequence begins with basic suppliers of raw materials and ends with the final customer. A supply chain includes activities and facilities external to the internal operations function, e.g., sourcing and transportation of inbound materials.

2. The three primary functions are operations, finance, and marketing. Operations is concerned with the creation of goods and services, finance is concerned with provision of funds necessary for operation, and marketing is concerned with promoting and/or selling goods or services.

3. The operations function consists of all activities that are related directly to producing goods or providing services. It is the core of most business organizations because it is responsible for the creation of an organization's goods or services. Its essence is to add value during the transformation process (the difference between the cost of inputs and value and price of outputs).

4. Among the important differences between manufacturing and service operations are:

   a. The nature and consumption of output.
   b. Uniformity of input.
   c. Labor content of jobs.
   d. Uniformity of output.
   e. Measurement of productivity.

   Among the important similarities between manufacturing and service operations are:

   a. Forecasting and capacity planning to match supply and demand.
   b. Process Management
   c. Managing variations
   d. Monitoring and controlling costs and productivity
   e. Managing the supply chain
   f. Location planning, inventory management, quality control and scheduling

5. a. The Industrial Revolution began in the 1770s in England, and spread to the rest of Europe and to the U.S. in the late eighteenth century and the early nineteenth century. A number of inventions such as the steam engine, the spinning Jenny, and the power loom helped to bring about this change. There were also ample supplies of coal and iron ore to provide the necessary materials for generating the power to operate and build the machines that were much stronger and more durable than the simple wooden ones they replaced.

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b. Frederick W. Taylor, who is often referred to as the father of scientific management, spearheaded the scientific management movement. The science of management was based on observation, measurement, analysis, improvement of work methods, and economic incentives. Management should be responsible for planning, carefully selecting and training workers, finding the best way to perform each job, achieving cooperation between management and workers, and separating management activities from work activities.

c. Parts of a product made to such precision that each part would fit any of the identical items bring produced. It meant that individual parts would not have to be custom made because they were standardized.

d. Breaking up a production process into a series of tasks, each performed by a different worker. It enabled workers to learn jobs and become proficient at them more quickly, avoiding the delays of workers shifting from one activity to another.

6. a. The service sector now accounts for more than 70 percent of jobs in the U.S. and that figure continues to increase.

b. Manufacturing is important in that it supplies a large proportion of exports and many service jobs are dependent on manufacturing because they support manufacturing.

c. Farm products are an example of non-manufacturing goods because there is no production and the products naturally grow without human intervention.

7. Models provide an abstraction and simplification of reality. Mathematical models are the most abstract and most used in operations management. These models are used to assist in various decision-making scenarios. One of the main reasons for building mathematical models is that the experimentation with the model enables the decision-maker to analyze the model and make inferences about a problem without actually manipulating the real situation or problem. Therefore, the experimentation with the mathematical model rather than the actual problem or situation is less time consuming and less expensive.

8. The degree of customization has important implications throughout a business organization. Generally, higher degrees of customization involve more complexity in terms of production or service, involve different forms of layout (arrangement of the workplace), require higher worker skills, and have lower productivity.

9. a. Initial cost, convenience, parking, taxes, time, repairs, upkeep, etc.

b. Cost, technology, productivity, convenience, software applicability, etc.

c. Initial cost, repairs, warranty, upkeep, monthly payments and interest, dependability, insurance costs, etc.

d. Control of the situation, class participation, perception, image, etc.

e. This would depend on the nature of the product or service being offered as well as the type of customer. Computer literate customers might seek a web site. If customers are strictly local, newspaper advertising might be a reasonable choice, especially if potential customers were not actively seeking out the business. In addition, if the business is seasonal, newspaper advertising might be preferred.

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10. Craft production: involves producing high variety of customized goods, low volume output with skilled workers, and utilizing general-purpose equipment. The main advantage is the flexibility to produce a wide variety of outputs providing many choices for the need of customers. The main disadvantage is its inability to produce at low cost. Examples: tailoring, machine shop, print shop, and landscaping.

    Mass production: involves producing a few standardized goods at high volume of output with low skilled workers utilizing specialized equipment. The main advantage is low cost, efficient production. The main disadvantage is that it does not allow easy changes in volume of output, product, or process design. Examples: automobiles, computers, mail sorting, appliances, paper, soft drink bottling, etc.

    Lean Production: involves producing more variety of goods than most production at moderate to high volume of output. It requires high skilled workers, quality, employee involvement, teamwork, and flatter organizational structure with fewer levels of management. It combines the advantages of both mass production (high volume, low cost) and craft production (variety, flexibility). Examples: similar to mass production.

11. Workers may not like to work in a lean production environment because there are fewer opportunities for employee advancement, more worker stress due to higher levels of responsibility and greater variability and expansion of job requirements.

12. a. Matching supply and demand is an important objective for every business organization. Undersupply can result in dissatisfied customers, potential loss of business, and opportunity costs. Oversupply can potentially result in additional cost to store the excess, the need to sell the excess for a reduced cost, or the cost to dispose of the excess.

    b. Managing a supply chain is important for several reasons, including matching supply and demand, reducing transportation costs, achieving a competitive advantage, managing inventories, and achieving supply chain visibility.

13. There are four basic sources of variation:

    1. The variety of goods or services being offered: The greater the variety of goods and services, the greater the variation in production or service requirements.
    2. Structural variation in demand, such as trends and seasonal variations. These are generally predictable. They are particularly important for capacity planning.
    3. Random variation. This natural variability is present to some extent in all processes, is present in demand for services and products, and generally cannot be influenced by managers.
    4. Assignable causes of variation: Variation caused by defective inputs, incorrect work methods, out of adjustment equipment, and so on. This type of variation can be reduced or eliminated by analysis and corrective action.

    Variations can be disruptive to operations and supply chain processes, interfering with optimal functioning. Variations result in additional cost, delays and shortages, poor quality, and inefficient work systems. Poor quality and product shortages or service delays can lead to dissatisfied customers and damage an organization's reputation and image.

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14. The reasons for doing unethical things vary from person to person and from one situation to another. Some of the possible reasons are listed below:

    a. The decision-maker cannot recognize his or her action as unethical because of a lack of morals or understanding or lack of sensitivity towards a given issue.

    b. Even though the decision-maker recognizes his or her behavior or action as unethical, he or she justifies it based on self-rationalization that involves justice theory. For example, the decision-maker may think that the consequences of his or her decision is not going to hurt other people or organizations in the short run but the potential long term effects may be devastating.

    c. The decision-maker knows that his or her action is unquestionably unethical. However, the type of ethical behavior required is not in the personal portfolio of the decision-maker and ethics in general is not important to him or her.

    d. The decision-maker does not think he or she will be caught.

    e. The self-interest of the decision-maker outweighs the ethical considerations.

15. Value added is defined as the difference between the cost of inputs before the transformation process and the value or the price of output after the transformation process. In a manufacturing process as the inputs are transformed to outputs, value is added to products in a number of different ways. The value adding can take many different forms. For example, value can be added by changing the product structurally (physical change) or transporting a product (a product may have more value if it is located somewhere other than where it currently is).

16. Outsourcing can result in lower costs, the ability to take advantage of others' expertise, and allow businesses to focus on their core business. Outsourcing generally results in layoffs and some loss of control. In addition, outsourcing to companies in other nations may result in problems due to cultural or language differences, and increased shipping times for products.

17. Sustainability refers to service and production processes that use resources in ways that do not harm ecological systems that support both current and future human existence. Business organizations are increasingly facing sustainability regulations as well as pressures from environmental groups to act responsibly toward the environment. Some organizations are capitalizing on their "green" efforts in their advertising.

Taking Stock

1. When we decide to take an action there are usually consequences of that action and advantages and disadvantages of taking that action. In other words, before we make a decision, we must weigh the pros and cons of that decision. Trade-offs involve weighing of pros and cons regarding a particular decision. For example, if a decision-maker decides to increase the level of inventory, he or she has to consider the trade-off between increased level of customer service and the additional inventory carrying cost.

2. It is important for the various functional areas to collaborate because collaboration will lead to improved communication among the departments (functions) that in turn will improve the performance of the firm. Collaboration will reduce the chance of sub-optimization by a functional area due to the possibility that a particular functional area does not have enough information about the other areas and their constraints or decisions.

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3. Product and service technology allows a company to develop new products faster. Process technology enables a company to improve methods, procedures, and equipment used to produce goods and to provide services. Information technology enables companies to process large quantities of data quickly, to identify and track goods, to obtain point-of-sale data, and to communicate documents electronically to suppliers and customers.

Critical Thinking Exercises

1. There are many implications due to the differences between delivery of services and production of goods in manufacturing operations. For example, in a service firm, because the degree of customer contact is high, we have to make sure that employees are better trained in customer service than employees in a manufacturing industry. In a pure-service industry firm, we will build a lot of slack in scheduling because of the uncertainty of input.
2. That would depend on whether supply was too large or too small. If there is over capacity, try to increase demand through advertising and/or price reductions. If output (goods) can be stored, and future demand is expected to be higher, store excess output for future demand. If supply is too small, options might be to outsource, work overtime, or hire temporary workers. If there are few or no competitors, increase prices.

3. Innovations might be product or service related, or process related. These typically involve added cost and time for training and possibly new equipment or equipment changes, and potential changes for the supply chain (e.g., new suppliers, new delivery requirements, etc.). Process innovations can be disruptive to the workforce due to lower labor or machine time requirements, which may result in job loss, retraining, and/or lower worker morale. New products or services also probably will involve new advertising campaigns or other promotions, and the need for consumer education. Consumers will have to adjust to new products or services, and may have some difficulty if innovations entail increased complexity.

4. Managers should strive to find solutions in the best interests of all stakeholders. Technological change such as automation, robotics, and AI may increase productivity and lead to lower production costs. It may also replace human workers, which is a cost to the community and workforce. Applying an ethical framework can help with ethical decision making.

5. a. Business people make unethical decisions for a variety of reasons including the following:
    1. Pressure from superiors
    2. Pressure for stakeholders
    3. Not being informed
    4. Keeping the company afloat
   b. Their risks for unethical behavior including the following:
    1. getting reprimanded
    2. getting fired
    3. losing reputation

Case: Hazel

1. a. Number of yards, number of mowers, number of workers, time to mow a given area, regular maintenance, weather, length of growing season, time between necessary mowing.

   b. Mowers, parts, fuel, lubricants, fertilizer, chemicals, tools, etc.

   c. 1) Lawns, type of work, regular maintenance, workers.

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2) Weather, illness, overloads, emergencies, breakdowns.

d. Very important. Repeat business would be greatly affected and new business depends on word of mouth and reputation.

e. Oil change, blade sharpening, motor tune-up, mower and filter clean up, etc.

2. a. Timing: not too late but not too soon.

b. Coverage: does not leave streaks.

c. Length of grass: not too long but not too short depending on the weather and time of year.

d. Trimming and clean-up (details).

3. a. Responsibility, possibly security, fringe benefits, regularity of work hours, cannot pass the buck to someone else, decision-making, etc.

b. Responsibility, financial investment, work load, hiring of more employees, possibility of greater government regulation, personnel problems tend to increase and a general increase in all administrative work.

c. Risk involved in starting a new type of business using new technology and making it successful, learning curve involved in the area of e-commerce, additional workload, hiring of more employees in the area of Web design, computer programmers, etc.

4. Hazel has two options:

(1) Hazel could leave grass clippings on customers' lawns.

Advantages: Decreases her time per lawn. Grass clippings serve as a natural fertilizer. Hazel will not have to raise her prices.

Disadvantages: Customers may not like the mess left behind. In addition, over time, customers' lawns may build up thatch and have to be de-thatched.

(2) Hazel could take grass clippings to a landfill in a nearby city.

Advantages: Customers' lawns will not build up thatch. Customers will appreciate the appearance of their lawns.

Disadvantages: Hazel will need to raise prices due to her increased driving time and fuel expense.

5. Yes, since Hazel promised the part-time workers a bonus of $25 for good ideas and since this idea appears to hold promise, Hazel should honor her promise and pay the student $25. However, in the future she might want to make the bonus offer contingent on continuing employment at the time of implementation of the idea because after becoming aware that the idea was successfully implemented, the idea may become an attractive option for the competitor. In addition, she might want to include a confidentiality clause or a statement in the employment contract of the workers regarding not sharing proprietary information that may be useful to competition.

6. a. Weather, worker absences due to illness, vacations, extra requests from customers, new customers, and lost customers.

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b. At times she will have excess capacity while at other times she will have too little regular capacity to handle the workload.

c. Revise schedules, work overtime if regular capacity is insufficient and/or hire additional workers, if capacity exceeds demand layoff workers or find something else productive for them to do such as maintenance of equipment, training, etc.

7. Use hand tools instead of power tools, and recycle grass clippings. Factors to take into account include cost savings, quality, risk of injury, job completion times, training, reduction in pollution (air and noise), and energy savings.

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Chapter 1
Business Writing Exercises

Business writing exercises are intended to help you strengthen your written communication skills while applying what you have learned to issues of managerial concern. Use the following as a guide for writing business emails.

To: Students using this book
From: W. Stevenson
Subject: Business communication using email

Email is often used to convey information within an organization, but also used to communicate with people outside the organization, such as suppliers, distributors, and, sometimes, customers.

Business emails should communicate information in an organized, concise format. Even so, their length and degree of formality depend in part on their purpose, the amount of information to convey, and the intended audience. Thus, an email reporting financial information to the chief executive officer would be more formal and probably longer than an email to employees about the company picnic. A variety of email styles can be used. The style illustrated here is informational.

- Begin by stating the purpose of the email.
- Use the next paragraph to provide important details (e.g., a proposal, main reasons for a
- decision or suggestion, or to indicate why you agree or disagree with a proposal or idea).
- Use the third paragraph for minor details.
- In a long email, you may want to end by again stating your position on the subject.

1. Suppose that your boss, Tony Roman, who is the operations manager of your company, sends you an email asking for your input on holding joint planning sessions with people from marketing and finance. A portion of that email follows:

Gail in Marketing and Jim in Finance have been bugging me lately about holding joint meetings. They're real gung-ho on this. But I'm a little concerned about agreeing to it. I don't want them to get the impression that they can come in here and tell us what to do. They don't really understand what it is we do or the kinds of problems we have. I'm sure they think we aren't doing as well as we could, but that's not any of their concern. I don't know why they just don't concentrate on what they do, and leave operations to us.

Compose an email that summarizes the potential benefits of holding joint planning meetings with Marketing and Finance.

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Business Writing Exercises

2. Assume the role of a mid-level manager of a small company. The CEO, Rachael Barker, wants your views on a new computer network she is considering. The current network is adequate, but the new one will provide much greater capabilities for managing files, word processing, and accessing the database.

   Write a one-page email in which you list (1) the key factors that you believe must be taken into account in making the decision, and (2) the trade-offs that must be considered.

3. Write a brief email, responding to this one:

To: (Your name), V.P. of Manufacturing@company.com
From: Deiter Smith, Production Supervisor, second shift
Subject: Accidental spill

We recently experienced an accidental discharge of mildly toxic chemicals into the creek that runs past one of our plants. Although there have been a few complaints of contamination from downstream property owners, I don't think that the spill can be traced back to our plant. Besides, other nearby companies have been getting away with more serious abuses for years, so let them take the heat.

I am confident that this is a one-time occurrence, so let's not blow the whole thing out of proportion. If we were to have to pay for a cleanup, this would have a big impact on quarterly profits, and our stockholders wouldn't like that one bit. Furthermore, in light of our recent efforts to promote an image of an environmental-friendly company, I say we should definitely keep quiet about this and let things die down. What do you think?

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4. Go to the web site for this book (www.mhhe.com/stevenson14e), click Additional Student Resources, and then briefly look over the items in the menu. Write an email to your instructor on which of the items on the list you feel will be most helpful to you in this course.

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