

Operations Management

Operations Strategy and Competitiveness

4.1 Strategic Role Of Technology

Over the last decade we have seen an unprecedented growth in technological capability. Technology has enabled companies to share real-time information across the globe, to improve the speed and quality of their processes, and to design products in innovative ways. Companies can use technology to help them gain an advantage over their competitors. For this reason technology has become a critical factor for companies in achieving a competitive advantage.

In fact, studies have shown that companies that invest in new technologies tend to improve their financial position over those that do not. However, the technologies a company acquires should not be decided on randomly, such as following the latest fad or industry trend. Rather, the selected technology needs to support the organization's competitive priorities, as we learned in the example of FedEx. Also, technology needs to be selected to enhance the company's core competencies and add to its competitive advantage.

4.2 Types of Technologies

There are three primary types of technologies. They are differentiated based on their application, but all three areas of technology are important to operations managers. The first type is *product technology*, which is any new technology developed by a firm. An example of this would include Teflon, the material used in no-stick fry pans. Teflon became an emerging technology in the 1970s and is currently used in numerous applications. Other examples include CDs and flat-screened monitors. Product technology is important as companies must regularly update their processes to produce the latest types of products.

A second type of technology is *process technology*. It is the technology used to improve the process of creating goods and services. Examples of this would include computer aided design (CAD) and computer-aided manufacturing (CAM). These are technologies that use computers to assist engineers in the way they design and manufacture products. Process technologies are important to companies, as they enable tasks to be accomplished more efficiently. The last type

of technology is *information technology*, which enables communication, processing, and storage of information. Information technology has grown rapidly over recent years and has had a profound impact on business. Just consider the changes that have occurred due to the Internet. The Internet has enabled electronic commerce and the creation of the virtual marketplace and has linked customers and buyers. Another example of information technology is enterprise resource planning (ERP), which functions via large software programs used for planning and coordinating all resources throughout the entire enterprise. ERP systems have enabled companies to reduce costs and improve responsiveness but are highly expensive to purchase and implement. Consequently, as with any technology, investment in ERP needs to be a strategic decision.

4.3 Technology as a Tool for Competitive Advantage

Technology can be acquired to improve processes and maintain up-to-date standards. Technology can also be used to gain a competitive advantage. For example, by acquiring technology a company can improve quality, reduce costs, and improve product delivery. This can provide an advantage over the competition and help gain market share. However, investing in technology can be costly and entails risks, such as overestimating the benefits of the technology or incurring the risk of obsolescence due to rapid new inventions.

Technology should be acquired to support the company's chosen competitive priorities, not just to follow the latest market fad. Also, technology may require the company to rethink its strategy. For example, when the Internet became available, it was generally assumed that it would replace traditional ways of doing business.

This has not turned out to be the case. In fact, for many companies the Internet has enhanced traditional methods. Physical activities such as shipping, warehousing, transportation, and even physical contact must still be performed. For example, pharmacy chains such as Walgreens and CVS have found that although customers place orders over the Internet, they prefer to pick them up in person. Similarly, the airlines have discovered that an easy-to-use Web site can increase airline bookings. However, successful use of a technology such as the Internet requires companies to develop strategies that integrate the technology. As you can see, acquiring technology is an important strategic decision for companies. Operations managers must consider many factors when making a purchase decision.

Sound business strategy and supporting operations strategy make an organization more competitive in the marketplace. But how does a company measure its competitiveness? One of the most common ways is by measuring productivity. In this section we will look at how to measure the productivity of each of a company's resources as well as the entire organization.

4.4 Measuring Productivity

Recall that operations management is responsible for managing the transformation of many inputs into outputs, such as goods or services. A measure of how efficiently inputs are being converted into outputs is called **productivity**. Productivity measures how well resources are used. It is computed as a ratio of outputs (goods and services) to inputs (e.g., labor and materials). The more efficiently a company uses its resources, the more productive it is.

4.5 Interpreting Productivity Measures

To interpret the meaning of a productivity measure, it must be compared with a similar productivity measure. For example, if one worker at a pizza shop produces 17 pizzas in two hours, the productivity of that worker is 8.5 pizzas per hour. This number by itself does not tell us very much. However, if we compare it to the productivity of two other workers, one who produces 7.2 pizzas per hour and another 6.8 pizzas per hour, it is much more meaningful.

We can see that the first worker is much more productive than the other two workers. But how do we know whether the productivity of all three workers is reasonable? What we need is a standard. It is also helpful to measure and compare productivity over time. Let's say that we want to measure the total productivity of our three pizza makers (our "labor") and we compute a labor productivity measure of 7.5 pizzas per hour. This number does not tell us much about the workers' performance. However, if we compare weekly productivity measures over time, perhaps over the last four weeks, we get much more information.

Now we see that the workers' productivity is improving over time. In fact, productivity changed from 5.4 to 7.5 pizzas per labor-hour, resulting in an increase of $7.5/5.4 = 1.39$, or an increase of 39 percent. But what if we find out that our main competitor, a pizzeria down the street, has a productivity of 9.5 pizzas per labor-hour? This productivity rate is 26.7 percent ($9.5/7.5 = 1.267$) higher than our productivity in week 4. Suddenly we know that even though our productivity is going up, it should be higher. We may have to analyze our processes and increase our productivity in order to be competitive. By comparing our productivity over time and against similar operations, we have a much better sense of how high our

productivity really is. When evaluating productivity and setting standards for performance, we also need to consider our strategy for competing in the marketplace—namely, our competitive priorities. A company that competes based on speed would probably measure productivity in units produced over time. However, a company that competes based on cost might measure productivity in terms of costs of inputs such as labor, materials, and overhead. The important thing is that our productivity measure provides information on how we are doing relative to the competitive priority that is most important to us.

4.6 Productivity and Competitiveness

Productivity is essentially a scorecard of how efficiently resources are used and a measure of competitiveness. Productivity is measured on many levels and is of interest to a wide range of people. As we showed in earlier examples, productivity can be measured for individuals, departments, or organizations. It can track performance over time and help managers identify problems. Similarly, productivity can be measured for an entire industry and even a country.

The economic success of a nation and the quality of life of its citizens are related to its competitiveness in the global marketplace. Increases in productivity are directly related to increases in a nation's standard of living. That is why business and government leaders continuously monitor the productivity at the national level and by industry sectors.

Productivity in the United States had been increasing for over 100 years. Then in the 1970s and 1980s productivity dropped, even lagging behind that of other industrial nations. Fortunately, productivity rebounded in the mid- and late 1990s. Today, companies understand the importance of competitiveness, and productivity in the United States continues to improve.

4.7 Productivity and the Service Sector

Service sector companies have a unique challenge when trying to measure productivity. The reason is that traditional productivity measures tend to focus on tangible outcomes, as seen with goods-producing activities. Services primarily produce intangible products, such as ideas and information, making it difficult to evaluate quality. Consequently, accurately measuring productivity improvements can be difficult. A good example of the difficulty in using traditional productivity measures in the service sector is the emergency room. Here inputs are the medical staff, yet outputs may not exist if no one needed treatment on that shift. In that case, by traditional measures, productivity would be zero! The real issue in this type of environment is the level of readiness, and the challenge is to adequately

measure it. As we discussed previously, employment in the service sector of the U.S. economy has grown rapidly over the past 30 years. Unfortunately, productivity gains in this sector have been much lower than those of manufacturing. It is hoped that advancements in information technology will help standardize services and accelerate productivity in this sector.

4.7.1 Operations Strategy Within OM: How It All Fits Together

We have learned that the strategic decisions of a firm drive its tactical decisions. Operations strategy decisions are critical in this process because they serve as a linkage between the business strategy and all the other operations decisions. Recall that operations strategy provides a plan for the OM function that supports the business strategy. In turn, decisions regarding operations strategy directly impact decisions on organizational structure and infrastructure of the company. As in the example of Southwest Airlines, an operations strategy that focuses on cost competition would translate into specific operations decisions that eliminate all frills from the system. In subsequent chapters of this book, we will study specific decisions that pertain to organizational structure and infrastructure. We will see that these decisions are decisions impact each other.

4.7.2 Operations Strategy Across the Organization

The business strategy defines the long-range plan for the entire company and guides the actions of each of the company's business functions. Those functions, in turn, develop plans to support the business strategy. However, in defining their individual strategies, it is important for the functions to work together and understand each other's needs.

4.7.3 Marketing

Marketing identifies target markets, studies competition, and communicates with customers. In developing its own strategy, marketing needs to fully understand the capabilities of the operations function, the types of resources being used, and the way those resources are utilized. Otherwise, marketing's strategy could entail making promises that operations cannot deliver. In turn, marketing needs to communicate to operations all its observed and anticipated market changes.

4.7.4 Finance

Finance develops financial plans to support the business strategy. However, since it is the operations function that manages all the organization's resources, the financial plans in effect support operations activities. Before it can develop its own strategy, finance needs to communicate with operations in order to understand the financial requirements of planned resources. In turn, operations managers cannot

fully develop a strategy until they have a clear understanding of financial capabilities. The strategies of all the business functions need to support each other in achieving the goals set by the business strategy and are best developed through a team approach.