Introduction to Operation Management

010 Directing the operation

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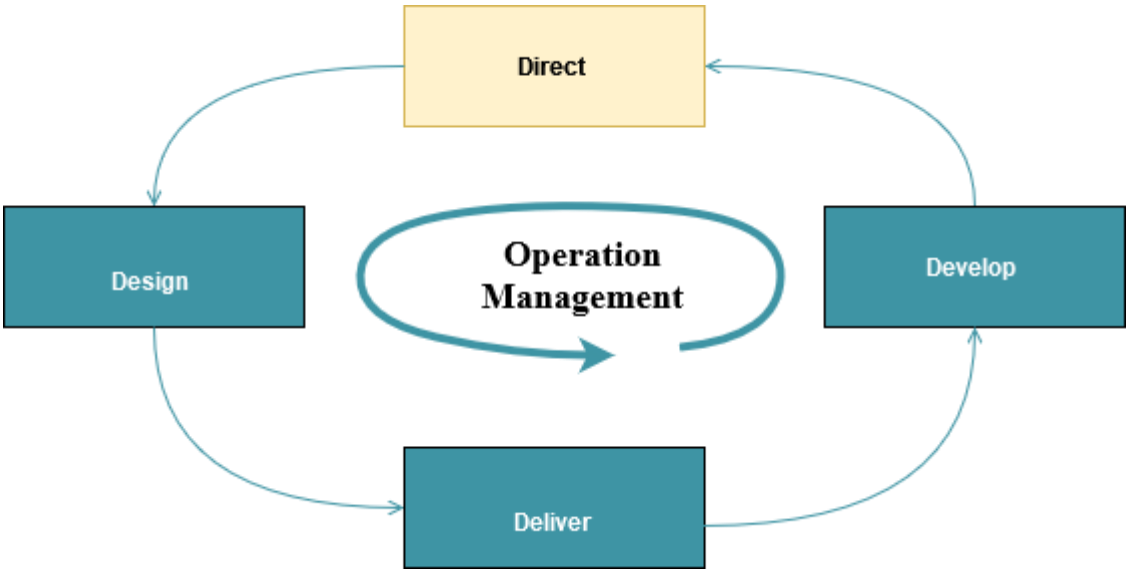
2 Operations strategy and competitiveness



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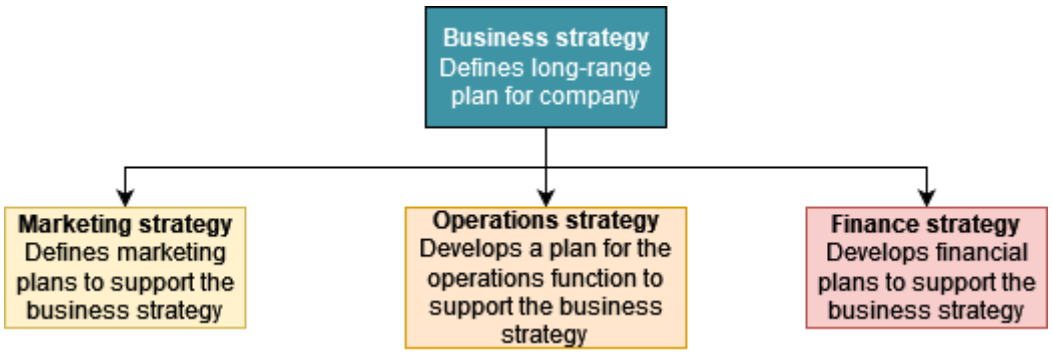
Operation strategy

The purpose of an operations strategy is to outline a framework for the operations function, ensuring that it effectively utilizes its resources. The operations strategy outlines the guidelines and action plans for deploying the organization's resources in a way that aligns with and supports its overarching competitive strategy.

It's important to recognize that the operations function is tasked with managing the resources required to produce the company's products and services. The operations strategy is a comprehensive plan that dictates how these resources should be designed and utilized to reinforce the business strategy. This encompasses decisions about facility locations, sizes, and types; the skills and capabilities of the workforce; the adoption of technology; the need for specialized processes and equipment; and the methods for ensuring quality control. The operations strategy must be in harmony with the company's business strategy and facilitate the achievement of its long-term objectives.

FIGURE 1. Relationship between the business strategy and the functional strategy



Competitiveness

Operations managers must collaborate with the marketing department to gain insights into the competitive landscape of the company's market. This understanding is crucial for determining which competitive priorities to focus on. There are four main categories of competitive priorities that companies can choose to emphasize:

Cost: Competing on cost involves offering products at a low price relative to competitors. The operations strategy in this case is to develop a resource plan that supports cost efficiency without compromising quality. A low-cost strategy can lead to higher profit margins even with competitive pricing. Operations functions in cost-competitive companies might focus on process efficiencies, economies of scale, and cost-saving measures.

Quality: Quality is a priority for many companies and customers, but it can be subjective. Some may define quality as durability, while others may see it as high performance. Operations strategies that prioritize quality will focus on the dimensions of quality valued by their customers, which include high-performance design and consistency in goods

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and services. Operations must ensure that products and services consistently meet design specifications and customer expectations.

Time: Speed is increasingly important in today's market. Companies are striving to deliver high-quality products quickly. Operations strategies that prioritize time focus on rapid delivery, on-time delivery, and development speed. The operations function must streamline processes, leverage technology, and maintain a flexible workforce to meet these time-based competitive priorities.

Flexibility: In rapidly changing markets, the ability to adapt to shifts in customer needs and expectations can be a key competitive advantage. Flexibility has two dimensions: product flexibility, which is the ability to offer a wide variety of goods or services and customize them to individual customer needs, and volume flexibility, which is the ability to quickly scale production up or down in response to demand changes. Operations strategies that prioritize flexibility will design systems that can easily introduce new products, discontinue underperforming ones, and adjust production volumes as needed.

Each of these competitive priorities requires a tailored operations strategy that aligns with the company's business strategy and market position. Operations managers must carefully consider these priorities when planning and managing the operations function to ensure that the company can effectively compete in its chosen areas.

(Reid, R. D., Sanders, R. N., Operations Management An Integrated Approach)

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Productivity

Creating goods and services involves converting resources into final products and services. The more efficiently we perform this transformation, the more productive we become, and the greater the value we add to the goods and services we offer. Productivity is the ratio between the outputs (goods and services) and one or more inputs (resources such as labor and capital).

The operations manager's job is to improve the ratio of outputs to inputs. Enhancing productivity means increasing efficiency.

(Heizer, J., Render, B., 2013).

Productivity is indeed a critical concept in operations management and is used as a measure of the efficiency with which an organization utilizes its resources to produce goods and services.

The formula for productivity is typically expressed as a ratio:

$$\text{Productivity} = \frac{\text{Output}}{\text{Inputs}}$$

Where:

- Output refers to the goods and services produced by the organization.
- Input refers to the resources used to produce the output, which can include labor, materials, energy, capital, and other resources.

Productivity can be measured in various ways depending on the type of inputs and outputs being considered:

- Labor Productivity This measures the output produced per unit of labor input, often per labor hour or per employee.

$$\text{Labor Productivity} = \frac{\text{Total Output}}{\text{Total Labor Hours}}$$

- Materials Productivity This measures how efficiently materials are used to produce output.

$$\text{Materials Productivity} = \frac{\text{Total Output}}{\text{Total Materials Used}}$$

- Energy Productivity This measures the output produced per unit of energy consumed.

$$\text{Energy Productivity} = \frac{\text{Total Output}}{\text{Total Energy Used}}$$

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- Capital Productivity This measures the output produced per unit of capital investment.

$$\text{Capital Productivity} = \frac{\text{Total Output}}{\text{Total Capital Employed}}$$

Total Factor Productivity (TFP) This measures the output relative to the combined input of multiple factors, such as labor and capital.

$$\text{TFP} = \frac{\text{Total Output}}{\text{Combined Inputs}}$$

Improving productivity means increasing the output for the same or a lesser amount of input or maintaining the same level of output using fewer inputs. Managers strive to enhance productivity as it can lead to lower costs, higher competitiveness, better customer service, and increased profitability. They may employ various strategies to improve productivity, such as adopting new technologies, streamlining processes, training employees, and optimizing resource allocation.

Partial measures	$\frac{\text{Output}}{\text{Labor}}$	$\frac{\text{Output}}{\text{Machine}}$	$\frac{\text{Output}}{\text{Capital}}$	$\frac{\text{Output}}{\text{Energy}}$
Multifactor measures	$\frac{\text{Output}}{\text{Labor} + \text{Machine}}$		$\frac{\text{Output}}{\text{Labor} + \text{Capital} + \text{Energy}}$	
Total measures	$\frac{\text{Goods or services produced}}{\text{All inputs used to produce them}}$			

FIGURE 2. Some examples of different types of productivity measures

Computing productivity

Determine the productivity for these cases:

1. Four workers installed 720 square yards of carpeting in eight hours.

   $\text{Productivity} = \frac{\text{Yards of carpet installed}}{\text{Labor hours worked}} = \frac{720 \text{ square yard}}{4 \text{ workers x } 8 \frac{\text{hours}}{\text{worker}}}$

2. A machine produced 70 pieces in two hours. However, two pieces were unusable.

   $\text{Productivity} = \frac{\text{Usable pieces}}{\text{Production time}} = \frac{70-2=68 \text{ usable pieces}}{2 \text{ hours}} = 34 \text{ pieces/hours}$

Calculations of multifactor productivity measure inputs and outputs using a common unit of measurement, such as cost. For instance, the measure might use cost of inputs and units of the output:

$$\frac{\text{Quantity of production}}{\text{Labor cost} + \text{Materials cost} + \text{Overhead}}$$

Note: The unit of measure must be the same for all factors in the denominator.

Computing multifactor productivity

Determine the multifactor productivity for the combined input of labor and machine time using the following data:

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Output: 7,040 units

Input

- Labor: 1,000 €
- Materials: 520 €
- Overhead: 2,000 €

$$\text{Multifactor productivity} = \frac{\text{Output}}{\text{Labor+Materials+Overhead}} = \frac{\text{7040 units}}{\text{1000 € x 520 € x 2000 €}} = 2 \text{ units per euro input}$$

(Stevenson, J. W., Operations Management)

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Exercise 1

Productivity can be measured in various ways, such as through labor, capital, energy, material usage, etc. At Modern Lumber, Inc., Art Binley, the president of this wooden apple crate manufacturing company that sells to farmers, has been able to produce 240 crates for every 100 logs used with his current equipment. Currently, he buys 100 logs per day, and each log requires 3 hours of labor to process. Binley believes he can hire a professional buyer who can procure higher quality logs at the same cost. If so, he can increase his production to 260 crates for every 100 logs. His labor hours would increase by 8 per day. What will be the impact on productivity (measured in crates per labor hour) if he hires the buyer?

$$\left[\frac{100 \text{ logs}}{} \times 3 \text{ } \left\{\frac{\text{hours}}{\text{log}}\right\} = \frac{300 \text{ hours}}{}\right]$$

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Business strategy

Indeed, the development of a company's business strategy is a multifaceted process that involves a deep understanding of its mission, the market environment, and its core competencies.

Mission

The mission statement articulates the company's purpose and the value it aims to provide to its customers, employees, and stakeholders. It serves as a guiding principle for decision-making and sets the direction for the company's long-term goals. The mission helps to align the organization's activities and can be a source of inspiration and motivation for the workforce.

- What business will the company be in ("selling personal computers," "operating an Italian restaurant")?
- Who will the customers be, and what are the expected customer attributes "homeowners," "college graduates")?
- How will the company's basic beliefs defi ne the business ("gives the highest customer service," "stresses family values")?

Market environment

This involves systematically examining the external environment to identify opportunities and threats that could impact the business. Environmental scanning helps managers anticipate changes and adapt their strategies to maintain competitiveness.

Opportunities:

- Market Gaps: Identifying unmet customer needs or underserved market segments that the company can target.
- Technological Advances: Recognizing new technologies that can improve products, services, or processes.
- Regulatory Changes: Anticipating changes in laws or regulations that may open up new markets or allow for new ways of doing business.
- Partnerships: Finding potential partners for collaboration, which could lead to new markets, shared resources, or enhanced capabilities.
- Global Trends: Understanding global economic and social trends that could lead to new business models or market opportunities.

Threats:

- Competition: Monitoring existing competitors and new entrants that could erode the company's market share.
- Technological Disruption: Being aware of technological innovations that could make the company's products or services obsolete.
- Economic Fluctuations: Preparing for economic downturns or instability that could affect demand for the company's offerings.
- Supply Chain Risks: Identifying vulnerabilities in the supply chain, such as reliance on a single supplier or geopolitical risks in certain regions.

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- Regulatory Risks: Staying informed about potential regulatory changes that could impose restrictions or additional costs on the company.

Core competencies

Core competencies are the unique strengths and capabilities that give a company a competitive advantage in the market. These may include specialized knowledge, proprietary technologies, efficient processes, strong brand recognition, customer relationships, or a skilled workforce. Understanding and leveraging core competencies enable a company to differentiate itself from competitors and create value for customers.

1. Workforce	Highly trained
	Responsive in meeting customer needs
	Flexible in performing a variety of tasks
	Strong technical capability
	Creative in product design
2. Facilities	Flexible in producing a variety of products
	Technologically advanced
	An efficient distribution system
3. Market Understanding	Skilled in understanding customer wants and predicting market trends
4. Financial Know-how	Skilled in attracting and raising capital
5. Technology	Use of latest production technology
	Use of information technology
	Quality control techniques

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Operations strategy

The operations strategy is a critical component of the overall business strategy, as it translates the company's strategic objectives into actionable plans within the operations function. The competitive priorities you've outlined—cost, quality, time, and flexibility—are the key areas where operations can contribute to creating a competitive advantage. Let's delve into each of these competitive priorities and how they can be leveraged in operations strategy:

1. Cost:

Operations strategies focused on cost leadership aim to be the lowest-cost producer in the industry without sacrificing acceptable quality levels. Cost reduction can be achieved through process improvements, economies of scale, supply chain optimization, waste reduction, and efficient labor management. The challenge is to maintain cost leadership while still meeting other competitive priorities such as quality and delivery performance.

2. Quality:

Quality can be a differentiator in the market, with operations strategies focusing on delivering products or services that exceed customer expectations. High-performance design involves creating products with superior features, durability, and serviceability. Consistency in quality ensures that every product or service delivered meets the same high standards, leading to customer trust and loyalty. Operations must implement rigorous quality control systems, continuous improvement programs, and employee training to maintain high quality.

3. Time:

Speed and timeliness are increasingly important in today's fast-paced market. Rapid delivery and on-time delivery are critical for customer satisfaction and can be a significant competitive advantage. Development speed is essential for innovation-driven industries where being first to market can capture significant market share. Operations strategies must focus on reducing lead times, optimizing workflows, and ensuring reliability in delivery schedules.

4. Flexibility:

Flexibility allows a company to respond quickly to changes in customer demand, market conditions, and technological advancements. Product flexibility enables the operation to offer a wide range of products, customize products to customer specifications, and rapidly introduce new products. Volume flexibility allows the operation to scale production up or down efficiently in response to demand fluctuations. Operations strategies must incorporate flexible manufacturing systems, cross-trained employees, and adaptable supply chains to achieve this priority.

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To develop an effective operations strategy, companies must carefully consider which competitive priorities align best with their overall business strategy and market position. It's often challenging to excel in all areas simultaneously, so companies typically choose to focus on one or two priorities that will provide the most significant competitive edge.

For example, a discount retailer might prioritize cost and quality, ensuring that they can offer products at the lowest possible price while maintaining a level of quality that meets customer expectations. On the other hand, a luxury car manufacturer might focus on quality and flexibility, delivering high-performance vehicles with customizable options to cater to individual customer preferences.

In implementing an operations strategy, companies must consider the following:

Trade-offs: There are inherent trade-offs between the different competitive priorities. For instance, increasing product variety (flexibility) might lead to higher costs. Companies need to understand these trade-offs and make strategic choices that align with their business goals.

Capability Development: To excel in chosen competitive priorities, companies must develop specific capabilities within their operations. This could involve investing in new technologies, training employees, redesigning processes, or reconfiguring the supply chain.

Alignment Across Functions: Operations strategy must be aligned with other functional strategies, such as marketing, finance, and human resources, to ensure a cohesive approach to achieving the business strategy.

Performance Measurement: Companies need to establish metrics to measure performance against their competitive priorities. This allows for continuous monitoring and improvement of operations.

Strategic Fit: The chosen competitive priorities must fit with the needs and desires of the target market. For example, if customers value speed and customization, the operations strategy should focus on reducing lead times and increasing product flexibility.

Dynamic Adaptation: Operations strategy is not static; it must evolve in response to changes in the business environment, technology, and customer preferences. Companies must be prepared to reassess and adjust their operations strategy as needed.

Ultimately, the operations strategy is about making deliberate choices on how to configure the operations function to support the business strategy effectively. By excelling in the competitive priorities that matter most to their customers and to their market position, companies can build a strong competitive advantage that is difficult for competitors to replicate.

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