CHAPTER 1: OPERATIONS

1.1. WHAT IS OPERATIONS MANAGEMENT?

Operations Management deals with the production of goods and services that we buy and use every day. It is the process that enables organizations to achieve their goals through efficient acquisition and utilization of resources. Every organization, whether public or private, manufacturing or service, has an operations function. The management of that function is the focus of this book.

Industrial societies are societies of organizations, ranging from sports teams, schools, and churches to hospitals, legal institutions, military complexes, and large and small businesses. These formal groups enable people to produce a vast range of products and services that would be beyond the capabilities of the individual. Operations management is crucial to each type of organization because only through successful management of people, capital, and materials can an organization meet its goals. Thus every organization has an operations function.

At one time, operations management referred primarily to manufacturing production. The emergence of a wide range of nonmanufacturing business activities, however, broadened the scope of the operations management function. Today term ***operations management*** refers to the systematic direction and control of the processes that transform inputs into finished goods and services. This function is essential to systems producing goods and services in both profit and nonprofit organizations.

As Figure 1 illustrates, operations management is part of a production system. Inputs include human resources (workers and managers), capital (equipment and facilities), materials, land, and energy. The circles in the center of the figure represent the operations through which products, services, or customers may pass during the transformation process. Because operations encompass a variety of different situations, the types of transformations vary as well.

For example, in a factory the transformations would be physical or chemical. At an airline it would be locational. At a school it would be educational. And at a hospital it would be physiological. The operations vary accordingly: a machine center, two or more airport terminals, a classroom, and a hospital room.

The dashed lines in Figure 1 represent two special types of inputs: participation by customers or clients and information from internal and external sources. Participation by customers or clients occurs when they not only receive the outputs but also take and active part in the transformation process itself, such as students participating in a class discussion. Information from both internal and external sources includes internal reports on customer service or inventory management, government reports on economic trends, or telephone calls from suppliers concerning past-due shipments. The operations manager needs all types of information to manage the production system.

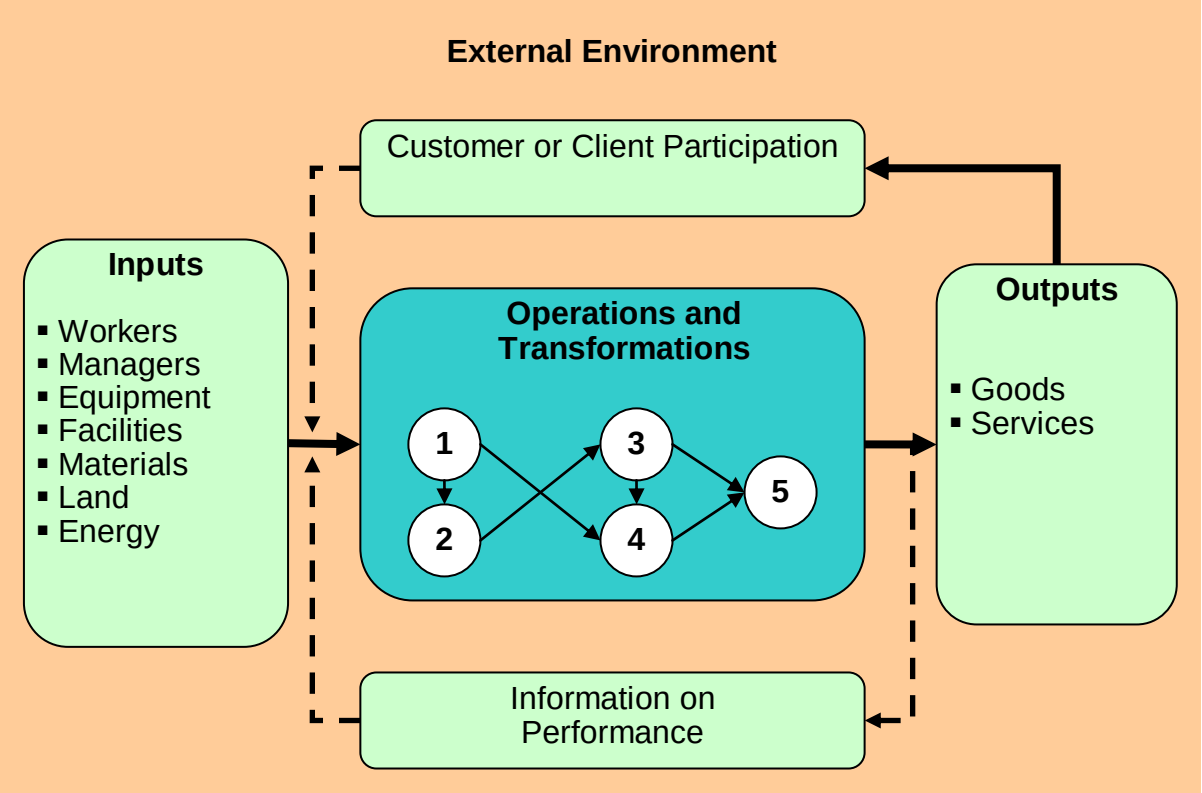

Figure 1 The Operations Management System

Outputs from manufacturing operations include goods and auxiliary services. Outputs from service operations range from delivered mail (the post office) to a recovered patient (a hospital). Even though inputs and outputs vary among different industries, the underlying transformation process holds true for all production systems. Table 1 shows specific inputs and outputs for operations systems in three different types of organizations

Table 1 / Examples of Inputs and Outputs

Organization	Input	Output
Jewelry Store	Merchandise Store building Sales clerks Registers Jeweler Customers	Customer Sales
Manufacturing Plant	Machines Plant Raw materials Workers Managers	Consumer Goods Materials for purchase by other firms
University	Faculty and staff Classrooms Library Supplies Students	Graduates Research Public Service

1.2. DIFFERENCES BETWEEN MANUFACTURING AND SERVICES

Operations management initially focused on manufacturing organizations and was thus called *industrial management* or *production management*. Service organizations were largely ignored and were performed almost at handicraft levels. Times have changed. Today's managers can apply concepts of job design, facility location, capacity, layout, inventory, and scheduling to both service organizations and manufacturing firms.

The differences between manufacturing and service organizations are real, but they also are a matter of degree. For example, more and more, manufacturing firms offer services and a decreasing proportion of their value added is due strictly to the transformation of materials. For the sake of discussion we've organized these differences into eight categories, shown in Table 2. Because there are exceptions to every rule, these distinctions actually represent the ends of a continuum.

Table 2 / Continuum of Characteristics of Goods and Services Producers

	More like Goods Producer ⟷	More like Service Producer
1.	Physical, durable product	Intangible, perishable product
2.	Output can be inventoried	Output cannot be inventoried
3.	Low customer contact	High customer contact
4.	Long response time	Short response time
5.	Regional, national, or international markets	Local markets
6.	Large facilities	Small facilities
7.	Capital intensive	Labor intensive
8.	Quality easily measured	Quality not easily measured

The first distinction arises from the physical nature of the product. Manufactured goods are *physical, durable* products. Services are *intangible* and *perishable* – often ideas, concepts, or information. The distinction between a goods producer and a service producer is cloudy. Service organizations normally provide a package of goods and services. For example, customers expect service as well as food at a restaurant and service as well as quality goods from a retailer.

Durable goods are outputs that can be *inventoried*. They can be stored and transported in anticipation of future demand. Thus with durable goods operations managers can cope with peaks and valleys in demand by creating inventories and smoothing output levels. By contrast services cannot be preproduced. Without inventories as a cushion against erratic customer demand, service organizations are more constrained by time. This constraint doesn't mean that inventories are of no importance to service systems. Hospitals, for example, must maintain an appropriate supply of medications. The difference is that these inventories are inputs, not outputs. As inputs, they must undergo further transformations during provision of the service.

The third distinction is *customer contact.* Most customers for manufactured products have little or no contact with the production system. Primary customer contact is left to distributors and retailers. However, in many service organizations the customers themselves are inputs. For example, at a college the student studies, attends lectures, takes exams, and finally receives a diploma. Hospitals, jails, and entertainment centers are other places where the customer is present during the most of the service operations. Some service operations have low customer contact

at one level of the organization and high customer contact at other levels. For example, the branch offices of postal, banking, and insurance organizations deal with customers daily, but their home offices have little direct customer contact. Similarly, the backroom operations of a jewelry store require little customer contact, whereas the sales counter involves a high degree of contact.

A related distinction is *response time* to customer demand. Manufacturers generally offer lead times in days or weeks. Many services, on the other hand, must be offered within minutes of customer arrival. The purchaser of a forklift truck may be willing to wait 16 week for delivery. By contrast shoppers at the local supermarket grow impatient if they must wait more than five minutes in a checkout line. Since customers usually arrive at a time of their choosing, service operations may have difficulty matching capacity with demand. Furthermore, arrival patterns may fluctuate on a daily or even hourly basis – creating even more short-term demand uncertainty.

Market volume and availability of transportation and distribution facilities all affect the *location* and *size* of an operation. Manufacturing facilities often serve regional, national, or even international markets. This generally means larger facilities, more automation, and greater capital investment that for service facilities. In general, service cannot be shipped to distant locations. Thus service organizations requiring direct customer contact must locate relatively near their customers.

A final distinction is *quality*. As manufacturing systems tend to have tangible products and less customer contact, quality is easier to measure. Service systems, on the other hand, generally produce a mixture of tangibles and intangibles. Moreover, individual preferences affect assessments of quality, making objective measurement difficult. For example, one customer might value a friendly chat with the sales clerk during a purchase, whereas another might assess quality by the speed and efficiency of a transaction.

1.3. THREE VIEWS OF OPERATIONS MANAGEMENT

We have mentioned the importance of operations in achieving organizational goals. We have also described how operations management affects competitive advantage in both the manufacturing and service sectors. Here we will explore operations management from three different perspectives: as a function, as a profession, and as a set of decisions.

As a Function

Figure 2 shows that operations can be identified in every organization and is but one of several functions within an organization. Large companies generally assign each function to a separate department, which assumes responsibility for certain activities. However, many of these functions are interrelated. Thus, it is essential that top management coordinate them and establish an effective communication network to achieve organizational goals. Owners of small businesses might choose to eliminate separate departments and manage one or more functions, such as marketing or operations, themselves.

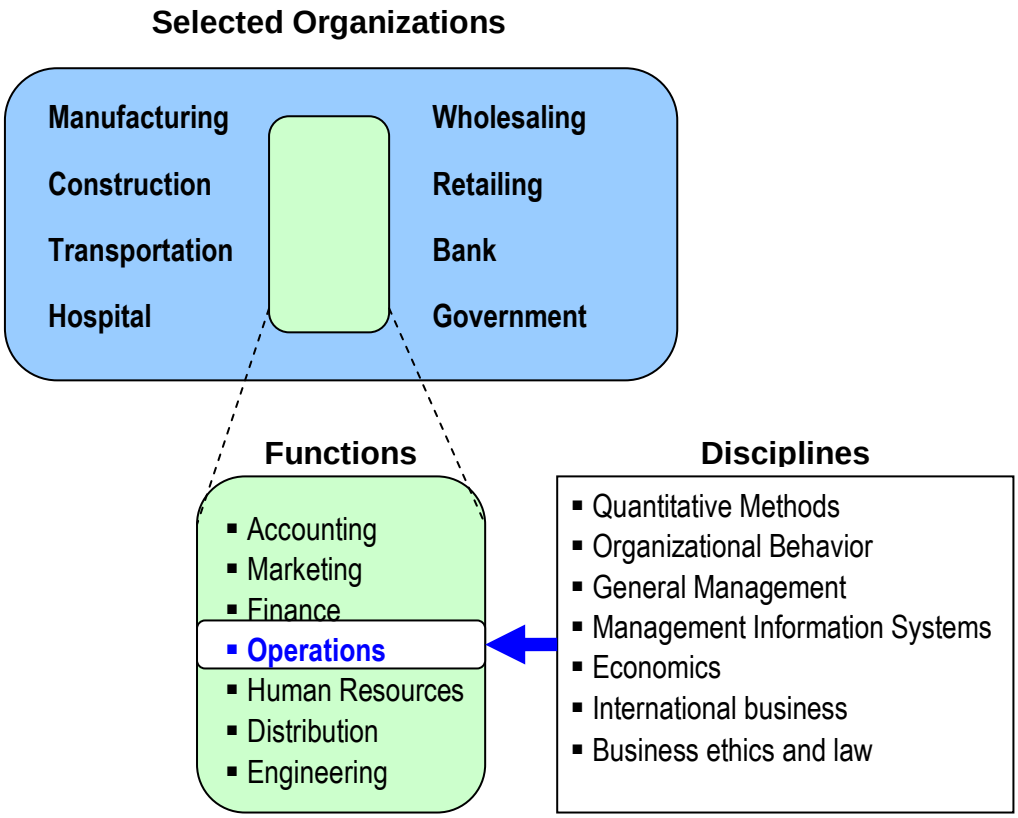

Figure 2 Operations Management as a Function

In large organizations an operations or production department is usually responsible for the operations function, or for the actual transformations of inputs into finished products and services. The *accounting* function collects, summarizes, and interprets financial information. *Marketing* is responsible for generating demand for the company's output. *Finance* secures and invests the company's capital assets. *Human resources* (or personnel) hires and trains employees. *Distribution* transports inputs and outputs. *Engineering* develops product and service designs and

production methods. Some organizations, however, never need to perform certain functions. Other organizations find it economical to contract for a function, such as engineering, when they need it, rather than maintain an in-house department.

Operations managers draw on many disciplines and techniques (see right side of Figure 2). Quantitative analysis provides modeling techniques to help solve production problems. Computer and other electronic information systems help manage vast quantities of data. Concepts of organizational behavior aid in designing jobs and managing the work force. Studies of international business methods provide useful ideas about facility location, technology, and inventory management. Thus most operations managers must be generalists. They must also be able to communicate with specialists and be comfortable with a variety of complex concepts and analytic techniques.

As a Profession

Operations has emerged as and excellent career path to upper management positions in many organizations. In 1984, biographies of 237 chief executive officers showed that 36% learned the ropes in production. This proportion compares favorably with those for chief executives with backgrounds in finance (22%), marketing (21%), research (10%), and law (9%). A more recent survey of manufacturing firms showed similar results, with more than 45% of the chief executives appointed having operations background and only 15% coming up through finance. Such statistics may be one reason why it is becoming more fashionable for business students to join a firm that makes a tangible product. The upward mobility of skilled operations managers is closely linked to the current challenge of global competition. Promotions tend to go to managers who have successfully met challenging problems.

Figure 3 shows a typical organization chart for a manufacturing firm. Each major business function reports to the chief executive officer (CEO). The operations function is further broken down in the figure to show the wide range of job opportunities there. In manufacturing firms, the head of operations generally holds the title vice president of manufacturing (or production or operations). The corresponding title in a service organizations might be vice president (or director) of operations. Reporting to the vice president are the managers of other production

departments, such as materials, industrial engineering, quality assurance, and plant supervision.

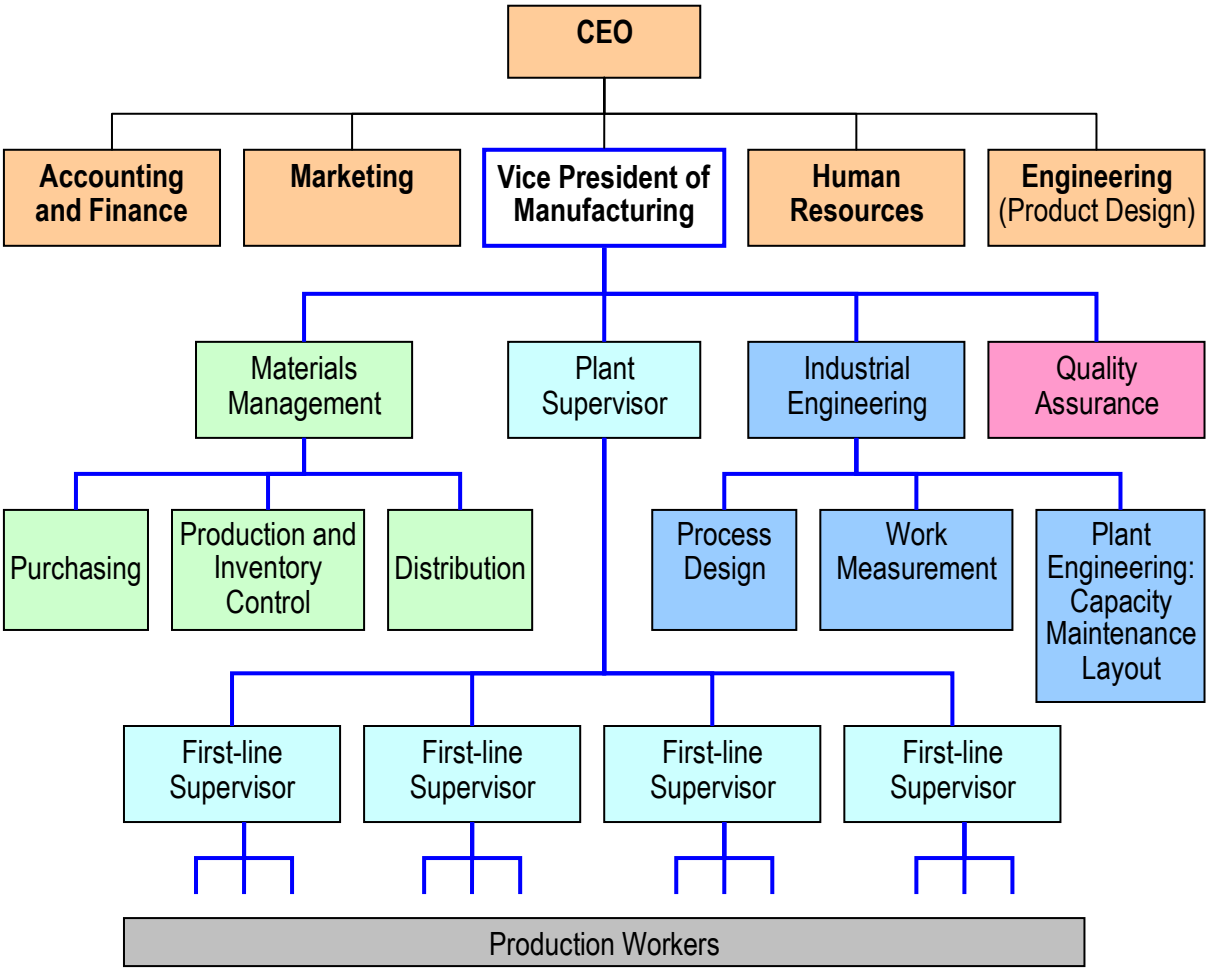

Figure 3 A Typical Organizational Chart

Lower management and entry-level positions in manufacturing carry titles such as inventory control supervisor, first-line supervisor, buyer, scheduler, production control analyst, time standard analyst, and facilities planner. Corresponding titles in the service sector might be department supervisor (insurance), office supervisor (contractor), section head (government), flight scheduler (airlines), operations analyst (bank), and scheduler (trucking).

As a Set of Decisions

Decision making is an essential aspect of all management activity. Although the specifics of each situation vary, decision making generally involves the same basic steps:

1. recognize and clearly define the problem,
2. collect the information needed to analyze possible alternatives,
3. choose and implement the most feasible alternative.

What sets operations managers apart, however, are the *types* of decisions they participate in with others in top management or actually make themselves. Table 3 lists several key decision areas and a sample question about each. It begins with the *strategic choices* that affect the future direction of the company. For example, operations managers must help decide which products or services to offer, what the company's competitive priorities will be, what the quality objective and control methods will be, and whether to organize resources around products or processes.

Table 3 / Decisions in Operations Management

Decision Area	Sample Questions
Strategic Choices	
Product and service plans	What products and services should we offer?
Competitive priorities	Should we excel on the basis of cost, quality, or flexibility?
Positioning strategy	Should we organize resources around products or processes?
Quality management	How do we get the whole organization committed to quality improvement?
Quality control	How do we best achieve our quality goals?
Design Decisions	
Process design	What processes should we use to make our products?
Technology management	Is it time to automate some of our processes?
Job design	Should our jobs be specialized or enlarged?
Capacity	What is the maximum reasonable size for our facility?
Location	Should we be followers or leaders in picking new store locations?
Layout	How should we physically arrange desks and equipment?
Operating decisions	
Forecasting	How do we design the best forecasting system for our needs?

Decision Area	Sample Questions
Materials management	Who should be our suppliers? How do we evaluate and support them?
Inventory	How much inventory do we need in our store? How should we control it?
Aggregate plans	What should be our output rates and staffing levels for this quarter?
Master production scheduling	Should we make to stock or make to order?
Production control systems	When should we release new orders for production? In what quantities?
Scheduling	What customers or jobs should receive top priority?

Next are the *design decisions* concerning the production system. Here the operations manager's recommendations and decisions often require long-term commitments. For example, the manager must help determine what the system's capacity should be and then decide what equipment and technologies to purchase, where to locate facilities, and how to organize departments and plan facility's physical layout.

Operating decisions, sometimes called the operations infrastructure, deal with operating the facility once it is in place. At this stage, the operations manager decides how to manage inventory, when to release purchase or production orders, which suppliers to deal with, how to schedule resources and maintain quality, and how to increase output levels over shorter periods of time.

1.4. CORPORATE AND OPERATIONS STRATEGIES

Business and government leaders increasingly are recognizing the importance of the whole organization's (and operation's function's in particular) involvement in strategic issues. Here we will explore some basic concepts of strategy, starting at the organization, or corporate, level.

Corporate Strategy

Whatever the type of organization, top management is responsible for relating the organization's efforts to its long-term future. Sometimes called *long-term planning*, setting **corporate strategy** (or *organizational strategy*) is the process of determining the organization's mission, of monitoring and adjusting to changes in the

environment, and of identifying the organization's distinctive competences. These strategic choices affect the future direction of the company.

The Mission

Determining the organizations mission requires answers to fundamental questions such as:

- What business are we in? Where should we be ten years from now?
- Who are our customers or clients?
- What are our basic concepts and beliefs?
- What are the key performance objectives, such as growth or profits, by which we measure our success?

The Environment

An organization needs to adapt continually to its changing external environment. Adaptation begins with environmental scanning, the process by which managers monitor the environment for potential *opportunities* and *threats*. As a General Electric's chairman, John F. Welch, Jr., once said, "Strategy is trying to understand where you sit in today's world. It's assessing with everything in your head the competitive changes, the market changes that you can capitalize or ward off"[1].

One crucial factor is competition. Competitors may be gaining an edge by broadening product lines, improving quality, or lowering costs. New entrants into the market or product substitutes may threaten continued profitability. Other important environmental elements include economic trends, technological changes, political conditions, social changes (such as attitudes toward work), and the availability of vital resources. The bargaining power of suppliers and customers can become either a threat or and opportunity. The impact of such changes on current strategies can reveal shortcomings in planning and product development – leading to adjustments in corporate strategy.

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[1] The New Breed of Planners, 1984

Distinctive competencies

Environmental impact cannot be managed away. Corporate strategies must change to meet them, which means taking into account the organization's unique *strengths* and *weaknesses*. An important concept is that few firms succeed by meeting competition head on but instead take advantage of what they do particularly well.

Distinctive competencies are the unique resources and strengths that management considers when formulating strategy. These competences include:

1. *An available and competent work force*. Although skilled employees gravitate to good jobs, there is often a significant lag between demand and supply. Having the right employees when you need them is a strength.
2. *An efficient and advantageous location of facilities*. The availability of facilities, such as offices, stores, and plants, is a major advantage because the long lead time required to build new ones.
3. *The ability to meet and create demand*. An organization that can easily change output levels, attract capital from stock sales, market and distribute its products, or differentiate its products from similar products on the market has a competitive edge.

A study shows that companies achieving international leadership employ various strategies, depending on their distinctive competences (see Porter, Michael 1990), however, their underlying character is fundamentally the same. They achieve competitive advantage through acts of innovation and new ways of doing things, such as new products designs, production technologies, training programs, quality control techniques, or new ways to manage supplier relationships. They find a new basis for competing or better ways of doing things. Some innovation in strategy is revolutionary, and other innovation is mundane and incremental, depending more on accumulation of small insights and advances than on a single major breakthrough. These innovations anticipate environmental changes at both the domestic and the foreign level. For example, Swedish company Volvo took advantage of a new market opportunity by anticipating the growing international concern for product safety. Such innovations can give a firm a competitive advantage for while, but relentless improvement is also required to sustain this advantage. Competitors will eventually overtake a company that stops innovation and upgrading. Korean companies have already matched the ability of Japanese competitors to mass produce color

televisions and VCRs, and Brazilian companies assembled technologies comparable to those of Italian rivals in casual leather footwear.

Strategies versus Tactics

Managers make decisions today about tomorrow. This future-oriented process is called planning. There are differences between plans – some plans are more strategic and some are more tactical. For one thing, plans developed high up in the organization tend to be more strategic. For another, tactical plans are intended to implement strategic plans. Learning more about such differences sharpens our understanding of strategy, which must be formulated at both the corporate and functional levels. Table 4 shows that every planning activity lies somewhere between the two ends of a continuum, with tactics at one end and strategy on the other.

Table 4 / The planning continuum

	Strategic Planning ⟷	**Tactical Planning**
1.	Long time horizon	Short time horizon
2.	Less certainty	More certainty
3.	Less structured	More structured
4.	More ends oriented	More means oriented
5.	Poorly defined information requirements	Well-defined information requirements
6.	Tends to have irreversible impact	Tends to have reversible impact
7.	Focuses on the whole	Focuses on parts

Strategic planning has a relatively longer time horizon that tactical planning. Of course, what is considered a long time depends on the specific operations involved. Because forests take so long to grow, strategic plans in the forest products industry must look ahead as far as 100 years. A public utility that generates and distributes electric power might plan 30 years ahead. But to a firm competing in a very volatile environment with short lead times for product development and resource acquisition, a long time horizon may be only 3 years.

Because of their longer time horizons, strategic plans are made with little certainty about what the future holds. Accurately forecasting what will happen far into the future is difficult. Strategic plans also are less structured than tactical plans for two reasons. First, they are more ends oriented. Strategic planning establishes corporate ends (or performance objectives). By contrast, tactical planning focuses on the

means by which these previously established ends can be achieved. Second, strategic planning is less structured because its information requirements are poorly defined. Managers can be less clear about information they need now to make a strategic choice that may not have an impact for five years. Tactical planning, which is more routine and repetitive, requires very specific information. Thus it must be based on more formal, well-defined information systems. These systems are often computerized because of the amount of data involved and the rapid rate at which data change.

Strategic plans lead to decisions that are major commitments of present and future resources. As a result, they tend to have an irreversible impact. For example, a strategic decision to build a new warehouse has a much greater impact than a tactical choice to order more machine parts this month from a certain supplier. Finally, strategic planning focuses more on the organization as a whole, cutting across functions and departments. This view of strategic planning recognizes that plans and decisions made in one area affect the plans and decisions made in others.

1.5. OPERATIONS STRATEGY

Operations strategy specifies how operations can achieve the organization's overall goals, within the framework of corporate strategy. Managers determine operational shortcomings by comparing corporate strategy requirements with the production system's current and projected capabilities. Managers then try to overcome any shortcomings by taking advantage of the operation's available resources and distinctive competencies, or they may change operational strategies regarding automation, facility location, capacity, suppliers, and inventories. If none of these approaches is sufficient the operations manager must alert top management, so that corporate strategy may be reviewed and, if necessary revised.

We want to emphasize three points about operations strategy:

1. Operations can be a competitive weapon or a millstone.
2. Managers should link decisions in operations.
3. Although management must first address strategic choices, success also depends on tactical choices based on careful analysis of specific alternatives.

A competitive weapon

Operations concentrates on the resource side of corporate strategy, where the organization usually commits the bulk of its human and financial assets. Many years ago Wickham Skinner suggested that the production system could be either competitive weapon or a millstone (See Skinner, 1969). He concluded that all too often it has become a millstone – or burden – with top management unknowingly giving up large portions of corporate strategy to operations managers. As a result, operations polices on such issues as inventory levels, schedules, and capacity reflect incorrect assumptions about corporate strategy and may actually work against a firm's strategic goals. This lack of understanding can commit the firm to inappropriate resources for years.

Largely because of foreign competition and the technological explosion, there is a growing recognition that a firm competes not only with new products, creative marketing, and skillful finance, but also with unique competencies in operations. The organization that can offer superior products and services at lower prices is a formidable competitor.

Linking Decision Areas

The operations manager must link various decision areas in operations in the way that best complements corporate strategy. Plans, policies, and actions within operations should focus in the same direction and be mutually supportive. Quality, automation, capacity, and inventory decisions must not be made independently. Even though individual choices may make sense on their own, collectively they might not add up to the best result.

Strategy and Analysis

Strategic planning dictates that *first-order questions* are the manager's first concern. For example, the manager must decide whether even to hold an item in inventory at all (as opposed to buying material as needed with each new customer order) before deciding how low inventory should get before reordering. Similarly, the manager must decide whether to expand on the same site or relocate before deciding how large the new parking lot will be.

Much of tactical planning depends on careful analysis. Operations managers have a wide variety of analytic techniques at their disposal. These techniques range from

simple lists of pros and cons jotted on a scrap of paper to sophisticated linear programming models, simulation models, and computer-based information systems. Strategy and analysis are both necessary and should complement one another. Although you can view each separately, they are actually part of the whole.

1.6. CHAPTER HIGHLIGHTS

- Production processes transform inputs (workers, managers, equipment, facilities, materials, land, and energy) into outputs (goods and services).
- Service systems in contrast to manufacturing systems tend to have intangible products that cannot be inventoried, more direct contact with the customer, shorter response times, local markets, labor-intensive operations, and less measurable quality. Nonetheless, the distinctions are relative.
- Operations management can be viewed as a function, a profession, and a set of decisions; it is concerned with the strategic positioning, design and operation of production systems.
- Decision areas in which operations managers are involved include product and service plans, competitive priorities, positioning strategy, quality management and control, process design, new technologies, job design, capacity, location, layout, materials management, production and staffing plans, master production scheduling, inventory, and scheduling. Each succeeding type of decision has a shorter time horizon and is more tactical but has an important cumulative effect on system performance.
- Corporate strategy is the process of determining the organization's mission, monitoring and adjusting to changes in the external environment, and exploiting distinctive competencies. Key ingredients of successful strategy are innovation and continual improvement.
- Strategic planning, in contrast to tactical planning, has a longer time horizon, less certainty, less structure, and ends orientation, poorly defined information requirements, and a focus on the whole organization.
- Operations strategy is a natural extension of corporate strategy and involves three important concepts: (1) operations can be a formidable competitive weapon, (2)

the various decisions in operations must be linked, and (3) first-order decisions are paramount, even though tactical decisions have major cumulative effect.

1.7. KEY TERMS

Corporate strategy

Distinctive competencies

Environmental scanning

Operations management

Operations strategy

Planning

Productivity

1.8. STUDY QUESTIONS

1. Identify the inputs and outputs for four of the following types of firms.
    a. Hotel
    b. Public warehouse
    c. Paper mill
    d. Newspaper company
    e. Supermarket
    f. Home office of bank
2. Identify the largest company in your hometown or country. What are its inputs, outputs and transformation processes?
3. Do the employment shifts to the service sector mean that the demand for goods is declining? Do you expect these employment trends to continue at the same pace? Explain.
4. What are the usual distinctions between goods producers and service producers?
5. Why is productivity of particular interest to operations managers?
6. What is a function?

7. Which disciplines contribute significantly to the field of operations management? What does this imply about the skill needed by operations managers?
8. What questions does an organizational mission statement answer?
9. How are environmental scanning, adjusting to environmental change, and distinctive competencies are related?
10. What are the differences between strategic and tactical planning?
11. How can linking decisions better help make operations a competitive weapon? Can tactical decisions be ignored? Explain.

1.9. SOURCES AND REFERENCES

1. Krajewski, Lee J., Ritzman, Larry P. *Operations management: strategy and analysis*. Addison-Wesly Publishing Company Inc., 1993.
2. Porter, Michael E. *Competitive Advantage: Crating and Sustaining Superior Performance.* New York: The Free Press, 1985.
3. Porter, Michael E. *The Competitive Advantage of Nations. Harvard Business Review* (March-April 1990) pp. 73-93.
4. Skinner, Wickham. Manufacturing – *Missing Link in Corporate Strategy. Harvard Business Review* (May-June 1969) pp. 136-145.

1.10. TERMINOLOGY

Terms	Synonyms	Meaning
operations management	production management	Производственный / операционный менеджмент, управление производством / операциями
enable	authorize , sanction , empower	давать возможность или право что-л. сделать
vast range	wide range	широкий ассортимент
thus		таким образом
emergence	emersion, appearance	появление, возникновение
activities		деятельность
inputs	costs, incoming resources	затраты, входящие ресурсы, "входы"
finished goods / services	good / services ready for sale	готовая продукция / услуги
profit / nonprofit organizations	commercial / noncommercial organizations	коммерческие / некоммерческие организации
human resources	labor resources	человеческие / трудовые ресурсы
facilities	Installations	здания, оборудование, приспособления; то, что создает условия для производственного процесса
encompass	include	охватывать, включать
internal reports	reports for internal use in the organization	отчеты внутреннего пользования
past-due shipments	overdue shipments	просроченные поставки
register	registry, list, catalogue	реестр, список, журнал
auxiliary services	additional services	вспомогательные/побочные услуги (например, для собственных нужд

Terms	Synonyms	Meaning
		предприятия)
merchandise	goods	товары
customer	consumer, buyer, user, client	потребитель, покупатель, пользователь
plant	factory	завод, фабрика
raw materials	input materials for production	сырье
faculty	department teaching staff in American university	профессорско-преподавательский состав факультета (ППС)
handicraft industry	hand-made industry	ремесленное / кустарное производство
job design	specification of job content and of the employee skills for that job	проектирование трудовых операций
location	a place where business is situated	местонахождение предприятия
capacity	production potential, capabilities	мощность, производительность
layout	physical arrangement of things in business	планировка, размещение, расположение
inventory	Material things in store for production and sales	материально-производственные запасы
scheduling	putting together a schedule for business activities	составление расписания, календарное планирование
value added		добавленная стоимость
durable product	product that lasts	продукт длительного пользования
Intangible product	product you can not touch, not physical	нематериальный продукт
perishable product	product that doesn't last	скоропортящийся продукт
response time	lead time = time between receiving customer's order and filling it	время выполнения заказа
capital intensive	needs a lot of capital	капиталоемкий
labor intensive	needs a lot of labor	трудоемкий
erratic demand	inconsistent demand	непостоянный спрос

Terms	Synonyms	Meaning
forklift truck		вилочный погрузчик
checkout line	a line where you pay for the goods you're buying	очередь к кассе
assume responsibility	take responsibility	принимать ответственность
learn the ropes	to know ins and outs	хорошо ориентироваться, знать все входы и выходы
upward mobility	possibility of promotion	вертикальная мобильность
chief executive officer	(CEO)	исполнительный директор корпорации, президент
industrial engineering		организация производства
quality assurance		гарантия качества
plant supervision	control over plant	контроль за производством
insurance		страхование
contractor	supplier, provider	подрядчик, поставщик, снабженец
trucking	cargo transportation on trucks	авто-грузоперевозки
most feasible alternative	most probable alternative	наиболее вероятная альтернатива
key decision areas	important decision areas	ключевые области принятия решений
competitive priorities	areas in which a firm is going to compete in	конкурентные приоритеты
product and service plans		Планы производства товаров и услуг
positioning strategy	a system of resource grouping in production	стратегия позиционирования
quality management		управление качеством
quality control		контроль качества
process design		разработка производственного или технологического процесса
forecasting		прогнозирование
materials management		управление поставками материалов

Terms	Synonyms	Meaning
aggregate plans	general plans for outputs	суммарные планы
master production scheduling	design of master production schedule	разработка основного производственного плана
production control systems		контроль процесса производства
long-term commitments	long-tern obligations	долгосрочные обязательства
distinctive competencies	unique strengths of a firm	отличительные сильные стороны в организации
mission	main goal,	миссия
environmental scanning	monitoring of the organization's external environment for potential opportunities and threats	мониторинг внешней среды
ward off	to fight off; to keep at a distance; to avoid	отражать, держать на расстоянии
crucial factor	key factor	ключевой фактор
gain an edge (in competition)	to obtain a good competitive position	добиваться выгодного конкурентного положения
new entrants into the market	new competitors	новые конкуренты
product substitutes		товары-субституты, товары-заменители
availability of vital resources		доступность жизненно важных ресурсов
bargaining power	power to force economic interests	рыночная власть (покупателя/продавца) позволяющая отстаивать свои интересы
shortcomings in planning	flaws, defects in planning	недостатки в планировании
skilled employee		высококвалифицированный рабочий
lead time	response time, time needed to fill and order	время реализации заказа,

Terms	Synonyms	Meaning
		цикл заказа
differentiate products		дифференцировать товары, делать их отличными от других
competitive edge		конкурентное преимущество
employ	use, apply	использовать, применять
mundane	worldly	земной, мирской
insight	understanding of things, good idea about something	понимание сути вещей
advances	improvements, progress, achievements,	достижения, прогресс
major breakthrough		основный прорыв (большое достижение)
domestic and foreign level	national and international level	отечественный и зарубежный уровень (национальный / международный)
relentless improvement	non-stop improvement	постоянное улучшение
overtake	to leave behind	обогнать
rivals	competitors	конкуренты
casual leather footwear		повседневная кожаная обувь
versus	against	против
for one (thing)	for example, as for, on the one hand	например, что касается, с одной стороны
ends and means	goals/objectives and tools/methods of reaching them *means became ends*	цели и средства
volatile environment	changing / inconstant environment	непостоянная изменчивая среда
corporate ends	performance objectives	корпоративные цели
impact	influence	влияние, воздействие
routine	regular, repetitive	типовой, регулярный, рутинный

Terms	Synonyms	Meaning
major commitments		крупные обязательства
irreversible impact		необратимое воздействие
framework	structure, limits	структура, рамки
review and revise		пересматривать и исправлять
competitive weapon or a millstone		конкурентное преимущество или недостаток
first-order questions	key questions	первоочередные вопросы
site	location	место
list of pros and cons	list of things that are "in favor" or "against" something	список "за" и "против"
linear programming models		модели линейного программирования
simulation models		имитационное моделирование

Terms	Synonyms	Meaning