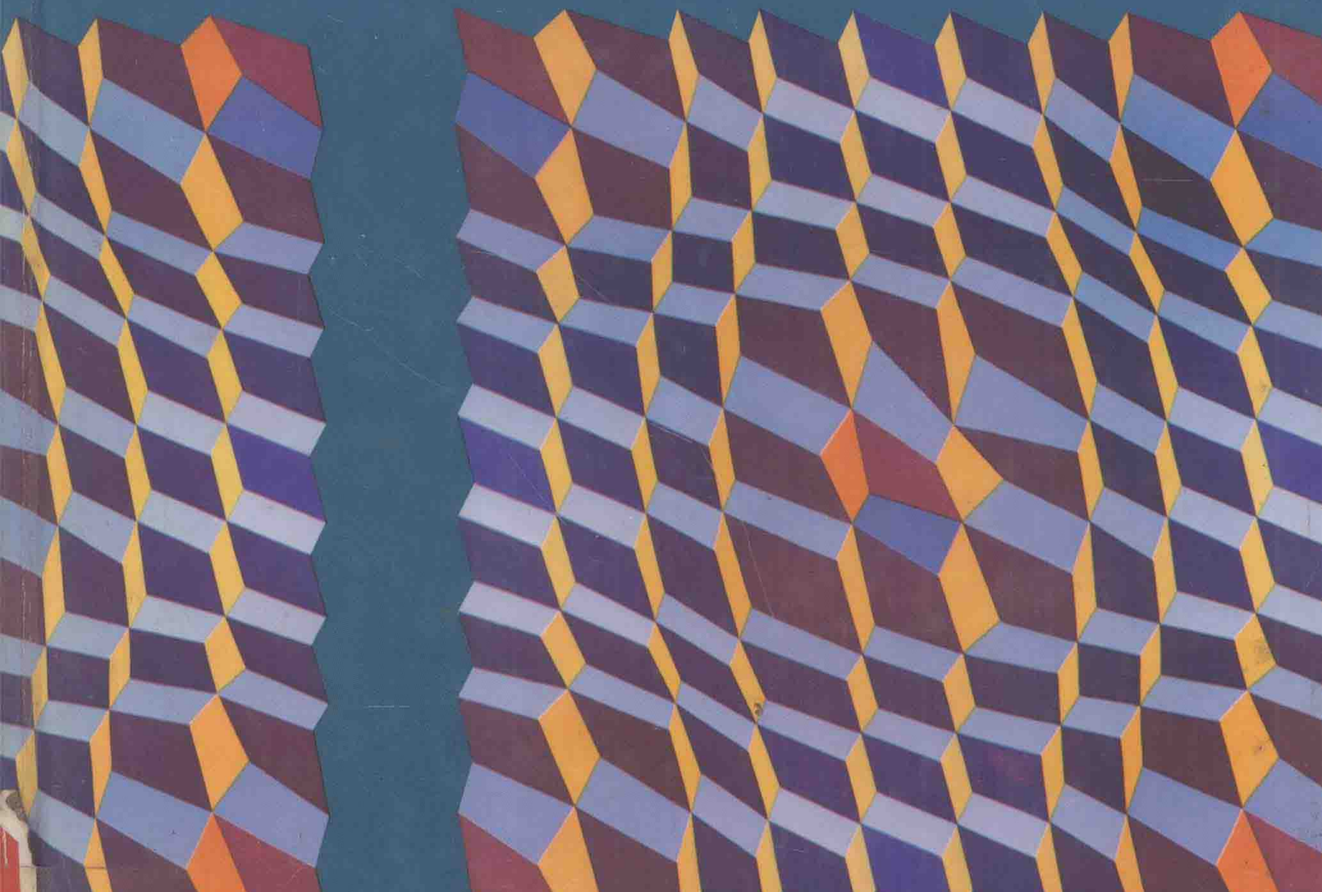
THE OPERATIONS MANAGER:
ROLE, PROBLEMS, TECHNIQUES



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The Operations Manager

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Preface

Operations management is the most widely practiced, and least understood, managerial function in modern enterprises. This confusion exists because in many occupations in both the public and private sectors, relatively few managers use the title "operations," but these persons are in fact directing activities that would fall within our definition of operations. Consequently within this text we expand the conventional view of operations management to include any individual who performs the managerial activities needed to oversee the production of any good or service.

This emphasis on the managerial role in operations is the result of our combined fifty years of experience in management and in teaching. We have concluded that operations management can best be understood when it is placed within the context of top-level managerial problems. We do not ignore the many tools, techniques, and analytical models available to the operations manager, but they are always described within the framework of the managerial situations in which these methods and techniques apply.

The role of the operations manager and the problems that he or she faces occur within the general policy framework of every modern enterprise. Thus the role of the operations manager is positioned above the level of direct supervision of workers and below general management. The operations manager also has direct and indirect relations with managerial peers in marketing, accounting, finance, engineering, and distribution. The strategic problems of operations management require decisions about *production capacity*, *process technology*, and methods for *adjusting output* to match demand. These decisions determine the investment in plant, the composition and size of the labor force, and the many other day-to-day management choices the operations manager makes.

In this text we illustrate major production systems by analyzing the one-time project, the continuous assembly line, and the custom jobshop. Each of these systems shares the common managerial problem of scheduling—timing the production of goods and services. Critical path scheduling and jobshop scheduling are useful techniques of the operations manager in these production systems.

Another whole set of operations decisions and managerial problems revolves around materials. In many production systems, transforming materials is the dominant factor. Materials management includes purchasing, process control, and distribution. We present materials requirements planning and order-point systems to develop materials policy.

Relationships with peer managers form another whole class of problems that concern operations managers. Engineering and operations managers often work together closely when a new product is being introduced or changed. Thus in many high-technology situations, operations often becomes an extension of engineering. In addition, the quality control manager must help personnel in operations to make products that conform to engineering design specifications. Our final chapter illustrates how the accountant, the ubiquitous friend of all managers, uses cost accounting to keep financial score of operations activities.

In our experience of the practice of management, we have confronted many of the problems of the operations manager described in this text. Our experience has been that many problems faced by the operations manager have no ready conceptual or theoretical solutions. In the past, operations texts emphasized only those areas where analytical models fitted, and solutions to problems had been worked out. We think that students of operations management should also be aware of those areas where problems are ill-defined and tough to solve. In the world outside the classroom, these kinds of problems are what make managers' lives interesting.

Roy D. Harris
Richard F. Gonzalez

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Although wealth is generally thought of as the ownership of land and possessions, the ability to *create* goods and services is more important than ownership in an economic sense. Unless someone knows how to turn capital ownership into goods or services, wealth will diminish.

A specialist in handling this task of using land and possessions for production is called an operations manager. This individual plans and controls the labor, materials, and process technology which create goods and services. Many operations managers go by the name of the product they manage—for example the hospital manager, or the accounting manager, or the refining manager; but their function is the same.

The definition of operations management, a description of the role of the operations manager, and illustrations of the context of modern operations management are found in this chapter.

The operations manager oversees the creation of goods and services—the economic activity called production. Operations managers choose the production processes to use, purchase materials, select the equipment, and hire and direct the efforts of workers. In the small shop, the craftsman is often his own manager. In the large industrial enterprise, the role of the operations manager has developed into a formal position and a career.

As an occupation, operations management is both a satisfying and a frustrating role. Operations managers have the satisfaction of seeing the tangible fruits of their efforts—the goods and services their managerial efforts help create. But frustrations result from the need to juggle many variables: materials, labor, costs, equipment, information, and time. The operations manager is forever pursuing an increase in productivity. While standing accountable at all times for the use of materials, labor, and equipment during production, the operations manager strives to maintain a higher ratio of product output to resource input.

This text is about the role of the operations manager, the problems faced, and the managerial techniques used in implementing that role.

Operations Management Defined

Operations management plans and controls the processes used to create goods and services. This is the **process view** of operations management. Wherever production processes are managed in a purposeful way, operations management is taking place.

The role of the **operations manager** results from a division of labor between the management activities that plan and control the production processes and the management activities that finance, engineer, and market the output of the production process. Most often the operations manager is identified by the name of the processes being managed, for example, assembly-line manager, service manager, refinery manager, or distribution manager.

To understand the term **operations manager** and **operations management** as used in this text requires both the process view of operations and the division of labor view of operations. In general, the term **operations management** will mean the activities associated with planning and

controlling processes that turn out goods and services. The term **operations manager** will generally refer to the division of labor view, and the assignment of responsibilities for processes that turn out goods and services to a specific manager.

Process View of Operations Management

E.S. Buffa defines productive systems as "the means by which we transform resource inputs to create useful goods and services."[1] The Random House dictionary defines production as "the producing of articles having exchange value." Webster's dictionary extends the definition of output to include works of literature or art. The process view of production or operations is so broad it includes almost *any* economic activity in which someone is productively engaged.

The outputs of production processes are **goods** and **services.** In economic terms, **goods** are defined as movable personal property. Examples might include this book, a desk, a pencil, or a keg of beer. Houses, dams, and factories are **capital goods;** they are personal property, but are not movable. The other production output, **services,** is the performance of

1. Elwood S. Buffa, *Modern Production Management*, 6th Edition (New York: John Wiley & Sons, 1980), p. 8.

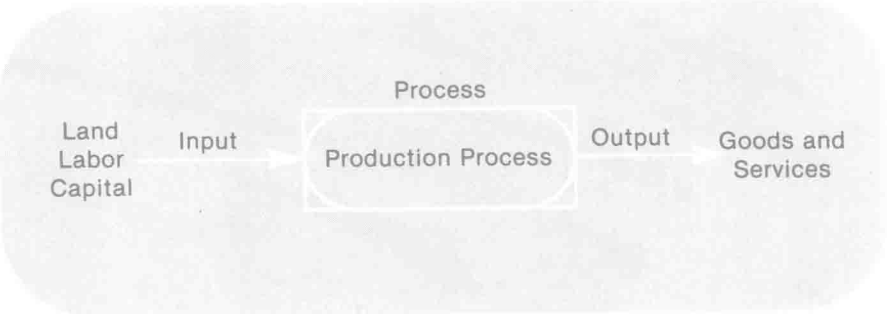

FIGURE 1–1
The Economic View of Production

activities required by the public, or work done for another person. Examples of services include a lecture, a haircut, a live play, a repair, a medical operation, and electricity. From a management point of view, services produce problems because their consumption is bound in time and location. Goods may be produced at one time and place, and stored for later use. Services must be produced as they are consumed; this bond to the consumer poses special challenges in managing the production of services.

The term **production,** meaning the creation of goods and services, is a well-defined concept in economic theory. Adam Smith identified the factors put into the production process as land, labor, and capital. The **production function,** in economic theory, defines a relationship stating the maximum amount of production output for each and every set of inputs. The production process and the production function are modeled in Figure 1–1. The production process takes materials, labor, equipment, and information as inputs; the output is goods and services. The process view of operations management considers how the input factors are to be transformed into goods and services.

Division of Labor View of the Operations Manager

Business enterprises typically divide management activities into five categories: (1) operations management, (2) financial management, (3) marketing management, (4) engineering management, and (5) general management. Financial management concerns activities related to acquiring capital and controlling its use. Marketing management deals with activities necessary to define products and sell them to consumers. Engineering management designs products and processes. General management coordinates the activities of the financial, operations, marketing, and engineering managers.

The word *operations* is not usually used to label the operations function. Instead, the names of the production processes involved are used. For example, a college of business will have an accounting department to provide services associated with the teaching of accounting. Hospitals have a pediatrics ward, a label that describes a group providing medical services for children. Thus, the term *production* usually describes only the production activities involving mass production of durable goods. For example, *production* worker has come to be associated with the laborers directly involved in manutacturing. *Production* manager has come to be associated with the *first* or *second* level supervisor in manufacturing firms. It is no less proper, however, to call a professor a *production* worker when that person prepares and delivers a lecture or to call a surgeon who performs an operation a production worker. In fact, in economic terms it is proper to call entire organizations such as universities, hospitals, or factories, production organizations, since they are engaged in producing services and goods.

The word *operations* has been substituted for *production* in denoting the production activities in service industries—government, health care, education, and so on. This text uses the terms *operations* and *production* interchangeably. **Production operations** is the process by which goods and services are created. **Operations management** is the term applied to the management of the production processes. The **operations manager** is the person responsible for effectively planning and controlling the production process.

Role of Operations Manager

To effectively plan and control the production processes the operations manager must have some plan or rationale for the use of the materials, labor, equipment, and information. Knowing whether the output of goods and services is the *right kind*, of the *right amount*, at the *right time*, of the *right quantity*, and at the *right cost*, determines how capably the operations manager accomplishes this task.

In the absence of an operations manager, production workers act as their own manager. They decide what needs to be done, when, and how; they then must judge the quality and quantity of their efforts, that is, they must perform the control function.

The dual notions of the division of labor arising from the desire for more output, and specialization of labor to gain more efficiency, provide separate approaches to production activities. These ideas can also be applied to the separation of management activities and to management specialization. The operations manager's role is organizationally located between the direct production workers and the general manager (Figure 1–2). This role was first spelled out by Frederick W. Taylor as functional foremanship. Taylor established a group of functional foremen as a management team just above the direct production worker level. Each functional foreman took charge of part of the management planning or control, for example, time boss, speed boss, or methods boss. Under Taylor's

FIGURE 1–2
Organization View of Operations Management

scheme, each foreman assumed responsibility for only one specialized part of the management work.

Today, the dominant practice gives each production worker a single boss who coordinates all of the management services provided for that worker. The **first-line supervisor** assigns materials and equipment and jobs to direct production workers daily and on an individual basis. The idea of this **first level supervisor** for direct production workers is almost universally accepted today.

In industrial organizations, further division of management and specialization results in a **second level supervisor:** the operations manager. Planning and controlling the activities of the first-line supervisors comes under the operation manager's jurisdiction. Operations managers plan work activities on a weekly, monthly, and yearly basis. They plan material purchases, equipment usage, and total labor to be hired on a long-term basis. Operations managers cooperate with management peers in engineering, accounting, finance, and marketing. They report to the general manager about their activities and try to plan and control the production processes to enable the total operations-engineering-accounting-finance-marketing activities to all mesh.

In large modern corporations, the role of operations management may evolve into several more levels between the first-line supervisor and