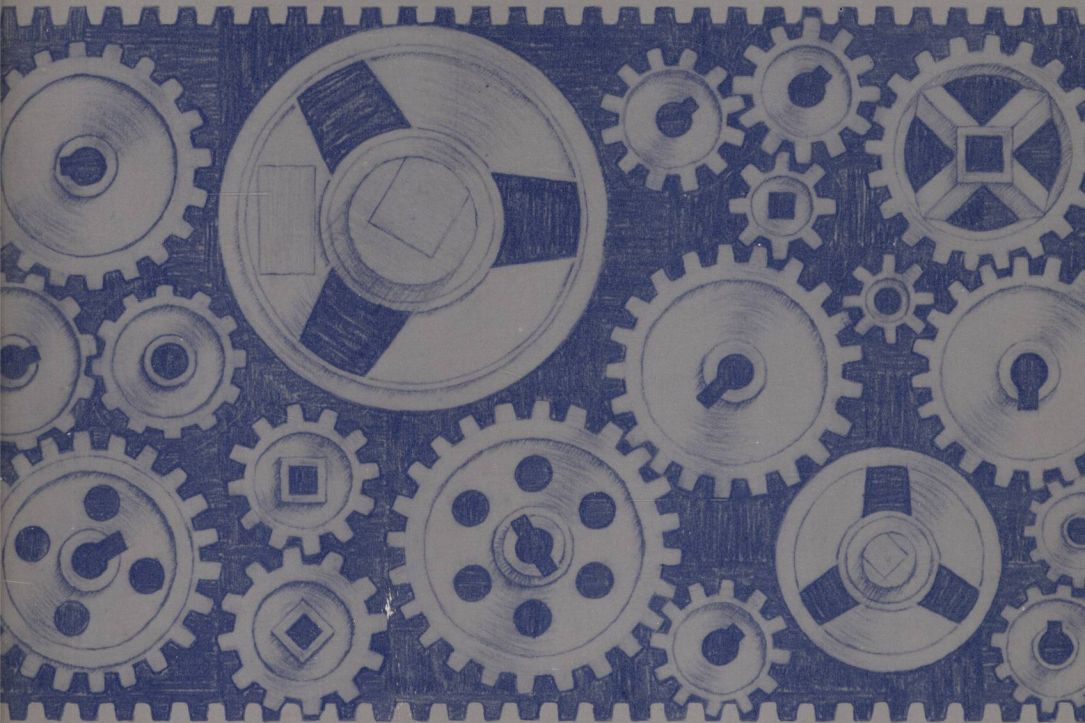


READINGS IN



PRODUCTION AND OPERATIONS MANAGEMENT

A PRODUCTIVITY PERSPECTIVE

Ahmad Ahmadian, Rasoul Afifi,
and William D. Chandler

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A Productivity Perspective

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**READINGS IN
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Preface

During most of the past three decades the discipline of production and operations management has been less attractive to both educators and practitioners than have other fields of business such as finance, marketing, accounting, and human resource management. As a profession, production/operations management (POM) offered fewer opportunities for growth within the ranks of management. The responsibilities were diverse, difficult to define, and tended to be divided into narrow subdisciplines or bureaucratic functions. Specialists in human and organizational behavior, labor relations, computer information systems, finance, management science, and operations research dominated the realm of business management.

Other managers also assumed more commanding roles in the development of organizational strategies than did production and operations managers. POM managers often were expected to adapt to both marketing managers concerned with growth in market share, product consumption, and service utilization and to financial managers concerned with profitability growth. Productivity growth was taken for granted and given relatively low priority in the goal structures of many organizations.

In recent years, however, production/operations management and organizational productivity have received more of the attention they always deserved. Increased emphasis is being placed on POM today due to concerns about the globalization of markets for both goods and services, dwindling energy resources, inflation, and the stagnating growth of productivity in the United States. The attention given to productivity management in Japan and other nations has prompted U.S. managers and educators to examine and increase their commitment to production/operations management and to the enhancement of productivity.

This book is divided into five parts. The chapters included in Part One emphasize the idea of productivity and its relationship to quality, employee attitudes, and involvement, as well as a variety of work system revisions that have brought changes to the operations management field. Part Two addresses design issues in production and operations management, emphasizing the importance of modern manufacturing techniques and technologies and describing the critical role they play in the POM domain. Part Three deals with the areas of planning and control, including inventory planning and policy, material requirements planning, Just-in-Time concepts, quality control, and the relation of these managerial methods to the POM field. In Part Four technological innovation and the operational issues of POM are explored. The chapters reflect current thinking on the central role of innovation in organizational planning and its relationship to the operations management function. Part Five, on strategic issues in production and operations management, examines the linkages between POM and the formulation and implementation of cohesive strategies by manufacturing and service organizations.

The selected readings in this book are intended to be used either as a supplement to a basic POM text or as a source of self-development for individuals interested in enhancing their understanding of the field. The editorial comments preceding and the questions following each section are provided to help position the reader and to deepen one's understanding of the material presented. We would like to thank the scholars and researchers whose contributions are included in the book, and express our appreciation to the publishers and authors who granted permission to reprint these articles. Without their help and cooperation, this collection would not have been possible.

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PART ONE

Productivity and Operations Management

Productivity considerations have been a major management concern both within organizations and on a national level since the 1970s. This concern originated in the significant increases in productivity and competitiveness in other nations relative to those in the United States. For example, the American Productivity Center reported that between 1973 and 1985 gross domestic product per employee in the U.S. increased at an average annual rate of only 0.4 percent. During the same period the annual average increase of this broad measure was 2.1 percent in France, 2.2 percent in West Germany, 2.9 percent in Japan, and 4.9 percent in Korea. More recently, during the period 1981–85, U.S. labor productivity improved to an annual rate of 1.0 percent, still far less, however, than the 2.6 percent of the United Kingdom, 2.9 percent of Japan, or Korea's 6.0 percent.

Similarly, in terms of total factor productivity growth in manufacturing, Japan's increase was three times that of the United States for the period 1970–80 (5.1 percent versus 1.7) and 1980–83 (4.1 percent versus 1.3). Even more significant, in overall manufacturing development Japan achieved twice the growth rate of the United States.

Economists and management observers have identified a variety of explanations for the U.S. productivity slump that started in the 1960s and became routine in the

1970s. The productivity surge that followed World War II was dampened by the arrival of the baby boomers in the job market. A flood of young workers reduced the overall level of experience and skill in the workforce. In addition, both society and industry failed to recognize the impact and size of the competitive challenge that developed outside the United States, and the need for change within this nation. The intense market orientation of many American firms encouraged strategies in which product innovation was emphasized to a far greater extent than process and manufacturing innovation.

A general shortage of manufacturing experience and insight among top managers also led to policies that failed to take advantage of the strategic potential of the operations function. Emphasis in manufacturing tended to stress considerations of short-term efficiencies rather than long-term progress. Investment in both new equipment and research and development activities, as a percentage of gross national product, was significantly higher twenty years ago than it is today.

Technology plays a major role in productivity advancement, but the vital element in all operational improvement is people. It is people who devise better ways to use materials, people who determine the best ways to improve product quality, and people who provide the driving force in any productivity improvement effort. Only people can give wisdom to the machines.

The operations manager, as the individual most responsible for improving the productivity levels of an organization, must recognize that capital and labor can no longer be seen as competing inputs in production. The first industrial revolution involved the mechanization of musclepower. It led to simpler, more elemental tasks that demanded little of workers except the use of their hands. Today there is a new industrial revolution underway; capital is invested in information technologies that require the mental commitment of workers who accept the responsibility for an entire system instead of for narrow tasks. Today, information technology permeates the workplace in both service- and product-producing organizations. The integration of new information systems, industrial robots, and computer-controlled processes and machinery calls for

workforce arrangements that strongly emphasize the involvement of people in the decisionmaking process.

The increased use of teams and other innovations in working with people (participatory management, job enlargement and enrichment, elimination of bureaucratic layers of supervision, actually listening to employees, development of job security and retraining programs, increased insight into techniques of employee motivation), in conjunction with modern technology, can make the improvement of productivity a continuous process. Indeed, this understanding is one of the secrets of how the Japanese “pulled the rug out” from under U.S. manufacturing. They put the craft back into operations by making quality a major responsibility of individual workers, not a corps of after-the-fact inspectors. Jobs that need mindless hands are delegated to mindless machines: robots. And while it seems unbelievable to many American operators, the Japanese approach yields products that are both higher in quality and less expensive to produce. In 1981, both labor costs and employee hours per car built by General Motors and Ford were nearly 40 percent greater than the Japanese equivalents of Tokyo Kogyo and Nissan.

For productivity in the United States to meet world-wide competition, American POM managers must increase their awareness of the potentials of productivity improvement. Awareness can best be enhanced by further education regarding the emerging management techniques available to enhance productivity. This section provides a basic foundation for awareness: an understanding of productivity, technology, employee involvement, and a variety of work reforms that managers must accept if the United States is to achieve the productivity gains necessary to compete in global markets.

READINGS

E. Earl Burch’s chapter, “A Conceptual Framework for Understanding Productivity” focuses on productivity and its measurement in organizations. He argues that the idea of productivity is often misunderstood and its measurement frequently misinterpreted. He suggests an approach for the

presentation and consequent analysis of productivity data at the level of the firm, and argues that managers must better understand the factors that are responsible for changes in productivity levels. A common source of confusion involves the use of the term *productivity* when it is really *labor productivity* that is being measured. He submits that productivity is multifaceted and complex, involving aspects of labor; skill and quality; capital stock; changes in technology, scale of production, and management skills; all of which must be assessed carefully.

“How Three Companies Increased Their Productivity,” by Edward Meadows, addresses three firms operating in very different environments yet able to achieve exceptional productivity increases through innovation and efficiency. Corning Glass Works, a high-technology, energy-intensive manufacturer, uses a sophisticated cost-reduction program that focuses on multiple small technological innovations. Their productivity increases average twice that of the glass industry as a whole. The Crompton Company, a New York-based manufacturer of corduroy and velveteen, utilizes relatively low technology and uncomplicated machinery, which it operates 24 hours a day, 350 days a year, to maintain high levels of productivity. The firm holds rejects to less than 4 percent, compared to a fabric industry average of about 10 percent. Crompton uses innovative work schedules and bonus pay to keep low- and semi-skilled workers effective and on the job. The third firm, Burger King, is a relatively typical service company that demonstrates that concern with productivity is not exclusively an interest of the manufacturing industries. Burger King makes intensive use of time and motion studies, computer models, applied technology, and employee suggestions to increase their ability to compete.

Kenneth Wantuck’s article, “The ABCs of Japanese Productivity,” provides a useful overview of the operation control methodologies used in Japan, comparing and contrasting them to the traditional U.S. approaches. He notes that the Japanese are excellent students. They examined, observed, and modified American production and inventory control techniques to develop an intensely practical system that is generally more productive. While U.S. management has taken increasingly sophisticated ap-

proaches, the Japanese have learned the basics and rigorously put them into practice. As a result, Japanese manufacturing output per man-hour in 1978 was reportedly two-thirds higher than in the U.S., and the gap was widening. Wantuck suggests that American management should borrow back some of the Japanese approaches and modify them to meet our environment.

"The Measurement of White-Collar Productivity," by William A. Ruch, addresses the special problems associated with assessing the productivity of workers whose contribution to the firm—their output—is difficult to define and measure in a meaningful way. He provides a useful definition of white-collar workers based upon their level of discretion and the degree to which there is a physical product involved in their activities, and suggests ways to develop relevant partial measures of productivity (labor, capital, materials, and energy) as well as an integrated system that combines the four partials into a total productivity measure for a firm, functional department, or work group. Ruch also discusses six specific problems associated with measuring white-collar work and suggests a sequential procedure to guide the efforts of managers in developing workable and useful measures. Finally, he provides three case examples of varying complexity and sophistication to illustrate how organizations have succeeded in accomplishing the task.

Leilani Allen, in "Measuring Productivity in the Automated Office," considers some of the factors involved in measuring productivity in a computer-intensive white-collar environment. The automated office is becoming more and more common, and operations managers must consider whether the multitude of desktop computers and terminals are productivity-enhancing tools or expensive paperweights. Allen suggests an approach to task classification and qualitative measures useful in an office environment, and offers guidelines for making before-and-after comparisons, using control groups, and keeping workers informed about the interrelationships of their activities.

"Employee Motivation: A Key Factor in Productivity," by Ahmad Ahmadian, reviews some of the major motivational and management concepts and techniques produced by research in light of the current nature of worldwide com-

petition. He proposes a system of productivity-oriented motivation based on job involvement, the effective employment of small groups, the development of employee loyalty, and a bottom-up management style.