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OPERATIONS MANAGEMENT

Production Management and Operations Research



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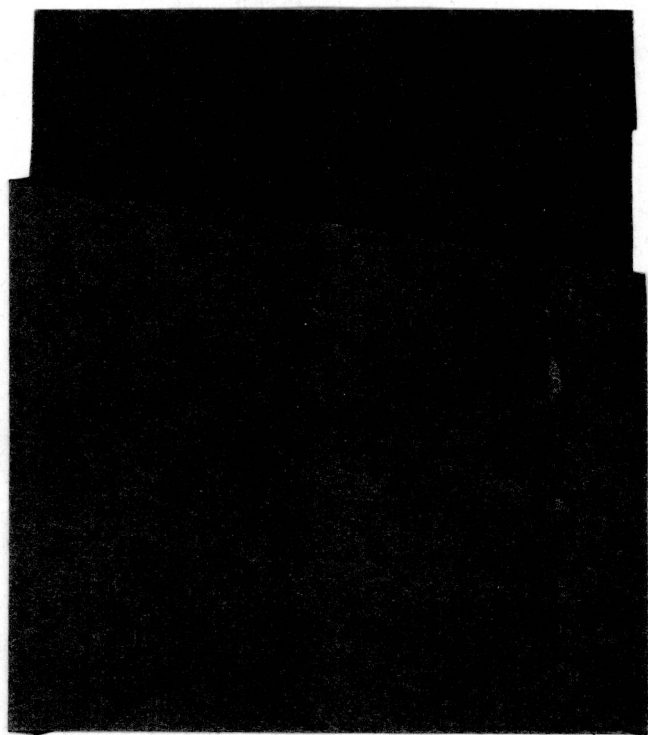
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OPERATIONS MANAGEMENT
Production Management and Operations Research

By the same author

Managerial Dynamics.

Managerial Mirage.





This book is dedicated to the loving memory
of my dear brother NARESH.

*Like pilgrims to the appointed place we tend
The world is an inn, and death the journey's end.*

N.K.S.

Preface

OPERATIONS MANAGEMENT is an attempt to study modern administrative management from the perspective of systems analysis. Using both planning and control techniques, an effort has been made in this book to integrate production aspects with systems functions as currently used in large corporations. As such it fills a vacuum existing in the area of integrated operations management studies.

The author is a student of modern management and has been one for the past twenty years. During this period, he has served as a consultant, teacher, and active practitioner of management craft. All concepts, theories, and cases included in this book have either been tested in classrooms or been derived from author's own operations management experience. As such, the validity and relevance of all textual material is self apparent.

It gives the author great pleasure to acknowledge the assistance received from various friends, associates, and studies, in different aspects of the completion of this book. The book is lovingly dedicated to a person who combined in his short life the true meaning of the art and science of management. My friend Mr Suraj "Raj" P. Duggal has been a source of great affection, trust, and understanding.

In addition, the author is grateful to friends like Dr R.D. Sethi, Major B.K. Chopra, Dal Chand Jain, K.C. Surana, Shashi Saini, and Dr N.N. Sachdeva for various acts of compassion and kindness. Various members of the family have, as usual, shown great empathy towards the author's creative struggles. To all of them, a deep sense of personal gratitude.

Finally, I wish to express my loving appreciation towards my wife Kiran, my children Madhu, Manoj, and Michelle. They all provide me the right atmosphere to continue my literary and research pursuits.

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Narendra K. Sethi

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Introduction

OPERATIONS management is an analytical process which can be applied in all activities involving deployment of resources. It should not, however, be equated with either production management or industrial management. Production management connotes a heavy manufacturing orientation, and industrial management suggests a factory-setting. Although both are parts of operations management, the term is far more wide and comprehensive. It uses several analytical techniques of work-design, decision-making, information control, systems analysis, and coordination engineering. It activates both planning and control commitments in the organization and it can be used both in the manufacturing and the non-manufacturing environment. Its effectiveness is not confined to the corporate sector; it can be used efficiently in non-corporate, governmental, or even institutional perspectives. It focuses on both quantitative as well as qualitative areas of business operations.

Definition of Operations Management

The literature of operations management affords some examples of its definition. Joel Corman writes:

It is important to note that while the old definition of "production management" concerned itself only with manufacturing, time and technology have forced us to enlarge the scope of "production management" to include any operation whose function is the creation of utility, tangible or intangible. In many instances, the new definition of production management has been given a new name—"operations management."

Martin K. Starr states:

Operations management is management of the transformation process.

Voich, Mottice and Shrode point out:

Operations management is the examination of the nature of decisions, work and activities of each major operation within the organization.

These three definitions indicate three different but altogether valid perspectives on operations management. For example, the first definition of Corman simply extends the parameters of traditional production management. According to him, operations management is the extended scope of new forms of production—of any kind or type. The second definition suggested by Starr shows a higher level of sophistication. The process of transformation is basically from the input to the output stages of production. There is an implied suggestion of systems here. Finally, the third definition by Voich, Mottice and Shrode gives a comprehensive frame of reference for the study of operations management. It centres on the triangular pattern of relationships among (1) decisions, (2) work, and (3) activity.

That not everyone is agreed on the definition of operations management is borne out by the fact that a completely different definition is employed by Johnson, Newell and Vergin. According to them, "Operations management is the design and operation of systems." Although systems overview is an integral component of operations, it is not altogether right to equate it with operations management.

Perhaps a more rational approach would be to first agree on what would qualify for inclusion in the term operations management. It does apply to all managerial functions but, what are its most critical and essential components? If one agrees on what are its major parts, a better definition can be attempted. There is also considerable disagreement on what should be included in an operations management text-book. Many texts include systems overview; some confine their

approach to production science; others treat it as part of management science; sometimes, they include accounting as well as financial orientation, too. Therefore, one's concept of operations management is directly related to one's concept of its contents.

This book includes the following three major structural components in operations management:

1. Systems dynamics,
2. Operations planning and control, and
3. Techniques in operations management.

In the light of the above framework, operations management as used in the present context is defined as follows:

Operations management is the administration of organizational systems through the use of planning and control techniques in a dynamic environment.

Scope of Study

This text uses an environmental systems approach. It covers both domestic and foreign operations. A historical view of the development of operations management is presented to clearly delineate the areas of similarity and dissimilarity between operations management and production management. A systems approach affords the critical perspective in which production planning and control area are discussed. Different functional applications of operations management are included. A step-by-step analysis is made in the narration of the theory of each chapter. The techniques of operations management are included, although in a selective manner.

The scope of the book can be better understood by the observation that the conceptual material included in the book is a blend of both the qualitative and the quantitative aspects. No effort is made to make it an all-inclusive treatise on all statistical, mathematical, quantitative, and computer-based techniques of operations analysis. Emphasis is placed on application, rather than on narrative descriptions of these techniques. Each chapter focuses on the theory of operations management by first including a section on the theoretical

part and then by integrating a case study with it.

Operations Management Relationships

The nature of operations management is such that the functions of management are very intimately connected with and related to the operations analysis programmes. These functions of planning, controlling, organizing, staffing, directing, motivating, leading, and coordinating are all inter-dependent. Their relationship patterns are now discussed in detail.

Operations Management and Planning

Inasmuch as planning is the ability to look into the future and develop rational tactics thereof, operations management has several areas of relationships characterising its planning commitment. Operations planning, logistics planning, facilities planning, personnel planning, production planning, inventory planning, marketing planning, and information systems planning are all components of operations analysis requiring a thorough understanding and review of planning theory and practice. Both strategic and tactical planning require the use of operations orientation.

Operations Management and Control

As control is the ability to take corrective action in time with a view towards ensuring the final success of the planning mechanism, operations management uses a number of different control functions, processes, and techniques. Some of these are operations control, inventory control, use of budgetary and forecasting control, techniques of gaming, PERT and CPM, and the deployment of control strategies related to information systems.

Operations Management and Organization

Inasmuch as organization involves grouping of tasks, workers, and functions in a structured entity, operations management uses an organizational approach in several of its basic activities. Both formal and informal processes of organization interact with operations management. Each major operation requires a supportive organizational base for

carrying out the mission. The operational personnel—both line and staff—must be organizationally oriented otherwise they may not be totally effective.

Operations Management and Staffing

Since staffing involves matching individual with a job, it uses several operationally focused concepts of management. These include *inter alia* job structuring, job engineering, job analysis, wage and salary formulation, analysis of performance standards, and training. The parameters of each job need to be operationally restructured in order to make it truly productive and functionally viable.

Operations Management and Directing

Directing is the process of assuming authority, power, and overall functional control over an administrative task. It requires the permission of the chief executive who is the “apex” in any organizational entity. Depending on the level of technology in the firm, “directing” can be done by using operational management ideas profitably for the entire firm. Operational personnel can also learn the process of directing and thus use several functions of directing like delegation of authority, functional control and communication.

Operations Management and Motivation

Motivation involves the application of the “right” stimulus to obtain the desired improvement in the subject’s performance. Inasmuch as motivation tools are essential to obtain optimum effectiveness, operations managers can use them for the same ends. Similarly, people engaged in the task of developing the “right” stimuli for individual employees can also use operational techniques to develop the “right” approach to what the worker requires in the way of his chosen motivating instrument.

Operations Management and Leadership

The objective of leadership is to provide situational guidance, inspiration, and stimulus to the work-group. The group looks up to the leader as its catalyst and change-agent. There are various theories regarding leadership behaviour.

The one which uses operational techniques most effectively is the situational theory of leadership. Decisional situational analysis—a major component of operations management interacts with the situational leadership theory.

Operations Management and Coordination

Coordination is the process through which all functions, activities, processes, and operations are integrated for achieving a common mission or purpose. In the increasingly complex organizations of today, the process of coordination is very important in establishing a sense of direction, discipline and functional unity. Operations management uses the techniques of management information systems, centralized data base, and strategic planning to achieve coordination.

Operations Management and Business Functions

Operations management involves the *total* process of transformation in the actual business activity. This totality encompasses all business functions like marketing, personnel, finance, accounting, production, research, and international trade. The impact of operations management on various business functions is now discussed in detail.

Operations Management and Marketing

Marketing is the creation and maintenance of a standard (and level) of living. This concept of marketing is deeply influenced by operations management. The theory of gaming is used in establishing marketing strategy and competitive approach. Budgeting and forecasting are two primary sales techniques used in strengthening aggressive sales performance. PERT and CPM are used in developing product life-cycles and new products. The model building approach is used in distribution, advertising, and marketing research. Finally, marketing information systems are also designed to improve the total marketing impact of the firm.

Operations Management and Personnel

Personnel management is the overall administration of the work-force in the organisation. It activates several operationally focused techniques/tools of operations management. Some

of these techniques include planning for employment, control of performance, merit rating, job engineering, and systems analysis.

Operations Management and Finance

Finance is the management of all monetary inputs of the firm. It uses operations management in most of its concepts and practices. Some of these applications are to be found in cash flow analysis, budgetary process, financial ratio analysis, capital structures, capital formation, expense budgeting, forecasting techniques, depreciation decision, and statistical calculations. The quantitative nature of financial management lends itself to effective operational orientation.

Operations Management and Accounting

Accounting is the history of the firm's growth. As such, it involves the establishment of adequate information systems and managerial orientation towards the corporate assets/liabilities. In its advanced applications, it assumes significantly sophisticated dimensions of administrative decision-making. It uses several operations management concepts inasmuch as it records every single "operation" within the firm and often certain operations external to the firm. In various aspects of managerial accounting, cost control, standard and average costing behaviour, budgetary reviews, and cash flow projections, the applications of operations techniques become quite effective.

Operations Management and Production

Production is management of the firm's manufacturing process. At one stage in the development of operations management, the terms "production management" and "operations management" were interchangeable. It is only since the use of production concepts in non-manufacturing areas that a distinction between these two terms has begun to be appreciated. As such, the impact of production on operations management and *vice versa* is quite significant.

Operations Management and Research

Research in the corporate context involves the creation of

new products, processes, and methods for higher organisational profitability. It is a creative as well as an adaptive process. Operational management uses several primary and secondary research tools in all its functional and investigative activities. Similarly, research personnel use various operational techniques in their work area. There is great affinity between these two corporate functions, namely research and operations, because their paths are complimentary to one another.

Operations Management and International Trade

International trade covers a number of related activities including export-import business, foreign subsidiaries, branch administration, multi-national management, licenses, patents, overseas franchises, and collaboration deals. It extends domestic techniques of management in a larger and wider scale of operations. As such, the introduction of the cultural dimension in the international trade context makes the use of operations philosophy essential for the success of a foreign enterprise. Such key considerations as strategy of international operations, overseas linkage-patterns by management information system, and foreign technology are always integral parts of international operations orientation.

PART I

Systems Dynamics