Preface

Operations and supply management (OSM) has been a key element in the improvement in productivity in businesses around the world. Creating a *competitive advantage* through operations requires an understanding of how the operations and supply functions contribute to productivity growth. However, our intent in this book is to do more than just show you what companies are doing to create competitive advantage through OSM. Our overriding goal is to create a competitive advantage for you in the marketplace by conveying a set of skills and tools that you can actually apply.

Three hot topics in business today are Supply Chain Management, Six Sigma, and Enterprise Resource Planning Systems. These topics are studied in the book from the view of the operations function with up-to-date high-level managerial material to clarify the "big picture" of what these topics are and why they are so important to business today. Applications that range from high-tech manufacturing to high-touch service are used in the balanced treatment of the traditional topics of the field. Operations and supply management requires a global perspective for many of the topics. OSM is best done with significant cross-functional integration. Accounting, finance, marketing, human resources management, purchasing, logistics, and engineering impact how firms are run operationally. To highlight our emphasis on services, globalization, and cross-functional integration, we've used the logos you see here in the text margin next to these discussions.


Service


Global


Indian


Cross Functional


Excel

Each chapter includes information about how operations-related problems are solved. These are concise treatments of the many decisions that need to be made in designing, planning, and managing the operations of a business. Many examples and case studies from Indian Organisations have been included in the chapters. Many spreadsheets are also included on the DVD to help clarify how these problems are quickly solved. We've indicated those spreadsheets with the spreadsheet logo shown here in the margin.

OSM should appeal to individuals who want to be directly involved in making products or providing services. The entry-level operations specialist is the person who determines how best to design, supply, and run the processes. Senior operations managers are responsible for setting the strategic direction of the company from an operations standpoint, deciding what

technologies should be used, where facilities should be located, and managing the facilities that make the products or provide the services. OSM is an interesting mix of managing people and applying sophisticated technology. The goal is to efficiently create wealth by supplying quality goods and services.

Features to aid in your understanding of the material include the following:

- Solved problems at the end of chapters to serve as models that can be reviewed prior to attempting problems.
- Key terms highlighted in the chapter outline and their definitions at the end of each chapter.
- Answers to selected problems in Appendix A.
- The student DVD that includes PowerPoint slide outlines of each chapter, Excel® spreadsheets for many of the solved problems and other examples, practice quizzes, ScreenCam tutorials, Internet links, and video segments and clips that illustrate the application of operations concepts in companies such as Xerox, Zappos.com, Six Flags, Caterpillar, Burton Snowboards, Honda, Disney, Ford, and many more.
- Breakthrough Boxes and boxed inserts provide short overviews of how leading-edge companies are applying OSM concepts today. Many of these are specially in the Indian context.

Our aim is to cover the latest and the most important issues facing OSM managers as well as basic tools and techniques. We supply many examples of leading-edge companies and practices. We have done our best to make the book interesting reading and give you a competitive advantage in your career.

We hope you enjoy it.

PLAN OF THIS BOOK

This book is about methods to effectively produce and distribute the goods and services sold by a company. To develop a better understanding of the field, this book is organized into five major sections: Strategy, Processes, Supply Chain Design, Planning and Controlling the Supply Chain, and Scheduling. In the following paragraphs, we quickly describe the major topics in the book.

Strategy is an important and recurring topic in the book. Any company must have a comprehensive business plan that is supported by a marketing strategy, operations strategy, and financial strategy. It is essential for a company to ensure that the three strategies support each other. Strategy is covered from a high-level view in Chapter 2 (Operations and Supply Strategy), and more details are covered in three chapters: Chapter 5 (Strategic Capacity Management), Chapter 10 (Supply Chain Strategy), and Chapter 12 (Lean Manufacturing). Our reason for spreading the strategy material throughout the book is to make things a bit more interesting. In general, we try to give you the "big picture" and then fill in the details with the following chapters.

Businesses have to change to remain competitive. The idea is to get you thinking early in your course about how to organize projects that are needed to manage change. Working on projects is very common and even a predominant organizing approach in companies now. The success of any project is invariably measured by our ability to complete the project on time and within budget. How can we be confident we will meet the objectives? Becoming proficient in managing projects is important to success in operations management. Project Management is covered in Chapter 3. In Chapter 4, we discuss possibly the most complex project that most firms face, the design of products and services.

The second section of the book, titled Processes, focuses on the design of internal processes. Chapter 6, Process Analysis, is a nuts-and-bolts chapter on process flow charting and static process analysis using some

easily understood "real-life" examples. Chapters 7 and 8 cover the unique characteristics of manufacturing and service processes. Important technical material that relates to these design activities is covered in Chapter 7A, Facility Layout, and Chapter 8A, Waiting Line Analysis.

An essential element of process design is quality. Six-Sigma Quality is the topic of Chapter 9. Here we cover Total Quality Management concepts, Six-Sigma Tools, and ISO 9000. Technical details covering all the statistical aspects of quality are in Chapter 9A, Process Capability and SPC. Chapter 13 (Operations Consulting and Reengineering) is designed to show how consultants package the material that is covered in the book. Many students who major in OSM end up working for consulting companies, so this information is particularly valuable. Constraint Management, the focus of Chapter 20, is also used by consultants, as well as being very popular among practitioners. The basic idea is to add resources to production bottlenecks that are constraints or obstacles to producing more profit. It is fairly complex material, so we positioned this at the end of the book so that you would have the background to better understand the ideas.

The third section of the book, titled Supply Chain Design, expands our focus to the entire distribution system from the sourcing of material and other resources to the distribution of our products and services. All companies face critical decisions such as: Where should we locate our facility? What equipment should we buy or lease? How many people should we hire? All of these also directly relate to important financial decisions regarding the capacity of resources that we use. Making fact-based decisions is what operations management is all about, so this book features extensive coverage of decision-making approaches and tools. One useful way to categorize decisions is by the length of the planning horizon, or the period of time, that the decision maker must consider. For example, building a new plant would be a long-term decision that a firm would need to be happy with for 10 to 15 years into the future. At the other extreme, a decision about how much inventory for a particular item should be ordered for tomorrow typically has a much shorter planning horizon of a few months or, in many cases, only a few days. Such short-term decisions are usually automated using computer programs. In the intermediate term are decisions that a company needs to live with for only 3 to 12 months. Often these decisions would correspond to yearly model changes and seasonal business cycles.

A typical initial decision is the nature of a firm's operations strategy. This comes from the mission of the firm itself and is tied to the notion of achieving competitive advantage through the operations and supply system—the broad goal of this book. We introduce linear programming and the important product mix problem in Chapter 2A to get students thinking quantitatively about strategic decisions. Later we use linear programming in plant and warehouse location decisions, manpower planning, and scheduling.

Many different transformation processes are needed to put together a supply chain. In Chapter 12, we discuss the concepts behind Lean Manufacturing and Just-in-Time processes. These ideas are used by companies throughout the world and are key to efficient and quick-responding supply systems. Section Four (Planning and Controlling the Supply Chain) covers the techniques required to actually run the system. This is at the heart of OSM. The basic building blocks are Demand Management (Chapter 15), Sales and Operations Planning (Chapter 16), Inventory Control and Material Requirements Planning (Chapters 17 and 18), and Operations Scheduling (Chapter 19). These daily processes are often partially automated with computer information systems. Coverage of enterprise resource planning systems is the topic of Chapter 14 that starts this section.

In this edition, we have included many Indian case-studies and examples. Some of them are those of Tata Nano, LG Electronics India Ltd, Delhi Metro, Mobile Banking in India, Tata Swach, Indian Railways, Sundaram Clayton, Mumbai *Dabbawalah*, UPTU Academic Excellence Award Model, eNagare System at Maruti, WIPRO, Indian Pharmaceutical Company, Narayana Hrudayalaya, eGovernment Project in India, ONGC ICE Project, Aggregate Forecasting of Electricity Demand, Inventory Management during onset of Recession in India, TOC in Tata Steel, etc. These are either placed at the end-of-chapter or included as a

"Breakthrough" boxed item of a chapter. We have also included brief profiles of a few inspiring Indian leaders of in OSM area. Depending on the context, these have appeared within the text or as case-studies. Some of them are those of Ratan Tata, E Sreedharan, Azim Premji, Anil M Naik, Yasho V Verma, Prem Vrat, Devi Shetty, etc. Profile of these experts would certainly motivate our readers and would help them to appreciate and understand the importance of OSM.

As you can see from this discussion, this material is all interrelated. A company's strategy dictates how operations are designed. The design of the operation dictates how it needs to be managed. Finally, because businesses are constantly being presented with new opportunities through new markets, products, and technologies, a business needs to be very good at managing change.

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