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Operations Management

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- Make sense of complex topics
- Understand key concepts in operations management
- Score your highest in your operations management course

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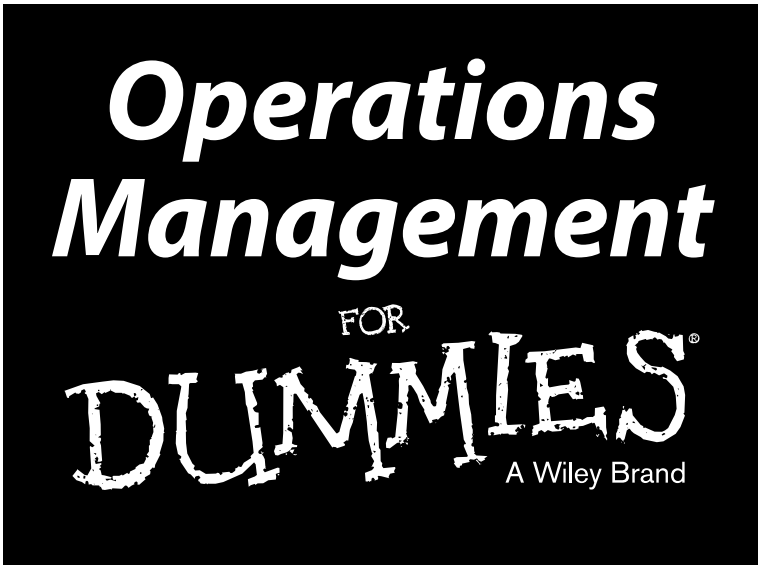

by Mary Ann Anderson, Dr. Edward Anderson, and Dr. Geoffrey Parker

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Operations Management For Dummies®

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Contents at a Glance

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Introduction

We like to think of operations management as the neurological system of a healthy business. It coordinates the behavior and system functionality of living, breathing organizations to ensure that they continue to grow and thrive in the real world. The more complex the organization, the more vital it is for its operations management to be strong and in good working order.

Successful operations management leaders tend to be the well-organized and systematic types of the world. They fuss and arrange and then ponder and tweak. They see the wrinkles and iron them out to ensure that their companies make the most of what they've got. And many people think operations managers thrive on bringing order to chaos, but this shouldn't be the case! In this book we show you how to plan operations and implement those plans so that your company's operations run smoothly — chaos-free.

Maintaining order and efficiency is a fact of life — in business, families, personal relationships, and other human systems. And operations management is essentially the science of managing resources and behavior. But unfortunately, this important field of study is often explained in a way that makes it sound like an exercise in advanced math instead of a vital part of corporate governance and strategy development.

We wrote this book to help you get a handle on the fundamentals of operations management and to make your life more comfortable when dealing with operations. Whether you'll actually be managing operations or just want to understand what goes on in operations, this book is for you. If you plan on taking an operations management course as part of your business major or MBA coursework, this book provides a foundation for your understanding. It will also be there for you when it's time to apply the concepts in real situations as you advance your career!

About This Book

Like all other *For Dummies* books, *Operations Management For Dummies* isn't a tutorial. It's a reference book that, we hope, provides you with as much information as you need on the fundamental concepts of operations management to succeed in your coursework and your entry-level tasks in the real world. Use this book as you need it. That is, don't feel pressured to read it cover to cover — although you'd no doubt be fascinated at every turn! You

can jump right to the topics that are giving you nightmares, get the assurances you need, and be on your way with tips and insight that may not be available in your regular textbooks.

We've done our best to describe operations management concepts in a fun and lively way. We point out the most important theories, techniques, and ways of thinking about managing products, processes, services, supply chains, and projects without all the mind-numbing details, outdated examples, and complicated explanations that fill some other books on this topic. Here's a glimpse of the topics in this book:

- Evaluating and measuring current performance
- Designing processes to meet your objectives
- Improving your processes
- Estimating and predicting demand
- Planning and managing capacity
- Determining the right amount of inventory
- Getting the right products to the right place at the right time
- Selecting and managing suppliers
- Getting the gist of Six Sigma and lean production
- Planning and managing projects
- Scaling operations for the life cycle of your product

Read the chapters in any order, and feel free to go straight to the subjects that interest you. You don't need to bother with a bunch of stuff that you already know — although you may wonder how well you really know it. There is, after all, always room for improvement, right?

As you work your way through this book, keep in mind that sidebars and Technical Stuff icons are skippable. Reading these bits will certainly add to your understanding and appreciation of the topic, but you won't miss anything crucial if you skip over them.

Foolish Assumptions

We're well aware of the fact that you're a one-of-a-kind person with countless unique attributes, but as we wrote this book, we had to make some assumptions about our readers. Here's what we assume about you:

- You're smart, resourceful, and interested in how the world works.
- You have a new interest in operations management. You may be currently taking an introductory operations management course as part of your

business major or MBA studies and need help with some core concepts. Or you're planning to take an operations management course next semester, and you want to prepare by checking out some supplementary material.

- You may have just been promoted into a position of operations management from another field (that has happened to all three of the authors), and you need to learn how to manage operations fast.
- You may be focused on a different field of study and have an interest in what those OM folks do, or you may find yourself promoted into a management position and realize that operations are important to every field; time to get up to speed on OM principles.
- You've had algebra and statistics and remember enough of the basics to get by with a few gentle reminders.

Icons Used in This Book

To make this reference book easier to read and simpler to use, we include some icons to help you home in on certain types of information.

Any time you see this icon, you know the information that follows is so important that it's worth recalling after you close this book — even if you don't remember anything else you read.

This icon appears next to information that's interesting but not essential. Don't be afraid to skip these paragraphs.

This bull's-eye points out advice that can save you time when establishing and analyzing processes.

This icon is here to prevent you from making fatal mistakes in your operations management work.

Beyond the Book

In addition to the material in the print or e-book you're reading right now, this product comes with some access-anywhere goodies on the web. Check out the free Cheat Sheet at `www.dummies.com/cheatsheet/operationsmanagement` for helpful formulas and more.

Where to Go from Here

This isn't a novel — although you may find as many twists and turns as there are in the best whodunit. But this book is set up so you can follow the information in any given section or chapter without reading it cover to cover. It's possible for you to know what's going on even if you skip around.

The book is divided into independent parts so that you can, for instance, read all about managing risk without having to read anything about project management. Take a look at the table of contents to see what topics we cover where.

If you're brand-new to operations management, we suggest starting with Part 1. In this part you can find everything you need to know about processes. Regardless of your field or career path, this part can help you understand processes that affect everything you do.

If your interest is primarily related to quality, then you may want to start in Part III, which focuses on quality management and improvement and highlights the popular Six Sigma methodology. If you've recently been assigned to a product development team, then Part IV is likely to be your favorite; find the basics you need to get a solid start on your new job.

If you're not sure where to start, no problem — that's exactly what this book is for. Be vintage about it: Start at the beginning and read through to the end. We expect that you'll gain useful knowledge from every page that you can use to ace your operations management course and advance your career.

Part I

Getting Started with Operations Management

web extras

For Dummies can help you get started with lots of subjects. Visit www.dummies.com to learn more and do more with *For Dummies*.

In this part . . .

- Get the lowdown on the fundamentals of operations management and understand why it's so essential to successful businesses.
- Learn how to document and improve your business processes in order to gain a decisive advantage over your comany's competitors.
- Figure out what you want to accomplish and then determine whether you have the processes in place to meet that goal. If your processes need improvement, find out how to improve them in a structured and systematic way.
- Discover how to overcome common process management challenges, such as shared resources, batching, and rework to keep things running as smoothly and efficiently as possible.
- Make your job as an operations manager easier by ensuring that you're designing processes that create a product in the best way possible, keeping costs low and profit margins high.

Chapter 1

Discovering the Fundamentals of Operations Management

In This Chapter

- Understanding the function and value of operations management
- Getting a handle on business models and processes
- Facing key challenges in operations management

Operations — a set of methods that produce and deliver products and services in pursuit of specific goals — are the heartbeat of every kind of organization, from iron foundries and hospital emergency wards to high finance and professional services. Well-designed operations enhance profitability. Poor operations, at best, equal ineffective processes and wasted resources. At worst, poor operations can drive a company out of business. Therefore, managing operations with competence is vital to meeting strategic goals and surviving financially.

In this chapter we point out what's part of operations and what isn't. We also describe key concepts in the world of operations and tell you what you can do to improve operations in a business or any other type of organization.

Defining Operations Management

When most people think of operations management, if any picture comes to mind at all, an image of a large factory billowing smoke often emerges. And, yes, factories that billow smoke are indeed performing operations, but

they're only a small subset of everything that's involved with operations management. Ultimately, operations determine the cost, quality, and timing of every interaction an organization has with the people it serves.

In this section we tell you exactly what operations management is — and what it's not. Moreover, we point out why operations are such a critical part of an organization and why all departments must care about operations for an organization to be successful.

Getting beyond the smokestack

No job is so simple that it can't be done wrong.

—Message in a Chinese fortune cookie

Operations management is the development, execution, and maintenance of effective *processes* related to activities done over and over, or to one-time major projects, to achieve specific goals of the organization.

Operations management covers much more than smokestacks or manufacturing parts and products; it also encompasses services and all sorts of projects and initiatives that groups of people undertake together. From restaurants and fast-food joints to medical services, art galleries, and law firms, operations management ensures that organizations minimize waste and optimize output and resource use for the benefit of customers as well as everyone else with skin in the game, or the *stakeholders*.

Doing something a little inefficiently one time is no big deal, but when you do something inefficiently over and over, hundreds or even millions of times per year, even little mistakes can add up to very expensive amounts of waste. Mistakes in an operation that result in defective products, even if they represent only 1 percent of total output, can alienate millions of customers. Similarly, if poorly designed operations result in habitually serving customers late, a company will eventually lose customers to better-functioning competitors.

In for-profit firms, operations management is concerned with the cost-effective operation and allocation of resources, including people, equipment, materials, and inventory — the stuff you use to provide goods or services for customers — to earn the big bucks and maximize your return on investment. Just look at the annual reports of big successful firms. Some, like ExxonMobil, take pride in their operational excellence. In the case of ExxonMobil, just 1 or 2 percentage points better energy efficiency or plant up-time can represent millions in additional profit.

In nonprofit organizations, managing resources is also vital. Here, operations management may be concerned primarily with maximizing a specific metric, such as people served while staying out of the red.

Seeing the relevance of operations management

Operations management is a fundamental part of any organization. In fact, *Forbes* magazine reported in 2011 that about three quarters of all CEOs came from an operations background. Not all these CEOs studied operations in school; only some of them did. Many majored in finance, marketing, information systems, or engineering and ended up in operations at some point in their careers.

Even if you don't want to be a CEO or ever work in operations, you'll probably have to work with operations people during your career. So consider these facts about the impact of operations on various business functions:

- **Engineering:** Engineers are notoriously great with numbers and focus. That doesn't always translate to being great with operations. Operations analysis is both quantitative and intuitive, and engineers without operations training can — and do! — waste millions of dollars when tasked to oversee operations. For maximum benefit, you need to evaluate the individual process in the context of the overall system of processes it connects to. So some operations knowledge can help engineers place their analysis of an individual process into an overall context of the operations system.
- **Finance:** Corporate finance folks exercise oversight over budgets, so having some operations knowledge can help this team make good decisions. For instance, when an operations leader asks for money to *de-bottleneck* a process (check out Chapter 3 for information on bottlenecks), knowing what this means tells you the intent is to increase the capacity of an existing operation. This almost always makes more economic sense than building a new plant. It also makes it easier to evaluate costs and benefits of the investment. Otherwise, you may suspect it's like spending money to put paint on an old jalopy.
- **Information technology (IT):** A big part of IT within some companies is to automate operations. Knowing the core principles of operations can help these folks build an operations superhighway instead of paving a cow path. Companies tend to easily accept the traditional way of doing things without question. There's a great temptation to simply automate an existing process with imbedded inefficiencies. Some knowledge of operations may help IT professionals to more effectively partner with operations management people to truly create competitive advantage by improving processes while they automate.
- **Marketing:** When the marketing folks come up with a new product idea or promotions concept, they need to talk to operations to find out

whether it can be produced profitably. If the answer is no — operations managers are sometimes a grumpy lot — persuading them to find a solution may be easier if marketing can speak the language of operations and understand their concerns.

Understanding the Process of Operations

The field of operations management isn't always intuitive. Ultimately, the intent is to eliminate waste and maximize profitability. Depending on the type of organization and its specific goals, operations can be managed with a wide range of strategic approaches and techniques.

This section describes some of the major aspects of operations that often trip up people who study and work in this field.

Driving the business model

An organization's business model should influence operations strategy; likewise, operations strategy drives the business model (see Figure 1-1). The *business model* — which identifies the target market, the product or service available for sale, pricing, marketing, and overall budget — is intimately entwined with operations.

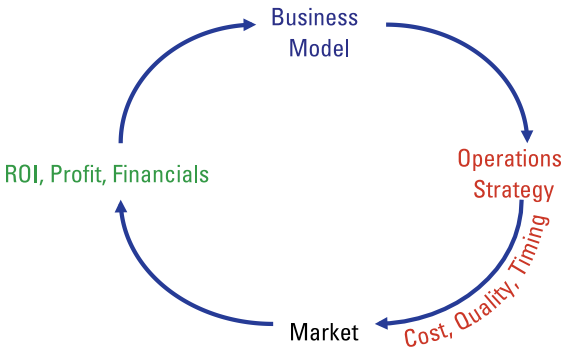

Illustration by Wiley, Composition Services Graphics

Figure 1-1: The business model drives operations, and operations drive the business model.

In other words, operations determine the cost, quality, and timing of the value proposition that a company delivers to its customers. Operations determine the customer experience, whether it's a service or a tangible product. If the customer experience is good, then financials also tend to be good — and there are always ways to further improve the business model (much more on continuous improvement later). If, on the other hand, operations and the customer experience are poor, then financials are also likely to be poor. This situation calls for a reevaluation of the business model, the operations strategy, or both.

In the pragmatic gray area of the real world, operations at a company may be independently good in some areas but out of alignment with the business model. For example, if the operations strategy emphasizes low cost, but the business model relies on using customization to obtain a higher markup from customers, then a company is functioning with fundamentally incompatible goals, making the "good" operations ineffective.

Recognizing the diversity of processes

Processes vary in thousands of ways for different kinds of organizations with different kinds of needs. Start-up firms need to scale up rapidly, and the restaurant business requires some artistry. Pharmaceutical companies must stay focused on strict regulations, and firms in the personal computer industry need to worry about their products' shelf life (find details on the product life cycle in Chapter 18). To manage operations effectively, you need to understand a company's processes in context of its business model and industry.

This section highlights some important characteristics of organizations that can help illustrate the nature of certain processes.

Customer interface

Processes vary quite a bit based on the amount of face time with customers they involve. Service processes that don't directly interface with customers, such as reconciling checks, are more like manufacturing processes than processes that involve interaction with customers. After all, reconciled checks, like pizzas or widgets, don't become upset if the resource processing them doesn't smile. Nor do they get confused by poor signage, waiting in line, or bad process design.

The customer interface aspect of operations also differs based on whether the customer is the end consumer, known as a *B2C relationship,* or another business, or *B2B relationship:*

- B2C firms tend to market products to a lot of customers who each purchase a small quantity of units.
- B2B firms tend to deal with a small number of customers with high quantity demands that require heavy customization and significant customer service.

In general, business customers are much less forgiving of late deliveries than end consumers.

Scale

The scale of an operation definitely impacts operations. Producing thousands of parts or serving thousands of customers per hour is quite different from handling only a few. If a company is working by the thousands, then automation may make a lot of sense because the fixed costs of automation can be spread out over many customers. A low-volume operation typically requires more flexible processes, which may rule out automation.

Customization

If a company's product or service is highly customized, then flexibility in processes is extremely important. Automation may not be practical. Producing products before a customer places an order is also impractical in many of these situations, and this may prevent a business from obtaining *economies of scale,* which refers to the fact that it becomes increasingly cheaper to produce a unit of something as unit volume grows. Customizing products usually means higher production costs per unit and higher prices for customers.

Customer priorities

Successful businesses know what matters most to their target customers: time, cost, or quality. If time is most important, you may try to produce the product before the customer orders it. If cost is the priority, maximizing economies of scale — possibly through level production runs or outsourcing (covered in Chapter 17) — is critical. An emphasis on quality may require more expensive materials and equipment to make the product.

Managing processes

Although processes vary in many ways, they also share some common characteristics that apply across a broad spectrum of operations.

Nearly all processes in operations have three major components:

- **Inventory:** This includes not only the *finished goods inventory* (products that are complete) but also jobs (products or services) that are only partly complete in your process (known as *work in progress,* or WIP).
- **Materials:** These are the items needed to make a product or provide a service.
- **Resources:** The equipment, information systems, and people in an operation that make the product or provide the service are considered resources.

Assuming that the business model is aligned with operations strategy, effectively managing inventory, materials, and resources achieves the two goals of operations management: efficiency and risk management. Here are some ways to manage these laudable goals:

- **Standardize the process and draw it out.** Before you try to modify any process, standardize it and all the operations within it. Drawing a standardized process is the first step of process management (see Chapter 2). And don't get hung up on making this perfect. Even a rough process drawing can help you spot trouble points in the process, and the drawing can be perfected later as you work to improve the process.
- **Use resources effectively.** The key to utilizing resources effectively is to find the bottleneck. The *bottleneck* is the resource that limits the capacity of a process, and it can be surprisingly hard to find. It's not necessarily the biggest machine in a process or the most expensive person you employ; it's simply that operation that is the slowest or most rate-limiting in the whole process chain.

  

  The best way to find the bottleneck is to determine which resource on average spends the most time working on each job (unit of product) that's completed by your process (find more on bottlenecks in Chapter 3).

  If you need more capacity, make sure to add it at the bottleneck; adding it anywhere else doesn't help and just wastes it. For non-bottleneck resources, resist the temptation to utilize them 100 percent of the time on the same job (unit of product) because this just ends up creating WIP that builds up.
- **Keep material moving.** Try to minimize the amount of time a job waits around in the process. This is especially important in face-to-face services or when a product is made to order, but using material quickly also matters in standard manufacturing. WIP is essentially tied-up cash that could be used for better purposes (such as collecting interest!). (Flip to Chapter 3 for details.)

- **Keep the process simple.** One mark of a simple process is an easy-to-read process flow diagram (check out Chapter 2 for advice on how to draw a process flow diagram). Complex processes are hard to schedule and manage; they accumulate lots of WIP and hide defects (see Chapter 5 for tips on simplifying processes).
- **Hedge against variability.** Variability in demand is a big problem for process management. If the company sells tangible product from a finished goods inventory, a company can carry extra inventory to ensure that unexpected surges of customer demand are satisfied. However, big inventories are costly. (See Chapter 6 for how to forecast demand and Chapter 8 to set inventories.) Extra capacity to make more finished goods is another tool for managing demand variability and is particularly critical in face-to-face services and make-to-order businesses. But capacity, too, can be pricey. (Find details on capacity in Chapter 7.) Finding the right balance of tools to handle demand variability can provide one of the biggest paybacks from operations management.

- **Don't fall in love with technology.** Avoid the misdirected comfort of assuming that just buying the fanciest information system can solve a company's slew of operational problems. The right technology and aggregate planning (see Chapter 9) can help, but these support tools are not cure-alls; they can't compensate for a basic mismatch of capacity with demand.
- **Manage the supply chain.** A product or service is only as good as the weakest link in the *supply chain,* the network of suppliers that provide the materials, services, and logistics that support an organization (see Chapter 10). If a company can make suppliers into actual partners in the business and integrate them tightly into product development and productivity improvement efforts, profitability follows (see Chapter 11).
- **Improve quality.** Figuring out what the customer actually wants and delivering it is everything in business (flip to Chapter 12). Continuously improving the quality of processes is necessary to keep up with changing customer expectations. Better quality can also reduce waste and improve profitability. Chapter 13 covers quality improvements.
- **Realize it's a system thing.** Operations aren't about doing one thing right. They're about doing a lot of things right — at the same time. This means using resources and materials efficiently, producing high quality goods, and maintaining a reliable supply chain while keeping things simple and managing risk. Got all that? Chapter 11 presents one especially effective way to achieve this: the lean process methodology.