

Lean FOR DUMMIES®

by Natalie J. Sayer and Bruce Williams



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About the Authors

Natalie J. Sayer began studying and applying Lean before it was formally known as Lean. Over her 20-year career in the automotive industry in the United States and Mexico, Natalie honed her skills applying Lean and Organizational Development methods across functional areas of Fortune 130 companies. In 1996, Natalie was an instrumental team member in the Lean transformation of a GM facility in Matamoros, Mexico. The team was awarded the 1996 GM President's Council Honors for the project. While working with General Motors, she had multiple opportunities to visit and learn from New United Motor Manufacturing, Inc. (NUMMI). Natalie has trained, coached, mentored, and rolled up her sleeves to implement Lean practices, whether working in a company or volunteering at a food bank.

She received a Bachelor of Mechanical Engineering from the University of Dayton in 1988 and a Master of Manufacturing Systems Engineering from the University of Michigan in 1992. She is a graduate of Coach University and Corporate Coach University. Natalie is also a Six Sigma Black Belt and a Global Leadership Executive Coach.

In 2003, Natalie founded I-Emerge, an Arizona-based global consultancy dedicated to the facilitation of people and processes experiencing significant change. The I-Emerge toolbox includes executive and personal coaching, group facilitation, Lean methods, public speaking, and Organizational Development tools and assessments. She is a passionate people person, who lives her life with the convictions that “there is always a better way” and “change won't happen without the people.”

Beyond I-Emerge, Natalie can be found on stage acting in musical theater, teaching graduate school, traveling to exotic places, learning something new, working on causes advancing people and literacy, or spending time with friends and family.

Bruce Williams strives for perfection and added value as a scientist, educator, consultant, and entrepreneur. Leveraging the Lean principle of standardized work, this is his third *For Dummies* book in three years, having previously coauthored the best-selling *Six Sigma For Dummies* in 2005 and the *Six Sigma Workbook For Dummies* in 2006.

Undergraduate degrees in physics and astrophysics from the University of Colorado testify to his early pursuit of understanding the ultimate nature of root cause.

He was a sculler in the value stream of aerospace systems, where he shot the rapids in the tumultuous whitewater of the Hubble Space Telescope program. With graduate degrees in technical management and computer science from Johns Hopkins University and the University of Colorado, Bruce elevated his value-stream role to that of tugboat captain, leading and managing technical teams and projects.

A decade of personal *Kaizen* has inspired his continuous journey through technology, software, business development, and management. A *Kaikaku* moment unleashed his entrepreneurial self in 1999. He is now sea captain of Savvi International, charting the deeper value-stream waters of solutions for business performance improvement using Six Sigma, Lean, and Business Process Management.

He lives with his standard family in the rural desert foothills of North Scottsdale, Arizona, flowing just-in-time value in response to their continuous demand pull. He regularly suffers the *muri* of 5S'ing the house on weekends. His hobbies include mucking the *muda* of the family horses.

Dedication

Natalie J. Sayer: To Frank Cooney, Al Billis, and Pam Oakes, my first Lean teachers; to Jim, Patt, and Eric Sayer, my family who support all my endeavors; and to Anne Ramsey, Derek O'Neal, Lori Kobriger, and the rest of my inner circle. Thank you all.

Bruce Williams: To the Lean person within all of us. Recognize and nurture your Lean self. Every waste you eliminate today sets the stage for a better world tomorrow.

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As authors and researchers, we humbly bow to the miracle that is Google.

All people interested in Lean owe their ongoing gratitude to Mark Graban and his associates, who through their blog site translate Lean to the world around us.

As consumers, and on behalf of consumers everywhere, we acknowledge the uniquely groundbreaking contributions of brilliant pioneers W. Edwards Deming, Taiichi Ohno, and Shigeo Shingo, as well as U.S. Lean leaders Norm Bodek and Jim Womack. Through their achievements, we are all better off.

But most of all, we acknowledge the many thousands of Lean practitioners around the world, who regularly confront established structures, functional silos, arcane accounting practices, and entrenched procedures to cut the waste and find the real customer value. You make Lean thrive. You are our heroes.

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Introduction

The principles and practices of Lean organizations are recognized the world over as the most powerful and effective way to build and sustain continuously improving businesses and institutions. Following a Lean path, any business in any industry of any size or type can improve itself continuously over the long term. Led by advancements first pioneered at the Toyota Motor Corporation over 50 years ago, Lean is now established as the most consistently successful approach to organizing and operating any enterprise.

If you're in certain manufacturing industries, or public institutions like the U.S. military, you've probably heard about Lean. You may even have been through a *Kaizen* event or been part of implementing a pull system. If so, you've already experienced some of the power of Lean tools.

But if you're like most people, the term *Lean* itself may be unfamiliar to you, let alone its principles and practices. Even within those businesses and organizations that have adopted Lean methods, most people don't really understand the bigger picture of Lean. Organizations often implement Lean piecemeal, leaving some of the most important elements behind — and with much less than optimal results.

For decades, the whole system of Lean principles and practices was known only to specialized manufacturers, certain academic researchers, and quality gurus. The Toyota Production System (TPS) was the incubator where the methods, techniques, and tools of Lean were pioneered and refined. Its full potential has been a mystery to most organizations and professionals.

All that began to change in the late 1980s, as the term *Lean* was coined to describe the fundamentals of business systems like TPS to the rest of the world. As the understanding of Lean has spread across continents, industries, and organizations, it has become less of a mystery and much easier to understand and implement.

Simply stated, Lean is a philosophy and a proven long-term approach that aligns everything in the business to deliver increasing customer value. It's about orienting people and systems to deliver a continuous stream of value to the customer, and eliminate waste and deficiencies in the process. Lean is an everyday practice at all levels to perform consistently, as well as to consistently improve performance.

About This Book

This book makes Lean accessible to you. We wrote it because Lean is applicable everywhere — it's applicable in large and complex corporations, but also in small businesses and industries, as well as public-sector institutions — at all levels.

We wrote this book for you, the individual. You may be a small-business owner, an ambitious career person, or a manager who wants to know what Lean is and how to apply it. You may be a college student or job applicant who wants to have an edge in upcoming job interviews. No matter who you are, if you want to know more about Lean, this is the book for you.

Lean For Dummies is not just an overview or survey of Lean. It's a comprehensive description of the philosophies and principles of Lean, as well as the methods and tools to put Lean into practice.

This book is

- ✓ A reference book that's organized into parts, chapters, and sections, so that you can flip right to what you need, when you need it
- ✓ A comprehensive text that addresses both the common tools of Lean and the improvement principles and practices
- ✓ A guide for leading a Lean initiative, helping you identify and manage Lean projects, and using Lean tools and procedures
- ✓ Step-by-step instructions for Value Stream Mapping and the methodology of Lean projects
- ✓ Instructions on where you can go for additional help, because the field of Lean is much too large to fit in just a few hundred pages

Lean *is* different, and it contains Japanese terms and ideas that may be foreign to you. But we've taken this difficult subject and made it understandable through examples, simple explanations, and visual aids.

Conventions Used in This Book

When a specialized word first appears in our book, we italicize it, and provide a definition. We also italicize any foreign-language words, including the many Japanese terms that make up the lingo of Lean.

For terms and phrases that industry practitioners use as acronyms, we define the term first and then use it in its abbreviated form going forward.

We put any Web addresses and e-mail addresses in monofont, to set it apart from the rest of the text. When this book was printed, some Web addresses may have needed to break across two lines of text. If that happened, rest assured that we haven't put in any extra characters (such as hyphens) to indicate the break. So, when using one of these Web addresses, just type in exactly what you see in this book, pretending as though the line break doesn't exist.

We use some business-management and statistical concepts and language in the course of the book. To get extra smart on the statistical and problem-solving aspects, check out *Six Sigma For Dummies*, by Craig Gygi, Neil DeCarlo, and Bruce Williams; *Six Sigma Workbook for Dummies* by Craig Gygi, Bruce Williams, and Terry Gustafson. Also check out *Managing For Dummies*, 2nd Edition, by Bob Nelson, PhD, and Peter Economy; *Statistics For Dummies*, by Deborah Rumsey, PhD; and *Coaching & Mentoring For Dummies* and *Managing Teams For Dummies*, both by Marty Brounstein (all published by Wiley).

Foolish Assumptions

We assume you've heard something about Lean and are intrigued and compelled to find out more, for one or more of the following reasons:

- ✔ You're contemplating using Lean in your business or organization, and you need to understand what you might be in for.
- ✔ Your business or organization is implementing Lean, and you need to get up to speed. Perhaps you've even been tapped to participate in a *Kaizen* event or a Value Stream Mapping exercise.
- ✔ You believe Lean is the pathway to better performance in your job and can help you advance your career.
- ✔ You're considering a job or career change, and your new opportunities require you to understand Lean practices.
- ✔ You're a student in business, international business, operations, or industrial engineering and you realize that Lean is part of your future.

We assume that you realize Lean demands a rigorous approach to analyzing the value stream of business processes. We also assume that you accept that Lean practice calls for capturing data and applying analytical tools to discover the true nature of value creation and the causes of waste in your environment. In addition, we assume that you might be from any industry, including manufacturing, service, transactional, healthcare, or even government. For these reasons, we have devoted several chapters of this book to describing and defining the Lean toolset.

How This Book Is Organized

We break this book into five separate parts. Each chapter is written as an independent standalone section, which means you can move around the book and delve into a given topic without necessarily having to read all the preceding material first. Anywhere we expound upon or extend other material, we cross-reference the chapter or part of origin, so you can tie it together.

Part I: Lean Basics

Part I is an overview of Lean, including the pedigree, tenets, and language of Lean. In this part, we address the key tenets underlying the foundation of Lean practice. Chapter 1 is a comprehensive overview of Lean. Chapter 2 addresses the key tenets as well as the language and lexicon of Lean.

Part II: Understanding Flow and the Value Stream

Part II gets into the essence of Lean: understanding the way value is created and flowed to the customer. In four chapters, we thoroughly describe the flow of value. Chapter 3 defines value precisely, in terms of the customer and the end consumer. Chapter 4 introduces and explains the process of Value Stream Mapping, one of the key tools of Lean. Chapter 5 explains how to use a Value Stream Map to define where you want to go and how you'll approach getting there. Chapter 6 explains the principles and practices of *Kaizen* — the basis for continuous improvement.

Part III: The Lean Toolbox

In this part, we present a comprehensive listing and overview of the many customer, value stream, flow, pull, perfection, and management tools of Lean in four chapters. Collectively, these tools form the Lean toolkit.

Chapter 7 describes the many tools used to understand the value stream and customer needs and wants. Chapter 8 describes the flow and pull tools. Chapter 9 covers the perfection tools used within Lean to create standardized work, improve with *Kaizen*, visualization, and everyday improvements. Chapter 10 addresses the management tools of *hoshin*, *gemba*, and the growing suite of software applications that support Lean practice.

Part IV: The Lean Enterprise

Part IV contains five chapters and describes how Lean becomes part of the enterprise. In this part, we explain the issues and challenges with implementing Lean in an organization. Chapter 11 addresses organizational issues specifically. Chapter 12 focuses on the people elements of Lean — often the most overlooked (and risky) part. Chapter 13 addresses the life cycle of a Lean implementation, from strategy to startup and, finally, evolution. Chapter 14 explains how Lean works in the different functions and organization of a business. Chapter 15 addresses Lean in different industries.

Part V: The Part of Tens

This part, in the *For Dummies* tradition, is a compilation of key points of reference. Chapter 16 discusses ten practices for success. Chapter 17 addresses ten pitfalls to avoid. And in Chapter 18, we tell you about ten additional places you can go for help.

Icons Used in This Book

Throughout the book, you'll see small symbols called *icons* in the margins, and these highlight special types of information. We use these to help you better understand and apply the material. When you see any of the following icons, this is what they mean:



These are key points to remember that can help you implement Lean successfully.



When you see this icon, we're cautioning you to beware of a particular risk or pitfall that could cause you trouble.



This icon flags a detailed technical issue or reference. Feel free to skip right over these, if you don't want to dig deeper.



We use this icon to summarize information into short, memorable thoughts.

Where to Go from Here

The beauty of a *For Dummies* book is that you don't have to start at the beginning and slowly work your way through. Instead, each chapter is self-contained, which means you can start with whichever chapters interest you the most. You can use *Lean For Dummies* as a reference book, which means you can jump in and out of certain parts, chapters, and sections as you wish.

Here are some suggestions on where to start:

- ✔ If you're brand new to Lean, start at the beginning, with Chapter 1.
- ✔ Want to know about the basics of Value Stream Mapping? Check out Chapter 4.
- ✔ If you want to know all the tools of Lean, jump in at Chapter 7.
- ✔ Interested in the organizational and people elements of Lean? Go to Chapters 11 and 12.
- ✔ If you want to understand all the Lean lingo and terminology, flip to the glossary.

Lean is a journey. Like any journey, it is exciting and exhilarating, stretching and life altering, challenging and unexpected. But *it is* worth it. We wish you well on this journey. With this book by your side, you have what it takes to live Lean and thrive!

Part I

Lean Basics

The 5th Wave

By Rich Tennant



In this part . . .

Think of Lean as a fitness program for your business. Like a diet and exercise regime for your body, Lean is a way to get your business fit for life, through a focus on your customer, the implementation of new business practices, and the ongoing commitment to continuous improvement. In this part, we fill you in on the foundations, philosophy, and basics of Lean.

Chapter 1

Defining Lean

In This Chapter

- ▶ Knowing that Lean is big
 - ▶ Understanding that Lean is a philosophy, a framework, a methodology, techniques, and tools
 - ▶ Probing the Lean pedigree
 - ▶ Figuring out how Lean fits in with the global family of business improvement systems
-

When you first hear the word *lean*, it conjures up an image. Most likely, you're seeing a mental picture of thin people — like long-distance runners, or those aerobics junkies who somehow don't seem to have an ounce of extra fat on them. Or maybe you're thinking about lean food — the foods that are lower in fat and, of course, much better for you. *Lean* also implies lightweight, in the sense of speed and agility, with a sort of edge or underlying aggressiveness that recalls the rhyme "lean and mean."

That's because the word *lean* suggests not only a physical condition, but also a certain discipline — a mental toughness. The notion of Lean carries with it a commitment to a set of principles and practices that not only *get* you fit, but *keep* you fit. People who are lean seem to be that way not just temporarily, but continuously. Lean people are committed to being lean; they act a certain way in their habits and routines. Lean isn't a fad or diet — it's a way of life.

Now take this concept and apply it to a business or organization. What do you see? What does *lean* mean, business-wise? Back in 1988, a group of researchers working at the Massachusetts Institute of Technology (MIT), led by Dr. James P. Womack, were examining the international automotive industry, and observed unique behaviors at the Toyota Motor Company (TMC). Researcher John Krafcik and the others struggled with a term to describe what they were seeing. They looked at all the performance attributes of a Toyota-style system, compared to traditional mass production. What they saw was a company that:

- ✓ Needed less effort to design, make, and service their products
- ✓ Required less investment to achieve a given level of production capacity
- ✓ Produced products with fewer defects

- ✔ Used fewer suppliers
- ✔ Performed its key processes — including concept-to-launch, order-to-delivery, and problem-to-repair — in less time and with less effort
- ✔ Needed less inventory at every step
- ✔ Had fewer employee injuries

They concluded that a company like this, a company that uses less of everything, is a “lean” company.

And just like that, the term *lean* became associated with a certain business capability — the ability to accomplish more with less. Lean organizations use less human effort to perform their work, less material to create their products and services, less time to develop them, and less energy and space to produce them. They’re oriented toward customer demand, and develop high-quality products and services in the most effective and economical manner possible. (See Table 1-1 for a comparison of mass production and Lean.)

The practice of *Lean* — from here on capitalized because, in this context, it’s a proper noun — is, therefore, a commitment to the set of tenets and behaviors that not only gets your organization fit, but keeps it that way.

Table 1-1 The Lean Enterprise versus Traditional Mass Production

	<i>Mass Production</i>	<i>Lean Enterprise</i>
Primary business	A product-centric strategy. Focus is on exploiting economies of scale of stable product designs and non-unique technologies.	A customer-focused strategy. Focus is on identifying and exploiting shifts in competitive advantage.
Organizational structure	Hierarchical structures along functional lines. Encourages functional alignments and following orders. Inhibits the flow of vital information that highlights defects, operator errors, equipment abnormalities, and organizational deficiencies.	Flat, flexible structures along lines of value creation. Encourages individual initiative and the flow of information highlighting defects, operator errors, equipment abnormalities, and organizational deficiencies.
Operational framework	Application of tools along divisions of labor. Following of orders, and few problem-solving skills.	Application of tools that assume standardized work. Strength in problem identification, hypothesis generation, and experimentation.