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Natalie J. Sayer

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*Coauthor of Six Sigma For Dummies
and Six Sigma Workbook For Dummies*

**Foreword by Robert Miller, Executive Director,
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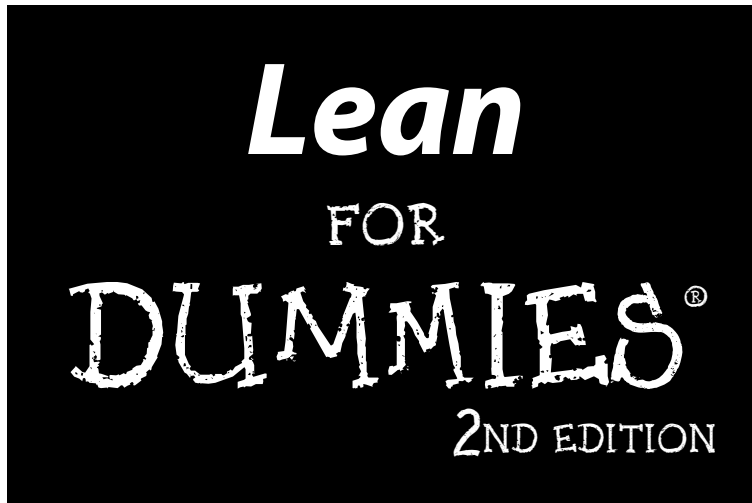
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by Natalie Sayer and Bruce Williams



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About the Authors

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She brings a unique blend of people, process, and cultural skills to every project. Natalie has a Bachelor of Mechanical Engineering, a Masters of Manufacturing Systems Engineering, is a graduate from Coachu, a professional speaker, a Six Sigma Black Belt, a Global Leadership Executive Coach, and an actress. She is a passionate people person who lives her life with the convictions that “there is always a better way,” “change won’t happen without the people,” “adjust yourself accordingly,” and “learn from every life experience and move on.”

“To strive, to seek, to find and not to yield” —Alfred, Lord Tennyson

Bruce Williams strives for perfection and added value as a scientist, educator, consultant, entrepreneur, and executive. Leveraging the Lean principle of standardized work, this is now his seventh *For Dummies* work, dating from 2005, on topics including Six Sigma, Lean, Business Process Management, and Process Intelligence.

His undergraduate degrees in physics and astrophysics from the University of Colorado testify to his early passion to uncover the ultimate nature of root cause. He then was a sculler in the value stream of aerospace systems, where he shot the rapids in the tumultuous whitewater of the Hubble Telescope program. With graduate degrees in technical management and computer engineering from Johns Hopkins and the University of Colorado, Bruce then elevated his value stream role to tugboat captain, leading and managing technical teams and projects.

Decades of *kaizen* inspired his continuous journey through high technology, software, process improvement, and strategic management. A *kaikaku* moment once unleashed his entrepreneurial self in 1999; he is now charting the deeper value-stream waters as an executive with Software AG.

He lives with his standard family in the rural desert foothills of northern Scottsdale, Arizona, flowing just-in-time value in response to their continuous demand pull. He regularly suffers the *muri* of 5S’ing around the house and occasionally pursues the unattainable ideal state of par golf.

Dedication

To all Lean leaders who “get it,” who know that Lean happens through the people, is sustained by the culture and is a long-term journey of excellence in enterprise. To my inner circle: you enrich my life by supporting, guiding, cheering, and challenging me at every turn. To my family who is always there no matter what. Thank you all.

— Natalie J. Sayer

To my children: my daughter, Hannah, who has always been keenly able to help net-out just what is and what isn't “value-add,” and my son, Evan — the greatest personification of 5S I'll ever know. You both just seem to practice *kaizen* naturally, and inspire me to do the same. I dedicate this work to you.

— Bruce Williams

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As authors and researchers, we humbly bow to the continuing miracle that is Google, and also to the ubiquitous multi-sensory stimulative and collaborative experience that is Starbucks, whom we recognize both as consumers and for their Lean initiative.

As consumers, and on behalf of consumers everywhere, we acknowledge the contributions of the brilliant pioneers who have contributed to the evolution and dissemination of what we now know as Lean: W. Edwards Deming, Taiichi Ohno, Shigeo Shingo, Norm Bodek, James Womack, and Jeffrey Liker.

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

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Foreword

Something deep inside of almost every person tells us that it is good to improve. It is better to move forward than it is to move backward. It is better to move faster than slower. Personal contribution to a relentless pursuit of perfection is perhaps the most exhilarating thing that can happen to an individual, followed closely by being recognized for that contribution.

I love being a part of an organization that has its roots in recognition. Recently, we substantially raised the bar for what is required to receive a Shingo Prize to include an evaluation of the culture. Many very experienced Lean leaders, when first exposed to this much higher standard, strongly advised against what we were attempting to do. They said, “The standard is too high; no one will be able to meet it. Your expectations are far greater than almost any organization is capable of performing.” This was exactly what we wanted to hear.

We knew that something had to shake business out of the wasteful cycles of program- and tool-oriented improvement initiatives that have become commonplace. In my role as executive director of The Shingo Prize for Operational Excellence (named for Japanese industrial engineer Shigeo Shingo who distinguished himself as one of the world’s thought leaders in building operational excellence), I have observed firsthand the many failed improvement programs that have come and mostly gone in most organizations all over the world. “flavor of the month” is the universal descriptor for these initiatives.

Everyone seems to recognize this wasteful practice, but few know how to stop it. Each new flavor seems so attractive, so logical! Doing nothing is never an attractive option, so in we jump, hoping against hope for a different outcome. Lean has the potential to become one such flavor.

This new edition of *Lean For Dummies* goes a long way toward exposing the necessities of a successful Lean deployment. The authors not only teach the tools and methodologies associated with Lean, but more importantly help to make the connections between the tools and techniques and the principles and concepts behind them. Shigeo Shingo said, “It is not enough to teach people how to do something; they need to know why.” Correct principles are “the why.”

When people understand “the why” behind “the how,” they become empowered to act independently and to take initiative. Creating a culture of Lean requires every single individual in an organization become fully engaged in continuous improvement. When people understand the principles behind the tools, they become capable of innovating the application of the tools to their unique problems. One successful improvement followed by another, slightly different, and then another, different yet, unleashes a continuous flow on innovation, enthusiasm, and commitment to a never-ending journey.

No one that has tasted the fruit of continuous improvement can ever again be satisfied in an environment of mediocrity and stagnation. Associates who learn the principles and tools associated with Lean become change agents, leaders, inspirational and powerful. This happens from the very top of an organization to the very bottom. I have observed over and over that a powerful leader at the bottom of the organization is no less impactful than one at the top.

This second edition of *Lean For Dummies* rightfully acknowledges that organizations cannot afford to implement Lean the same way they implemented JIT, TQM, and a plethora of similar programs. By emphasizing Lean principles and insisting on cultural transformation, Sayer and Williams empower the reader to break the cycle of failed programs and create a lasting culture of continuous improvement.

Robert D. Miller
Executive Director, The Shingo Prize for Operational Excellence

Introduction

Lean is recognized globally as a one of the most powerful and effective ways known to build, improve, and sustain businesses and institutions. Following a Lean path, any business in any industry of any size or type can improve itself continuously — both in the short term and over the long term. Led by advancements first pioneered at the Toyota Motor Corporation over 50 years ago and since translated and refined by experts and practitioners world wide, the principles, methods, and practices of Lean constitute a successful approach to organizing and operating any enterprise.

If you're in certain manufacturing industries, healthcare facilities, or public institutions, you've probably heard about Lean. You may even have been through a *kaizen* event or been part of implementing standardized work. If so, you've already experienced some of the power of Lean tools. But if you're like many people, while the term *Lean* itself may be familiar to you, its principles and practices are not.

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

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

Simply stated, Lean is a proven long-term approach to aligning everything in a business or institution to deliver increasing customer value. It's about engaging people and aligning systems into processes that deliver a continuous stream of value to customers while continuously eliminating waste and deficiencies in the process. But Lean techniques are not just for specialists; Lean is an everyday practice, performed by everyone, at all levels, 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 — and it applies at all levels.

We wrote this book for you, the individual. You may be a small-business owner, an ambitious career person, a hospital administrator, or a manager who wants to know what Lean is and how to apply it. Your company may be adopting and applying Lean. 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 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
- ✔ A guide to engaging people successfully in a Lean organization
- ✔ 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 John Wiley & Sons).

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 you realize Lean demands a rigorous approach to analyzing the value stream of business processes. We also assume you believe that change only happens through engaged people working together, intelligently to solve problems and improve processes and designs. And we assume 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 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 six 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 principles and language of Lean. Chapter 1 is a comprehensive overview of Lean. Chapter 2 addresses the key principles as well as the language and lexicon of Lean.

Part II: The Lean Culture

Part II focuses on the often overlooked Respect for People aspect of Lean. Chapter 3 looks at Lean in the organization, including principles, behaviors, and change. Chapter 4 shows Lean and change at an individual level. Chapter 5 covers the organizational strategy and evolution of Lean.

Part III: Understanding Flow and the Value Stream

Part III 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 6 defines value precisely, in terms of the customer and the end consumer. Chapter 7 introduces and explains the process of value-stream mapping, one of the key tools of Lean. Chapter 8 explains how to use a value-stream map to define where you want to go and how you'll approach getting there. Chapter 9 explains the principles and practices of *kaizen* — the basis for continuous improvement.

Part IV: 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, Part III and Part IV cover the tools that form the Lean toolkit.

Chapter 10 describes the many tools used to understand customer needs/wants and to deliver customer value. Chapter 11 describes the flow and pull tools. Chapter 12 covers the perfection tools used within Lean to reduce variation, create standardized work, enable management-by-eye, and improve every day. Chapter 13 addresses the management tools of *hoshin*, *gemba*, and management information tools.

Part V: The Lean Enterprise

Part V contains three chapters and describes how Lean becomes part of the enterprise. Chapter 14 explains how Lean works in the different functions and organization of an enterprise. Chapter 15 addresses Lean in different industries. Chapter 16 shows five real-life case studies in different organizations.

Part VI: The Part of Tens

This part, in the *For Dummies* tradition, is a compilation of key points of reference. Chapter 17 discusses ten practices for success. Chapter 18 addresses ten pitfalls to avoid. And in Chapter 19, 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.



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 want.

Here are some suggestions on where to start:

- ✓ If you're brand-new to Lean, start at the beginning, with Chapter 1.
- ✓ Interested in the organizational and people elements of Lean? Go to Chapters 3 and 4.
- ✓ Want to know about the basics of value-stream mapping? Check out Chapter 7.
- ✓ If you want to know other Lean tools, jump in at Chapter 10.
- ✓ If you are interested in real world examples, go to Chapter 16.
- ✓ 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



"I'm writing the corporate bylaws. How do you spell 'guillotine?'"

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, philosophies, and basics of Lean.

Chapter 1

Defining Lean

In This Chapter

- ▶ Defining Lean as a philosophy, a framework, a methodology, techniques, and tools
 - ▶ Probing the Lean pedigree — what it is and isn't
 - ▶ Understanding Lean and Toyota — the history and the present
 - ▶ 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. Maybe you're thinking about lean food — the foods that are lower in fat and, of course, much better for you. The term *lean* also implies a 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 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. 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. Table 1-1 shows a contrast between a traditional mass production organization and a Lean enterprise.

And just like that, the term *lean* became associated with a certain business capability — the ability to “do 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. Lean organizations are also better oriented toward customer demand, and develop a higher quality of products and services in the most effective and economical manner possible.

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 principles 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 strategy	Focus is on exploiting economies of scale of stable product designs and non-unique technologies. A product-centric strategy.	A customer-focused strategy. Focus is on identifying and exploiting shifts in competitive advantage.

	Mass Production	Lean Enterprise
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.

In this book, we fill you in on the origins, applications, and continuing evolution of Lean, which is now an established science and a mature global practice. Although Lean has a toolset, it is much more than a set of tools. Lean is a philosophy, an approach to your life and work. Lean is a journey, without a predefined path or end state. It's a way to go forward that guarantees continuous improvement. Lean isn't a diet or a fad; it's a disciplined way of life.

What Is Lean?

Lean is a broad catchphrase that describes a holistic and sustainable approach to using less of everything to give you more. Lean concepts aren't new; companies large and small around the globe have practiced the techniques in various forms for decades. The term *Lean* can be described by the following ideas:

- ✓ Maintaining an unrelenting focus on providing customer value
- ✓ Respecting people most of all
- ✓ Adopting a philosophy of continuous learning and everyday improvement

- ✓ Using techniques for reducing variation and eliminating waste
- ✓ Taking the long-term view
- ✓ Improving value not just locally, but globally — across the whole “value stream”
- ✓ Providing exactly what’s needed at the right time, based on customer demand
- ✓ Leading by focusing not just on results, but *how* results are achieved, where customer value is created, and by building capability in employees
- ✓ Building long-term relationships with all its stakeholders, including employees, managers, owners, suppliers, distributors, customers, the community, society, and the environment
- ✓ Keeping things moving — flowing — in a value-added, effective manner

Lean means less of many things — less waste, shorter cycle times, fewer suppliers, less bureaucracy. But Lean also means more — more employee knowledge and empowerment, more organizational agility and capability, more productivity, more satisfied customers, and more long-term success.

Although the term *Lean* was originally associated with manufacturing and production processes, Lean covers the total enterprise, embracing all aspects of operations, including internal functions, supplier networks, and customer value chains. A broad range of industries — including automotive, aerospace, banking, manufacturing, retail, construction, energy, healthcare, and government — have applied Lean.



The Shingo Prize, called “the Nobel Prize of Manufacturing” by *Business Week*, was developed to promote Lean practices, and has been awarded in North America each year since 1988. Honoring the renowned engineering genius Shigeo Shingo, its purpose is to “promote awareness of Lean manufacturing concepts.”

These broad definitions and history are all interesting enough, but what really matters is that the world’s customers are the better for it — much better, in fact. It’s been invisible to many people, but Lean has brought to everyone vastly improved products and services, and it’s brought them faster, cheaper, and more reliably. Its successes have saved billions of dollars. Its competitiveness has forced traditional functional organizations to retool themselves and focus on customer value. And it has equipped struggling companies and industries with methods and techniques to improve performance.

The logic of Lean

In Lean, you pursue the ideal state of perfect processes and performance. You seek to understand the sources and root out the causes of waste (more on this in Chapter 2). The practice of Lean as the root-cause eliminator of wastefulness is based on a core set of fundamental assumptions. Follow this logic:

- ✔ **You provide products and/or services to your customers.** The customer has the need and defines the purpose. It all begins and ends with what your customer requires. Everything else is fluff.
- ✔ **The customer is the one true arbiter of value.** Your customer is willing to exchange their capital for your product or service only when they believe it's a fair exchange of value. It has to be the right combination of the right quality of products and services, in the right place, at the right time and at the right price.
- ✔ **Value-creation is a process.** You create value for your customer through a combination of steps — such as marketing, design, production, processing, delivery and support — rightly performed, that result in the products and/or services that the customer will properly value.
- ✔ **Waste diminishes the process of value creation.** Things that creep in and prevent the steps in your processes from flowing quickly and effectively will inhibit your ability to create customer value.
- ✔ **A perfect process has no waste.** If every step in the process is fully capable, acts only when necessary, flows perfectly, and adapts to perform exactly as needed, the process will develop and deliver products and services perfectly — without waste. This is the ideal state.
- ✔ **Pursing perfect processes maximize customer value.** The closer to perfection your processes become, the more effective the creation of value, the more satisfied the customers and the more successful the endeavor.



People create value. They implement the processes and utilize technology and equipment. Rooting out waste through Lean depends on creating the right culture and environment, where people are engaged, innovative, and perform meaningful work.



Some organizations believe in “being practical” and don’t strive for the “perfect process.” Lean warns you to not set your sights too low. Perfection through Lean is a journey, not a destination. Although your next practical implementation may be far from the ideal, you must always have a vision for what the ideal could be.

Where is Lean?

You can apply Lean wherever there is waste, and anywhere there is opportunity for improvement. In other words, Lean applies everywhere. It's not confined to any particular part of the organization or within any particular function. Lean practices apply across the board.

It's in the enterprise

Lean is a business-improvement initiative, best applied enterprise-wide and ingrained in the organizational culture. A common misconception holds Lean is a sort of manufacturing quality program. Not so! The philosophy, principles and practices of Lean are applicable anywhere, and they are most effective when applied across the entire organization (see Chapter 14).

Think of Lean in the enterprise not as a group of functional or departmental practices, but as a set of multidisciplinary practices that cross functional lines. This is because Lean focuses on the processes that create customer value, which by their nature are cross-functional. Examples include the:

- ✓ Supplier-assembler process
- ✓ Assembler-distributor-customer process
- ✓ Marketing-design-development process
- ✓ Patient care-administration-insurance process
- ✓ Employee acquisition-on-boarding-training-evaluation process
- ✓ Order-to-cash process
- ✓ Procure-to-pay process
- ✓ Company-government-regulatory process

In each of these cases, work is not aligned by classic Western-style functional departments. Instead, multidisciplinary teams facilitate the process.

It's in the people

Lean calls for everyone to adapt a certain mindset and to utilize a particular set of facilitating tools and techniques to eliminate waste and maximize customer value (covered in Parts III and IV). Although the Lean tools are important, Lean is first about the people, then the tools. This is a critical point — companies that have failed to recognize this have met with disastrous consequences.

Organizations on a successful Lean journey value and respect their people. They put the primary emphasis on the people in the organization. The journey must engage everyone, continually educate and train them, challenge and empower them. Employees must be safe and feel secure in their work environment and job situations. They must be stimulated and incentivized, celebrated and properly compensated.

A Lean organization views people as their most valuable assets. They are more important than tools and fixtures, equipment, material, or capital. Some Lean organizations have promised work for life, in return for individual commitment and dedication to pursuing perfection.

It's in the culture

In a Lean organization, the tenets and philosophy of Lean are fundamentally part of its fiber — embedded in the organization's culture. Everyone practices Lean techniques habitually. When you observe an organization practicing Lean, you will see that:

- ✔ Leaders have a long term vision of the business and understand that you must continue to improve it.
- ✔ People always see activities as processes; they strive to standardize these work processes, eliminate non-value-added activities (see Chapter 6) in them and work to the standard they've created.
- ✔ People routinely communicate through value-stream maps, team meetings in the work area, process flow diagrams, communication centers, graphical analyses, control charts, and other explicit instruments.
- ✔ Leaders frequent where the organization creates value. They are in touch with their customers and their organization.
- ✔ Visual signs and cues are everywhere. People are in deliberate and decisive motion, performing standardized work. Meetings are short and crisp.
- ✔ People naturally and regularly use *kaizen* to eliminate wasteful non-value-added work and follow the Plan-Do-Check-Act (PDCA) methodology. (See Chapter 9 for more about *kaizen*.)
- ✔ Everyone makes improvement suggestions — continually.
- ✔ People regularly take on new roles and tasks in order to be more complete team contributors. They embrace learning, share knowledge, and are open to changes and new ways of doing things.
- ✔ The business builds long-lasting relationships with employees, suppliers, providers, and customers.

What Lean is not

Lean is a lot of things — it's a philosophy; a set of principles; a language (complete with its own jargon and acronyms); a management strategy; a methodology; a set of techniques, behaviors, tools, and even includes some specialty software — all of which support you in reducing waste and delivering long-term customer value. Lean is often associated with other process improvement programs and initiatives, and in particular it's frequently paired with Six Sigma (more on this later in this chapter). And Lean, as a way of thinking and behaving, can be part of many initiatives.

So Lean is a lot of things. But there are a number of things that it isn't:

- ✔ **Lean isn't consulting foo-foo dust.** It's not just a bunch of manager-speak, arcane mapping sessions, or feel-good teaming exercises sprinkled with hoity-sounding Japanese terms. Lean is a well-grounded, mature, and very real framework for developing and sustaining performance excellence. Although some Lean concepts might sound counterintuitive at first — and are very much counter to how many organizations are run — the tools and techniques of Lean have been around for decades and are fully complementary to long-standing proven methods.
- ✔ **Lean isn't onerous.** Unlike most other process improvement initiatives, Lean does not require large upfront investments, prescriptive training or expensive software; nor does it call for a one-size-fits-all formulaic rollout. It requires top-down senior-management support, but Lean can begin in a small group and expand naturally as it grows and as the business needs it. This ease-of-adoption is why Lean has been so successful in small and medium-sized enterprises, as well as larger organizations — and even within operating units of large companies.
- ✔ **Lean isn't a Western-style system.** Take note of this key point: Lean may be very much different from what you're used to. Unlike most Western-style tools and techniques, Lean is not a quick-hit, big-bang, upside-the-head, technology-enabled, silver-bullet solution to fix yesterday's problems right now, today. In fact, it's quite the opposite. Lean is a continuous, steady, long-term, everyday approach to building the flexibility and adaptability that enables you to address tomorrow's challenges as they happen. Kaizen events and Lean projects often reap significant near-term benefits, but don't look to Lean as an overnight sensation. Lean is very much a long-term deal. And to sustain the gains, you must develop a culture of respect for people and continuous improvement beyond a project mentality — arrive at every day Lean.

What makes Lean so special?

Companies, organizations, and government entities all know that they must do something — present circumstances just will not allow any of us to sit still. Long gone are the days of doing things the same old way and being successful regardless — or of just being smart, working hard and hoping for the best. Aggressive, unrelenting economic and demographic pressures are forcing everyone to embrace some type of dependable approach and strategy for performance management and improvement. It's now a given that you're going to do something to improve — so what's it going to be?

The Lean approach is increasingly popular, because it offers organizations a sensible, proven, and accessible path to long-term success. Unlike so many of the alternatives, Lean is something that everyone can understand, everyone can do, and everyone can benefit from:

- ✔ **Lean is proven.** The principles and techniques of Lean have been practiced successfully by thousands of organizations of every type and size in every industry worldwide, spearheaded by over 50 years of continuous improvement by one of the world's most successful corporations.
- ✔ **Lean makes sense.** In an era of mind-boggling complexity, Lean is a solid foundation for addressing all kinds of challenges — simply. Lean is broadly applicable in any situation, combining old-world logic and reason with new-world tools and constraints. Lean helps you focus on what your customer wants and how to deliver compelling customer value more effectively.
- ✔ **Lean is accessible.** Lean is accessible to anyone, with any budget. Lean is a serious commitment, but isn't expensive, exclusive, or difficult.
- ✔ **Lean is “hands on.”** One of the secrets of Lean is its hands-on approach. From the leaders of the organization to the people working on the front line, everyone understands how to contribute and improve where they can help the organization create value.
- ✔ **Lean is for everyone.** Many performance improvement solutions are strictly tailored for specialty disciplines, or isolated in specific functions or departments — requiring advanced skills and knowledge. Not Lean. Lean is so powerful in part because it is so easily learned and applied by everyone. Lean excludes no one.

The Lean Pedigree

While the specific assembly of principles and practices known as *Lean* date from the late 1980s, the origins of Lean are much older. Lean has a deep pedigree. Historians cite King Henry III of France in 1574 watching the Venice Arsenal build complete galley ships in less than an hour using continuous-flow processes. In the 18th century, Benjamin Franklin established principles regarding waste and excess inventory. Eli Whitney developed interchangeable parts. In the late 19th century, Frank and Lillian Gilbreth pioneered the modern-day understanding of motion efficiency as it related to work. In the early 20th century, Frederic Winslow Taylor, the father of scientific management, introduced the concepts of standardized work and best-practices. (The legendary Shigeo Shingo cites Taylor's 1911 seminal work *Principles of Scientific Management* as his inspiration.)

However, it was in Henry Ford's revolutionary mass-production assembly plants where many practices first emerged. In 1915, Charles Buxton Going, in the preface to Arnold and Faurote's *Ford Methods and the Ford Shops*, observed:

Ford's success has startled the country, almost the world, financially, industrially, mechanically. It exhibits in higher degree than most persons would have thought possible the seemingly contradictory requirements of true efficiency, which are: constant increase of quality, great increase of pay to the workers, repeated reduction in cost to the consumer. And with these appears, as at once cause and effect, an absolutely incredible enlargement of output reaching something like one hundred fold in less than ten years, and an enormous profit to the manufacturer.

Henry Ford also explicitly understood many of the forms of waste and the concepts of value-added time and effort.

Both the United States and Japan developed new practices during the industrial buildups that preceded and then supported World War II. In the United States, quality leaders like W. Edwards Deming and Joseph Juran refined management and statistical concepts in support of war production. The Training within Industry (TWI) Service formalized practices in management, training, and production, while emphasizing methods and relationships. In postwar Japan, Deming and Juran worked with Japanese industrial leaders to apply these practices to national reconstruction.

Toyoda and Ohno

The Toyoda Automatic Loom Works was founded by Sakichi Toyoda in 1926, where he pioneered the practice of *jidoka* — automation with a human touch. Ten years later, the company changed its name to Toyota and Toyoda's son, Kiichiro, and engineer nephew, Eiji, began producing automobiles with parts from General Motors. Japan's entry into World War II in 1941 diverted its efforts to truck production; during postwar reconstruction, the company nearly went bankrupt.

Meanwhile, Ford regularly invited managers and engineers from around the world to visit Ford plants and observe his mass-production systems. In the spring of 1950, Eiji Toyoda participated in an extended three-month visit to Ford's famed Rouge plant in Dearborn, Michigan. At that time, the Rouge plant was the largest and most complex manufacturing facility in the world. Toyota was producing about 2,500 cars a year; Ford was producing nearly 8,000 a day.

Eiji returned to Japan, and with Toyota's production manager, Taiichi Ohno, concluded that the way Ford's system of mass production had evolved would *not* work for them in Japan. The domestic Japanese automotive market was too small and too diversified, the workforce demands were different and the capital requirements for facilities were too high. Toyoda and Ohno set out to develop an entirely new means of production, including engineering, manufacture, supply, assembly, and workforce management.

The Toyota Production System

A number of the world's leading corporations are known for developing unique, competitive business systems. Some are legendary. General Electric developed Workout. At Hewlett-Packard, there's the HP Way. P&G has IWS — the Integrated Work System.

And then there's the Toyota Production System. It's so famous that it's referred to simply by its abbreviation: TPS. TPS is perhaps the most studied system of production and operations management in the world. Countless companies have visited Toyota and observed TPS in action. Dozens of books have chronicled its successes and hailed its methods (see Chapter 20). It is the foundation for what is now known as Lean.

Lean and Toyota's US challenges

In 2008 – 2010, Toyota Motor Company faced a perfect storm of issues. First, to the great dismay of American industrialists, Toyota had become the world's largest automaker, dethroning the U.S. titan General Motors. This put Toyota in the crosshairs. Then, the Great Recession created a challenging business environment globally for all automotive manufacturers, including Toyota. But throughout these years, Toyota continued to follow their corporate culture (The Toyota Way) and production system (TPS). During the recession they did not layoff any permanent employees or close plants, which is counter to the traditional Western response to such business conditions. Instead, they had their people focus on eliminating waste; they invested in continuous improvement activities and trained their employees more profoundly in both The Toyota Way and TPS. Toyota also worked with their suppliers, whom they consider long-term strategic resources, to help them weather the recession by supporting kaizen activities and implementing creative inventory strategies. Even in a difficult business climate, Toyota stayed true to its culture and way of conducting business.

Just as the recession began to ease, the perfect storm strengthened. In August of 2009, in San Diego, California, a family was driving a Lexus loaned to them by their dealer while their vehicle was in service. The loaned vehicle had the wrong floor mats installed. When the accelerator pedal became stuck to those floor mats, the car sped out of control, crashed, and the family perished. As a result of this accident, Toyota became the focus of a media storm and then government scrutiny. Other accidents and incidents were identified and lumped into a broad category; people began questioning Toyota's legendary product quality.

Fueled by inaccurate and sensationalized reporting in the U.S. media, many people began

to lose faith in Toyota and question the company's commitment to its customers and product quality. The response from the company was not what the public and the government expected, based on their preconceptions of how Western companies should act in similar situations. Akio Toyoda, Toyota's president, did not blame others or name scapegoats, but rather apologized to all customers affected by the floor mat issue. The U.S. media perception was that Toyota was not doing enough or acting fast enough. This fueled greater suspicion of Toyota and an increase in vehicle complaints for other quality issues. By February of 2010, Toyota had issued recalls for several quality issues, including aftermarket all-weather floor mats that could cause accelerator pedals to jam, sticky accelerator pedals, Prius brake pedal "feel" issues, and the unconfirmed issue of electronic throttle control system failure. In the past, they would have issued service bulletins for these issues per industry standard because they were not inherent design-quality issues, but because of the negative public opinion and the risk to the Toyota brand, they issued recalls.

What really happened? Did The Toyota Way and Toyota Production System fail? What did Toyota learn as a result of this experience?

After all of the data was in, the analysis — including an analysis by NASA and NITSA — confirmed that Toyota did not have a systemic product quality issue. Toyota did have a public perception issue. In the short term, they had to contain the issue and work to win back customer trust. They were able to redeploy people, who were trained during the recession, to focus on solving problems and fortify customer relationships. In the long term they had to understand the true issues within their organization that caused or contributed to their handling of

the crises — both the recession and the customer quality concerns.

Central to TPS and The Toyota Way is deep reflection (*hansei*) to understand the true problem so you can continuously improve the right situation, rather than waste efforts solving the wrong issue. The Toyota culture is one of improvement and understanding, rather than blame. Toyota leadership has always expected the organization to continually improve how it functions, even when it isn't in crisis. True to its culture and practices, Toyota identified several key factors that contributed to the crisis and is steadily working to improve these conditions.

Some of the key findings:

- ✓ Rapid growth of the organization resulted in less investment in the training and inculcation of The Toyota Way and TPS across the global organization.
- ✓ Centralized decision making and engineering in Japan caused bureaucracy and a disconnection to the voice of the customer. (Fundamental to TPS is the idea that people go to where the action is to fully understand.)
- ✓ Information from the dealer networks and customer service centers did not effectively flow to all areas of the organization.

- ✓ Cultural differences between the United States and Japan resulted in miscommunications and a lack of understanding of the cultural and contextual impacts of the situation.
- ✓ Globalization strategies needed to include trusted, empowered, national leaders.
- ✓ Success had caused a drift away from the rigorous adherence to the basics — TPS and Toyota Way.

Toyota has turned this crisis into a learning and improvement opportunity, one not directly related to the manufacturing floor. The TPS and Toyota Way are how Toyota does business in every part of their business. The long-term impact of these challenges is yet to be determined, but the short term data indicates that Toyota has made things right with their customers and has kept their loyalty. Did TPS and The Toyota Way fail? The analysis says not; they were actually the foundation used to move beyond the crises.

For a more detailed analysis of this topic, see *Toyota Under Fire: Lessons for Turning Crisis into Opportunity* by Jeffrey K. Liker and Timothy N. Ogden (Mar 14, 2011).

TPS was principally architected by cousins Eiji and Kiichiro Toyoda and Taiichi Ohno. History credits Ohno as the Father of TPS. He led its development, extension to the supply base, and integration with global partners from the early 1950s through the 1980s. By the time Lean was introduced to U.S. manufacturing, Toyota had been evolving and applying TPS successfully for over 40 years. In the 2000s, Toyota explicitly defined The Toyota Way, which put into words the culture that supported their long term success.

Toyota built the first model House of TPS (see Figure 1-1), depicting graphically that Toyota's quality sets on the combination of just-in-time, built-in quality, and highly motivated people. All of this stands on a foundation of operational stability and kaizen, bolstered by visual management and standardized work.

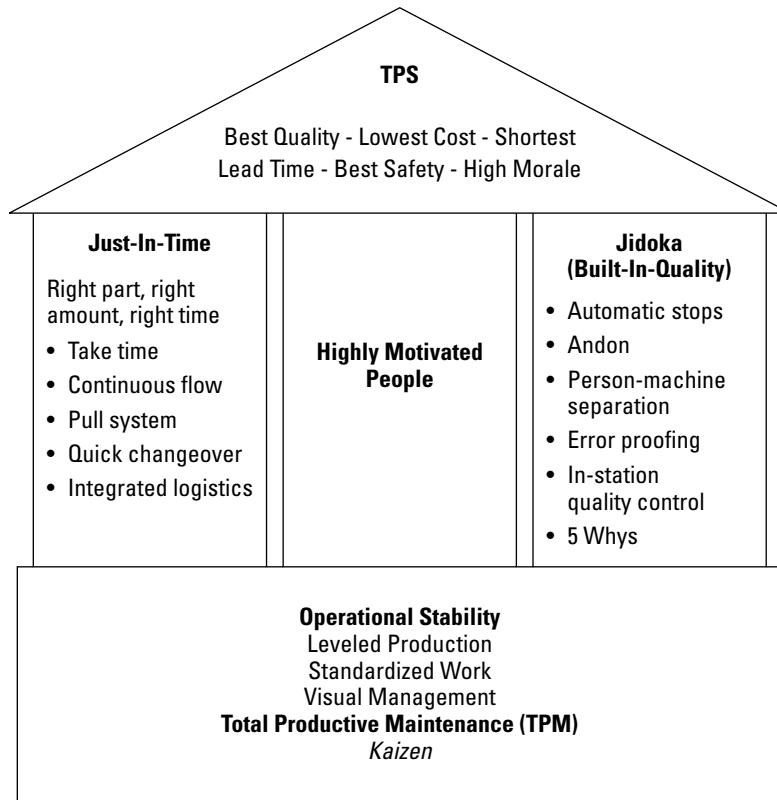


Figure 1-1:
The TPS House — a high-level view of the Toyota Production System.

Lean and the World of Continuous Improvement

We've been awash in business and process improvement programs for decades. It's been an alphabet soup of initiatives. Remember TQM, BPR, MBOs, and QITs? Well, now we also have the likes of TPM, TOC, GMP, QRM, ISO, Six Sigma, LSS, BPM, and BPE. They're all part of continuous process improvement (yet another acronym: CPI!). It's all very confusing — and somewhat on purpose! Some have come and gone; others have morphed into something else. This section focuses on the ones beyond Lean that are currently well known in business.