THE
LEAN
MINDSET

ASK THE RIGHT QUESTIONS

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with HENRIK KNIBERG

The Lean Mindset

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✦✦ Addison-Wesley

Contents

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Preface

Several years ago, Henrik Kniberg invited us to stop in Stockholm and give a talk. He met us at the train station, helped roll our suitcases to a nearby hotel, and invited us to the small office he shared with other consultants at Crisp. There, he presented us with a book he had recently finished, *Scrum and XP from the Trenches,* the story of one of his early forays into agile software development. We were impressed.

Henrik has invited us back to Stockholm many times, where we partnered in offering Deep Lean events, Leading Lean workshops, and many community talks. We have joined Henrik and his family for fishing in the Stockholm archipelago, canoeing on Lake Mälaren, and many barbecues at their lakefront home. We even met in New Zealand when both of our families decided to spend Christmas there.

Henrik's clear thinking and innovative applications of lean can be found in his book *Lean from the Trenches* and in his blog.[1] We love the way Henrik illustrates his work with engaging sketches that simplify and clarify complex concepts. In fact, our book was starting to look a bit bland by comparison. So we asked Henrik if he would contribute some sketches to liven things up. We are sure you will enjoy the results: characters scattered liberally throughout the book and diagrams that are worth a thousand words. For an additional treat, enjoy Henrik's well-illustrated account, at the end of Chapter 4, of how Spotify develops products.

Thank you, Henrik! Your contributions have truly enhanced this book.

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1. blog.crisp.se/author/henrikkniberg.

About the Authors

Mary Poppendieck has led teams implementing various business solutions, ranging from enterprise supply chain management to digital media. Mary is the president of Poppendieck.LLC, which specializes in bringing lean techniques to software development.

Tom Poppendieck, an enterprise analyst, architect, and agile process mentor at Poppendieck.LLC, currently assists organizations in applying lean principles and tools to software development processes.

The Poppendiecks are authors of *Lean Software Development,* winner of the 2004 Jolt Software Development Productivity Award, *Implementing Lean Software Development,* and *Leading Lean Software Development* (all from Addison-Wesley).

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Introduction

Back in the 1990s, when open source was an outlier and eBay was a startup, most people believed that economic transactions—at least important ones—required a trustworthy company to back them up. And trustworthy companies required a management structure to make sure that important work got done.

When economists first stumbled upon Linux, their instinctive reaction was "This is impossible!"[1] How can a deeply complex operating system that was developed and maintained by volunteers be reliable enough for widespread adoption by businesses? But today Linux, along with GNU, is arguably the most successful operating system in the world. Apache HTTP Server has powered over 60% of all Web servers since 2000. Sendmail and its commercial derivatives deliver 65% of e-mail worldwide. All this was accomplished without traditional management structures or work practices.

eBay faced a different dilemma; it needed to find a way to create trust between buyers and sellers who were strangers. The company devised a review and ranking system that quickly exposed bad behavior. This widely imitated reputation system has kept instances of fraud in consumer-to-consumer transactions amazingly low, paving the path for a broad range of trust-based businesses.

While the Internet was growing up, it was used mostly by scientists. They developed it into a tool to support the way they worked; it helped

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1. See Peter Kollock, "The Economies of Online Cooperation: Gifts and Public Goods in Cyberspace," Chapter 9 of *Communities in Cyberspace,* ed. Marc A. Smith and Peter Kollock, pp. 219–40 (Routledge, 1999).

them find information, share knowledge, collaborate with peers, and establish a reputation. By the time the Web became available for commercial use in the mid-1990s, it was a well-developed research tool, and its capabilities nudged newcomers toward the same work practices that scientists used. So it should be no surprise that early users of the commercial Internet tended to favor the academic model of working, which is light on management but strong on guidance by a master in the field; light on efficiency and strong on experimentation; light on proprietary knowledge while strongly encouraging information sharing and collaboration across disciplines.

Early Internet users included many software developers, who were comfortable with the primitive user interfaces available at the time. A group of developers used the Internet as a collaboration platform to spawn a movement aimed at changing the work practices commonly used in software development. They lobbied for a customer-focused, team-based, experimental approach to their work, mirroring the academic practices already supported by the Internet. Over time these agile development practices gained widespread acceptance and emerged as a credible—even superior—approach to developing software-intensive products. It turns out that the academic approach to learning works quite well for creating innovative new products and services.

The arc of change toward collaborative work practices[2] has followed the growing sophistication and accessibility of Web-based tools that support knowledge sharing and collaboration. Consider Karen, our oldest granddaughter, who is about to head off to college. She is perhaps the quintessential digital native: proficient at surfing the Internet before she was ten, posting her thoughts on Facebook by 12, engaged in a stream of text messages for several years. It won't be long before Karen and her cohorts will be the only kind of college graduates available to fill the jobs that our organizations create.

Digital natives have been immersed in an environment of readily available knowledge and instant access to colleagues for as long as they can remember. They know how to leverage the advantages of this environment, and they will expect to find it in their workplace. They will expect easy, transparent access to information; they will expect to collaborate with a wide range of people; they will expect anywhere,

2. We first heard of this Arc of Change from Yochai Benkler of Harvard Law School in his keynote talk at Lean Software and Systems 2012, Boston, May 16, 2012. See also Yochai Benkler, "The Unselfish Gene," *Harvard Business Review,* July–August 2011.

anytime access to their network of peers; they will probably not make much distinction between work and personal activities; they will certainly expect to be trusted.

Of course, organizations should not blindly cater to the expectations of the new kids in the company. But it turns out that the academic approach to working is a good model for bringing out the best in knowledge workers of all ages. The kids are on to something that works really well—for everyone.

This is a book about the design, development, and delivery of exceptional products and services. Therefore, it is a book about creating work environments where Karen and her colleagues routinely leverage a growing body of knowledge and multiple perspectives to create and launch brilliant products and services. It is a book about learning: learning about customers and creating experiences they love. It is about discovering effective ways to develop and deliver those experiences. Finally, this is a book about gaining the insight and adaptability to thrive in a rapidly changing world.

Lean Is a Mindset

Lean is a mindset—a mental model of how the world works. In this book we present a mental model of how to design and deliver amazing products that delight customers. We start with two foundational questions: *What is the purpose of a business? What kind of work systems are best for accomplishing that purpose?* Next we explore ways to create an environment that energizes the people whose intelligence and creativity are essential to creating great products. Then we turn our attention to the process of creating products and services that work well and delight customers. We move on to consider efficiency—because this is a book about lean, after all, and lean has always been associated with efficiency. We demonstrate that genuine efficiency in product development is about developing the right product, creating a steady flow of new knowledge, and linking the design and delivery processes together to gain rapid customer feedback. Finally, we move beyond efficiency to innovation and discuss how great products come from changing the focus . . . from productivity to impact . . . from predictability to experimentation . . . from efficiency to decentralization . . . and from product to problem.

Through research results and case studies, the book builds a mental model of how lean design and development should look and feel in

order to foster a lean mindset in organizations that create products and services. The case studies in the book are not to be emulated so much as absorbed, because developing a mindset is not about copying practices—it's about developing the expertise to ask the right questions, solve the right problems, and do the right thing in the situation at hand.

How Mindsets Work

Our minds are amazing. It appears to us that we make decisions thoughtfully and deliberately, but research has shown that most of the time we make decisions instinctively, based on the mindset we have developed over time. It's almost as if we have two minds—one that builds our mindset and corrects it from time to time, and another that reacts quickly to situations as they develop, drawing on the currently available mindset to arbitrate trade-offs.

The idea that we have two rather different decision-making processes is not a new one; the literature is filled with many varied descriptions of our two minds. One mind might be intuitive, the other analytical; one mind could be emotional, the other rational; one reflexive, the other reflective. One mind might look for patterns, the other follows rules; one mind acts on tacit knowledge, the other prefers explicit information; one mind makes snap decisions, the other takes time to think things through.

Psychologists Keith Stanovich and Richard West proposed that we take all of these different theories about people being of two minds and combine them into a single theory: the **Dual Processing Theory**.[3] The theory works something like this: Humans have two different methods for processing information, and each method operates more or less independently of the other one, exchanging information at appropriate times. Sometimes the two processes arrive at different conclusions, and that's when we become aware of the fact that we have two minds, because they are in conflict with each other.

In order to avoid a bias toward any particular way of describing our two "minds," Stanovich and West proposed that we simply call them **System 1** and **System 2**.

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3. See K. E. Stanovich, *Who Is Rational? Studies of Individual Differences in Reasoning* (Lawrence Elrbaum Associates, 1999); and K. E. Stanovich and R. F. West, "Individual Differences in Reasoning: Implications for the Rationality Debate," *Behav. Brain Sci.* 2000 (23): 645–726.

System 1 and System 2

An excellent description of System 1 and System 2 can be found in Nobel laureate Daniel Kahneman's book *Thinking, Fast and Slow.*[4] Kahneman describes System 1 as our fast-thinking self, the one that makes decisions based on intuition, is influenced by emotions, uses tacit knowledge, and operates out of habit. If you have ever walked into your home after a long day at work and wondered how you got there, you can be sure that System 1 brought you home all by itself while you were distracted with other things. For getting the everyday things in life done, we can't beat System 1; we might think of it as our autopilot mode.

System 2 is the part of us that analyzes situations, considers alternatives, plans for the future, and does the math. Whenever we find ourselves pausing to consider something carefully, it's like switching from autopilot to manual mode; our analytical mind takes over from our intuition and works out rational choices. Although System 2 is not actively directing us most of the time, it regularly checks up on System 1 to see if it needs to intervene. When we develop a decision tree to make sure we consider all of the alternatives before making a decision, System 2 is in charge. When we are quiet and polite even though we are angry, System 2 is keeping System 1 in check.

Generally speaking, we operate in autopilot mode. If unusual circumstances arise, we switch out of autopilot and over to manual mode. And it is in this manual mode that we develop or modify our mindsets. We will need to spend a good amount of time in manual mode, with System 2 fully engaged, in order to change an established mindset. But there's a problem: System 2 is slow. It takes much longer than System 1 to make decisions and get things done. In addition, System 2 is lazy; its preferred approach is to turn as much work as possible over to System 1. So modifying a mindset takes deliberate effort and considerable time—time spent reading a book, for example.

We would like to introduce you to Otto and Anna:

 Otto represents our System 1 mind, so he is on autopilot much of the time. He is intuitive and moves easily, adjusting rapidly to whatever happens. He has a lot of

4. Daniel Kahneman, *Thinking, Fast and Slow* (Farrar, Straus and Giroux, 2011).

experience in his specialty area and is comfortable trusting his expertise and intuition to guide his actions.

Anna represents our System 2 mind; she analyzes situations before she acts. She knows that the best decisions are those based on evidence. She is good at gathering data, running experiments, and weighing the impact of various choices before making a decision.

Otto and Anna are very opinionated. They will be reading this book along with you, and they will ask questions and challenge our ideas on a regular basis. We put our dialog with Otto and Anna in a sidebar so you can follow along with your favorite co-reader.

The Fabric of Lean

Lean principles are woven throughout this book, just as they must be woven throughout the fabric of an organization with a lean mindset.

Chapter 1: The Purpose of Business emphasizes the principle *Optimize the Whole*, taking the Shareholder Value Theory to task for the short-term thinking it produces. The alternative is to *Focus on Customers*, whose loyalty determines the long-term success of any business. It is one thing for business leaders to have a vision of who their customers are, but quite another to put the work systems in place to serve those customers well. In the end, the front-line workers in a company are the ones who make or break the customer experience.

It turns out that the "rational" thinking behind the Shareholder Value Theory has had a strong influence on the way workers are treated. It all boils down to Douglas McGregor's Theory X and Theory Y. Theory X assumes that people don't like work and will do as little as possible. Theory Y assumes the opposite: Most people are eager to work and want to do a good job. The lean principle *Energize Workers* is solidly based on Theory Y—start with the assumption that workers care about their company and their customers, and this will be a self-fulfilling prophecy. The principle of reciprocity is at work here— if you treat workers well, they will treat customers well, and customers will reward the company with their business.

Reciprocity was the basis of human cooperation long before money was invented, and it remains central to human behavior today. However, reciprocity is local. It depends on group (or team) size, team member engagement, and norms for creating and enforcing mutual

obligations. When designing work systems that *Energize Workers* and help them *Focus on Customers*, leverage the power of peers, rather than incentives, to steer behavior in the right direction.

Chapter 2: Energized Workers is based on the work of Mihaly Csikszentmihalyi, who found that the most energizing human experience is pursuing a well-framed challenge. Energized workers have a purpose that is larger than the company and a direct line of sight between their effort and achieving that purpose. They strive to reach their full potential through challenging work that requires increasing skill and expertise. They thrive on the right kind of challenge—a challenge that is not so easy as to be boring and not so hard as to be discouraging, a challenge that appeals to aspirations or to duty, depending on the "regulatory fit."

Regulatory fit is a theory that says some people (and some companies—startups, for example) are biased toward action and experimentation and respond well to aspirational challenges. Other people (and companies—big ones, for example) prefer to be safe rather than sorry. For them, challenges that focus on duty and failure prevention are more inspiring. But either way, a challenge that is well matched to the people and the situation is one of the best ways to energize workers.

One of the most important challenges in a lean environment is to *Constantly Improve*. Whether it is a long-term journey to improve product development practices or an ongoing fault injection practice to hone emergency response skills, striving to constantly get better engages teams and brings out the best in people.

Chapter 3: Delighted Customers urges readers to *Focus on Customers*, understand what they really need, and make sure that the right products and services are developed. This is the first step in the quest to *Eliminate Waste*, especially in software development, where building the wrong thing is the biggest waste of all.

Some products present extraordinary technical challenges—inventing the airplane or finding wicked problems in a large data management system. Other products need insightful design in order to really solve customer problems. Before diving into development, it is important to *Learn First* to understand the essential system issues and customer problems before attempting to solve them.

When developing a product, it is important to look beyond what customers ask for, because working from a list of requirements is not likely to create products that customers *love*. Instead, leaders like GE

Healthcare's Doug Dietz, who saw a terrified child approach his MRI scanner, understand that a product is not finished until the customer experience is as well designed as the hardware and software.

Great products are designed by teams that are able to empathize with customers, ask the right questions, identify critical problems, examine multiple possibilities, and then develop products and services that delight customers.

Chapter 4: Genuine Efficiency starts by emphasizing that authentic, sustainable efficiency does *not* mean layoffs, low costs, and controlling work systems. Development is only a small portion of a product's life cycle, but it has a massive influence on the product's success. It is folly to cut corners in development only to end up with costly or underperforming products in the end. Those who *Optimize the Whole* understand that in product development, efficiency is first and foremost about building the right thing.

Two case studies from Ericsson Networks demonstrate that small batches, rapid flow, autonomous feature teams, and pull from the market can dramatically increase both predictability and time to market on large products. Here we see the lean principles of *Focus on Customers*, *Deliver Fast*, *Energize Workers*, and *Build Quality In* at work.

A case study from CareerBuilder further emphasizes how focusing on the principle of *Deliver Fast* leads to every other lean principle, especially *Build Quality In* and *Focus on Customers*. A look at Lean Startup techniques shows that constant experiments by the product team can rapidly refine the business model for a new product as well as uncover its most important features. Here the lean principles of *Optimize the Whole*, *Deliver Fast*, and *Keep Getting Better* are particularly apparent.

Finally, a discussion of how Spotify develops products summarizes most of the lean principles one more time, with a particular emphasis on customer focus, data-driven experiments, empowered teams, and rapid feedback.

Chapter 5: Breakthrough Innovation starts with a cautionary tale about how vulnerable businesses are—even simple businesses like newspapers can lose their major source of revenue seemingly overnight. But disruptive technologies don't usually change things quite that fast; threatened companies are usually blind to the threat until it's too late. How can it be that industry after industry is overrun with disruptive innovation and incumbent companies are unable to respond?

The problem, it seems, is too much focus on today's operations—maybe even too much focus on the lean principle of *Eliminate Waste*—and not enough focus on the bigger picture, on *Optimize the Whole*. Too much focus on adding features for today's customers and not enough focus on potential customers who need lower prices and fewer features. Too much focus on predictability and not enough focus on experimentation. Too much focus on productivity and not enough focus on impact. Too much focus on the efficiency of centralization and not enough appreciation for the resiliency of decentralization.

Lean organizations appreciate that the real knowledge resides at the place where work is done, in the teams that develop the products, in the customers who are struggling with problems. Several case studies—including Harman, Intuit, and GE Healthcare—show how the lean principles of *Focus on Customers*, *Energize Workers*, *Learn First*, and *Deliver Fast* help companies develop breakthrough innovations before they get blindsided by someone else's disruptive innovations.

Developing a lean mindset is a process that takes time and deliberate practice, just like developing any other kind of expertise. No matter how well you "know" the ideas presented in this book, actually using them in your work on a day-to-day basis requires that you spend time trying the ideas out, experimenting with them, making mistakes, and learning.

Cultivating a lean mindset—especially in an organization—is a continuing journey. We hope this book brings you another step along the path.

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1
The Purpose of Business

The Rise of Rational Economics

In 1950, as George Merck retired from his job as president of pharmaceutical giant Merck & Co., he summarized the underlying philosophy that drove its success:

> We try never to forget that medicine is for the patient. It is not for profits. The profits follow; and if we have remembered this, they have never failed to appear. The better we have remembered it, the larger they have been.[1]

The idea that the purpose of business is to serve customers was widely accepted at the time. The Second World War had recently ended, and the homecoming of untold numbers of soldiers triggered a boom in births as well as in business. After years of austerity, demand was particularly high, and businesses were eager to supply new products to a growing population. The economy had nowhere to go but up.

But if we fast-forward 25 years to 1975, we find that business opportunities were not so plentiful anymore. The war generation was retiring, and a new cohort of business leaders was faced with slower growth, broader competition, and limited memories of depression and war-era hard times. The conventional wisdom that companies should preserve cash and take care of their employees was feeling a bit outdated to this new generation of business leaders.

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1. Jim Collins and Jerry I. Porras, *Built to Last: Successful Habits of Visionary Companies* (Harper Business, 2004), p. 48.

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