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To Jennifer, who puts up with all my antics. To Judy, who taught me her version of continuous improvement—“Do not rest on your laurels.” And to George, for supporting me and for helping me reach a higher level of accomplishment.

—Tony Manos

To my wife, Holly, and my kids, Austin and Miranda, who gave up their time with a husband and father to make this book possible, and whose continued support provides me strength to pursue my dreams.

—Chad Vincent
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Foreword

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The Lean Handbook is a terrific compilation of sections written by practitioners who bring their individual and unique experience and expertise to this body of knowledge. I appreciate the connections made with many of the dimensions and principles identified in the Shingo model. We must each be on a journey of continuous improvement, which means we must be constantly looking for new perspectives and approaches to bring about personal and organizational improvement.

Anthony Manos is correct when he says that the most difficult and yet important work we will do with lean is to change the culture of the organization. For lean to be successful, the many tools outlined in this handbook must be supplemented with an equally devoted effort to influence the mind-sets and behaviors of people in the organization. At the Shingo Prize we have learned that the best way to do this is to, as Stephen Covey would say, “begin with the end in mind.” In other words, while you are learning to use these great tools, you must also keep the deeper meaning, or the “why” behind the tools, very clear. The Lean Handbook can help each of us act our way into a new way of thinking, and then think our way into a new way of acting. By putting the wisdom of this handbook to work every day by every person and never taking your eyes off the prize—a new culture that is deeply embedded in the principles of lean—we will greatly increase the odds of a sustainable business transformation.

As you put this work into practice, you will recognize the shifting roles of leaders and managers in your organization. It is not enough for leaders to just keep doing what they have always done, nor is it enough for them to merely support the work of others. Rather, leaders must lead the cultural transformation and build the principles behind all of these great tools into the mind-sets of their associates. Similarly, managers have to do more than participate in kaizen teams. The emerging role of managers is to focus on designing, aligning, and improving the systems of the business so that they drive ideal behaviors that cause people to change their thinking of what excellence really looks like.

Using The Lean Handbook as a roadmap will no doubt be a powerful tool in helping you avoid many of the mistakes made by others over the years. I invite you to visit http://www.shingoprize.org to see how the key points illustrated here support the Shingo model for operational excellence. My thanks to all of the contributing authors!
Welcome to the Lean Handbook

What a remarkable journey this has been. Working on this book has been a terrific experience. We have had the great pleasure of working with a number of wonderful and giving individuals. Lean practitioners are truly an amazing and unique family. The energy and willingness of the individuals who helped create this book are evidence of the great profession and network of people of which we take part. So many different points of view and applications of knowledge made for great discussions, contemplation, and collaboration. With so much knowledge and understanding, it was difficult to find a point at which to stop talking and start putting these discussions on paper. In the end, we believe this book embodies the Lean Body of Knowledge (BOK) in a way that is much like the lean journey—ever evolving and always adaptable.

Lean has been a culmination of multiple individuals, philosophies, systems, tools, and applications throughout history. The challenge has been that all these different contributions are found in different places, called different things, and applied in different manners—making it difficult for the lean practitioner to gain an understanding of lean at a level of its full body of knowledge without great effort, research, experience, and networking. While this book is not a substitute for the effort, research, experience, and networking every seasoned lean practitioner goes through, we hope it provides a sound starting point for those just beginning or expanding their knowledge of lean.

Not an Exam Preparation Manual

First and foremost, this book is not a Lean Certification exam preparation manual. The Lean Bronze Certification exam questions are based on material from the five recommended reading books (see Appendix B, “Recommended Reading List for Lean Certification Exam Preparation”):

- Learning to See
- Lean Thinking
- Gemba Kaizen
- Lean Production Simplified
- Lean Hospitals

Preface
Make no mistake—this book takes nothing away from the great lean works that have preceded it. As a matter of fact, we believe that this book complements and pays tribute to those works as being pieces of the larger Lean BOK. But that is exactly what they are—pieces. Our intent was to put these pieces together in a manner to provide a higher-level overview of the Lean BOK. We realized early on in the project that this task was not something we could do alone.

This handbook’s intention is to gather information related to the Lean BOK (see Appendix A, “Lean Certification Body of Knowledge”) into one source. This book will enhance your understanding of the BOK as a whole and give you a more holistic look at lean. As great as the five recommended reading books are, they were not written with the intent of covering all aspects of the Lean BOK individually. Additionally, this book does not rehash the content of the five recommended reading books. What we have done is put together a book whose sole purpose is to embody the entire Lean BOK, section by section. This book is, by design, written at the Bronze Level for certification knowledge. This means that the weightings used in the Lean BOK for the Bronze Certification were considered for the depth and breadth of material considered for each rubric. Therefore, it is by no means all inclusive of every principle, system, and tool at every level of application related to lean.

By addressing the Lean BOK at the Bronze Level, this book provides a basic understanding of the lean principles, systems, and tools at a tactical level to drive improvements with measurable results. The intent is to revise the book over time to encompass the topics of the Silver Level (an integrated application on value stream transformations for lean leaders) and the Gold Level (for strategic application of lean across the entire enterprise, with emphasis on assets, systems, processes, and people). Therefore, this book, much like a lean journey in an organization, will be adapted as the Lean BOK evolves and more knowledge is integrated.

Given that the intent of this book is not to rehash the certification reference books, we hope that this book serves as a good starting point for those practitioners who want a holistic view of the Lean BOK, with links to many other lean references for greater detail and understanding. While there are many references, we tried to stay true to the terminology and applications discussed in the core books of the certification reading list.

One of the difficulties we faced in creating a book of this magnitude was how to structure it. While we could have structured it alphabetically by topic, organized it by case studies or by organizations, or arranged it by some other method, we wanted to stay true to the Lean BOK structure. While this structure does not allow for a nice flow from one topic to another for easier reading, the writing conforms to the Lean BOK and the Shingo Prize model. We thought that this would provide a traceable reference for those individuals and organizations utilizing those structures for the pursuit of operational excellence.

When lean is applied in an organization, the knowledge of the processes and the generation of ideas do not come from the organization’s designated lean experts. They come from those who perform the work on a daily basis. We took the same approach with this book. It would have been easy for us to read all the books and then pull information from those books to create another book. But then it would have been just that—another book. We needed to take a lean approach with this book. So, just as you would create a team of individuals who perform the
work in a kaizen event, we assembled a team of individuals who perform the work and who apply lean in their organizations every day.

MANY VOICES AND MANY STYLES

We were lucky to have some of the best minds in lean contribute to this endeavor (see “Contributing Authors and Editors”). There are many voices, many contributors, many styles of writing, and more than one point of view. The contributing authors come from many different backgrounds. Such different life experiences weave a wonderful lean tapestry. This book is not just lean for manufacturing—or lean for service or lean for healthcare. The examples given in this book can fit any type of organization. We hope you find these different points of view helpful while finding your voice in lean.

It has been a pleasure to not only be authors and share our knowledge of lean but also be editors and work closely with others like us. The great thing about working with all these individuals was learning how they apply the same things we apply, but maybe just a little differently. These differences provided us a different perspective on our version of lean and were wonderful opportunities to expand our personal lean knowledge base.

Coming together is a beginning. Keeping together is progress. Working together is success.

—Henry Ford

We wish you the best of luck and fair weather on your lean journey!
Acknowledgments

It would be nearly impossible to mention everyone who had an influence on the creation of this lean handbook, but we would like to make a few special mentions.

First and foremost we would like to thank all the contributing authors, who worked tirelessly to help construct and shape this handbook. Their willingness to share their knowledge and experience was exceptional. To learn more about these extraordinary lean thinkers, see “Contributing Authors.” A special acknowledgment goes to all the people and organizations that the contributing authors and editors have worked with over the years to help develop and deepen our understanding of lean and influence us as we continue to learn more.

This handbook would not have been possible without the support of the Lean Enterprise Division (LED) of the American Society for Quality (ASQ) and the LED Leadership Team—Kiami Rogers (chair), Frank Murdock (chair-elect), and Tammy Miller (secretary). We would also like to thank George Alukal, founding member of the LED and the driving force behind lean’s becoming an integral part of ASQ and a resource for its members.

The Lean Certification is supported by the four alliance partners: the Society of Manufacturing Engineers (http://www.sme.org), the Association for Manufacturing Excellence (http://www.ame.org), the Shingo Prize (http://www.shingo-prize.org), and of course ASQ (http://www.asq.org).

We would like to thank Kris Nasiatka from the Society of Manufacturing Engineers (SME) for all her efforts in creating the Lean Certification and for her continued support of the partner organizations and this lean handbook. Also from SME, Kelly Lacroix leads the Lean Certification Oversight and Appeals Committee, which continually monitors and improves the certification process.

If it wasn’t for our friends Matt Meinholz and Paul O’Mara at ASQ Quality Press, this book never would have been completed. We appreciate their patience and advice while working on this endeavor.

Last, but not least, we would like to give our utmost gratitude to Robert Damelio. As a member volunteer, Robert not only was the driving force behind ASQ’s LED adopting the Lean BOK, but he also guided the certification initiative at ASQ. Without his tireless efforts, ASQ would not have been a partner member of the Lean Certification.
HOW IT STARTED

The publication of *The Machine that Changed the World*, in 1990, brought the concept of lean to the masses. It also provided opportunities for many different flavors of lean to be born. With that came a myriad of education, training, and consulting practices, each bringing its own version of lean to the market.

In 2001, members of the Society of Manufacturing Engineers (SME) and the Association for Manufacturing Excellence (AME), and constituents of the Shingo Prize came together and determined that some type of validation for professional practice of lean was necessary. There was a need to align practitioners with a common foundation (fundamentals) of lean practice and, more importantly, provide a roadmap to support workforce development and training efforts. After a few stops and starts, development was under way in earnest in 2004.

The parties involved agreed that the Shingo Prize model should serve as the basis for the program’s Body of Knowledge (BOK). The initial BOK went deeply into evaluating lean practitioners’ job tasks. The model was modified to make it applicable to people and workforce development efforts versus being a corporate lean transformation model. The proposed Lean BOK was validated in a study in early 2005, thus launching version 2.0.

KAIZEN BLITZ WEEK

Shortly after version 2.0 was launched, a core development committee was established. With the preliminary validation of the BOK in place, a straw man for program components was outlined. SME hosted a “blitz week” to expedite development of the program. Nearly 60 lean practitioners, representing a breadth of manufacturing industries, consulting practices, and academia, gathered for a week to develop the components of this new certification program. During the blitz, development teams were established to focus on exams, portfolios, and the mentoring requirements for this new program. Throughout the entire development process, nearly 200 lean practitioners were involved in the creation of this program not including the couple of thousands that participated in the study.

The first Bronze exam was offered to the public in March 2006. The Silver exam was available in June 2006, and the Gold exam was launched in December of that year. The formal Lean Certification Oversight and Appeals Committee was established and met for the first time in March 2006.
UPDATED VERSION OF THE BOK

With the program “live” for a year, a second BOK validation study was conducted. It was desired to structure the certification BOK similar to the Shingo Prize model. The Shingo Prize was restructuring its model, which created an opportunity for the certification program to validate proposed changes to the BOK received by certification candidates as well as the oversight body.

The validation study was completed in 2007. The Lean Certification Oversight and Appeals Committee used the findings to restructure the BOK and launched version 3.0 in 2008 (see Appendix A). Although the topics did not change, the BOK was reorganized for better flow and improved alignment of topics within each category. Each BOK validation study is structured in a way that derives a weighting factor for each section of the BOK. The weighting factors identify the percentage of exam coverage for each BOK area and help the committee identify priority areas for building the exam bank.

THE FUTURE OF THE BOK

Validation studies will be conducted every five to seven years. The studies are intended to verify that current topics are still relevant in contemporary practice of lean and to identify any new or emerging topics that should be added to the BOK.
Special Dedication

Kiami Rogers
Chairperson, ASQ Lean Enterprise Division

This handbook is dedicated in loving memory to Wayne Paupst (1957–2010), past chairman of the Lean Enterprise Division (LED). In August 2010, Wayne lost a long battle with cancer. Wayne was a quality professional’s “quality professional.” He never complained about his condition. In fact, many of us on the Leadership Team, which worked closely with Wayne, were not even aware of the severity of his condition. Wayne possessed a wonderful sense of humor and had a kind word for everyone. He was always ready with a joke, and always ready to laugh at jokes offered by others. His leadership, instruction, kindness, and humor will be missed by family and friends as well as organizations such as ASQ.

I first met Wayne at a meeting of the founders of the LED prior to the LED becoming a forum and subsequently a division. Wayne had been a member of ASQ since 1988. He had more than 25 years in the quality profession, holding positions such as quality engineer, quality systems coordinator, inspector, and quality assurance manager. He had been instructing certification courses for the Lehigh Valley Section of ASQ since 1996 and also had provided instructional courses for many of the top companies in the Lehigh Valley as well. Wayne also held several ASQ certifications: Six Sigma Black Belt, Quality Engineer, Quality Manager, Quality Auditor, Quality Technician, Quality Inspector, Process Analyst, and Quality Improvement Associate. It was during Wayne’s tenure as LED division chair that ASQ introduced the Lean Certification, in partnership with SME, AME, and the Shingo Prize organizations. I have no doubt that Wayne would have pursued obtaining the ASQ Lean Certification himself, as well as teaching and mentoring other lean professionals pursuing this certification. It is with great honor that we dedicate this handbook to Wayne.
The purpose of this handbook is to provide a reference guide for lean principles and methods. This handbook on its own is not intended to prepare one for the ASQ Lean Certification (in partnership with SME, AME, and the Shingo Prize organizations). The user of this handbook is a lean professional who has some knowledge of and experience with lean principles and methods. Material from several lean practitioners with differing levels of disclosure of their experiences has been gathered to create this handbook and has been edited to be presented in a consistent and unified format.

With 6000 members worldwide, the ASQ Lean Enterprise Division (LED) is a global network of professionals helping individuals and organizations apply proven and leading-edge lean principles and practices to achieve dramatic results for personal and organizational success. Whether or not you are a member of the ASQ LED, we hope you find this handbook a useful guide in your lean journey.

Prologue
Kiami Rogers
Chairperson, ASQ Lean Enterprise Division
This handbook was a large collaborative effort, and we would especially like to thank all the contributing authors, who shared their time and wisdom to help make this endeavor possible.

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Section

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Sections

1.2.1. Planning & Deployment
1.2.2. Create a Sense of Urgency
1.2.3. Modeling the Lean Principles, Values, Philosophies
1.2.7. Motivation, Empowerment & Involvement
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**Sections**

1. Cultural Enablers
   1.1. Principles of Cultural Enablers
      1.1.1. Respect for the Individual
   4.3.5. Competitive Impact

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**Section**

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2.1.2.2. 7 Wastes (Muda), Fluctuation (Mura), and Overburden (Muri)
2.3.5. Product and Service Design
2.3.5.1. Concurrent Engineering
2.3.5.2. Quality Function Deployment
2.3.5.3. Product or Process Benchmarking
2.3.5.4. Design for Product Life Cycle (DFx)—Cradle to Cradle
2.3.5.5. Variety Reduction—Product and Component
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4.3.2. Delivery
4.3.2.1. Takt Time
4.3.2.2. Cycle Time
4.3.2.3. Lead Time

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Section
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Sections (with Pat Wardwell)
2.1.2. Identification & Elimination of Barriers to Flow
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2.3.7.1. Mistake and Error Proofing (Poka Yoke)
2.3.7.4. Right Sized Equipment
2.3.7.5. Cellular Flow

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      4.2.4.1. Visible Feedback Real-Time

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2.3.7.6. Sensible Automation  
2.3.7.8. Source Inspection

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Sections
2.1.1. Process Focus  
3.1.1.3. Closed-Loop Thinking to Assure Effective Feedback of Organizational Learning

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Sections
1.1.2. Humility
1.3.5. Coaching & Mentoring
2.2.1.1. 5S Standards and Discipline
3.2.2. Policy Deployment/Strategy Deployment
4.3.5.1. Customer Satisfaction

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Section
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Sections
1.3.1. Cross Training
1.3.3. Instructional Goals
1.3.6. Leadership Development
1.3.7. Teamwork
1.3.8. Information Sharing (Yokoten)
1.3.9. Suggestion Systems
2.2.14. Pull System
2.3.6. Organizing for Improvement
2.3.6.1. Kaizen Blitz Events
2.3.7. Countermeasure Activities
2.3.7.1. Mistake and Error Proofing (Poka Yoke)
2.3.7.2. Quick Changeover/Setup Reduction (SMED)
2.3.7.3. One Piece Flow
2.3.7.4. Right Sized Equipment
2.3.7.5. Cellular Flow
2.3.7.7. Material Signals (Kanban)

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Section
4.2.1.6. Voice of the Customer

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Sections
2.1.5. Jidoka
2.1.7. Seek Perfection

**Sections**

3.2.1. Enterprise Thinking
3.2.1.1. Organize around Flow
3.2.1.2. Integrated Business System and Improvement System
3.2.1.3. Reconcile Reporting System
3.2.1.4. Information Management

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2.1.5.1. Quality at the Source
2.1.7.1. Incremental Continuous Improvement (Kaizen)
2.2.9. Continuous Improvement Process Methodology
2.2.9.1. PDCA
2.2.9.2. DMAIC
2.2.9.3. Problem Solving Storyboards
2.2.10. Quality Systems
2.2.11. Corrective Action System
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2.3.4. Presenting Variation Data
2.3.4.1. Statistical Process Control Charts
2.3.4.2. Scatter and Concentration Diagrams
2.3.5.2. Quality Function Deployment
2.3.5.4. Design for Product Life Cycle (DFx)—Cradle to Cradle
2.3.5.6. Design for Manufacturability
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**Sections**

2.1.5. Jidoka  
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2.3.4.2. Scatter and Concentration Diagrams

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2.2.4. 3P Production Process Preparation

2.2.13. Process Design

3.1.1. Systemic Thinking

3.1.2. Constancy of Purpose

3.1.3. Social Responsibility

4.2.2. Goal and Objective Setting

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**Sections**

2.1. Principles of Continuous Process Improvement

2.1.2.2. 7 Wastes (Muda), Fluctuation (Mura), and Overburden (Muri) (with David Foxx)

2.1.5.1. Quality at the Source (with Govind Ramu and Mark Paulson)

2.1.5.3. Separate Man from Machine

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4.3.3.5. Changeover Time
4.3.4. Financial Impact
4.3.4.1. Cash Flow
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Sections (with Bruce Hamilton)

2.1.2. Identification & Elimination of Barriers to Flow
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2.1.2.3. Connect & Align Value Added Work Fragments
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2.1.2.6. Manage the Flow Visually
2.3.7.1. Mistake and Error Proofing (Poka Yoke)
2.3.7.4. Right Sized Equipment
2.3.7.5. Cellular Flow

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Sections

3.3.1. A3
3.3.2. Catchball
3.3.3. Redeployment of Resources

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Relying on his diverse knowledge of business, manufacturing techniques, and applications, Tony has assisted numerous clients in implementing a lean enterprise and lean healthcare. Over the past 10 years, he has helped over 150 companies in several aspects of lean implementation, including team building, standardized work, 5S workplace organization and visual workplace, quick changeover, plant layout, cellular, kanban, total productive maintenance, kaizen events, and hoshin planning. Tony is an internationally recognized speaker and expert on lean and presents at several conferences a year. As an ASQ faculty member, he teaches a two-day course in lean enterprise and a one-day course on kaizen. Tony is the past chair of the Lean Enterprise Division of ASQ. He is a senior member of SME and a member of AME. Tony is coauthor of the book *Lean Kaizen: A Simplified Approach to Process Improvement* and author of many articles on lean and its allied subjects. He serves as an ASQ representative to the Lean Certification Oversight and Appeals Committee. Tony is Lean Bronze Certified and was part of the original team to develop the Lean Certification.

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Module 1
Cultural Enablers

1.1. Principles of Cultural Enablers
1.2. Processes for Cultural Enablers
1.3. Cultural Enabler Techniques and Practices

Culture is the widening of the mind and the spirit.
—Jawaharlal Nehru

The first section of the Lean Body of Knowledge is dedicated to culture. Although lean is about the tools, it is more about creating a culture of people who truly believe in continuous improvement. This portion of the book focuses on what it takes to create, change, and lead an organizational culture into operational excellence. There is no lean without people. This section explores the importance of leading with humility, showing respect for people, having a well-crafted plan with a sense of urgency, and developing the people and leaders in your organization.
According to Pascal Dennis (2007, 145), author of *Lean Production Simplified*, “Intensity is the soul of lean production, and team members are its heart.” In other words, people are the most critical element of lean production, and the *culture* the team members create is the major source of fuel required to propel lean systems forward in any organization.

In a vast majority of cases, the success or failure of any lean, Six Sigma, or other corporate initiative will depend on the people who execute it rather than on any equipment, consultant, software, or other tools and techniques. Thus, organizations that consider people as the prime appreciating asset and invest adequate time, effort, and money in hiring and developing the right people will get unmatched results (Dalal 2011, 584).

**What Is a Culture?**

*A culture* is the sum total of all behaviors, relationships, comprehension, and interactions that fuel overall alignment via collective thoughts, words, and actions.

**What Is a Lean Culture?**

*Lean* is an approach to improve quality, increase productivity, reduce costs, and increase customer satisfaction by eliminating waste and creating value.

*A lean culture* is the sum total of all the lean tools, techniques, and knowledge that exist within an organization at the root level and that fuel the overall organizational alignment via collective lean thoughts, words, and actions toward the elimination of waste and the creation of value.

Organizations that have a strong lean culture do two things:

1. They promote at least five key *cultural enablers* (safety, standards, leadership, empowerment, and collaboration), which allows the lean culture to exist

2. They build their business on the core fundamentals of respect for individuals

**An Example of a Strong Lean Culture**

The consistent growth, prosperity, innovation, and operational excellence of Toyota are clearly results of the Toyota Production System (TPS), which is built...
on the foundation of a strong and dynamic culture and sophisticated “human systems” consisting of highly motivated and well-trained people in plants, dealerships, and offices around the globe. In *Toyota Culture*, authors Jeffrey Liker and Michael Hoseus (2008) explain Toyota’s four-stage process for building and keeping quality people: attract, develop, engage, and inspire. The “people-centric” culture of Toyota is carefully designed by:

- Finding competent, able, and willing employees
- Beginning the training and socializing process as they hire the people
- Establishing and communicating key business performance indicators at every level of the organization
- Training the people to solve problems and continuously improve processes in their daily work
- Developing leaders who live and teach your company’s philosophy
- Rewarding top performers
- Offering help to those who are struggling (Liker and Hoseus 2008, 44)

**What Is a Cultural Enabler?**

Just as a sapling requires critical factors like the right soil, adequate sunlight, and water to survive and grow into a strong tree, culture requires factors that allow it to stabilize and pervade throughout the organization. These factors are known as cultural enablers.

Cultural enablers are critical to the people on the journey of building a culture of operational excellence within an organization.

**What Constitutes as Cultural Enablers of a Lean Culture?**

Cultural enablers of a lean culture include the basic principles of safety, standards, leadership, empowerment, and collaboration.

**Basic Principles of Safety**

There are only two types of organizations: safe or lucky.

Safety is the prime cultural enabler, as only safe environments can be productive and profitable. Lean organizations believe that merely adhering to all requirements of the Occupational Safety and Health Administration (OSHA) is not sufficient in order to have a safe working environment.

The following two principles are engrained in the culture of lean organizations:

1. Safety is the responsibility of every employee within the organization
2. A proactive versus a reactive approach is required in order to create and maintain a clean, safe, ergonomic, and sustainable work environment

Lean organizations realize that to attain all-encompassing safety standards, they must focus on education and awareness in safety practices related to people’s health and wellness, and interface with people and equipment and environmental aspects.
**Personal Safety**

Personal safety focuses on security and protection from accidents, injuries, fire hazards, equipment malfunction, and any other aspect threatening the health and well-being of every individual in the organization.

**Fatigue Prevention**

Fatigue results from a poorly designed workplace, work environment, tools, equipment, and policies and procedures. Practicing workplace ergonomics, which optimizes the comfort of employees while they are interacting with all the elements of their workplace, is the key to reducing fatigue and increasing employee efficiency.

**Environmental Safety**

Environmental safety involves reducing the carbon footprint of products and processes on the surrounding environment. It encompasses product and process design from cradle to grave, including use of environmentally conscious raw materials, supplies, and packaging materials requiring minimal transportation and minimal waste, along with proactive implementation of recycling or reuse programs.

Some top enablers for creating a culture of safety are the following:

- Focus of top leadership
- Organizational emphasis on safety
- Clearly defined organizational structure
- Clearly defined lines of authority and accountability
- Unambiguous communications
- Trust and engagement
- Ability of organization to learn from failures
- Safety training and sharing of lessons learned

Some top barriers for creating a culture of safety are the following:

- Lack of support from top leadership
- Minimal emphasis or pseudo-emphasis on safety
- A culture of blame and retribution
- Lack of training or sharing of lessons learned

**Basic Principles of Standards**

Standards are baselines from which improvements can be easily measured. All standards related to safety, communications, operations, human resources, policies, procedures, and tasks need to be standardized across the entire organization. Standardization is not static but dynamic and requires continuous improvement using the Plan-Do-Check-Act model of the Deming cycle (ASQ).

Taiichi Ohno is credited with saying, “Where there is no standard there can be no kaizen.” Thus, a standard is “the best known method/process/system at
a particular point of time” and is a dynamic point of reference that becomes the baseline for future improvements. Every continuous improvement activity must result in the establishment of a new standard. This “new standard” may require establishing a new standardized work sequence, recalculating takt times and establishing new inventory levels, updating visual work instructions, and setting new inspection or quality control standards.

According to Masaaki Imai (1997, 54–56), author of *Gemba Kaizen*, standards have the following key features:

- Represent the best, easiest, and safest way to do a job
- Offer the best way to preserve the know-how and expertise
- Provide a way to measure performance
- Show the relationship between cause and effect
- Provide a basis for both maintenance and improvement
- Provide objectives and indicate training goals
- Provide a basis for training
- Create a basis for audit or diagnosis
- Provide a means for preventing recurrence of errors and minimizing variability

**Basic Principles of Leadership**

Without support from the top leaders and executives, lean initiatives cannot survive in an organization. The leader is not only required to support lean initiatives in good times but also required to show persistence and constancy of purpose during tough times. The leader needs to develop a clear vision for lean, communicate it effectively to his or her employees, and empower them to adopt it as their own mission. Thus, leadership is the key cultural enabler that determines whether lean is established as a culture in the organization.

Good leaders understand that in an environment of continuous improvement, failures are imminent. But rather than blame people for failures, they ask “why” five times, approach the problem, and create a plan to strengthen the people (Dennis 2007, 130).

According to Dalal (2011, 471–85), there are three types of failures:

1. System level failures
2. Process level failures
3. Human level failures

Great lean leaders avoid focusing on the human level failures, as this would create an environment of fear, distrust, and a culture of risk aversion lacking creativity and innovation. Instead, great lean leaders:

- Focus on system failures (“why”)
- Spend more time to prevent the failure
• Believe that 80% of the failures are avoidable by 20% of planning
• Perform root cause analysis to prevent failures
• Implement dynamic risk assessment to identify and plan for failures
• Use Plan-Do-Check-Act cycle to prevent failures
• Establish a creative and open environment for lessons learning (Dalal 2011, 471–85)

Figure 1.1-1 shows a representation of an empowered culture of trust created by leaders using these techniques.

**Basic Principles of Empowerment**

A Japanese saying alludes to the fact that a statue of Buddha will not mean much without putting a soul in it (Imai 1997, 242). The soul of a lean organization is employee empowerment.

The prime responsibility of a leader in a lean organization is to develop effective problem solvers and decision makers. The only way a leader can achieve an empowered workforce is by helping to set a vision and relinquishing some authority in order to allow the capable employees to make decisions and influence corporate policies. Empowered employees get to the depths of understanding of lean technology and go beyond the know-how of lean and experience and apply lean with a deeper understanding of the know-why. Thus, lean leaders rely on their

![Diagram showing the 5-Why analysis process](image)

**Figure 1.1-1** Empowered culture.

*Source: Dalal (2011, 471–85).*
empowered employees to optimize the benefits of lean initiatives, ensuring superior levels of customer satisfaction.

Employee empowerment must be done in six steps:

Step 1: Leaders make a commitment to have an engaged workforce
Step 2: Roles and responsibilities are clearly defined
Step 3: Training is conducted for managers, supervisors, staff, and shop-floor personnel
Step 4: Training is conducted for all administrative and support staff
Step 5: A formal idea-suggestion or idea-sharing program that involves all employees is implemented
Step 6: Action is taken to assign responsibility and accountability

Basic Principles of Collaboration

The cultural enabler “collaboration” is the backbone of lean. Lean initiatives do not depend on the knowledge of one but achieve breakthrough results due to the deployment of the collective wisdom of many. In lean organizations, collaboration exists across:

- Various functions
- Different departments
- Staff and union workers—and even between executives and operators

Collaboration and partnerships extend beyond the four walls of the organization and include suppliers, contractors, and, in some cases, competitors.

By design, lean tools allow for a collaborative culture throughout the organization. Nemawashi, A3 form, kaizen events, and several other lean tools are designed for automatic collaboration.

1.1.1. RESPECT FOR THE INDIVIDUAL

One of the most critical aspects of lean cultures is the inherent importance placed on valuing individuals and treating each individual with dignity.

In lean organizations, respect starts with the top leaders and permeates throughout the organization. However, “respect for every individual” does not end at the four walls of the organization; rather, it extends to all customers, suppliers, and stakeholders, including the community in which the organization does business.

Respect allows the lean culture to achieve the following goals:

- Create a culture of cohesive teamwork
- Create a culture of continuous improvement
- Increase employee involvement
- Empower employees
- Encourage diversity
A key requirement and an underlying quality required by employees of lean organizations is humility.

Leaders and employees all practice humility as a technique that allows the process of continuous improvement to go on via open collaboration. In lean cultures, everyone is open to learning from one another and to raising their game incrementally on a daily basis in order to generate superior value and increase customer satisfaction.

The key traits of a humble environment are as follows:

- An open learning environment
- People form a critical element of the value stream
- A long-term relationship based on mutual loyalty
- A mentor-mentee, sensei-student relationship throughout the organization
- Lack of discrimination throughout the organization and the entire supply chain

Thus lean organizations and their leaders focus on operational excellence via a people-centric approach by ensuring an empowered, safe, and collaborative environment based on standards and a philosophy of a wholehearted pursuit of long-term excellence.

1.1.2. HUMILITY

Humility leads to strength and not to weakness. It is the highest form of self-respect to admit mistakes and to make amends for them.

—John J. McCloy

Humility ties in directly with respect for the individual (see Section 1.1.1, “Respect for the Individual”). Humility is considered the quality of being modest, unassuming in attitude and behavior. It also can be taken as feeling or showing respect and deference toward other people. Don’t think of humility in the lean sense as being meek, shy, and timid or of lesser value. Of course, the opposite of being humble is being arrogant, overconfident, condescending, or egotistical or displaying hubris. Humility is a principle that enables the people in your organization to learn, improve, and excel.

Consider two types of humility: personal humility and leading with humility. This approach helps us understand what it takes to develop our own personal style, along with the similarities and differences in leading people.

Personal Humility

Personal humility can be thought of as having pride (not boastful), self-respect, and dignity. These traits are created over the years with a commitment to integrity, honor, and pursuing lifelong learning. Being humble means that you understand
that you don’t know everything and can continually learn from those around you. As you learn, you improve. This also involves understanding your strengths and weaknesses. Understanding your strengths allows you to be a better team member, as you bring certain skills to your workplace. Appreciate your weaknesses (or opportunities for improvement) so you can continually develop and progress as a person. Another important role of humility includes being able to accept personal responsibility for your actions. Admit when something doesn’t go as planned. Hansei is a Japanese word that means “self-reflection” or to acknowledge a mistake and pledge to improve. It is perfectly acceptable to say, “I don’t know; let’s find out.” Humility also includes being authentic to yourself and to others and staying true to your principles or virtues. Another important skill for fostering humility is to perfect your active listening skills and be present for the other person. Humility is also being mindful of others, in your thoughts, speech, and actions. In Stephen Covey’s *The 7 Habits of Highly Effective People* (1989, 235), habit 5 says to “seek first to understand, then to be understood.” This is a classic example of showing your humility. By reserving your desire to jump in, speak up, and be heard and truly trying to understand the other person’s point of view you create a better relationship and find overall solutions to problems. In a way, humility can be thought of as living by the golden rule: Treat others as you would like to be treated. This leads to workplace satisfaction and gratification of a job well done.

**Leading with Humility**

Leading with humility is not only for the CEO or the president of your organization. Leading with humility should permeate all the way through the ranks to the level of the value-adder. At any one time, everyone has a chance to lead, from daily meetings or training to large-scale projects. Gary Convis (2011) tells of his mentor at NUMMI, Kan Higahsi, telling him his greatest challenge would be “to lead the organization as if I had no power.” This is a sure sign of humility.

In his book *Good to Great*, Jim Collins (2001) talks about Level 5 Leadership, of having personal humility and professional will. Table 1.1.2-1 shows a summary of Level 5 Leadership personal humility traits, adapted from the book.

**Leading by Deeds**

Building trust to become trustworthy as a leader starts with personal humility. Building trust can take time. Your words and actions demonstrate your ability to

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**Table 1.1.2-1** Level 5 Leadership—personal humility traits.

- Demonstrates a compelling modesty, shunning public adulation; never boastful
- Acts with quiet, calm determination; relies principally on inspired standards, not inspiring charisma, to motivate
- Channels ambitions into the company, not the self; sets up successors for even greater success in the next generation
- Looks out the window, not in the mirror, to apportion credit for the success of the company—to other people, external factors, and good luck

*Source: Adapted from Collins (2001, 39–40).*
do what you say. An example of this is a leader who says that the customer comes first but then makes it difficult for the customer to contact him or her—making the customer search a website for a telephone number or navigate lengthy phone menus that lead nowhere. As a humble leader, you will need to know how to be patient in developing your people. While there are always deadlines, proper planning, tapping into the creativity of your employees, and having the patience to stay the course will pay off dramatically as you create a more engaged workforce. Always make sure to give credit to others for their contributions to the success of the organization, and take personal responsibility for any letdowns. Learn how to shine the spotlight on others; let them shine in the eyes of the company. If you can learn how to talk to the CEO and the value-adding worker in the same way, you are developing the type of skills that will make you invaluable to your institution. As a leader, design your systems with respect and humility.

Dwight Davis (2011), associate vice president of Utah State University, on the topic of leading with humility, says, “Humility is a key element in building teams, unifying organizations, unleashing employee capabilities, optimizing relationships, designing systems of accountability and achieving a culture of discipline. Humility simply enables individual and organizational learning and improvement.”

_We come nearest to the great when we are great in humility._

—Rabindranath Tagore

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