Karen Martin
Mike Osterling

# The Kaizen Event Planner

**Achieving Rapid Improvement in Office, Service, and Technical Environments**

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# ACKNOWLEDGMENTS

# PREFACE

In writing this book, we had to make a number of difficult decisions. Just like a Kaizen Event, our first decision concerned scope. We were tempted to include information about how to apply the specific improvement tools, such as pull systems, work balancing, and standard work, to name a few. But we decided to narrow our scope and focus specifically on what we considered the continuous-improvement community's greatest need: how to plan and execute Kaizen Events and conduct post-event follow-up. Productivity Press and other publishers offer a number of excellent resources, and professional associations and seasoned consultants can help you design and implement the actual improvements. That said, we did include sample value stream maps for a purchasing process in Chapter 1, and a section on map interpretation because we feel strongly that the bulk of your Kaizen Events should be closely tied to a future state value stream map and implementation plan.

Our second major decision concerned how much information to include about the Toyota Production System (TPS), lean enterprise principles, the plan-do-check-act (PDCA) cycle, and other philosophies and approaches that have played a strong role in the development of Kaizen Events as an improvement implementation strategy. While a fair number of readers may be new to lean terminology and concepts, many of our manufacturing-based readers likely have extensive TPS knowledge and experience applying lean enterprise principles and tools. For those in the former group (and those in the latter group who need a refresher), you may wish to read seminal works, such as James Womack and Daniel Jones' *Lean Thinking*, Jeffrey Liker's *The Toyota Way*, or Masaaki Imai's *Gemba Kaizen* or *Kaizen: The Key to Japan's Competitive Success* to gain a greater appreciation for kaizen's roots. It would be a mistake to move forward with Kaizen Events without a firm grasp of TPS and lean principles. We sincerely hope that Chapter 1 delivers enough introductory information to set the stage for holding successful Kaizen Events and whets your appetite for continuous learning to deepen your understanding of TPS and lean.

The final decision, closely tied to the previous one, concerned how much Japanese terminology to include. This was not an easy decision for us to make because we feel passionate about lean's roots and the metaphorical nature of the Japanese language. But we wanted the book to be accessible to individuals and, in some cases, entire organizations that are firmly rooted in Western culture and don't share our appreciation for Eastern ways. Further, we continue to meet resistance from well-meaning professionals in nonmanufacturing industries who believe that TPS and lean can't possibly apply to them because they're not manufacturers. Therefore, we find it more effective to initially limit what many perceive as manufacturing-specific terminology, then integrate the Japanese terms and Lean vernacular as the practitioner begins to recognize that it is not a question of whether they manufacture goods; it's about *process*—and offices, service organizations, and technical staffs all have their own versions of a production line. So, with some reluctance, we have limited the use of Japanese terminology in the book itself, but those such as *muda*, *gemba*, *poka-yoke*,

*kaikaku*, etc., are included in the glossary, which can be found both in Appendix A and on the accompanying CD as a printable PDF file.

A final note for those of you in manufacturing: While this book focuses on office-related improvement efforts, many of the concepts and tools apply to production-specific Kaizen Events as well.

Enjoy the journey to becoming a kaizen-thinking and kaizen-behaving organization. We invite you to share your experience with us at *http://www.kaizeneventplanner.com/*.

# INTRODUCTION

In the world of continuous improvement (CI), kaizen may perhaps be the most misunderstood concept. We've heard executives refer to their organizations as "kaizen organizations" when there is little evidence of ongoing improvement being designed and implemented by the workforce. We've seen organizations refer to their value stream mapping activities as Kaizen Events. We've also attended conferences where seasoned continuous-improvement professionals refer to kaizen as a specific tool for reducing lead time or creating process capacity rather than what it is: a continuous-improvement philosophy and business management approach for making small, incremental progress on a daily basis. Kaizen sets the stage for the workforce to effectively apply specific improvement tools. When practiced on a daily basis, this process can transform an organization's culture.

But even those who truly understand the essence of kaizen often struggle when it comes to execution. Applying the kaizen philosophy at a tactical level on a daily basis isn't as easy as it seems it should be—especially here in the West. At its core, kaizen is about people and respect for human dignity. Today's organizations are complicated ecosystems comprised of independent-minded people with varying needs, experience, goals, understanding, priorities, and responsibilities. When we add the challenges associated with daily firefighting, excessive multitasking, functional organizational structures, unclear roles and responsibilities, and changing organizational priorities to this system, it's no wonder that many organizations struggle with how to use kaizen to improve bottom-line performance, the work environment, and ultimately, their position in the marketplace.

Kaizen Events—the subject of this book—offer an effective way to train organizations to break unproductive habits and adopt the kaizen philosophy while, at the same time, achieve breakthrough performance and unprecedented results. Through Kaizen Events, cross-functional teams learn how to make improvements in a methodological way. They learn how to apply specific improvement tools, establish relevant metrics programs, and sustain their gains. Most importantly, they learn how to work with one another to solve problems rapidly and in a highly effective way. After a Kaizen Event ends, these team members become ambassadors for change, spreading their learned behaviors across the organization.

With each Kaizen Event, the pool of ambassadors grows, fueling a cultural shift that begins to place *improvement* as the organization's top priority and increasingly authorizes the workers themselves to design and implement tactical level improvements. After a series of many Kaizen Events that reach into various operating units, organizations are often better positioned to begin practicing daily kaizen. But while Kaizen Events provide the focus, structure, and skilled facilitation that enable daily kaizen to become standard practice within an organization, the need for Kaizen Events never goes away. Even the most seasoned organizations benefit from using Kaizen Events for making larger scale, rapid improvements, which are best achieved in a structured setting with a sequestered, cross-functional team.

Although many U.S. manufacturers have been holding Kaizen Events since the early nineties, the approach is fairly new to office, service, and technical environments. And while these settings present unique challenges, we have seen their Kaizen Events produce even more dramatic results than those from manufacturing-based events. In two to five days, Kaizen Event teams in office, service, and technical environments regularly reduce throughput time by 60 percent, improve quality by 80 percent, and increase capacity by 20 percent.

But these impressive outcomes don't magically appear. Kaizen Events in these settings require more planning, skillful execution, and follow-up than their manufacturing counterparts. The teams are often larger, and they are often less familiar with cross-functional problem solving, less comfortable with the concept of standard work, and more isolated from the customer who ultimately determines value. In addition, relevant current state performance data is often difficult to obtain.

As we began facilitating Kaizen Events in office areas within manufacturers and in nonmanufacturing environments (e.g., healthcare, information technology, financial services, distribution, insurance, engineering services, oil and gas production, government, military, and construction), we discovered the need for detailed standard work for planning and executing Kaizen Events in environments that weren't accustomed to the structure that Kaizen Events require. When we looked around for existing materials, we discovered a market void and created our own set of tools. As we began sharing these tools with clients and conference attendees, they asked us to make them publicly available.

At the same time, we grew increasingly concerned with two observations. First, many organizations were (and still are) relying too heavily on external consultants to drive their continuous-improvement efforts and seemed reluctant to develop a pool of internal resources to facilitate Kaizen Events and other improvement activities such as value stream mapping. But an organization will never become self-sustaining if it doesn't develop its own cadre of continuous-improvement experts. Further, it's difficult to achieve momentum and sustain gains if activities only occur when an outside consultant is on site.

Our second concern stemmed from the growing number of organizations that tell us they are holding Kaizen Events, but the only outcome is a *plan* for implementation, not actual implementation—a defining element for a Kaizen Event. While we value what we refer to as "rapid planning events," they are not Kaizen Events and should not be referred to as such. So, with tools in hand and concern for retaining the original theme and objectives for Kaizen Events, a book was born.

## HOW TO USE THIS BOOK

This book is organized into four parts. Part I provides background information about the Toyota Production System (TPS), the lean philosophy, and the difference between the practice of ongoing, daily kaizen and Kaizen Events. For those of you who are new to TPS and lean, Chapter 1 includes a sample value stream map, so you can see how Kaizen Events fit into a larger strategic improvement plan.

Parts II, III and IV center around the planning, execution and post-event follow-up phases of the Kaizen Event, which form a macro plan-do-check-act (PDCA) cycle. Within the execution phase, lies a micro PDCA cycle as teams design, test, modify, implement, and monitor their improvements.

In looking at Part II, you may wonder why it would take seven chapters to discuss planning an event, but the *success of a Kaizen Event is directly related to the quality of the upfront planning*. Do not succumb to the temptation to skip this vital section to get to the "meat" of the matter. Part II may require even more of your focused attention than the rest of the book. Through your thorough understanding about who should lead events, how to scope them properly and select an effective team, and how to properly communicate event details, you will be positioned for success.

Part III addresses event execution and introduces a new process mapping technique we refer to as *Metrics-Based Process Mapping* (MBPM), which combines the metrics components from value stream mapping with the swim-lane structure of functional process maps. This mapping approach, described in Chapter 12, has proven a powerful addition to our improvement tool belt. It enables teams to perform a deep dive and "get into the weeds" with a process, which results in powerful current state analyses, which lead to effective solutions. We use this mapping technique in about 50 percent of the Kaizen Events we lead.

Part IV addresses essential post-event follow-up activities and techniques to assure sustainability. Most events generate a short list of activities that need to be completed immediately following the event, such as conducting makeup training on the improvement for the workforce that may have been out of the office during the Kaizen Event. The sustainability section provides direction concerning process audits—including how often audits should be conducted and by whom—and the role of metrics in driving ongoing improvement.

You may wish to read the final chapter in the book, Creating a Kaizen Culture, before you begin the book. While Kaizen Events are an effective implementation strategy for *any* type of organization, the outcomes are often directly related to the organization's readiness for the commitment and discipline required by the approach. Kaizen Events significantly test an organization's ability to handle rapid change. They reflect current culture and reveal organizational weaknesses like no other improvement tool. Through having the courage to look into the mirror that Kaizen Events provide, organizations can make quantum leaps in their desire to become lean enterprises. But looking into the mirror isn't always easy, and requires a committed leadership team. Chapter 19 includes a change management matrix that addresses the key elements for effective change—essential understanding for those of us who seek to shift culture—and the desired leadership behaviors that will set you on a path to success.

## THE CD

The book is structured around a set of Excel-based tools and templates that can be found on the CD included at the back of the book. These tools are designed to serve as standard work for planning and executing Kaizen Events, and conducting post-event follow-up. The CD

instructions for use, which follow this introduction, describe how to use these interactive tools most effectively. You may not need every tool for every event. We encourage you to take a careful look at what's available, each tool's intended use, and then make an informed decision based on your specific needs. We hope you find the tools as helpful to the rapid change process as we have. While we've tested them extensively and have used them in many Kaizen Events, we practice continuous improvement on a daily basis. So if you discover the need for additional tools or discover an opportunity for improving the ones provided, please contact us at *http://www.kaizeneventplanner.com*. The CD also includes additional documents and templates you may wish to print and refer to as you read the book, or to include in your internal training efforts.

## OTHER LEARNING MATERIAL

The book also contains a number of other learning tools to support your development as continuous improvement leaders and Kaizen Event facilitators. Appendix A includes a glossary of commonly used lean enterprise terms and acronyms. An electronic version of the glossary is included on the CD, so you can print it for distribution or as a learning aid during training sessions. Appendix B lists a wide variety of resources available to you to practice continual learning. To continue your professional development, read, attend workshops and conferences, form communities of practice, and join user groups. The Internet, your local library, and booksellers offer a wealth of information. Through continuous learning, we strengthen our skills as CI leaders and model the behavior we encourage others to adopt.

This book has been a labor of love. While the seed was planted from our personal needs as consultants, it has evolved into what we hope will provide substantial support to others who seek to make rapid improvements and shift organizational culture through Kaizen Events. We're relatively certain that we haven't hit on every aspect of holding Kaizen Events, but we hope we have captured the largest issues and have addressed them in an accessible way. Enjoy, freely share your knowledge, get results, reflect, and continue learning. Ultimately, that's what improvement is all about.

# CD INSTRUCTIONS FOR USE

The CD included at the back of the book contains a file—Kaizen Event Tools—that contains practical tools and standard work templates to help you plan and execute successful Kaizen Events and perform necessary follow-up activities. In addition, the CD includes a folder containing several full-size versions of the graphics that appear in the book. This material is included in case you want to print them to take notes as you read the book and/or use them for training purposes.

The CD files are:
- **Kaizen Event Tools** (Excel file)
- **Additional Materials Folder**, which includes:
    - **Current and Future State Value Stream Maps**—This file contains the sample value stream maps described in Chapter 1. You may want to print these to refer to as you read Chapter 1.
    - **Kaizen Commandments**—These "rules," which are discussed in Chapter 11, help ensure a successful event. You may want to distribute these rules to the kaizen team and/or post them in kaizen central.
    - **Key Mapping Metrics**—This table, introduced in Chapter 12, lists the most common mapping metrics used to measure the current state and projected future-state performance for either macro-level value stream maps or micro-level process maps.
    - **Certificate of Achievement**—This certificate, referred to in Chapter 17, can be modified for your organization and either printed as is or the borders can be removed and you can print on certificate paper available through any office supply store or specialty company such as Baudville, www.baudville.com, 800-728-0888.
    - **Lean Terminology**—This reference guide, which appears as Appendix A in the book, includes the most commonly used lean terms and acronyms.

## KAIZEN EVENT TOOLS—GENERAL INFORMATION

These interactive Excel-based tools, which provide standard work for planning and executing Kaizen Events, form the backbone of this book. Detailed instructions and best practices for using the tools are described throughout the book. The matrix on the following page lists the tools, their tab numbers on the Excel file, the Kaizen Event phase in which they will likely be used, and the chapter in the book in which the tool's use is first introduced.

### File Type and File Naming Conventions

The Kaizen Event Tools file—named "Kaizen Event Tools.xlt"—is an integral part of this book and serves as the standard work for planning and executing successful Kaizen Events,

| Kaizen Event Phase | Tab | Tool | Chapter |
|---|---|---|---|
| Pre-Event Planning | 1 | Kaizen Event Charter | Chapter 3 |
| | 2 | Planning Checklist | Chapter 3 |
| | 3 | Team Formation Matrix | Chapter 6 |
| | 4 | Supplies Checklist | Chapter 7 |
| | 5 | Communication Worksheet | Chapter 8 |
| Event Execution | 6 | Execution Checklist | Chapter 10 |
| | 7 | Improvement Ideas | Chapter 10 |
| | 8 | Sustainability Plan | Chapter 17 |
| | 9 | 30-Day List | Chapter 17 |
| | 10 | Parking Lot List | Chapter 17 |
| | 11 | Kaizen Event Report | Chapter 17 |
| | 12 | Final Presentation Agenda | Chapter 17 |
| Post-Event Follow-up | 13 | Post-Event Activities | Chapter 18 |
| | 14 | 30-Day Audit Report | Chapter 18 |
| | 15 | 60-Day Audit Report | Chapter 18 |

as well as laying the groundwork for improvement sustainability. This file has an .xlt suffix, indicating an Excel template file type. Templates offer the user a degree of protection against inadvertently overwriting the master file. In addition, a template creates a convenient way for creating multiple derivations for each of your Kaizen Events. We recommend that you modify the template to create an organization-specific template. For example, you could preload the Team Formation and Communication worksheets (Tabs 3 and 5) with the functional departments within your organization. Store the new template in a safe and accessible place, such as a shared drive. You may want to create a master folder to house all information related to Kaizen Events, with subfolders for each event. When saving the company-specific master file, rename the file with language that clearly indicates it's a master. In the "save as type" window (directly below the file name window), select "template" from the drop-down choices. The file will retain the ".xlt" extension.

For each Kaizen Event, you can perform the "save as" function and give the tools a unique file name for that event. When you do this, the file name will then carry the regular Excel file extension—".xls." We recommend you include the event name and start date (e.g., Accounts Receivable 2007-08-15) in the file name.

## Macros

The tools contain several macros. Therefore, when you open the file, you will receive a message warning you that macros are embedded in the file. Select "Enable Macros" to ensure the best functionality. If your computer's macro security settings are set to "high" or "very

high," you will need to change the security settings to medium before you'll be able to enable the macros so the tool will operate properly.

Because of the macros, when you exit the tool you will be asked whether you want to save changes, *even if you haven't made any changes*. If you have made changes and want to save them, select "yes." If you have not made any changes to the file, or have made changes that you do not wish to save, select "no."

### Tools Organization

The file, which Excel refers to as a workbook, contains 15 different standard work tools/templates, which Excel refers to as "sheets." You can access each sheet by clicking the appropriate tab along the bottom of the Excel workspace. The tabs are color-coded according to the Kaizen Event phase in which the tools are typically used:

| Tab Color | Phase |
|---|---|
| Blue | Pre-event planning |
| Yellow | Event execution |
| Lavender | Post-event follow-up |

## KAIZEN EVENT TOOLS: NAVIGATION TIPS

While detailed information about each specific tool's use can be found within the book's chapters, the following navigation instructions provide general information about the tool structure and function. The instructions for use are not intended as Excel training. Rather, the instructions assume users possess a basic understanding of Excel.

### Cell Color Coding

All cells are color coded to indicate the cell's format, functionality, and what action, if any, the user should take:

| Cell Color | Action |
|---|---|
| Yellow | These are the *only* cells that will accept direct data input from the user. On those tools containing pre-populated lists, we have included blank yellow cells so you can add activities or items that are unique to your organization (e.g., cells C14 –C17 in the "Planning Checklist" sheet). |
| White | White cells contain descriptions of activities or items in a list and are "locked" to prevent inadvertent deletions, formula revisions, or cell reformatting. |
| Black or gray | These cells contain section, column, or row labels and are also locked, preventing alteration. |
| Salmon/tan | For user ease, salmon-colored cells are auto-populated from other cells within the workbook. For example, once the top three sections of the Kaizen Event Charter are completed, all corresponding cells, on the subsequent tools, auto-populate with the information entered into the charter cells. If you need to update the information in any of the tools' fields that drive from the charter, you'll need to modify the information in the charter first as it's the driving document. Metrics-related salmon-colored cells auto-populate based on programmed formulas that auto-calculate once data is entered into the driving yellow cells. The salmon cells are also locked. If the source cell information is altered, the |

salmon cells will update automatically. More detailed information about this feature is included in the auto-populate section.

## Cell Content

When more content is entered than the cell's size allows, one of two things happen, depending on the format of the particular tool: 1) the font size automatically shrinks to accommodate additional text, or 2) the text wraps within the cell. Cells are limited in size to encourage concise communication. When possible, we opted for the "text wrap" feature. If text wrapping would alter form layout, we used the "shrink to fit" feature. In this case, the font will be reduced to the size necessary to fit all text into the space available. Again, we encourage brevity but not at the expense of clarity.

If you want to create a list within a single cell, such as the Boundaries and Limitations cell (C11) on the Kaizen Event Charter (Tab 1), press alt + enter after each item to move to a new "line" within the cell.

## Insert Comment

Any time you need to explain a *yellow* cell's contents further, you may insert a comment by right clicking on the cell. A small red triangle appears in the upper right corner of the cell to indicate a comment exists. To view the comment, simply left click on the cell (making it "active") and the comment will appear. To delete the comment, right click in the cell and select "delete comment." You may also insert and delete comments from the menu bar by selecting "insert," then select "comment."

## Check Boxes and Progress Boxes

Place the cursor over the check box and left click once to check the boxes that appear on several of the tools containing lists. To remove the checkmark, simply left click again.

On the 30-Day List's progress section, if you delete the number on the progress box quadrant that indicates the appropriate degree of completion for the particular task, the quadrant color will change from yellow to green. You may delete the cell contents by left clicking the cell to make it active and pressing the "delete" key or right clicking in a cell and selecting "clear contents." To change the color back to yellow, enter the corresponding value (1, 2, 3, or 4).

## Footers

Each tool includes a footer that contains up to three pieces of information. The file name and the tool's tab number appear in the left position of the footer. For tools with multiple hard copy pages, the page numbers appear in the center position. If you print the Planning Checklist, page numbers will appear as "Page 1 of 4," "Page 2 of 4," etc. If you print a one-page tool, the printed copy will not include a page number.

If you select "entire workbook" before printing, the hard copy will be paginated sequentially: "Page X of 26." The entire workbook is 26 pages. Footers are protected and may not

be altered. Please note that the Excel print option defaults to "active sheet," so if you want to print the entire workbook (entire set of tools), you need to highlight all of the tabs or select "entire workbook" before printing.

The right position of the footer includes a copyright: © 2007 Karen Martin and Mike Osterling.

### Protection

All sheets are protected. In addition, all cells with the exception of yellow cells have been locked to prevent alteration. Yellow cells—intended to be filled in by the user—are "unlocked" and color coded yellow. This formatting restriction is intentional, designed to prevent you from inadvertently deleting key information, creating inoperable formulas or reformatting the cells.

### Auto-Populate Feature

Certain cells on the various tools serve as source cells that, when data is entered, automatically populate corresponding cells on the same or subsequent tools. Cells that receive this automatic population are color coded salmon (Excel refers to this color as tan). For example, once the executive sponsor's name is entered into cell H3 on the Kaizen Event Charter, it will automatically populate the Executive Sponsor cell on the Planning Checklist, 30-Day List, and all other sheets that include the executive sponsor's name. Another example is when the Event Start Date is entered into cell F4 on the Planning Checklist, the "Due Dates" in column D auto-populate, based on a calculation that includes the Event Start Date and the suggested timing for that activity (four weeks prior to the Kaizen Event, three weeks prior, etc.).

Metrics-based examples appear on the Event Report, and the 30- and 60-Day Audit Reports, in which formulas automatically calculate the projected change and percentage of action items completed. In addition, metrics information entered in the Event Report auto-populate the corresponding cells on the audit reports.

### Insert Pictures

When completing the Event Report sheet, you will notice two sections where you may insert graphs, charts, or pictures. Since this sheet is protected (as are all of the sheets), pictures cannot be inserted using typical Excel commands. To insert pictures, an "insert picture" feature has been added. To use this feature, click the "insert picture" button. After selecting the desired picture file, a pop-up message will appear prompting you to select the cell into which you'll insert the picture—simply type in the cell address (e.g., L7) or click on the desired cell. The picture will auto-size to fit within the selected cell. To enlarge or shrink the image, you may use the standard picture editing commands (e.g., crop and rotate).

### Kaizen Event Tools Licensing Information

The Kaizen Event Tools file is licensed for a single user. Separate copies of "The Kaizen Event Planner" must be purchased for anyone who enters data into or edits the file. No purchase is required for users who only view the file contents.

When the Kaizen Event Tools file is opened for the first time, a pop-up box will appear containing an End User License Agreement (EULA), which specifies the terms and conditions of this license. If you prefer not to see the pop-up box each time the file is opened, you may check the box "Do not show license message at start-up" and "Agree." You may view the EULA at any time by clicking the "License Agreement" button in the top right corner of the Kaizen Event Charter (Tab 1).

If you are distributing the file for viewing purposes, the pop-up box containing the EULA should be activated so the recipents understand the terms and conditions of the license. To reactivate the EULA pop-up, click on the "License Agreement" button in the top right corner of the Kaizen Event Charter (Tab 1) and uncheck the "Do not show license at start up" box.

# PART I

# Lean and Kaizen: An Overview

# LEAN ENTERPRISE PRINCIPLES

To thrive during strong economic times and survive the inevitable downturns, organizations must continuously improve their ability to deliver high-quality goods and services as quickly as possible—and at the lowest cost. At the same time, they must develop new capabilities, attract and retain a talented workforce, and provide a safe working environment. As market demands, technological advancements, and new business requirements challenge companies to adapt quickly, they need to apply new continuous-improvement tools to create the agility and flexibility necessary to become increasingly responsive to their customers and stakeholders.

But most organizations are plagued with one of two problems at the core of their culture. First, most organizations do not respond quickly. They take so much time analyzing and planning for change that, by the time they are ready to execute it, the parameters under which they were operating have changed, requiring further analysis and planning. The arduous cycle begins again, resulting in little or no meaningful change. Potentially worse, some organizations ignore the altered conditions and move forward, implementing suboptimal improvements.

The second problem arises when organizations behave in the opposite manner—they implement knee-jerk improvements that are not well planned, do not involve all the key stakeholders, and do not connect to the organization's overall strategy. Interestingly, many of these organizations view themselves as responsive and boast at the speed at which they implement change, but then find themselves coping with poor morale, disconnected processes, shrinking margins, and dissatisfied customers.

The Kaizen Event is an effective tool for moving past "analysis paralysis," tying improvements to a larger strategy, and involving all the necessary perspectives to create relevant, measurable, and sustainable improvements. The Kaizen Event is a *two- to five-day focused improvement activity during which a sequestered, cross-functional team designs and fully implements improvements to a defined process or work area.*

While many manufacturers have achieved tremendous improvements using Kaizen Events, the approach often generates even more dramatic results when applied in office, service, and technical environments. In environments where the "product" is difficult to see, the workforce is often disconnected from both internal and external customers, measurement has not been the norm, and significant waste exists. Because these areas directly impact the quality and speed at which organizations are able to deliver goods and services—and, ultimately, their profitability—they are ripe for properly run Kaizen Events. But before exploring the nuts and bolts of this approach, it is necessary to see how Kaizen Events fit into the essential business management philosophy that businesses and organizations must adopt to succeed in today's marketplace: *lean thinking*.

## LEAN THINKING

The story of lean thinking began in the early 1900s in Japan with the Toyoda family business, the Toyoda Automatic Loom Works, which developed a key business principle known as *jidoka*. Jidoka loosely translates as automation with a human touch and involves building in quality as you produce goods and deliver service. Jidoka focuses on enhancing human beings' ability to perform value-adding work, which creates a more humane and positive workplace. Working by trial and error and getting your hands dirty was another important Toyoda family principle. Before you can truly understand a situation or problem, you must go to the area in which the work is being done (*gemba*) and see it for yourself.

In 1930, the Toyoda family established the Toyota Motor Company, which integrated a second key business concept: *just-in-time* (JIT), producing goods and providing services only when needed and only in the quantity needed. Toyota adapted the *continuous flow* manufacturing methodology developed at Ford Motor Company and the *pull* concept (producing to replenish only what has been consumed) used by U.S. supermarkets to maintain low inventories while consistently meeting customer demand. The two principles of *flow* and *pull* were essential to the early success of Toyota, steering them past the wasteful pitfalls of a mass production *push* system that results in overproduction and high inventories. The concepts of jidoka and just-in-time form the two pillars of the Toyota Production System (TPS).

After WWII, W. Edwards Deming, the American statistician who developed the concept of Total Quality Management (TQM), began teaching his philosophy in Japan and Joseph Juran began working directly with Toyota. Influenced by Deming and Juran, Taiichi Ohno led Toyota's philosophical development. Toyota also adopted the scientific approach for problem solving that Deming adapted from Walter Shewhart's work, commonly referred to as the Deming Cycle or Plan-Do-Check-Act (PDCA), and the WWII training program from the United States, Training Within Industry (TWI). These elements formed the basis for the kaizen revolution of democracizing Japanese management and empowering the workforce to continuously identify, design, and implement improvements, no matter how small or large.

By consistently producing high-quality and reasonably priced products, Toyota accelerated its market share gains through the 1980s to their preeminent position today. The book *The Machine that Changed the World* (Womack, Jones, Roos, 1990) revealed Toyota's successes and introduced the Toyota Production System (TPS) to the manufacturing world. The authors contrasted the two production paradigms—batch (mass) production versus continuous flow—and identified TPS as a state-of-the-art business management approach for manufacturing and service delivery.

James Womack and Daniel Jones further developed the lean paradigm in their book *Lean Thinking* (1996), which identified five major lean principles: *value, value stream, pull, flow, and perfection*. Table 1-1 describes each principle and the role Kaizen Events play in realizing each principle.

**Table 1-1.** The Five Lean Principles and Their Relationship to Kaizen Events

| Lean Principle | Definition | Relationship to Kaizen Events |
|---|---|---|
| *Specify Value* | Value is defined from the external customer's (end user's) perspective. Knowing what the customer values and is willing to pay for helps differentiate which activities are truly required. | In a Kaizen Event, the team looks at the process targeted for improvement and identifies activities as value-adding, non-value-adding, or necessary non-value-adding. The order of priority for improvement is: 1) *eliminate* unnecessary non-value-adding activities; 2) *reduce* necessary non-value-adding activities; and 3) *optimize* value-adding activities. |
| *Identify the Value Stream* | A value stream represents all value-adding and non-value-adding activities that are required to deliver a product (good or service) from request to delivery (and ultimately, to receipt of payment from the customer). Value stream maps are commonly used to help organizations identify opportunities to improve performance through waste elimination. | The future state value stream map and resulting implementation plan provides direction in identifying where Kaizen Events should be used to implement improvements. |
| *Create Flow* | Flow occurs when a product (good or service) moves through a series of process steps without stopping. Identifying and eliminating non-value-adding activities is the key to achieving continuous flow: processing one unit of work at a time with no waiting or delays between or within process steps. | A common goal in Kaizen Events is to create flow through waste elimination. An essential activity is having the team view the process as though they were the material, data, or paperwork being passed through the system—or the thing or person receiving service—and identifying all the stops along the way. After determining why the stops occur, the team members are able to use relevant lean tools to improve flow. |
| *Pull from the Customer* | Pull is a scheduling methodology used to reduce process lead times. Pull is a key tenet within most flow systems, and is also a necessary strategy in situations where flow cannot yet be realized. Pull is based on the concept whereby consumption of resources triggers the replenishment of that resource. That is, the upstream supplier doesn't produce anything until the downstream customer signals a need and has available capacity to begin work. | Pull is often achieved most easily during Kaizen Events, since a cross-functional team can ensure that both supplier and customer requirements are taken into account. Pull systems include one-piece flow, FIFO lanes, and kanban. |
| *Seek Perfection* | In the pursuit of perfection, the company must continuously strive to eliminate all waste along all value streams to achieve continuous flow. The more a lean-seeking company works on the other four principles, the greater ease it has in identifying additional opportunities for improvement. | Learning is most effective if accompanied by "doing." Kaizen Events are an effective means for the workforce to learn new tools, practice real-world application in a facilitated environment, and become better prepared to implement other improvements in the future. Holding multiple Kaizen Events for the same process gives the team the opportunity to learn about and apply more advanced tools. |

In the 1990s, fueled by Womack's findings and Toyota's continued success at capturing a progressively greater market share, U.S. automotive companies began adopting selected aspects of lean thinking and TPS with varying degrees of success. Many other types of manufacturers followed suit, first in high-volume/low-variation environments, then later in custom job shop settings. Success in the latter category led practitioners to see the parallels between high-variation manufacturing and non-manufacturing processes. Today, lean thinking has spread to healthcare, government, research organizations, food service, education, construction, information technology, nonprofit organizations, financial services, and law enforcement, to name a few. All of the success stories report the same results: The journey to becoming a lean enterprise generates *rapid* and *sustainable* organizational improvements that far surpass traditional approaches. The reasons are attributable to lean principles, which:

- use customer-defined value to drive the way in which an organization delivers services or manufactures goods;
- use lead time as a primary metric to identify opportunities and drive improvement;
- seek ways to improve the entire value stream, from request to delivery, rather than optimizing individual components of a delivery system;
- engage the entire workforce in shortening lead time and improving quality through the elimination of waste;
- seek out root causes to performance problems and apply innovative solutions that exploit existing resources before considering capital expenditures;
- generate rapid and sustainable results, often through the proper use of Kaizen Events;
- improve organizational performance by building organization-wide accountability, standards, discipline, and trust.

One can visualize this integrated approach to operational excellence using the principle components of a house, including the foundation, pillars, bricks, and roof. Adapted from the original Toyota Production System house that was developed by Taiichi Ohno disciple Fujio Cho, and further refined by Jeffrey Liker in *The Toyota Way*, Figure 1-1 illustrates how lean principles and tools can build upon each other to achieve optimal organizational performance.

Those familiar with the TPS house will note that speed and quality, the pillars around which the house is built, represent the concepts of just-in-time and jidoka on the traditional TPS house. Also, two people-based outcomes specified in the figure—motivated workforce and customer loyalty—sandwich the tactical tools that are used to achieve flow, and flow is achieved when both speed and quality are present. Finally, it's important to note that daily kaizen and Kaizen Events are part of the foundation of building the lean enterprise house, and serve as the tactical means to implement lean principles.

The remainder of this chapter looks more closely at the first two lean principles—value and value stream, the first and second layers in the house's foundation—which are essential in driving the need for improvement and creating a relevant strategy. The other three principles—flow, pull, and perfection—form the core of the kaizen philosophy and are discussed throughout the book.
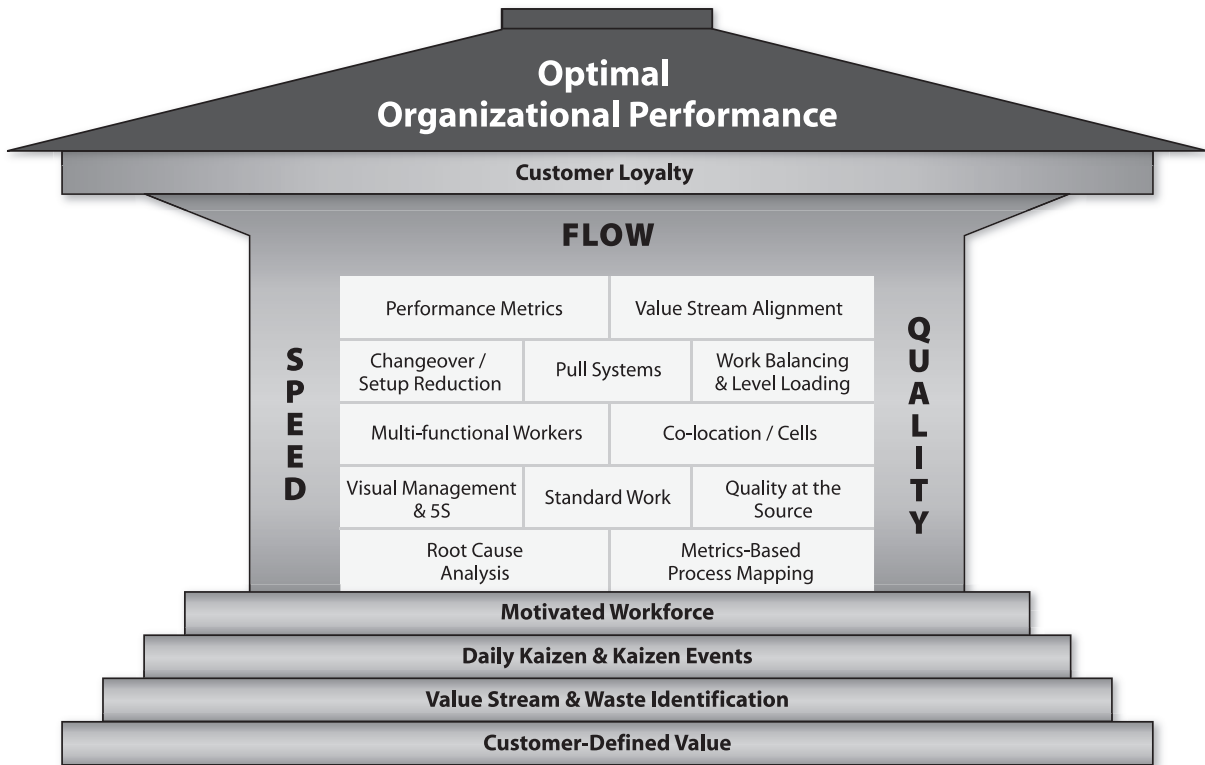
**Figure 1-1.** Building a Lean Enterprise

## DEFINING VALUE—ELIMINATING NON-VALUE-ADDING ACTIVITIES

Lean thinking defines value from the external customer's perspective. In processes that have intermediary internal customers and/or multiple external customers, view your processes first from the end user's perspective. "What does this customer (end user) value and is, therefore, willing to pay for?" That is, if the customer knew the incremental cost for a particular activity, would he or she be willing to pay for it?

A mature lean organization views every activity through the customer lens. It seeks to identify, from the customer's perspective, all activities that are *non-value-adding and that, therefore, merely add operational expense*. Theoretically, from the customer's perspective, every activity that does not add value to the service or good is waste, and the organization should eliminate it.

But classifying waste as non-value-adding (NVA) is not always that straightforward. A lean enterprise understands that some activities are *necessary non-value-adding*—though they are non-value-adding through the eyes of the external customer, they are essential to properly operate the business. Activities that are necessary to meet regulatory requirements and accreditation standards fall into this category, as do many activities within support departments that do not provide direct value to the customer, such as human resources, information technology, finance, legal, etc. In these areas, the goal becomes to *reduce* the effort required to assure 100 percent compliance and proper operation of the business.

Table 1-2 shows how lean thinking reverses the way improvement efforts have been traditionally prioritized. With this new perspective, the first priority is to eliminate unnecessary NVA, followed by reducing necessary NVA, and then optimizing value-adding activities. In many cases, the traditional approach—which focused on helping people perform the value-adding work faster—created quality, safety, and morale problems that exacerbated the organizational performance issues that drove the need for improvement in the first place. Toyota has turned this thinking on its ear.

**Table 1-2.** Lean Versus Traditional NVA and VA Activities

| SHIFTING THE FOCUS OF IMPROVEMENT ACTIVITIES | | |
|---|---|---|
| **Type of Activity** | **Lean Approach** | **Traditional Approach** |
| Unnecessary non-value-adding | 1st Priority—Eliminate | Often unrecognized, hidden, or accepted as is |
| Necessary non-value-adding | 2nd Priority—Challenge and reduce | Accepted as required |
| Value-adding | 3rd Priority—Optimize as necessary | Top improvement priority, primary focus |

While optimizing value-adding activities is important, lean thinking shows that faster and more dramatic results occur by first eliminating NVA activities—in part, because the traditional view did not consider this aspect when evaluating how to improve a process. The outcomes from eliminating NVA are measurable and wide ranging, including faster delivery, improved quality, freed capacity, and reduced inventory—all of which lead to greater customer loyalty, market share and reduced expenses. *Collateral benefits* that result from eliminating non-value-adding work include improved interdepartmental and interpersonal relationships, safer working conditions, and reduced workforce frustration—all of which create a work environment that attracts and retains a talented workforce, which, in turn, leads to further business growth.

Toyota's Taiichi Ohno identified seven major types of non-value-adding activities, also known as *muda* or waste: 1) overproduction, 2) waiting, 3) defects (errors), 4) overprocessing, 5) inventory, 6) movement (motion), and 7) transportation. Many lean practitioners have since added an eighth waste, 8) underutilization of people, to underscore the degree to which many workers are not being utilized to their fullest potential. But these eight wastes are not the direct targets for elimination. Root cause analysis reveals that they are merely symptoms of underlying problems. To truly eliminate the waste, you have to identify and eliminate the relevant root causes for the waste that is preventing flow in the value stream. Simply looking for and even addressing the "symptoms" in suboptimal processes will not effectively eliminate waste.

Table 1-3 lists the eight wastes as they frequently appear in office, service sector, and technical environments. One waste often causes another, multiplying the problems exponentially. For example, motion may result in batching, which produces waiting. We often inadvertently

**Table 1-3.** Eight Wastes in Office, Service, and Technical Environments

| Waste | Explanation | Evidence | Risks | Common Root Causes |
|---|---|---|---|---|
| **Overproduction** | Producing too much, too fast or too soon. Upstream supplier pushes work to downstream customer regardless of whether he or she has the capacity to work on it. | Build up of work-in-process (WIP) between process steps. Build up of queues, people waiting, etc. | Excessive lead times (also referred to as throughput and turnaround time). Unnecessary complexity and confusion due to reprioritization of tasks and the development of multiple tracking systems. | Lack of focus on entire value stream. Push environment. Individual performance is valued more highly than team/value stream performance. Ignoring downstream bottlenecks. |
| **Waiting** | People waiting for people. Information, product, or equipment waiting for people. People waiting for information, product, or equipment. | "The thing" passing through the system stops. Idle people. Idle bottleneck equipment. | Extended lead times, long work days, and paid overtime. Unnecessary capital expenditures for equipment. | Too many handoffs or approvals required. Push environment. Suboptimal use of equipment. Unbalanced workloads. Lack of cross-training. |
| **Overprocessing** | Doing more to anything than the customer is willing to pay for. | Inspections, audits, and reviews. Redundant tasks, duplicate data entry, rewriting, etc. Too many handoffs; multiple approvals. | Excessive lead times. Low productivity. Frustrated workforce. | Lack of trust between individuals and departments. Unclear understanding of customer requirements. Too many or too few software applications, which result in workaround development. |
| **Defects** | Internal or external suppliers providing incomplete or incorrect information or material. | Correcting information that has been supplied. Adding missing information that should have been supplied. Clarifying information that should have been clear when supplied. | Errors become defects that require rework, a 100% NVA activity. Produces dissatisfied customers, frustrated workers, lost productivity, and extended lead times. | Nonstandard work. Poor training. Lack of visual work instructions and job aids. Poor communication between internal upstream suppliers and downstream customers about customer requirements and performance. |

**Table 1-3.** Eight Wastes in Office, Service, and Technical Environments, *continued*

| Waste | Explanation | Evidence | Risks | Common Root Causes |
|---|---|---|---|---|
| **Inventory** | Excess paperwork, supplies, materials, equipment, etc. | Stockpiles of supplies, forms, materials, etc. Disorganized storage areas. | Reduced cash flow. Lost productivity due to searching. Excess Space. Damage. Obsolescence. | Just-in-case thinking. Unreliable or burdensome purchasing process. Unreliable suppliers. |
| **Motion** | Movement of people. | Hand carrying work product. Functional layout. Traveling to shared equipment. Searching for information; seeking information clarification. | Reduced capacity to perform value-adding work, which produces increased staffing requirements. Injury. | Poor layout. Lack of cross-training. Insufficient equipment. |
| **Transportation** | Movement of "things" — paperwork, electronic information, material, drawings, equipment, and supplies. | Hand carrying. Traveling to shared equipment. Searching for information; seeking information clarification. | Damage or loss during transport. Delay in work being available. | Poor layout. Lack of cross-training. |
| **Underutilization of people** | Not utilizing the full capacity of the individual — knowledge, skills, aptitude, and creativity. | Excessive reviews and approvals. Specialized workers and sole-service providers. Processes designed by managers or select few workers. Excessive hand-offs. | Frustrated and unfulfilled workforce. Absenteeism. Turnover. Excessive handoffs and delays. | Difficulty in "letting go" and allowing workers to design and implement improvements. Lack of trust in ability of workforce to perform. Lack of training. Siloed thinking. |

create the waste of overprocessing, such as approvals, reviews and audits, to cope with the waste of errors. Overproduction creates a buildup of inventory, work-in-process, and queues—which, in turn, produces waiting. And so on.

A surprising finding about waste is how tiny pockets of seemingly insignificant waste add up over time. For example, an organization with *1,500 employees*, each earning an average of *$22 per hour*, estimated that each employee spent at least ten minutes a day looking for information on shared drives, or looking for the equipment and supplies necessary to perform their tasks. When they calculated the impact of this problem, they were shocked. Disorganized shared drives and storage areas were costing this company *41.7 hours* of wasted time per year, per employee. Viewed another way, each employee could take an additional week of vacation with no appreciable loss to the organization. Or the company could absorb growth that would have traditionally required thirty additional full-time employees, without adding a single worker—a potential cost avoidance of *$1.4 million*.

Table 1-4 provides two additional examples of seemingly minor office waste that, when viewed over the course of a month, quarter, or year, result in significant performance losses.

**Table 1-4.** Two Additional Examples of Waste in the Office

| Motion Waste | Overprocessing Waste |
|---|---|
| A department was having difficulty meeting customer demand and the supervisor wanted to hire two additional employees. Her boss resisted. Upon analysis of the processes, she was able to handle the growing workload with no additional employees being hired and, at the same time, improve departmental morale dramatically. Here's how: the staff had to walk **788 feet** to a printer. And they did this **31,200 times** per year, which translates into **4,656 miles per year**.<br><br>Assuming a one mile per hour walk pace (a slow but surprisingly common finding in offices due to interruptions along the way and waiting for shared equipment to become available), the motion translated into **582 days** of non-value-adding time, which equals approximately **2.2 FTEs** (Full-time Equivalents). By reorganizing the departmental layout, they were able to move the printer adjacent to the workstations, which freed them to handle an increased workload without hiring additional staff. And the staff was thrilled to eliminate an activity they had long complained about. | This case illustrates a surprisingly common waste—excessive handoffs and approvals—in which eight approvals were required for a purchase requisition before a purchase order could be generated. Current state analysis revealed that each approval took approximately three minutes to complete. Yet the requisitions waited from **four hours** to **five days**, depending on the reviewer. During a Kaizen Event, each approval was reviewed for its necessity. As a result, six of the eight approvals were eliminated, and overnight the organization reduced its turnaround time from **10 days** to **2.25 days**—a **77.5% improvement**—greatly increasing the speed in which workers were able to receive the supplies and material they needed to perform their work. And there was no quality loss from eliminating the redundant handoffs. |

Many organizations are likely to have similar types of waste riddled throughout their processes, slowing customer responsiveness, increasing operational expense, and producing worker frustration. A few wasted minutes here and there can add up to significant productivity

losses and increased costs over the course of time. So how does a lean-seeking company go about uncovering these eight wastes? By following the second lean principle: identifying the value stream.

## MAPPING THE VALUE STREAM

Value stream maps are invaluable tools for visualizing macro-level process steps, identifying the waste in those steps, and creating a desired *future state* (sometimes referred to as the "ideal" or "desired" state). It's beyond the scope of this book to teach you how to map value streams and there are several excellent resources available on that topic. In *Learning to See* (Rother and Shook, 2003), the authors provided a systematic approach for analyzing the current state of a value stream and designing a future state for manufacturing operations. *The Complete Lean Enterprise* (Keyte and Locher, 2004) and *Value Stream Management for the Lean Office* (Tapping and Shuker, 2003) are excellent guides for mapping value streams in nonmanufacturing environments.

The CD that accompanies this book includes printable sample current and future state value stream maps for a purchasing process to show the connection between value stream mapping and Kaizen Events. Readers are encouraged to print a copy of these maps to refer to while reading the rest of this section.

Value stream maps are visual storyboards. Limited to an $11'' \times 17''$ piece of paper, the current state map documents how the process is currently being performed and helps visualize waste, revealing opportunities for improvement. It represents a snapshot in time—the process as it exists on *the day that you map*—and sets the foundation for designing the future (desired) state. The future state value stream map is a management-level strategic plan. It illustrates the value stream, as you envision it three to six months in the future, and the improvements necessary to fully realize the future state. Some practitioners encourage mapping teams to create longer-term future states, but when mapping a value stream for the first time, shorter implementation time frames are advised (especially in office and service environments), as this practice drives a bias toward action. Table 1-5 defines the common value stream mapping icons that provide necessary shorthand for visualizing a process.

Value stream maps illustrate three major types of information: information flow, product flow, and a timeline. The upper portion of the map typically contains information flow—both verbal and electronic—and depicts how information is passed through the system. How is work scheduled? Which IT systems are involved?

The bottom portion of the map depicts the macro-level process steps for product flow. Typically, each block represents a series of micro-level tasks that are performed before there is a break in the timeline due to a buildup of work-in-process (represented on the value stream map by an inventory triangle), queues, or delays of any sort. Often, the delay is due to handoffs to a different work team or functional department.

**Table 1-5.** Common Value Stream Mapping Icons

**Process Block**—This contains the macro-level process steps. The process blocks are numbered for convenience (upper right corner) and include the task, the responsible person/department, and how many workers perform the tasks.

**Data Box**—These smaller boxes appear directly below the process block they represent, and include relevant data such as process time and percent complete and accurate (%C&A). Process blocks can also include other obstacles to flow.

**Information System**—This contains the description of the application program/software used.

**Information Flow Label**—Appears on relevant communication flow lines describing how the information is being communicated. Due to the available space on the sample map, only select information flow lines have been labeled.

**External Entity** (outside your organization)—May be used for customers, suppliers, or contractors to whom you outsource work.

**Lines with Arrows**—Represent information and material flow.

Information flow initiated by human intervention. The arrowhead shows the direction of information flow; double-headed arrows mean the information flows in both directions.

Automatic electronic flow of information.

Product flow (physical product, such as reports, supplies, equipment, etc.).

**Push Arrow**—Represents when a process works to a schedule or other rules which don't take into account the downstream processes' actual needs, capacity or availability to process additional work.

The label for an information flow line, illustrating that direct communication occurs via telephone. Other icons may include lips for in-person communication, e-mail symbols, etc.

**Inventory**—Indicates an accumulation point (or queue) of work—either incoming inventory or work-in-process (WIP). The value that appears under the inventory triangle typically depicts the physical quantity of "items" completed by the prior process and either waiting to be worked on, being worked on, or waiting to be passed onto the subsequent process step.

**Inbox**—A more appropriate symbol of office-related work-in-process than the typical inventory triangle commonly used in manufacturing VSMs. The in-box depicts the total lead time (turnaround time) from the time work is made available until it's completed and passed to the next macro-level step in the process. It can also include the quantity of "items" waiting to be worked on and in the process of being worked on.

**Workers**—Represents the number of workers who perform that particular task.

**Kaizen Bursts**—These "starbursts" of activity define the improvements that need to be implemented to realize the future state design. When all of the kaizen bursts have been implemented via projects, just-do-its, or Kaizen Events, the future state becomes the current state. The process is then monitored and measured on an ongoing basis to compare the mappers' future state predictions, depicted on the timeline, with reality.

The timeline, traditionally drawn as a saw tooth visual with peaks and valleys, may also be drawn as a single straight line and includes the two primary time metrics:

1. *Process time*—the time it actually takes to perform the task, and includes both "touch time" and "think time" for processes that are analytical in nature. Process time is also sometimes referred to as cycle time, though cycle time has several meanings and can be confusing when used in non-manufacturing environments.

2. *Lead time*—the elapsed time from when the work is made available until it is completed and passed on to the next step in the process. Lead time is also sometimes referred to as throughput time, turnaround time (TAT), or clock time.

An additional metric that measures quality throughout the process—*% Complete and Accurate (%C&A)*—is also included. Table 1-6 contains definitions for these metrics, as well as a calculated quality metric (rolled first pass yield) that are helpful in analyzing the current state and establishing a baseline from which to measure improvements. These and other key mapping metrics are discussed in greater detail in Chapter 12 during the introduction to *metrics-based process mapping*.

**Table 1-6.** Key Metrics for Value Stream Mapping

| Abbreviation | Metric | Description |
|---|---|---|
| **LT** | Lead Time | The elapsed time from the time work is made available to a person, work area, or department until it is made available to the next person, work area, or department in the process. LT = PT + Waiting/Delays. Typically expressed in hours, days, weeks, and months. |
| **PT** | Process Time | The typical touch time it takes to complete an activity if the worker was able to work on one job uninterrupted. Also referred to as touch time or cycle time. In office and service environments, PT is often expressed in minutes or hours. |
| **AR** | Activity Ratio | PT/LT x 100 = The percentage of time work is actively being worked on (including analysis, discussion, and physical transformation). 100-AR = the percentage of time work is sitting idle. Note: In manufacturing, this metric is often referred to as %VA (percent value-adding). Our concern with this label is that it carries with it an erroneous assumption that all of the process time is value-adding, when this is rarely the case. |
| **C&A** | Percent Complete & Accurate | The percentage of occurrences in which a person, work area, or department releases work that doesn't require the downstream customer to correct the information supplied, add information that should have been supplied, or clarify information that should have been made clear upfront. |
| **RFPY** | Rolled First Pass Yield | The product of all of the process block's C&A (in its decimal form) expressed as a percentage. Rolled First Past Yield represents the percentage of time "the thing" (i.e., paper, data, people) passes through the process completely "clean," requiring no rework (which includes correcting, adding, or clarifying information that should have been complete and accurate when it reached the downstream customer). |

Traditional mapping convention places the customer icon in the upper right-hand corner of the map and the supplier icon in the upper left. But in many non-manufacturing

processes, the customer and the supplier are one and the same—especially if the customer is internal to the organization. In this case, you may prefer to center the customer block at the top of your map.

Figure 1-2 shows the current state value stream map for a purchasing process. The map depicts the value stream—from order to delivery—for nonrepetitive purchases of less than $5,000. The driver for the mapping activity came from members of the engineering group, who complained that they were not able to meet project deadlines because it took too long to get the supplies they needed. So the customers for this process are the 31 engineers—the "requisition originators"—who collectively initiate approximately 615 requisitions per year for nonrepetitive supplies and material purchases.

At the time the current state map was created, the average lead time for the engineers to receive the materials they had ordered was 28.4 business days (5.7 weeks). During those 28 days, the requisition and the subsequent purchase order that the requisition evolves into were only being worked on ("touched") for a total of 65 minutes (process time). As a result, the process had an overall *activity ratio* (the percentage of time work is being done to or concerning "the thing" passing through the process) of 0.5 percent—which means that the customer request was being worked on less than one percent of the total lead time.

Another finding was that, of the ten macro-level steps the requisition went through, five of them were inspection steps, in the form of review. In these steps, no physical transformation of the requisition was occurring. If you were this organization's external customer, would you consider these reviews value-adding? If you were one of the engineers (internal customer), would you consider it value-adding—or even necessary—to have others review your work?

You'll note that, for many of these reviews, the requisition sat for a full day before undergoing a five-minute review. Further, we see that excessive lead times at blocks four, eight, and nine created bottlenecks where work-in-process had accumulated. It took the systems engineer (who travels 50 percent of the time) an average of one work week to complete a five-minute review, and once the requisitions reached the corporate purchasing area, they sat for another two weeks (three and seven business days at blocks eight and nine, respectively) before the purchase order (P.O.) was generated and submitted to the supplier. It then took the supplier another two weeks before they shipped the order.

Another thing we see is that six separate software programs or systems are utilized in this process, which prompted the mapping team to wonder: Was there a way to streamline the system aspects of the process?

An additional issue was that a severe quality problem existed. The overall quality performance of this process is reflected in a rolled first pass yield of only five percent. That is, only five out of 100 requisitions passed through the process "clean"—with no rework required—on the first attempt. Interestingly, the mapping team discovered that the bulk of the quality issues in the process were generated by the customer. This is a surprisingly common finding in office- and service-related processes where, traditionally, upstream and
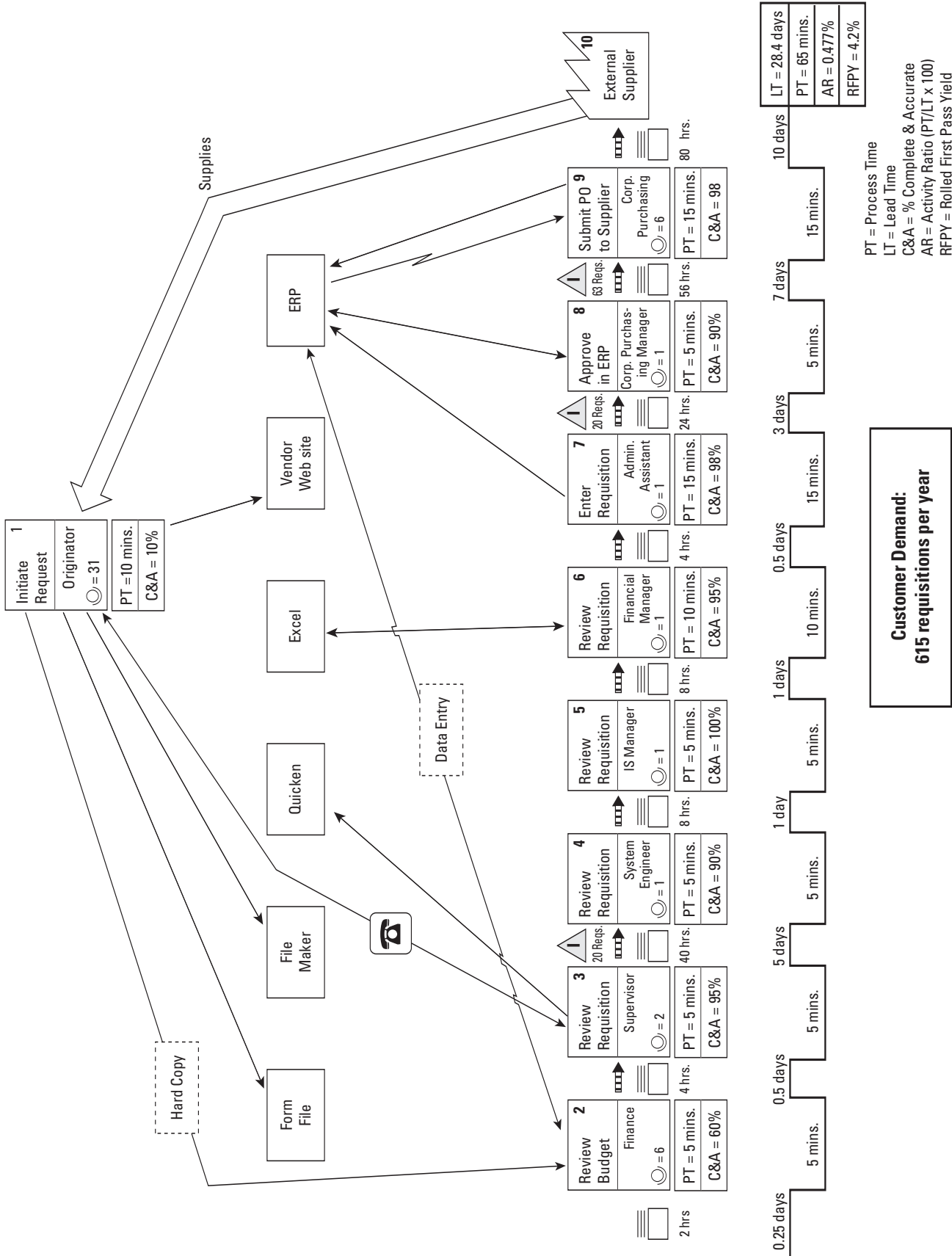
**Figure 1-2.** Current State Value Stream Map: Purchasing—Nonrepetitive Purchases Less than $5,000

downstream process workers—the internal suppliers and customers within the process—haven't talked about requirements nor measured quality output along the value stream.

And finally, an issue not reflected on the map itself but revealed through the mapping process was that, at the time of mapping, the overall morale in this organization was quite low, resulting in high turnover in two areas. The originators were consistently frustrated by how long it took to get the material they needed for their projects, and the corporate purchasing department was chronically overwhelmed with a backlog of requisitions waiting to be processed.

So in creating the future state map, the mapping team focused on three desired outcomes: shortening the lead time, improving overall quality, and eliminating the bottlenecks to improve flow and reduce workforce stress and frustration.

Figure 1-3, the future state design, includes several key improvements: reducing the number of reviews, creating a higher quality product entering the process (more complete and accurate requisitions), and eliminating the bottlenecks—all of which greatly reduce lead time and improve quality. Note that the mapping did not create a "*perfect* state" with this future state map. Additional opportunities still existed, such as delivery lead time from the outside supplier, which has since been addressed. Reducing supplier lead time further improved the engineer's experience of the process (improving retention), shortened the response time to the external customer, reduced expenses as the cost of expediting was eliminated, and improved quality as ineffective shortcuts were eliminated.

Table 1-7 contains a summary of the current state metrics and the mapping team's projections for value stream performance when all of the kaizen bursts have been implemented and the future state is fully realized.

**Table 1-7.** Projected Future State Results

| Metric | Current State | Projected Future State | % Improvement |
|---|---|---|---|
| LT | 28.4 days | 12.3 days | 56.7% |
| PT | 65 mins. | 30 mins. | 53.8% |
| AR | 0.48% | 0.51% | 6.3% |
| RFPY | 4.2% | 71.0% | 1,590% |
| # Steps | 10 | 5 | 50% |
| # IT Systems | 6 | 3 | 50% |

The future state map isn't designed to include micro-level details about how specifically to implement the improvement—those decisions fall to the Kaizen Team or others implementing improvements. Rather, the kaizen bursts on the future state map illustrate *what* improvements need to be implemented to realize the future state and form the foundation of the implementation plan (Table 1-8). The implementation plan categorizes improvements based on the best type of implementation approach for that particular improvement. Just-do-its (JDI)
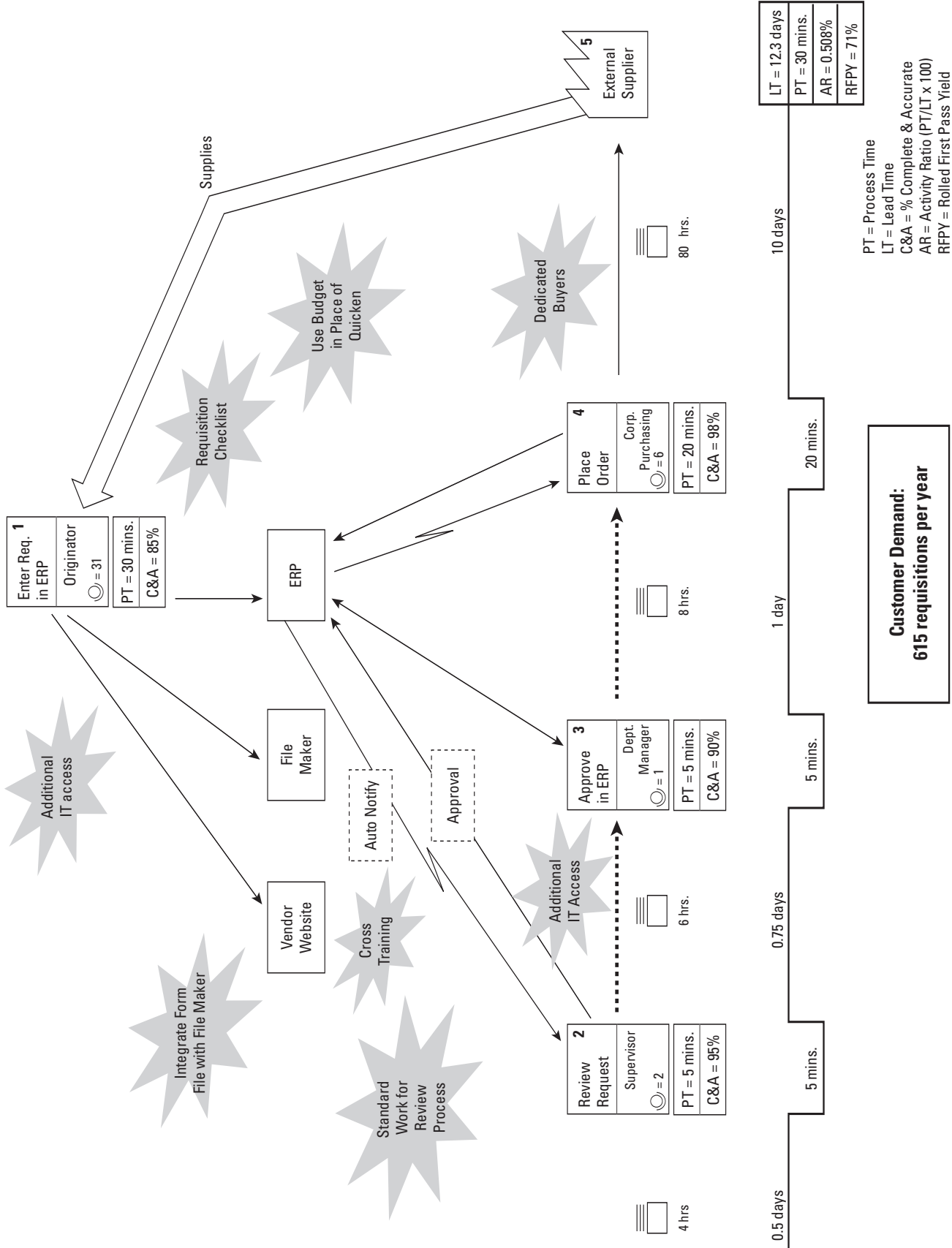
**Figure 1-3.** Future State Value Stream Map: Purchasing—Nonrepetitive Purchases Less than $5,000

**Table 1-8.** Future State Implementation Plan

## FUTURE STATE IMPLEMENTATION PLAN

| | |
|---|---|
| Executive Sponsor | Allen Ward |
| Value Stream Champion | Karen Louise |
| Value Stream Mapping Facilitator | Thomas Albin |
| Date Created | 10/5/2007 |

**Implementation Plan Review Dates**

| | |
|---|---|
| 2-Nov | 14-Dec |
| 16-Nov | 28-Dec |
| 30-Nov | 11-Jan |

| Block # | Goal Objective | Improvement Activity | Type* | Owner | Implementation Schedule (weeks) 1–12 | Date Completed |
|---|---|---|---|---|---|---|
| 1, 3, 6, | Reduce number of IT systems by 50%; orginator to corp PT to 40 min. | Integrate FormFile data with MasterFile system | Proj | Dianne M. | ↑ (weeks 9–11) | |
| 2, 4–6 | Reduce number of review/approvals by 66%; originator to corp LT = 1.25 days | Put in place standard work for requisition review | KE | Ryan A. | ↑ (weeks 4–8) | |
| 7 | Eliminate handoff to admin. assistant; originator to corp LT = 1.25 days | Define standard work and cross-train originators in use of ERP | KE | Sean M. | ↑ (weeks 5–8) | |
| 1 | Improve %C&A from originator to 85%; RFPY to 71% | Create checklist for initiation of requistion, integrate into form | KE | Ryan A. | ↑ (weeks 6–8) | |
| 3 | Reduce number of IT systems by 50% | Eliminate use of Quicken | JDI | Dianne M. | ↑ (weeks 1–2) | |
| 8, 9 | Reduce LT through corporate purchasing group to 1 day | Put dedicated buyers in place (by commodity) | PROJ | Sam P. | ↑ (weeks 7–9) | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

## APPROVALS

| Value Stream Champion | Value Stream Mapping Facilitator |
|---|---|
| Signature: | Signature: |
| Date: | Date: |

| Executive Sponsor | |
|---|---|
| Signature: | |
| Date: | |

*JDI = Just-do-it; KE = Kaizen Event; PROJ = Project*

are simple improvements that take a day or less to complete. Projects (PROJ) include activities that will take weeks or months to complete. Improvements best suited for Kaizen Events (KE) are those that are most effectively implemented in two- to five-day focused activities by sequestered, cross-functional teams. These improvements are often bundled together and implemented during a single Kaizen event.

One final general note about value stream mapping: It is as much an art as it is a science. While mapping conventions exist, and it's important to stick with convention as much as possible so that a wider number of people can interpret your maps, the art of value stream mapping—especially in office, service, and technical environments—is knowing when to break with convention for the sake of creating a clear, concise map that serves its purpose: visualizing the process, illustrating the need for improvement, and defining an action plan for implementing the defined improvements.

Value stream maps have proven to be effective tools to heighten leadership's level of awareness regarding the opportunities for improvement. These maps are also invaluable for defining what tactical-level activities need to take place to accomplish leadership's vision for value stream performance. The kaizen philosophy and Kaizen Events are being used around the world to execute improvement in support of that vision. So what are the characteristics of kaizen and Kaizen Events? Read on.