Managing Lean Projects

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For my two college buddies, Jim Davis, who recently passed away, and Drew Powers. I will always value our friendship and the great times we had. Thanks for the memories and comradeship.

Contents

Preface

Sometimes revolutions come with a burst of energy, shaking up the world dramatically. At other times, they arrive in subtle ways. Lean is a revolution that is more of the latter. Like a good after-dinner liqueur, the effects hit gradually, changing one's perceptions and feelings.

Lean is a revolutionary way of changing how a private or public organization does business, whether at the strategic or operational levels. It changes how decisions are made. It changes how people interact as much as how materials are acquired, processed, and delivered. It changes the priorities by placing the customer in the forefront of everyone's minds. Above all, it creates as much as it destroys. The last thing one wants in any revolution, even in business, is to devour one's own children.

Project management is a means to prevent, or at least to soften the impact of, the Lean revolution. It provides the discipline needed to harness the energy and power that Lean offers so that everyone benefits from the gains, despite the pain that often accompanies it. Fortunately, I have been the beneficiary of those gains, such as higher stock prices and greater bonuses. I have also, sorrowfully, found myself a victim of Lean and other process improvement efforts. Success came, but only after falling on my own sword. Yes, Lean can not only devour its own children but its parents, too. I've seen people lose their livelihoods while others enriched their own pockets without any consequence, just as in most revolutions.

Project management plays a significant role because it is not just about building schedules, collecting data, using software applications, and maintaining costs. It is also about people. In fact, it is all about people. If applied, project management can serve as a means to obtain ownership and commitment among everyone at all levels of an organization, from the chief executive officer to the rank and file on an assembly line. It can also open everyone's vision and perceptions about the reason why an organization exists in the first place. It can help everyone to participate effectively, not just efficiently, in satisfying the customer. It helps absorb the pain, and spread the gain, from a Lean project.

This book is not a diatribe about Lean although it does discuss some of the major concepts and techniques that make it so powerful. Rather, its purpose is to help project professionals to apply and leverage the power of their field to help them lead, not just manage, their Lean projects to success and to the benefit of their organization and the people who work in it.

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I want to thank my personal editor, Ameeta Chainani, for taking the time to review the manuscript and to provide insights on improving it.

About the Author

Ralph L. Kliem, PMP, CBCP, president of LeanPM, LLC, has more than 30 years of experience with Fortune 500 firms, including Safeco Insurance Companies and The Boeing Company.

Ralph started his business career as methods analyst for Safeco Insurance Companies, performing time and motion studies and executing process improvement responsibilities for an information technology department. Later, as a senior project manager with The Boeing Company, he managed several process improvement, maturity model, and Lean projects. Ralph was the project manager for the companywide re-engineering of The Boeing Company's policies and procedures process during and after the merger with McDonnell Douglas. He was also the project manager for information technology projects that supported the 787 and P8A programs; several of these projects had the purpose of achieving specific maturity levels according to Software Engineering Institute's Capability Maturity Model Integration (CMMI) model. As a corporate internal auditor, he also led several process improvement projects, one of which evaluated the effectiveness of direct shipment and transition to just-in-time delivery of paints to the 777 program. He also led numerous audit projects that evaluated the performance of other major business and information technology projects and programs including some for Boeing's Executive Council and Audit Committee. Ralph was also the project manager for a Lean initiative that improved the business continuity processes supporting several of the major airplane programs such as the 747, 767, 777, and 787, and major business units and programs within The Boeing Company.

In addition, Ralph teaches PMP certification courses and conducts project management seminars and workshops. He is an adjunct faculty member of City University and a former member of Seattle Pacific University in Seattle, Washington. He is also an instructor with the continuing education program at Bellevue College, Cascadia Community College, and Everett Community College in Seattle, Washington. He is the author or coauthor of more than 15 books and 300 articles with leading business and information technology publications.

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1

The Long Road to Lean

Lean did not just pop up overnight in the corporate world. It is predicated on a long legacy of other approaches that allowed it to become a reality, originating as far back as the 1980s, if not earlier.

1.1 QUALITY: A SHORT HISTORICAL PERSPECTIVE

In large part, the rise of Lean owes its existence to the Quality Movement that took on, in the 1980s and 1990s, what was known as the Japanese challenge. Much of this movement was predicated on the works of a small handful of gentlemen, mainly American, who ironically seemed to receive more fanfare outside the United States than in it. See Figure 1.1.

One of the first names in the Quality Movement in the United States is Philip Crosby. His major contribution to the Quality Movement was conformance to requirements. The idea was that whatever was delivered to the customer must conform to business and design specifications, and be as determined by the customer and other standards. He also stressed the concept of zero defects and discussed at length the impact of poor quality as well as the importance of prevention over inspection by ensuring that no defective product or service is delivered to the customer. He coined the concept "quality isn't free," meaning that achieving quality requires an investment that must lead to returns. Ideally, he observed that a point of equilibrium is reached between the benefits of investing in quality measures and the costs; ideally, the payback gets greater for every dollar invested.

Ironically, W. Edwards Deming became a legend in the Quality Movement in the United States long after he had become one in Japan.

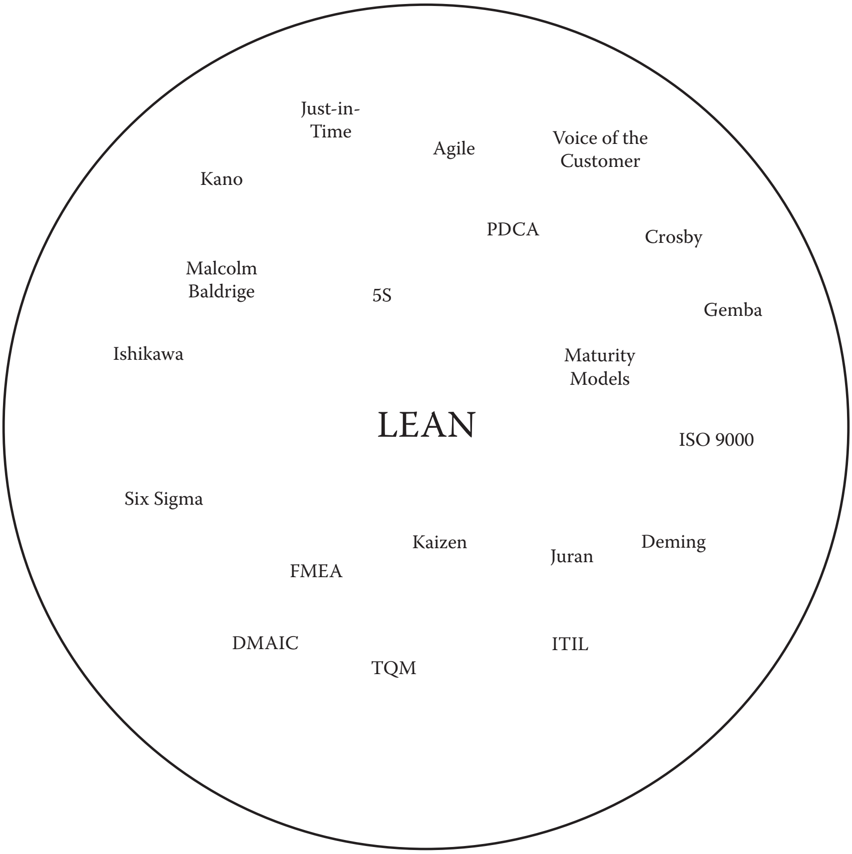

FIGURE 1.1
The dynamic world of quality.

He advocated taking a systemic perspective regarding quality and emphasized the need for statistical analysis as a basis for achieving quality. He identified his famous 14 Steps of Quality which essentially advocate adopting quality as a philosophy that emphasizes the importance of it being in the forefront of everyone's minds, taking ownership and responsibility for the quality of work up and down the organizational hierarchy, the existing need to eliminate psychological as well as physical barriers to quality, and providing everyone with the knowledge and other support to ensure quality is built from within and not inspected from without. Deming also adopted the formula, plan, do, check, act (PDCA), often erroneously referred to as the Deming wheel, for making improvements.

Joseph Juran is another legend in the Quality Movement. Like Deming, he received considerable acceptance in Japan before receiving widespread recognition in the United States. He is noted for giving quality a more humanistic perspective and he embraced the concept of "fitness for use" and "conformance to requirements." The former stresses the importance of delivering or producing a product or delivering a service that meets certain requirements; the latter is that the product or service satisfies real needs. Another key concept that he advocated is the Pareto rule which essentially says that 80% of the effects are the result of 20% of the causes.

Crosby, Deming, and Juran represent the triple crown of the Quality Movement in the United States. It was their contributions, not the only ones, however, that laid the basis for the Total Quality Management, or TQM. During the 1980s, especially, TQM provided an organizational approach to quality. The basic approach was to form what were known as quality circles, consisting of a cross-functional group of people, working to solve quality problems or to improve processes, resulting in customer satisfaction. The group would apply a wide array of quality tools and techniques to define the problem or issue and then come up with one or more recommendations. Many of these tools and techniques were developed by Japanese quality experts. In large organizations, it was not unusual for an employee at any level in an organization to participate in multiple quality circles.

TQM was one of the first organizational initiatives to improve quality in organizations. Since that time, there have also been several others that either have capitalized on TQM or risen in parallel to it.

Six Sigma, originating with Motorola, is a statistical approach applied toward managing variation in processes that lead to defects. It relies on a series of statistical tools and techniques that provide greater reliability in the product or service being delivered to the customer. The idea is to reduce variability around the mean, or average, as well as meet the specifications as defined by the customer. Six Sigma basically means that 99.99966% of the output of a process is defect free; as such, it depends on heavy use of statistical methods to determine the appropriate level of quality to achieve; it requires constant monitoring to determine whether that appropriate level of quality has been met and applying the PDCA cycle to determine the effectiveness of a change, for example, and making any necessary adjustments.

Six Sigma has managed to merge, to some degree, with Lean, creating a hybrid known as Lean Six Sigma. Unlike Six Sigma, the focus shifts entirely to the customer. It requires looking at the value stream from both an As-Is and To-Be perspective and then coming up with a series of recommendations for quality improvement. The idea is to remove variation in the flow of the process stream by eliminating waste. Lean Six Sigma relies on continuous improvement as with Six Sigma. The difference is that a modified approach is adopted. The phases in the cycle increase in number and are referred to in an acronym, DMAIC, standing for define, measure, analyze, improve, and control, for improving an existing process. For a new process, the approach is DMADV, which stands for define, measure, analyze, design, and verify.

Failure mode and effects analysis, or FMEA, is another way to identify and address errors in a process, product, or service being delivered to the customer. This approach is somewhat dated in comparison with Six Sigma and Lean Six Sigma. However, some of its concepts have laid the groundwork for risk management and quality as it exists today. FMEA is basically an approach to determine and improve the reliability of a system, be it hardware, software, or process. A hierarchical perspective is taken of all the components as they are exploded into finer detail. An analysis of the components is conducted to determine failure "modes," and to identify the corresponding causes and effects. The entire effort is documented and recorded prior to a system being built. Risk mitigation is employed to deal with any threats to the components of a system. FMEA lays the basis to develop testing criteria. FMEA contributes to the Quality Movement chiefly by providing a way to ascertain threats, such as those related to poor quality in systems design, mainly hardware.

Just-in-time, or JIT, delivery has also contributed to the Quality Movement. Like FMEA, it has been around for a while. However, in the past 10 to 15 years, it has received more visibility as a means to improve customer satisfaction and to reduce operating costs. The fundamental idea behind JIT is to have timely delivery of resources to a manufacturing environment rather than have large inventories due to trying to predict future customer demand or hold large quantities for potential situations. JIT requires a steady flow of resources and information throughout a manufacturing process and today plays an integral part in the Lean process. The reason is that it depends on pull, rather than push, to meet the needs of the customer. JIT, of course, has its risks, due to the free flow of resources and a stable business environment.

Another quality initiative that occurred somewhat later is the voice of the customer, or VOC. The VOC emphasizes the importance of requirements and feedback from the customer to provide the highest level of quality possible, often referred to as best-in-class. The emphasis is on capturing user expectations, wants, and needs according to priorities established by the customer. Using qualitative and quantitative approaches both on individual and group levels, every effort is made to understand and address what the customer seeks. The VOC provides the necessary information to perform what is known in engineering disciplines as quality function deployment, or QFD, which essentially is transferring customer prioritized needs and wants into a solution.

ISO 9000 is another quality initiative that took off during the 1990s and the early 2000s. It is essentially a documentation effort that emphasizes the idea of, "Say it, do it, prove it," in an effort to meet the needs of the customer. Heavily documentation oriented, ISO 9000 has led to developing consistent quality processes within an organization as well as adhering to regulatory requirements. An independent third-party certifying organization provides the independent assessment on whether an organization is ISO 9000 compliant.

The Malcolm Baldrige Award arrived around the height of the Quality Movement in the United States, circa the late 1980s. This award, presented by the president of the United States, was coveted by manufacturing firms. The award still serves as a means to encourage firms to improve their quality practices and to select companies that serve as models for what quality should be. The winner is selected according to these criteria: leadership; strategic planning; customer focus; measurement, analysis, and knowledge management; workforce focus; operations focus; and results. The award spans six industries and has evolved from a narrow focus on quality to one of a much broader concern referred to as "performance excellence."

A number of maturity models have also arisen during the Quality Movement. Maturity models cover much more than quality. However, they can be considered an outgrowth of the Quality Movement. A maturity model consists of a level of maturity that an organization can achieve as it progresses when providing a service or building a product. Each level of maturity has criteria to satisfy before it can progress to the next highest level. The lowest level is often considered chaotic and the highest level considered highly proficient and adaptable to change. The Software Engineering Institute's Software Maturity Model, or CMM, was one of the first maturity models. CMM has evolved to CMM-I, whereby the emphasis has been on the integration of different information technology aspects. The fad for maturity models continues, but at a slower pace; models have arisen for a wide number of fields from human resource management to business continuity.

Another IT service-oriented model that focuses on quality from a customer perspective is the Information Technology Infrastructure Library, or ITIL. This model provides a series of practices related to service management. ITIL stresses the importance of alignment of services in a manner that adds value to the customer and integrates with the customer's overall strategy. Some common topics of interest include financial management; service design, operations, and improvement; business relationships; and demand management.

Around the same time as ITIL, came Agile software development. This approach toward systems development capitalized on many of the concepts of Lean. Agile relies on short delivery cycles that emphasize incremental delivery of a product, in this case software. It achieves results through a series of sprints and releases that involve close interaction with the customer as well as participation by the people doing the work. Agile was developed in response to significant lengthy cycle times for software development using the traditional life cycle approach and backlogs piling up to meet the needs of the customer. Agile also emphasizes the need for flexibility and speedier communications on the part of all the stakeholders, from the development team to the customer; however, the customer remains the focus.

Another important quality-related movement that occurred in the 1990s is re-engineering. The basic premise of re-engineering was, and still is, to overhaul workflows and business processes radically with the purpose of improving customer service, reducing costs, decreasing cycle times, and eliminating non-value-added activities. The premise is that the existing process can be overhauled with a better, ideal workflow or business process; a perfect state, so to speak. Re-engineering has received some backlash because of its perceived unrelenting war on the status quo and, consequently, less stress on incremental improvement. In many cases, re-engineering projects and initiatives involved very little participation by the people who did the work and often led to short-term results and added substantial fear among employees. Nevertheless, it required using some of the Quality Movement tools and techniques and stressed the importance of focusing on obtaining customer results.

It would be a mistake, of course, to conclude that the Quality Movement is the result of only three American gurus. The Japanese came up with some powerful concepts, tools, and techniques, too, that Americans adopted to enhance quality.

Dr. Kaoru Ishikawa is one of the leading Japanese thinkers who have contributed significantly to the Quality Movement. Not only is he the developer of the fishbone diagram, but he identified what are known as the seven quality control tools applicable to process improvement projects. The seven tools are fishbone diagrams, Pareto charts, check sheets, scatter plots, graphs, histograms, and control charts. These tools are fundamental to Lean projects. Numerous Japanese and American thinkers in the Quality Movement have leveraged these tools to supplement the originals, which also can be used on Lean projects. These tools include a wide assortment of affinity diagrams and matrices.

Another major Japanese contributor is Dr. Noriaki Kano. His contribution is showing the necessity of emphasizing the needs of the customers by understanding their requirements. He identified three categories of requirements: requirements which must be met; wants, those that the customer expects; and delighters, those that go beyond the needs and wants. Needs and wants require fulfillment; otherwise the customer will be unsatisfied. Fulfilling delighters is not necessary but can lead to a very satisfied customer.

The Japanese have also come up with several concepts that are not specifically identified with any individual, per se, but have contributed to the Quality Movement. These include kaizen for continuous improvement; the five Ss (seiri, seiton, seiso, seiketsu, and shitsuke); gemba, visiting the place of action; kanban for signaling when needing more supplies; heijunka, for leveling schedules; and many more. These concepts can be, and have been, integrated into Lean.

Japanese contributions to quality control have been immense. Their contributions have stressed the importance of focusing on the customer and minimizing obstacles through the contributions of the people doing the work. By collecting facts and data in support of improving processes and meeting the needs of the customer, they have eventually led to formulating and adopting Lean as a way of doing business. In other words, Lean is, in many respects, the pinnacle of the contributions by the Japanese and the Americans to improve quality through greater efficiency and effectiveness.

1.2 TEN TRENDS IN QUALITY

Although the above topics are by no means exhaustive, some common trends have led to Lean as we know it today (refer to Figure 1.2).

The customer is the focus of all efforts. The customer defines the expectations, wants, and needs, and it is up to the organization, such as a service provider or manufacturer, to provide products or services to define, understand, and satisfy them. The customer is literally king. All effort is geared toward satisfying the customer, whether of a product or service. Without this focus on the customer an organization is considered inefficient and ineffective in its processes, procedures, and activities that add no value other than to itself.

The organization providing the product or service must be willing to adapt to the changing requirements of the customer. The environments for both stakeholders are dynamic; ultimately, however, the organization delivering the product or service has the responsibility to adapt accordingly and to work with the customer to make any changes. These changes may involve modified functionality, demand increases or decreases, higher standards of reliability performance, or product pricing reductions, to name a few. The organization providing the product or service must be flexible to accommodate these changes.

Qualitative and quantitative variables are both important considerations to ensure that quality criteria have been met. Both variables provide a balance that should support the other. Too often the numbers become overemphasized at the expense of the qualitative criteria such as leadership, communications, and teaming. In other words, not only what is measurable is important but so are the intangible criteria. A more balanced perspective ensures the quality of the product or service being delivered to the customer.

Quality management requires taking the initiative. In other words, quality is a conscious disciplined effort. Measurements and ongoing communications, for example, must occur consistently and persistently. Quality also requires making an investment in time and effort and, like all investments, a certain point needs to be reached where the gains must at least match the losses before adding value. This initiative begins at all levels within an organization, from the very top to the very bottom of the organizational hierarchy. Ultimately, though, management retains responsibility for the quality of the output from its organization, meaning it must provide the initial impetus to encourage people to embrace quality in all

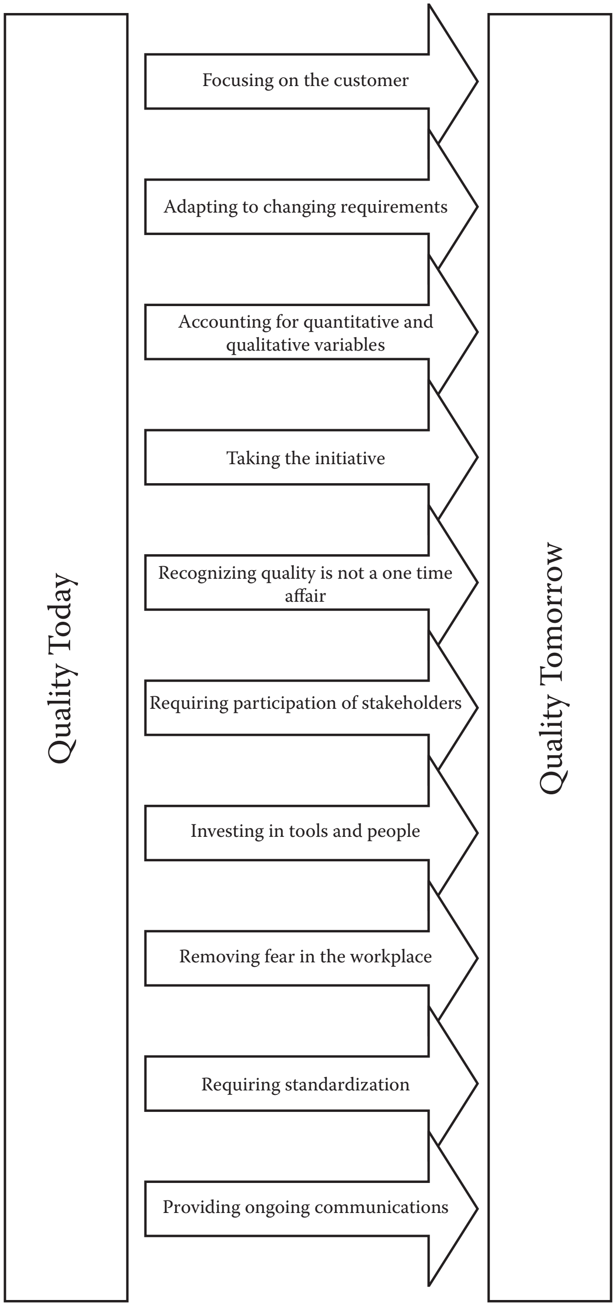

FIGURE 1.2
Trends in quality.

that they do. Quality, indeed, isn't free. It requires time, effort, and other resources to make it a reality.

Quality management is not a one-time affair. It requires continuous vigilance through feedback and monitoring. The PDCA wheel and DMAIC are two examples where continuous vigilance is needed to ensure that quality efforts on a large or small scale satisfy requirements and, if not, allow for corrective action to occur. Quality, as mentioned earlier, demands taking the initiative to get deployed. It also requires taking the initiative after deployment. Without constancy of purpose and vigilance, quality, as with any program or activity, will decline in vigor. Hence, concepts such as kaizen and customer focus serve as means to sustain quality improvement.

Quality management requires participation by affected stakeholders. Quality requires the participation of those responsible for meeting the requirements of the customer. This situation is especially the case when a cross-functional process or value stream requires improvement. The people doing the work should provide input because they have the best knowledge and expertise and have input to the recommendations for change; their buy-in is critical for successful implementation. People affected by a change will have less of an emotional commitment if they are excluded from its formulation and implementation and may actually become opponents to change.

Quality management requires investing in not only the tools to perform the work but also in the people making products and services. However, people need education and training to develop recommendations for improvement. They cannot innately generate opportunities for improvement without some investment. This training and education must be relevant and timely if they are to contribute to quality improvement.

Quality management requires removing fear in the workplace. Formulating and implementing change is difficult. It requires challenging the status quo for many reasons. Vested interests will protect themselves if they see no gain in changing. Many people become comfortable with routine and will resist any need to change unless no other choice exists. Senior leadership may see it as a threat to their power and stature within an organization. Lean, despite its claims of being incremental, can be revolutionary over time, resulting in significant change in the means of production and relationships among people. If Lean is going to work, executive leadership and senior management need to embrace change and drive fear out of the workplace. Otherwise, people will simply go through the motions and nothing will really change.

Quality management requires standardization. Common processes, tools, and techniques enable greater understanding and communication among all the participants when implementing change. Unfortunately, standardization often gets construed by some stakeholders as meaning regimentation, resulting in inflexibility and loss of creativity. Such assumptions are erroneous when it comes to collaborative efforts to produce products and services to the customer. Standardization does just the opposite, allowing for greater adaptation to change but also allowing people to operate from a common approach. Lack of standardization often results in redundancy and conflicting approaches that can lead to waste and an inability to adapt to the needs of the customer, especially in a reasonable period of time. The five Ss (discussed in greater detail in another chapter) are a step toward standardization that enables organizations to operate more efficiently and effectively to deliver a product or service to the customer.

Quality management requires ongoing communication. Communication occurs vertically and horizontally throughout an organization and externally, especially with an external customer. This communication includes both qualitative and quantitative data and information that provide a balanced perspective. Poor communication often results in an inability to determine the effectiveness of change in the level of quality and whether corrective action is necessary.

1.3 DRIVERS FOR LEAN

A number of recent contextual factors have enabled Lean to become a reality (refer to Figure 1.3).

Globalization is perhaps the biggest driver for Lean. Resources from across the globe are assembled to produce a product or deliver a service. Products and services are, in turn, distributed across the globe in a complex supply chain to customers, all with requirements and expectations surrounding price and quality. Lean strives to ensure that the value stream from beginning to end executes smoothly so that customers feel satisfied. Failure to provide the highest quality for the lowest cost can result in a company losing market share, showing a decline in profits, and even failing to survive. Lean focuses on increasing the likelihood of customer satisfaction on a global scale by eliminating waste and addressing customer requirements.

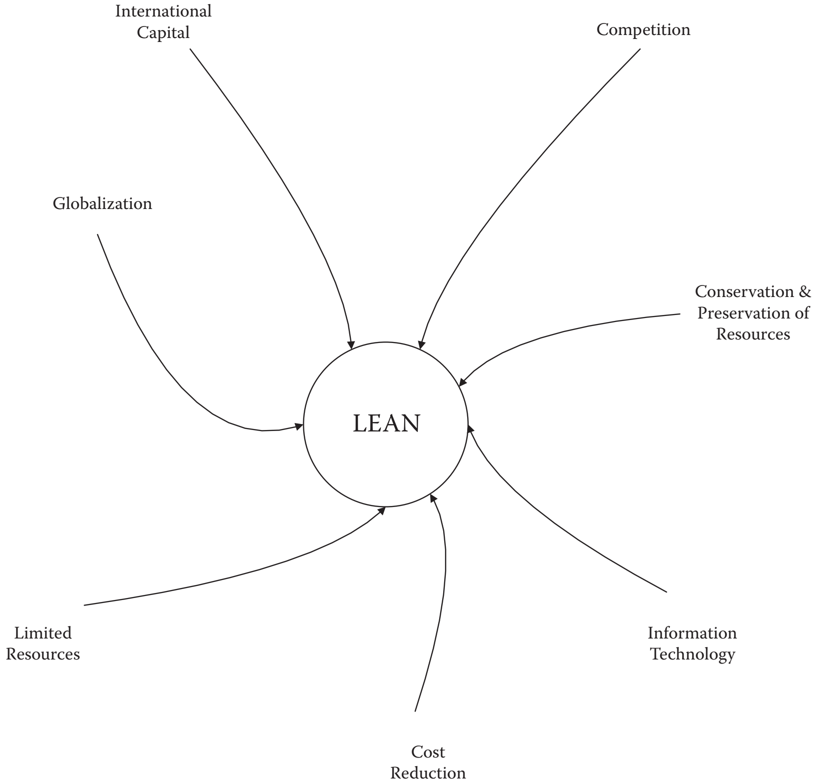

FIGURE 1.3
Drivers for Lean.

Limited resources have become a major concern in recent years. As globalization takes off, the demand for resources will increase dramatically. As the demand increases globally, so does the price. The days of hoarding resources and replenishing them after they spoil, for example, are largely over simply because the cost of the resource will increase and the investment in the existing inventory is lost; such circumstances lead to waste. In addition, inflation increases periodically which, in turn, causes increases in the cost of a product or service being delivered to a customer who in turn, will likely be unhappy about absorbing the cost.

Cost reduction is another related factor. In a global environment, competition is intense simply because there are more competitors that likely can provide the same product or service for the same quality at a cheaper price; competitors can then pass that price advantage to the customer. Waste in all forms puts a company at a disadvantage because until that waste is removed the price will likely be embedded in the product or service to the customer. The customer, in turn, goes to a competitor for the same quality at a cheaper price. Waste in all forms adds to operating costs; a bureaucratic bloated overhead only leads to higher prices to cover costs, which are then passed on to the customer. Lean, of course, helps to reduce or eliminate waste, so that a company remains competitive.

Along with cost reduction is a demand for higher quality products or services. Thanks to globalization, once again competition has become intense and customers expect more for their purchase. As a result, less emphasis is placed on inspection and warranties than on ensuring that quality is being addressed in the processes of building products or providing services. By addressing quality in a process, less need exists for inventory and less overhead is needed for inspections as well as warranty support.

Competition is perhaps the biggest cause for demand for higher quality products or services. Due to globalization, once again, competition can come from any part of the world, not just within the United States. Cheaper products of similar quality will overcome similar products of a higher cost, if the free market is allowed to have its way. The best way to compete, therefore, is to eliminate waste in the value stream so that the cost of a product or service remains competitive relative to other companies across the same industry.

The explosion in information technology serves as a driver, an enabler of processes. Data and information flow freely and quickly unlike in the past. Today, a customer can communicate requirements in a short period of time. A company, such as a manufacturing facility, must respond accordingly if it hopes to retain the customer. If a company continues to rely on legacy systems that impede rather than enhance process performance, the customer may elect to go elsewhere for the product or service. In addition, old systems add to the overhead which creates waste where, in turn, the cost is embedded in the price of the product or service. Lean seeks to improve a value stream by leveraging the power of newer technology, thereby reducing waste associated with cycle time and overhead.

Conservation and preservation of resources is also a driver. Already mentioned is the importance of reducing waste, such as inventory costs. For example, when excessive inventory is held for "just in case" purposes, the items stored in a facility occupy floor space and require some type of oversight to avoid spoilage or pilferage. This situation adds to the overall cost of the product or service, which, after a few significant increases, causes a price increase to the customer. Through conservation and preservation of resources, especially those considered high-cost items, inventory and other wastes can be lowered.

Large investments of international capital have also served as a driver for Lean. Because the value stream may involve resources coming from across the globe, facilities in other countries may require substantial investments. These facilities provide a wide range of resources, subproducts, and expertise often that arrive at a single manufacturing facility. These resources, subproducts, and expertise do not lend themselves to storage due to their demand at other locations or by other competitors. Instead, their delivery must occur based upon pull from the customer, rather than push by the company providing the product or service. Lean stresses the importance of the value stream to flow continuously by eliminating waste, such as holding large inventories.

1.4 LEAN, A LONG HISTORY

Viewing Lean as another flavor of the month would be a grave error. Lean is largely a culmination of quality management concepts, tools, and techniques that have arisen in post–World War II Japan and then, thanks to the Japanese economic challenges to the United States, gained acceptance on the North American continent and eventually around the globe. Thanks to globalization, the need for a more comprehensive approach to address quality arose: Lean focuses on satisfying the requirements of the customer through quality management measures and other disciplines that reduce waste in the value stream.