A History of Lean and Continuous Improvement

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A History of Continuous Improvement

It's time for a new generation of Lean and continuous improvement in general. The need for improvement, and the new opportunities for improvement continue to evolve at a much faster rate than most organizations can understand and harvest the benefits. In fact, there are more opportunities for improvement today and into the future than there has been in the history of improvement. Most organizations have more opportunities for improvement today than when they began their Lean and Six Sigma journeys a decade ago. The largest opportunities are the ones that are yet to be discovered.

Exposing Your Soul of Lean

What is the soul of an organization? It is the organization's immaterial essence, animating principle, and moral purpose of the total organization's existence. It is embodied in the mission, vision, purpose, and culture of how organizations work - or do not work so well. Organizations that strive to become superior global industry performers must step back and recognize the changing global industry and technology dynamics, and comprehend their gaps in current business improvement strategies, plans, and Lean approaches . . . or lack thereof. In effect, it is confronting and exposing one's soul about their Lean beliefs, strategies, approaches, and performance. It is also a recognition of the external factors driving the need to change their souls of Lean. They need to understand, appreciate, and recommit to Lean and continuous improvement as a never ending evolutionary process, just as it has been for centuries. They also need to trade in the limited short term, tools-based approaches of Lean manufacturing, and view Lean as a more holistic, culturally-specific standard of excellence throughout the entire enterprise (and extended enterprise). Finally, they need to shift paradigms about their Lean beliefs, strategies, and approaches to achieve superior global industry performance. In my previous book I used a term Improvement Excellence™, which is the organizations capacity to learn, adapt, and improve how they improve. This Chapter puts decades of Lean and continuous improvement on the chopping block and under the microscope. This is sure to create a tough emotional challenge of everything one might believe about Lean and continuous improvement. However, improving how you improve is the first step towards evolving to a better and culturally grounded systematic process of Lean and permanent continuous improvement.
**First question:** Have most organizations failed at Lean? Don't get annoyed - but consider the well documented history of failed fad improvement programs in Western organizations. The historical failure rate has been running above 80%, and the recent Lean and Six Sigma initiatives have followed in the footsteps of this disturbing pattern of failure. Congratulations if your organization is a long term 20%er. For the 80%ers, it just means a need to rethink your journey. Have Western organizations achieved short term gains in productivity and performance? Absolutely, in all organizations! To their full potential to improve? Absolutely not, in all organizations! During this same Toyota and a few other organizations have leapfrogged Western organizations by evolving their improvement efforts to *continuous*, permanent, and superior levels of industry performance. Over the years the same reasons have been used to conveniently explain away the Western failures: lack of leadership commitment, poor implementation strategy, scope and magnitude issues, wrong projects, insufficient education, conflicts with other day-to-day priorities, wrong metrics, serious customer issues, lack of executive and process owner support, employee acceptance, short term financials focus, Japan vs. U.S. culture, complexity and differences of the business, lack of time to improve and perform regular real jobs, workforce skill limits, and several others. Recognize that these reasons have been stated for decades, for dozens of different improvement initiatives under different banners and slogans, with the same birth-death cycles of improvement. Over time, the perception-based root causes become *excuses*. If we continue on the same path, accept these excuses, and in essence, view Western culture as a detriment to failure - we achieve the same results. We will discuss this in more detail later in this Chapter.

**Second question:** Are the above reasons for failure the true root cause(s)? The above reasons are symptomatic of a much larger, long term issue with Lean and continuous improvement initiatives in organizations. If we are willing to listen to history in this case, it will tell us a lot about where we need to go in the future. The real difference in long term performance is due to two major strategic factors:

1. **Non-Adaptive, Non-Systematic Improvement.** Organizations have spent the majority of their time on the latest tools, principles, and jargon of continuous improvement. Today many organizations have the knowledge of Lean manufacturing tools and principles right, but historically they have not invested in the longer term leadership commitment and
architecture to establish a formal, adaptive, systematic and sustainable management process of improvement. This missing organizational DNA is the superglue that holds this great foundation of knowledge in place, and enables people and organizations to continuously improve how they improve through structured means and the right deliberate actions. Hence, tools and principles by themselves eventually lose popularity and traction in favor of the next fad program.

2. **Culture and Values.** This is a topic that Western executives appreciate but fail to continually transform into competitive advantage. Herein lies the failure to recognize the power of our great Western culture and leverage our values to innovate, lead, and nurture improvement vs. copy the improvements of others. Culture has been the vulture eating the Lean lunches of organizations for decades because it is easier to copy than it is to lead, innovate, mentor and coach, develop talent, build a permanent adaptive systematic management process, and continually transform culture.

Toyota's organizational DNA and culture was created by Japanese ingenuity over a seventy year period and still going strong. Their production system is really a deeply embedded management system of adaptive systematic improvement throughout the entire corporation. Toyota has aggressively implemented fundamental industrial engineering, Lean, and Six Sigma since the end of World War II, without any fancy labels, belts, or program jargon. Toyota is undoubtedly the grand masters of Lean and continuous improvement. They arrived at this status without banners, slogans, and a string of failed fad improvement programs. They arrived there out of necessity through brilliant leadership and a systematic and culturally grounded process of improvement. Western organizations should continue to learn from their success, but they must create their own business needs driven and culturally powered systematic process of improvement. Merely asking employees to use a few new visible tools, templates, and methodologies and instantly act like Toyota equals cultural rejection. We will discuss the ramifications of oversimplifying and mimicking the long term success and evolution of the Toyota Production System (TPS).

*Here is the bottom line:* America remains the number one global competitor in the world. What is occurring for certain is that America's lead in global competitiveness is shrinking and in
jeopardy of being overcome by other industrialized regions of the globe. This is a global challenge, not an American challenge. Failure at Lean and other strategic improvement initiatives is a matter of perspective and temporary because true improvement is always continuous. No organization is perfect or best-in-class at everything, and certainly not forever. Best-in-class is a moving target, and it is within reach for any organization that chooses to go for it. The 80% failure studies dwell on the negatives and regurgitate the same intellectual reasons for failure. Improvement and success or failure are temporal relationships that do not matter in a single instant. Being one of the 20% successes or 80% failures today is irrelevant to the future because improvement is a never-ending race without a finish line. Failure is only failure when executives choose to throttle down or stop improvement, and institutionalize waste as a norm. It may not be evident, but a close enough is good enough mindset in organizations is the equivalent of falling behind. Like it or not, we all live in an improve or die world. Best-in-class organizations continually learn from their successes and failures, and get back in the race with better strategies and approaches. In it to win it! Improve how they improve! Improvement is all about always staying ahead and not falling behind in the race. Falling behind is not necessarily a kiss of death because improvement is always renewable and breakthroughs in improvement are always possible with the right leadership, creativity, and innovation. An organization's place in this never-ending race is a controllable leadership choice. Organizations are always slipping off, or climbing their way up the leaderboard of best-in-class performers. In several industries, the time to go from a trivial follower and a market leader could be months!

Overall, the progress with Lean manufacturing and other initiatives in most organizations has been very respectable. However it is definitely below the capability of what was, and is still is possible when cultural ingenuity fully rises to the occasion. Hundreds of great organizations have demonstrated this ingenuity in their Lean and general continuous improvement initiatives. The future Lean and continuous improvement is all about learning, adapting, custom-architecting, and living improvement - lead and powered by an organization's cultural beliefs and values. The challenging journey of how to evolve Lean to a higher order, adaptive systematic and sustainable process of improvement is the purpose of my new book, Global Kata: Success Through the Lean Business System Reference Model™.
Culture Rocks!

My long career in continuous improvement has taken me far beyond the specific methodologies and tools and into the unknown wilderness of successful Lean leadership and cultural transformation. For over three decades I have worked with hundreds of diverse organizations and thousands of CEOs and their executive teams across the Americas, Europe, and Asia. Not surprisingly, I have found myself in the middle of a very talented population of executives, managers, and associates with different backgrounds, experiences and cultural influences, corporate beliefs, operating styles, egos, and many other personality traits. In the United States alone there are significant cultural differences in organizations in different states and regions. This incredible learning experience has taught me that transforming culture is difficult as hell and a full time continuous effort. The word culture change is actually a misnomer; the most successful organizations treat it as a continuous evolutionary process, a constant adaptive process of rediscovery, renewal, and enlightenment. I can speak firsthand that leading executives and organizations through this evolutionary process is a very emotional and humbling cohesion building and constancy of purpose experience. These executive teams and their organizations were both serious and committed to discovering their improvement model. They revealed their souls of improvement, thumped their chests for their successes, confronted their weaknesses, and recognized the need for a more sustainable model of improvement. For me, leading organizations and their teams of people to improve and benefit personally, professionally, and financially is the ultimate experience of success. It is the impossible and very emotional mega-leadership learning and development exercise where the results are often as amazing as Moses parting the Red Sea! Their experiences have taught me the importance of leadership and the ability to sculpture the right success-enabling behaviors and culture. Culture matters! The culture within your own country, local, and organization matters! The successes above are successes because they made the deliberate effort to link adaptive systematic improvement to their culture and not a knock-off of some other company's culture. History demonstrates that Western executives and their people have not been able to create and sustain this cultural evolution with so many other issues on their organizational plates. Overloaded plates tend to drive an oversimplification and underestimation of what it takes for success - a "hurry up and finish improvement" mindset . . . and hence, the undermining and birth-death lifecycles of improvement.

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The objective of my latest book is to share my deep passion and interest in these topics, and build recognition and awareness in the Western world (and the global universe) that we are in the infancy stages of Lean in terms of what is possible. I am blessed to work every day with clients who expand our shared competencies and understanding of integrating cultural values into a systematic process of improvement. There is nothing wrong with or any other culture. Culture is the foundation of excellence and it can evolve to become the best culture for creating a superior systematic process of improvement. Let's make sure that my message is clear: THE WESTERN WORLD IS IN THE INFANCY STAGES OF LEAN IN TERMS OF WHAT IS POSSIBLE. THE MAJORITY OF ALL GLOBAL ORGANIZATIONS ARE IN THE INFANCY STAGES OF LEAN IN TERMS OF WHAT IS POSSIBLE. The concepts, principles, and best practices guidance throughout this book is universal to all global organizations.

Think about the Western culture we all live in. For example, in the U.S. there is Wall Street, a short term focus on financial metrics and performance, immediate reason leadership, change, speed, ambiguity, complexity, financial independence, professional success, materialism, open thinking, elbow room, freedom of actions, and many other factors of our culture are not going away. Nevertheless, think about all of the great cultural personalities that exist in our U.S. corporations, our small and mid-sized publicly and privately owned companies. Each of these organizations also has their own micro-personalities and codes of conduct. Despite our dawdling economy and other political issues, these values enable us to enjoy freedoms and a high standard of living. This is who we are, what we are all about. This is what makes America great! America’s native attributes born out of diversity are not so much cultural as they are great natural human values and beliefs. All societies would adopt these values if they were free to experience the greatness of American values. Culture rocks! So how does all of this relate to Lean and continuous improvement? Because the underpinnings of Western and other global culture and specific organizational values have been missing in Lean and general continuous improvement initiatives. For three decades, organizations have been attempting to replicate specific improvement methodologies and tools rebranded and repackaged from the East, wishing for improvement and cultural change. Organizations cannot copy and paste culture; they must nurture and develop the right enabling patterns of behavior and cultural attributes of excellence.
Many organizations have discussed their cultural attributes as barriers to success rather than enablers of success. Benchmarking and learning from the successes of other organizations is a good practice, but superficial imitations will never achieve best practices. It's time for all global organizations to adapt and architect *their own* systematic and permanent process of continuous improvement that is culturally grounded to *their own* cultural values. There is no single cultural model of universal success. Executives and their people have been pummeled long enough by the anemic global economy, global competition, and a hollowing out of their industrial bases by China and other countries. Leadership and cultural attributes represent the new requirements to build a superior adaptive systematic process of improvement. It is time for all organizations to step up their Lean game, and regain a superior competitive position in the global economy with *their own* style of cultural beliefs and values. This book provides direction for this renewed journey of improvement to a brighter future.

**The Evolutions of Improvement**

Continuous improvement has been around for a millennia, since the beginning of time. Also, there are hundreds of thousands of people that have made significant contributions to improvement, from the ancient Egyptians to the people in organizations giving it their all today. If we go back to 2500B.C. the people building the colossal pyramids along the Nile were using division of labor, standardization, gemba walks, pull systems, one piece flow, teaming, collaboration, visual management, quality at the source, and many other fundamentals of Lean. People and culture drove the development of the methods and tools that made this possible. The Romans continued the legacy of earlier generations with new and improved materials, equipment, and work systems. They constructed landmark architectures and weapon systems that were way ahead of their time, deploying engineering principles that are still in use today. The point here is that Lean and continuous improvement is not new. Generations of societies from the Stone Age to present have applied improvement fundamentals to further their standard of living. One could easily develop an encyclopedia of continuous improvement but that is not the intent.
The purpose of this section is to illustrate the ever-evolving generations of improvement, and the continuous adaption and architecting of improvement to the times. It is impossible to mention every contributor to the history of improvement. We will outline the more modern and documented generations of improvement up to the present time and include some of the key contributors and milestones that evolved us to where we are today. For example, Frederick W. Taylor, the father of scientific management, was known as the Isaac Newton of the science of work. He adapted the science of improvement and accomplished great things in his time.

Today, he would be perplexed if he walked into the 21st Century and noticed the small influence of labor, the massive organizational and technological advances, factories replaced by broader and complex supply chains, people replaced by technology, and the short life spans of his "one best way" philosophy. What worked great in his time is not the same answer as current times, but the overarching philosophy of continuously making things better through adaptive thinking remains the same. Throughout history, the various approaches and methodologies of improvement achieved great success in the respective competitive conditions that prevailed at their times. The same holds true today: what worked well for Lean manufacturing in 1995 is not the same right strategy for the future of improvement. Why? Because in the global economy the world spins faster and faster - driving higher order improvements to remain in the game.

The history of improvement is long and certainly not boring, especially if you have a deep inner passion for excellence and an interest in taking Lean to the next levels of achievement. In fact, it provides valuable insights about how to evolve next generation Lean and continuous improvement in organizations to achieve superior global competitiveness. An open mind will benefit from these long lessons about improvement from the past and help to discover the critical success factors for the future.

The remainder of this section sheds light on the long history - and continuous evolution of improvement. This history has been embedded in several industrial revolutions. For centuries - and in particular, the past three decades, the science of improvement has been called by many names, many brands, many labels. This has created a significant amount of confusion over Lean and general continuous improvement I, and what it takes to achieve lasting success. This section will illustrate the continuous evolutions of improvement where the heroes of their time adapted, architected, and time tested improvement to specific business needs and cultural values. Not
coincidently, they were able to adapt improvement and leverage leadership, culture, strategy, architecture, execution, and organizational learning into breakthroughs in global performance. Success was, and continues to be the adaption of improvement to the challenges and cultural values of particular points in time. This history is extremely important because it reveals many timeless fundamentals of improvement that are critical to the future of global competitiveness.

The chart below (Figure 1.1) outlines The Generations of Improvement.

**Figure 1.1: The Generations of Improvement**

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As the chart indicates, the Western world has passed through three major evolutions of continuous improvement, and is on the cusp of a new evolution with far reaching rewards for success. Today, Western organizations are at a tipping point with Lean and continuous improvement in general. The new evolution which is upon us requires adaptive thinking to the challenges at hand - just as it has in the prior evolutions of improvement. The purpose of this
history lesson is to underscore that adaptive thinking always creates success at a philosophical level. The details of architecture and culture are the real game breakers of improvement. Keep in mind that it is impossible to give credit to every hero in every evolution in this book. Each evolution includes a few milestones to highlight the improvements of their eras.

The First Evolution: Engineered Improvement

The first evolution of improvement occurred between the 1780s to the 1880s, fueled by the Industrial Revolutions in Europe and America. This is the Engineered Improvement evolution, where inventors achieved significant gains in productivity by harnessing the power of water and steam and standardization. Another element of this evolution were organizational strategies to increase productivity. Manufacturing began with hand-made "outwork systems" (craft manufacturing) whereby small parts of a larger production process were carried out in numerous individual homes. These strategies worked well for shoe and boot making. However, the major organizational breakthrough was the "factory system" where manufacturing was performed on a large scale in a single centralized location with mechanized equipment. New Englanders are very familiar with the huge historical textile mill landmarks, some of which employed as many as 12,000 men, women, and children.

Some of the improvement highlights and influences of this evolution included:

- Eli Whitney, inventor of the cotton gin in 1794. He invented a machine that used standard interchangeable parts and revolutionized the production of cotton by greatly speeding up the process of removing seeds from cotton fiber. The cotton gin made cotton America's number one export by the mid-nineteenth century.

- Samuel Slater, father of the American factory system, built a large textile mill in Rhode Island that greatly increased the speed with which cotton thread could be spun into yarn. By the 1820s this system evolved into the building of many large textile mill campuses throughout other New England towns. New England was an impoverished farm economy. Management recruited female and child labor for these large mills because they paid them less than men. Female workers benefited by experiencing a new kind of independence outside the traditional male-dominated family farm work.
Abbott Downing Company was a Concord, NH manufacturer of stage coaches for Wells Fargo and many other customers across the country. By 1827 they had developed a lean progressive assembly operation where they used patterns to cut white oak and ash wood for body parts and spokes, patterns for the millwork parts and leather upholstery, and templates to inscroll lettering and fancy painted designs on the exterior. This was not a mass production line, but a mass customization line where coaches were built to customer’s carefully drawn up specifications. Many of the components were standardized and interchangeable, and Abbott Downing would also provide standard options or one-of-a-kind options often requiring hand forging. Their 360 degree spring leaf suspension (front to back, side to side, lateral dampening) was available in several standard and engineered choices to smooth out the ride, depending upon customer end use. They prided themselves on quality and later developed style books for their stage coach, pie wagon, hearse, buggy, and omnibus product lines. Their products enjoyed the reputation never breaking down, but just wearing out or eventually replaced by the automobile. Today these restored coaches are beautiful and technically impressive icons of that industrial era.

There are so many more influences that could be mentioned here. These influences did not have formal improvement tools, but they had an overabundance of Yankee ingenuity which spread as American ingenuity like wildfire across our great country. During this evolution, New England became a manufacturing powerhouse along rivers like the Housatonic, Quinebaug, Shetucket, Blackstone, Merrimack, Nashua, Cochecho, Saco, Androscoggin, Kennebec or Winooski. These structures were built to last. Today, many of these historical brick textile mills are still occupied as stunning, rich heritage office, retail, educational, medical, and condominium space with large windows, exposed beams, and plank maple flooring. These magnificent buildings are a testimony to their constancy of purpose - a phrase first used by England's Prime Minister Benjamin Disraeli in the 1800s. On the down side of this evolution was the beginning of worker exploitation protesting against wage, safety, and other working conditions. This eventually led to strikes and organized labor later in history. By 1886 Samuel Gompers had founded the American Federation of Labor (AFL).
America wasn't discovered, it was built. At the end of the Civil War, America was seen as a failing experiment in democracy; a nation fraying from the inside and at war with itself. Just 50 years later, the United States was the greatest superpower the world had ever seen. The latter part of this evolution is known as The Gilded Age. This landmark transition was due in no small part to a group of business-savvy, innovative young men: John D. Rockefeller, Cornelius Vanderbilt, Andrew Carnegie, Henry Ford, J.P. Morgan, John Jacob Astor, and Thomas Edison. These men constructed a bold vision for a modern America and transformed the greatest industries of our time, including oil, railroads, steel, shipping, automobiles, electricity, real estate, and finance.

These industrialists are known as the "captains of industry," ingenious and industrious leaders who transformed the American economy with their entrepreneurial and innovative business skills. They were praised for their skills as well as for their philanthropy (charity). A trip to Arcadia National Park in Bar Harbor, Maine is but one tribute to their generous and widespread philanthropy. Others refer to these individuals as "robber barons," accentuating the negative aspects of industrialization. These cruel and ruthless businessmen were greedy power seekers.
who believed in runaway capitalism, stopping at nothing to achieve great wealth. They were accused of exploiting workers and forcing horrible working conditions and unfair labor practices upon the laborer. A trip to the mansion district in Newport, Rhode Island underscores their zeal for unchecked power, wealth, and social superiority. These two perspectives reflect divergent views of industrialism itself. Just as there were both positives and negatives to industrialism there were positives and negatives to the leaders of industrialism. The same holds true in current times.

**The Second Evolution: Scientific Improvement**

The second evolution of improvement occurred during the period of 1880 to 1980 with a large spike in industrial efficiency at the beginning of the 20th Century. This is the birth of scientific management and the discipline of industrial engineering, division of labor, progressive assembly lines, standard methods, and waste reduction. Yes, waste reduction - scientific management focused on eliminating the same eight wastes that are part of present day Lean, but the methods were via time and motion studies to improve industrial efficiency.

Some of the improvement highlights and influences of this evolution included:

- **Frederick W. Taylor**, the father of scientific management. Named after the U.S. industrial engineer Frederick Winslow Taylor (1856-1915) who in his 1911 book 'Principles Of Scientific Management' laid down the fundamental principles of large-scale manufacturing through assembly-line factories. He emphasized gaining maximum efficiency from both machine and worker, and maximization of profit for the benefit of both workers and management. His production efficiency methodology breaks every action, job, or task into small and simple work elements which can be easily analyzed and taught. The basic fundamentals of Taylorism:
  - Aims to achieve maximum job fragmentation to minimize skill requirements and job learning time,
  - Separates execution of work from work-planning,
  - Separates direct labor from indirect labor,
  - Replaces rule of thumb productivity estimates with precise measurements,
- Introduces time and motion study for optimum job performance, cost accounting, tool and work station design; and
- Makes possible payment-by-result method of wage determination.

Taylor was using scientific principles to eliminate waste in production. Taylorism was popularized as a way to make the emerging industries of the captains of industry available to the masses, while significantly increasing power, wealth, and social status. Taylorism was 100% science and overlooked what we today refer to as the soft human elements of improvement. Although rightly criticized for alienating workers by (indirectly but substantially) treating them as mindless, emotionless, and easily replicable factors of production, Taylorism was a critical factor in the unprecedented scale of US factory output that led to Allied victory in Second World War, and the subsequent US dominance of the industrial world.

- Frank and Lillian Gilbreth expanded the pioneering work in time and motion studies begun by Frederick Winslow Taylor by developing a system of subdividing worker motions into 18 kinds of elemental motions used in the study of motion economy in the workplace (called "therbligs", a close Gilbreth spelled backwards). A workplace task is analyzed by recording each of the therblig units for a process, with the results used for optimization of manual labor by eliminating unneeded movements. The Gilbreths were also pioneers with their introduction of the study of workplace psychology. Their work evolved to predetermined motion and time studies (MTM) and human factors in the workplace. Therbligs are the 1920s equivalent of today's "Eight Wastes" and the "Twenty Key Workplace Improvements" imported from Japan back to the U.S. in the 1990s.

- Walter Shewhart is known as the father of statistical quality control. While working at Western Electric Company, Shewhart framed the problem in terms of assignable-cause and chance-cause variation and introduced the control chart as a tool for distinguishing between the two. Shewhart stressed that bringing a production process into a state of statistical control, where there is only chance-cause variation, and keeping it in control, is necessary to predict future output and to manage a process economically. Dr. Shewhart created the basis for the control chart and the concept of a state of statistical control by carefully designed experiments. Later while working at Bell Labs in the late 1930s,
Shewhart furthered statistical quality and engineering techniques and developed the Plan-Do-Check-Act (PDCA) which was popularized by W. Edwards Deming. His work is still part of what we know as Six Sigma today; DMAIC is a more contemporary version of Shewhart's PDCA cycle.

- Henry Ford, who introduced mass production of cars, adopted Taylor’s methods but took them further with the use of machines to replace some of the tasks performed by workers. Ford is one of the originators of progressive, continuous flow manufacturing. Most famous of these was the introduction of a moving conveyor belt in his factories which provided an extension to Taylor’s methods. Instead of workers moving from car to car at their own pace, the belt moved the cars to the workers at a speed set by management, helping to speed up the flow of work and make it difficult for workers to ‘soldier’. In this way Ford kept workers in motion, balanced with such marvelous clock-like precision, while removing another element of discretion from workers’ jobs and thereby reduced his reliance on workers’ motivation. Ford, like Taylor, had a rather low opinion of the worker on his assembly lines. His take on the average worker was that they want a job in which they do not have to think. Nevertheless, Ford made automobiles affordable to the masses.

- Henry J. Kaiser built Liberty ships to support America’s World War II efforts – fast! Kaiser adapted mixed model mass production techniques to shipbuilding, instituting modular construction and assembly techniques in which the ship sections were synchronously planned, built, and welded together instead of the traditional large single ship riveting shipyard. In addition to being faster, welding required less skill than riveting, an important factor because Kaiser’s yard crews contained workers new to shipyard work, including women, because able-bodied men were being drafted to serve in uniform. In addition, Kaiser was in the vanguard of companies hiring African-Americans. Instead of the industry average of 230 days, Kaiser shipyards initially reduced construction time to an average of 45 days and ultimately to less than three weeks. One yard crew set a record in November 1942 when it built the Liberty ship Robert E. Peary in four days and 15½ hours. Between 1941 and 1945, 18 American shipyards, either Kaiser’s or using Kaiser’s shipbuilding techniques, turned out 2,751 Liberty ships, easily the largest class of ships ever built.
• Alfred P. Sloan, Chairman and CEO of General Motors (GM) from 1923 to 1956, applied what we call group technology and cellular thinking to organizations. He decentralized GM into independent market/product business units. His actions standardized entrepreneurial thinking by keeping risk-taking alive within a hierarchical, rule-bound, massive, decentralized corporation. Sloan oversaw the use of rigorous financial and statistical analytical tools to profitably manage GM's far-flung empire. Sloan's tenure at GM provides a useful reminder that great corporate leadership is mainly honest and usually brilliant. It is also, due to performance and reward systems, almost always fiercely self-interested at the expense of employees and broader society interests. Sloan believed that that executives have a moral obligation to keep these things in balance. His mottos were timeless: "Get the facts . . . recognize the equities of all concerned . . . realize the necessity of doing a better job every day . . . keep an open mind and work hard - the last is most important at all. There are no short cuts to success."

• Peter Drucker was a renaissance man and guru's guru of management. In the 1950s he was promoting the notion that workers are a human community and should be treated as assets, not as liabilities to be eliminated. In the 1970s Drucker wrote about the contribution of professional knowledge workers, long before anyone knew or understood how human capital would trump physical assets as the essential capital of the global economy.

Many Western organizations with an appreciation for Industrial and Systems Engineering were also involved in many of the manufacturing improvement under our current umbrella of Lean such as rate-based & short interval scheduling, assembly line balancing, two-bin replenishment systems, more efficient equipment and plant layout, motion and time studies, predetermined time standards, quick set-ups, preventive maintenance, downtime reduction, quality improvement, and continuous flow that supposedly originated in Japan. This occurred in an era where there were no buzzwords other than the standard industrial engineering (IE) terminology, workplace improvement methodologies, and body of knowledge. Western IE efforts tended to be adversarial, exclusionary, reactionary vs. prevention-based, with a major focus on cost cutting and maintaining the punitive, incentive-based piece-rate pay systems left over from the Taylor
philosophy of manufacturing. The leaders and practitioners of this evolution were undoubtedly the most influential forces of the Toyota Production System (TPS).

During the earlier stages of this evolution of improvement in Japan, Sakichi Toyoda (the father of the Japanese industrial revolution and founder of Toyota Industries Co., Ltd.) was busy in the Toyoda Automatic Loom Works plant in the 1920s inventing numerous weaving devices including an automatic power loom that stops itself when problems occur. Today this concept is part of the Toyota Production System (TPS) as Jidoka (autonomous automation). Toyoda also developed the concept of the "5 Whys" which is commonly used in improvement activities today. World War II ended shortly before a scheduled Allied bombing run on the Toyota factories, but the company was on the brink of bankruptcy due to all of Japan's other extreme economic difficulties.

During the latter stage of this evolution of improvement (the post World War II era), Japan recognized that their recovery was highly dependent upon continuous improvement methodologies of the West. Dr. Deming and his expertise on statistical quality improvement, and Taiichi Ohno with his Industrial and Systems Engineering background and visionary thinking from Toyota took center stage in business improvement. During this same period there were many other contributors to what we now label Lean. This included folks like Kauru Ishikawa, Armand Feigenbaum, Taichi Ohno, Shigeo Shingo, Joseph Juran, Masaaki Imai, and others who will be noted in the next evolution of improvement.

Rather than listening to the wisdom of Deming and other U.S. manufacturing gurus, we exported quality and continuous improvement to Japan which was faced with post-war reconstruction issues related to manufacturing. Post-war Japan was severely constrained in terms of space, resources, time, cost, and their perceived low quality by the East. At Toyota for example, there was a concern with quality and inventory levels, and the costs and space consumption associated with each. Emulating exactly what U.S. companies were doing was essentially not doable and unaffordable. This era was the birth of what was later to become popularized as the Toyota Production System (TPS). Much of the TPS is Taiichi Ohno’s evolution of basic Industrial and Systems Engineering improvements aimed at the unique inventory, quality, space and natural resource limitations in post War Japan. Development and implementation of the TPS was a lot
of work – Relentless, never ending work – Work that turned out to go unnoticed by the Western World until it revolutionized global manufacturing by 1980. Toyota, Honda, Nippon, Sony, Mitsubishi, Canon, Hitachi, Kawasaki, Komatsu, and many other Eastern corporations mastered continuous improvement under the radar screen for years.

**The Third Evolution: Technology and Globalization**

Thirty years ago America became painfully aware of the importance of quality improvement and executives were scratching their heads as they watched the 1980 NBC documentary, “If Japan Can, Why Can’t We?” This was a mammoth wake up call for business improvement. We watched their industry success at reducing set-ups, defects, cycle times, costs, and inventories based on improvement techniques introduced to by Taylor, Gilbreth, Ford, Shewhart, and Deming in the early 1900s. Suddenly there was a high degree of U.S. interest in improvement. This third evolution is Program-Based Improvement. This evolution began in 1980 and has lost momentum with the 2008 economic meltdown. During this same period the Western high technology industry and industrial globalization evolved. Improvement was initially motivated by the stiff competition from the Japanese automotive, consumer electronics, steel, machine tool, and several other industries.

Some of the improvement highlights and influences of this evolution included:

- W. Edwards Deming is the father of the global quality revolution. He has been described variously as a national folk hero in Japan, where he was influential in the development of the quality culture in Japan and the spectacular rise of Japanese industry after World War II. In the U.s. he is most known for his "System of Profound Knowledge" which incorporates Deming’s 14 Points, fourteen key principles to managers for transforming business effectiveness. The points were first presented in his book *Out of the Crisis.*

- Taichi Ohno was the inventor of the Toyota Production System (TPS) which incorporates many of the manufacturing philosophies of what we know as Lean Manufacturing. Ohno is credited with taking the ideas of flow, motion and waste reduction, synchronization of
resources, and perfection in product/process quality to new levels never before experienced in Western organizations. When one peels back the onion, they recognize that Ohno and Toyota evolved Western IE fundamentals to breakthrough levels of application and results.

- Shigeo Shingo was a Japanese industrial engineer and consultant that worked closely with Ohno and Toyota in a consulting role, but his contributions are primarily from the science of set-up reduction and quick changeovers. His famous SMED System (Single Minute Exchange of Dies) revolutionized set-up reduction and mistake-proofing equipment. This was a major contribution that enabled other elements of Lean namely, one piece flow, mixed model scheduling, pull systems and kanban, and visual management. He is also known for writing about, and introducing the Western world to the Toyota Production System (TPS) and the Shingo Prize, the premier award for operations excellence which was created in 1988 at Utah State University.

- Kauro Ishikawa translated, integrated, and expanded the management concepts of W. Edwards Deming and Joseph M. Juran into the Japanese system. Ishikawa introduced the concept of quality circles in 1962 in conjunction with the Japanese Union of Scientists and Engineers (JUSE). He is best known in North America for the Ishikawa or cause and effect diagram (also known as fishbone diagram) that is incorporated into Lean and Six Sigma and used in the analysis of industrial processes.

- Joseph Juran worked in Western Electric's Hawthorne Works where he was responsible for disseminating Bell Labs' statistical quality control innovations. He later joined the faculty of New York University as an adjunct professor in the Department of Industrial Engineering, where he taught courses in quality control and ran round table seminars for executives. In 1951 he published a book, "Quality Control Handbook" which attracted the attention of the Japanese Union of Scientists and Engineers (JUSE) who invited him to Japan to consult with many companies. Top and middle management involvement, the Pareto principle of defect reduction, the need for widespread training in quality, the definition of quality as fitness for use, and the project-by-project approach to quality improvement are Juran's major contributions to quality and continuous improvement.

- Masaaki Imai popularized the methodology of Kaizen in his famous books, "Kaizen" and "Gemba Kaizen." The origins of kaizen come from post World War II reconstruction.
efforts when General Douglas McArthur sent two bright engineers (Homer M. Sarasohn from Raytheon and Charles Protzman from Western Electric) to teach Japanese manufacturers about statistical control methods in the production of radio and electronic communications products. Their course was titled "Improvement in 4 Steps" (Kaizen eno Yon Dankai). Thereby, "Kaizen" was introduced to Japan. W. Edwards Deming and Joseph Juran were also on the scene with their teachings. Allied forces also sent consultants Edgar McVoy and Lowell Mellen to Japan to install the Training Within Industry Program (TWI) developed by the U.S. Department of War in 1940-1945 to increase efficiency in manufacturing plants supplying materials, supplies, and equipment for the war. TWI was instrumental on the development of kaizen and the TPS. Ironically, TWI literally disappeared in the U.S. after the war because Western industry faced little serious competition in 1945 - and few saw the need to continue to improve.

- Oliver Wight was a thought leader and educator in the evolution of material requirements planning (MRP) into MRP II which has become the standard ERP and IT architectures in organizations today. This effort began at IBM in 1964 as a response to the TOYOTA Manufacturing Program for managing inventory and other critical resources. His contribution Western industry was, from strategy to tactics, all processes integrate sales, marketing, finance, manufacturing, engineering, distribution, purchasing, suppliers, and customers. Everyone is linked to the company's single game plan.

- Eliyahu Goldratt is the father of Theory of Constraints (TOC). He observed that several MRPII software implementations did not come close to their estimated potential because the basic assumptions and undisciplined practices of employees did not change. His answer was the book The Goal which became a standard manufacturing read and a great success. He is credited with building awareness of constraints in manufacturing and how it negatively affects total system throughput, cost, and cycle time, explained brilliantly in his Drum-Buffer-Rope methodology. His reasoning was simple but not new: Schedule to the capacity of the bottleneck and reduce the bottleneck. For years previously a frustrated IE community attempted to improve "bottlenecks," while plant management's mindset was to hurry up and release and expedite more work to operations that were already overloaded . . . increasing the magnitude of the bottleneck, creating more hidden bottlenecks, and hiding the true bottleneck. Fifty years earlier consulting firms like Booz
Allen Hamilton, Alexander Proudfoot, and A.T. Kearney were helping clients with this identical challenge.

- Michael Hammer was the proponent of a process-oriented view of business management. His book *Reengineering the Corporation* promoted business process reengineering (BPR), the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary modern measures of performance, such as cost, quality, service, and speed. Hammer's claim was simple: *simplify, automate, or obliterate*. Reengineering was presented as an alternative to continuous improvement and the TQM movement at the time, by virtue of its aim for fundamental and radical change rather than iterative incremental improvement. Hammer was trying to get executives to focus on improving transactional processes. Reengineering lost popularity because it focused too much on IT solutions and disregarded people and process aspects of change in practice, and quickly became overhead downsizing under a fancy name. Reengineering's successors, business process management (BPM) and business process improvement (BPI) are very relevant today.

- Bill Smith is known as the father of Six Sigma. Developed at Motorola in 1986, six sigma is a set of statistical engineering techniques and tools for process improvement. The objective of six sigma is to improve the quality of process outputs by identifying, removing, or managing the factors that most influence the causes of defects (errors) with a focus on understanding and reducing variation (to a goal of 3.4 defects per million opportunities, a 6σ or 99.99966% level of quality). It uses a set of quality management methods, including statistical methods, and creates a special infrastructure of people within the organization ("Champions", "Black Belts", "Green Belts", "Yellow Belts", etc.) who are experts in these methods. Companies such as GE, Motorola, Caterpillar, J.P. Morgan Chase, Honeywell, Ford, Raytheon, and many others have achieved incredible success with six sigma. Six sigma has also been criticized for its rigid and structured waterfall problem solving nature, its over-reliance on complex statistical methods and tools, and its negative impact on innovation.
There are so many influencers that we could add to our wall of fame for this evolution: James Womack, Norman Bodek, Mikel Harry, Armand Feigenbaum, Seiichi Nakajima, Romey Everdell, Nick Edwards, Dorian Shainin, Genichi Taguchi, Richard Schroeder, Joseph Orlicky, George Plossl, Steve Zinkgraf, and hundreds of other passionate practitioners.

In case you were not around or not paying attention, there is a disturbing trend in this last evolution of Western improvement. History is informative, but it is much more useful if we can learn from it to our advantage in the future. A deeper dive into the why-why-why-why-why why in all of this is very revealing in terms of how Western organizations must improve how they improve.

Figure 1.2 is an exploded view of our Program-Based Improvement evolution. During this evolution of improvement organizations went through a lengthy succession of different discrete improvement programs like Deming’s PDCA and Quality Circles, Total Quality Management (TQM), Just-In-Time (JIT), Enterprise Resource Planning (ERP), Reengineering, Kaizen, Lean, Six Sigma, Lean Six Sigma, and dozens more. Each of these improvement initiatives had their moments of popularity and sporadic successes followed by their discrete birth-death lifecycles. For the first time, many manufacturing and service organizations engaged their hourly employees as valued partners in improvement. Through these experiences of each successive program, organizations became increasingly skilled in the methodologies and tools of improvement with good results . . . for a while. One executive shared his perspective on improvement with me recently:

"American executives never took the time to understand the essence of Deming’s PDCA cycle. They were hasty and jumped on the long bandwagon of improvement programs. What happened? The P was oversimplified, the D was too long and scattered all over the organization, and the C and A were non-existent. There was never any system to the Western way of improvement"

The degree of success and length of the lifecycles of improvement varied from organization to organization. These lifecycles have been disrupted over time by multiple leadership changes.
with different agendas, and other different opportunities for improvement through globalization, technology, outsourcing, customer relationship management, automation and robotics, and other popularized business movements. These birth-death patterns have arisen by missing the integrated system, the human spirit, and soul of improvement. Organizations have inoculated themselves from continuous improvement through a long string of failed fad programs and an oversimplified mimicking of improvement tools. Every organization claims to have their mumbo jumbo incantations of a Lean program, but the substance and results are just not present. Keeping this alive and unchanged also inoculates organizations from continuous improvement. Lean becomes a meaningless ritual, a non-value added "Yep we're already doing Lean" activity. I walked into a company lobby one day and observed their Lean mission poster and a performance chart that had not been updated for months. When no one was looking I wrote on the chart, "Please Update Me." I returned a week later and there was a new version of the same outdated chart without my comment. Today, very few Western organizations can claim a successful and sustainable run at continuous improvement that compares to Toyota's constancy of purpose and success. By the way, Toyota is the only organization in the world that has been on a uniform, evolving journey of continuous improvement with a single strategy and purpose.
The root causes of these birth-death cycles of improvement are a function of Western executive behaviors, choices, and actions:

- When things are great, improvement is the first casualty because it is perceived to be no longer necessary. The high technology industry is a good example of this period. Double digit revenue growth and margins produced enormous profits while hiding the sins of waste. Everyone's focus was on top line growth, not waste reduction. In this mode, improvement programs become insignificant, check-the-box activities.

- When things are bad, improvement is the first casualty because people are directed into instant firefighting and symptomatic problem solving, and do not have the commitment and time to improve with structured and disciplined approaches. This mode sends a strong message that improvement is no longer important.
• Between these two extremes, improvement has been supported by temporary and wavering commitments, token agreements, follow-the-leader fad programs, massive training, and more going through the motions of improvement. Over time, executives and their organizations ride through many of these cycles, creating a separation disorder of improvement culture: People view improvement as “in addition to” program rather than “an important and expected part of” their daily work.

From post World War II to the late 1970s American manufacturing became complacent. America stopped taking the deep disciplines of improvement seriously - the same disciplines that enabled America to prevail in World War II. During this period a phenomenal rate of growth occurred in corporate and personal wealth, primarily from the emergence of the high technology industry. The top line revenue growth and high margins of corporations took care of covering other problems and waste became an expected, institutionalized cost of doing business. The same opportunities for improvement being aggressively pursued by Japanese manufacturers were present in Western organizations, but Industrial Engineering departments were diminished to an insignificant function or eliminated to reduce overhead spending. Many were decentralized to functional engineering and management positions where their previous emphasis quickly became overrun by day-to-day crises. The purpose and sense of urgency to improve were secondary priorities. America was the dominant global superpower with very little competition. Shutting down lines to fix problems or running out of inventory or a shortage of employees was taboo. America ran with a "buffered waste" model of production. Why was there a need to change the business model? America's success bred a false overconfidence in future success.

At the same time, Japan was evolving Western quality and continuous improvement methodologies to rebuild their nation. They pursued continuous improvement like a religious movement and mottainai - the Japanese term conveying a sense of regret concerning waste. World War II left Japan a country of rubble and ashes that could not manufacture anything, and its people were starving. Whatever could be made and exported from Japan was perceived to be low quality junk by Western standards. The purpose and sense of urgency to improve was extreme and visible in daily life. Out of necessity they eliminated waste and maximized the value-added content of work. Japanese executives and their borrowed gurus implemented
continuous quality and process improvement as a universal philosophy and cultural standard of excellence. Through the combination of economic interventionism of the Japanese government, a renewed national pride, and U.S. support to rebuilding their manufacturing infrastructure, Japan quickly rebuilt their manufacturing base under the radar of foreign competitors, and catapulted themselves into the world's second largest economy (after the United States) by the 1980s.

What happened in this evolution of improvement is sheer Western panic. The Japanese miracle delivered the wake-up call by gaining market share over U.S. competitors. Loyal Ford customers were now driving a Toyota, Honda, or Nissan. Trades people were upgrading their Black and Decker, Sears, and DeWalt power tools for Ryobi, Hitachi, and Makita. Music enthusiasts were upgrading from their Fisher, Marantz, and Realistic stereo receivers to Sony, Panasonic, and Pioneer. Photographic enthusiasts were drawn to the quality and simplicity of Canon, Olympus, Minolta, and Pentax automatic cameras. Owners of Admiral, RCA, and Zenith televisions replaced them with Sony, Sharp, Mitsubishi, and Toshiba brands. Caterpillar vs. Komatsu. New Holland vs. Kubota. And the list went on and on. Suddenly there were several executive field trips to Japan to tour their factories and learn about Japanese manufacturing techniques. Executives observed the physical mechanics and learned the terminology of Japan's manufacturing improvements without realizing their origins. They did not realize that what they were observing for the most part, was fundamental industrial engineering operating at its max. Translated books about single point improvement tools (e.g., kanban, cellular manufacturing, one-piece flow, SMED, pull scheduling, TPM, kaizen, 5S, etc.) and a dozen more books about Toyota, Honda, and other successes were published. Consultants popped up everywhere offering training on the various du jour programs and their associated jargon, methodologies, and tools. Western organizations implemented continuous quality and process improvement with a more hasty and cursory, program-by-program approach because this is what people observed on the surface when they visited Japanese plants. They could not see, nor appreciate the deep cultural foundation that Toyota and other companies created to power their efforts. Learning about the methodologies and tools is quick and easy; the perceived simplicity lead many Western executives to believe that their organizations could offset Japan's thirty-five year evolution of continuous improvement by fast implementations of the same methodologies and tools. Western
organizations simply emulated Japan's manufacturing excellence successes with a focus on the methodologies and tools themselves. In 1980 Western organizations were anxious to catch up and were not willing to work at it for the next thirty-five years.

Collectively, these various improvement programs have served as drivers to clean up many inefficient Western manufacturing environments related to quality, excess inventory, space, and delivery performance. Many American companies who were direct competitors of Japanese manufacturers have reinvented themselves and have made a great comeback during this evolution, with their hard work being answered by the next challenge of outsourcing. The stream of new references continues: Toyota Way, Toyota Culture, Toyota KATA. These books continue to play back Japan's history of improvement. Like Six Sigma and belts, KATA is nothing more than an advanced martial arts spin on Deming's PDCA cycle. We reference Toyota throughout the book because they are the grand masters of continuous improvement. Toyota is not the sole inventor of the topic of improvement, but they are without a doubt, the innovators and sustaining practitioners of improvement. Toyota has a running seventy year track record of continuous improvement that overshadows Western rate of progress with no end in sight. Today, many executives are waiting for the next magic improvement bullet or have decided to improve through emerging technology or via outsourcing manufacturing, design, software development, customer service, and other strategic functions to China and other third world countries.

**Improvement Lessons Learned from History**

The history of improvement reveals a portion of the path to future success with improvement. History reveals that many of the basic fundamentals are timeless - and never mastered to their fullest potential. History provides a slice albeit a very important slice of the future of improvement. History provides some of the enduring design guidelines for architecting the next generation of Lean and continuous improvement. To be successful with the next generations of Lean and continuous improvement, organizations must architect a new systematic process of improvement that also factors in emerging and future business requirements. Although the world
of business is evolving at warp speed, several basic fundamentals of improvement success remain the same.

**Ten Timeless Fundamentals of Improvement**

Let's talk specifics and list the individual lessons about improvement that are observed in this Chapter. These serve as fundamental and timeless design criteria for the future of improvement.

1. **Improvement is, and always has been purpose and needs driven.** It is leadership's role to keep the mission, vision, purpose, and recognition of needs in front of their organizations. It is also their role to create the motivation and sense of urgency to change through continuous communication and reinforcement. If a clear mission, vision, purpose, and sense of urgency for change is not recognized and embraced by the organization, then the momentum for improvement diminishes into its respective lifecycles. This is Deming's "Constancy of Purpose," a point that organizations must master on in the future.

2. **Improvement is first and foremost a philosophy and operating culture.** Throughout history improvement has evolved by creativity and innovation - and not the means (e.g. methodologies and tools) of improvement. Many Western improvement initiatives have been characterized by mass training and a fanatical focus on tools. Tools do not create this operating philosophy, people do. These basic fundamentals of continuous improvement are like the Gospel; they do not change. This is why many successful executives make analogies between continuous improvement and religion.

3. **Continuous Improvement (regardless of the label) is a continuous full time effort.** Whether it is Taylor's Scientific Methods, Deming's PDCA, Six Sigma's DMAIC, or Toyota's KATA - these are all continuous structured cycles of improvement. They are not once through the cycle and we are finished. "Best method" or "best-in-class" is just a state (data point) on a continuous timeline, always open to further improvement. The intent of these structured problem solving models has always been to foster a culture of relentless, never-ending improvement. This is achieved by 100% leadership commitment, 100% organizational acceptance as the standard code of conduct, 100% engagement 100% of the time, and 100% of an organization's capacity for ingenuity, creativity, innovation, and talent development. This is the big differentiator of improvement between Toyota and Western organizations.
4. The most successful developments in improvement include leadership, science, technology, and intellectual capital working together toward a unified goal. Stated another way, improvement is a cohesive, systematic socio-technical management system. Improvement is sub-optimized when these critical success factors are separated (e.g., improvement just through leadership mantras, just through tools, just through IT, just through teams, just through other single point approaches). History demonstrates that the influencers of every evolution of improvement have been on a continuous journey of improving how they improve. Improvement is state in time; what makes it successful is its continuous nature.

5. The Western world and namely America was home to the prime inventors, authors and practitioners of continuous improvement as we know it today. The respective scientific and engineering methodologies and tools of improvement (the means) have remained basically the same for the past Century. They have been enhanced, repackaged, and rebranded for the times and circumstances - by both successful Japanese and Western companies. The origins, background, and fundamental methodologies of Lean and continuous quality and process improvement have a long history of development and evolution within the industrial, mechanical, manufacturing, and systems engineering disciplines. Toyota has kept culturally and architecturally in tune with this evolution of improvement.

6. What we refer to as Lean and TPS was really invented in the Western world as long as a century ago or more. The difference in recent times is that Toyota evolved and actually implemented these concepts as the operating and cultural foundation for doing business, where western organizations have emulated the specific methodologies and tools through a number of fad programs (TQM, JIT, TPM, SMED, Lean, etc.). Toyota's improvement efforts have been truly continuous as an operating philosophy and system; the improvement efforts of Western organizations have been intermittent through many different and often inconsistent programs and agendas. Western organizations must develop a better appreciation for the cultural underpinnings and daily disciplines that make improvement continuous.

7. In retrospect, the repeatable, short-lived program-based improvement approaches of Western organizations have been wishful thinking. In the past three decades many
organizations have been through dozens of confusing, fad improvement programs and their associated arsenal of tools and terminology. The Western approach as of recent has been to send an associate off to a three-day Lean course or push them through Black Belt certification and then expect them to become instant change leaders and super-problem solvers. It is impossible for organizations to create a permanent cultural standard of excellence with these superficial approaches to improvement. Many organizations have their well intentioned practitioners roaming around the organization applying improvement methodologies and tools in a vacuum. Organizations have treated improvement as a destination of programs, instead of a continuous journey powered by a permanent mindset embedded in culture and the way they think and work.

8. Improvement requires an exploratory mindset and culture - one that constantly learns, becomes comfortable with complexity and uncertainty, which opens up the mind' eye to new challenges and opportunities. Lean and continuous improvement is a mindset, not a toolset. The right methodologies and tools under the broader topic of improvement are the means to a continued and successful journey that never ends. This talent resides within people, not tools. Deming's PDCA cycle describes this process. KATA is an updated spin on PDCA. The processes of PDCA, DMAIC, KATA are fundamentally the same. The objective of these thinking processes is to create a standard structure, discipline, and common language of improvement. We could create another new acronym tomorrow. Remember that it is the relentless, never-ending and culturally-grounded improvement actions behind the acronym that create long term success.

Throughout history, actions speak much louder than words!

9. America and other Western organizations have lost improvement ground with their instant gratification approaches and their fanatical focus on decoupling and branding individual tools. Frederick Taylor, Eiji Toyoda, the Gilbreths, Walter Shewhart, Henry Ford, W. Edwards Deming, Taichi Ohno, H.B. Maynard, Henri Fayol, Patrick Blackett, George Dantzig, Harvey Wagner, Thomson Whitin, Oliver Wight, Joseph Orlicky, George Plossl, and other 20th Century pioneers of industrial process and quality improvement created an extensive body of knowledge called industrial and systems engineering. Many of these pioneers had industrial, manufacturing, or mechanical engineering backgrounds and deep analytical experience in process and quality
improvement. All of these methodologies and approaches are contained in the standard industrial engineering degree in universities. The whole of industrial engineering was exported to Japan after World War II. By the 1980s it was being imported back to Western organizations in the form of individual translated tools and applications. Western organizations have spent decades building single point improvement programs from the tools themselves. Organizations have spent too much time, effort, and investment in intellectual exercises and debating the relative value between various methodologies and tools. There are hundreds of articles about the superiority of value stream mapping, why kanban is, and is not compatible with ERP, why you should begin with 5S, Lean is easier than Six Sigma, Lean vs. TOC, kaizen vs. DMIAC, or the right sequence of tools to use to begin a Lean journey. Others argue that Six Sigma should be avoided because Toyota does not use Six Sigma. Does anyone really believe that Tagucchi developed his experimental design methodologies just so he could send them to Motorola for inclusion in Six Sigma? Make no mistake about it: Toyota has adapted data-driven analytical problem solving for decades without the fancy labels and belts. They just do it! Many practitioners run around, pulling a tool out of the toolbox, and then looking for a problem to solve. Some refer to this approach as "fools with tools." Tools are the means and the 20% success factor. No single point tool is all exclusionary or all inclusive. Like constructing a house or repairing a tractor the ends (improvement) require knowledge and calibration of the problem (thinking and behaviors), isolation of root causes (discipline), a plan (logic), and the right set of skills (people) and tools (plural) to get the job done. Think about a master craftsman: he/she has a vision, a passion for excellence, a deep, subconscious skill set, a systematic process of using the all of the right tools at the right time for the tasks at hand, and a deliverable of customized greatness. None of these folks would be successful with just a hammer, or just a screwdriver, or just a wrench, or just a level, or just a power saw. Organizations must return to the integrated body of knowledge way of thinking about improvement.

10. The architecture and process of how organizations improve has not changed in decades and is now obsolete. Western organizations have followed an approach that is best described as the big bang, top down, executive mandated, talk-the-talk, token agreement vs. true commitment, train the masses, launch across the entire organization, require strict
compliance, get the certificate, move on to the next program. This huge process often replaces the original objective of improvement. *Going through the motions* of this model often creates resource conflicts and overloads, with dozens of lengthy projects always in process and questionable benefits. Lean, six sigma, and other improvement initiatives that are structured in this manner eventually become hierarchies of overhead, detractors to improvement, and questionable value contribution efforts. This explains why management loses interest in light of other conflicting business needs, and abandons or moves on to the next vogue program. This approach is definitely not a systematic management system.

History underscores common threads to failure with improvement. It's time to put the popular and trendy programs aside and go for superior global success. Western organizations have been on a path of improvement that is fascinated with colored belts, sensei certificates, rebranded fad programs, and tools and more tools. These approaches have produced temporary success, but have failed to create the much needed, autonomous and continuous systematic way of thinking about improvement. Before our very eyes are the fundamental and timeless design criteria that creates the foundation to a better systematic process of improvement. I have lived through the recent evolution of improvement and have directly observed the paintball of "clip on" improvement programs in organizations over the past three decades. Organizations that are missing committed and unwavering leadership and constancy of purpose will eventually take a ride down the maturity and death side of the improvement cycles. The general shape (e.g., frequency, period, wavelength) and longevity of the cycle and benefits realized are directly proportional to the level of constancy of purpose that exists in the organization. We will demonstrate that a true systematic process changes the structure and general shape of the improvement lifecycle because it is a continuous, never-ending systematic process.

**Shingo Prizes and Best Plants Awards**

What about Shingo Prizes and Best Plants Awards? Where are these organizations today? A few years back, people were asking the same questions of Baldrige winners. Some have even criticized the value of these awards. Personally, I admire the organizations that win
these awards. These are all very noble accomplishments for a specific moment in time based on an assessment of using the methodologies and tools, but it does not guarantee long term success. Remember that the impressive winners represent a very small piece of the total manufacturing population. The majority of Lean initiatives in organizations are not even remote contenders for these prestigious awards. Many previous winners have all but abandoned their Lean initiatives with multiple changes in leadership, business conditions, and priorities. A few winners continue to triumph far beyond the original awards (Ahrens, Flextronics, Lincoln Electric, Avery Dennison, General Cable, GE, Harley Davidson, Motorola, IBM, Deere, Lockheed Martin, Raytheon, Dana, Boeing, Johnson Controls, Visteon, Emerson Electric, Caterpillar, Honeywell, and dozens of other great organizations).

All of these organizations continue to face the same or greater operating obstacles as everyone else, yet they continue to lead and win at improvement.

**The XPS Trend**

Another trendy movement today is something called XPS which stands for X (your company name) Production System. The intent of XPS is a corporate-wide system that aims to create an operational system of improvement. Many multinational companies like the Bosch Production System, Boeing Production System, Audi Production System, Lego Production System, John Deere Quality and Production System, Alcoa Business System, REC Production System, Electrolux Manufacturing System, Danaer Business System, and others are successful XPS examples. For the majority of XPS systems in other organizations, it is another copy and paste effort and a superficial imitation of the Toyota Production System (TPS). Some organizations have chosen the brand names "X Business System (XBS)" or "X Management System (XMS)," A closer look at many of these initiatives reveals that their XPS, XBS, and XMS are simply Lean renaming exercises, going through the same motions with the same recipe of tools and templates-based approaches. Most are narrowly focused on Lean manufacturing. These organizations have simply renamed their same process of improvement and are expecting different results. New acronyms might create a sense of improvement and renewal, but are often fallacious solutions to much more complex leadership, cultural, and operating problems. Organizations that have created a true,
successful XPS, XBS, of XMS openly admit the continued challenges of keeping momentum and results high and maintaining their status on the Lean leaderboard.

The Present Day Improvement Robber Barons
As we mentioned earlier in this Chapter, Western organizations have reached a historical tipping point with Lean and continuous improvement in general. The present global economic situation and in particular the rising debt and political uncertainty of the U.S. economy has caused many organizations to pull back on their formal improvement initiatives. A recent executive comment drives this point home:

"Our industry has set aside Lean due to being forced to look at more short term problems. I think we will be in this mode for the next two years or so. Then we will rebuild our Lean program and value-focused methods once the immediate impact of the current situation subsides. I believe then that some of the gains made in the previous three years can be recovered."

Wrong! Everyone knows that statements like these make no sense. But too many organizations are spending more time getting out of recurring jams or immediate trouble, than solving problems via a structured and disciplined, universally accepted approach (the cultural standard of excellence) yet they call it "improvement." Other executives make empty claims that people are using the huge investment in Lean, Six Sigma, and continuous improvement skills in auto-pilot mode. Their people are the first to admit that they are not, and are missing the commitment, time, and resources to do the right things right the first time . . . and are totally frustrated by the firefighting trap they find themselves in. Winging it based on opinions and perceptions sometimes works and meets management's immediate timetable, but it destroys commitment, loyalty, and team spirit when people feel like they are being undermined to do their best job. People will never feel a sense of pride and accomplishment when they are forced to take symptomatic actions that do not fix problems. Most of the time these problems keep returning as larger problems. One executives added his thoughts:
"We don't need Lean or Six Sigma because we already know our problems, and we are good at fixing these problems every time they occur. We have real jobs to worry about here before we think about Lean and besides - Lean is not in my goals and objectives."

Short term profit-and-loss (P&L) and cash flow performance temporarily hides the hidden wastes in organizations when improvement is moved down the priority list. Great organizations understand that success involves much more than hitting the numbers. When organizations sit on cash and refuse to advance Lean and disciplined improvement in general in their organizations, this is the modern day equivalent of a "robber barons" strategy. Procrastination, postponement, complacency, abandonment are losing strategies for improvement. History demonstrates that the piper always comes a calling with great consequences such as excess and obsolete inventory, warehouses full of defective product, warranties, returns and allowances, hidden financial variances, unplanned discounts, cannibalized equipment bone yards, non-transacted material review board (MRB) and return to vendor (RTV) stockpiles, invoicing errors and uncollectable accounts - all of which remain hidden until they hit the bottom line. Unfortunately, accounting rules allow management to conveniently perform "accounting heijunka" (i.e., level out the numbers) and pretty up the financial statements, while putting the burden on the next leadership regime to explain away these wastes with write-offs and restructuring costs. The costs are very real but invisible - and it's all avoidable waste and incremental profits. The piper never seems to be paid by those who allowed these wastes to accumulate in the first place.

**Adaptive Systematic Improvement: The Winning Future Strategy**

Continuing while adapting and changing the process of improvement is the winning strategy of improvement. This all points to the serious need to change the process of improvement to meet new requirements and operating criteria of our competitive world. The answer is not abandoning or postponing improvement, it comes down to *rethinking the process* of how organization's achieve the desired results. Organizations can rediscover Lean and continuous improvement as a critical enabler of success across all timeframes: immediate, short term, long term (which is about 12-18 months these days). It all comes down to replacing an outdated model of improvement, and architecting a new and adaptive model of improvement.
by improving how we improve. For Western organizations, this next evolution of improvement is an adaptive systematic process of improvement that recognizes the soul and spirit of improvement throughout the entire enterprise, and views continuous improvement first and foremost as a cultural standard of excellence.

Summary
We have learned in this Chapter that organizations and their people typically have different perspectives and motivations of improvement and how it should be rolled out. In the absence of a cohesive systematic process, formal improvement initiatives can (and have) run astray very quickly and in many different directions. Organizations will never get continuous improvement right by a copy and paste strategy, or by slapping a new label (i.e., The HalFast Company® Business System or HFC-BS) on what they have been doing all along. Another waste that must cease is the silly debates over methodologies and tools, and the popularizing of a single point and success-limiting approaches to improvement. The challenge is not about a better name for a Lean manufacturing program, but about the evolving a higher order philosophy of improvement and cultural standard of excellence (kata) - the soul of the greatest organizations in the world. The soul of improvement emphasizes the immaterial essence, animating principle, and moral purpose of the total organization's existence, and not the quick wealth of a few individuals. History shows us that the latter always disintegrates industrial, technical, and social progress.

FOOTNOTE
Halfast Company® was originally a batch-pull vs. demand-pull lego simulation game developed in 1992 by The Center for Excellence in Operations, Inc. (CEO), Bedford, NH as part of their Lean education. The game secretly scaled down and simulated a client's actual manufacturing operations, and the real world problems showed up in the game as inventory, defects, bottlenecks, wasted space, expediting, productivity, blaming each other for the inefficiencies, and confusion. Then participants realized that the game was their company and its problems! Participants reengineered their operations using Lean concepts, ran the simulation over and over, and experienced the continued improvements firsthand, especially in the before and after metrics. The simulation provided strong evidence of Lean's benefits in a direct situation where participants could experience and easily comprehend the improvements. Today it is still used to simulate an organization's total enterprise, service and installation, and global supply chain processes.

Finally, executives have a moral and conscious obligation to build great organizations and superior talent. They also have the moral obligation to swing the leadership pendulum back to a state where the whole benefits, short term and long term. The Puritan values and characteristics of Western culture have evolved over three centuries. Its origins are from the industrial revolutions in Europe and America. These basic human values and beliefs are timeless; these values turned a handful of small American colonies into the greatest economic and political power on earth. Many countries around the globe have been influenced by these fundamental cultural values. Puritan roots are synonymous with energy, social mobility, competitiveness and capacity for innovation. In recent times, many of these basic Puritan values are being replaced by Charlatan values that focus more on instant gratification, short-term financial success, personal prosperity, and other get rich quick mindsets. Generally there are no shortcuts to success; Charlatan success is success that benefits a subset at the expense of the whole. The next greatest generation is already busy developing direct digital and additive manufacturing technologies (3D printing); reshoring manufacturing jobs back to the U.S. based on fully loaded costs vs. labor rates; integrating improvement and emerging technologies within the high impact professional, knowledge-based transactional processes; and using technology to transform traditional manufacturing and storefront businesses into large software logistics organizations.
that happen to have physical and human assets attached to them (e.g., FedEx, Apple, Amazon, Google, Williams-Sonoma, Dell, WalMart, Staples, Best Buy, Deluxe, etc.).

They accomplish this by continuously mining for new improvement opportunities and flushing the hidden wastes out of their organizations. Western organizations have made respectable progress with Lean and continuous improvement. The problem is that the world is changing at a faster rate than the rate of improvement in many organizations. The same old Lean manufacturing approaches will not harvest these new and very different opportunities. The philosophy and intent of Lean is the same, but new approaches must evolve to address the higher complexities of process. It is time to break the old mold of improvement and innovate a superior, for real Lean Business System. The need for strategic and operating improvement never goes away, and there are millions upon millions of new improvement opportunities in this economy - particularly in customer service and order fulfillment, global supply chain management, new product development, software development, product management, R&D and innovation, sales and marketing, outsourcing and supplier management, technology-enabled improvement, global operations, distribution and logistics, facilities management, and every other professional knowledge-based enterprise processes.

Bibliography

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