

Lean revisited: Taking a fresh look at lean manufacturing strategies

If you are one of the veterans of manufacturing, you'll remember the days in the 1980s when lean manufacturing was a revolutionary new concept. It's been at least 30 years since terms like *kanban* and *kaizen* entered our manufacturing vocabulary. Is it time to step back and evaluate where lean strategies stand now? Are the principles still relevant in light of the drastic changes in operational processes, global markets, and IT solutions?

Is lean still relevant?

Lean manufacturing, which originated as the Toyota Production System (LPS), is one of the most well-known process strategies in modern manufacturing. It migrated to the US in the 1950s and began to draw serious attention in the 1980s. Since then, it has become the industry's default best-practice approach and has been widely adopted in manufacturing facilities worldwide. The impact on the manufacturing industry is staggering, similar to Henry's Ford's vision for assembly line production and Eli Whitney's notion of interchangeable parts.¹

But where does lean stand today? Have new technologies made lean irrelevant? Have the retiring Baby Boomers, yesterday's lean pioneers, taken the secrets of lean success with them into retirement?

A lean refresher

When Toyota started to develop its Toyota Production System (TPS) in the late 1940s, only a few people in the car industry took notice. By the 1950s, it gave rise to an entirely new approach to manufacturing and, more recently, lean business processes.

Taiichi Ohno, Toyota production engineer, is the father of lean manufacturing, perfecting his ideas from the 1940s to 1970s on the shop floor of Toyota's main factory, near Nagoya. By the 1950s, Ohno's groundbreaking concepts started to gain attention of analysts and authors, including a research team headed by Jim Womack, Ph.D., at MIT's International Motor Vehicle Program. Womack is credited by many as coining the term "lean" to describe the Toyota Production System.¹

Lean manufacturing has two main building blocks: reducing waste and creating customer value.

Continuous improvement is the ultimate goal. To achieve this, manufacturers strive to eliminate information silos and, instead, optimize the flow of products and services through the entire value stream—across departments, processes, and equipment to customers.

By the late 1980s and early 1990s lean manufacturing was the hot topic in western industries. The principles of lean and elements of the system became fully entrenched in the vocabulary of managers. Terms like *muda* (the elimination of waste), *jidoka* (the injection of quality), and *kanban* (the tags used as part of a system of just-in-time stock control) became fairly commonplace.

Lean became synonymous with modern manufacturing, until economics derailed the transformation journey for some companies. As the world economy plunged into recession in 2009, manufacturers were forced to cut back on spending and use of resources, covering only the bare necessities. While this eliminated every last bit of excess, it also tended to eliminate the proactive continuous improvement projects that were part of the early lean initiatives. Projects that required investment in training, upgrades in equipment, or investment in technology were often put on hold.



Fast forward to today

Today, lean processes are still at the heart of most manufacturing operations worldwide and are increasingly important in other industry sectors, including distribution and financial services. As the manufacturing industry recovers from the recession and moves into a growth phase, analysts are starting to once again pick up the lean dialogue, as though it simply had been paused. In response, managers are starting to review their original lean strategies in light of today's changing market demands. Some are asking, "Is lean still relevant?" Others wonder, "How does a lean enterprise also embrace investment in new technologies like 3D printing and the Internet of Things?"

The manufacturing industry has changed dramatically since lean principles were first adopted, especially in the areas of manufacturing technology and information management. When many companies first rolled out their lean initiatives, the Internet was in its infancy and few could imagine a workplace that included use of mobile devices, online portals for customers and suppliers, and real time collaboration with suppliers in other continents. It's a quickly evolving global market place today with highly demanding customers. How do lean principles hold up to this new paradigm?

On the surface, it may seem that advanced technologies are contrary to the lean principles of simplicity. Although, Taiichi Ohno did not map out an IT infrastructure that incorporated predictive analytics and closed loop feedback channels with customers, that doesn't mean he wouldn't embrace them now, if he were updating his concepts for today's manufacturer.

7 wastes to avoid

According to [Tech Target's "What are the 7 wastes of lean manufacturing,"](#) there are key wastes that are to be avoided, as categorized by Taiichi Ohno, Toyota engineer and father of the Toyota Production Systems (TPS), which serves as the basis of lean manufacturing.

1. **Overproduction**—Excessive production in advance of customer demand wastes money, time, and space.
2. **Waiting**—Gaps in production flow with frequent pauses waste time and resources. The flow of operations should be smooth and continuous.
3. **Transportation**—Moving products between processes adds no value, wasting time and risking damage to the product.
4. **Inappropriate processing**—Unnecessary, over-accessorized equipment wastes resources. Often, simpler is better.
5. **Excessive inventory**—"Just in case" inventory wastes resources, including costs of storage and maintenance.
6. **Unnecessary motion**—Extra steps or movements in the daily workflow waste time. Workplace ergonomics assessments should help design efficient environment.
7. **Defects**—Inspecting and quarantining inventory takes time and costs money. Proper attention to quality, reduces the need to inventory or rework faulty units.

Since the early days of lean adoption, IT managers and production managers have often clashed, as they struggled to find the balance between big powerful ERP systems and streamlined minimalist processes with as few steps as possible. The monolithic ERP systems that tried to impose a one-size fits all structure were not always lean compatible. “Early pioneers of Lean systems pursued strategies of removing IT from production processes, viewing this technology as an additional step which could be ‘leaned’ out of processes to remove waste. This philosophy was probably reasonable in the 1970s when technology was in its early, nascent stages; today, however, is a completely different situation with a level of complexity that necessitates reliance on IT systems to remove the waste of manual processes,” says blogger Fred Thomas in his post, [“The Lean Manufacturing Makeover.”](#)

In a recent *Computer Weekly* article, [“Business applications, data analytics can make business lean,”](#) author Stephen Pritchard says, “One of the objections raised by lean practitioners is that centralized back office and business applications—such as ERP and customer relationship management (CRM)—often impose rigid business processes on the organization.” Such impositions can deviate from the lean process flow, creating friction between the two camps.

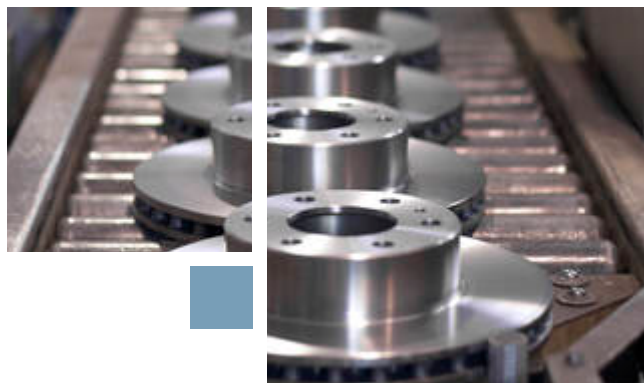
“You have lean purists who think that enterprise resource planning (ERP) gets in the way of business improvement,” says Mark Edwards, manufacturing expert at [business consultancy, KPMG](#). He adds that lean programs and ERP solutions may follow different routes, but the goal is the same: continuous improvement. “People have started to realize that there can be a virtuous circle. ERP brings in common nomenclatures and data standards, so you have a fact base to apply lean thinking to.”

[A Manufacturing Business Technology article,](#)

“Beyond Lean: Adding intelligence to unlock the power of smart pull,” addresses the new demands placed on manufacturers today and suggests that lean processes—along with modern data management capabilities—can provide organizations with the insights they need to thrive.

“The world of technology and manufacturing has changed so drastically, we find ourselves scrambling to keep up,” says the author, adding, “A fourth Industrial Revolution is upon us, characterized by ‘smart devices’...that can actually communicate ‘device to device’ and autonomously manage manufacturing operations and distribution.”

Smart devices create smart production lines, changing the role of lean mandates. Today the manufacturer must, above all, be able to connect customer needs with a company’s ability to deliver a product—on demand. Multiple tactics and tools are required to make on demand manufacturing feasible—and profitable—from product configuration solutions to component subassemblies, co-manufacturing partnerships, and late-stage assembly strategies. Modern ERP solutions bring these tactics and tools together into one streamlined process flow. Today, the highly flexible ERP system acts as the central nervous system, connecting process flows and making a lean philosophy attainable.



Updating lean concepts to match current business drivers

To remain relevant, a business philosophy can't operate in a vacuum. Manufacturers, technology, and the manufacturing workforce have all evolved. It seems logical that lean principles, too, must evolve.

Data management is one of the key aspects that requires a fresh perspective. Since many of the early books and how-to guides on lean concepts were written, Big Data technology has dramatically transformed reporting and analytics. Now, data can be used to predict market demands, rather than just report on historical transaction trends. Reporting tools are also easier to use, bringing KPI tracking to users throughout the organization. Users no longer need the help of the IT team to simply obtain a performance report. This ease of use brings a new challenge, though: Over reporting and data deluge. Here is where the lean guidelines for "keeping processes simple" can help managers control the temptation to over-analyze.

Just-in-time inventory concepts, part of the lean philosophy, also need a refresher. Expectations over delivery dates have escalated greatly. In 1990, a six-month delivery wait may have been tolerated; today, in some industries, six days or six hours may be too slow. Just as expectations have drastically changed, capabilities and best practices have kept pace. Raw materials can be shipped faster, received sooner, and put into the production value chain with remarkable speed, reducing even further the need to inventory raw materials. Even an extended, global supply chain can respond with great agility. This doesn't mean lean principles can be ignored by warehouse managers. On the contrary, it is more important than ever to manage the complexity, minimize steps, and optimize resources.

Shop floor scheduling is the next area that requires a new chapter in the lean manual. Early lean consultants didn't address technologies, such as 3D printing, smart sensors, and the Internet of Things (IOT), for one important reason: These concepts were little more than visions and prototypes when the Toyota Production System drifted to Western shores. Can manufacturers reconcile disruptive innovations and lean efficiency? How can a manufacturer balance innovation, which brings some natural waste as ideas are tried and discarded, with the lean mandate to minimize waste? On the surface, the two precepts seem incompatible.

"Times have changed. And, in order to remain an agile manufacturer, Lean methodologies must adapt and change too," says lean advocating blog, [The Manufacturing Transformation](#). "Otherwise, organizations will remain stuck in the 1950s while the competition soars into 21st century manufacturing."

Manufacturers must strive to overcome this fallacy that branching into uncharted territories to develop new products is wasteful, and against lean philosophies. Innovation can't be curtailed, as it brings the next generation breakthroughs that will continue to inspire growth and investment. Disruptive technology brings some degree of "waste" as new systems and workflows continue to be refined, until best practices are reached. Manufacturers are still on the upward slope of the learning curve, as they work to establish new best practices for on demand scheduling and "printing" needed components, rather than manufacturing them. Lean concepts can be used to guide the workflows and keep waste in check, without totally restricting some tolerance for the trial and error and experimentation that come with any new approach.

Bringing lean concepts to a new generation

A look back at lean's history's and lean's future comes at an opportune time, as many of the early adopters of lean transformation projects are reaching retirement age. Thousands of Baby Boomers reach retirement age every day, leaving gaps in the workforce that are hard to fill. These retirees likely include the managers and their production crews who sat through the eye-opening training sessions in the 1980s as words like *kaizen* and *kanban* still sounded so strange.

Now, a new generation of manufacturing personnel is being introduced to the lean vocabulary and striving to put the lean concepts in context for their jobs, their roles, and their priorities. This isn't always easy, but it's certainly necessary.

The article, "[It's Time for a Lean Manufacturing Makeover](#)" sums up the issues up well, saying, "Lean manufacturing is still a very relevant business practice. But, like everything else in manufacturing, the process must progress to keep pace with the organizational shifts happening all around it. Perhaps that means new conversations will have to take place between CIOs and manufacturing executives. Or, that traditionally accepted best manufacturing practices have to get better. Either way, Lean is not going away, it's just in a new phase of innovation and transformation."

The lean manufacturing philosophy is so import, so entrenched in manufacturing today that it isn't going away completely. It's time to polish up some of the lean concepts and recognize that they are still relevant, and still valuable to manufacturing.



1. Lean Enterprise Institute: "A Brief History of Lean"

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