

The Thought Leader Interview: Jeffrey Liker by Jeffrey Rothfeder

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Photograph by Dean Van Dis

Jeffrey Liker: The Thought Leader Interview

The lean process expert explains why it's so hard to emulate Toyota.

by Jeffrey Rothfeder

It is now generally accepted that the principles of lean production and management are far more effective, in the long run, than most other forms of management. And it is also well known how difficult it is to adopt them. The company that was the original model for lean production, also often considered the most cost-effective and successful company in the world, is the Toyota Motor Corporation. Many writers have attempted to decode the key to lean success in general and Toyota's success in particular. The question they are trying to answer is always the same: How can other companies achieve similar results, without having to duplicate Toyota's 60-year-long history of intensive trial-and-error experiments and observation?

There are few Westerners more devoted to answering this question than Jeffrey Liker, a professor of industrial and operations engineering at the University of Michigan. He is the author of *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer* (McGraw-Hill, 2003), perhaps the most widely read and frequently quoted guidebook to the philosophies, principles, and strate-

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gies that drive Toyota's unrelenting quest to streamline and continuously improve its manufacturing systems. Liker is hardly alone, of course, as a Western expert on this company's production system. His fellow writers on Toyota include lean theorists James Womack and Daniel Jones; Portland State University Professor H. Thomas Johnson; innovation writer Matthew May; and Booz & Company automotive experts William Johnson, Michael Pfitzmann, Kevin Dehoff, John Loehr, and Conrad Winkler. But Liker's perspective is uniquely focused on the underlying philosophies of the "Toyota way" and the gap between the Toyota production system and the prevailing system of management at other companies. Liker is used to having his advice sought and his prescriptions ignored, and this has given him a valuable perspective not just on the Toyota production system but also on the way that management ideas take hold.

Like many people engaged in a life calling (as he now sees his study of Toyota), Liker came to the work somewhat unexpectedly. When he arrived at the University of Michigan as an assistant professor in

1982, Liker wasn't certain what course his academic career would take, but, as he explains it, the American auto industry's interest in understanding the Japanese was beginning to emerge. "The Americans were starting to realize that there was something real in Japan. It wasn't simply manipulation of the yen or labor cost differences. Something different and remarkable was going on."

Almost immediately, Liker became part of a study at the University of Michigan, headed by auto expert David Cole and Japan expert Robert Cole, designed to compare the U.S. and Japanese auto industries from the operational and cultural points of view. Funded by U.S. and Japanese auto manufacturers and parts suppliers, this represented one of the first Western efforts to unravel the secrets behind the Japanese success story. Liker was asked to examine buyer-supplier relations and product development. He researched Toyota, Mazda, and Nissan, and the suppliers of those companies. On the heels of that effort, Liker became codirector (later director) of the University of Michigan branch of a program sponsored by the United States Air

Force and the Office of Scientific Research that sent technically oriented students to Japan to work within the country's manufacturing enterprises and gain insights about their practices.

As Liker immersed himself in the ways of Japanese companies and particularly in the inner workings of Toyota, one thing became eminently clear to him. "Toyota was special in nearly every important measure," he recalls. "We did a study of ergonomics, and Toyota was ahead of everybody else in having unique tools for ergonomics. We studied product development; Toyota was faster than other companies, and it had a more defined system for working with its suppliers. We looked at the transfer of its plants to the U.S., and Toyota was much more thoughtful about how it established its culture here."

Liker's latest book is an effort to explain how one company can gain competitive advantage in all these arenas at once. His approach can be boiled down to a phrase: slowly, deliberately, holistically, and through the development of its people. The book is titled *Toyota Culture: The Heart and Soul of the Toyota Way* (McGraw-Hill, 2007).

Coauthored with Michael Hoseus, a former Toyota manufacturing and human resources director, it examines the “human systems” at the automaker. Specifically, it analyzes how Toyota selects, develops, motivates, trains, and empowers its employees. Now an acknowledged expert on lean systems, Liker has worked to implement these techniques at such organizations as Hertz, Caterpillar, Johnson Controls, Harley-Davidson, and the United States Navy — admittedly with mixed results. “Lean is a difficult journey, and most companies simply are not made with the right mettle to complete it,” he notes.

During an in-depth conversation at a corporate manufacturing summit sponsored by *strategy+business* in Chicago last autumn, Liker discussed his evolution as a chronicler of lean production, why Western companies still struggle to implement lean principles, and the reasons for his concerns that apparent signs of progress may be illusory for many companies.

S+B: If Toyota didn't exist, which company would you have picked to learn manufacturing lessons from?

LIKER: I don't really know. I feel like before I discovered Toyota I was kind of lost. I was interested in socio-technical systems theory [a concept that proposes jointly optimizing social and technical systems to achieve high performance]. I was thinking and talking about things like self-directed teams and learning organizations, and all those con-

cepts were present at Toyota. In other companies, there would be an experiment in socio-technical systems, and it would have success for a certain period of time before it would fall apart. So either you become an eternal optimist and say, “Somehow or somewhere, this is going to work” or you start to get more jaded, thinking that the concept is just not realistic.

Toyota gave me optimism. And as I got closer to the company I decided that I could, indeed, learn a lot from a really exceptional company that illustrates so many different ideas that I was attracted to, particularly those involving lean manufacturing: reducing lead time by eliminating waste, dealing with suppliers in a revolutionary way, practicing efficient planning and problem solving. And I was partial to the value that Toyota has gained from long-term thinking and the way its overall philosophy guides its strategies for the company. There were so many pieces of the puzzle that all fit together in Toyota's case.

The Perils of Leapfrogging

S+B: It's not unusual now to find many companies in the West adopting lean techniques — or at least giving lip service to them. But in the 1980s, lean manufacturing was far less widely known. Can you describe the contrast between Toyota and the Western manufacturers that you have worked with on lean management?

LIKER: In the mid-1990s, I got involved in helping Ford Motor Company develop the Ford production system, which was largely based on the Toyota production system. Ford wanted to know everything that it could possibly know about Toyota. And that was a great opportunity, because a lot of the fundamental ideas for the Toyota production system came from Henry Ford's original production system — his writings and philosophies as well as Toyota's visits to Ford back in the 1930s and '40s. So this was kind of bringing things full circle.

It would have been a good idea if Ford had stuck to its goal of learning from Toyota, but instead a management consulting firm convinced Ford's executives that the company needed to leapfrog Toyota. The pitch was, “If we simply copy Toyota, we can only be as good as Toyota, but we're trying to compete with and be better than Toyota.”

S+B: That sounds reasonable, though. Some would call it proactive.

LIKER: Yes, but it made it easy for Ford to overlook some of the thinking and design that had led to the success it was trying to emulate.

One example of how this played out was in the painting process. For any automaker, almost every car that comes “out of paint,” as they call it, is defective and has to be reworked; usually there's a separate process after paint for repairing the paint and buffing out the defects. In Toyota's case, it keeps a

relatively small overstock of maybe 30 or 40 cars of all paint colors. The cars that come out of paint with no defects can be moved down the assembly process into final assembly while the others can go into final assembly subsequently, after paint repair. And the overstocked cars can be used to pick up the slack if a car of a certain color is needed immediately. So as the cars go down the assembly line, Toyota can send a signal to its suppliers saying, “We’ve got this red car, and it’s going to have these options and this kind of seat. Seat supplier, please make us this seat set and send the seats in this sequence.” The seat supplier then has three hours to build the seats for that car and deliver them to the assembly line.

Ford’s view was that it is not realistic for suppliers to build and ship something in three hours; they need more planning time. So its idea, to go beyond what Toyota did, was to lock in assembly sequencing for 10 days and then be able to tell its suppliers, “Next Tuesday, we’ll need these types of seats or dashboards exactly in this sequence.” To do this, however, Ford needed a much bigger cushion of extra cars and a larger warehouse with auto-

mated storage and retrieval to hold that inventory.

When Ford finally implemented this system — after taking two years to build the warehouses — the inefficiency was obvious, as was the sheer impossibility of sequencing assembly for more than a week in advance. For example, I walked the line at a few of Ford’s assembly plants and saw a huge bin with several hundred carpets. Inquiring about this, I was told, “Oh, those are the carpets that were out of sequence. When a carpet comes in, if it’s not the right one for the car, we throw it in that bin.”

“Why does that happen?”

“Lots of reasons: We planned on building this car, but the sequence got interrupted because we were missing a part or the car was defective. And then we had to replace that car with other cars with different specifications to keep up with our assembly plan.”

Simply put, a car may be scheduled today for completion next Friday, seven days from now. Ford is predicting and assuming that it knows what’s going to happen next Friday, and then when circumstances do not cooperate, the carpets — and who knows

how many other parts — simply get tossed aside.

S+B: Having seen the problem, why couldn’t Ford just change its approach?

LIKER: Because it was already locked in with its investments, and more importantly, locked in with its way of thinking.

Most of the companies I’ve seen, in Detroit and elsewhere, have an approach based on a deterministic paradigm: They want to control every phase of their future. But the Toyota approach was an adaptive, dynamic paradigm, which could be summed up as, “We don’t know what’s going to happen more than three hours from now, but we feel pretty comfortable that we know what will happen within that period. We have enough discipline in our system that we know in three hours this specific car is going to be done, and we’re going to need this seat.”

A Western “expert” is capable of believing that if you get enough people in a room with some knowledge of the Toyota production system and they just use their imaginations, they’re going to come up with something better than what

“Lean management takes a consistent leadership philosophy, one that doesn’t change even as the top leadership changes.”

Toyota has designed and refined over six decades. But that just isn’t accurate. The Toyota way is ingrained in its people’s attitudes; they are not just trained, but habituated to tackle problems through observation and experimentation. They know how to grasp the current situation, come up with a vision, and plot a step-by-step course to that vision, recognizing the need for adjustment along the way. The Toyota system, in other words, is a mind-set rooted in practicality and realism.

Maturity and Equity

S+B: In the last few years, though, more companies have been trying to take on the adaptive mind-set. In your books, you talk about the complex, diligent, painstaking steps required to implement a Toyota-like system — and you’ve introduced those steps in a number of organizations. How well are these companies doing in catching up to Toyota?

LIKER: That’s not easy to determine for any company in a short period of time, even in a couple of years. Because it takes many years of continuous effort to create a lean organization, it also takes a long time to be certain that lean manufacturing

as a concept has really gotten into the company’s DNA.

Many companies that have started on the lean journey recently have done very well. But my skepticism arises when you compare them to Toyota. And it’s really partly a question of maturity and stages. I’ve been to at least 20 companies in 2007 where the leaders say the same thing: “We began a lean project and we got incredible returns, like a 90 percent reduction in inventory. We reduced overall costs by 20 percent, and we doubled productivity.” Those sorts of stories, I find, are very common.

And it’s a real wake-up call, because part of the implication of improving from point A to point B is you realize how bad point A was: how bad things were for much of the history of the company and how rapidly they have moved forward. So people begin to ask themselves, How could we have let that happen for 40 years — and then turned it around so suddenly?

The next logical step would be for company executives to ask, What else are we missing? What else should we improve? At that point, I don’t think it’s appropriate to ask the question, Have they gotten to

Toyota’s level? Toyota has been at this for 60 years. And these companies may have been at it for five years. The more interesting question is, Are they on a path of continued progress? Or are they in danger of falling backward or giving up altogether?

And in many cases, they *are* in danger. For example, a company called Wiremold [a maker of racks and duct strips to protect cabling] was, a half dozen years ago, held up extensively as a lean exemplar. There is a book by Bob Emiliani, *Better Thinking, Better Results* (Center for Lean Business Management, 2003), that details how Wiremold started implementing lean on the shop floor, eventually bringing it all the way to the enterprise level, the supply chain, and even information technology. What he describes happened over about a 10-year period. It completely transformed this company to a high level of excellence, higher than many people would have ever expected. The Wiremold executives who led this effort were Americans who had been to Japan, learned from Toyota, and gotten passionate about lean. Before long, Wiremold was buying other companies, turning them around, convert-

“To Toyota, a breakthrough is: ‘Let’s take half the cost out of assembling an engine and let’s design it in half the time.’”

ing them to lean, and transforming them from money losers to profitable enterprises.

After the first edition of the book was published, Wiremold did so well that it was bought by a French conglomerate, Legrand, which proceeded to get rid of all the existing managers and bring in its own people. The managers who were let go were the lean leaders who had brought the company to that point. The new managers didn’t have any real understanding of lean. As a result, Legrand basically destroyed much of what had been built up. It took only a couple of years. And now, you’ll find that Wiremold is trying to reinvigorate the lean effort, because its performance has suffered. But it’s unlikely that this will be accomplished.

Wiremold originally was a private, family-owned company. The company might still be an exemplar if the ownership group had somehow maintained the equity arrangement in such a way that the family didn’t give up complete control or lose all the top managers. That could have been the result if the owners had valued the company enough to say, “We’re going to be very picky about who we sell this to.

And when we sell it, there are going to have to be certain agreements.” But that didn’t happen. One advantage of Toyota being in Japan is that it’s much more natural there to keep equity ownership within a small family of the *keiretsu* [a group of affiliated companies].

S+B: Is Wiremold’s story typical? In maintaining a lean system for many years instead of just a few, what difference does the financial structure of a company make?

LIKER: The one constant in lean management is that it takes a consistent leadership philosophy, one that doesn’t change even as the top leadership changes, for long-term success. And a consistent leadership philosophy is the hardest thing to ensure in companies that turn over as frequently as Western companies do and that have such a short-term orientation toward their returns.

Thus, there are people in the lean world who are calling for different models of equity ownership. The most common models — build a company and then, once it’s successful, take it public or sell it to a private equity owner who’s interested in flipping it relatively quickly — are anathema to developing lean

systems. In a company benefiting from lean systems, one thing management can do, although it may be difficult, is refuse to capitulate, and instead make a strong business case to private equity owners that actually shows the value of maintaining the management philosophy and growing leaders from within who are able to do this.

Really big companies such as Boeing, which are publicly traded but have a senior leadership with a lot of power, don’t have to think short term because they have orders for the next 10 or 15 years. Those kinds of companies can sometimes maintain the lean philosophy pretty consistently. Boeing is not perfect and has had its ups and downs, but it has always come out of tough times still supporting the lean philosophy and continuing to work at it.

Boeing’s not in danger of being bought out. They’re just too big. As a result, they’ve been able to be pretty persistent about lean for many years. So has Alcoa. Former CEO [and former U.S. Treasury Secretary] Paul O’Neill helped to lead the charge for lean at Alcoa, and it has continued there without him. The Alcoa business system has to a large degree become its

management philosophy.

One can compare Alcoa, Boeing, or other companies that have had long-term success to Toyota, and that represents a really high standard. But I can also tell you that when these companies run into short-term financial difficulties, they often abandon their own lean principles — and end up going backward. Managers at these companies have described it this way: “For a while, it was great and everything was lean and ‘do the right thing’ and ‘reduce lead time’ and ‘work with the people.’ And then something bad happened and suddenly everything became, ‘What’s the bottom line?’ and ‘What’s the short-term payback of this lean project?’” So, even in the best of the Western companies, you see a lot more variation over time and a lot more “stutter starts” compared to the amount of variation you see at Toyota.

The Essential Lesson

S+B: Why do so many companies find it so difficult?

LIKER: Their leaders are unable or unwilling to grasp one essential lesson: that they should first under-

stand the Toyota principles, and then build their own capabilities using these principles. And they must be willing to do it slowly, step by step. Take the case of *kanban* [the system of visual signals that Toyota uses to notify suppliers in a just-in-time arrangement that a part is needed]. An argument can be made that part of the learning curve is to develop the discipline to use a manual *kanban* [with simple cards and markers] effectively before you go to an electronic *kanban*, as Toyota did. This creates the discipline in the company culture to order parts as they are needed, and not in potentially erroneous anticipation of future demand. After Toyota had achieved this cultural transformation, it evolved to a more efficient electronic *kanban*.

But many Western companies prefer to skip over the learning curve by buying the software for an electronic *kanban* without first going through the manual process. Companies want to imitate solutions instead of developing the culture and building their own learning capabilities to ensure that the solution succeeds.

S+B: How does Toyota view its competition? Is it motivated by what other companies are doing?

LIKER: Toyota is always concerned that one of its competitors might have a breakthrough that it hasn’t thought of, a game-changing technology. But it’s not so concerned that it would change its internal emphasis on continuous improvement. Toyota’s view is that it has certain projects with which it is trying to move the company far ahead, but most of the company is trying to improve incrementally.

Toyota wants the people in

paint to be improving the paint process and the people in welding to be improving the welding process. In the meantime, at headquarters in Japan, the company will be working on the larger breakthroughs. To Toyota, a breakthrough means: “Let’s take half the cost out of assembling an engine and let’s design it in half the time.”

S+B: You’ve described Toyota as a learning organization. What does that mean, and what does it take to become one?

LIKER: When a learning organization takes a leap forward — for example, when it makes a breakthrough internally or with a new product — its people then slow down to see what they can gain in understanding from what they’ve just done. The only companies that are going to be able to learn in that way are those with an organizational structure that stresses a continuity of leadership, because each generation must carry forward what the prior generation has already learned.

Toyota highly values its brain trust, the people who have learned the Toyota way and understand it very deeply. The company considers the brain trust to be its competitive weapon. But lately there have been disturbing signs that Toyota is growing faster than it can develop that brain trust. And the brain trust is being stripped by companies who hire away its people. For example, Jim Press, the head of Toyota North America, was named the vice chairman and copresident of Chrysler in September of 2007. Losing the brain trust is probably the biggest threat to Toyota’s continued success.

But there’s also a part of the Toyota culture that is very optimistic, that says whatever the

constraints are, whatever the challenges, they can be solved. In *Toyota Culture*, my coauthor, Mike Hoseus, who worked for Toyota for about 20 years, describes being very frustrated after developing a group leader who left for another auto company. Mike said to his Japanese *sensei* [his project leader and teacher], “This seems hopeless. Every time I develop somebody really good, they leave.” The *sensei* replied, “Mike-san, don’t think of it that way. That person is now better because of what you taught him, and that person is going to do good work out in the world. We have to think about our own plant; you have to think about the next person you’re going to develop.”

Mike was also told to “think about solving the problem at hand. If the problem is retention of people, we have to ask, ‘What can we do to retain our people?’” The problem-solving mentality is very keen within Toyota. If people are leaving, the solution is not to give up. It is to understand the root cause and do more to eradicate it.

In Toyota’s view, you don’t have a problem without a standard. Someone might tell his or her boss, “We’re not meeting our delivery

date” or “Our meetings are not happening on time.” And the boss would say, “What is the standard? What would be acceptable lateness?” or “Why is lateness a problem? What is the result of lateness?” As long as the standards are clear, the organization can focus on continuous improvement and ultimately raise those standards. A company that wants to learn from Toyota has to learn an equally robust type of problem solving. It’s hard to imagine a company thriving that doesn’t have a good problem-solving process.

S+B: How is Toyota’s investment in people reflected throughout the organization — not just in its leadership?

LIKER: Toyota has what we call in *Toyota Culture* a “people value stream.” It starts with selecting and attracting the right people. Within the value stream, a new employee’s first responsibility is to learn the basics of the job. A lot of fundamental skills are required to do any job in Toyota. After these basic skills are mastered, the employee should start to improve on the practices that he or she learned and on the work that he or she does. In this second

stage, which could be called “engagement,” employees are actually engaged in improvement. The final step is what we call “inspire”: Employees become committed to their jobs and identify themselves in this way: “I’m part of Toyota, and I’m going to accomplish my personal goals through this company.”

All of this — not just the people investments but the deep cultural organizational change required to implement lean systems — is a tall order for many Western companies. But nobody said that transformation would be easy. The demands for excellence, streamlining, and lean processes are uncompromising. They are not just business demands; they are also cultural and social. When you think about it, perhaps the most daunting part of implementing this system is that even at Toyota, the originator of lean production, it has been difficult work. +

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