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A Critical Eye

Looking carefully at lean and the Toyota Production System

By John P. Collins, CFPIM, CSCP, and Eric P. Jack, Ph.D., CFPIM, CSCP

Toyota's recent quality problems have caused some angst over the effectiveness of the Toyota Production System (TPS) and lean manufacturing principles in general. With this in mind, we challenge you to think critically about the following five questions.

1. Did inherent tradeoffs associated with manufacturing systems cause Toyota to hit a barrier? Many manufacturing experts have argued that manufacturers must make inherent operational tradeoffs on four key dimensions of customer value: quality, cost, delivery/dependability, and flexibility. Operational systems cannot excel simultaneously on all dimensions, and sustained competitive advantage depends on a differentiated strategy supported by an appropriate operational strategy.

Still, others have used the Sand Cone model to suggest otherwise. The model suggests that, although it is possible to trade off capabilities in the short term, there actually is a hierarchy among capabilities. Thus, one can compete successfully on all of these dimensions if tradeoffs are operationalized and implemented in a hierarchical order beginning with quality, dependability, speed, and cost.

Could it be that, in its quest to become a global leader in the automotive industry, Toyota finally has stalled out?

2. Did Toyota grow too big, too fast? And is the TPS proving to be impossible to scale globally? Data show that Toyota now operates numerous manufacturing plants with some 300,000 employees across 150 countries. Are we now witnessing growing pains inherent in the desire to replicate TPS? To be effective, such global operations require not only the transfer of technology and processes, but also a change in culture—and this often is difficult to establish and sustain. The evidence from the number of recalls that auto manufacturers (not just Toyota) have made over the past 10 years is overwhelming. Could it be that Toyota has met the invisible manufacturing scalability frontier that other manufacturers such as General Motors and Ford discovered in past years?

3. As Toyota shortened its product development cycle—while simultaneously facilitating an effort toward mass customization—did the risks become too great?

Consider the variety and complexity of Toyota's product offering. Leading-edge and complex vehicles—particularly the Prius and Lexus hybrids—expose Toyota to many pitfalls. Is it possible that these components were brought to market too quickly?

It is difficult to determine the root cause of these failures. For example, in Toyota cars with electronic (ETCS-i) acceleration systems, the engine's throttle is controlled by sensors that detect how far the mechanical gas pedal is depressed. These electronic signals then are transmitted to a computer module that controls how much the throttle opens. Given the variety of electronic components installed in these new vehicles, there is some suspicion that electromagnetic interference may be a contributing factor.

There also is some evidence that the mechanical design flaw may be caused by the wearing of a plastic and metal part used to give the driver normal feedback, similar to that from the old gas pedals. However, because these new pedals now rely on electronics and embedded software, it is much more challenging to identify problem spots. Data show that Toyota has shortened its product development cycle time (for example, only 22 months were required to bring the Toyota Tundra truck to market, compared to 30 to 40 months for similar vehicles 10 years ago). The risks inherent in such an aggressive product development strategy should make us all appreciate the importance of proper development, design, and testing.

4. What risks do we take by being lean? The TPS relies on lean manufacturing to efficiently deploy standard parts in a variety of vehicles. As part of this process, Toyota relies on fewer suppliers to reliably make and deliver these parts Just-in-Time and Just-in-Sequence to their manufacturing plants across the globe. For example, in the case of the gas pedal, the failing part is manufactured by North American supplier CTS Corporation of Elkhart, Indiana; while similar parts produced by Toyota's traditional supplier Denso do not appear to have the same problem. Here, again, we can appreciate the complexity of numerous suppliers delivering increasingly complex components to plants around the world. While there may be several contributing factors, if the root cause of the unexpected accelerations turns out to be a quality conformance problem (rather than a design specification issue), then, at the very least, it exposes the risks inherent in these aspects of lean manufacturing.

5. Are these incidents simply symptoms of Toyota leaders' failure to remain focused on what is important—serving the customer with great products at reasonable prices? Instead, did Toyota fall victim to managers who focus on being lean rather than being better? As many lean practitioners know, lean is a tool we use to improve. However, too often, true improvement is forgotten in a company's quest to be leaner. It's sort of like a rain dance: What was started as an effort to cause rain somehow morphed into a contest to see which dancer had the best costume, used the best moves, and chanted the best chants. The fact that it never rained was ignored. We hope that it is not too late for Toyota to regain its footing. Take the time to ask the following questions so that you may learn from these teachings.

- What is your company's core competency, and what operational tradeoffs are you making to achieve it? Are these tradeoffs potentially exposing your company in ways that might lead to unintended results?
- What realistic challenges do you have as you scale operations globally? Are cultural issues distorting your company's strategic vision?
- What risks are you accepting as you shorten the product development cycle in order to facilitate mass customization?
- What risks are you taking by employing lean manufacturing approaches that rely heavily on standard parts (across multiple product lines) from a limited number of suppliers?
- Are you using lean manufacturing practices to make better products, or are you simply using lean principles to reduce cost?

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