

## Preamble: Lean and New Product Development

“Lean production” was introduced in *The Machine that Changed the World*<sup>1</sup> as the next paradigm of modern manufacturing. Modeled after the Toyota Production System it has indeed become commonly accepted as the right way to satisfy customers through building in quality and delivering with short lead times. Often missed in that same book was the chapter on new product development. There is a widespread movement to take the lessons from lean manufacturing and apply them to “lean out” product development. But is that the right approach?

We have been comparing product development in the U.S. and Japanese auto industries for almost thirty years and derived principles that parallel, but are not exactly the same as, lean manufacturing principles. In fact no Japanese company tried to superimpose their manufacturing methods on product development. Our thirteen principles in *The Toyota Product Development System*<sup>2</sup> are organized into three buckets—processes, people, and tools. We argue that top Japanese automakers were able to out engineer American companies for decades because they effectively integrated this three-legged stool as a system of engineering excellence.

We have worked with dozens of companies on introducing lean product development and in every case the first question is: How do you apply a the lean manufacturing methodology to a highly variable knowledge work process? Our simple answer is: “You don’t. In fact you should not apply a manufacturing methodology to other manufacturing processes.” At the root of this discussion is confusion about the definition of lean.

If lean is a specific set of tools for reducing lead time and driving out inventory like production leveling, one-piece flow cells, and kanban for replenishing materials it is natural to try to transpose each method one for one to product development. This is a serious mistake. In Toyota each of these methods is a solution to a particular problem and the solution is always tailored to the specific question. The starting point is never to “implement kanban throughout the enterprise.” The starting point is to ask: “What is the problem?” The problem will fall into one or more of the following areas: quality, cost, lead time, safety and morale. The goal in lean product development may be “to consistently hit the market before our competitors with new technology that solves customer problems at a competitive cost.” Or it could be to “deliver innovative solutions to customers in one-third the time of any of our competitors.”

Once you know why you want to improve you can focus on the way to improve. Our principles suggest that any serious improvement will involve eliminating waste from processes by engaging people in creative problem solving using tools that make problems visible—the three-legged stool. When you think of

<sup>1</sup> Womack, James, Daniel Jones, and Daniel Roos, *The Machine that Changed the World*, N.Y.: Free Press, 2007.

<sup>2</sup> Morgan, James and Jeffrey Liker, *The Toyota Product Development System*, N.Y.: Productivity Press, 2006.

lean product development in this way the answer to how lean applies to product development becomes obvious. In new product development we always want to set aggressive goals and achieve them with short lead times, efficiently, and with the highest possible quality to satisfy our customers. The focus of how to do this shifts from implementing manufacturing methods, like kanban, to engaging the right people at the right time in the right way.

People engagement is the missing ingredient in most companies trying to “implement” lean production. It is even more critical in engineering where a “process” actually resides within a person or team of people. The thing we are acting on is knowledge. We want to transform what we do not know into something we do know that solves the problem. The biggest barrier to this is that the best solutions generally involve knowledge scattered across different departments in the enterprise.

If we think of a manufacturing plant as a bunch of different processes like machining, molding, and assembly the lean problem is that these were treated like process islands and there was poor flow across value streams that deliver to customers. The analogous process islands in product development are purchasing, product design, engineering analysis, tooling, machine design, manufacturing and the problem is poor flow across value streams that are supposed to deliver to customers.

There are some common elements to solutions in lean product development. The right cross-functional experts need to get together and visualize the total project identifying problems in real time and solving them one by one. The obeya, or big room, is a key enabler of that and creates something analogous to flow in a manufacturing cell. We need deep functional knowledge integrated by strong leaders with a technical vision and exceptional leadership skills. We need to pull problems up front in the process and solve them as early as possible when there are still sets of alternatives available.

These methods are all well described in the book you have before you. Andreas Romberg and his associates at Staufen have dedicated an unusual amount of their practice to lean product development and his book brings the general concepts to life through actual case examples. As in anything important in life there is an art that goes beyond the rote technical details and they have been learning the art of transforming product development organizations. The only way you can learn the art is through practice, but good books like this give you a conceptual foundation for your practice. As the book explains lean is truly a cultural transformation of your system of engineering products and should be treated as such, and not reduced to implementing a few tools. Your products are your life blood and engineering is how you get the most value-added products possible to your customer. Investing in lean product development is an investment in your future competitiveness and prosperity.

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