**LEAN MANUFACTURING AND OPERATIONS MANAGEMENT**

You’re washing dishes when your ring — a wedding ring, a class ring, whatever — slips off your finger and falls into the murky dishwater. You could fumble around amongst the dishes while blindly searching for the ring. Or you could twist the drain knob to safely drain the water, knowing your ring is too large to slip through the grate at the bottom of the sink. With the water gone, the ring will be right there, easily found. Seems obvious, right? Well, in manufacturing, this has become obvious to more and more companies, evolving into what we call the philosophy of lean.

Like draining the water so you can find your ring, lean **is the process of making obvious what adds value by reducing everything else**. Lean methodology is transforming companies and organizations in services, manufacturing, government and healthcare. Let’s take a look at just one example of the latter.

**IMPROVING PATIENT FLOW BY REDUCING WASTE**

The John Hopkins Outpatient Center, the Otolaryngology-Head and Neck center had problems. Registration lines were long, waiting rooms were crowded, and it was becoming increasingly difficult to start appointments on time. Something had to be done to improve service to the center’s clients while reducing waste and therefore cost. The methodology chosen to address the center’s issues was lean.

The center’s processes were mapped, while the team chosen to address clinic’s problems used a variety of different tools to identify waste. They then implemented a series of process changes to reduce that waste. For example, staffing patterns for the front desk were changed to better align with patient flow, reducing lines. Ultimately, applying lean methodology to waste reduction in the clinic produced a 44 percent increase on-time appointment commencements.

**TPS AND THE ROOTS OF LEAN**

The roots of Lean can be traced back to the automobile manufacturer Toyota. The United States first became aware of the Toyota Production System, or TPS, in the 1970s. TPS is a manufacturing system whose philosophy centers on the complete elimination of all waste in all aspects of production. The most efficient methods are pursued in all areas of the company’s activities.

TPS was established based on two concepts: Jidoka and Just-in-Time (JIT).

* Loosely translated, Jidoka means "automation with a human touch." When a problem occurs, personnel and equipment stop immediately. This prevents defective products from moving through the production process and results in a higher quality of output. This philosophy is one of the reasons that Japanese automobiles competed so well against lower-quality domestic automobiles in the United States during the 1970s and 1980s. Japanese imports developed a reputation for better quality and thus fewer maintenance issues, making them a more appealing consumer choice.
* Just-in-Time (JIT) is a philosophy of waste elimination. It is based on making and supplying “only what is needed, when it is needed, and in the amount needed.” Each process produces only what is required by the next process in a continuous flow, with (ideally) no shortages, no overages, and very little ongoing materials inventory.

**THE 3 OPERATING ELEMENTS OF JIT**

JIT is comprised of 3 operating elements: the pull system, takttime, and continuous flow. Another concept, Kanban, plays a key role across all three elements.

“Kanban” is the Japanese word for “sign” or “card.” Kanban is something that sends a pull signal— a notice to personnel operating in a JIT environment that it is time to produce or replenish something — and consists of a card, container, or a simple square marked with tape. An empty kanban from a downstream station signals the worker to produce. If the kanban is not empty, the operator does not act (because, in a JIT system, it is not time to replenish that item).

In this system, production is pulled by downstream stations and eventually by customers. Takt is the German word for “drumbeat.” The rate or pace of JIT production is timed to the pace, or takt, of customer demand.

**LEAN THINKING AND THE “VALUE STREAM”**

"Lean" was coined by authors James P. Womack and Daniel T. Jones in 1996. Their book, Lean Thinking, explains that central to lean as a methodology is the concept of the value stream. A value stream comprises all those activities and actions required to bring a product from concept to launch and from order to delivery. This includes actions to process information and to transform the product from raw inputs to finished goods.

**WOMACK AND JONES’ 5-STEP LEAN THINKING TRANSFORMATION**

Adopting the lean methodology requires that business leaders change their thinking. Womack and Jones, in Lean Thinking, propose a five-step thought process to guide managers through this transformation. They recommend that business leaders do the following:

1. **Specify value** from the standpoint of the end customer by product family.
2. **Map the value stream**. This means identifying all the steps in the value stream for each product family and eliminating, whenever possible, those steps that do not create value.
3. **Create flow** by arranging the value-creating steps in tight sequence. This will help the product to flow smoothly toward the customer.
4. **Establish Pull**. As flow is introduced, let customers pull value from the next upstream activity.
5. **Seek Perfection**. As value is specified, value streams are identified, wasted steps are removed, and flow and pull are introduced. As the cycle repeats, continue refining its until a state of perfection is reached. This is a condition in which perfect value is created without waste.

In TPS/Lean, the primary vehicles used for making improvements are the Kaizen, WorkOut, and Rapid Improvement Event. These are very focused, organized work sessions that include process stakeholders.

These events are well planned in advance. Each event can last from 1 to 5 days, depending on the scope and nature of the problem area or process to be improved.

**MANAGEMENT IMPLICATIONS**

Lean is a proven vehicle for reducing waste and improving flow, whether done as a project or Lean event (such Kaizen and WorkOuts) or as a well-coordinated series of projects in a company-wide deployment.

Lean transformations occur every day in every industry. From manufacturing to healthcare and across every industry in between, eliminating waste makes companies more cost-efficient, more responsive, and more competitive as they provide value to customers. These are critical and innovative methods through which you, as a business leader, can better position yourself and your company to win.