Increasing Productivity with Lean Thinking

More than just a manufacturing process tool, lean thinking is a holistic program designed to transform a company's entire business strategy. Boosting profits and competitiveness by making continuous improvements in production costs, product quality, customer service, and delivery are the goals of the lean model. Companies that apply lean production or management techniques strive to create a culture of waste reduction, ongoing improvement, and worker empowerment.

Origins of the Lean Model

Lean manufacturing was originally developed by Japanese automaker the Toyota Motor Company, building on concepts pioneered by Henry Ford and others who emphasized maximum efficiency in production. The principles of lean thinking that evolved with the Toyota Production System (TPS) were popularized in the West and further developed by business experts in the 1990s. Since then, companies of all kinds have adopted TPS techniques in an effort to emulate Toyota's success in producing the high-quality, reliable cars the market wants, while keeping production costs low.

The lean "one-piece flow" method represents a departure from the traditional "batch and queue" method of mass production, in which large numbers of identical products are manufactured based on assumptions about future market demand. In a batch and queue system, individual functional departments handle different stages of the assembly process. This can lead to inefficiencies when delays occur, as well as to a buildup of excess parts and inventory.

By contrast, a one-piece flow method arranges production so that the different processing steps are conducted in a continuous flow by individual "cells," allowing an operation to produce items that meet customer specifications at the time they are needed. This is also referred to as "pull" production, whereby production is pulled by orders, not pushed by sales targets.

Using *Kaizen* to Improve Workflow

This flexible form of production becomes possible through the application of *kaizen*, or continuous improvement processes. *Kaizen* demands that teams of workers with different functions and at different levels work together to address problems and improve production processes.

The *kaizen* approach encourages teams to get to the bottom of a problem by asking "why" five times. If, for example, the problem is that production was interrupted due to a lack of materials, the group asks why the materials were missing. If the answer to that question is that the shipment did not arrive on time, the team then asks why the shipment was late. If the answer is that the supplier was given the wrong information, the group then asks how that occurred. This process continues until workers are able to identify, and subsequently address, the root causes of breakdowns in the production process.

The Seven Deadly Wastes

A central *kaizen* technique is value stream mapping, which involves drawing up a flowchart of the steps, activities, material flows, communications, and other elements that make up a specific process. Mapping out the process should help the group uncover the elements of a process that do not add value. According to lean theory, the "seven deadly wastes" occur in the following areas:

1. Overproduction
2. Waiting
3. Transportation
4. Inventory
5. Motion
6. Over-processing
7. Defective units

After collecting detailed information about non-value-adding activities and other forms of waste, team members should then consider how improvements could be made. Any action or activity that does not add value should be eliminated or targeted for eventual elimination. If, for example, value stream mapping reveals that goods are being produced ahead of customer orders, resulting in high inventory levels, smaller batch sizes should be considered. If it is discovered that material handlers and workers are making unnecessary trips, this can be corrected by altering the factory layout.

The Five Steps of 5S

To ensure rapid product flow over time, the team should implement a set of steps known as 5S. The five steps of 5S are as follows:

1. **Sort:** Organize the contents of the work area and remove unnecessary items, leaving only the tools and materials needed for daily activity.
2. **Set in order:** Arrange work tools and materials so they can be easily accessed as needed.

3. **Shine:** Keep the workspace clean and orderly, maintain equipment, and strive to prevent mess.
4. **Standardize:** Establish a consistent approach for carrying out tasks and procedures, and create visual controls—such as signs or color codes—and guidelines for maintaining "shine."
5. **Sustain:** Implement training and discipline to ensure that standards are followed.

Adapting to a New Paradigm

After changes are implemented, they should be tracked continuously and measured at specified intervals. If necessary, modifications may be made, or new approaches can be tried. The team should be constantly aware of production performance and strive to improve production processes on a continuous basis.

Quality control is a key aspect of lean production theory. The goal of the Toyota Production System is to achieve perfect first-time quality. Using the principles of total quality management (TQM), workers, rather than inspectors, are assigned the responsibility to discover defects and correct them on the spot.

In contrast to traditional business improvement models, lean thinking largely rejects benchmarking and best practice assessments. Instead of making comparisons to competitors, companies are encouraged to focus on eliminating waste while improving quality. Sales targets are also viewed as counterproductive, as they encourage overproduction. Instead of pushing, sales should be pulled by actual demand.

The application of lean methodology is not the same as cost cutting. Rather than choosing the least expensive materials or achieving the lowest labor costs, companies should weigh the efficiency of each choice. If using higher quality materials results in fewer defects and improved consumer confidence in the product, the choice of better materials may be deemed cost-effective. Lower production costs are achieved by methods such as minimizing excess labor and inventory, or improving cash flow by ordering supplies on an as-needed basis.

Adaptability is an essential element of lean production. To reduce costs and meet evolving customer demand, equipment should be designed for rapid changeover to new product lines. An organization adopting lean methods may switch from using large, high volume machines to smaller, more flexible machines suitable for use by cells.

Lean techniques are effective only if the workforce is engaged. Organized in teams, workers are responsible for controlling the quality of products, monitoring machines to prevent breakdowns,

eliminating waste through visual inspection, and acquiring multiple skills. Traditional hierarchical structures are flattened in a lean organization, as individual workers cooperate with others to achieve goals. Because more is demanded of workers in a lean production environment than in a top-down organization, companies should have in place incentives for both individuals and teams to act in accordance with lean principles.

Beyond the Factory Floor

While lean production theory was developed for manufacturing, it can also be applied to administrative or other office-based work environments. Many companies continue to be organized according to "mass production" principles, with separate departments employing workers with distinct skill sets. When a lean model is implemented, cells are established across job functions and job classifications. Working as a team, groups of employees can find ways to improve the flow of materials, information, and knowledge within the organization.

The lean production paradigm is very different from the mass production model that governs most businesses. A company that intends to become lean must provide extensive training to employees at all levels of the organization, and a period of transition can be expected as workers learn new practices and adopt new attitudes.

As the lean model is implemented within the organization, a company will also have to manage its relationships with customers and suppliers along the lines of lean production principles. Suppliers will be instructed to make deliveries on an as-needed basis, instead of a set schedule; customers will be asked to adjust to receiving orders in smaller batches. If handled properly, however, the transition to the lean model can enable a company to forge stronger relationships with a core group of suppliers, as well as with customers who appreciate receiving a higher-quality, made-to-order product on time and at a reasonable price.

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