Lean Thinking: It's About Efficient Value Creation

Learn to match customer needs without waste.

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he principles of lean thinking can be used as a framework for improvement of both recurring manufacturing activities and also upstream in non-recurring processes such as product development. The focus is on efficient value creation.

The **first principle** is that companies must clearly define the value of their products as perceived by their customers. This means scrutinizing every product category for excessive complexity, performance overshoot, unnecessary features and options, and so on. The goal is to deliver products that precisely match the customer's needs without waste.

The **second principle** argues that for the firm to deliver value efficiently, they must first understand the value stream (see the accompanying box) within the company. The value stream is the sequence of activities and process steps that are essential to creating and delivering a product.

Although it may seem like everything that goes on in a company is part of the value stream, in reality

The Value Stream

An organization's value stream is a complex network of interrelated activities that transform a product from raw inputs to delivered value (in the case of recurring manufacturing). A set of value-mapping tools has been developed by the Lean Enterprise Institute that enable a firm to document its "current state" processes and plan for the desired "future state."These tools include icons and symbols representing the critical aspects of value stream performance: cycle time, inventory levels, staffing levels, information flow, etc. The institute has created a notebook, *Learning to See*, by Mike Rother and John Shook, that guides the reader through the process step-by-step. much effort is wasted on non-value-adding (NVA) tasks. Mapping the organization's value stream enables it to categorize activities into value-added (VA — those tasks that transform the product in some measurable way) and NVA (wasted effort that could be eliminated without any impact on the customer).

Once the value stream is identified, we then focus on the **third principle**: Eliminate barriers to the flow of value. These barriers can take the form of large batches of inventory or capacity bottlenecks in the factory, or it could be in the form of excessive meetings, approvals, documentation, etc. during the product development process.

After these obstacles have been eliminated, a firm is free to allow its customers to "pull" value, meaning that all production activities are triggered by real demand from the marketplace. This **fourth principle** is illustrated by the pull/ JIT production system developed by Toyota Motor Company.

The **fifth and final lean principle** demands that the first four steps be repeated continuously to ensure that methods and systems are constantly being purged of waste.

Taking Steps Towards a Lean Enterprise

Education is the first step in moving towards a lean enterprise. This learning must include all senior management (including the CEO). Lean thinking is an enterprise-wide concept. To be truly effective, it requires commitment at all levels.

Once the appropriate tools and knowledge are

Eliminate barriers to the flow of value.

22

available to relevant employees, a team can be formed to map out the current-state value stream of the firm. From this "as-is" map, two improvement efforts can be launched. The first attacks the low-hanging fruit of waste through a process often referred to as a "kaizen blitz" in manufacturing, or a "process blitz" for upstream processes. These short-term, intensive efforts target opportunities for quick-hit improvement and involve immediately-implemented solutions.

I would suggest that firms do a quick-hit, blitztype effort very early in their lean implementation, both to gain some early successes and to force some focused thinking on how the lean principles actually apply to a specific firm's environment. Don't get hung up on the tools, symbols, and methods of value-stream mapping. Adapt the tools to your firm and industry, and choose icons and mapping methods that make sense to you. Keep it simple and relaxed. Remember, the whole idea is to provide you with insights into waste, not to create additional structure and bureaucracy.

The second initiative supported by the initial value stream mapping effort has a longer-term impact. In this effort, a team is formed to envision a "future state" map, which is then used to form an extended plan for improvement that will align the firm with the concept of lean value creation. For example, a future-state improvement plan for a product development might involve transitioning from a rigid phase/gate structure to a more flexible, continuous-flow process in which information moves from task to task on a "just in time" basis.

Consider Metrics

Lean implementation metrics include such traditional measures as inventory turns, manufacturing cycle time, quality and defects, etc. In addition, new metrics such as the value-added ratio can be used to capture the unique perspectives of lean thinking. This metric is simply the ratio of time spent on VA activities when compared to the total time spent in creating a product or service. The closer this ratio is to one, the better the efficiency of an operation. It is not uncommon for the ratio to be 1:10 or worse for manufacturing companies before instituting lean improvements.

Lean Manufacturing Extends into Product Development

The product development arena provides an example of lean concepts at work. We are dealing with a non-recurring process that creates value through manipulation of information. This is in contrast to production activity focusing on the recurring transformation of physical materials.

Yet there are powerful analogies that can be made reflecting the extension of lean manufacturing into the domain of product development. For example, functional departments within a firm can represent an obstacle to the flow of value during product development by enforcing queues for performing discipline-specific tasks (such as electronics design, software development, etc.). This is a form of "time batching" in the sense that each task within the project must pass through the queue to be completed. This is in contrast to the lean best practice of continuous-flow product development that mandates high-priority projects receive immediate action along their critical paths.

One suggestion for applying lean thinking to the early conceptual stages of product development is to question every specification or feature of a proposed product using the criterion of the "least discernable difference." The idea is that we only want to include performance and features that the customer is willing to pay for (that they measurably value). Another way to ask this question is to determine if a firm's customers will pay "one penny more" for a feature a given feature or benefit. One example is the modern VCR. How many of the features, controls, buttons, etc. in this product are actually worth a penny more to customers? Perhaps a better question would be, "Wouldn't some simplicityminded customers be willing to pay more for a *simpler* product (along the lines of the iMac computer)?"

With respect to the process of product development, there are two lean concepts that enable dramatic reductions in time-to-market and profitability of new products. The first is the integrated product team, which reflects the need for continuous information flow within the process. This concept is an extension of traditional concurrent engineering to encompass the entire structure of the firm.

Another lean concept is the idea of continuous flow product development. Many firms have implemented "phase and gate" product development processes as a means to enforce concurrency during product design. This is an excellent transitional method, but it can become a major barrier to the flow of value if it is enforced rigidly, arbitrarily, and externally. I recom-

continued on p. 26

The product development arena provides an example of lean concepts at work. mend that firms soften their gates, reduce their number, and allow the integrated product team to select logical points along their critical path to hold those go/no go meetings. In this way, the flow of value is driven *internally* by the team, rather than externally and rigidly by senior management.

Product Architecture

The benefits of lean thinking are not restricted to process improvements. Lean principles apply equally well to the design of products for lean production. Moreover, the leverage gained through applying lean design principles compounds the improvements achieved through lean manufacturing initiatives.

The most important opportunities for lean product design occur at the level of product architecture. Products should share common platforms, sub-assemblies, and individual components to the greatest extent possible. The ultimate goal is to have the highest percentage of reused common components possible for various varieties of a given product, as well as across multiple product lines.

One of the concepts supporting lean design is mass customization. It proposes that products be designed so that customization is postponed as late as possible in the manufacturing process. In this way, an entire line of products can be produced on a single integrated line, with only the last few steps being specific to individual customized versions.

Will your organization learn to efficiently deliver the highest value to your customers through lean product development and lean manufacturing? Simplicity and competitive strength await those who accept the challenge.

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