

Process and Value Stream Mapping the Toyota Way

Toyota Production System Concepts

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Dedication

I created this book with the help of more than fifteen different business resources. These academic articles and books are all cited at the end of this book. A number of people have influenced my learning journey and my entire career. I would like to acknowledge them here.

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Introduction to Lean and Value

Lean thinking is about creating value while using fewer resources and producing less waste. Lean is when you keep trying new ways to do things better and without wasting anything, so that it's just right. Lean thinking and practice go hand in hand (Lean Enterprise Institute).

Lean thinking begins with the customer. What is important to the customer. In other words, what does the customer need help with.

Lean has five core principles:

1. Value: Specify what adds value to the customer and what doesn't. The customer needs a good quality, good prices, and good delivery speed. Quality should meet the customer's expectations, no exception. Non-value-added processes are those works that customer are not willing to pay for. They add cost to the product and delay the process.

2. Value stream: This involves every step of the process, starting with the supplier and ending with the customer. Every step must bring the product closer to completion and add value to it.

3. Make the product flow: All obstacles that constrain the flow of the parts through the manufacturing process must be removed. Lean strives for one-piece flow, which is about providing smooth flow for each piece of product with no wastes in time, performance, and quality in order to deliver the right product on time to the customer.

4. Pull not push: Produce what customers need and avoid over productivity, which creates the most waste in any

production process. By producing more than the customer demands, you are investing all your resources, including money, space, manpower, equipment, tools, material, etc., in building an inventory that may not be sold for a period of time.

5. Strive for perfection: There must be a vision for perfection. Companies should strive to continuously improve the process rather than be good at what they are doing. Processes tend to slip back and lose their sustainability if the cycle of continuous improvement, or plan-do-check-act cycle, has not been repeated continuously.

The core idea is to maximize CUSTOMER VALUE while minimizing waste. Simply, lean means creating more value for customers with fewer resources. A lean organization understands customer value and focuses its key processes to continuously increase it. The ultimate goal is to provide perfect value to the customer through a perfect value creation process that has zero waste.

Lean and Waste

Lean Strives to remove wastes from the process. Wastes are those non-value-added steps that create obstacles to the flow of the stream, add cost to the product, reduce quality, and delay the delivery to customers.

For example, suppose there is a manufacturing process consisting of several processes, such as cutting, casting, assembly, handling, maintenance, inspection, and changeovers. The added value works, which involve making what customers need, are just a few processes: cutting, casting, and assembly. The others are those non-value-added works that need to be removed or minimized to improve the process. The seven wastes define those non-value-added works in terms of

transportation, inventory, motion, waiting, over processing, and over productivity. The eighth waste is the underutilization of human capabilities, or untapped human potential.

Relationship between Wastes and Profitability

Frequently, the inexperienced estimators will perform a cost estimate assuming everything is perfect and the plant is working at full capacity. This approach is totally erroneous as it does not consider all operation wastes, such as downtimes, waiting between processes, inventory carrying for long periods, re-working for quality, and delay of orders delivery.

The relation between profitability and operation wastes can be seen through this simple formula:

$$\text{Profit} = \text{Revenue} - \{(\text{Fixed Cost} + \text{Variable Cost}) + \text{Wastes}\}$$

The fixed and the variable costs are the manufacturing operation costs required to make the product. Organizations that are working at or near the break-even point can find ways to be more profitable through the losses. Furthermore, if a company is running at 80% of its actual capability and can sell 100% of its capacity, there is an opportunity to produce the extra 20% through the losses. Those twenty percentages of losses are the sales losses that can be recovered through the removal of the operation wastes. The losses are the price of the unsold parts which recover the profit, labor salaries, maintenance costs, overheads, and indirect expenses.