Chapter 13
Lean Principles and Optimizing Flow: Interdisciplinary Case Studies of Best Business Practices

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ABSTRACT

This chapter aims to provide an elementary background on lean methodologies from its beginnings at Toyota through current applications of lean processes at local companies. Via case studies, a greater understanding of the advantages of lean systems will be attempted along with a discussion of the future of lean practices. Notable improvements to the lean philosophy, such as successful implementation of six-sigma techniques, are addressed through interdisciplinary case studies of successful best business practices. Therefore, we need a cluster of metrics, certainly more than just cost. If we cannot adequately measure customer satisfaction and utility, we need to have more subjective ways to measure it in order to understand its complexities. Unfortunately, it is unlikely that there is a one-size-fits-all solution, as many managers are more prone to try something that has worked elsewhere in times of crisis, but has limited applications to other dissimilar problems.

INTRODUCTION

In theory, the ultimate goal of lean is perfection. Eliminating waste, creating value through efficiency, constructive and collective organizations are themes central to lean methodology. The delicate balancing between employee satisfaction, process improvements that create value for a company, and the external needs of customers is typically the give and take struggle that lean-thinking strategies that many companies face. Lean manufacturing, for example, relies heavily on the use of Kanban tools for effective management of the warehousing function of Supply Chain Management (SCM) systems. Kanban is one of the lean tools designed to reduce the idle time in a production process. In essence, lean methodologies

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use cards as a signaling system that triggers an action to supply the process with its needs either from an external supplier or from a warehouse (Sabry, 2010). As Kanban was originally invented as a part of the famous Toyota Production System (TPS), it is associated with the design of pull systems and the concept of delivering JIT (just-in-time) goods and services. A demand-based pull system designs processes based on customer demand. It is expected that each process produces each component based on the exact expectation of delivery from the customer. By following lean practices, it is the end goal that businesses produce only what is deliverable and processes become leaner due to reduction in excessive stock levels of raw, partly-finished, or finished materials. Hence, a demand-pull system allows management to produce only what is required at the right quantity at the right time. Ultimately, inventory levels of raw materials, components, work-in-progress and finished goods must be kept to a minimum. Management is then forced into a system that only through careful planned scheduling and flow of resources that JIT targets can be meet. Much of this sophisticated production scheduling software to timely plan production is done through information sharing that is exchanged with suppliers and customers through a fully implemented Electronic Data Interchange (EDI) systems.

Toyota Motor Company is often credited as the first example of a company implementing lean methodology and thinking. Toyota’s penchant for lean processes can be traced back as far as 1890, before the current iteration of Toyota that is currently practiced (Jain & D’lima, 2018; Kache & Suring, 2015; Ketikidis, Hayes, Lazuras, Gunasekaran, & Koh, 2013). In 1926, Sakichi Toyoda founded the company, Toyota Loom Works (Emilani, 2006). Kiichiro worked closely with his father, and it was ultimately Kiichiro’s decision to expand Toyota Loom Works to include an automobile manufacturing division. Toyota Motor Corporation was founded in 1937, backed by the forward thinking ideologies of both Kiichiro and Sakichi (Emilani, 2006).

The first formalized lean methodology was the Toyota Production System (TPS). Toyota’s forward thinking approach has helped create an environment that promotes continuous innovation and internal assessment. The two employees who are credited with creating the system were Taiichi Ohno and Shigeo Shingo (Emilani, 2006). They often attributed some of the ideas with TPS to Henry Ford and other American industrial practices. One of the most influential systems they cited was the United States’ plan during World War II to increase production for the war effort, the “Training Within Industry Service” program (TWI) (Emilani, 2006).

Their influences are not meant to discredit their original ideas, as the influence from western culture was somewhat limited. They openly rejected many popular notions held by American management theorists. Toyota’s employees, especially the highly influential officers, lacked formal management training (Emilani, 2006). They focused on practicality and the true nature of problems that arose in the production cycle.

The TPS system was largely developed between 1948 and 1975 (Emilani, 2006). The main objectives of the system were to eliminate waste, eliminate inconsistency and improve overall efficiency. There are two major cornerstones of TPS. First, is the actual implementation of JIT production system. This was the original concept developed by Toyota that served as the original basis of TPS and involved ordering the minimum needed quantities to reduce waste. Second is systemic processes guided by human oversight with an emphasis on keeping human involvement minimal and yet ever-present. The Toyota Way serves as the guiding principles behind the TPS system. The Toyota Way is the strong corporate culture at Toyota that focuses on continuous improvement and having sound operational processes.