The Emergence of Lean

James Womack and his colleagues derived the Lean Enterprise approach to managing business operations from the findings of their study of the Toyota Production System (TPS) and other Japanese companies' commercial practices. They compared these practices with those employed by a wide array of other automotive companies from around the world. The study was implemented in 1985 by the International Motor Vehicle Program located in the Center for Technology, Policy, and Industrial Development at the Massachusetts Institute of Technology. Its goal was to enable automobile manufacturers worldwide to advance the prosperity of their host countries and improve the work life of industry employees by transferring knowledge of the more competitive approaches implemented by Japanese companies such as Toyota. The study lasted five years, had 36 sponsoring governmental and industry organizations, produced 116 scholarly publications, and culminated in the publication of *The Machine That Changed the World* (Womack et al., 1991). It introduced the term "lean production" to characterize TPS's manufacturing strategy and contrasted it with "mass production," which was the norm. Over the next decade and a half, the "lean production" approach was elaborated into "Lean thinking." Toyota's strategic perspective and operating methods are expressed in its depiction of the "Lean Enterprise." The refinement of Lean thinking continues.

Lean Thinking and the Quality Model

Massao Nemoto, a Toyota General Manager during the time of its emergence as its industry's leader, credited *The Machine That Changed the World* (Womack, Jones, and Roos, 1991) as "a truly excellent book," but noted that "Its one really disappointing flaw" was its failure to recognize W. Edwards Deming's contribution to Toyota's success (Nemoto, 2009, p. 175). Our research indicates that Deming's teaching was, in fact, the foundation of the Toyota Motor Corporation's success during the period of its emergence as an exemplary global automotive manufacturing company (circa 1960–1990) (Vitalo and Bujak, 2019, pp. 17–19). As Vitalo (2017) reported, Deming taught the leaders of Japanese industry about his quality approach to commerce through the auspices of the Union of Japanese Science and Engineering (JUSE) in the early 1950s. Prior to his arrival, Homer M. Sarasohn and Charles Protzman instructed Japanese management in thinking that incorporated Deming's teaching. It was Sarasohn who recommended to General Douglas MacArthur, the supreme commander of the Allied powers in post-war Japan, that he bring Deming to Japan. Deming went on to play a pivotal role in enabling the resurrection of Japanese industry to its place of worldwide importance in the post–World War II era. His 90 hours of direct instruction to the leaders of Japanese industry and multiple follow-up visits to Japan inspired a renewed confidence and redirection of their commercial efforts. Indeed, the Japanese government recognized Deming's contributions to the resurrection of its industry by extending to him the Second Order Medal of the Sacred Treasure.

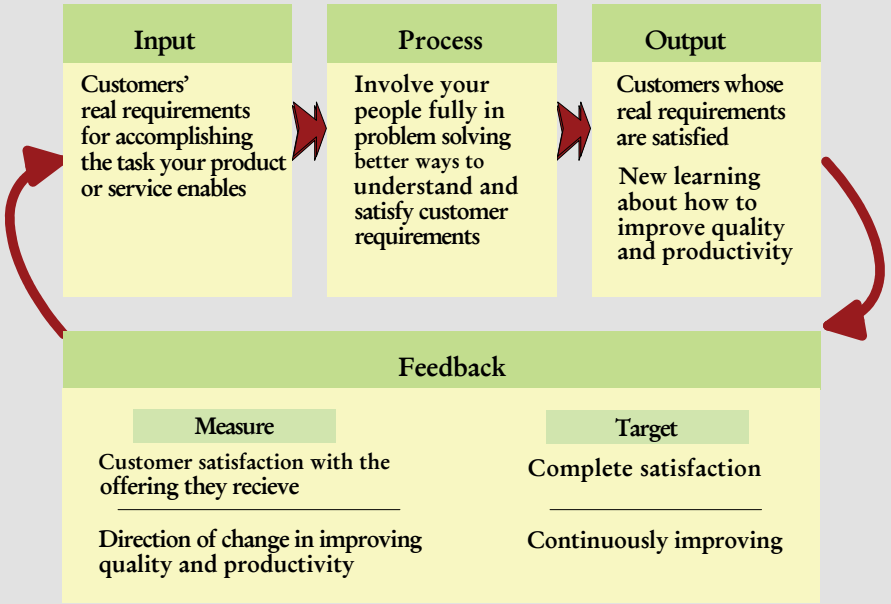
Origins and Limitations

Deming's contributions to the Lean model as practiced by Toyota Motor Corporation were personally acknowledged and appreciated by Dr. Shoichiro Toyoda, the son of the founder of the Toyota Motor Corporation and its chairman from 1992–1999. "Everyday I think about what he [Deming] meant to us," said Dr. Toyoda. "Deming is the core of our management" (Toyoda, 1988). After a detailed analysis, Vitalo (2017) concluded that "Deming's work represents the heart and soul of Lean Enterprise " (2017, page v).

The Essentials of the Quality Model

Lean thinking incorporates Deming's basic premise that a business's success is a function of how well it enables its customers' success by satisfying their real requirements and by continuously improving its realization of that end. Lean also incorporates the quality model's basic methodology. That methodology involves every employee in every workplace every day in applying problem-solving methods to uncover better ways to learn about and fulfill customer needs and enable their success (Exhibit 1). The outputs of this model are satisfied customers and learning that drives improved quality and productivity in meeting customer needs. The measures of success are customer satisfaction and continuous improvement.

Exhibit 1. The Essentials of the Quality Model for Achieving Business Success



Business strategies rooted in the quality model share a core set of principles. The model asserts that following these principles creates sustained commercial success. You need to understand these principles because striving to become a Lean Enterprise means incorporating them as core beliefs and consistent practice. The principles are

1. The essential goal of every business is to enable its customers to succeed in whatever pursuit they apply its offering.

Corollary: Customers use a business's offering to accomplish a purpose. The greater the success your offering enables your customers to achieve with respect to their purposes, the more satisfied they become and the more likely they are to engage in future commerce with you.

2. The necessary input required for a business to achieve its goal is an accurate understanding of the customers' real requirements.

   Corollary: Real requirements are features of your offering that must be present for the customer to succeed. The more detailed and complete is your understanding of the customers' real requirements, the more likely your offering will enable their success.

3. The most important means for achieving business success is the full involvement of its people in problem solving ever-better ways to achieve customer satisfaction.

   Corollary: The more teamed, aligned, capable, and empowered a business's workforce is in thinking through better ways to understand and satisfy customer requirements, the more powerful the business becomes in delivering value. Also, the learning power and productivity of such a workforce make the company more likely to sustain its success across whatever challenges the future may present.

4. In addition to maximizing the delivery of value to its customers, a business must also benefit *all its stakeholders inclusively*. "The aim proposed here for any organization is for everybody to gain—stockholders, employees, suppliers, customers, community, the environment" (Deming, 2000, p. 51).

   Corollary: The primary imperative of a commercial organization is to deliver value today and improved value tomorrow, continuously and forever. As Deming wrote in the fifth of his fourteen points, a business must "improve constantly and forever" (Deming, 1988).

The most deviant notion Deming introduced was that the pursuit of profit was best realized by the delivery of benefit to a business's customers and all its stakeholders. This was a very different viewpoint from the traditional understanding that businesses maximized their profits by focusing on just that purpose. "Maximizing profits" and "benefiting customers" are ends that do not necessarily imply the same means. If a business strives to maximize profits, it may or may not benefit its customers. For example, one way companies have succeeded in making huge profits and becoming giants in their industry is by restricting their customers' access to alternative products or services (e.g., IBM in the 1960s and 1970s and Microsoft since its inception). IBM built in proprietary components to its "big iron" computers that forced customers to return to them for hardware upgrades and software (Mcbride, 2022). Microsoft required computer vendors to pay a fee for every machine they built, whether or not they loaded it with Microsoft's operating system (U.S. Department of Justice, 1994). If they did not, they could not load MS DOS on *any* of their machines. Consequently, manufacturers only loaded MS DOS, since adding any other operating system would increase their costs. These market-controlling methods are antithetical to benefiting customers; nonetheless, many companies seek to use them, and many more wish they could.

Lean's Extension of the Quality Model

Lean makes several important contributions that advance the utility of the quality model.

- **Lean expands a business's understanding of how to satisfy its customers.** Beyond those features that are essential to ensuring a customer's success, there are other features of an offering that customers deem valuable. These features are not functionally necessary but, if present, would increase a customer's satisfaction with the business's offering. They might, for example, increase an offering's ease of use. Hence, in pursuing its understanding of customer values, a business must learn about not only the 'must have' features essential to ensuring the customer's success but also those other features that, if present, would elevate the customer's experience of satisfaction and benefit.

- **Lean expands a business's pathways to deliver value to explicitly include the customer's buying–benefiting experience.** The customer's buying–benefiting experience includes all the activities the customer must engage in to access, acquire, prepare to use, and use an offering to accomplish the customer's purpose; maintain it in a useful state between uses; and dispose of it and its byproducts. These activities can either enhance or detract from a customer's experience of satisfaction. Thus, to maximally satisfy its customers, a business must build value into its offering *and* the buying–benefiting experience it supports. It must understand its customers' values with regard to that experience and build into its buying–benefiting experience features that satisfy those values.

- **Lean roots the judgment of the value of an offering's feature in a customer's willingness to pay for it.** Lean thinking defines value as any feature for which a well-informed and reasonable customer is willing to pay. The feature may be an element of the product or service offering or of the customer's buying–benefiting experience. This conceptualization has several implications. First, the feature must be detectable in some way by the customer. If it is not, the feature cannot be of value. Second, any activity that does not result in a detectable consequence for the customer cannot add value. Therefore, it must be waste and should be eliminated. Third, an activity that produces a detectable consequence only adds value when the customer is willing to pay for it.

- **Lean operationalized the concept of waste and introduced tools for its elimination.** Deming was quite aware of the problem of waste and its undermining effects on the delivery of quality products at least cost. He stated clearly that every business must engage in the "continual reduction of waste and continual improvement of quality in every activity" (Deming, 1982a, p. 49). The Lean approach to commerce incorporates this thinking. What it adds is an operational definition of waste and tools for its elimination. Waste is any activity or resource expenditure that does not materially change a product or service output in a way that a well-informed and reasonable customer is willing to pay for. Lean has also developed a list of the most frequent types of waste that occur and definitions that enable a person to detect when each is present (Vital, Butz, and Vitalo, 2003). And Lean has added tools such as 5S and Kaizen to eliminate waste. As with Deming, Lean's perspective is that 100% of the resources a company expends should produce value

for customers. This means that every operation performed, from governance to grounds maintenance and from back office to store front, must produce a result that the customer experiences and finds of sufficient worth to pay for.

- **Lean adds tools for improving the functionality of a business's extended value stream.** Deming taught the concept of an extended value stream to leaders of Japanese industry in 1950 at the Mt. Hakone conference. He also taught the need for management to manage a business from that perspective. He depicted the extended value stream as a "flow diagram" (Deming, 1982a, p. 4) that begins on its left side with suppliers and ends on its right side with customers. The term 'extended value stream,' however, was coined by Womack and Jones (2003) and is used in the Lean Enterprise model, but its meaning appears the same in all its particulars. What Lean has done is introduce tools and methods for managing a business from the perspective of the extended value stream (e.g., value stream mapping) and to enhance the performance of the extended value stream. Consider, for example, Lean's introduction of just-in-time manufacturing wherein suppliers produce only what you need and provide it when you need it, thereby reducing inventory costs. An enabling tool of this approach is Lean's integrated kanban system. It creates an efficient information flow back through the extended value stream from a producer's delivery of a finished product to a customer to its input suppliers. That signaling process alerts the supplier to the business's need for new inputs that are then delivered. There are many other such Lean tools and concepts that support the efficient performance of the extended value stream (e.g., flow, mura).

The Limitations of Lean Thinking

Vitalo and Bujak (2019) documented a number of critical limitations in Lean thinking as a guiding system of thought and action. The most pertinent here is that the definition of the ultimate goal that Lean's approach to conducting commerce serves varies depending upon who you ask within the Lean community. Since lean enterprise is not a formally developed model—that is, it is not a set of knowledge logically derived from basic assumptions about what commerce is, why people engage in it, and what its contribution to society should be—there is no way to reason conclusively about its ultimate purpose. Its aim is whatever its practitioners use it to achieve (Vitalo and Bujak, 2022). For those who would turn to practices of the Toyota Motor Company as their "Rosetta Stone" for deciphering what is and is not "Lean thinking" or a Lean Enterprise, this avenue of resolution has also been shown to be fruitless by an exhaustive study into the history of practices demonstrated by that company (Vitalo, 2019). It revealed that the company's practices have not been consistent with its own definition of the *Toyota Way*.

Defining the Aim of Lean Enterprise

There appear to be three dominate perspectives on the aim of the lean approach to commerce. Some practitioners see its purpose as a method for maximizing the profitability of a company by continuously improving a business's efficiency and reducing its costs. Others believe that

the lean approach to commerce is about striving for perfection by eliminating all waste through the consistent application of lean tools (e.g., 6S, Kaizen, TPM). Still others see it as a comprehensive approach to conducting a commercial enterprise. This perspective defines the aim of lean enterprise the continuous pursuit of maximizing the delivery of value to customers in ways that benefit all stakeholders inclusively. It emphasizes the importance of competing through the excellence of one's offerings and of engaging the extended value stream[1] in applying Lean thinking. Regarding executive functions, community members of this persuasion discuss the need to change the role of managers from overseers and controllers to enablers of employee success and to adjust human resource management systems to comply with the Lean perspective (for example, see Liker and Hoseus, 2008). It asserts the need for the application of lean thinking by every person every where from the board room through the C-suite and into every workplace.

What Constitutes a Lean Enterprise

The significance of definitional problem concerning what the aim of Lean Enterprise is integrally related to the confusion of what constitutes a Lean Enterprise . The nature of this relationship seems poorly grasped by the leaders of the Lean community. A set of ideas coheres into a system only when they are organized around a specific aim. The aim of each system determines the presence and relevance of each component within it and the role it will perform. It defines the relationships among elements and regulates how they interoperate to achieve the system's aim. The necessity for a definitive statement of a system's aim applies to every system whether human or mechanical (Barnard, 1968; Deming, 2000). Hence, if the end the Lean approach to commerce pursues has no singular definition, there cannot be a definitive understanding of what constitutes a Lean Enterprise.

The factual basis that supports this logical conclusion became exposed with regard to the Delphi Corporation's bankruptcy in 2005, a company that had won "many Shingo Prizes for lean manufacturing excellence" (Waddell, 2005). Following its bankruptcy, there was much disagreement about whether Delphi had been truly a "Lean Enterprise ." Indeed, Waddell lists many factual features of that company's conduct and management that he and others considered not Lean (Meyers and Waddell, 2005). Waddell stated that "The lesson is that looking lean is not the same as being lean" (2005). Yet, in the same article he reports that James Womack himself declared that Delphi was indeed a Lean Enterprise.

What Every Lean Practitioner Must Do

Given this situation, it is incumbent of every Lean practitioner to define explicitly his or her understanding of the aim the Lean approach to commerce seeks to realize and what in fact constitutes a Lean Enterprise. Absent such documentation and its sharing, we can never know whether we are speaking about the same concept or entity when we share our thoughts about Lean Enterprise or the results we realize from our applications of Lean thinking.

[1] An extended value stream represents the flow of input resources from suppliers to and through a business's production system and from the business's production system to the customer of its output. Each of the organizations who contribute to that flow, whether internal or external to the business, is represented in it.

In *Our Understanding of the Lean Approach to Commerce* (Vitalo and Bujak, 2023), we provide our understanding of the Lean Enterprise model. In the article *How Different is a Lean Enterprise?* (Vitalo and Bujak, 2023a), we differentiate in concrete terms how completely different a Lean Enterprise is from a traditionally run business. In neither case do we presume to speak for the Lean community or to claim that our thinking represents the "definitive" view of Lean thinking.

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