

**The Missing Pieces in the Lean
Enterprise Model
A Monograph**

**Raphael L. Vitalo and Christopher J. Bujak
Vital Enterprises and Continual Impact LLC**

June 17, 2019

Contents

Introduction	1
Confusion About the Meaning and Purpose of Lean Enterprise	1
The Implications of Confusion About Lean’s Ultimate Aim	6
Other Gaps in Lean Thinking	7
Ends and Controlling Values for Tool Applications	8
Executive Functions Guidance	9
Organizational Structure	10
Market Strategy	10
Externalities	12
Employee Compensation	12
Foundational Knowledge	14
The Missing Deming Content	16
References	20

Why Toyota Is Not Lean Thinking’s ‘Rosetta Stone’ [View / Download](#)

Why Lean Management’s Rubrics Cannot Tell Us What Lean’s View of People Is [View / Download](#)

Introduction

Several years ago, we undertook a project to document the Lean Enterprise approach to commerce and provide additional tools to enable its successful use. Both authors had studied and applied Lean thinking for more than two decades. We each had observed and measured its effects. *When implemented with the aim of benefiting all stakeholders inclusively*, Lean thinking increases the value received by customers, reduced operating costs, and provided employees the opportunity to experience pride in the products they produce and the services they deliver. It also yields new learning, improved employee engagement, elevated teamwork, and has raised the performance of businesses on traditional measures of business success.

As we proceeded with our project, however, we uncovered problems in documenting what we understood to be the Lean Enterprise approach to commerce. Addressing these problems caused us to elaborate and extrapolate what is termed “Lean thinking” to the point that we could no longer confidently say that what we were describing was “*the Lean model.*” These problems included:

- confusion among Lean practitioners about the meaning of Lean Enterprise,
- gaps in the development of Lean Enterprise as a commercial model,
- absence of foundational knowledge¹ that explains the intellectual basis for Lean thinking, and
- failure to recognize Deming, not Toyota, as its origin and the proper inclusion of his thinking in its teachings.

This paper shares the results of our efforts and describes the gaps in Lean thinking we uncovered. We see it as a first step in problem solving ways to improve the Lean Enterprise model and its use by Lean community members. Since no one person controls the content and interpretation of the Lean model, the solving of these issues will require consensus across the Lean community.

Confusion About the Meaning and Purpose of Lean Enterprise

We, and others in the lean community, considered the name, “Lean,” to be misleading. Yes, the application of “Lean thinking” (Womack and Jones, 2003; Womack, Jones, and Roos, 1991) does streamline work and workplaces and results in less use of resources, but that is the least of what it achieves. Exhibit 1, beginning on the next page, explains two possible origins of the name we uncovered. One possible source of the name appears to be due to an error in translation of a statement by Taiichi Ohno, a person presumed by the Lean community to be a primary source for Lean thinking. Another source for the name, “Lean,” is John Krafcik, a member of the Massachusetts Institute of Technology research team that studied the question of why Japanese manufacturing was superior to manufacturing done elsewhere in the world. It reflects his amazement at what was, at the time, a startling discovery—namely, that one can actually produce quality products, tailored to customer needs, and in relatively small quantities with strikingly fewer resources.

¹ Foundational knowledge refers to the set of concepts, principles, and relations used to explain the “why” underlying observed facts or the set of assumptions from which the judgments and directives of a deductive knowledge systems are deduced.

Exhibit 1. Why the Name “Lean” Is Misleading

It is the name of the Lean approach to commerce that everyone first encounters. For many, it is only the name that is known. Therefore, it is a fair question to ask, “How effectively does the name ‘Lean’ describe the essence of its approach to commerce?” Our analysis of the name “Lean” concludes that it is, at best, unhelpful in clarifying the fundamental thrust of the Lean model and the scope of its concerns. It suggests an approach riveted on pursuing efficiency in business operations rather than one riveted on maximizing the delivery of value to customers and all stakeholders.

Through our research, we uncovered two roots for the origin of the name “Lean.” The first and most referenced origin is the book, *“The Machine That Changed the World”* (Womack, Jones, and Roos, 1991). The second is the English translation of Taiichi Ohno’s *Workplace Management* (Ohno, 2013). Ohno is considered by Lean community members to either be the originator of Lean Enterprise or a major contributor to it. Neither source captures the scope of what Lean Enterprise signifies. Indeed, the second source is based on an error in translation.

The Machine That Changed the World

Womack, Jones, and Roos (1991) introduced the term “Lean” to refer to the approach to production used by Japanese auto manufacturers. That approach contrasted with “mass production” and enabled the efficient production of tailored products in small volumes. Greater profit could be realized by enabling a company to respond to the varying wants and needs of different customer segments. They credited the term to John Krafcik, their research associate (1991, page 13). He used the word “lean” to represent that the Japanese approach “used less of everything compared with mass production—half the human effort ..., half the manufacturing space ..., half the investment in tools, half the engineering hours to develop a new product” (ibid).

What can we take from this reference? If we were to infer what a Lean Enterprise was about *just* from this description, we might conclude that it is an approach to production that enables a manufacturing company to operate with a very high level of efficiency and least cost footprint while allowing it to respond to variations in the wants of different customer segments. We might further conclude that (1) Lean thinking focuses on operations and (2) its purpose is to make your business’s production operations flexible, efficient, and least costly. Based on this conclusion, we might reason that Lean’s ultimate end is to provide a producer the capability to sell more products, at better margins to maximize producer profitability.

What do you think? Is that the ultimate goal that drives the Lean approach to commerce? If you listen to Art Byrne, the person recognized to have transformed the Wiremold company from the traditional approach to commerce to the Lean approach, you would answer, “No.” He said, “To me ... the thing that is most misunderstood about Lean is the fact that Lean is a strategic thing To be successful you have to see Lean as your underlying core strategy. Removing waste and improving your value-adding activities, *in order to deliver more value to your customers* [italics added], is what Lean is all about” (Meyer, 2012). In other words, benefiting your customer is its *strategic* purpose, not maximizing company profits. Similarly, we believe that once you include in your thinking *all* the ideas that Womack and his associates present in their various works, you must also conclude that the essence of Lean is more than the realization of efficiency, cost reduction, and profit maximization for the producer.

Workplace Management

There is actually an earlier reference than Womack et al (1991) for the use of the word “lean.” It is in the English translation of Taiichi Ohno’s book, *Workplace Management*, first published in 1982. This use, an artifact of translation, appears to misrepresent the point Ohno was making. In Chapter 2, Ohno uses the Japanese word *genryou* to refer to companies that have apparently succeeded by streamlining their operations—hence, the choice of the English word “lean” (Ohno, 2013, pages 29-30). By becoming ‘leaner,’ they became more efficient and, by their reckoning, more successful. However, Ohno introduces this more common meaning of *genryou* only as a prelude to using the word *differently* to describe *his* perspective. He alters the first character in the two character ideograph representing the word *genryou* from one meaning “reduce” to another meaning “limited” (Ohno, 2013, Footnote 9, page

Continued

Exhibit 1. Why the Name “Lean” Is Misleading (continued)

29). By this “wordplay,” he intends to change the term's meaning from “reducing weight” (literally; or becoming ‘leaner’ figuratively) to “limited volume” or “limited production.” Importantly, “limited volume” or “limited production” *does not* mean “small volume.”

In fact, the quantity of a product produced, in itself, has no significance for Ohno. Rather, as Ohno explains. What is important is producing *only what sells in the quantity that satisfies demand*. “From the standpoint that we only make what will sell and we do not make what will not sell, it becomes very important for limited volume production to be production at a low cost” (2013, page 31). Be careful with how you parse this statement. He is not saying that limited volume production must be at low cost and therefore, low cost is what is fundamentally important. Rather, he is saying that *producing only what sells in the quantity that matches demand* is the only way to realize lowest cost production. As he goes on to explain, there may be efficiencies in operations one can realize either through streamlining or, paradoxically, by producing large volumes. These may reduce cost from an accounting perspective, either in terms of total cost of production or unit cost. However, if what you produce sits unsold in inventory—none of these efficiencies are beneficial.

As you read Ohno’s statements carefully, it becomes clear that he is essentially making the point W. Edwards Deming made to the heads of Japanese companies in 1950. In his first lecture to them, Deming stated, “Every month you must make ... the right amount of product, or you cannot achieve economical production” (Deming 1950a). Ohno’s meaning is also similar to Deming’s statements about pursuing cost reduction or efficiency. Deming said that if you pursue cost reduction, you may well reduce cost but you may also destroy your business. Neither cost reduction nor efficiency is a proper focus for commerce. Ohno states “reduced weight” or pursuing ‘leanness’ may just as well eliminate *muscle as fat*. Essentially, pursuing cost reduction or ‘leanness’ is wrongheaded and can be dangerous. Thus, Ohno’s meaning by using his altered version of the word *genryou* is not cost reduction through streamlining but ‘smart’ production—*producing only what sells in the quality that is required*. If all that is produced is sold, all resource consumption generates value. Both Deming and Ohno assign a controlling notion that every business person should use to guide decision making so that they avoid the pitfall of pursuing ‘leanness’ per se. For Deming, the central focus should be on quality—which, for him, meant producing outputs that benefit customers and that customers will want to buy. The secondary control is producing a volume that matches demand. For Ohno, the controlling notion is more akin to the concept of “pull”¹ but, by necessity, incorporates both aspects of Deming’s notion of quality since there can be no “pull” for products people do not value and will not pay for. For pull to lead to business success, one must produce the *right product, when it is needed, and only in the amount needed*. For both men, pursuing ‘leanness’ per se is at best irrelevant and at worst destructive to business success.

¹ Pull means that customer demand triggers the flow of activity that transforms resource inputs into a finished product (i.e., value-adding activities).

In researching the origins of the name lean, we uncovered another, more serious problem that challenged our understanding of Lean really means. We discovered that there are, in fact, inconsistencies among Lean community members about the ultimate aim the Lean approach to commerce serves. That judgment is not *just* based on our analysis of the Lean literature. Indeed, the fact that Lean community members are confused about the ultimate purpose their approach seeks to realize is apparent to all who participate in or are observers of various Lean community online forums. Witness, for example, the different answers members produce to the basic question of “What Is Lean?” (See Exhibit 2, next page). Members appear to anchor their responses in their personal experiences, training, and readings. And, while not agreeing with each other, everyone with an answer speaks with confidence.

Exhibit 2. Sample of Definitions of Lean Offered in One Online Lean Community Forum

1. "Lean is providing value to your customers while eliminating waste as much as possible. Value means providing the product the customer wants, at the quality they want it, and only when they want it."
2. "Lean is about profitable growth - it's as simple as that."
3. "Lean is minimum inventory and minimum rework in a manufacturing industry. Extrapolating the concept to other industries, it would entail using capital in the most efficient manner in order to produce the same result or, to increase output."
4. "[Lean] is a philosophy for business that means reduce waste to improve the profit for company."
5. "I believe Lean is one of the most powerful continuous improvement strategies in the world. It brings out the best in workers and managers by getting them to collaborate more and focus on the needs of the customer. The methodology challenges people to always improve and go way beyond their comfort zone."
6. "Lean is simply a set of tools used to execute Process Improvement."
7. "Lean is about cultures, mindsets, and behaviors. The tools and jargon are incidental to an organizational culture that continually strives to improve, eradicates waste as a matter of habit, and has a disciplined process-focused management team that values its direct contributors. Techniques are temporary; principals [sic] are permanent."
8. "[Lean] is about reducing the use of any and all resources, that could be put to profitable use, including space."
9. "Lean is a mindset. It is a philosophy that strategically and continuously reviews waste in the organization and empowers teams to remove it. A byproduct of Lean is, without doubt, improved profitability as all waste generates a cost. You are kidding yourself if you feel the business will not expect [cost savings] as its ROI and [compensation for the] risk of challenging the status quo. Generally speaking you cannot embark on this journey without an understanding that there will be [worker] displacement; wasteful processes require additional resources and, by its very nature, a Lean organization cannot – NO, will not - allow that."
10. "Waste removal/reduction is something you get from implementing Lean; not the purpose of Lean. The purpose of Lean is to give the customer what they want, when/where they want it, with the minimum consumption of resources along the way."
11. "[Lean] is a strategy for linking, aligning, and coordinating our activities to give our customers what they want, when they want it, at a competitive price."
12. "I don't think that the focus of Lean is the removal of waste as many people believe it to be. Lean is about making what the customer wants flow."
13. "In my opinion, Lean is none other than waste killing."
14. "Lean is a positive change in culture and methods that improves the organization's processes as well increases customer satisfaction."
15. "Lean/CI and most of its associated tools are designed to do three basic things. 1) Reduce/remove non-value adding activities (reduce waste). 2) Build quality into the whole process. 3) Make the product or service flow."
16. "I don't think there is a definition of Lean. Lean is now an 'umbrella term' that means all sorts of things to all sorts of people depending on their frames of reference. Earlier I made this point that there is no definitive definition of Lean and this thread confirms that. The reason is that Lean is essentially descriptive. It attempts to describe the management and production systems at Toyota in Japan and our understanding of that is changing over time. As Joe [another participant] put it: 'It seems that people are taking different ideas and combining them together to redefine Lean.'"

In every online discussion about the meaning of Lean Enterprise we observed, at least a third of the answers asserted that Lean is all about “efficiency and cost reduction” with the intent of maximizing profitability for the company. For these community members, the name “Lean” is a good fit. While respondents proposing this ‘efficiency and cost reduction’ interpretation rarely cite sources for their assertions, they could. For example, despite Ohno’s assertion in his work *Workplace Management* (Ohno 2013) that efficiency *in itself* is destructive, he makes the following seemingly paradoxical statements in his book, *The Toyota Production System* (Ohno 1988).

“The most important objective of the Toyota system has been to increase production efficiency by consistently and thoroughly eliminating waste” (Ohno 1988, page xiii). And, later he adds, “In the Toyota production system, we think of economy in terms of *manpower reduction and cost reduction* [italics added]. The relationship between these two elements is clearer if we consider a manpower reduction policy as a means of cost reduction, *the most critical condition for a business’s success*” [italics added] and “... all considerations and improvement ideas, when boiled down, must be tied to cost reduction. *Saying this in reverse, the criterion of all decisions is whether cost reduction can be achieved* [italics added]” (Ohno 1988, page 53).

Be clear, we *do not* propose that this excerpt, on its own, presents a correct understanding of Ohno’s perspective. Nonetheless, *on its face*, it does strongly support the assertions of the ‘efficiency and cost reduction’ camp.

A second portion of respondents define Lean from a continuous improvement perspective. They see Lean as focusing on the application of tools (e.g., 6S, Kaizen, TPM) to eliminate all non-productive work from work processes and to elevate the utility of workplaces. Ohno is also the touchstone for their thinking, perhaps especially his book, *Workplace Management* (Ohno, 2013). In that work he emphasizes continuous improvement. He exhorts everyone to challenge the current state of work processes and imagine still better processes. He wants everyone to understand that the term, *gemba*,² applies not just to production areas but to administrative areas as well.

Still another cluster of respondents view Lean Enterprise from an executive perspective. Their minds are anchored on the extended value stream and see Lean Enterprise as a cooperative strategy integrating the contributions of all participants to commerce. They also see it as a different approach to leading and involving people, one that recognizes the knowledge and creativity of workers. The Lean approach emphasizes the importance of engaging the peoples’ minds. It develops peoples’ knowledge and skills and provides them opportunities to contribute to improving the business and sharing in the benefits they generate. These community members define Lean’s purpose as maximizing the delivery of value to customers as judged from the customers’ perspective. This maximizing of customer value, however, must be accomplished in a way that *benefits all stakeholders* to commerce *inclusively*. Proponents of this perspective sometimes emphasize waste removal as the singular means to this end. For example, Womack (2016) states “The

² The term *gemba* means “where the real work is done.” It refers to the front-line workplaces where the product or service offering of a business or a business function are actually produced.

objective [of Lean] must be to produce a better result for the customer, better work experience for employees, and better performance for the organization, all by removing waste.” At other times, Womack and others also discuss the importance of affirmatively adding of value to offerings and services and not just eliminating waste. For example, Jones (2016) states, “At its core, Lean is a customer-focused strategy to develop better products, which are created and delivered by much better product development and production processes.”

Authors assuming the executive perspective also envision the Lean approach as responsible for creating value for communities, governments, and society as a whole (for example, see Emiliani 2004). Their focus leads us to characterize their view as strategic and not just operational. This strategic perspective also emphasizes the importance of competing through the excellence of one’s offerings and of engaging the extended value stream³ in applying Lean thinking. Regarding executive functions, they 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). They also assert the need for all business activities—ranging from the board room and executive suite through the management, supervisory, and front-line tiers in and across every business function—to work together as a team in the continuous pursuit of maximizing the delivery of value to customers in ways that benefit all stakeholders inclusively.

While you might respond that none of these different perspectives are necessarily mutually exclusive—that comment leaves unanswered the central question: “Which of these notions or what higher order notion represents the *controlling aim* of the Lean approach to commerce?” Minimization of cost? Maximization of profit? Delivering of value to customers? Benefiting all stakeholders inclusively? Which should constrain the pursuit of the others when trade-offs are required? How does a Lean community member systematically resolve conflicts between the different ends businesses pursue without a definitive understanding of the controlling aim Lean pursues?

The legitimacy of our confusion about the goal of Lean Enterprise was reinforced by the findings of a survey implemented by Womack in 2010 (Womack 2010). He asked community members at large to identify what the major barriers to propagating Lean’s application were. To his “surprise”—but not ours—Womack discovered that “Many of you [Lean practitioners] identified confusion about the meaning of Lean as a barrier to progress in your organization [sic]” (Womack 2010a).

The Implications of Uncertainty About Lean’s Ultimate Aim

The significance of this definitional problem seems poorly grasped by the leaders of the Lean community. A set of ideas cohere into a system *only* when they are organized around a central

³ 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.

aim. It is in the service of this aim that a system's components have meaning. It is the aim of each system that defines the role each element within it serves. It establishes the relationships among the elements and regulates how they interoperate to achieve their common function. The necessity for a definitive statement of aim applies to every system whether human or mechanical (Barnard 1968; Deming 2000). Thus, the purpose of Lean Enterprise, the ultimate end its approach to commerce is to serve, determines the validity and meaning of all other assertions one may make about it. Its absence renders Lean thinking a mere collection of ideas with no way to detect which ideas truly belong in its ensemble or, if they belong, how do they properly interrelate with the model's other contents.

This definitional issue, therefore, is a fundamental problem for the Lean community and any serious business researcher. No science about any conceptual system is possible if one cannot define its boundaries and establish what is and is not part of it. To realize this end, a single, common, operational, and stable definition of the conceptual system's function is essential. Absent a definitive statement of the model's function that is endorsed community wide, "Lean thinking" becomes a euphemism for a set of tools and activities pursued by different people, in different ways, for different purposes.

Other Gaps in Lean Thinking

Tools support people in accomplishing certain tasks. No matter how carefully designed a tool might be, its actual use is determined by the judgments its user makes. These judgments decide the end a tool application should realize and whether and how it should be used in a given situation.

In a commercial context, the judgments that guide task performance are steered by the commercial model an organization chooses to implement. The knowledge detailed in that model of commerce, as understood by the tool user, *provides the only intellectual control on the purpose to which a commercial tool is put and the manner in which it is used*. Thus, for example, if my commercial model is based on the pursuit of the producer's self-interest with the intent to maximize the producer's profit—I will apply tools to uses in ways that realize that end.

We understood this requirement. Therefore, given that we wanted to add some tools to the Lean tool kit, we drafted a summary of the Lean model organized around the aim *we* thought defined the purpose Lean commerce pursued. We populated this summary with the contents of Lean thinking *consistent with that aim*. Our initial summary of the model captured what we perceived to be the Lean Enterprise approach as described in existing Lean literature, *albeit culled to align it to the aim we imagined Lean Enterprise to have*. We used this summary to guide our tool building and to construct the principles that should control each tool's use. Our premise was that the Lean literature would provide us any additional content we needed to complete our work.

The first shock to our thinking was the discovery of uncertainty about the aim Lean Enterprise pursues. We encountered more shocks the deeper we proceeded into building the new tools. As

we encountered issues that a tool user would have to resolve, we derived from our understanding of Lean Enterprise a solution. When we sought to verify our thinking, we could not uncover within Lean literature a commonly accepted principle upon which to rest our thinking. The more we proceeded, the clearer it became that Lean literature did not address all the issues we encountered in guiding people in the proper use of the tools we were building. We uncovered a number of different gaps the most significant of which we grouped into the following categories.

- Lack of definitive guidance for discriminating the end and controlling values that should guide the application of Lean tools in specific, but common, circumstances
- Lack of definitive guidance for how certain executive functions are implemented

By “definitive guidance,” we mean a set of principles expressed, defined, and applied consistently across the community of people who represent a particular system of thought—in our case, the Lean community.

Ends and Controlling Values for Tool Applications

Certainly everyone in the Lean community will agree that Lean is about driving waste out of processes. But, we could not find agreement across the Lean literature about how the benefits of waste removal should be shared or applied. Should they be disbursed to owners or shareholders as the popularly endorsed aim of a Capitalist enterprise would seem to suggest (Bainbridge 2012; Friedman 1970)? Should some of it be put at risk and applied to discovering better ways to meet customer needs? If so, how does one assess the amount of profit to apply? Should the increased margin produced by reduced cost to current price be shared with employees, returned to customers, or both? Who decides such issues and what guidance do you use to decide these questions?

As another example, can one properly apply Lean tools to downsizing a company. If you say “Yes,” then how do you address the blowback on worker participation in continuous improvement activities when people realize they are assisting in ending their jobs? Would we not be endorsing the view of the people who see the true meaning of the term ‘Lean’ as, “Less Employees Are Needed”? How do you resolve the application of Lean tools to downsizing with Womack’s assertion that, “those of us in the Lean Community have always said that we won’t work with enterprises that use Lean knowledge to eliminate jobs” (Womack 2016).

If you say “No,” do not use Lean tools to downsize, then how do you resolve your position with Ohno’s assertion that “we consider a manpower reduction policy as a means of cost reduction, the most critical condition for a business’s success” (Ohno 1988, page 53).⁴

Similarly, what about the use of Lean tools to drive cost reduction *solely* for the purposes of improving the company’s profits? Is that consistent with the purpose of maximizing the delivery of value to customers or the notion of generating benefits for all inclusively? In our experience as

⁴ Again, this Ohno statement seems at odds with his statement in *Workplace Management* (Ohno 2013) that efficiency *in itself* is destructive. Nevertheless, he stated it and it seems unequivocal.

management consultants, owner profit alone has certainly been the most common end that cost reduction has served and the main interest business's have had in applying Lean thinking. And, as you recall, perhaps a third of all Lean community members agree with this use. But, if you accept Emiliani's position (Emiliani 2004, 2011), you will not. He decries what he sees as the dominant business thinking which, he terms, "zero-sum thinking." By that calculus, one stakeholder can only improve his or her wins at the cost of other stakeholders. Owners maximize their profits by keeping them and that extracts resources from the enterprise. It benefits themselves singularly, not all stakeholders inclusively.

Also, the importance of systematically studying and understanding customer values is broadly endorsed across the Lean community, even if exercised infrequently. However, what are the permissible uses of this understanding? Knowledge of your customer's values can be used in different ways. I can use it to design into my offering functional features important to my customers. Or, I can use that knowledge to shape my offering's packaging and advertising to suggest (not say) that a product has a customer-valued feature—e.g., it is healthful—when such a claim, if made explicitly, could not be factually supported. Is that acceptable? Must value be real? Must advertising be absolutely factual? Must the utility delivered to the customer be objectively valid?

Continuing in this line of thought, can a company that makes a product that is inherently unhealthy (e.g., cigarettes) become a Lean Enterprise? Can the pharmaceutical companies that knowingly produced and profited from drugs they new were injurious to health (e.g., Celebrex, Vioxx, and OxyContin) be Lean enterprises? What about the chemicals and coatings manufacturers who knew the toxic consequences of such products as teflon and talcum powder could produce yet sold them while hiding that knowledge? Or can any of the other producers of commodities that have reaped profits but undermined the buyers' well-being be Lean enterprises? Is the *caveat emptor* ("let the buyer beware") principle that is perfectly appropriate within the commonly applied producer-focused, profit-driven approach to commerce also appropriate to the conduct of a Lean enterprise?

Finally, what about profit itself? What does it mean in a Lean Enterprise? Is it *only* money acquired that exceeds all costs? Is it money at all? Do monetary gains, in themselves, advance the purpose of Lean Enterprise? Or do they only advance it based on how that money is applied? Is learning profit? Is having more knowledgeable, better skilled contributors profit?

The issues identified above are just a sampling of the questions we needed to resolve to prepare guidance for the tools we were building.

Executive Functions Guidance

Executive functions are those activities that ensure an enterprise maintains itself as whole, viable, and capable of accomplishing its purpose (Barnard 1968). They include activities such as structuring the organization, setting goals, developing plans, solving organizational problems, and improving organizational performance. They also include the activities that ensure the presence,

engagement, and effective contribution of each person needed to accomplish the business's aim. Finally, they ensure the integration of efforts among all contributors to the business. Most of the tools we were developing were targeted to enable the performance of executive functions. Below, we select three executive activities and discuss the gaps we found in Lean guidance. They are: structuring the organization, developing a market strategy, and structuring employee compensation.

Organizational Structure

Based on our business consulting experience, the organizational structure of almost all companies is a hodgepodge of tradition, some logic, and a good deal of politics. For example, in most businesses you will find parts of one business function split away and placed under different function heads. This splintering of functions hinders implementing important aspects of the Lean Enterprise approach. These include implementing a business measurement system capable of supporting learning from performance; the implementation of an organization-wide, yearly planning and renewal process (Hoshin Kanri); and functional teaming within and across all work units and locations.

Realizing the problems with the existing structures in most business, we decided to develop a tool for restructuring an organization so that it enabled the implementation of Lean thinking. This purpose led to the question of how is a Lean Enterprise structured. We could not find content in our Lean literature research that addressed this question. Yet, without that knowledge one cannot resolve this problem.

Absence explicit guidance, we developed a solution. That solution was triggered by statements made by Tokihiko Enomoto (1995) that revealed to us the role of Chester Barnard in Japanese management's conception of organizational structure.⁵ But, this solution—despite its pedigree, logic, and utility—does not make it Lean thinking. As far as we could discern, Lean community members are not even aware of Barnard and his role in shaping Japanese management thinking.

Market Strategy

The Lean literature is markedly deficient in its discussion of the competitive strategies a Lean Enterprise may undertake. Certainly, one well rooted notion is that a Lean Enterprise competes in the marketplace by offering its prospective customers better value than its competitors. Beyond that point, little to nothing is said about what other marketplace strategies a Lean Enterprise should and should not use to realize its success. For example, one approach to competing in a marketplace is to use control strategies such as creating barriers to entry into a market by potential competitors so that customer choice is limited. IBM reportedly

⁵ Chester Barnard (1886–1961) is considered by many to be the premier theorist on the topics of organization and executive functioning. His seminal work, *The Functions of the Executive*, was published in 1938 and is still taught in graduate programs in business and management today. While the model of organization and executive functions he formulated is an excellent fit to the current dominant approach to commerce, it is *antagonistic* to the Lean Enterprise approach. Nonetheless, his writings about how an organization should be structured, among other topics, were widely praised in Japan in the early 1950s and did contribute to the Lean model (Enomoto, 1995).

used this strategy to build its almost monopolistic control of the “big iron” mainframe computing market in the 1970s and 80s (Baase 1974; U.S. Department of Justice 1995). One technique used was “bundling.” It “often required buyers to pay for a lot of services they did not want at all or could have obtained more cheaply elsewhere, but they wanted IBM equipment enough to accept the package deal” (Baase 1974). As well, some customers complained that IBM threatened “to stop maintenance service or cancel leases if the user attache[d] equipment made by a competitor to an IBM main-frame” (Baase 1974). Microsoft Incorporated used a similar tactic in the 1980s to squash competition to its MS DOS operating system. It required all computer manufacturers to pay for an MS DOS license for every machine they made whether or not it had MS DOS installed. Otherwise, the vendor could not install MS DOS on any of its machines (U.S. Department of Justice 1994). In both cases, the market strategies used were *not* judged *illegal*, although actions to modify the behaviors were negotiated with each company. Nonetheless, can a Lean Enterprise use such strategies? If not, why not?

Another example relates to the practice of externalizing costs. Consider a simple example of involving rework costs. Let’s say that a company attempts to reduce its rework cost by determining the likely breakdown point for its product—essentially, its product’s “mean time to failure” given the product’s existing state of quality in terms of both its design and execution. Despite knowing ways to improve the product’s mean time to failure, the company chooses for profitability reasons to adjust its warranty period so that there is little chance that a product failure will occur within the warranty period. By doing this, the company externalizes the cost of rework. This means, rather than it paying for the product’s repair when it failed, it arranges matters so that the buyer pays. Can a Lean Enterprise use such a strategy? It certainly is legal. If you say “No,” then what if the Lean Enterprise is low on funds and can’t afford to make improvements in its product? Would it then be acceptable? If so, why?

Another strategy producers use involves withholding information from customers that might negatively affect one’s sales or profits. As documented by Vitalo and Bujak (2019), Toyota used this strategy to protect its sales and profits during the period between 1995 and 2010.⁶ It withheld information about defects in its cars. Before that, Tobacco companies used this strategy to sustain their sales of cigarettes for decades (Levin 2006). More recently, Exxon has apparently used it to protect its highly profitable fossil fuel business (Banerjee and Song 2015; Banerjee, Song, and Hasemyer 2015; Banerjee, Song, and Hasemyer 2015a; Cushman 2015; Hasemyer and Cushman, Jr., 2015; Song, Banerjee, and Hasemyer 2015). Again, can a Lean Enterprise use this strategy? If not, why not?

⁶ See *Why Toyota Is Not Lean Thinking’s ‘Rosetta Stone’* (Vitalo and Bujak 2019) for a thorough discussion of the limitations of using Toyota as your guide for understanding what constitutes the Lean approach to commerce.

Externalities

An externality is a cost or benefit experienced by a party who did not participate to the transaction that caused the cost or benefit. Air pollution experienced in eastern states in the United States caused by coal-burning power generating companies operating in the western states is an example of negative externality. Companies implementing the dominant producer-focused, profit-maximizing approach to commerce do not recognize externalities as a producer responsibility. When a negative externality exists in a free market context, producers take no responsibility for the costs required to remedy it nor the human harm it produces. Rather, these consequences are passed on to society. Such companies employ a two part strategy in dealing with externalities. They seek to off-load negative externalities and to maximally benefit from positive externalities.⁷ What is the Lean thinking about how a Lean Enterprise should deal with externalities? What principles should guide its conduct? What is permissible and not permissible?⁸

Employee Compensation

Compensation refers to the monetary benefits provided to employees in exchange for their work. It includes base pay, variable pay, awards, and benefits. Compensation is one of a set of actions that distribute the financial gains produced by a company. The commercial model a business implements and, to some extent, the form of business it assumes (e.g., for profit corporation, limited liability company, partnership) determine how those decisions are made and in whom the power for making them is vested.

Within a producer-focused, profit-maximizing corporation, management decides the compensation for all roles except the chief executive officer role. At least for hourly wage workers, the pay structure is designed to ensure the lowest cost compensation system that will attract, motivate, and retain needed employees since the company seeks to maximize its profit.

What is Lean thinking's guidance on compensation? Liker and Hoseus (2008) describe the approach to compensation they report the Toyota Motor Corporation uses. In the absence of foundational knowledge, Toyota is used as the case example one studies to extract guidance for what constitutes the Lean approach to commerce. Toyota's guiding concept for compensation within the United States is "perceived fairness." If it sets compensation such that employees *perceive it as fair*, then compensation will be deemed acceptable from the employee's perspective. It judges that "perceived fairness" is essential to employee morale and retention, at least in the United States culture.

⁷ Milman (2019) reports on an effort underway to pass legislation that will extend to polluting corporations legal immunity for damages done to the environment by the pollutants they emitted. The law "would squash [a] raft of climate lawsuits launched by cities and counties across the US seeking compensation for damages." The promoters of this plan include British Petroleum, Exxon Mobil, Chevron, ConocoPhillips, Shell Oil Company, and Microsoft Corporation. Can any of these corporations be a Lean Enterprise?

⁸ We are aware of Toyota's publicly expressed vision of community responsibility and acting as a good citizen. However, we cannot use Toyota's words. See *Why Toyota Is Not Lean Thinking's 'Rosetta Stone'* (Vitalo and Bujak 2019) for thorough discussion of the limitations of using Toyota as your guide for understanding what constitutes the Lean approach to commerce.

Operationally, Toyota sets the pay for hourly wage workers using market surveys. These surveys reveal what other companies pay people in specific roles within a geographical area. These surveys always find a range of pay and Toyota attempts to either match the first or second best pay level in a given locale. This intent is subject to a controlling condition. Toyota “wants to be competitive *without giving away its profits* [italics added] (Liker and Hoseus, 2008, page 408).”

But, is “perceived fairness” really “fairness?” And, if not, which is consistent with Lean thinking? Consider these facts. The findings of market surveys for determining a fair wage can be artificially depressed due to coordination between employers for the purpose of suppressing wages or through Governmental actions that weaken labor’s ability to organize and bargain for better wages. An example of the former action, is how major IT companies conspired to and succeeded in suppressing employee wages in Silicon Valley. “In early 2005, ... Apple's Steve Jobs sealed a secret and illegal pact with Google’s Eric Schmidt to artificially push their workers wages lower by agreeing not to recruit each other's employees, sharing wage scale information, and punishing violators” (Ames 2014). The participants in this agreement expanded to include Intel, Adobe, Intuit, and Pixar (Knoczal 2014). With this collusion among employers, employee wages were effectively suppressed. An example of governmental action, both at state and federal levels in the United States over the last 60 years, governments have limited the right of workers to unionize, strike, and otherwise bargain for what they perceive to be fair wages. This weakened state of workers, acknowledge by Federal Reserve Chairpersons Alan Greenspan and Janet Yellen (Pollin 2002), also depresses wages in a locale. By either of these means (employer coordination or governmental action), any market survey would reveal comparative wage levels that would be “perceived” as fair but, by any common sense measure, not be fair.

What if one took a different perspective to judge fairness, a perspective used by businesses themselves? Consider, for the moment, compensation as being an employee’s return on investment. His or her investment is the time, effort, and skill applied in advancing the company’s goals. It also includes all the costs associated with being able to make that investment. These include the currently non-reimbursed cost of the worker’s prior education and non-compensated time spent in developing his or her expertise. It also includes all costs associated with the worker’s personal maintenance (food, shelter, clothing, safety, maintenance of fitness to work, etc.), and any expenses related directly to his or her work (e.g., travel, uniforms, cleaning of uniforms). One might challenge that a truly fair wage must deliver a positive return on this investment. Since employers look at their success in these terms, would it not be “fair” for employees to do likewise? Would this perspective be more consistent with Lean thinking?

Still another possible perspective on fairness is to set “total compensation” as a negotiated portion of the monetary value of what a worker produces for the business.⁹ Such pay would reflect the actual yield of benefits the business derives from the worker’s invested effort. Is this the perspective a Lean Enterprise should assume?

Finally, consider this. Toyota decides what compensation it will pay an employee with an eye to *preserving its profit*. It alone, without transparency, decides what amount of profit Toyota “deserves.”¹⁰ Would not equity in a Lean Enterprise, with its emphasis on team and community, require that both employees and employer participate in this decision making with equal access to information?

Foundational Knowledge

The third significant problem area in documenting the Lean model concerns the absence of an explicit statement of the basic theory that explains why the actions Lean thinking directs one to do make sense. This theoretical underpinning is the set of assumptions from which the model’s various ideas and edicts flow.

All theories of commerce are rooted in its premises about people. This is because commerce is a human activity and, as such, it is an expression of people’s motive, values, inclinations, and purposes. These underpinning premises are the set of assumptions from which the model’s various ideas and edicts devolve. They describe the theory’s view of the nature of people.¹¹ Are people inclined to be self-serving? Do they act on the basis of external rewards alone or is their behavior directed by inner values other than the acquisition of material rewards? Do people consider the effects of their actions on others? Are they inclined to ensure that their actions benefit others as well as themselves? Each of these questions affects whether and how an organization can be created and sustained; whether and how people can be aligned to a common goal; and whether and how one can successfully engage, involve, and enable their successful performance.

The prevailing producer-focused, profit-maximizing approach to commerce, for example, has explicit assumptions about human motivation and the end people pursue when interacting with others. Its view of people’s nature is that they are driven to maximize their gains from every exchange with another and that they rationally pursue this end without regard for the impact of their decisions on others (“Homo Economicus”) (Hubel 2014; Yamagishi, Takagishi, Matsumoto, and Kiyonari 2014). From these assumptions, the model deduces that each person looks out for his or her own interests and engages with others only on a *quid pro quo* basis. In every transaction, each party seeks to get more than he or she gives.

⁹ This calculation could be refined to net out from the value produced whatever producer incurred costs were expended to produce that value and *add in* whatever costs for producing that value were born by the employee.

¹⁰ We say, “without transparency” because we have not read anywhere that the Toyota Motor Corporation uses *open book accounting* to share financial information with its employees and nor do they share the specific decision criteria executives use in making financial choices.

¹¹ They also describe the context within which people will be acting when they engage in commerce. For example, is the setting one in which each party has equal power and equal information? For our purposes here, we will defer addressing this set of assumptions.

Based on this thinking, people join an organization to garner material rewards. Thus, employees should be recruited using monetary incentives. They should be persuaded that the deal being offered is the best they can expect to find anywhere. As to obtaining from employees the performance the business seeks, employees must be ‘managed’— i.e., actively supervised to ensure that they align to the organization’s purpose since their intrinsic direction is to pursue their own interest. Given that their interest is to maximize their own benefits, they will be inclined to do the least to get the most (Hubel 2014). That is, to take the rewards while not having to give the effort expected in return.

Within the context of seller-buyer exchanges, these assumptions translate into the rule of *caveat emptor*—“let the buyer beware.” The producer-focused, profit-maximizing model assumes that it is the customer’s responsibility to look out for his or her own interest, not the producer’s. The producer seeks to maximize profit measured monetarily. The buyer seeks to maximize the satisfaction of his or her values, which, in economics, is also measured monetarily.

What are Lean Enterprise’s assumptions about people? How does Lean thinking replace this producer-focused, profit-maximizing set of assumptions? Does Lean thinking accept that model’s assumptions that people operate from self-interest alone and are a singularly focused on maximizing their personal gain? Is a Lean marketplace rules by *caveat emptor*?

If you think the answers to Lean’s assumptions about people are contained in the Lean management literature, think again. Lean management guidance is essentially a set of rubrics that clarify what one should do and how one should behave. “Strive for perfection in all operations.” “Respect people.” And many others. While at first it may appear that one can extract from these rubrics Lean’s view of the nature of people, that is not the case. For example, the two just mentioned rubric might imply the need to correct an inconsistent underlying inclination within people—i.e., peoples inclination to not strive to improve themselves or not respect others. Or, they may be attempts to reinforce and encourage the free expression of an inherent inclination people already possess. Vitalo and Bujak (2019a) attempted to derive Lean’s perspective of human nature from Lean management’s rubrics and failed. In their article, *Why Lean Management’s Rubrics Cannot Tell Us What Lean’s View of People Is*, they demonstrate that it is not possible to extract a definitive statement of Lean’s perspective on the nature of people from its guidance for how to manage a Lean enterprise.

Another possible response a Lean community member might offer is that there is no need to replace the assumptions about people that underpin the dominant producer-focused, profit-maximizing approach to commerce. People can act from that basis and still provide benefit to others (i.e., value-adding products) because “Benefiting others will maximize benefit for oneself.” This “enlightened self-interest” response, however, does not withstand real-world, rational analysis. First, in the zero sum world of the dominant approach to commerce (Emiliani 2004), any benefit a second party gains from a transaction is benefit lost to the first party. Second, if I, as an individual, am driven to maximize my personal gain, I will seek out a way to get all I can from

every exchange with another. Based on the self-interest model, I would search out and use methods that accomplish the redistribution of all benefits to myself. And, those methods both exist and are in use. Essentially, they boil down to establishing power over the other party in commerce. The means for doing such are many. A few have been described above. The methods may be direct, as through the use of deception, misinformation, or the withholding of information. They may be indirect, as through the manipulation of the commercial context by influencing law and regulation or by colluding with others.

If you counter argue that one cannot continue to exploit others in a commercial context over the long-term and win—again, you would be historically wrong. As just one example, big Tobacco did it and these firms continue to thrive today.

Finally, consider the time horizon for “self.” By definition, it is the length of one’s adult life or, more narrowly, one’s commercial career. While a business may exist over many employee “lifetimes,” it is implemented by people pursuing their self interest within their limited lifetimes. Any argument that self-interest will be constrained by the ‘long view’ in which the long view assumes the accumulation of wealth past one’s personal lifetime is, by definition, nonsensical since it implies that self-interest persists past the death of ‘self.’

The Missing Deming Content

If Lean community members seek to establish the set of premises that underlay their approach to executive functions, they have easy access to a beginning point. Our research to find answers to the problems described above, and others not detailed here, led us to revisit the work of W. Edwards Deming. We say revisit because both of the current authors had studied and used Deming’s ideas in our early careers as managers and consultants. When Lean emerged, we both heard echoes of Deming in it edicts but rarely saw any mention of him outside of Lean’s incorporation of his Plan Do Check Act tool for guiding problem solving actions.¹² Based on our further research of Deming (Vitalo 2017), however, it was clear to us that he had made *the* seminal contribution to what evolved into the Lean model. We based this judgment on eight facts.

- First, Deming’s thinking and the Lean model’s views concerning the role of executives, managers, and supervisors are essentially identical *except* that Deming’s provides a theoretical underpinning for it.
- Second, Deming taught the leaders of Japanese industry about the quality approach to commerce through the auspices of the Union of Japanese Science and Engineering (JUSE) beginning in June, 1950. His teaching of top Japanese management began in 1950 at the

¹² Actually, the tool derives from Shewhart. Deming consistently represents the four-stage Shewhart cycle as plan, do, study, and act and sees it as a systematic process for uncovering “learning, and for improvement of a product or process” (Deming, 2000, page 131).¹ In his earlier works, he refers to it as the “Shewhart Cycle.” Later, he labels it the “PDSA Cycle.” See Exhibit 14, Deming’s Different Representations of the Shewhart Cycle in *Deming Revisited: The Real Quality Model for Commerce* (Vitalo 2017).

Hotel de Yama on Mt. Hakone in Japan (Deming 1950a, 1982a). He continued to teach and consult with Japanese management throughout the decade and into the 1960s.¹³

- Third, Deming played a pivotal role in enabling the resurrection of Japanese industry to its place of worldwide importance in the post 1950s era. Indeed, Japan, as a nation, recognized Deming's contributions to the resurrection of its industry by extending to him the Second Order Medal of the Sacred Treasure.
- Fourth, Ohno himself stated, "The Toyota production system is one and the same with TQC¹⁴ They are simply different names for the same basic approach" (Shimokawa and Fujimoto 2009, page 3).¹⁵
- Fifth, Masao Nemoto, a former Toyota senior Manager, credited Womack, Jones, and Roos' original book on Lean by stating that, "It was truly an excellent book." But, he went on to say that, "Its one really disappointing flaw is that it fails to mention the role of TQC in Lean manufacturing. It's a pretty thick book, but even where it mentions quality control, it leaves of the *T* [for Total]" (Shimokawa and Fujimoto, 2009, page 175).
- Sixth, Toyota's rise as a automobile manufacturer took off in the 1960s *after it adopted Deming's quality management approach* (Shimokawa and Fujimoto, 2009, page 177).
- Seventh, 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). The Toyota Production System is often cited as a foundation for the Lean Enterprise model.
- Eighth, many elements essential to Lean thinking were first expressed by Deming in his teaching to Japanese leaders. Just one example is the concept of the value stream and the necessity of managing from perspective of the whole system. In *Out of Crisis*, Deming reproduces a graphic of what, in Lean lexicon, we term the extended value stream (Deming, 1982a, Figure 1, page 4). In its caption, he tells us that "This chart was first used in August 1950 at a conference with top Japanese management at the Hotel de Yama on Mt. Hakone in Japan." Elsewhere he states "The simple flow diagram was on the blackboard at every conference with top management in 1950 and onward" (Deming, 2000, page 57). Another

¹³ Noguchi (1995) claims that Deming did not specifically teach his "14 management points" in Japan; however, a review of the contents of his lectures and his notes indicate that the same ideas were embedded in the content he presented.

¹⁴ TQC is the term used at Toyota to refer to Deming's total quality management as reflected in the standards used to assess the Deming Quality Prize in Japan (Union of Japanese Scientists and Engineers, 2016).

¹⁵ Of course, Ohno did also reveal in this statement his incorrect understand of total quality management as he aligns it with the "principle of zero defects" (Shimokawa and Fujimoto 2009, page 3). Deming abhorred "zero defect" and condemned it as an empty slogan. He stated, "Of course we do not want to violate specification, but to meet specifications is not enough" (Deming 2000, page 16). One can have zero defects many ways, most which can still deliver customers undesired outputs to customers. Nonetheless, Michikazu Tanaka, a student Ohno, does confirm the importance of Deming. He reports that, "Ohno always said, 'Kanban won't work right anywhere that TQC isn't working right. ... The kanban system only works when you're making quality products'" (Shimokawa and Fujimoto 2009, page 9). Thus, Ohno's acknowledgment of Deming's contribution appears to stand.

example is the redefinition of the management role from oversight and control to enabler of every employee's success (Vitalo 2017). Exhibit 3, next page, provides additional examples.

Most relevant to this paper, Deming's teaching is underpinned by four sets of what he termed "profound knowledge." He declares managers must master this knowledge because it provides the "why" behind all management decision making and actions (Deming 2000; Vitalo 2017). These four domains of knowledge are:

- a theory of organization (the nature of systems),
- the concept of variation and its significance,
- a theory of knowledge, and
- the basic principles that reveal the nature of people and the source of their striving.

Should the Lean community seek to develop its fundamental premises about the nature of people, human organizations, and commerce itself, Deming's thinking would be the place to start. It provides a knowledge foundation for all Lean's executive guidance.

To explore further Deming contributions to Lean thinking, see *Deming Revisited: The Real Quality Model* (Vitalo 2017). This monograph provides a detailed analysis of Deming's thinking and contains citations to his original works. Use this monograph as a pathway into primary sources: Deming 1950, 1950a, 1967, 1975, 1982, 1982a, 1988; Reddie 2001; and Deming Prize 2006.

Exhibit 3. Examples of Elements in Lean Thinking First Expressed by Deming

1. Anchoring enterprise success in maximizing the delivery of value to customers as judged by customers. (Aim of commerce)
2. Deming's inclusive perspective as to whom commerce must benefit— customers, employees, owners, suppliers, community, etc. (Stakeholders to commerce)
3. Anchoring product development and all improvement efforts in research revealing customer wants and needs (Customer research)
4. Using cross-functional teaming in developing new products and their implementing processes (Teamed product development)
5. The concept of preventing errors rather than correcting mistakes. (Poka yoke)
6. The continuous pursuit of perfection through an endless cycle of Research, Design, Production, Sales (Deming Wheel)
7. The role of continuous improvement through learning as the engine of commercial success (Learning as the engine of improvement)
8. The use of systematic methods to solve problems in production and the use of experimentation to research new ways to improve products and methods (Problem solving and Experimentation)
9. The recognition that the greatest waste in enterprise is the failure to recognize and engage the knowledge and full capabilities of employees
10. The re-definition of the role for management from oversight and control to enabler of every employee's success (Manager as enabler)
11. The responsibility of managers to support every employee in realizing the fullness of his or her capabilities. (Employee development)
12. The importance of effective training in enabling employee success (Training development)
13. The importance of the supply chain and teaming with suppliers to realize the deliver of maximum value to customers (Supply chain integration)
14. The edict that manager decisions and action must be based on knowledge not intuition or the mere imitation of others. (Knowledge-driven management)
15. The necessity for management to manage from the perspective of the whole system and avoid local optimization (Avoid component optimization)
16. The use of the value stream concept and graphic to enable people to envision the whole system (Value stream mapping)
17. The understanding that process improvement required process standardization and documentation. (Standardized work)
18. The development of a culture of teaming across the enterprise (Teamed organization)
19. The use of measurement of *both* process and outcome and its use to support learning by everyone (Measure means and ends)

References

- Ames, M. (2014, January 23). The Techtopus: How Silicon Valley's most celebrated CEOs conspired to drive down 100,000 tech engineers' wages. Retrieved October 2, 2015, from <https://pando.com/2014/01/23/the-techtopus-how-silicon-valleys-most-celebrated-ceos-conspired-to-drive-down-100000-tech-engineers-wages/>
- Baase, S. (1974). IBM: Producer or predator. *Reason*, April 1974, 4-10. Retrieved February 10, 2017, from <https://www-rohan.sdsu.edu/faculty/giftfire/ibm.html>
- Bainbridge, S. (2012). The shareholder wealth maximization norm. Retrieved August 28, 2013, from <http://www.professorbainbridge.com/professorbainbridgecom/2012/05/the-shareholder-wealth-maximization-norm.html>
- Banerjee, N. & Song, L. (2015, October 8). Exxon's Business Ambition Collided with Climate Change Under a Distant Sea. *InsideClimateNews*. Retrieved October 27, 2015, from <http://insideclimatenews.org/news/08102015/Exxons-Business-Ambition-Collided-with-Climate-Change-Under-a-Distant-Sea>
- Banerjee, N.; Song, L.; & Hasemyer, D. (2015, October 16). Exxon's Own Research Confirmed Fossil Fuels' Role in Global Warming Decades Ago. *InsideClimateNews*. Retrieved October 27, 2015, from <http://insideclimatenews.org/news/15092015/Exxons-own-research-confirmed-fossil-fuels-role-in-global-warming>
- Banerjee, N.; Song, L.; & Hasemyer, D. (2015a, October 17). Exxon believed deep dive into climate research would protect its business. *InsideClimateNews*. Retrieved October 27, 2015, from <http://insideclimatenews.org/news/16092015/exxon-believed-deep-dive-into-climate-research-would-protect-its-business>
- Barnard, C.I. (1968). *The functions of the executive*. Cambridge, MA: Harvard University Press.
- Cushman, Jr., J.H. (2015, October 8). Highlighting the allure of synfuels, Exxon played down the climate risks. *InsideClimateNews*. Retrieved October 27, 2015, from <http://insideclimatenews.org/news/08102015/highlighting-allure-synfuels-exxon-played-down-climate-risks>
- Deming, W.E. (1950). *Elementary principles of the statistical control of quality: A series of lectures*. Tokyo, Japan: Nippon Kagaku Gijutsu Renmei.
- Deming, W.E. (1950a). First lecture to Japanese industry leaders at Mt. Hakone. (John Dowd, Translation). Union of Japanese Science and Engineering (JUSE). Retrieved June 2, 2019, from <https://curiouscat.com/management/deming/deming-1950-japan-speech-mt-hakone>
- Deming, W.E. (1967). What happened in Japan. *Industrial Quality Control*, 24(2), August 1967, 89-93.
- Deming, W.E. (1975). On probability as a basis for action. *The American Statistician*, 29(4), 146-152.
- Deming, W.E. (1982). *Quality, productivity and competitive position*. Cambridge, MA: Massachusetts Institute of Technology Center for Advanced Engineering Study.
- Deming, W.E. (1982a). *Out of crisis*. Cambridge, MA: Massachusetts Institute of Technology Center for Advanced Engineering Study.
- Deming, W.E. (1988). Quality and the required style of management - the need for change. *Journal for Quality and Participation*, 17(7), 1-2.
- Deming, W.E. (2000). *The new economics: For industry, government, education* (2nd edition). Cambridge, MA: Massachusetts Institute of Technology Center for Advanced Engineering Study.

- Deming Prize (2006, March 13). Deming prize. *The Everything Japanese Guide*. Retrieved March 4, 2017, from <https://web.archive.org/web/20090105221133/http://www.japanese123.com/deming1.htm>
- Emiliani, M.L. (2004). Is management education beneficial to society? *Management Decision*, 42(3/4), 481-498. Retrieved February 4, 2017, from https://www.researchgate.net/publication/235311329_Is_management_education_beneficial_to_society
- Emiliani, M.L. (2011). Moving forward faster: The mental evolution from fake Lean to REAL Lean. Kensington, CT: The Center for Lean Business Management, LLC.
- Enomoto, T. (1995). The individual in the group. In P. Graham (Ed.), *Mary Parker Follett profit of management* (240–45), Washington, DC: Beard Books.
- Friedman, M. (1970, September 13). The social responsibility of business is to increase its profits. *The New York Times Magazine*. Retrieved February 9, 2011, from <http://www.colorado.edu/studentgroups/libertarians/issues/friedman-soc-resp-business.html>
- Hasemyer, D. & Cushman, Jr., J.H. (2015, October 22). Exxon sowed doubt about climate science for decades by stressing uncertainty. *InsideClimateNews*. Retrieved October 27, 2015, from <http://insideclimatenews.org/news/22102015/Exxon-Sowed-Doubt-about-Climate-Science-for-Decades-by-Stressing-Uncertainty>
- Hubel, P. (2014). Is homo economus a psychopath? *Forbes Magazine*. Retrieved June 10, 2019, from <https://www.forbes.com/sites/peterubel/2014/12/15/is-homo-economicus-a-psychopath/#1f35cbe1604e>
- Jones, D. T. (2016). Dan Jones on lean as a strategy to create better products. Retrieved February 3, 2017, from <http://planet-lean.com/dan-jones-on-lean-as-a-strategy-to-create-better-products>
- Knoczal, M. (2014). The Silicon Valley Labor Scandals Prove Minimum Wage Hikes Don't Cost Jobs. *The New Republic*. Retrieved June 1, 2019, from <https://newrepublic.com/article/116608/silicon-valley-labor-scandals-prove-minimum-wage-hikes-dont-cost-jobs>
- Levin, M. (2006). Big tobacco is guilty of conspiracy. *The Los Angeles Times*. Retrieved November 18, 2015, from <http://articles.latimes.com/2006/aug/18/nation/na-smoke18>
- Liker, J.K. & Hoseus, M. (2008). *The Toyota culture: The heart and soul of the Toyota way*. New York: NY, McGraw-Hill.
- Meyer, K. (2012). 5 questions - meet Art Byrne. Retrieved 08/23/13, from <http://www.evolvingexcellence.com/blog/2012/10/5-questions-meet-art-byrne.html>
- Milman, O. (2019). Microsoft joins group seeking to kill off historic climate change lawsuits. *The Guardian*. Retrieved June 11, 2019, from <https://www.theguardian.com/technology/2019/may/01/microsoft-joins-group-seeking-to-avoid-climate-change-lawsuit>
- Noguchi, J. (1995). The Legacy of W. Edwards Deming. *Quality Progress*, 28(12), 35-37
- Ohno, T. (1988). *Toyota production system*. New York, NY: Productivity Press.
- Ohno, T. (2013). *Workplace management*. New York, NY: McGraw-Hill.
- Pollin, R. (2002). Wage bargaining and the U.S. Phillips Curve: Was Greenspan right about “Traumatized Workers” in the 1990s? Department of Economics and Political Economy Research Institute (PERI) University of Massachusetts-Amherst Amherst, MA. Retrieved February 24, 2017, from <http://courses.umass.edu/econ797a-rpollin/Pollin--Was%20Greenspan%20Right%20about%20Traumatized%20Workers.pdf>

- Reddie, B. (2001). The Deming Wheel - A study. Retrieved April 1, 2014, from <http://deming.india.8m.com/THE%20%20DEMING%20%20WHEEL.htm>
- Shimokawa, K. & Fujimoto, T. (Eds.) (2009). *The birth of lean*. Cambridge, MA: Lean Enterprise Institute.
- Song, L., Banerjee, N., & Hasemyer, D. (2015, September 9). Exxon confirmed global warming consensus in 1982 with in-house climate models. *InsideClimateNews*. Retrieved February 10, 2017, from <https://insideclimatenews.org/news/18092015/exxon-confirmed-global-warming-consensus-in-1982-with-in-house-climate-models>
- Toyoda, S. (1988). Statement about the significance of Deming for the management approach of the Toyota Motor Company. In Burns, A.D. (2008a). Six Sigma lessons from Deming, Part 2, *Quality Digest*. Retrieved February 22, 2012, from <http://www.qualitydigest.com/inside/six-sigma-article/six-sigma-lessons-deming-part-2>
- U.S. Department of Justice (1994, July 16). Microsoft agrees to end unfair monopolistic practices. Retrieved June 1, 2019, from <https://www.justice.gov/sites/default/files/atr/legacy/2006/04/11/msjudge.pdf>
- U.S. Department of Justice (1995). United States' memorandum on the 1969 Case. Retrieved February 10, 2017, from <https://www.justice.gov/atr/case-document/united-states-memorandum-1969-case>
- Union of Japanese Scientists and Engineers (2016). On revision of Deming Evaluation Criteria (From FY 2018). Retrieved February 12, 2017, from http://www.juse.or.jp/upload/files/hyoukakijyun_en_20161207.pdf
- Vitalo, R.L. (2017). Deming revisited: The real Quality Model for commerce. Vital Enterprises. Retrieved November 29, 2017, from http://www.vitalentusa.com/links/pdfs/deming_revisited-Vitalo.pdf
- Vitalo, R.L. & Bujak, C.J. (2019). Why Toyota is not Lean thinking's 'Rosetta Stone.' *Vital Enterprises*. Retrieved June 16, 2019, from http://www.vitalentusa.com/learn/toyota_not_lean_rosetta_stone.php
- Vitalo R.L. & Bujak, C.J. (2019a). The missing foundation for Lean management's guidance. *Vital Enterprises*. Retrieved June 16, 2019, from http://www.vitalentusa.com/learn/missing_foundation.php
- Womack, J.P. (2010). Beyond Toyota. Message posted to Jim Womack's E-letters, archived at <http://www.lean.org/common/display/?o=1306>
- Womack, J.P. (2010a). Back to work. Message posted to Jim Womack's E-letters, archived at <http://www.lean.org/common/display/?o=1366>
- Womack, J.P. (2016). You can't make countries great without great jobs. Retrieved February 3, 2017, from <http://planet-lean.com/you-can-t-make-countries-great-without-great-jobs>
- Womack, J.P. & Jones, D.T. (2003). *Lean thinking*. (Rev. ed.) New York: Free Press.
- Womack, J.P., Jones, D.T., & Roos, D. (1991). *The machine that changed the world*. New York: HarperCollins Publishers.
- Yamagishi, T.; Li, Y.; Takagishi, H.; Matsumoto, Y. & Kiyonari, T. (2014). In search of homo economicus. *Psychological Science*, 25(9) 1699–1711.

Vital Enterprises

8105 Luling Lane
Austin, TX 78729

Fax: 512.514.0518

WWW.VITALENTUSA.COM

