

UNLEASHING WEALTH CREATION: FINANCIAL DOMINANCE THROUGH BUILDING LEAN PRODUCT AND PROCESS DEVELOPMENT CAPABILITY WITH YOUR PEOPLE

Central to success is building capable people
by developing them with actual work.

JIM HUNTZINGER AND MATT ZAYKO

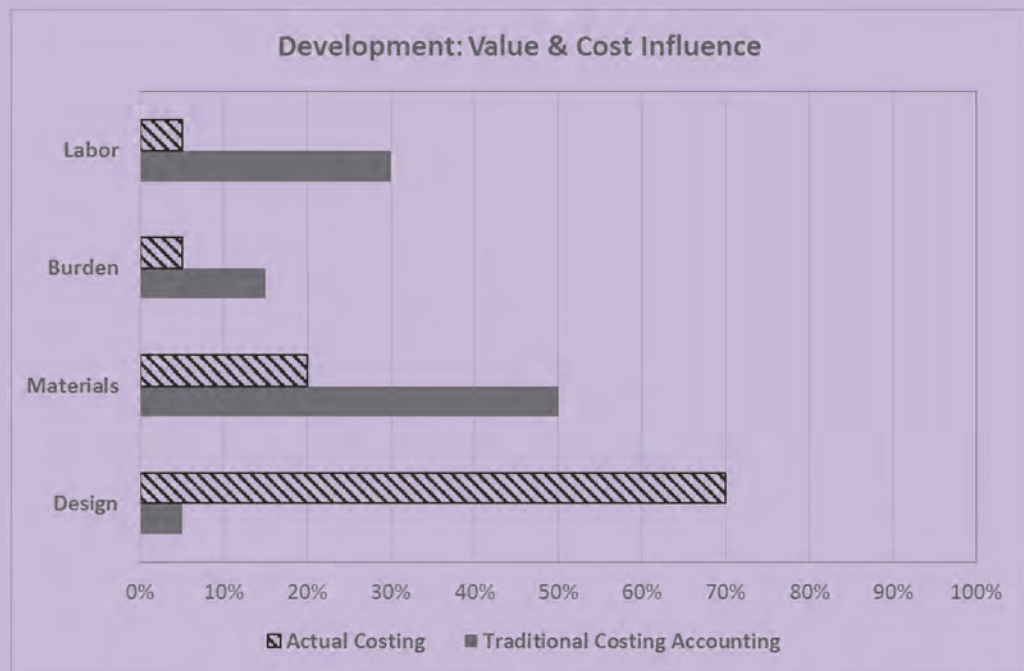
People have been striving to become lean in their organizations since the 1990 publication of *The Machine That Changed the World* by Womack, Jones, and Roos, who coined

the term “lean” and focused on the enterprise level in the global automotive industry.¹ The power of capable people using lean thinking and concepts was tremendous — half the time, capital investment, human resources, inventory,

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MATT ZAYKO has 25 years of experience in leading lean enterprise improvements in numerous industries by helping them transform product development, engineering, manufacturing, service processes, and operating systems. An industrial engineer by training, Matt worked in a variety of roles at leading organizations under the guidance of former Toyota mentors before starting his consultancy and affiliating with the Lean Enterprise Institute (LEI). Matt has authored numerous works based on successful transformation and is a frequent presenter at conferences related to lean transformation and a long-time faculty member of LEI, working closely with smaller, entrepreneurial-minded organizations, as well as larger global companies.

EXHIBIT 1 Development: Value and Cost Influence



*Data taken from "History Lean Design," Munroe & Associates, Inc. Available at: <https://leandesign.com/history-of-lean-design/>.

floor space, warranty costs, defects, and more.

The publication of *Lean Thinking* in 1996 demonstrated how organizations other than Toyota were using lean principles for a competitive advantage, primarily in operations. Subsequent publications of *The Toyota Product Development System* in 2006 by Morgan and Liker and *Lean Product and Process Development* by Ward cast a light on applying lean thinking and techniques to the development arena.² These publications came out at a time when development consisted primarily of hardware with very little software integration, whereas today the two must be tightly coupled together.

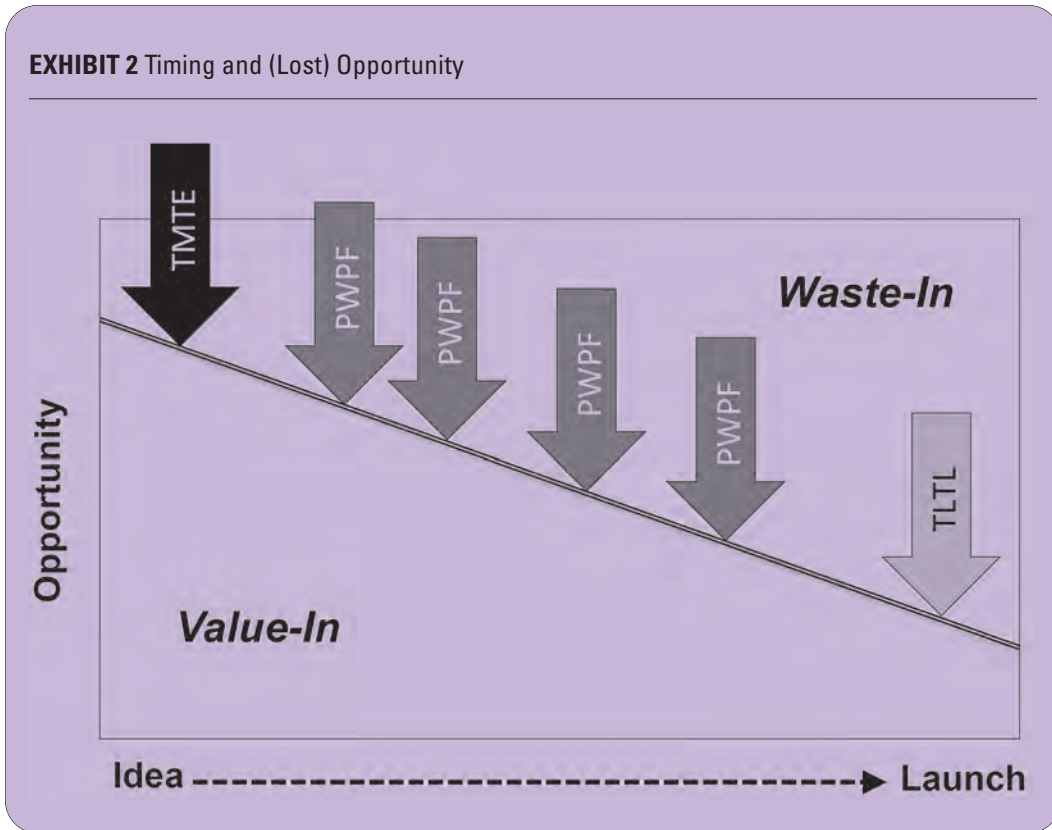
While lean thinking has made great strides as an operational element for many organizations, albeit sometimes with difficulty in sustaining it long-term, there has been only limited progress in the area of new product and process development focused on the total life cycle. As a result, since all operational value streams are the output of an initial new product and process development program,

most of the operational improvement that has occurred over time could actually be categorized as engineering rework.

Even more surprising is the fact that, from an economic and financial aspect, as much as 80 percent of the cost of a product is typically committed during the upfront product and process development stage, yet many are still only addressing the 20 percent that is not locked in during development. Another way to look at this is that the best time to define the value for the customer and design both the product and processes to meet their requirements is as close to the idea stage as possible. The graph in Exhibit 1, based on the original Munro Shadow Chart, helps to show the influence of development decisions on value and cost for new products.

One reason why most organizations do not recognize that 80 percent of costs are committed during the product and process development stages is that the financials used to manage the process are based on a traditional cost accounting model. This antiquated model tends to favor the tracking

EXHIBIT 2 Timing and (Lost) Opportunity



of when or where costs are *incurred* versus when or where costs are *committed*. Even if development teams want to do more upfront engineering work to address the 80 percent opportunity, they will have to convince the rest of the organization to shift more resources — personnel and funding — upstream in the short-term to provide the capacity. Due diligence must be done to determine which resources to shift. This, if done properly, will greatly reduce the downstream resources necessary in the longer term.

An important cautionary note. If we do not clearly define this value at product and process levels, then waste becomes embedded into the development system, which makes up the majority of the cost and erodes the customer experience and profitability (Exhibit 2).

Why aren't more companies experimenting with lean in development, given the known benefits?

Lean product and process development (LPPD) has made some progress in the lean community, but is greatly trailing

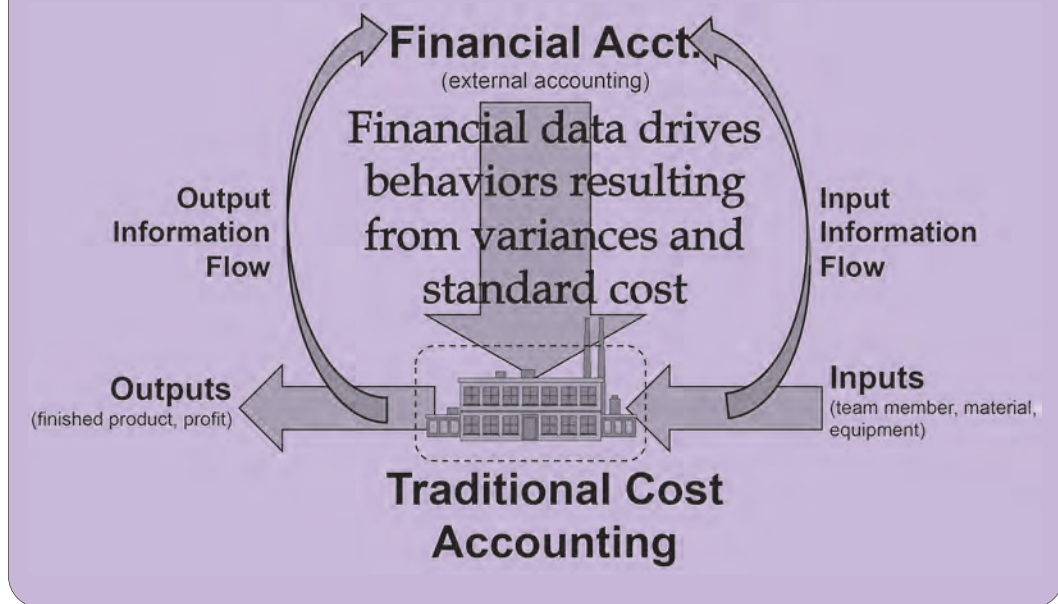
overall in enterprise awareness and use. While product development on its own has made progress, process development is nearly nonexistent other than the *kaizen* (Japanese for “continuous improvement”) workshop or similar variants that occur after production is underway.

So, what is the general current state of knowledge on LPPD impact? Here is what is known about performance for companies that have successfully embedded LPPD principles and thinking into their development system (based on *The Toyota Product Development System*³):

- 40–60 percent lead time reduction from idea to launch;
- 25 percent lower overall development cost;
- highest quality levels in industry; and
- capturing of knowledge for the next generation of product.

From an economic and financial perspective, LPPD is, by a massive margin, the most impactful practice and function of a lean enterprise in terms of increasing both the velocity and magnitude of wealth creation for customers, yet most companies still struggle to identify this opportunity

EXHIBIT 3 Traditional Cost Accounting



for themselves. The 80 percent of economic and financial impacts it can have on an organization (productivity, capital, and the management system), once lost, cannot be recovered. The industrial community is complacent about this, with far too little activity in this regard.

The “black box” concept of cost and operational management is another under-used idea. The black box, which represents operations, is misunderstood even by most lean organizations. While product cost information is very important to the lean enterprise, it simply is not used to manage day-to-day operations, hence the concept of the black box that is left unopened. Organizations employing traditional internal accounting methods, including many lean organizations, use variances and standard cost data to drive daily operations instead (see Exhibit 3).

Organizations practicing lean accounting (see Exhibit 4) abandon the practice of standard costing and variances. Lean organizations do *not* allow financial data to directly drive behaviors in daily operations. Instead, they use operational data and robust processes. Examples of these are throughput time, pull systems, and continuous improvement to drive and guide behaviors and operational changes needed

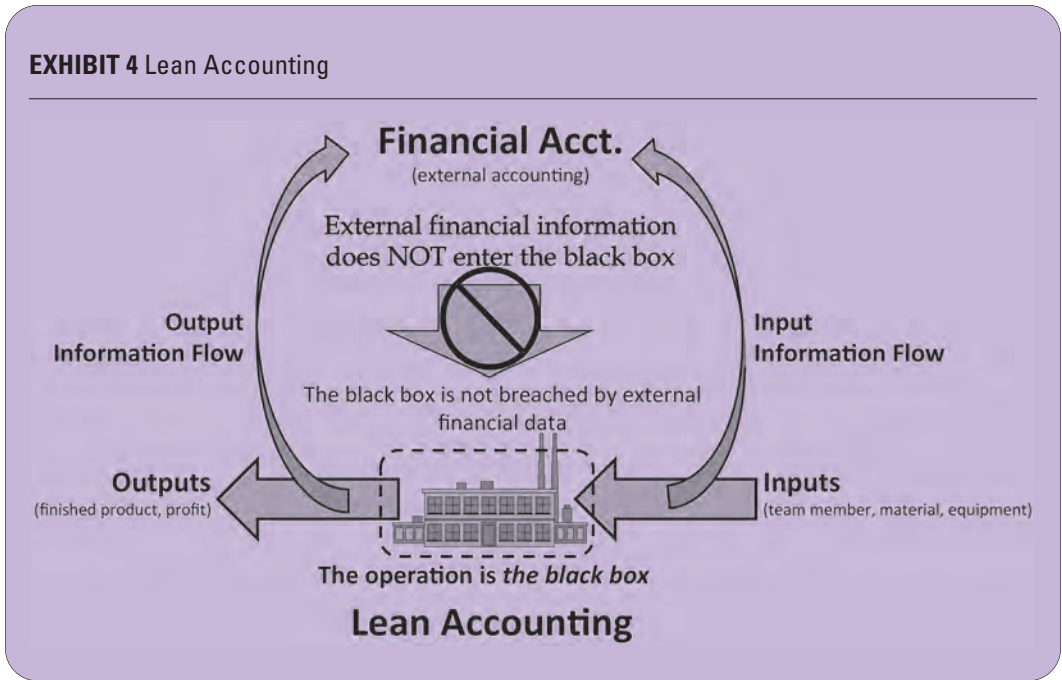
to achieve on-time delivery and customer satisfaction.

Improvement — often referred to as *kaizen* — is certainly worthwhile. Central to success is building capable people by developing them with actual work. This achieves the much higher-level purpose of developing the usable skills, actionable knowledge, and hands-on experience of people at every level. This will accelerate their problem-solving skills and experience to handle more complex problems in order to increase efficiency of production and design in order to repeat and achieve the next level. The next level significantly impacts improvements in product development timeline, process design for flow, and finally operational execution — all with a focus on customer needs and satisfaction.

The lack of *kaizen* creates a tremendous gap, and an immense amount of capital improvement, margin increase, and profit increase are lost as a result. Most importantly, there is a massive missed opportunity for knowledge and skill development within people at a company.

Organizations, including most mature lean companies, perceive product and process development as a set of tactics rather than an organizational strategy. This,

EXHIBIT 4 Lean Accounting



in turn, contributes to a lack of synchronization between product development and process development, and the continued release of subpar products and operational capability. There are few leaders in development who understand, guide, and mentor others in the organization to continually renew these skills and organizational guidance. This greatly limits the technical resources and skills available and creates immense rework.

Target conditions for LPPD

Strategic purpose of product and process development. In order to develop the appropriate target conditions for LPPD, it is important to align around the purpose of development in a lean organization. For mature lean-thinking companies, development has three purposes:

- create a definition of value from the customer’s perspective;
- create profitable operational value streams; and
- create useful knowledge.

This clear articulation of the purpose comes partly from the late Professor Allen Ward based on his studies, started in the 1990s, of Toyota’s product development system. It is a powerful summary of a fundamentally different perspective on development. Ward specifically called this out

as “development” and not solely “product development” or “process development.” He did this to clearly show that the responsibility for designing the product, selecting the process, organizing the value-added work, and creating the operational value stream had to belong to one capable team with a strong leader who served as the voice of the customer. Without this, each of the functions or areas would suboptimize the overall system by making shortsighted, local decisions that were in their own best interests.⁴

Tactical principles for target conditions.

Four tactical principles must be met to achieve target conditions for LPPD:

- A team of responsible experts is dedicated to collaborate with a strong leader on a shared vision, starting with customer value;
- The work to design both the product and its processes follows a repeatable routine and is integrated early on in the development cycle and is connected to the operational conditions for successful delivery to the customer;
- Multiple alternative concepts are explored early in the design space for maximum learning and leveraging of the learning; and
- The development work has a clearly defined management system cadence

to bring stability and maintain pacing, as well as to capture learning to improve for the next generation of development work.

The capability of an organization's people in building their development skills, knowledge, and experience is embedded in the actual work. This must be a conscious and deliberate effort on the part of the organization and leadership. For this reason, having a mentor/coach-style structure is critical to advancing the overall capacity and capability of people in the organization. This learn-by-doing approach and practice must be a deliberate structure that is part of the overall organizational objectives if it is to succeed.

Call to action

With a clear recognition of the powerful impact that lean product and process development actions have on an organization, as well as LPPD's strategic purpose and key tactical principles, the key decision makers for investment in future products are prepared to build momentum for improving how they create new value with deliberate effort.

The following questions should be used to help you assess your situation and serve as a baseline for an actionable framework to improve your own development system for creating new value for customers.

- How will you find a candidate to lead a team of responsible experts?

- What is your plan for identifying and building internal capability to provide the necessary technical knowledge?
- What is your understanding of value from the customer's viewpoint?
- How will you gain alignment on how the actual work will be organized to provide the value, from idea to production start? (Key point: Product and process development value stream mapping is one way to capture the work.)
- What is your plan to have adequate resource capacity available to begin to front-load the appropriate engineering work?
- What is your plan to visually manage the development work for learning, executing, and improving?
- How will you capture and share useful knowledge for the organization and for the next generation of team members involved in development?

In a future article, the authors will detail the technical framework that underlies many of the tactical principles introduced here. ■

NOTES

¹ Womack, J.P., Jones, D.T., and Roos, D., *The Machine That Changed the World*. (New York: Free Press, 1990).

² Womack, J.P. and Jones, D.T., *Lean Thinking*. (New York: Free Press, 1996); Morgan, J.M. and Liker, J.K., *The Toyota Product Development System*. (New York: Productivity Press, 2006); Ward, A.C., *Lean Product and Process Development*. (Cambridge, M.A.: Lean Enterprise Institute, 2007).

³ *Ibid.* Morgan and Liker.

⁴ *Op. cit.* note 2 Ward.