A Systematic View of Lean Principles:
Reflection on the Past 16 Years of Lean Thinking & Learning

By Matt Zayko

In 1990, *The Machine That Changed The World (Machine)*, packed with quantitative evidence, showed the automotive community how far ahead certain Japanese automakers were in manufacturing, design, and supply chain using lean production techniques pioneered and fine-tuned by Toyota over the previous 40 years. The vast gap between the lean producers and mass producers was startling.

Lean Thinking, the 1996 follow-up book, outlined some of the means that progressive companies were using to achieve a "leaner" state. Related books since tell similar stories across many industries and cultures. Numerous conferences, seminars, training organizations, and other resources further document and detail the progress or methods involved in getting lean. In addition, e-business, off-shoring, outsourcing, process automation, and other trends and management panaceas have and will continue to capture attention from those who may be addicted to insight, which sometimes serves as a distraction from moving toward the ideal end state vision as leaders erroneously attempt to fit their problem to a specific solution.

In the 16 years since *Machine* was first published and in the 10 years since the follow-up *Lean Thinking* started us down a clearer path, how much has our thinking been changed, and how much have we learned? Two things that are much clearer are the dominance of Toyota in the automotive industry and that Toyota uses a systematic approach to its enterprise improvement. This systems-based thinking focuses on the value creating processes for raw material-to-finished product, order-to-delivery, concept-to-launch, etc., rather than just departments and functions. Additionally, there is extensive development of people, not just products. Perhaps one way to approach the above questions on learning and thinking is to look at progress that has been made in certain subsystems that make up the larger product lifecycle system of the lean enterprise, as well as advances made at the top-level overall enterprise that balances it all together. Figure 1 shows these different subsystems that will be discussed.

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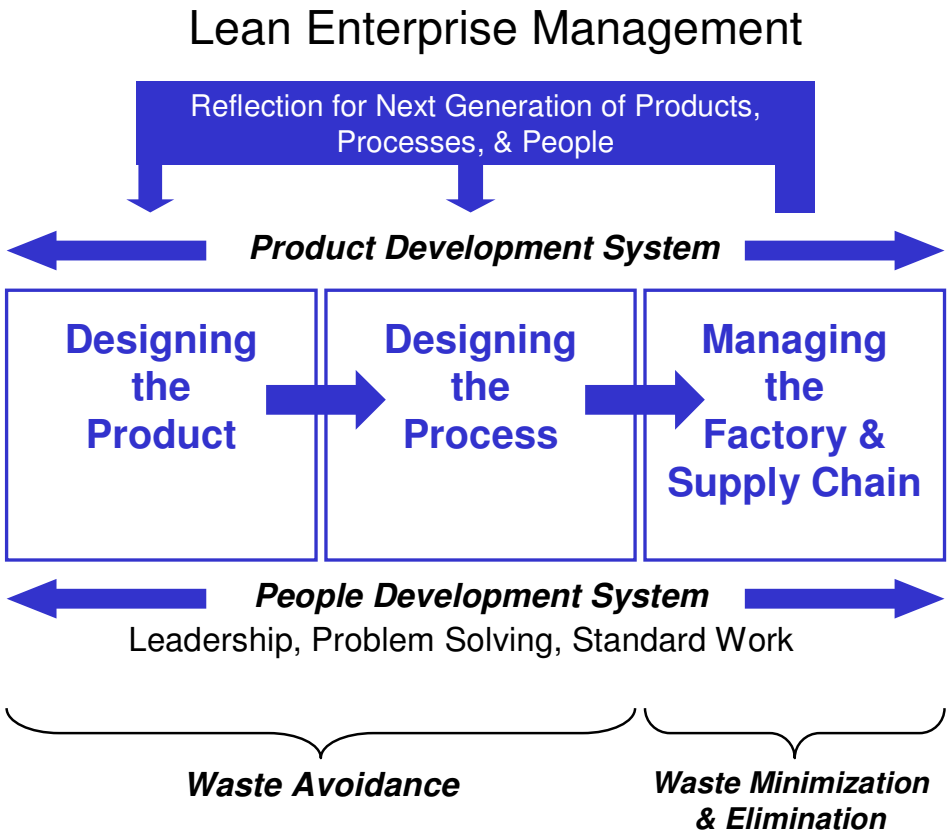

Figure 1—Lean Enterprise Lifecycle Model

Lean Enterprise Subsystems for Discussion:

I. Managing the Factory & Supply Chain
II. Designing the Process
III. Designing the Product
IV. Product Development
V. People Development
VI. Lean Enterprise Management & Leadership

I. Managing the Factory & Supply Chain Subsystem

Starting where the most resources have been focused the past 10 years, let's look at the "Managing the Factory & Supply Chain" sub-system first, and how thinking has evolved. *Lean Thinking* outlined an action plan to implementing lean. The initial six steps were in the realm of:

1. Find a change agent
2. Find a sensei (teacher)
3. Seize or create a crisis
4. Map your Value Streams
5. Pick something and get started
6. Replicate

Unfortunately, many people skipped step #4 and jumped from #3 to #5, then replicated inappropriate visions while falling into a spiral of spot kaizen that was not linked to an implementation strategy or plan. These kaizen events helped teach plants how to mobilize resources quickly to make improvements to areas. Many plants invested significant amounts of time and money into lean promotion offices, kaizen teams, certification programs, external coaches, blitz events, and so forth. Good intentions do not always equate to good results if we have not changed our thinking or understanding of value and how it flows to the customer.

The approach that has brought good success to date at the production re-design point is the value stream plan-based, action-oriented method. *Learning To See* from Mike Rother and John Shook was published in 1999 and was groundbreaking in that it provided a standard blueprint approach to view how both the material and the information flow in a set of linked processes (supporting step #4 above), as well as laying out a method to develop a work plan to guide moving from the current state to the desired future state. In essence, each model line value stream is a learning laboratory for conceptually introducing the proper tools and experientially trying them out through real implementations. The engaging and motivating of people to improve operational performance via a focused work plan serves as a means by leadership to improving quality, delivery, cost, and more. The main purpose is to teach the people in a hands-on fashion how to identify and solve problems from a systems perspective.

With only minimal resources available, this has helped plants focus and align their efforts on transforming their operations bite-by-bite, or rather value stream slice-by-slice, by eliminating waste, fluctuation, and overburden activities. This value stream approach is summarized here:

- Scoping Meeting (3-4 weeks prior to mapping workshop)
- Current State Mapping
- Ideal State Mapping
- Future State Mapping
- Planning the Work (3-6 months timeframe typically)
- Executing the Plan

This 6-step approach is far from simple to do initially. Understanding the proper level of mapping detail, grasping lean concepts, and picturing a leaner flow are not easy to fathom or map with little or no improvement experience, or without the right cross-functional team. In addition, leadership behaviors must change to support the approach. This is where it becomes wise to work under the guidance of an experienced implementer initially who will help guide and teach the people, leadership, and system development (supporting steps #1 & #2 above).

Opportunity: Improving performance through process re-design
Means: Value-stream based, action-oriented improvement approach
Benefits: Shorter lead times, balanced flows, customer-focused, kaizen leaders, system thinkers

II. Designing the Process—the Pre-Production Subsystem

While most of the enthusiasm and efforts of improving have been focused on manufacturing at the floor level, much less attention has been directed towards avoiding the process waste in the first place. Looking at the product lifecycle again in Figure 2, there are three critical cost control points for a product (this is a modified version of an original slide from Glenn Uminger of Toyota at The University of Michigan Lean Conference, May 6, 2003):

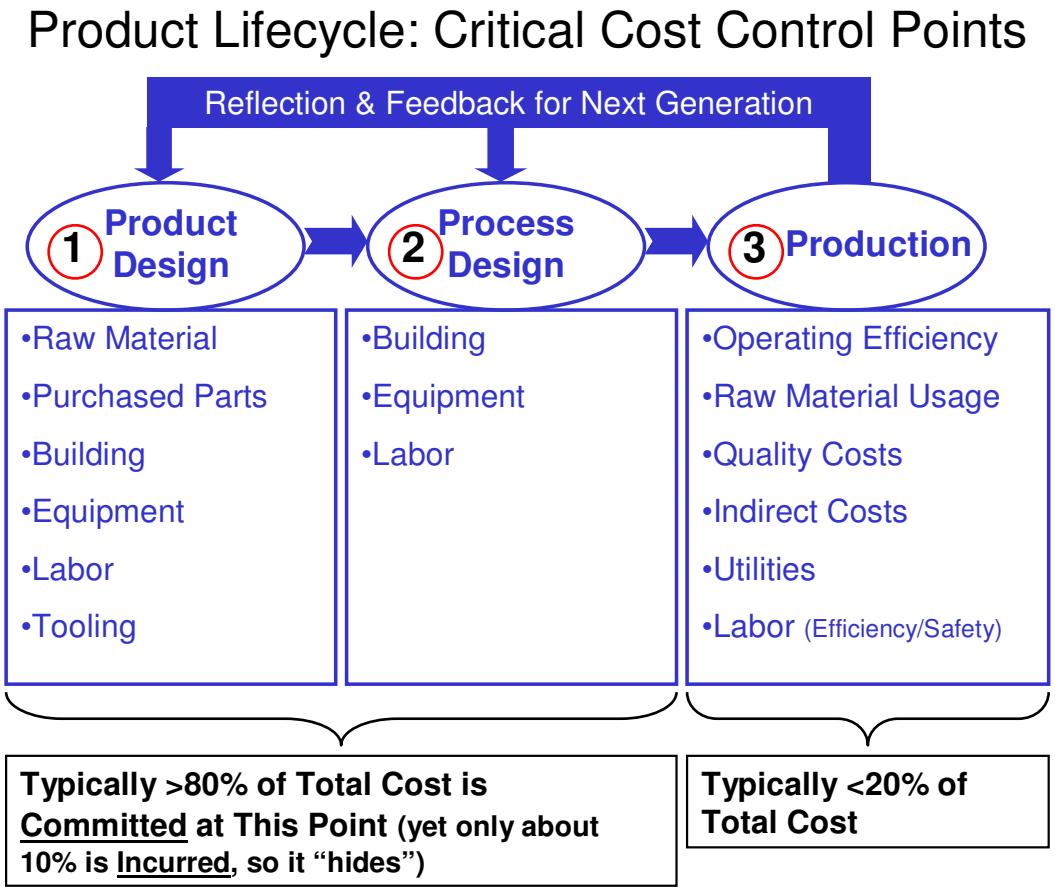

Figure 2—Product Lifecycle Cost Points

The key point here is that although most of the efforts of improvement have been spent on Production, this is also the lowest impact area, since typically up to 80% of the cost has been committed before it even gets to Production. Yet, only 20% of the cost may get incurred before that point, so this fact can easily remain concealed. Most of the process re-design in existing operations is waste of correction from poor initial system design.

It is important to start operating system improvements at the production point due to the fact that the tangible benefits can more readily be seen for learning, as well as being the last touch point for the customer. Organizations need to feed-back these experiences from implementation to new program launches and their subsequent product and

process designs, otherwise a great opportunity is lost to teach the upstream lifecycle partners about improving the business and supporting the true end customer.

Moving upstream to the first lifecycle point after Production and looking at the Process Design point, there are a few similar improvement approaches to lean process design. One of the most well-known is 3P (production preparation process), which can be used for new programs and also when a new product design is fixed, yet the process has not been defined, sometimes referred to as process preparation (2P). It is a big leap to go from no process preparation approach to 3P, and an evolution towards 3P typically occurs so that the organization initially develops the proper approach at the 2P-level before moving upstream further.

More and more companies are realizing the need to get new lines and cells better in the process design phase, and are using 2P-style approaches to enable this before capital is sunk or steel is cut. Other related approaches are also utilized, but the key is to have an easy-to-use framework and process following what Toyota calls "common-sense engineering". Progressive companies have even developed production system design approaches that improve upon 3P and 2P that are better customized to their business needs.

One example of this customization is combining the value-stream tool with the 3P framework to come up with an Operating System Design (OSD) approach. As outlined by Womack & Jones in *Lean Thinking*, the authors listed five principles to combat waste (and also fluctuation & overburden) in operations:

- Specify Value
- Identify the Value Stream
- Flow
- Pull
- Perfection

From an OSD perspective, these are the same principles to follow when designing and engineering production systems. Value is defined by the true customer. Next, identify the entire value stream for the product. Make the entire value-creating process flow by linking those process steps together. Let the real customer pull product from you as needed, rather than pushing product to a stranger. Finally, perfection occurs as supply chain partners work transparently to follow the principles throughout the entire product lifecycle to minimize the waste stream. (Womack & Jones, 1996)

Using an Operating System Design approach, the actual design needs to occur at two levels—concept & configuration. First, you need to understand the product, customer expectations, process characteristics, customer demands, supply chain partners, and a few more critical variables in order to come up with the proper concept, such as location plan, target cycle time, line layout vision, plant value stream design, material & information flow strategy. This is the Scope and Design part of OSD, as shown in Figure 3.

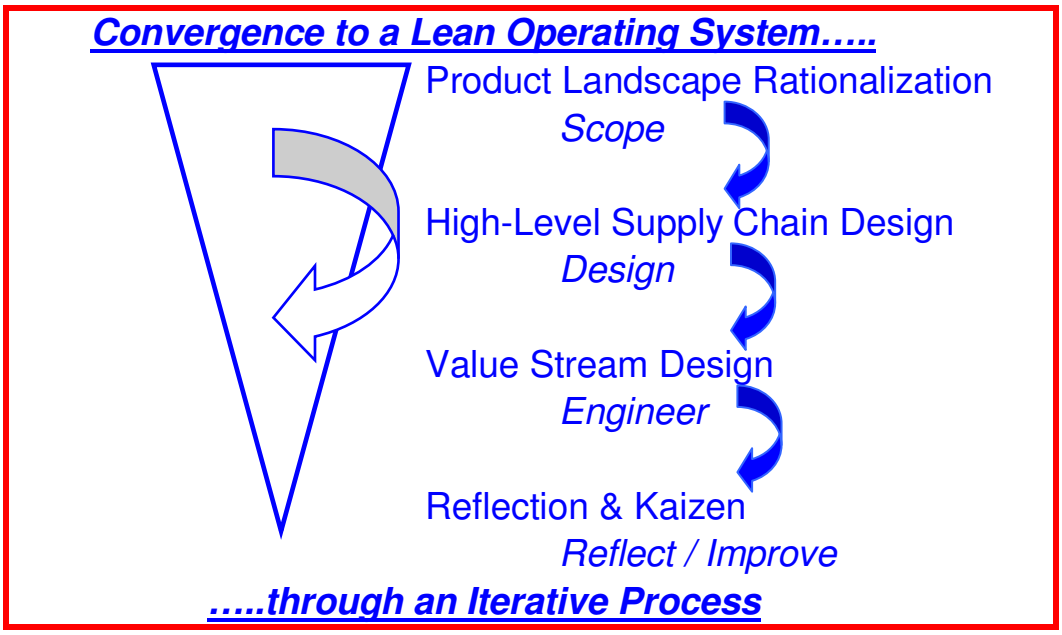

Figure 3-- Operating System Design (OSD) Framework

Once a high-level concept is understood, then configuration, selection, and development of the stations, layout, material movement, part presentation, lean equipment design, people / support systems, and more proceeds. Too often, engineers and teams will dive into the configuration stage for a pre-conceived cell design without first getting the proper conceptual understanding, which is very risky and wasteful, and may result in low levels of product or process performance, as well as poor operational execution. In addition, actual process selection should aim for right-sizing any technology, as well as minimizing energy consumption & environmental impacts, and spare parts usage, with an eye for the total lifecycle cost of the capital. This is the Engineer and Reflect / Improve part of OSD.

As before with the prior subsystem, it is initially best to work under the guidance of both an experienced value stream and process designer who will be able to mentor the next generation of designers for a cascading effect.

Opportunity: Lean Process Design
Means: Production Preparation Process (3P, 2P), Operating System Design (OSD) approach
Benefits: Flexible lines / capacity, continuous balanced flow, proper level of manual/automation work, capable people

III. Designing the Product Subsystem

In this subsystem today, product design needs to not only meet and exceed customer expectations, but the product needs to take into account that there is not an infinite amount of natural resources available in the world to keep up with ever-increasing global demand and development.

As for the first part of meeting and exceeding customer expectations for product design, one approach that Toyota uses has been coined “set-based concurrent engineering” (SBCE) by an academic team from the University of Michigan in 1995 (Ward et al, 1995). A broad range of alternatives are considered, and a process is followed where these choices are narrowed until a superior solution is found. SBCE differs from traditional “silo” flowing design in that it considers the design perspectives proposed by different functions, and converges towards the acceptable range of overlapping sets before selecting the best one. Figure 4 below illustrates this perspective with use of a Venn diagram. By front-loading the design phase, overlaps are identified in the acceptable range, minimizing future design and engineering changes further downstream, as well as eliminating a great deal of waste in the early stages of product design. (Morgan & Liker, 2006)

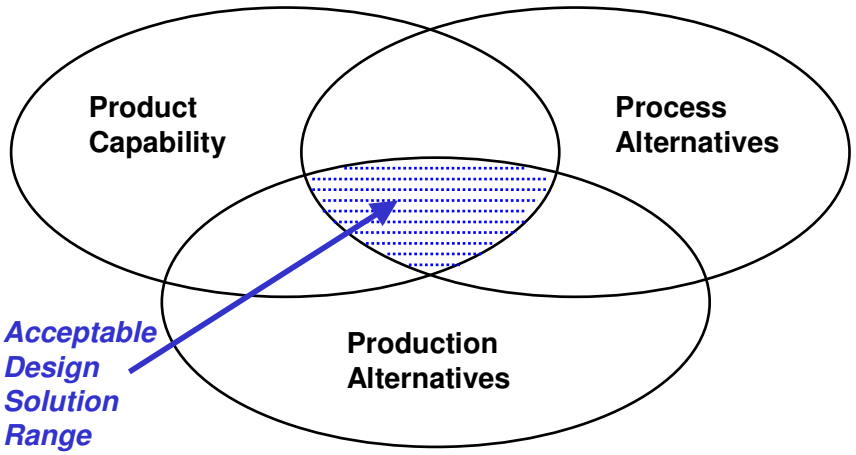

Figure 4—Set-Based Considerations of Different Parties
(Based on Morgan & Liker, 2006)

On the subject of conserving resources with future product designs, it is important to understand the current condition of supply, demand, and replenishment. The most recent World Wide Fund for Nature (WWF) conservation group 2006 Living Planet Report cited that at current consumption rates, humans will need two planets worth of natural resources every year by 2050. Waste streams are growing faster than nature can turn them back into usable resources. Many countries are living well beyond their means and everyone will have to change lifestyles to reverse this trend. Product designs will need to focus on many things to help support reversing the trend—energy usage minimization, re-use and recycling, common packaging and materials, elimination of components, and more. In addition, the design of product needs to support effective and efficient return and recycling of its materials once the usefulness has passed.

Opportunity: Lean Product Design
Means: Set-based concurrent engineering (SBCE), design standards, engineering checklists, numerous tools (QFD, Kano, etc.)
Benefits: Winning design solution, minimal environmental impact

IV. Product Development System

To successfully have any of the previously mentioned subsystems work seamlessly together, there must be a robust and lean product development system in place. In *Machine*, Womack, Jones, & Roos gave a very high-level outline of how the Toyota product development system worked in Chapter 5.

Until recently, little documentation was available on the actual details and methods employed by Toyota in their product development system, which is by far the best in its industry despite having the lowest R&D Cost-to-Sales ratio (Morgan & Liker, 2006). Whereas the performance gap within the production subsystem is closing between competitors, this is not the case in the product development subsystem since very few companies have ventured this far upstream yet.

Numerous organizations today have a stage-gate model of managing product development. This is typically a high-level framework with much detail on the needed results from various functional areas, and usually managed by a centralized corporate group. However, this only focuses on the "ends", and the different program teams are left trying to figure out the "means" to accomplish the results. Without a clear process to guide activity and work, waste is prevalent throughout the development cycle and many compromises and negotiations get made to move the product through the stages and gates.

In early 2006, a new book titled *The Toyota Product Development System* by James Morgan and Jeff Liker was published that outlined the extensive way that Toyota does their product development. Readers learn about the specific methods that Toyota developers use, such as chief engineer, "obeya room", set-based concurrent engineering, front-loaded development, rigorous standardization, and more. In addition, the philosophy behind each method or technique is explained (Morgan & Liker, 2006).

One of the most startling findings from the book is that many of the same tools that are applied in managing production are also utilized in managing product development (e.g., standards, waste / variation reduction, leveling, value stream mapping). The concepts are the same, but the approaches in which they are used will vary. With the critical publication of *The Toyota Product Development System*, there is now a fuller enterprise spectrum of reference and books to complement the conceptual learning piece in developing an organization for lean.

Furthermore, as figure 2 before showed, supplier selection occurs in the early stages of the product lifecycle, so it is imperative to also have a strong supplier partnership, development, and management process as part of the product development system.

Opportunity: Lean Product Development System
Means: Standardized engineering tasks, chief engineer approach, "obeya" room, pre-sourcing of supplier partners

Benefits: Flawless launch process, shrinking concept-to-launch cycles, high product quality & service levels, mixed-model flexibility

V. People Development System

As in the prior discussion of product development, people development is an underlying system that occurs throughout each subsystem and the enterprise. With the successful expansion of lean manufacturing systems around the world, many pre-conceived notions of it only working in certain cultures or industries has been proven incorrect. In addition, many companies or competitors that have unsuccessfully tried to implement Toyota-style product development or other systems in their own operations have seen their people leave and become successful at implementing these same systems elsewhere (some even at a growing Toyota).

In Toyota's case, more than one veteran has referred to TPS not as the Toyota Production System, but as the Thinking Production System. After all, value streams, cell designs, product launches, suppliers, and more do not improve on their own—they are the direct result of capable people (internal and external) identifying and solving problems and challenges in an ongoing basis.

Recently, an article appeared in the Society of Organizational Learning (SoL) Journal that discussed this topic of the Thinking Production System and people development (Balle et al, 2006). The authors introduce four deep frame perspectives that encompass TPS but that are frequently misunderstood:

- Performance mindset
- Problem awareness
- Solving problems the right way
- Developing people through problem solving

According to the article, the first goal of TPS is improving performance--it is not simply implementing a tool such as kanban, quick changeover, etc (sometimes referred to as "chasing kaizen"). The focus for performance is improving quality, service, and cost without compromising the core values. The second frame is problem awareness, and understanding how short of perfection the current state is at. The third frame is problem solving the right way, using experiments, actual observation of facts, and explaining "why" multiple times before finding the solution. The final frame is management teaching the people to develop a "kaizen consciousness" through problem solving and improvement tasks using repeated cycles of plan-do-check-act (PDCA).

The goal is to develop individuals to be capable to identify problems and to properly solve them, as well as feeding back the learning from these cycles of problem solving. Shorter periods of small-lot problem solving (e.g., daily, hourly, within the pitch) begin to replace the need of doing batch problem solving that may be done in a kaizen event that occurs monthly.

People are at the core for each of the subsystems that have been discussed. There are some common people development points that apply to each subsystem—understand the skill set needs, partner between human resources and functional areas, select the best candidates, invest in strong mentoring, do not rush rotations, teach technical skills not available through coursework, and practice reflection of the entire process periodically.

One area of increasingly discussed importance for people development is in undergraduate university curriculums. Many of the concepts and leadership skills that Toyota refers to as "common sense" are not taught or even introduced within the core requirements of engineering or business schools despite their proven success. Properly teaching these skills will continue to be a large area of opportunity for schools as organizations require a foundation of knowledge to develop more system-thinkers. The Lean Education Academic Network (LEAN), based at The Ohio State University but made up of educators and leaders from all around the US, is an organization that was recently setup to support this topic (www.teachinglean.org).

Opportunity: People Development System
Means: Management developing people through specific problem solving & improvement tasks using the PDCA cycle
Benefits: Kaizen leaders, learning & skill development, constant focus on narrowing the gap between current and ideal state

VI. Lean Enterprise Management & Leadership System

The final overriding system to discuss is management of the lean enterprise and leadership within it. Often, there is interest in finding the one roadmap or blueprint for implementing lean in an organization. Unfortunately, no magic pill exists and it is not something that can be treated as a project that can be completed quickly or easily. It is an evolving process that continues without end. In addition, it is not something that you can put in place and walk away from, or it will revert back to its initial condition or worse.

Waste is prevalent in all companies, and frequently takes up more than 99% of the time that a product or service need spends in a value stream, whether that stream of work is in production, product design, or another flow. Thus, value-added work time is usually less than 1% of that product's total cycle time. Management has to change how it thinks about, how it organizes, and how it measures this work.

One book that touches upon this topic of work is *Profit Beyond Measure* (Johnson & Broms, 2000). The authors outline the traditional mechanistic approach of managing by results (MBR) that perpetuates part of the waste due to a focus on pre-conceived accounting targets. People might end up hitting the short-term financial targets, but they might also ruin the enterprise in the process. Instead, companies need to shift to a management by means (MBM) approach that focuses on living systems principles of self-organization, interdependence, and diversity. It is the interaction of the people and

processes that determines the strength of the enterprise since it is a dynamic system, as well as determining its capability to think and improve.

The authors conclude that quantitative measures should be used to describe the state or condition of a natural living system, but not to control or regulate it. Since it is a living system that is being measured, any attempts to divide it up for measurement will compromise the underlying connections that hold it together, if people are held to meet targets that will sub-optimize the system. Instead, focus on organizing work and interactions into a smooth, continuous flow. Take care of the means, and the results will follow. Interestingly, Toyota does not use any external financial controls to evaluate or motivate their operations in the US. The book also gives a great historical overview of modern management accounting and how that has affected current management behaviors and decisions.

From W. Edwards Deming's perspective and book writings, it is management's job to understand business as a system of work. Good managers focus on this system of work, not on achieving the targets. Unfortunately, most managers do not ever get the chance to learn or "go & see" what the actual work is due to the focus on 90-day cycles of quantitative measurement and cost control of results. Since the tail is wagging the dog in that case, the organization starts to chase its tail into a spiral of wasteful actions and perceived cost-cutting measures that destroy a company's culture, DNA, and desire to improve. Without knowledge of the actual work for the business, it is impossible to improve a numerical target, let alone to avoid designing in the waste for future programs.

One effective management process for organizations is strategy deployment, which links improvement practices to the enterprise business strategy on an annual basis with a monthly cadence of reviews. Too often, companies will attempt to improve, but the approach may be deeply bottom-up. Other approaches may be heavily top-down with no involvement from other tiers. Strategy deployment is an appropriate process for helping to clarify the scope and pace of improvement, as well as expected targets, to help balance and connect activity across the spectrum of the organization.

As noted in the Product Design subsystem, now is the critical time to also change our thinking and actions toward the environment. Leadership and management needs to keep striving to hit the ideal state of the sustainable operating system. Endless growth is not sustainable in nature or business in the long-term. The challenges ahead will mean thinking how to minimize all waste, both tangible and intangible, as well as conserving resources throughout the product lifecycle to enable future generations an ample supply of these needed resources.

A focus on growth of value-added percentage time and shrinking of waste will grow profits and also sustain itself through the capable and developing workforce that is actually improving the business system every day. This often overlooked core skill of organizing work effectively and efficiently and systems-thinking is applicable no matter what the firm provides or builds. As these skills get cascaded throughout an organization, the results of improvement and learning get amplified.

Opportunity: Lean Enterprise Management System
Means: Management By Means (MBM), "Go & See", Strategy Deployment, Lean Location Logic
Benefits: Capable leaders, knowledgeable managers, learning organization, conserved resources, minimal waste, talent pipeline, higher profits

……thinking about Perfection

As the enterprise matures and begins to transform the business system, the lines between consumers, providers, and manufacturers begin to disappear. Part of the sustainable operating system is to perfectly match consumption to provision, per Womack's & Jones' latest discussion in the book, *Lean Solutions*, which came out in 2005. They outline five principles for lean consumption, with possible enablers listed in parentheses (Womack & Jones, 2005):

- Solve our problems completely—consumer, provider, manufacturer (implement intelligent feedback)
- Don't waste my time (eliminate queues & wait time)
- Provide exactly what I want (implement lean logistics)
- Exactly where I want (offer a range of low-cost formats)
- Exactly when I want (turn customers into partners)

One of the first questions for consumers, providers, and manufacturers to ask from a high-level is--how to eliminate the need for the product or service in the first place? This is a tough issue, since from a surface level it would potentially eliminate many operational value streams, many which are profitable from a short-term business standpoint. More importantly, however, it would more closely link everyone in the demand chain, as well as be the best option for all the partners in the longer-term (conserving resources, minimizing capital spend, etc.). It would eliminate excess footprints and vast inventories of finished goods and services around the globe that currently are not able to provide adequate service levels at reasonable costs. People would shift problem solving efforts to the next opportunity, rather than repeat fine-tuning of an unnecessary item or activity. In addition, it would further reduce providers having to push or steer customers to a given overabundant product or service that is not the best solution or fit.

One interesting point to expand upon from the five principles is that of offering a range of low-cost formats. In the past few years there has been intense focus on global sourcing and low-cost outsourcing, with a logic that direct labor costs are one big problem with a product's cost competitiveness (interestingly, these costs are usually only a small share of the total cost, with overheads being a larger chunk). Many companies are following the lead of others, like lemmings to the sea, and putting all their eggs in one basket, and this basket is multiple time zones away, and frequently difficult to communicate with. Without properly thinking about which processes,

components, or volumes should be re-located or re-sourced, lead times get inflated and service levels start to regress. To effectively solve problems and to develop people, this supply chain becomes very difficult to manage, and even more difficult to improve. A better solution is to understand the thinking of how to locate the supply chain partners.

In order to completely understand the customer and solve their problems, and meet all the principles of lean consumption, there needs to be a lean location logic approach as part of the supply chain design in an era of lean consumption, per Womack's and Jones' suggestion. When certain flow chunks of the value stream are in the right location, problem solving is easier (thus, faster and cheaper). The challenge going forward is finding the right location for each of the business line partners, while not putting constraints on the ability to continue to improve quality, shorten lead times, and reduce costs in a dynamic environment, the ends that occur from having a highly capable force of people finding new opportunities to improve the total system each day.

Conclusion

The past fifteen years have introduced us to many more facets of lean production and up one more level to the lean enterprise. The challenges ahead include becoming system-thinkers and problem solvers in running and strengthening the complete enterprise system to further support the customer in balance with nature, being steadfastly focused on heading toward the ideal state vision for the product and service streams, continuing to improve cost, quality, and service levels to world-class levels, and developing the next generation of leaders and talent that will take the organization to a higher level within industry and society. Perfection will occur when consumption or needs of the customer are matched evenly by providers or manufacturers of goods and services.

Epilogue: Lean Enterprise Action Plan Guidelines

The following points are some of the important steps that an organization will initially encounter as they attempt to transform any subsystem part of their enterprise in the first of many years. Although they are written in a linear sequence, the steps are not necessarily sequential, and may be recursive and iterative. *Lean Thinking*, *The Toyota Way* by Jeffrey K. Liker, and numerous other books on lean implementation have similar action plan tips.

- Select a small handful of model area candidates (no more than 4)
    - Begin by focusing on a small selection of areas to transform that have strong leadership; make the approach mandatory to follow—where the area is heading is not negotiable, but how to get there is
    - Give top-level leadership an awareness of what is coming; further focus in their area will come soon after this awareness is understood
    - Use this pilot group of areas to tailor an improvement approach for the organization through reflection & feedback

- Select one model line within each area to show that lean works in the business and to showcase a living "go & see" example
    - Pick one key beginning-to-end model line or value stream in the target area, and implement as many of the TPS or lean concepts as appropriate in the proper sequence
    - Eliminate the "lean does not work in our business" syndrome
- Use the value stream mapping plan-based, action-oriented approach as the blueprint for developing a future state vision
    - Analyze material, information, and process flows under the guidance of an experienced facilitator and implementer
    - Understand the gap between current, ideal, and future states; this is the driving vision for improvement
    - Begin to change leadership behaviors, cost control methods, and teach core concepts with implementations
- Develop a clear work plan as the means to reach the future state rapidly
    - Use focused kaizen events or other similar workshops to improve system flow within a 3-6 months timeframe
    - Use the model line as a learning laboratory and to develop people
    - Utilize external experts where needed
- Change the system first, then start the cultural change
    - Operations is a system, not a machine, and improving the operations needs to come first, followed quickly with development of internal leaders
    - In addition, with many past failed programs of the month and training, it may be necessary to show tangible improvement quickly at the start
- Focus initial efforts on implementation
    - Any training efforts should be done with implementation, otherwise the training part is wasted and further erodes the culture
    - Later on, find the proper balance of conceptual and experiential learning / doing
- Spread implementation results quickly
    - Use standard report-out formats such as A3 templates and set-up an intranet website or newsletter
    - Share and showcase the implementation successes, lessons learned, and reflection
- Begin to re-structure the area or business line into true value streams
    - Select people with leadership and business skills with a deep understanding of the product and end-to-end processes that will be held accountable to the customer
    - Note: this does not mean to completely eliminate or minimize all functions or departments
- Setup financial measurement systems that support value stream or business line improvement and costing
- Build on the organization's heritage to develop a tailored operating system methodology, using other successful companies as learning guides
    - Do not simply copy an approach from another company or industry
- Select and develop leaders with a clear succession plan

    - Top management needs to drive the change and understand the actual work
    - "Change agents" are a valuable resource to have in key areas (typically mid-level or higher) to help cascade the learning and skills needed, as well as turn a vision into reality
- Use a core team of external experts for teaching and quick improvement initially
    - Steal the learning curve from experienced guides; one person cannot do it all, however, so work with a network of individuals who have the same foundational approach to avoid "scope-creep"
    - Coordinate external resources through the internal change agent to get the most out of the investment for the people
    - Quickly develop internal leaders and guides to cascade the approach via hands-on implementations

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