

Is There Such a Thing as a Lean Enterprise?

By Nathan Brown

nbrown@evs-sw.com

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Section 1

Let me say firstly that this article is for anyone concerned with decision-making and business process improvement in the services component of an enterprise. When we talk about services here, we are talking about all non-manufacturing jobs, which may or may not have direct contact with a customer. We are going to start, appropriately, with a look at what “Lean” is by taking a peek at a manufacturing environment, because that is where Lean got its start. Most people in and around the manufacturing arena have been exposed at least to the word “Lean”. Lean is a philosophy used in manufacturing that focuses on eliminating waste and ensuring that every step in the manufacturing process adds value to the finished good. Those steps that do not add value will fall into one of the “7 Deadly Wastes”.

Imagine for a moment a simplistic example wherein you are assembling a small engine from existing components. Needing a variety of tools, you find yourself having to walk 10 steps to get a new tool because the tools are shared; and suppose that you change tools an average of 5 times for every engine you work on. Those 50 steps required to change tools would be considered waste because they do not add value to the product. The engine is still worth the same amount to the customer whether you walk 50 steps, 0 steps or 1000 steps to change tools. Being bright as you are, you immediately see that those steps can be eliminated by re-organizing the tools or the work-center. Lean says that by eliminating those steps, we can accelerate the throughput of the process by shortening the time required to produce 1 part.

Now that you have seen a basic example of “Lean thinking”, let me introduce you to some of the foundation concepts used in “Lean manufacturing”:

- **Maximizing Flow** – eliminates waste in the value stream and only values work that adds value to the end product. The goal is to continuously increase the velocity with which value-added work flows through an enterprise by reducing delays, reducing setup time (context switch) and eliminating complexity. A Lean optimized environment will always be simpler after the application of lean concepts than it was before.
- Creating a **Pull environment** – caps the amount of WIP in the system, and ensures that processes are driven by actual demand. In a near to over-capacity environment, controlling the release of work into a work queue is equivalent to controlling the “gas pedal” on the lead time of a process. By regulating how work is released into job-specific work queues, we can greatly reduce lead time variability, which is shown to lead to higher work efficiency in a near capacity environment. The relationship between amount of WIP and lead time is described by “Little’s Law”, a cornerstone of Lean understanding. Controlling WIP can also increase velocity of cash flow by prioritizing inputs, and making sure that the higher value processes get priority.

- **Continuous Improvement** - measures business processes and continuously improves flow. A Japanese term "Kaizen" is used to describe a focused improvement event where a small team of people will focus on a specific step in the process flow for perhaps 3-5 days, with the intent of identifying and helping the operator eliminate waste. One of the keys here is to reduce the setup time, or the time to switch between two jobs or tasks. If we can reduce cycle time, then we can get away from "batch" processing (ie, saving up a load of similar work and processing it together). It might not be obvious at first glance, but processing work in large batches is only more efficient for the processor; it can be a lead time killer and will result in increased lead time variability for the process as a whole, especially if the batch processing cell is a bottleneck.

In short, a "Lean Process" should have a process cycle efficiency of > 20%, where process cycle efficiency is:

Value Added Time Spent / Lead Time

This means that a process that has 1 hour of "Value added work" must have a total lead time of ≤ 5 hours.

Ok, now that we have a 10,000 foot view of how lean applies in a manufacturing environment, let's put on our "Lean" glasses and apply it to the business processes that interact with the ERP environment. We're going to now look into the service component of a business with "Lean" glasses: specifically, we are going to look at how we can apply lean principles to the interaction between a user and an ERP system.

Let's take a quick look at the order fulfillment process. Let's say that the sum of all value added work in shipping an order (picking, packing, billing etc) is 1 hour. If the fulfillment process were "Lean", then the whole order from release to invoice could be no more than 5 hours.

Section 2

Let me propose a couple areas where a Lean ERP system can increase return on invested capital in service processes, then we can focus on where to go from there:

Simplicity

Much of the complexity that exists in service processes exists solely to hedge the risk of imperfect or untimely information. This includes: unnecessary checks and balances, inefficient information routings, constantly checking for exceptions or risk situations, etc. If an ERP collated the information required for a job and “pushed” it to the user, the user would realize tremendous efficiency gains. Expediting and “searching” for information in a service organization inserts the same notorious wastes into a service process as expediting and searching for inventory does in a manufacturing process.

To achieve the velocity that Lean desires, simplicity must reign. Because we understand Lean principles, we understand that an increase in process velocity leads to reduced WIP, which leads to increased capacity and cash flow. Increase in quality (fewer defects) is also a product of decreased complexity, which in turn increases velocity. To this end, we would expect an ERP to not just collect information, store it, then wait for a user to ask for it; we would expect a Lean service oriented ERP system to digest information and actively present, or push, relevant information to the appropriate users. And, to be truly lean, it should give the user the ability to handle that information without then having to waste time navigating a menu, opening a task and navigating to the correct record.

Risk Management

In fact, in a pure lean environment, the goal is to drive the organization as close to the “rocks” as possible without crashing into them. In a stable, predictable environment where fluctuations are minimal, this works great. In a pure lean environment, the risk tolerance is close to zero, because crashing into the rocks can mean that your whole operation is derailed. For our assessment, we are going to assign value to having some measured “water under the boat” (acceptable risk), which lean allows as providing an acceptable quality of product.

In the previous section “Simplicity”, we mentioned how organizations can grow complex in an attempt to manage risk. ERP systems and implementors are eager to accommodate this, and can easily find a myriad of ways to attack a complexity problem with more complexity and data entry and steps and checks etc.

A Lean service oriented ERP would be a partner in managing risk. It should always be on the lookout for risk states of certain processes, and *manage the process* of handling the risk. Lean would call internal risk management a “critical non-value added activity”, i.e.: the customer doesn’t care, but it is critical to us internally. Lean permits critical non-value added time in a value stream, but a Lean service oriented ERP would manage this non-value added event to minimize its effect on Lead time.

Let me give a simple example:

Let’s talk about a simple and common scenario wherein vouchers over a certain amount, say \$10,000 must be approved by a manager or controller. The “approval”

of the checks does not add value to the check, but it mitigates the risk of fraud or error associated with paying vendors. The risk associated in cutting a check is the amount of the check times the probability that it will: cripple cash flow, go into Joey "The Muscles" Swiss bank account, or perhaps erroneously end up in a vendor's bank account. This risk value, in dollars, is often mitigated by instituting an approval step. Now, there is a tolerable level of risk, which is when the value of the check is less than this threshold. Someone has determined that the controller's time is more valuable than the risk mitigation associated with approving every \$5 check. Now this is a common, straightforward example that everyone can relate to, but how about all of the other organization specific risks that your service organization manages?

If the ERP is aware of your organization's risk tolerance, and it is aware of the process (assuming it is a Lean ERP), wouldn't you expect the system to manage this risk situation, the associated approvals, and the fulfillment of the process? And shouldn't it do this without the necessity of shuttling paper around the office, paper inboxes, voice mails, emails etc?

A streamlined, Lean service oriented ERP system should be at the forefront of identifying and managing risk, and ensure that risks are handled at the proper level by the appropriate person in the most efficient way possible. This will minimize the amount of critical non-value added time spent on a process and decrease lead time accordingly.

Strategic Improvements

One of the first recognized, important, and underused values of an ERP system is the use of data to generate actions that lead to a mission accomplished. Many ERP systems are great at collecting data, but we have just begun to see usable business analytics as an integrated part of mid-market ERP systems. This is a very hard one to value, but savvy execs know what they need, and in a "Lean" enterprise environment we can measure some value added by creating data that we have targeted for strategic decision making. In this sense, we are looking at an ERP system as adding value by serving its customers, the decision makers. The lead time here would be the time between an event happening and a decision being made based upon correct interpretation of that data. I did not say the time between an event and a having the ability to run a report, because reports are passive; they require a user to think about it, find it and run it. What we are really looking for is how data affects action; action is the goal. A Lean oriented ERP would digest and present (or "push") and decrease the lead time between an event occurring and the ability to make an informed decision based upon that data.

Tactical Improvements

This one is similar to strategic decision making, but with the goal of making a tactical change to eliminate waste and improve the P&L. Again, we would consider value added when we compile data that is targeted and useful to making tactical improvements to our Lean environment. What is the value of this data? It is the efficiency to be gained by implementing the things "suggested" by the data. This is another hard to measure, but you can bet that there are always gains to be made. The best place to start is by staking out where you want to target efficiency gains and targeting data collection toward projected efficiency gains. In this scenario, one would collect data relevant to help elect projects and scheduled future "Kaizen" events. The rule here is that we are collecting data that we are planning to turn into value.

Real-time Communication (Minimizing Information WIP)

If our ERP system is aware of the states of our business processes and our business rules, why are there still so much paper flying around and so much unnecessary communication? I believe it is because ERP designers have designed “passive” systems that require users to dig for whatever they need, instead of designing “active” systems that present the user with actionable items, work queues and exceptions that are job or role based.

What does an ERP do? It collects, processes and disseminates information.

What does a manufacturer do? They receive, process and ship inventory.

Inventory is to a manufacturer what information is to a service organization. Therefore, a manufacturer’s WIP inventory can be compared to a service organization’s information that is in process.

WIP, from the ERP’s perspective, consists of: unfinished orders, unhandled exceptions, all pending decisions on various documents, and every non-completed process in the ERP system. This WIP can often spend more than half of it’s time waiting, and those familiar with Lean understand that a delay or defect of 1x in one step of a process does not mean a delay of 1x in the whole process; a delay of 1x can contribute to a total process delay of 3-4x. In these cases, the information needed to move the process along exists in the ERP system, but the ERP is just *waiting* for this WIP to be acted upon.

How could an ERP be designed to minimize the amount of informational WIP? Any Lean environment (manufacturing or otherwise) should have integrated work queues, which: are managed, are measurable (how long has this item been in the queue, how many items are in the queue) and reduce waste by focusing the user on what is important (in a demand driven environment). A side benefit is much increased ease of use; new users will know exactly what they need to act on, they just need the training to act on it correctly. These work and exception queues mean that the ERP system would have to be constantly “digesting” the data so as to present the user with only those things that are actionable and necessary; i.e. **Demand Driven.**

These queues and real time business alerts would also increase the process velocity by eliminating the need for someone to “hand off” a process to someone else; let the queues manage process responsibility and hand-off.

Slow and inefficient communication is one of the “deadly wastes” that ERP vendors promise to minimize, but experienced ERP users are often disappointed at the gap between “paperless office” promises and reality. What the market is looking for is an “active” system.

Value Summary

If I can summarize how we ascribe value to people interacting with an ERP system, let me distill all of these areas into this rule:

People are phenomenal at making abstract decisions and not so adept at error-free and fast processing.

ERP systems are adept at processing, but not so adept at making complex decisions.

People add value into a business process when they direct the process with a judgment or decision that adds value (as described above). Everything else they do is a candidate for waste.

Section 3

What does this Lean environment look like?

An ERP solution implementing Lean-enabling concepts will:

Maximize process flow by

- Greatly reducing the time required to handle exceptions
- Eliminating mismanagement of risks (risks handled at the wrong level)
- Minimizing system navigation time and associated training
- Eliminating manual or paper communication with workflows, alerts, work queues and integrated approvals. This is real-time, business rule driven communication.

Create a pull environment using

- Job-specific work queues that are automatically populated by the system
- Intuitive drill-down navigation that allows users to go directly from the work queue to the required task
- Feedback to the user that verifies the work was completed by removing the item from the queue when the appropriate action was taken

Drive continuous improvement by

- Logging exceptions which can be analyzed for tactical improvement
- Managing work queue size and duration
- Increasing process and organizational visibility to management

Conclusion

Manufacturing has realized tremendous gains by implementing Lean concepts into manufacturing processes. In fact, to some that were on the leading edge, Lean concepts are not ground breaking, but accepted and necessary components to competing effectively. If we could take these Lean concepts and bring them into the whole of the organization, we will be able to bring their benefits to the bottom line of that organization. Since the ERP is the nerve center for most companies and holds key business metrics, it is a ripe environment for a Lean revolution.