

Win in the flat world

LEAN on IT: Applying LEAN Manufacturing Principles Across the IT Organization

– David P. Spencer, Gerhard Plenert

Introduction

Lean is a change management methodology that has received a wide range of attention for the enormous improvements that it has generated. Although at Toyota, Lean is used company-wide, in the United States, Lean's usage has been primarily focused on the production floor and little consideration has been given to using it in other places, least of all in an IT organization. However, there are numerous applications where the well-established methodology of Lean can find a broad range of uses including its application to the IT environment.



What is Lean?

When asked, "What is Lean?" most experts would reply back with a definition similar to, "A systematic approach to identifying and eliminating waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection."

However, we see Lean as a change management tool. Developed by Toyota over 40 years ago to help standardize on a methodology for continuous improvement, Lean has since evolved through numerous iterations. Today, Lean has become somewhat of a religious philosophy, with numerous followers, each of which strongly believes the doctrine, but with each having their own spin on how the doctrine should be interpreted and implemented into the lives of its followers. The result is that the version of Lean being used in many organizations has distanced itself from the original Toyota version.

Most adherents see their Lean implementations as something that is "only useful for the production floor." However, we see Lean as a company-wide tool. Across an organization, Lean practices can be used in engineering, in the front office, in the back office, in R&D, and even in IT to improve operations by driving waste from existing environments. Our claim is that Lean can now be effectively applied within the IT organization, an area where Lean has traditionally not tread.

Incorporated within Lean is both a management philosophy and a change methodology. The management philosophy stresses the elimination of waste. Lean does not focus on making anyone work harder or like its Six Sigma cousin, reduce variation in vertical processes. Rather, Lean focuses horizontally across the value stream of an organization. To illustrate this we need to define the following concepts:

Value Added Time – any time spent which either:

- Changes or improves the product being produced
- Directly satisfies the customer

Non-Value Added Time – any time that is not value added. This includes activities like communication, setup, preparation, etc. Specifically, the Toyota Lean process defines seven "wastes" which should be identified. They are:

- Motion
- Processing
- Transport
- Excess Inventory / Backlog
- Defects
- Delays
- Overproduction

Process – a series of activities that are necessary to achieve a desired outcome

Value Stream – the series of activities that occur as we work ourselves through a process

The goal of Lean is to eliminate the non-value added wastes that incur in any process. After working with many clients in the Discrete Manufacturing space, Infosys has found that many have a value added content of less than 5%, and at one of the largest clients, a value added content of less than 1%. Our experience shows that by eliminating non-value added wastes it is easy to double the capacity, throughput and output of the organization while simultaneously reducing backlogs (the inventory of IT), regardless of whether it is a single factory or entire IT organization.

Lean on IT

A typical IT organization can be broken down into a set of processes, all supporting a company's business. These processes can be further broken down into Level 1 and Level 2 processes that can have the Lean methodology applied (see Figure 1 below).

Typical IT Organization Processes

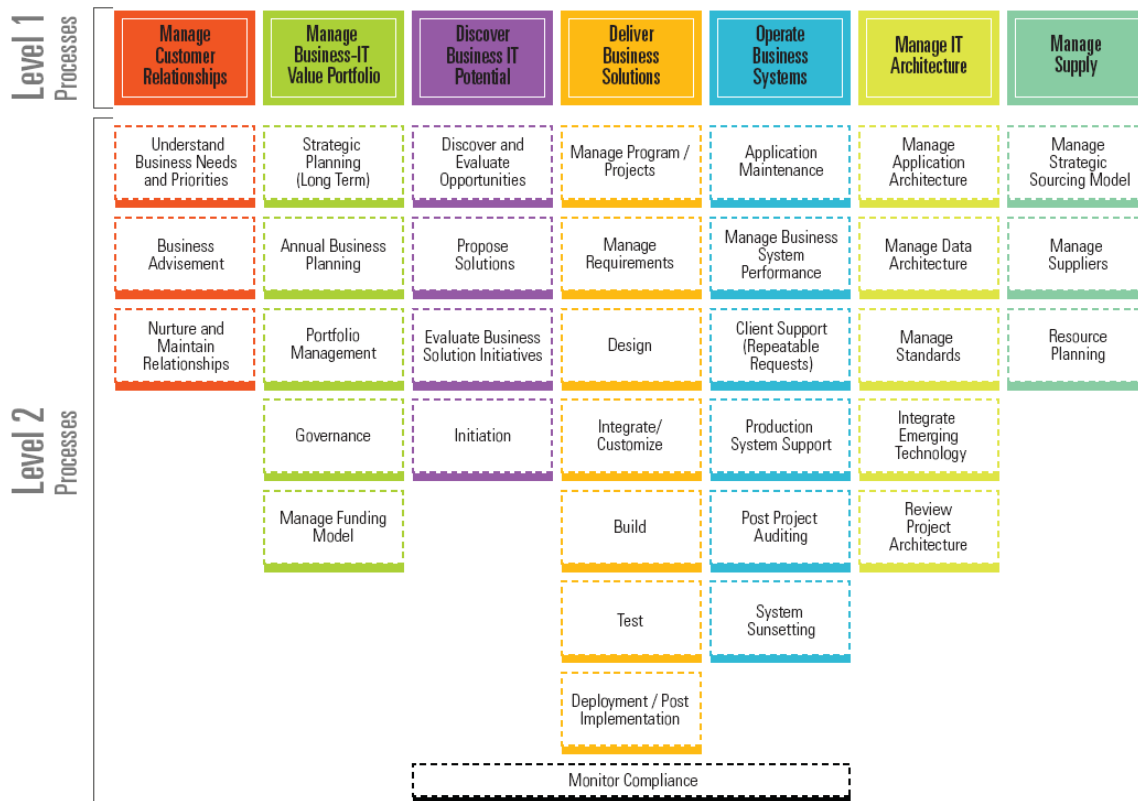


Figure 1 – Typical IT Organization Processes

Each of these processes can be subjected to a Value Stream Mapping (VSM) exercise that allows individuals to see what is actually happening in their organizations and what is possible. (see Figure 2 below).

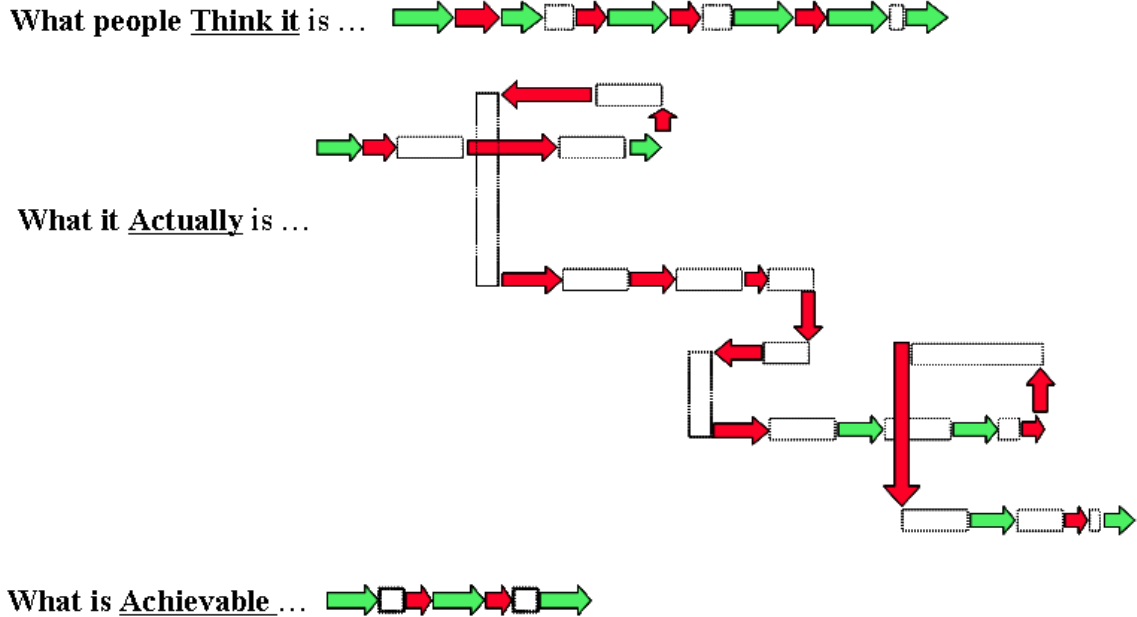


Figure 2 – Value Stream Mapping

The objective of the VSM activity is to identify large non-value added activities that can be eliminated, with teams focused on reducing or eliminating the non-value added activities that have been targeted. We often find that what we thought was the value of our process is in fact far from the reality of the actual process and what can be achieved to improve overall work flow.

It is our experience that IT organizations are notorious for re-inventing the wheel, with many redundant activities, including development and maintenance practices as well as documentation production. Across all of the Non-Value Time categories, typical IT organizations provide many examples, as illustrated below:

Non Value Time	Examples Found Within IT
Motion	<ul style="list-style-type: none"> • The flow and movement of individuals can be extremely inefficient. Accessibility to tools, like files, documentation, etc. can cause an IT employee to spend a lot of time walking, which is non-productive waste. • In IT we also find inefficient “movement” of data within the “system.”
Processing	<ul style="list-style-type: none"> • The big problem in this area is a lack of standardization. A lot of time is spent re-inventing the wheel. There are a lot of similar activities and the lead time (set up time) for reinventing the process of doing these activities can be eliminated.
Transport	<ul style="list-style-type: none"> • Transport in IT equates to the amount of time it takes to navigate through a series of applications in order to accomplish a highly repetitive task. For instance, this can show up within internal support systems.
Excess Inventory / Backlog	<ul style="list-style-type: none"> • In IT, inventory is backlog. What we find is that the workload throughout the organization is not evenly distributed. Rather, it is assigned by some predefined “area of responsibility”. The result is that some individuals have enormous backlogs while others have very little. Backlog is expensive in that it equates to reduced results and lost revenue. Often this is seen in documentation reviews, support team queues and finally in development projects not able to be initiated due to resource (money, people) constraints.
Defects	<ul style="list-style-type: none"> • Defects in IT occur in both the area of bad code, and in inadequate documentation. The question to ask is “Does the product being delivered (including the documentation) satisfy the needs of the customer?”
Delays	<ul style="list-style-type: none"> • Delays occur between activities. For example, between coding and testing or between test and documentation. These are wastes that increase total cycle time.
Overproduction	<ul style="list-style-type: none"> • Overproduction is where “just in case” work is done in anticipation of some upcoming event. In IT, this occurs when there is some “down time” and we feel the need to keep people busy, so we have them generate documentation or code some mini-systems which in the end will never be used. Lean thinking would suggest that it is better to not use resources than to waste them on non-value-added efforts.

Measurable Benefits of “Leaning on IT”

It is our belief that when applying Lean to IT, there are four specific measures that should be used. These measures will define the success or failure of any Lean activity. However, when specifically applied to IT they are:

1. **Cycle Time** – the time it takes to run through the entire process.
For example, in the Level 2 process: Manage Requirements, documentation activities can be reduced by applying standardization techniques, the result would be an overall throughput increase and reduced cycle time.
2. **Inventory** – For IT, inventory means backlog.
If the backlog of work for the IT department is measured in terms of months or even years, the IT department is out of control.
3. **Value Added Content** – A value added activity is one that either (1) directly adds value to the final product, or (2) directly satisfies the customer. Following this definition, some phone calls or meetings are value added, and some are not. Code development is value added, but discussing coding alternatives may not be; especially when the decision for these alternatives should already have been part of a standardized set. A measure of the value added content of the value stream is good for ongoing improvement efforts. It should be treated as an internal reference point of performance improvement. The value added content can never be declared as “good enough,” as there is always room for improvement.
4. **Throughput** – the measure of on-time customer delivery on or before the customer’s original requested delivery date. From an IT perspective, this could mean anything from a business application required by the business or a solution to a customer’s problem from its Shared Services group.

Beginning with Level 2 processes, we believe that IT organizations can identify and initiate Lean related activities to achieve respective Lean measures, and improve its ability to support the overall business, as illustrated below:

Lean Measures	IT Process Area 1	IT Process Area 2
Cycle Time	<ul style="list-style-type: none"> • All Level 1 Processes 	<ul style="list-style-type: none"> • Business Assessment • Discover and Evaluate Opportunities • Design • Build • Test • Deployment / Post Implementation • Application Maintenance • Review Project Architecture • Manage Strategic Sourcing Model
Inventory	<ul style="list-style-type: none"> • All Level 1 Processes 	<ul style="list-style-type: none"> • Design • Build • Test • Deployment / Post Implementation • Application Maintenance
Value Added Content	<ul style="list-style-type: none"> • All Level 1 Processes 	<ul style="list-style-type: none"> • All Level 2 Processes can have waste in their methodology and procedures
Throughput	<ul style="list-style-type: none"> • Deliver Business Solutions • Operate Business Systems • Manage IT Architecture 	<ul style="list-style-type: none"> • Deployment / Post Implementation • Application Maintenance • Manage Business Systems Performance • Client Support • Production Systems Support • Post Project Auditing • System Sunsetting • Manage Application Architecture • Integrate Emerging Technology • Manage Suppliers • Resource Planning

Lean adapts the Capability Maturity Models (CMM) commonly used in IT to define World Class status. However, a major shortcoming of the CMM measures is that they do not measure time: time to implement, time to change, cycle time for the IT process. Lean takes the World Class characteristics of the CMM and accelerates their implementation and integration throughout the IT organization.

Finally, Lean philosophy stresses not making changes based solely on financial measures. This will cause inappropriate activities to take place. Instead, our experience is that successful organizations make changes based on operational measures, and when these operational measures perform well, the financial measures will follow suit. For IT, this could mean such operational improvements as:

- Shortened Lead Time between project inception and initiation
- Increased Customer On-Time Delivery Performance
- Increased Customer Satisfaction from Business teams
- Improved Quality of Products & Services provided to internal and external customers
- Reduced Cost of Quality of products and services provided
- Reduced Cycle Time between project start and completion
- Increased Capacity for other needed tasks that traditionally would be delayed
- Increased Employee Satisfaction
- Reduced Cost of Administrative Processes

Summary

Lean has a history of excellent performance results across many manufacturing related functional areas. These results have been demonstrated in both production and non-production environments. However, Lean's capability to improve organizations does not have to stop in the manufacturing areas, but can also be applied to a company's IT organization to reduce its own wastes and drive its own efficiencies. Given the flattening world challenges of improving product innovation, optimizing worldwide workforces, and constant cost pressures, IT organizations need to also consider the improvement opportunities that are available to them through the use of both the Lean management philosophy and the Lean change methodologies. It is through the use of Lean that many manufacturing organizations are now finding themselves achieving World Class Status in the Flat World they are competing in. IT is a critical cost factor in nearly all organizations. Superior organizations can no longer stay competitive in rapidly changing 21st Century organizations without IT joining the lean continuous improvement wave.

About the Authors:

David P Spencer is the Associate Vice President in Infosys' High Tech & Discrete Manufacturing business unit. David has over 21 years of experience in designing and delivering technology-enabled business solutions to Fortune 1000 clients in the Hi Tech and Manufacturing industries. He holds an Executive Degree from Columbia University, MBA from Miami University (Oxford) and Bachelors' degrees in Computer Science and Business Administration from the University of Cincinnati. David can be reached at david_spencer@infosys.com

Gerhard J Plenert, PhD, CPIM is a Senior Principal in Infosys' High Tech & Discrete Manufacturing business unit. Gerhard has 12 years as a University professor and 20 years as a consultant in Lean and Supply Chain principles. He has published 9 books and over 150 articles in these areas. He is an examiner for the Shingo Award program and is actively involved in the thought leadership of numerous supply chain organizations.

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