

SOME MODELS FOR IMPLEMENTATION OF LEAN MANUFACTURING

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Abstract

Lean management and its forms: lean manufacturing, lean product design, lean network suppliers are now significantly applied in practice. Many small and medium-sized enterprises are preparing to apply lean and knowledge needed for successful implementation. The aim of this article is to analyze the selected models for the implementation of Lean manufacturing. Model selection favors a pragmatic recommendations and procedures in the form of road maps.

Key words: Lean Implementation, lean road map,

INTRODUCTION

The article analyzes the selected models for the implementation of Lean manufacturing. Model selection favors a pragmatic recommendations and procedures in the form of road maps. Described road map for lean implementation is only some examples. It could be shown with many different variations. However, there is a logical sequence to many of the tools. The key is to have a plan and get started. The path to lean will not be straight and it never ends.

To start lean manufacturing, two conditions are necessary: processes are under control and predictable, basic disciplines involving quality control, material handling, set-ups, and so forth, are in place.

Roadmap describes a logical sequence of several activities and the major tasks. All guide users that it is imperative to address continually the questions of "Who, What, Where, When, Why, and How" involved in any transformation undertaking. Where appropriate, the guide suggests and describes tools that can help in navigating successfully through the task at hand.

Factories that convert to Lean production typically achieve the following results [6]:

- There is a dramatic improvement in responsiveness to customers.
- Most of the factory-floor chaos is eliminated.
- Labour productivity is double or triple that of the past.
- Production control systems and their associated information systems are greatly simplified.

- Shipments from certified suppliers arrive shortly before needed, are organized in the correct sequence, and move directly to the point of use with no need for incoming inspection.
- Completed orders are shipped immediately to customers upon completion of the last stage in the internal value chain, rather than accumulating in large warehouses. Orders are shipped to customers in small quantities rather than in large lots.
- The total floor space needed in Lean factories is typically 55 percent to 65 percent of that needed in mass-production factories for the same level of production.
- Inventory levels at all stages (raw materials, in-process, and finished goods) are dramatically lower, often by greater than 90 percent.

MODEL FROM COMPANY BUSINESS BASICS

Company Business Basics presents recommendations for the implementation of Lean Manufacturing in the form of 10 business rules [1]:

1. Focus on Long Term Results

Lean is not a one- or two-quarter commitment. It takes one to two years to build the necessary momentum, and from there your journey will last forever. Tools such as kaizen can provide very quick and significant improvement. But, without taking the time to implement a program that yields sustainable benefits, process improvements gained by lean tools will slowly deteriorate back to where you started. Significant and sustainable results will occur throughout the entire process, but the most profitable returns are realized through a two-to-five year plan.

2. A Full Time Press

Don't expect someone to lead the lean charge in his/her spare time. You need to assign a dedicated leader or team to take on this challenge. It requires daily attention from leaders who fully understand the scope of the project and who won't get caught up in today's distractions. Most cultures are centered on solving today's problem, reacting faster and better and getting results today or tomorrow. Stuck in that culture, it is hard for leaders to consider a multi-year journey – people need to be extracted to focus on a different timeline. In addition, these leaders require continued support from management throughout the implementation.

3. Rules, Principles and Techniques,

Lean is not born from what you see; it is born from how you think. Lean is a set of rules and principles, not just tools. Tools focus on physical system changes, but that is not where the heart of lean beats. The entire way of thinking must become embedded in every person of your organization. You may fix one problem or process with a lean tool today, but if the old thinking continues, it will recreate the old problems. Only new principles or beliefs change behaviors, not systems or tools. Sustainable lean change -- the kind that builds momentum -- comes from the mind and heart of all employees.

4. There is no Status Quo

There is a tendency for companies to declare, "We've done it. We've achieved lean." The truth is, lean is a constant, never-ending process. You will always strive to be lean, but you will never get there, because there is always a gap between where you are and your ideal state. If you believe that your journey has ended, you've failed. Even when you can consider yourself a success, do not stop. Success is an organization that continues to move forward at such a pace that it would be difficult to even try to slow it down. Consider Toyota -- no matter how much better they are than their competition, they continue to find more and more opportunities to improve each and every year.

5. Resistance to Change

When change is proposed, people often feel threatened. Some will think it's because there has been something wrong with what they were doing, but most will just be uncomfortable with the unknown. So, as your company embarks on this journey, you must work to help people understand why, what and how. Remove the fears; or make NOT moving forward the more fearful choice. Also, many people think lean means cutting staff, when in reality it's about working smarter to preserve heads and even grow the workforce through market growth.

6. The Lean Champions

Managing is maintaining current reality. Leadership is moving people towards the ideal state. And you can't lead people to where they already are. Lean transformation is about leadership. And leadership is not a position or rank. Look for people at every level, and then in order to lead lean, you must be able to teach.

7. Educations and Training

People will need to learn new skills and they will need the time to gain them. This means experimenting with every process everyday to get it right. There is also a financial investment, mostly in training, but also in process changes. However, the evidence is clear that the payback for this period is in months and not years.

You can use focused-improvement tools such as kaizen to get immediate gains and pay for your investment. The potential of difference between lean and non-lean companies is not 5-10 percent, it is 100-1000% differences in quality, cost, and delivery and, of course, profit.

8. The Lean Enterprise

Taiichi Ohno, one of the fathers of the Toyota Production System, said decades ago "the Toyota Production System is not just a production system." If you reduced your lead-time in manufacturing by 90% and can get product out in hours, but order entry takes four weeks, then you aren't really moving forward in the market. You must attack every corner of the business from accounting to human resources to manufacturing.

9. The Lean Roadmap

A recipe tells you exactly how to do something -- the amounts, sequence and timing. There is no such recipe for lean success since every company starts with a different set of ingredients (or factors and constraints). However, there is a roadmap. There are guide posts along the way that help you determine where you are and offer potential solutions to help you get to where you want to go. Learn from as many other journeys as possible to help understand the roadmap.

10. Develop your own Path

Many people have tried to succeed at lean in the past by copying the solutions that Toyota or others have found, either through benchmarking or out of a book. The problem is, this is like a kid copying off someone else's test only to find out they were taking a different exam. Your company is unique and will likely have some unique problems and constraints -- you must engrain lean thinking in your organization so you can find your own answers.

MODEL 20 STEPS TO LEAN IMPLEMENTATION

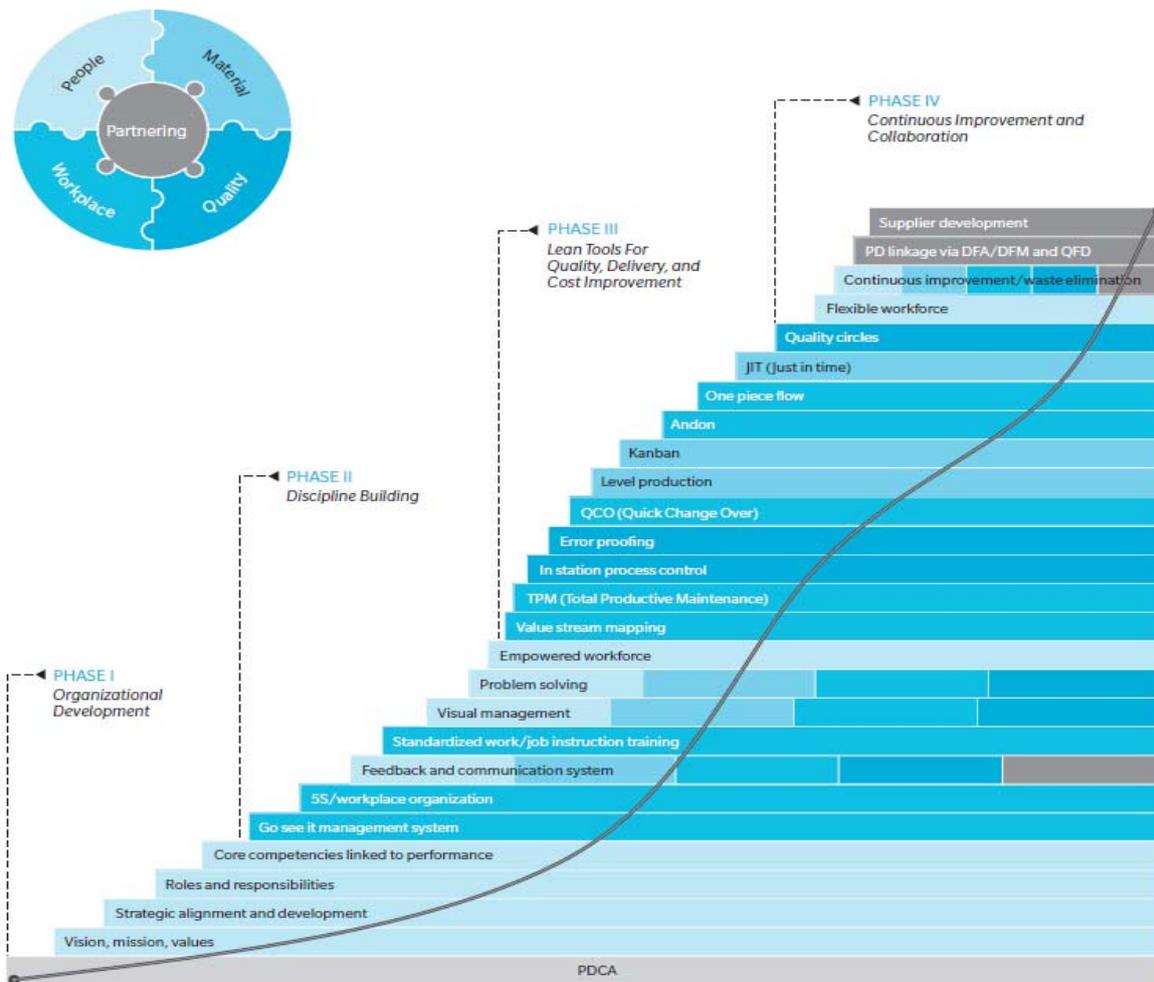
20 steps model implementation lean manufacturing is presented in the form of roads map is a combination of recommendations and shift lean techniques [4]:

1. Form team (mix of lean manufacturing and relevant business experience).
2. Develop communication and feedback channel for everyone.
3. Meet with everyone and explain the initiative.
4. Begin to train all employees (lean overview, eight wastes, standard operations, kaizen, RCPS, PDCA).
5. Facility analysis -- Determine the gap between current state and a state of "lean".

6. 5-S - It is the foundation of lean. Workplace organization is critical for any lean initiative.
7. TPM – Begin Total Productive Maintenance early (used throughout lean)
8. Value Stream Mapping – Determine the waste across the entire system.
9. 7 waste identification – Use with value stream mapping to identify system waste
10. Process mapping – A more detailed map of each process.
11. Takt time – Determine need to produce on all processes, equipment.
12. Overall equipment effectiveness and six losses – Determine the losses on all processes and equipment.
13. Line balance – Use, if necessary, with takt time and OEE.
14. SMED – Push setup times down to reduce cycle time, batch quantity and lower costs.
15. Pull/one-piece flow/Continuous Flow Analysis – Utilize kanban and supermarkets.
16. Analyze quality at the source application – Poor quality stopped at the source.
17. Implement error-proofing ideas
18. Cellular manufacturing/layout and flow improvement – Analyze facility and each process.
19. Develop standardized operations – Concurrently with SMED, line balance, flow, layouts.
20. Kaizen – Continue improving operations, giving priority to bottlenecks within the system.

MODEL THE STAGE FOR LEAN MANUFACTURING IMPLEMENTATION

Oliver Wayne consulting company focused on the automotive industry presents recommendations for the implementation of Lean Manufacturing graphical model showing the sequential arrangement of lean management tools [3]:



MODEL LEAN IMPLEMENTATION TOOLS

The Lean Division of Institute of Industrial Engineering is compiling a list of lean implementation tools. The goal of this model is to help companies on their lean journey. IIE is the world's largest professional society dedicated solely to the support of the industrial engineering profession and individuals involved with improving quality and productivity. Below is an outline of lean implementation resources classified by the chronology of lean implementation [2]:

1. Lean Awareness
 - Waste / Muda
 - 8 Forms of Waste
 - One Piece Flow
2. Lean Vision Development
 - Value Stream Mapping / Design
3. Preparation of Processes for Lean
 - Capacity / Capacity Calculations
 - Line Design / Cellular Manufacturing: Flexible Layouts
 - Ergonomics/ Ergo Charts
 - 5S / 5S Audit Sheets, 5S Red tag, 5S Wheel
 - Production Leveling (Heijunka)
 - Visual Management
 - Standard Work/ Standard Worksheets, Takt Time Calculation Example
4. Start of Lean Journey
 - Guidelines for supporting Lean Manufacturing (Selection of equipment, Process Planning, Execution Steps of Lean, etc.)

CONCLUSION

Lean is a powerful organizational and production model, which most experts consider, as the dominant paradigm in the long term. One of the problems the application of lean manufacturing are errors in the implementation. Reasons given for failure usually fall into the following categories: did not meet expectations, too long, too resource intensive, too costly, risks or costs began to greater than the benefits. Almost all experts agree that the main reasons for failure include lean the top management and ownership of the company [5].

Realistic impact on the overall competitiveness of the company and the value proposition must be derived first. Lean principles

must then be translated into the language of business: time, money and risk. The top management must have sufficient knowledge base to ensure strong support and implementation direction. Option, which features lean fit and the order of deployment is critical and depends largely on the company.

Implementation of lean is sometimes considered only for the project. But it is a fundamental change in the system of values. Different target groups need different descriptions of benefits, risks, changes and commitments. Senior management must explain "what" and "why". Much resistance disappears when the middle management heavily involved in the design and implementation of lean. Fear is removed through communication, education and motivation.

Key elements of lean relying on continuous improvement methodologies (CI). Proper deployment of CI requires competence in technical fields and teambuilding.

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