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TECHNOLOGY****BENEFITS OF LEAN MANUFACTURING SYSTEM IN INDIAN INDUSTRY-A  
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**ABSTRACT**

India is a developing country and hub for manufacturing industry. Manufacturing industry in India is fastest growing industry. Due to large production pressure to meet the customer requirements with optimum quality is main problem of manufacturing industry in India. To overcome this problem lean manufacturing system is the best solution. Lean manufacturing or lean production is a systematic method for the elimination of waste within a manufacturing system. Lean also takes into account waste created through overburden and waste created through unevenness in workloads. By implementing lean production system employees will increase production with improve quality, and performance. This paper deals and highlights the conceptual importance of lean manufacturing followed by potential benefits achieved through the implementation of lean manufacturing.

**KEYWORDS:** Productivity, Manufacturing.**INTRODUCTION**

In production plants across the globe, lean manufacturing techniques are being used to meet increasing demands placed on manufacturers. Originally developed as a methodology to make production processes highly efficient, lean techniques have been adopted by more than 72 percent of machine shops across the country. For many of these, the techniques have helped them to dramatically increase their competitive edge, while continuing to remove wasteful practices and contribute to the bottom line. Although the basic lean model was introduced more than 100 years ago, it has continued to evolve over time, from Henry Ford's continuous assembly lines for the Ford Model T, to the concept of interchangeable parts used by Eli Whitney and Samuel Colt, to the Toyota Production System. These concepts, in addition to a multitude of others, have come together to formulate what we know today as lean manufacturing.

The core idea behind lean manufacturing is maximizing customer value while minimizing waste, thereby achieving manufacturing excellence through the creation of more value with fewer resources.

Henry Ford defined the lean concept in one sentence: "We will not put into our establishment anything that is useless." Lean manufacturing is a system of techniques and activities for running a manufacturing or service operation. The techniques and activities differ according to the application at hand but they have the same underlying principle: the elimination of all non-value-adding activities and waste from the business.

Waste is defined as an activity that does not add value to the product. Through the elimination of waste along the entire manufacturing process, rather than at isolated points, companies are able to create processes that need less human effort, less space, less capital, and less time to produce high-quality, lower-cost products compared with traditional business systems.

**THE INDIAN SCENARIO**

The bad news is that in spite of all the above benefits, lean manufacturing in India is still in infancy stage and the Indian firms are far away from enjoying its complete benefits. The awareness level of Indian firms on lean manufacturing is very low. The concept is largely adopted only by the big firms. One such example is Tata Motors which has created a success story by launching Nano implementing lean manufacturing. Lean philosophy helped to reduce the cost without compromising on size and comfort. Recently many apparel firms have also opted for lean manufacturing owing to reduction in order-to-delivery time from European importers.

But Small and Medium Sized Firms in India are still mostly unaware of lean principle. The lean principles cannot be implemented exactly the same in every industry and therefore the Indian firms need to chose proper tools and techniques according to the work culture, infrastructure availability and working conditions of specific industry. Further, most Indian firms lack the human resources commitment on acceptance of a new philosophy. The implementation of lean philosophy demands a motivated and trained work-force and committed top management which is not available in most Indian Small and Medium Sized Firms even today. The competition is very tough and lean principles can prove very beneficial for the Indian manufacturing firms to compete globally. It will help them to improve upon product quality and reduce the costs along with speeding up the delivery.

The Indian Automotive Industry is relatively labour intensive by global standards and is in transition stage as low cost base for exporting labor intensive products. The important question arises "Is Indian Automotive Industry moving up the value chain"? The answer might be temporarily "yes", the Indian automotive industry is booming with high growth in the domestic as well in the export market. Till date all the growth has been possible because of Foreign automotive manufacturers and there valuable experience. To safeguard the interest of these manufactures in the long run in the Indian economy, the manufacturers need to be competitive simultaneously maintaining the quality standards which could be possible with implementing lean techniques in their system.

The basics of implementing lean begin with having a proper infrastructure of the economy, to which Indian economy is nowhere near. According to MUL during FY1994-95, a total of 724 vehicles were damaged in transportation . Even if we take the average cost vehicle would have been Rs 3 lac, then MUL nearly lost Rs 217,200,000 because of poor transportation system in India. This money should have been well spent somewhere else.

The government of India needs to realize the threat to Indian automotive Industry from China. If the Indian government continuous with rigid automotive policies (high import duty, taxes, FDI), then the foreign investors will simply loose their interest in India and could move to other countries like Poland, China etc.

Japanese are known to be Pandits of Lean manufacturing techniques. Indian automotive market is not new to Japanese manufacturers, they have been here for good number of years. But till today they have not been able to implement even 20% of their work lean techniques. Reasons behind it corruption, poor infrastructure, social excursion within Indian economy.

There is hardly evidence of R&D in Indian Automotive Industry. The government of Australia provides companies 125% rebate on their R&D taxation if the company set up its R&D base. Maruti which has been in India for more than 20 years, most of technology is imported from Japan. Just for the sake of name Maruti has set up a small R&D in its factory which apparently does nothing apart from trying new colors on bumper.



### IMPLEMENTATION

Your first step when implementing lean will be to establish your plan of action. The best way to get where you're going is to follow a map (or GPS with today's technology). Implementing lean is no different. You'll need a solid plan and some attainable targets. Be sure to incorporate each category below as part of your implementation plan. Don't be unrealistic with your target dates. As with any major project, people will want to see that you are progressing and reaching your milestones as planned. If you continually miss your deadlines due to overly aggressive target dates, you will lose support from upper management as well as those on the production floor. Another thing to keep in mind is this, do not expect everyone in your company to eagerly jump on board and embrace the idea with open arms. Change is difficult even at the best of times. Ensure all members of the company are kept abreast of the progress. A well thought out approach will be your best ally during the implementation phase.

Implementing lean is a never ending process; this is what continuous improvement is all about. When you get one aspect of lean implemented, it can always be improved. Don't get hung up on it, but don't let things slip back to the starting point. There will always be time to go back and refine some of the processes. Furthermore, the implementation of lean manufacturing can't be relegated to one web page, but I will outline some of the key steps necessary to get you on your way. You can also check through the Lean Resources section of this website for additional implementation material.

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**Lean Training**

The key to implementing any new idea or concept is training. It must be top down training so that everyone is on the same page. The more understanding of what lean manufacturing is all about, why you are implementing it and the expected benefits from it, the more likely you are to get buy-in. Remember, most people are of the mind set "So what's in it for me?". Make sure they understand how it will benefit the company (by making it stronger) and how it should help them in their current jobs.

There are many aspects to lean manufacturing so be sure to focus on the ones that will benefit your company the most. A macro-level presentation of what lean manufacturing is all about would be a good place to start. Include in the presentation the basic concepts of 5S, elimination of waste, standardized work, kanban, leveled production and just-in-time. Information on all of the aforementioned topics can be found within this website by clicking the appropriate tabs on the left, the highlighted links throughout this page or the site search tab.

**Implementing "5S"**

Different companies will require different approaches to implementing lean depending on where they are currently at and what they have in place already (kanban, routes, etc.). Due to this, I don't believe there is one right way or ultimate starting point towards implementing lean. Some aspects are easier to understand and will be quicker to put into place. In my experience, I suggest 5S as the first stepping stone towards implementing lean. My reasons for this are two fold; it can be a stand alone implementation (with or without lean), and it will most likely show the most benefit for the largest part of the company in the least amount of time. It can be applied to all areas of your organization by helping to get things organized and keeping it that way.

Lean manufacturing is very time sensitive and things need to be where they can be found every time. When tools or equipment are not where people expect them to be, they are forced to waste time looking for them. This creates waste which is the ultimate sin of lean manufacturing. Remember, the main objective of lean is to eliminate all sources of waste.

As I stated earlier, the most important aspect is to create your schedule and hit your targets. Set a target date for the first step of 5S. Train all employees and management with an overview of how 5S will help and what the ultimate goals are. Do a more detailed training on the first step and the expected results prior to implementing. Let everyone know the plan for rolling it out. Let them know the target date for the second step and stick to it. Ensure they receive training on step 2 prior to implementation. Continue this for the next three steps.

No matter what industry you are in, 5S will help you realize benefits. Even if you do nothing else, 5S will help your company. Again, this is why I suggest 5S as the first step. The change in the plant (or specified area) should help to build momentum for moving forward. It should help build support for Lean and help when the next part is rolled out. For more detail on what 5S is, click here!

**Elimination of Waste**

The basic concept of lean manufacturing is the elimination of waste. Ensure all members of your company understand the 7 types of waste, where to find it (everywhere) and how to identify it. During your 5S activity, company members should start to identify areas of excessive waste and make plans to eliminate it. Click here to see the 7 types of waste and links to explain each of them.

As you progress through the different stages of implementation, new areas of waste will be highlighted. Be sure to start eliminating some of the more costly sources of waste. Be sure to document the activity in order to report it to upper management. Also, by displaying this for the whole company to see, it may encourage more of the same activity. This will be an on-going process during and after all stages of implementing lean.

**Standardized Work**

So, you've made the place look better and eliminated some of the more obvious areas of waste. You are starting to show the people in your company that you are serious about implementing lean. Although each of the above categories can be implemented as a standalone project, this is where the more time consuming aspects of lean manufacturing come into play.

In order to highlight some of the not-so-obvious areas of waste, you need to put things into a logical order that will reveal the waste that wasn't easy to notice before. This is where standardized work comes into play.

Your production areas need to start performing tasks in a repetitive manner as much as possible in order to identify the inherent waste in the process and remove it. Work instructions will need to be created to ensure each operator understands the work sequence for performing the job duties correctly. The work load will need to be balanced to eliminate major gaps in the production cycle.

Once the above areas have been addressed standardized material handling routes can be considered, but not before the next area when implementing lean; kanban.

### **Kanban**

Many people make the mistake when implementing lean that all they have to do is put a kanban system in place and they are a lean factory; nothing could be farther from the truth. Contrary to this popular misconception, the kanban is only one of the tools used when implementing lean. It is however, a necessary tool when striving to become a lean company.

When implementing kanban, start with the finished goods. This inventory is the most expensive. Through implementation of the finished goods kanbans you will be able to control your FG inventory levels. As the production of finished goods starts the pull of your pull system, it drives requirements for all upstream processes. Once the finished goods kanbans are implemented, you will be able to include your next level of sub-assemblies into the loop. The component kanban loop for FG and sub-assemblies can now be incorporated as well.

### **Levelized Production**

Now that the kanbans have been established and the loops set up, you need to smooth out the production in all areas. A lean production facility should function like a well oiled machine. Each kanban loop is like a gear that turns or is turned by another gear. Through levelizing production each gear turns only as much as required.

Each pull from a downstream process triggers a production signal upstream. The kanban is the tool used to initiate the build. When you levelize production, you ensure the same amount of work is required each hour, day or week thus enabling you to stabilize your manpower. A system which requires 10 boxes one day and none the next leaves many people standing around waiting for work. This is waste and must be eliminated.

### **Just-In-Time**

The last major consideration that I will review with regards to implementing lean is just-in-time production. Through the use of kanbans and levelized production, it should be easier to control when product is being built.

As JIT states, build the right quantity, of the right parts at the right time. You need to ensure people are not building ahead and building only what the kanban calls for. Use of components prior to when they are needed could lead to shortage of these parts for similar products required now. This is a concept that needs to be deeply ingrained into all members of production. Training, auditing and constant reminding will ensure this principle is followed.

As stated at the beginning of this page, the implementation of lean cannot be relegated to one web page. Any one of these topics can be (and is) a book all in itself. For further information on any of these topics, please use the buttons on the left side of the page, the site search or visit the lean resources page. Also, keep returning to this website as we will continue to add information on lean manufacturing as well as develop products to help you while implementing lean in your company.

### **BENEFITS**

Before investing in any major project, you need to compare the potential benefits to the costs. Lean manufacturing is no different. You need to consider whether or not the benefits of lean will outweigh the costs incurred to implement. And understanding these differences will help you determine whether or not lean is right for your company.

### **Short and long term benefits**

The results your company can expect to see will differ from that of other companies. It will depend on where you start and what you put into it. But with the right level of commitment and planning, you will start to see some of these benefits in a short period of time. Listed below are some of the more common benefits you can expect to see. Others may present themselves as well.

**Improved quality**

A lot of the activity in a lean environment is geared towards improving quality. As quality issues arise, problem solving techniques are used to root cause the problem. From there, mistake proofing is put in place to strengthen the process and prevent recurrence. As a result, the quality of your product will be improved.

Improved Visual Management – Another benefit of lean manufacturing is management by sight. If done correctly, your plant will be set up so you can evaluate an entire area with a visual scan. Any abnormalities will stand out and be easy to identify as a problem.

**Increased efficiency**

Line balancing will ensure each person in the process is working in the most efficient manner. Standardized work will ensure they are doing it correctly following the same method every time. This leads to repeatability and increased efficiencies.

**Manpower reductions**

One of the major benefits of lean is getting more done with less people. With standardized work and increased efficiencies, the ability to do the job with less people becomes a very real possibility. This does not mean you have to send these people to the unemployment line. The concept of lean would have these freed-up people utilized to perform further kaizen activity, training to enhance skill level, or maintenance of the system once it is implemented.

**Easier to manage**

The work instructions and standardized work let people know what they have to do and when. This makes managing an area much easier. And problems will still arise. But they will be much easier to deal with in a team environment where the support groups are eager to help solve problems.

**Total Company Involvement**

Lean is meant to involve the whole company. It is not intended to be put into action in only one area. It is a management philosophy which should include every part of your organization. This helps promote the concept that everyone in the company is part of the team.

**Problem Elimination**

Lean manufacturing forces you to attack an issue and continue to investigate it until it has been eliminated. Root cause analysis and cross-functional teams are utilized to ensure a problem receives the level of attention it deserves to correct it.

**Reduced Space**

As part of the waste reduction process, space will be created. Reduction of finished and raw inventory will save space vertically in your racking as well as horizontally across your floor.

**Safer Work Environment**

Visual management and 5S will help identify when things are out of place. When unnecessary elements are removed from the operation, the workplace becomes much more organized. And an organized work environment is a safe work environment.

**Improved employee morale**

This is a benefit that may not be realized during the initial stages of your implementation (see resistance below). But once the concept of lean starts to get accepted by the employees, you will see employee morale on the rise. Employee involvement and empowerment will make all members of your company feel like a contributing part of the team. And the reduction of uncertainty in the workplace, as a result of lean, will reduce stress in your team members and lead to improved employee morale.

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