



Why Most Chinese Enterprises Fail in Deploying Lean Production

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Abstract

Since 1990s, many enterprises in Chinese Mainland have deployed lean production in consideration of its great success in other countries, but many of them failed to realize their original targets. The paper reviews the course from mass to lean, analyzes the status of lean production in Chinese mainland, points out the problems Chinese enterprises met in implementing lean production and makes a conclusion that we can't success in it without culture reform from extensive to lean. It also proposes the key points for Chinese enterprises to change to lean.

Keywords: Chinese enterprises, Lean production, Lean culture

1. Introduction to Lean Production

1.1 The definition of Lean Production

The term "Lean Production" (LP) has been discussed in many literatures frequently since early 1990's. The definition of lean is to identify and eliminate non-value-adding activities in the organization according to the APICS Dictionary. Lean production has an underlying principle: reduce or eliminate no value-adding activities and waste in the entire supply chain to realize premium prices, high quality and reliability of products.

On one side, we can say that lean is a set of tools such as 5S, value stream mapping and total production maintenance assist in identifying and eliminating wastes continuously. As waste is eliminated, product quality improves while production time and costs are reduced. On the other side, the managerial aspect of lean is just as important as or even more important than production tools or methodologies. So we define lean production as a business environment where waste is identified continuously and eliminated passionately to realize zero waste and produce products without defects, which means the change of culture.

1.2 The course from mass to lean

It is necessary to review the history of manufacturing industry from mass to lean for us to understand why Japanese and American enterprises have gotten great success in lean production.

At the beginning of 20 century, Ford Motor Company established the first assembly line in the world based on Taylor's time & motion research and Whitney's interchangeable parts, which had been the main characteristics of modern industrial production and significantly improved production efficiency. Mass production was suitable for the situation of USA of the time and made automobiles become popular vehicles rather than luxury goods for the rich. Although mass production is greatly important in the history of production technology and management, its weakness became more and more obvious after World War Two because of the diversification of consumer demand, which required multi-varieties and small batches production. Under this situation, Toyota Production System (TPS) was originated by a Japanese company named Toyota Motor, which is called "the machine that changed the world" and is the third milestone of modern production mode after mass production.

In general, lean production (LP) experience three stages during its formation as shown in figure 1.

1.2.1 The first stage - the formation of TPS

In 1950, a young Japanese Engineer Eiji Toyoda carefully investigated in the River Rouge Plant of Ford Motor in Detroit for three months, which was the largest and most efficient manufacturer in the world at the time as so many other people came from all over the world to learn mass economy, but he made a conclusion with the talented Taiichi Ohno different from the points of others that mass production was not suitable for Japan because the environment of Japan was small country and diverse needs that was completely different from that in USA, namely, big country and big needs. Therefore, they began to establish a production mode suitable for Japan. They first implemented some site management methods such as visual management, one worker-multiple machine and U-shape production cell, which were the budding of TPS and was proved effective; after this, Taiichi Ohno created more management methods such as single minutes exchange die (SMED), pull production, and finally built TPS met the case of Japan, which was spread in Japan after the oil crisis in autumn 1973.

1.2.2 The second stage-the formation of lean production

Along with the overseas expansion of Japanese auto makers, TPS was spread to USA regards to its great effect in cost, quality and product variety, and proved to be an advanced production mode generally suitable for various culture and industries.

Many foreign researchers studied TPS with enthusiasm, especially a research team initiated by Massachusetts Institute of Technology got significant achievement, and the members of the team professor James P. Womack and consultant Daniel T. Jones first put forward the term "Lean Production" or "Lean Manufacturing" after spent years analyzing the success of Japanese companies especially Toyota after World War II and summarizing their learning in a book called "Lean Thinking" published in 1989 and "The Machine That Changed the World (1990)", and lean production (hereinafter to be referred as LP) began to spread all over the world from then on.

In this stage, American enterprises and scholars learnt and studied lean production widely and put forward many new viewpoints such as combining LP with IE technology, information technology and culture to make it more applicable.

1.2.3 The third stage- the new development of lean production

In this stage, lean production was spread to various industries as a management philosophy such as construction, service industry, civil aviation, and so on. The wide spread and application of LP makes it more perfect, various new method came forth continuously such as mass customization, cell production, 5S and total production maintenance.

Insert Figure 1 Here

2. Lean Production in Chinese Mainland

2.1 The course of Chinese enterprises' deploying lean production

Chinese enterprises have been studying and learning lean production for more than thirty years since First Automobile Works (FAW), a famous large-sized state-owned enterprise, dispatched a delegation that had forty members to visit Toyota in Japan in 1978 and learnt there for half a year. We summarize the thirty years into two stages as follow.

2.1.1 The first stage – Introducing lean production

At the beginning of Chinese reform and opening to the outside world (1978), the plant manager of FAW Mr. Liu Shouhua directed an expert team to Toyota Motor in Japan to learn TPS, and then organized its senior managers to study TPS after they came back; they also invited one of the founders of TPS Taiichi Ohno to give lecture on TPS, tried out it in selected plant, built a TPS sample production line, and started two vigorous campaigns for studying TPS in 1980s and 1990s.

2.1.2 The second stage – Deploying lean production on a large scale

In the early days of 21 century, more and more Chinese enterprises in Mainland began to implement lean production, why? There are three main reasons for Chinese enterprises' enthusiasm in deploying LP, the first one: they are encouraged by other enterprises that have deployed LP successfully and learn from Sino-foreign contractual joint ventures especially Japanese and American enterprises in consideration of their great success in product quality and cost reduction by practicing lean production. The second one: various lean training organizations emerge as bamboo shoots after a spring rain; they bring new thinking of LP and make it spread in enterprises quickly. The third one: the management of enterprises is willing to deploy LP to realize their profit targets and establishes reputation in acceptance of new ideas and tools. So many Chinese enterprises deploys lean production blazingly, but they meet many problems that make them puzzled since few of them get the success that Toyota has experienced.

2.2 The effect of Chinese enterprises in deploying lean production

Some of the enterprises that have practiced LP benefit from it, but most of them haven't realized their original targets as expected. In general, we can make a conclusion that gains and losses coexist in Chinese enterprises' implementation of

LP over thirty years.

2.2.1 Positive effect in deploying LP

We have learnt and practiced LP for more than third years and gotten some achievements, on one hand, it makes lean thinking and tools spread all over the country, most enterprises know what lean production is and what it can do for them. For example, many employees in production site and managers in Chinese enterprises can make a detailed explanation of some terms and tools of LP such as 5S, total production maintenance (TPM), they also well know the benefits of LP such as improving product quality, reducing product cost by eliminating wastes, insuring the safety of machines and staffs, controlling over work site and so on. On the other hand, a few of them get some success in deploying LP, for example, the Chassis Branch of FAW reduced its work-in-process by 70% by deploying LP. Another example, Jialing Group dedicated to build a lean enterprise to overcome the adverse influence of financial crisis and got some positive effect in efficiency and manufacturing cycle: the efficiency of machining line and assembly line increased 44% and 21% respectively, the manufacturing cycle of both lines reduced 75% and 33%.

2.2.2 Problems we met in deploying LP

Although we have gotten some positive effect in deploying LP, we met so many problems that made us puzzled if LP is suitable for Chinese enterprises. In order to find out the true reasons for the failure of LP in china, we have investigated in more than twenty enterprises that ever implemented LP for two years and find that there are various reasons for their failure, for example, some of them lack the basis to deploy LP such as industrial engineering and automation, but we also discovered some wrong thinking and doing commonly made in deploying LP as follows, which we believe are main obstacles for many enterprises that implement lean tools without sustained benefit and finally make lean production a flash in the organization.

(1) Only pay attention to lean tools

Many enterprises started to deploy LP at the tool level, with no combination to business strategy and more seriously some employees don't know their business strategy at all including some leaders, not to speak of combining LP with it, which result that employees simply consider lean production as a set of tools, if they failed in one tool, they thought it didn't suitable for them and pursue other new tools but neglect the philosophy of lean that can teach employees to develop good working habits and improve personal quality through continuous improvement. In fact, the later is much more important than the former and is actually essential for enterprises to deploy lean production successfully. If we consider lean production is just a set of tools all the time, we can't get essential breakthrough in LP at all.

(2) Hope to achieve quick results

Many enterprises hope to build Rome in a day, once they can't get quick effect instantly after introducing lean production, they are suspicious of its prospect and give up. Rome can't be built in a day, Toyota had even spent almost forty years to establish TPS, together with we began to research on management late on relatively weak foundation, so the aggregation process is absolutely necessary although we can shorten it by our efforts.

(3) Indiscriminately imitate and copy the practices of others

During investigation, we found some enterprises thought they would get desirable effect by applying lean tools that others have gotten great achievements such as SMED that is proven significantly effective for improving efficiency and reducing costs. For example, a general manager of a manufacturing plant said to a lean consultant eagerly: "if you can teach us to master SMED, we are willing to pay the money satisfactory to you", but the fact is not so simple, the successful implementation of any lean tool is closely related to the management philosophy, so we can't succeed by imitating and copying practices of others indiscriminately, it must be combined with local culture.

(4) Master the superficial knowledge without understanding the essence of lean production

In April 2004, before FAW established strategic partnership with Japan Toyota Motor, Toyota dispatched Mr. Asakura Masaji, an expert in TPS, to FAW Car Company to supervise the latter to deploy TPS. After going around and inspecting the production site of FAW Car, the expert said seriously "I know what you are thinking" and wrote a sentence on the blackboard "beat down Japanese". Then he said without any emotion "I hope you can beat me down, but you must be more powerful than me, or else you must learn from me honestly". His words made the management present feel ashamed, but they had nothing to say, because FAW have learnt TPS more than thirty years, but they just learned some superficial knowledge without understanding the essence of TPS. For example, Asakura Masaji came to FAW Truck Branch on April 7, 2003, he put forward 26 problems about the site management of assembly and vehicle body plants on the spot. Why he can find out the problems and we are accustomed to them? The reason is what we learn from Japan and USA is superficial knowledge, so we can't analyze and research production site deeply to find out problems, consequently once Japanese experts came, they put forward the same problems, we are always at a standstill since we don't get the essence of lean production. So we can say lean production is a concept both familiar and unfamiliar to us.

3. Culture change to lean – the essence for Chinese enterprises to deploy lean production successfully

There are many scholars have put forward suggestions on how to deploy lean production successfully for Chinese enterprises, but we believe that culture change is the foundation for us to really master the essence of LP and establish characteristic production mode suitable for Chinese characteristics. Why we can make such a conclusion? As we all know, Toyota has gotten significantly success on TPS depending on its unique culture and American enterprises has gotten success depending on its innovation culture to make Japanese TPS grown into American Lean Production although they learnt TPS from Japanese. As a result, it is extremely necessary for Chinese enterprises to change from extensive culture to lean first. However, when facing culture reform, only 5% early adopters will embrace the change, 90% fence sitters will look for leadership, 5% concrete heads will resist it. So we have to guide enterprises to establish lean culture, which will make our enterprises success in decreasing costs and improving quality under the existing conditions.

3.1 Visible support and involvement from management in different level

Chinese people are used to follow their leaders, so management in different level should provide complete, real and visible support for lean production. Firstly, top management commitment is necessary for sustaining the program. This could be done in different ways such as visiting lean production areas, conduct LP audits, present awards for significant achievement and other ways to get involved on a regular basis. Secondly, the involvement from management in different level is also important for deploying LP because they can set good examples with their own conduct for employees, and consequently provide strong leadership and incentives to the 90% fence sitters.

3.2 All-staff involvement and change in work habits

Continuous improvement is the key of lean culture, which completely depends on the passionate involvement of all employees. In addition, employees' work habits will influence their behavior and behavior determines success or failure, so we must change employees' work habits to comply with lean standards: employees should conduct "continuous improvement" events, document results in one-point lessons and complete daily check to engage in lean production, which help build pride. How to motivate employees to conduct continuous improvement is an important task for the management.

3.3 Thinking lean and combining with Chinese culture

Thinking lean means we should keep firmly in our mind that we only do those things that create or add value, for which customer is willing to pay and all other activities are wastes. Moreover, when deploying lean production, we should break traditional concepts, overcome misunderstanding and combine it with the situation and culture in China, because Chinese is unique in the world different from Japanese and American in characteristics and working environments. Chinese are extremely clever, but some times they play petty tricks on their work. For example, when FAW deploying LP, it rebuilt the punching machine by adding a start button to require operators operating the machine with both of their hands together and thereby to avoid pressing their hands and fingers to guarantee the safety of work site, but the operators put a brick on one button to make it pressed down all the time and they still operate the machine with one hand, which not only disobeyed standardized working procedure, but also put their hands under the danger of injury.

3.4 Long-term commitment to lean production for continuous improvements

Lean production can not accomplish in one action, just as Toyota has spent scores of years in developing TPS and it is still in pursuit of perfect. So lean production is an endless journey, we must start as a long-term commitment and not as a task to realize continuous improvements and implement LP in accordance with famous PDCA cycle, which will make lean as a culture and a way of life. In order to make Chinese enterprises hand upon LP, we have a lot of work to do.

3.4.1 Make long-term commitment to lean production rather than three-minute blood

Many Chinese enterprises are used to setting off an upsurge when learn advanced tools and management mode, they ignore the effect or just do it as a show to demonstrate the advanced concepts of leaders; for example, many enterprises that have gotten Quality Certificate, but it can't guarantee the quality of their products, the result is they spent costs without quality improvement. During deploying LP, all staffs including the management and ordinary employees must prepare for a long-term battle since lean is an endless course, especially the former, without their support, it is difficult for the employees to persist in.

3.4.2 Establish the human resource management system that support LP as a long-term task

The success of TPS in Japan is closely related to the long-term employment system even if it changes somewhat, the situation in China is on the contrary, Chinese enterprises have broken the lifelong secure job since the reform and opening-up at the beginning of 1980s, many enterprises carry out last one eliminated system. The human resource management departments of Chinese enterprises are mainly engaged in assessing, punishing and firing employees, and pays little attention to staff training or makes it becomes a mere formality. The practice of Toyota is to train employees before manufacturing vehicles. They provide lots of On the Job Training including basic operation skills, multi-skills

and more important they train their staffs to find out and solve problems, which is the basis for continuous improvement. So we should on one hand improve the commitment degree of employees to their enterprises by taking them as our family members rather than profit-making tool, and on the other hand provide suitable training not only to let them master the knowledge and skills of LP, but also make them be used to working autonomously, namely, to make them find out and solve problems positively.

3.4.3 Deploy LP systematically and gradually

Many Chinese enterprises hope to achieve quick results and act rashly, which make them only stay on the surface and will not success at all. For example, in 1980s, FAW called TPS as misleading “kanban production” soon after they studied it. So we suggest Chinese enterprises to systematically deploy LP in stages and we give an example in table 1.

Insert Table 1 Here

4. Conclusion

Lean production will benefit an enterprise greatly if it is implemented correctly, especially in the current situation of financial crisis. The paper suggests a culture way for Chinese enterprises to deploy lean production successfully. But changing previous habits and establishing new culture are both long-term assignments that need the efforts of all employees, so the road to realize lean is still long. We hope to the paper will assist Chinese enterprises in deploying LP.

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Table 1. An example for deploying LP systematically in five stages

Stage	Tools	Sponsor
Stage 1: Make a comprehensive survey	Value stream mapping	Plant manager
Stage 2: Stability phase	5S Error proofing	HR manager Quality manager
Stage 3: Continuous flow phase	Setup reduction Total production maintenance Continuous flow manufacturing	Mfg. Eng. manager Maintenance manager Production manager
Stage 4: Standardized work phase	Standard work	Production manager
Stage 5: Pull production phase	Pull system (Production Kanban) Pull system (Supplier Kanban)	Production control manager Purchasing manager

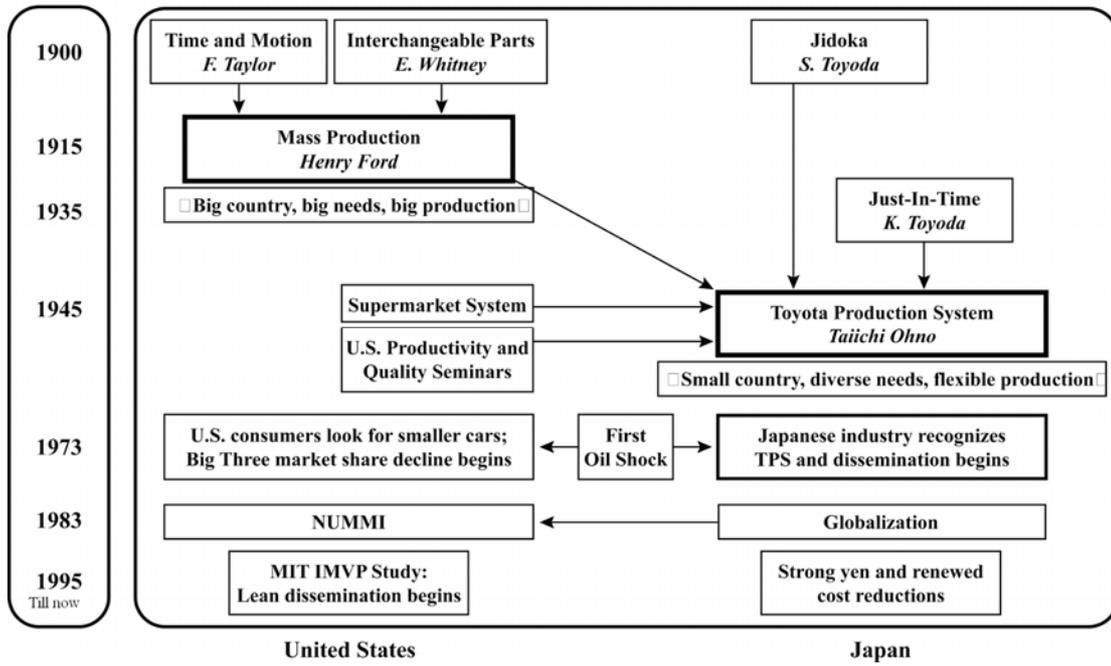


Figure 1. The course from mass to lean