

A Review on Lean Thinking and It's applicability for Implementation on Farming

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ABSTRACT

The lean thinking accentuates on the philosophy of continuously improving performance by systematically eliminating wastes. Lean thinking [1] was introduced to extend the concept from manufacturing floor to various fields like health care, supply chain, service industries, construction, hotel industries etc. Experience shows that adopting lean thinking requires abandoning deeply engrained mainstream management thought routines and this is never easy. As various lean tools when applied to industries results in development. Now this is the time to adopt this valuable tool of development in agriculture field for changing its status. This paper is intended to provide an overview on concept of lean thinking and its applicability for implementation on farming by conferring with various lean tools.

Keywords : Lean Thinking, Lean Tools, Lean Farming

I. INTRODUCTION

The popular definition [2] of Lean Manufacturing and the Toyota Production System usually consists of the following:

- It is a comprehensive set of techniques that, when combined and matured, will allow you to reduce and then eliminate the seven wastes. This system not only will make your company Leaner, but subsequently more flexible and more responsive by reducing waste.
- “Lean is the set of ‘tools’ that assist in the identification and steady elimination of waste (muda), the improvement of quality, and production time and

cost reduction. The Japanese terms from Toyota are quite strongly represented in ‘Lean.’ To solve the problem of waste, Lean Manufacturing has several ‘tools’ at its disposal. These include continuous process improvement (kaizen), the ‘5 Whys’ and mistake-proofing (poka-yoke). In this way it can be seen as taking a very similar approach to other improvement methodologies.”

Lean manufacturing [3] is a wide set of production practices to eliminate or reduce waste or any activity that consumes resources without adding value in design, manufacturing, distribution, and customer service processes. It was developed by the Toyota

executive Taiichi Ohno (1912-90) for large repetitive manufacturing in the automotive sector during post-Second World War reconstruction period in Japan, and popularized by James P. Womack and Daniel T. Jones in their 1996 book 'Lean Thinking'. [4] Nowadays, many manufacturing companies have considered lean production to be central to their manufacturing strategies.

Katayama and Bennett (1996) [5] describe lean production as a manufacturing system that use less resource input to produce a higher output performance which lead to customer satisfaction and gain larger market share than those of its competitors. Theoretically, Shahram (2008) [12] defines lean production "as a manufacturing system without waste" while waste is defined as "anything other than the minimum amount of equipment, materials, parts, and working time that is essential to production".

Conversely, Worley and Doolen (2006) [13] define lean production as "a systematic removal of waste by all members of the organization from all areas of the value stream", whereby the value stream is defined as all activities that contribute to the transformation of a product from raw material to finished product.

On the same note, Papadopoulou and Ozbayrak (2005) [14] define lean production as "an approach to manufacturing that is aimed at the elimination of waste while stressing the need for continuous improvement".

Holistically, Sanchez and Perez (2001) [15] refer lean production as a conceptual framework based on a few established principles and techniques such as multi-functional teams, elimination of zero-value activities, continuous improvement and supplier integration to achieve production effectiveness and delivers just-in time.

Likewise, Shah and Ward (2003) [7] define lean production as "a multi-dimensional approach that

include several management practices such as just-in-time, quality system, works teams, cellular manufacturing, supplier management in an integrated system".

But Agus and Hajinoor(2012) [8], stress the importance of technology and innovation in lean production.

Today's era of global competition has created intense challenges for manufacturing companies. Manufacturing companies that do not keep up with lean production would lose out to competitors. Manufacturing companies do not only compete on prices but also on who would first introduce new technological, creative, innovative and high quality products to enable them to be market leaders and ultimately gain higher profits. Lean production has the potential to assist the organization in achieving both cost minimization and value maximization ([9][10][11][6][8]). Many researchers claim that lean production can result in better performance ([9][10][7][6]), but very few empirical studies have been conducted to investigate the impact of lean production on business performance.

When we think about lean concept the first thing comes in our mind is 'Lean Manufacturing' because in olden days, lean concept firstly implemented on manufacturing industry.

Lean manufacturing is a management philosophy derived mostly from the Toyota Production System (TPS), which started its development in 1940s.

Lean thinking is a business methodology that aims to provide a new way to think about how to organize human activities to deliver more benefits to society and value to individuals while eliminating waste.

The term "lean thinking" was coined by James P. Womack and Daniel T. Jones to capture the essence of their in-depth study of Toyota's fabled Toyota

Production System. Lean thinking is a way of thinking about an activity and seeing the waste inadvertently generated by the way the process is organized

Lean thinking describes an approach to business that aims to deliver more and more with less and less.

- Less human effort,
- Less equipment,
- Less time
- Less space

II. PURPOSE OF STUDY

The purpose of this study is to examine the techniques of adopting lean, the tools implemented, obstacles and challenges in farming.

III. LEAN TOOLS AND THEIR APPLICABILITY

As lean concept applied to various fields like health care, supply chain, service industries, construction, hotel industries, manufacturing etc. results in development of above fields in various sense, hence by applying various lean tools to farming we can expect the development in the same. Here we are discussing various lean tools and their applicability for farming.

Lean thinking involves identifying and eliminating all forms of waste in supply chains and focusing instead on what delivers value for consumers. Waste is anything that consumes time or resources but does not add value to the product or service, as viewed from the perspective of the customer. General wastes are Transportation, Inventory, Unnecessary motion, Waiting, Over production, Over processing, Defects, Intellectual waste and opportunity loss.

Under the heading of lean thinking various tools are used for reduce the wastes and improve the working condition as well as status. The lean tools used are as

5S:

5S stands for sort, set in order, shine, standardize and sustain, it helps to eliminate waste, streamline production, and optimize efficiencies. When you adopt 5s thinking, you make a commitment to put safety, organization and effectiveness ahead of production deadlines, profits and output. 5S is designed to decrease waste while optimizing productivity through maintaining an orderly workplace and using visual cues to attain more consistent operational results. 5S refers to five steps – sort, set in order, shine, standardize and sustain (also known as the 5 pillars of a visual workplace). It is not just a cleaning but putting all the instruments, equipments, tools etc. at proper places for getting it on time when needed. hence when we implement this 5S lean tool in farming, definitely growth riches to high altitude.

Continuous flow / Supply Chain Management:

Continuous production is called a continuous process or a continuous flow process because the materials, either dry bulk or fluids that are being processed are continuously in motion. Continuous processing is contrasted with batch production. Continuous production system involves a continuous or almost continuous physical flow of materials. The examples are petrochemical, cement, steel, sugar and fertilizer industries, etc.

The aim of the continuous manufacturing flow is to produce a flow production to manufacture, produce or process materials uninterrupted. The reason it is called a continuous process is because the materials, which can also be fluids, are being perpetually processed.

The production from farming if we get continuously then cash flow will also come in to play and definitely it helps in improving the status of the farmer

Kaizen:

It is the Japanese word for "continual improvement", and a key lean manufacturing tool that improves quality, productivity, safety & culture in the workplace. It is an approach to creating continuous improvement based on the idea that small, ongoing positive changes can reap major improvements. Typically, it is based on cooperation and commitment and stands in contrast to approaches that use radical changes or top-down edicts to achieve transformation. The foundation of the Kaizen method consists of 5 founding elements which are teamwork, personal discipline, improved morale, quality circles, and suggestions for improvement. Hence Kaizen plays very important role when it is implemented in farming also changing some conventional working methods we can improve the production as well as quality of the product

3M (MUDA/MURA/MURI):

Muda, muri and mura are called "the three M's." Together they form a dissonant triad. All three M's must be eliminated to create a sustainable lean process. Muda is a Japanese word meaning "futility; uselessness; wastefulness", and is a key concept in lean process thinking, like the Toyota Production System (TPS) as one of the three types of deviation from optimal allocation of resources (the others being mura and muri). Mura is a Japanese word meaning "unevenness; irregularity; lack of uniformity; nonuniformity; inequality", and is a key concept in the Toyota Production System (TPS) as one of the three types of waste (muda, mura, muri). Waste reduction is an effective way to increase profitability. There are 7 types of muda commonly identified in lean manufacturing Overproduction, Waiting, Transportation, Over processing, Movement, Inventory, Making defective Parts, Unused Skills and Knowledge. By reducing wastes in farming or reducing it we can increase productivity, efficiency lower the losses and increase the profit.

Just in time:

Just in Time (JIT) production is a manufacturing philosophy which eliminates waste associated with time, labour, and storage space. Basics of the concept are that the company produces only what is needed, when it is needed and in the quantity that is needed. In inventory management, the Just-In-Time or JIT system reduces wastage, improves efficiency and productivity, and contributes to smoother production flows. A shorter production cycle can decrease financial costs, inventory costs and labour costs.

An effectiveness imparts with the help of JIT by implementing on farming, we reduce the time required for various processes, which will reduce the working hours and also reduce the labour cost which is the most burning topic in today's farming era.

Jidoka (Automation):

Jidoka is one of the three pillars of the world famous 'Toyota Production system' and also a key concept in 'Lean Manufacturing'. The concept of Jidoka is "Automatic detection of problems or defects at an early stage and proceed with the production only after resolving the problem at its root cause".

In farming where ever the necessity of automation required and when we applied it results in higher production, reduction in time and quality work .

Poka Yoke:

Poka Yoke, is known as mistake-proofing, is a technique for avoiding simple human errors at work. Poka-yoke helps people and processes work right the first time. Poka-yoke refers to techniques that make it impossible to make mistakes. These techniques can drive defects out of products and processes and substantially improve quality and reliability.

In farming the chain starts from crop planning, culturing, harvesting, processing or supplying during this process if we minimize the errors by using Poka

yoke tool we can improve productivity with improved quality product.

Heijunka (Level Scheduling/production):

A Heijunka is a scheduling tool used to visualize the work items that need to be completed to meet your average customer demand. Basically, it is a system that visualizes the orders of each product and according to the average demand, it levels a production sequence for achieving an optimal flow. Also Heijunka (hi-JUNE-kuh) is a Japanese word for leveling. It is part of the lean methodology of process improvement that helps organizations match unpredictable customer demand patterns and eliminate manufacturing waste by leveling the type and quantity of production output over a fixed period of time.

In farming, if we produce the product as per the demand and supply within time, we get the good rate and maintain the repo with customers which will definitely help in development.

IV. CONCLUSION

When adopting the “lean tools” we see the development in various fields i.e. Production, Manufacturing Company, health care, construction, supply chain, service industries and hotels etc. likewise from above discussion on various lean tools, if we implement them on farming then definitely the growth and development occurs.

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