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# Review on Implementation of Kaizen Technique for Productivity Improvement in Manufacturing Organization

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**Abstract** - The aim of this paper is to study and idea about Kaizen technique for a small improvement in a manufacturing company. The paper describes basis definition of Kaizen philosophy & a review on Kaizen concept and its implementation. Kaizen is one of the most important technique of continuous improvement. This paper explains various literature and presents a concept of Kaizen, which useful for new research in another field. Kaizen is an approach focused on improving productivity, reducing variation and eliminating waste, improve lead time, use of space in an organization. This study achieves from this literature review to different Kaizen tool apply in a different company as per necessary but Kaizen techniques, 5s and Value Stream Mapping are much effective and use full tool for the finding of waste and improvement of the process.

**Keywords**- Kaizen, Continuous Improvement, productivity, 5S, Value Stream Mapping

## I. INTRODUCTION

Kaizen means continuous improvement. A word of Kaizen is a combination of two Japanese words: 'Kai' means "Change" and 'Zen' mean "Good". The whole purpose of which is to improve working conditions and improving the organizational efficiency [1]. The Kaizen is established as the best technique to improve productivity in the manufacturing systems [2].

Kaizen was made in Japan following World War II. The source of kaizen can be traced back to the Quality Guru Dr. W. Edwards Deming, but it was Masaki Imai, who promoted the concept of Kaizen to become a revolution around the world [3]. Kaizen is a philosophy with the origins in the mid-twentieth century. In his book entitled "Kaizen: The key to Japanese Competitive Advantage" Masaaki Imai discusses the Kaizen having the possible origin of the Toyota System [4]. Kaizen is unique in its focus on small improvements of work standards as a result of a continuing effort. Furthermore, "There can be no improvement where there are no standards" [5].

The concept of work is too observing the process, Find out problems in the organization. Generating philosophies and strategy an action plan to overcome the problems, Implementing, analyzing all aspects of the conclusion and Refining the solution and set for a final result with respect to quality and quantity [2].

The Toyota production system is known for Kaizen, where all line personnel are expected to stop their moving production line in case of any abnormality and, along with their supervisor, suggest an improvement to resolve the abnormality which may initiate a Kaizen (Kishore et al. 2016). The Kaizen, every employee is responsible for finding the gaps and inefficiencies, at every level in the companies, ideas where improvement can take place, because all the people are implied when it comes to Kaizen management benefits can be viewed as long term improvements [4].

Kaizen philosophy recognizes that there is always room for improvement. Ultimately, the system uses quality circles, groups of workers who meet and work together to figure out problems and arrive up with innovative modifications. Quality circles, automation, suggestion systems, just-in-time delivery, Kanban and 5 S are all included within the Kaizen system of operating a business [7].

## II. LITERATURE REVIEWS

The Kaizen philosophy has made a great impact on researchers because it enhances the productivity of an organization and also helps to produce high-quality products with minimum efforts. The following authors have discussed the Kaizen techniques:

According to (Imai Maasaki, 1986), the Kaizen philosophy includes three main principles which are process orientation, improving and maintaining the standard and people orientation. This all principles are significant in order to implement the kaizen [5].

(Shubhangi&Gurway, 2016) They have experience of implementation of Kaizen, as a productivity improvement tool in a pipe manufacturing company which is facing the problem of increased lead time & stock out situations in seasons. This paper contains basis definition of Kaizen philosophy & a brief review of Kaizen concept & its implementation. In this paper involves in manufacturing company which practice Kaizen & 5S methods in its production area. The main concern of this case study is to highlight the importance and impact of the Kaizen & 5S a continuous improvement project approach in manufacturing companies [1].

(DipakGauri, Ajay Gajbhiye, 2015) This paper mention to apply the Kaizen technique for productivity improvement in Bajaj Industries Limited at Immamwada in Nagpur. This problem observed during Kaizen implementation are solved with better working efficiency, better working environment, continuous work production, Under these circumstances, the implementation of lean tool Kaizen, improves the production environment with moderate investment. This case study carries evidence of the genuine advantages when applying Kaizen to the manufacturing shop floor. In this study productivity is an average measure of the efficiency of production [2].

(Jignesh, 2014) this paper explains the concept of Kaizen and methodology of Kaizen, which is used to increase the efficiency of all processes in the organization [3].

(Aurel et al., 2015) The main objective for implementing of Kaizen management for industries that are oriented towards quality and continuous improvement given. Kaizen, its skill in modification processes, cultures and attitudes [4].

(Kishore et al. 2016) The aims of this study are to understand and improve the productivity by applying the Kaizen methodology in the industry. In this case study how to an implementation of Kaizen and other improvement practices can be used by companies to bring down manufacturing costs and increases productivity. In Spacewood Furniture Pvt. Ltd industry, the plant layout and material flow in shop floor also play important role in influencing productivity through distance traveling and take time. The results have compared with the existing layout result and show an improvement of productivity [6].

(Slobodan, 2011) in this paper describe the kaizen management philosophy. Kaizen management has involved top management to workers employees. It is providing a tool to adapt to the global competition by eliminating waste in the process of production, shifting corporate culture and encouraging cross-functional links between the management staff and workers. Kaizen is rooted in the key principles and supported by simple processes and tools that are designed to assist people to improve productivity and consistently deliver the value that customers seek in the products and services they buy. These principles will provide a platform to sound out the relevance of Kaizen in service settings [7].

(Jakubiec&Brodnicka, 2016) They have used case study method and formulated following research problems: features of Kaizen team, basic rules of Kaizen team, plan of Kaizen action and tools used during Kaizen action. Kaizen action in an analyzed company is realized during so-called "Kaizen week". They describe that the Improvement can be divided into two groups: Kaizen and Innovation. Kaizen is a small improvement as a result of ongoing efforts, but permanent, with determination and consequence [8].

(Mayank Singh et al. 2015) This paper is based on the application of lean manufacturing tools like 5S, Kaizen and Visualization. The main objectives of the paper to improve the efficiency of the plant by using various industrial engineering techniques, to improve various working positions of employees and to apply tools of lean manufacturing like 5S, Kaizen. The study about to implementation of 5S and Kaizen technique by facing problems like a waste of motion and time, improper material handling, ergonomics problem, improper usage of space, and arrangement of tools and materials [9].

(AbhijitChakraborty, 2013), they are present the importance of Kaizen technique and how to implement in a small manufacturing company. The case study of implementing Kaizen for improving productivity, improve lead time, etc[10].

(Salunkhe, Kamble&Malage) In this paper explain that how to improve productivity with less processing time in an Irrigation pump manufacturing company. Kaizen event is similar to a brainstorming exercise, at least in the beginning stages. Kaizen teams consist of 4 to 7 individuals. The team normally spends 100% of their time for a few days until the business problem or issue is solved or improved. Due to an implementation of 5s since we able to reduce a time for searching any tools or equipment of the system processes [11].

(Rajethirakumar&thyla, 2011) The paper describes a case study of a large-scale automotive component manufacturing industry which needs to improve the productivity in one their tube bending, assembly lines and the works focuses on the implementation of lean principles and to develop different strategies to eliminate waste. This paper refers how to use of the value stream mapping and other lean tools such as Kaizen can be used to map the current state of a production line and design a desired future state [12].



(Dinesh and Prashant, 2014) this paper refers improvement of plant layout by using 5S technique in an industrial case study. 5S is a system to reduce waste and optimize productivity through maintaining an orderly workplace and using visual cues to achieve more consistent operational results. The implementation of 5S pillars, Sort (Seiri), Set in Order (Seiton), Shine (Seiso), Standardize (Seiketsu), and Sustain (Shitsuke), provide clean, improvement and sustaining a productive work environment in the company [13].

(Asmita, 2013) experiment for Productivity improved along with a reduction in production cost. Takes some steps to modify or improve the whole process and eliminating the defects [14].

(Bhupendra, 2012) The Gemba define the real place where the all the value-added activities take place. The paper describes Kaizen can bring dramatic improvement in any individual and industries, can improve exponentially by adopting a Kaizen technique in the company. The techniques managers can bring Kaizen consultant who takes out the new ideas from employees and makes an environment to continue this process. Quality Circles, Kanban, Line Balancing and 5S are some techniques used to put through the Kaizen. In the Panipat, Cement Plant Kaizen is developed and different teams for improvement and suggestions were made. These teams take suggestions from employees about improvement in their section for better quality, cost reduction, improving delivery service, innovation, increasing productivity and increasing safety. The Gemba means a real place where the all the value-added activities takes place [15].

(Singh &Belokar, 2012) they are explained in this case study due to the implementation of lean manufacturing, Kaizen techniques, the productivity of the gearbox assembly area was also improved like other sub-assemblies in the assembly shop of the industry as per the required objective [16].

(Rajesh, Sushil and Sultan, 2012) this case study deals with the objective of discussing the implementation Kaizen and other techniques used with Plan-Do-Check-Act (PDCA) cycle in the industry [17].

(Patel &Thakkar, 2014) this paper review of the implementation of a 5S system and elimination of losses in the organization. 5S will create clean, productive work environments and assure the delivery system. And also discipline and will increase the sense of duty and compassion for the organization. This paper study demonstrates the effective implementation of 5S leads to continuous improvement in productivity of the manufacturing organization [18].

(Gudeep&Belokar) are explained in that case study the lean manufacturing has been utilized in the manufacturing of the spur gear. The results show a reduction of cycle time, increase productivity, decrease in overheads and thus provides a saving cost for the organization [19].

(Raluca, 2015) the paper presents the implementation of 5S, developed to ensure in the workplace, improve productivity, reduction of defects and increase cleaning in the company. 5S can be considered a philosophical system, a way of life, which can promote the morale and create a good impression to customers and enhance the efficiency. Any company that applied the 5S program will deliver immediate and visible results, reducing different types of waste, in respect of lean manufacturing principles, removing all the kinds of waste from the value stream mapping (cycle time, labor, materials, and energy) [20].

(Mihail, Constantin and Daniel, 2010) In this case study to the implementation of the concept of continuous improvement involves: continuous improvement of process and products, productivity, the Deming cycle- PDCA, the techniques and instrument of quality control and implement Kaizen-5S. The Kaizen principles presume a practical approach and lower costs of improvement. According to the Kaizen principles, we must be sure that, when we consider an action, our action will go on in the best possible way and is not merely an intermediate action to generate a temporary result [21].

(Vibhoret al.2015) the paper is on the implementation of a 5S quality tool in a manufacturing company. 5S system which they defend the quality of working conditions in the company which raised the efficiency of the workers and ultimately the productivity of the company is increased to 91% [22].

(Vinodkumar, Akash and Ankitkumar, 2014) Quality is a never-ending quest and continuous improvement process is a never ceasing effort to identify and eliminate the main reasons which create problems. That type of advance is achieved by various continuous improvement concepts such as Kaizen, PDCA Cycle, Quality circle, JIT, 5S, etc[23].

(Monoj and Sachin, 2014) Implementation of VSM tools has resulted in the experiment of the present process performance against the customer requirement. It also leads to the future state via scientific techniques like time and motion study, NVA reduction, Kaizen, 5S and focuses on the root cause of the problem [24].

(Pratikchandra, 2017) The aim of this research is about analyzing the process flow in a heat treatment plant and increasing its efficiency through value stream mapping of continuous improvement [25].

(Hossain&Uddin, 2015) In this paper portrays how the Value Stream Mapping process was applied to eliminate the manufacturing waste in a litchi juice production plant. The implementation of Lean Manufacturing in a small-scale production industry. The main

aim of this practice was to minimize the waste on the shop floor and the application of Value Stream Mapping in detail. This present work provides a case study of the continuous improvement of a hub manufacturing process by doing away with the non-value added activities by means of lean tools [26].

(Johnson, 2015) The objective of this research is to study a production line and apply Lean principles and tools to resolve quality problems, improve productivity and Current State Map with Kaizen Improvements [27].

(M.D. Singh et al.2017) This research paper carried out to put on the Kaizen, 5S methodology of Lean manufacturing to solve the problems of the industry in India with the objective to increase the efficiency of all processes and elimination of waste in the company. Implementation of Kaizen events presumes a practical approach and low cost of the improvement. This research paper carried out to assign on the Kaizen, 5S methodology of Lean manufacturing to solve the problems of the industry in India with the objective to increase the efficiency of all processes and elimination of losses in the company. Kaizen creates an atmosphere where employee suggestions are evaluated [28].

(Praveen and Deepak, 2014) Value Stream Mapping is used to define and analyze the current state for a product value stream and design a future state focused on reducing waste, improving lead-time, and improving workflow. By using VSM we observed that non-value added time reduced and Value Stream Mapping is used to improve the plant layout. This tool is also very important for the implementation of Kaizen technique [29].

(Buruiana et al.2009) The paper explains the simulation of a Value Stream Map in a small manufacturing company before and after implementing Kaizen technique [30]. (V. K. And AnupamSihag, 2013) according to them, the use of VSM has been imputed to the cause of much of the success that Toyota of Japan has had since 1980. VSM was introduced by Taiichi Ohno in 1960 and 1970's at its basic level. It is a systematic process to identify wasted time and action in the manufacturing process. VSM also use when applying Kaizen for continuous improvement in an organization[31].

(Jalu G., 2015) worked on "Achievement of Quality, Productivity for Market through Kaizen Implementation in Ethiopia". According to them the implementation of Kaizen technique changes the manner improvements are made. In order to improve productivity, profitability and quality. He was using Kaizen philosophy, principles and tools in the case study. He concluded that in the overall study, Kaizen philosophy, Pillars and Kaizen tools for increase productivity, reducing time loss, decrease down time, reduce cost, team work and motivation of employee's development [32].

(Anders Berger, 1997) explained the introduction of Kaizen and core principles are as process orientation, small step improvement and people orientation. This paper gave the concept of Kaizen in order to describe the origins of continuous improvement. Compared with the traditional Kaizen system and some contemporary continuous improvement application in the highly standardized production area, the discussion has explained that organizational designs for continuous improvement are depending on the production framework [33].

(Robin and Suraj, 2017) according to them, this case study is done under a well know automotive manufacturing companies. For improving the productivity, the work and time measurement technique is used. This work study involves a system and cycle time. It helps in defining a proper working process and expresses a standard time. This paper describes the estimation of machine cycle time reduction using value stream mapping and restores the machine to its required productivity after arranged Maintenance [34].

(Gupta and Jain, 2014) worked on "An application of 5S concept to organize the workplace at scientific instruments manufacturing company". According to them, the implementation of the 5S and Kaizen principles to help small-scale manufacturing companies to become more efficient and more productive. They concluded that implementing Kaizen events guesses a practical methodology and low cost of the improvement. Kaizen found problems as a chance to improve. Kaizen creates an atmosphere where employee ideas are appreciated [35].

(Jarial, 2012) worked with the aim of the implementation Kaizen in the manufacturing industry. Kaizen is a thinking that essentials the involved every person in the organization. This study shows that with the Kaizen and other technique, the company can continue with lower production cost and higher quality. Interactive program can be used in teaching the labors about Kaizen technique and their application problems. Concluded that by Kaizen, the productivity of the organization increased, the elimination level of products weakens, customer's fulfillment is achieved and income for the organization increases, therefore the performance of the organization is developed. [36].

(Wittenberg, 1994) This article gives the idea of the Kaizen strategy to manufacturing, definition and that title "Kaizen – The Many Ways of Getting Better". A new approach must be implemented to meet innovative challenges. A group had learned that the Kaizen process made improvements rapidly, the time consumed at the workplace was by far the greatest value, their whole team – workers and consultants – could achieve something, there is waste everywhere and Kaizen is doing things together[37].

(Puvanasvaran, Kerk and Ismail, 2010) This paper explains about kaizen case study in Small and Medium Industries, which produce machines spare part and food processing machines. This case study is focused on decreasing the lead time of sales order handing out. Kaizen footsteps are used as guiding principle and PDCA Cycle is selecting as a problem-solving method to ways the case study. The accurately tools and systems such as 5why, Work Instruction Sheet, Pareto diagram, Process Mapping, PDCA Cycle and braistorming were used[38].

(Mehul, Chauhan and Trivedi) This paper gives the literature review on different type of company to apply the lean manufacturing, like apply in to automobile and pharmaceutical company, cotton seed Oil Company. And alsogives the information about lean manufacturing and discussion. And also to introduces about different lean tools like JIT, kanban, Total Productive Maintenance(TPM), Continuous improvement, Kaizen, 5S, VSM[39].

### III. CONCLUSIONS

From the above literature, determined that there is a huge literature existing on Kaizen technique, which describes a liberal review of past practices and researchers carried out. The study of how to implementation of Kaizen technique lead to continuous improvement in productivity of the various manufacturing companies. This technique is widely accepted philosophy in manufacturing companies and more research work is taken in this area. Kaizen is an approach focused on improving productivity, reducing variation and eliminating waste, improve lead time, use of space in an arrangement. Kaizen is most important for step by step small improvement and gets better results in a production line. This study achieves from this literature review to different Kaizen tool apply in a different company as per necessary but Kaizen techniques, 5s and Value Stream Mapping are much effective and use full tool for the finding of waste and improvement of the process. And also Kaizen technique is applying in any industry and development benefits.

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