



THE IMPROVEMENT OF LOGISTICS PROCESSES THROUGH KAIZEN AND SIX SIGMA

Dominika Matusova¹

*University of Zilina, The Faculty of Operation and Economics of Transport and
Communications, Department of economics, Univerzitna 8215/1, 010 26 Zilina, tel:
+421/41/513 32 27, dominika.matusova@fpedas.uniza.sk*

Article history:

Received 25 January 2016

Accepted 8 February 2016

Available online 13 April 2016

Abstract: *The article describes the methods mainly – kaizen and six sigma. These methods are very important in manufacturing process. They help to improve and to effectively the manufacture. Particular information such as: advantages, disadvantages of kaizen, six sigma are in article. At the same time, through figures is seen concrete situation and steps to achieve better results (for example: productivity, key performance indicators and other cursors) which are necessary for next effectively using. The article has got a descriptive status and refers to the practical using of these tools (kaizen and six sigma) applied in companies. Through the operation of thoughts: induction, deduction, analysis, synthesis and comparison, I comprehensively mapped the tools to improve logistics processes. At the same the article represents a complete review of knowledge on the issue suggesting to use in practice.*

Key words: *improving the process in a manufacture, kaizen, six sigma*

1 INTRODUCTION

The basic to accompany each business activities are: improving and streamlining. In the business environment there are significant changes that interfere with corporate governance and decision-making. Development of information technologies, increasing productivity, and technical development caused by the pressure of growing competition. This cycle of companies is accompanied by a strong focus on customer needs with the ultimate objective of maintaining his favor, optimize the internal factory affecting the long-term prosperity of the company, with the main emphasis on the ability to innovate business processes. The primary goals of every business are: *continuous improvement, orientation on customer directed to*

improving the quality of products, processes, services that achieve high rationality, efficiency and finality. [1]

Kaizen (continuous improvement) is a long-term approach to work that systematically seeks to achieve small, incremental changes in processes in order to improve efficiency and quality. History of kaizen is in a Japan management. If a work environment practices kaizen, continuous improvement is the responsibility of every worker, not just a selected few.[2]

Six Sigma is an approach focused on improving quality, reducing variation, and eliminating waste in a company. The former is a quality management philosophy and methodology that focuses on reducing variation; measuring defects (output/opportunities); and improving the quality of products, processes and services. The concept of Six Sigma was developed in the early 1980s at Motorola Corporation. Six Sigma was popularized in the late 1990s by the General Electric Corporation and their former CEO, Jack Welch. [3]

2 KAIZEN

The strategy where employees at all levels of a company work together proactively to achieve incremental and regular improvements to the working process – is **kaizen**. Simply, it combines the collective talents within a company with the aim – to create a powerful engine for improvement. Also, we can say: kaizen is a lean tool. It stands for kai” (represents “change”) and “zen” (represents “for the good”). [4] It represents the continuous incremental improvement of an activity to constantly create more value for the customer by eliminating waste. It is an ancient Japanese philosophy that strives to continually improve all aspects of a person’s life; the Japanese workforce first used it in business shortly after World War II. Father Toyota Production System Taiichi Ohno in 1988 in the words kaizen in the form: „*the only thing we do, is that the time from the moment of entering customer orders, to the point at which cashed the money.*“ [5]



Fig. 1 Kaizen process [6]

Mapping how things are now is the first step of the process. This can be a daunting task and the use of a lean management consultant during this exercise (or any part of lean implementation) can add value by introducing standardized methods for visualizing your

process and helping you to see the processes from a fresh perspective. An important concept in Kaizen is that if you can't measure something you can't improve it. In an animal facility, things that could be measured might include:

- time it takes to change or process cages
- number of times a cage is handled in a process
- number of colony forming units on a surface after cleaning or disinfecting
- quantity of cages that need to be cleaned again.[6]

The main philosophy of kaizen is that the continuous improvement of business processes involving staff from all levels of company. Also, kaizen is an appropriate and well-to-use tool for identifying and analyzing problems related: unsystematic management, productivity and low efficiency of work.

Once the process is understood and key performance measurements identified, the process can then be reviewed to identify waste and eliminate it through modifications to the process. With staff trained on the new process, it can then be implemented and then measured again to see the level of improvement. Through this process, improvements are more tangible by workers, management and customers. Improvements often lead to a sense of accomplishment in staff that can further entrench lean into the culture and improve morale. The last step in the process is to continuously monitor the process and seek more ways to eliminate waste, increase efficiency and improve quality.

KAIZEN RULES are:

Results should be publicly displayed
Understand the thought process
Learn by taking action
Exercise mutual respect; work together
Share the successes

Keep an open mind to chase
Always maintain a positive attitude
Involve everyone in the activity
Zero blame! Fix the problem instead
Each member has an equal vote
Never leave in silent disagreement [7]

Examples of good practice, particularly in the automotive sector: streamlining the number of forklift trucks to take away the right and left door from the line to the warehouse; reducing the cost of security locks are used on a machine. Mostly in practice allocate these different types of Kaizen: Kaizen of month, Kaizen of year, Enviro Kaizen, Kaizen of quality, Kaizen of cost.

However, in general the system of kaizen focuses on the following areas:

- ❖ increase product of quality,
- ❖ improvement of materials handling,
- ❖ improved manufacturing processes, methods as well as the procedures,
- ❖ improving working conditions,
- ❖ elimination of damage used in the manufacture,
- ❖ waste reduction and standard time,
- ❖ eliminate redundant activities,
- ❖ improve communication, employee satisfaction and working environment,
- ❖ improve the safety and health at work.

In practice quite often the case that there is confusion between Kaizen and innovation. Kaizen is the process of long-acting, applied gradually in small increments without interruption, with the participation of all employees. Changes in the type of improvement, with the overriding momentum for change are common knowledge, experience and observation „common sense”, the minimum required investment. It focuses on employees. The criteria for evaluation are used - process efficiency and efforts to improve them. The company: Nemak Slovakia, Ltd. uses the tool kaizen for her production and the benefits for company is: reduction their production costs and increasing the productivity and quality. At the same – remove occurring imperfections and increase their competitiveness in the market. The advantage of the tool kaizen is that improvement is cheap in contrast with innovations. Instead of implementing a huge project with uncertain outcomes, the goal of kaizen is to implement a change in minutes or hours (in the case: day).

Innovative processes for a short time. They are applied intermittently, the big jumps and attend only selected specialists. The basic impulse for innovative changes are new inventions and technologies. Innovation requires high investments and their main focus is on technology. The criteria used for assessing financial performance. Kaizen and innovation should be an integral part of efforts to develop the company, they are complementary and coordinated.

3 SIX SIGMA

Six Sigma, or DMAIC, can assist in filling the gap that Kaizen (as it tends to be applied in many organizations outside of Toyota) fails to address. Six Sigma is not a substitute for Lean and does not necessarily cultivate a learning culture. It is effective in supplying the analytical discipline and rigor necessary to thoroughly understand the nature of processes and problems. Six Sigma is a structured, data driven approach to solving problems. Six Sigma is not a set of statistical tools, and it is not a bureaucratic, stage-gate approach to managing projects, although these features often are hallmarks of successful Six Sigma deployments. [8]

Six Sigma is a way of thinking and the results of the approach can yield a spectrum of improvement choices based on the balance of value and risk. The improvements can range from frequent and immediate, low-risk actions addressing obvious opportunities; to Kaizen event-like team efforts addressing root causes based on data; to protracted projects that require review and administration through the DMAIC project cycle. The figure below shows the spectrum of the project/risk relationship. [8]

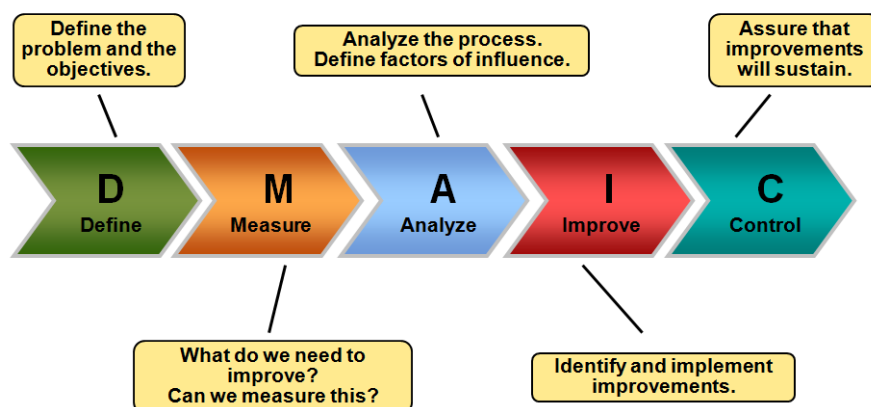


Fig.2 DMAIC [9]

Instructions for project management, whose mission is to improve the process are abbreviated as DMAIC (Define – Measuremenet – Analysis – Improve – Control. For enhanced variant model of process improvement based on Deming's PDCA circle (Plan-Do-Check-Act).

Although a real change in the performance process requires changes in culture and management philosophy to achieve measurable results, it is necessary to ensure the implementation of the project. The DMAIC Six Sigma methodology is used as a standard procedure for project planning and implementation. [10]

The Six Sigma way of thinking, through DMAIC, provides rigor and minimizes poor decisions by:

- asking what a company wants to learn versus jumping to conclusions
- discovering processes and requirements
- gathering the right facts and data
- characterizing root cause through $y = f(x)$
- innovating solution alternatives and selecting the best
- controlling results and verifying value
- standardizing and leveraging best practices. [8]

The collective insight of the project team, combined with analytical tools and a variety of risk-management tools like MSA (measurement system analysis) and FMEA (failure mode and effects analysis), help reduce the risk of sub-optimal decisions in the DMAIC process. Without the judicious application of some subset of these tools, Kaizen events are simply a technique similar to the less successful Total Quality Management approaches that initially forced the evolution of Six Sigma. [8]

Practical example - applied tool: Six Sigma in company in Slovakia

The company: Power - One, Ltd. is located in Dubnica over the Vah is engaged in manufacture and design of small switching power supplies and backup systems for telecommunications, transport and industry. Quality parameters of products and ranks among the three largest producers of switching resources in the world. Its largest customers include Cisco Systems, Ericsson, IBM, Nokia, Motorola, Siemens and other distributors.

The company Power – One, Ltd. has been successfully operating on the Slovak market for more than 14 years, has established a certified quality management system and employs highly qualified professionals in the field of power electronics, software engineering, automation, process engineering, IT, logistics and management. Six Sigma pilot program was launched in June 2011 as **support to increase production efficiency, quality stabilization and cost optimization for the selected products.**

After half a year of work was presented by the first positive results:

- ✓ **the shorten production time, about one product about 3 minutes**
- ✓ **more transparent maximum production flow**
- ✓ **reduction the number of workers**

These benefits us all in the end in quantifying the savings funds showed that at an average production of 20,000 units per year by our company had on this family of product will save

up to 66,000 €. The method Six Sigma is a convenient tool to have continued to optimize manufacturing processes and company was able to systematically and reasonably reduce their production costs. Workers - the technologist for production, manager for IT, planner and supervisor of production – evaluate the tool positively.

4 CONCLUSIONS

Kaizen is a process that if done correctly, humanizes the work environment to reduce excessively hard work and teach employees how to recognize and eliminate waste in production processes and planning. Kaizen usually delivers small improvements, a philosophy of continuous improvement brings great results in overall productivity increases. Kaizen can be effective if applied in the Lean spirit of continuous improvement (not just through sporadic events) utilizing the rigor and discipline of DMAIC. It must start with an organizational commitment to continuous learning applied to drive value for customers and society. Kaizen (management for a change) and Six Sigma together become elements of the larger quest for Lean.

References

- [1] Teplická, K.: Kaizen – kvalita versus 3 “MU“ [on line]. , 14, 2008. [cit. 2016-02-03] <<http://www.computerweekly.com/Articles/2008/05/14/230680/british-airways-reveals-what-went-wrong-with-terminal.htm><http://katedry.fmmi.vsb.cz/639/qmag/mj34-cz.htm>>
- [2] Kaizen (or continuous improvement). [on line], 2015. [cit. 2016-02-03] <<http://searchmanufacturingerp.techtarget.com/definition/kaizen>>
- [3] Furterer, S.L.: Lean Six Sigma in Service, Applications and Case Studies. CRC Press, Taylor&Francis Group, 2009, 468 p. ISBN 978-1-4200-7888-6
- [4] Thornton, Sh.> What is difference between kaizen and six sigma. [on line], 2015. [cit. 2008-05-26] <http://www.ehow.com/facts_5130008_difference-between-kaizen-six-sigma.html>
- [5] Ohno, T.: Kaizen – filozofia neustáleho zlepšovania. [on line], 2012. [cit. 2016-02-03] <http://www.podbrezovan.sk/regionnoviny/podbrezovan.nsf/page/2014_20_Kaizen_filozofia_neustaleho_zlepsovania>
- [6] Cosgrove, Ch.: An overview of lean management in lab animal facilities. [on line], 2012. [cit. 2016-02-03] <<http://www.alnmag.com/articles/2012/10/overview-lean-management-lab-animal-facilities>>
- [7] Graban, M.: Lean manufacturing training for 2002. [on line], 2015. [cit. 2016-02-03] <<http://www.leanblog.org/2015/03/throwbackthursday-lean-manufacturing-training-from-2002/>>
- [8] Tripp, R.: Kaizen and six sigma together in the quest for lean. [on line], 2015. [cit. 2016-02-03] <<http://www.isixsigma.com/methodology/kaizen/kaizen-and-six-sigma-together-quest-lean/>>
- [9] [on line], 2015. [cit. 2008-05-26] <http://www.symbolbv.com/en/six-sigma.html>
- [10] Výber projektov six sigma. [on line], 2015. [cit. 2008-05-26] <http://www.sixsigma.sk/metodika.htm>
- [11] Kaizen. [on line], 2015. [cit. 2016-02-03] <http://www.isixsigma.com/methodology/kaizen/kaizen-and-six-sigma-together-quest-lean/>