THE DEVELOPMENT OF MODELS AND METHODS KAIZEN

Ing. Lubica Kováčová
Technical University of Kosice
Faculty of Mechanical Engineering
Department of Materials and Technology
Masiarska 74, 040 01 Košice
Lubica.kovacova@tuke.sk

Abstract

The paper presents selected information on the development of Kaizen models. Describes basic approaches of classic, modular and dimensional model Kaizen. Classic Kaizen model forms an umbrella that covers many techniques including Kanban, total productive maintenance, six sigma, automation, just in time, suggestion system and productivity improvement, etc. Dimensional model describes as companies go from Point Kaizen to Plane Kaizen to Cube Kaizen. Modular Kaizen is a modification of the traditional Kaizen improvement process designed to provide the same rapid results and removing critical operations from daily processes. Modular Kaizen is conducted over a series of short activities designed to fit into a highly interrupt driven work environment. It is effective with PDCA or DMAIC cycles.

Key words: Kaizen, classic, modular and dimensional model, innovation,

INTRODUCTION

The best-known method of continuous improvement based on creative thinking is the concept of Kaizen workers [3]. Japanese Kaizen method is based on the philosophy of the two words that describe the importance of this method. KAI - improvement (everything can be improved, any product, technology, work activity, production systems). ZEN - is constantly improving, responds to each new opportunity, changing conditions, new information and can participate in it every worker.

Kaizen means improvement in the production of customer focus, improvement of all processes in the value chain of business activities, whilst reducing costs. Its base is a massive initiative supported by effective staff incentive schemes. Kaizen is focused primarily on workers, because workers are co-creators and bearers of the company values. Improvement in Kaizen is slow, gradual and not immediately visible process; its results are achieved only over time.

Models are normally expressed Kaizen main techniques and methods. They differ by detail specification methods, respectively naming of methods. Kaizen is a systematic method developed with new features and models. The present article analyses the selected alternative to the classical model of Kaizen.

CLASSIC KAIZEN MODEL

Kaizen originated in Japan in 1950 when management and the government acknowledge that there was a problem in the current confrontation management system and a pending labour shortage. Japan sought to resolve this problem in cooperation with the workforce.

First, it was been introduced and applied by Imai in 1986 to improve efficiency, productivity and competitiveness in Toyota, a Japanese car maker company in the wake of increasing competition and the pressure of globalization. Since then, Kaizen has become a part of the Japanese manufacturing system and has contributed enormously to the manufacturing success.

Classic Kaizen forms an umbrella that covers many techniques are shown in Figure 1.

Fig. 1 A classic umbrella Kaizen model [6]
Kaizen has 3 main principles that must be implemented if to operate properly.

- First, you must consider the process and the results. The process and results will surface the actions needed to achieve the correct results.
- Second, you must have a systematic thinking of the entire process instead of just the immediate problems. This is simply to avoid creating or missing problems in other parts of the process.
- Third, you need to approach kaizen with a non-judgmental, non-blaming, and learning method. This allows for the re-examination of assumptions that were part of the current process.

**KAIZEN DIMENSIONAL MODEL**

**Point Kaizen.** The term “Point Kaizen” is often associated with discrete events in a department or company. These are continuous improvement activities, where the principles of Lean Manufacturing are applied. “Point” is descriptive because the areas in which Lean is applied are unrelated and discrete. For example, Lean might be applied in the Finance Department as well as in Marketing. But those two Lean Deployments are unrelated with each other.

**Line Kaizen.** The next step in an organized Lean Deployment is what we know as Line Kaizen. “Line”, within this context, refers to an organized spreading of Lean from Point or Discrete, to the Line. For example, Kaizen might be applied to a process (point), but also to the downstream process. Those two points constitute a Line Kaizen. An example of this might be found in Lean implemented in Procurement, but also implemented in the Planning Department. In this case, Planning is upstream from Procurement and Kaizen is done at those two points; in which case, this would be a Line.

**Plane Kaizen.** The next step in maturity would be connecting several lines together. This we call “Plane Kaizen”. In more modern terms, this might be described as a Value Stream, where instead of traditional departments, the company is organized into product families and value streams.

**Cube Kaizen.** Finally, at least according to this model, we have Cube Kaizen. Cube Kaizen describes the situation where all the points are connected and no point is disjointed from each other. This would be a situation where Lean has spread across the entire enterprise. This might be visualized by diagram below (Fig. 2).

There is no limit to how small a point Kaizen can be. That is why it is "zero dimensions". This is good in that most point kaizen are immediate and remove safety hazards, make the workplace cleaner, etc. However one of the criticisms of point kaizens as the only type of continuous improvement effort is that it is hard to see the bottom line impact, or that the positive effects of point Kaizen in one area can wipe out the benefits of a point Kaizen in another area. An example of a point kaizen would be organizing (5S) a tool cabinet in a machine shop.

A line Kaizen would be layout change to create better flow, which may make the tool cabinet totally unnecessary, as the tools could be attached directly to the machine at point of use.

A plane Kaizen would be to deploy these layout improvements horizontally to other lines, and this may change the design of the original flow line now that the entire shop is being moved and door-to-door flow can being considered.

A cube Kaizen would be to make improvements "up and down" from the plane, or upstream and downstream by including the

![Fig. 2 The model dimensional kaizen][4]
suppliers and customers (such as configuration engineering, heat treat, assembly, shipping, etc.). This might change how the parts are designed or how orders are released, further changing the layout of the factory (plane).

The idea is that as you go from point to line to plane to cube you are expanding your Kaizen efforts enterprise-wide. This expands your thinking from one small area to the entire value stream. Just as in geometry, each type of Kaizen adds another dimension (line = 1 dimension, plane = 2 dimensions, cube = 3 dimensions). Moving to each higher dimension brings you closer to the customer, and also to systemic root causes.

Some call cube Kaizen "3D Kaizen" but this is confusing with 3D as in "dirty, dangerous, difficult" rather than 3D as in "3 dimensions".

I would rather have people do point kaizen than not do Kaizen at all. However it is too easy for people to learn a Lean tool and focus too much on implementing the tool for its sake rather than trying to understand the geometry of Kaizen and how to use the tool to go from point to line to plane to cube.

Additionally, we can take this model and plot it against a maturity curve. As you can see below, many, many companies dabble in Point Kaizen, but as one goes up the maturity continuum, there are fewer and fewer companies as you go from Point Kaizen to Line Kaizen to Plane Kaizen to Cube Kaizen.

MODULAR KAIZEN

Modular Kaizen is a modification of the traditional Kaizen improvement process designed to provide the same rapid results without removing critical personnel from daily operations. Modular Kaizen is conducted over a series of short activities designed to fit into a highly interrupt driven work environment. It is effective with PDCA or DMAIC cycles.

**Plan**
- Identify and prioritise QI opportunities
- Develop an AIM Statement
- Describe the current process, Collect data on the current process
- Identify all possible causes
- Identify potential improvements – use the House of Modular Kaizen components
- Develop an improvement theory, Develop an action plan

**Do**
- Implement the improvement
- Collect and document the data
- Document the problems, unexpected observations, lessons learned, and knowledge gained

**Check**
- Evaluate and determine when disruption is under control and resources can be returned to departments to resume regular activities – Green light
- Document lessons learned, knowledge gained, and any surprising results that emerged.

**Act**
- Red light
- If disruption is not under control repeat the Act/Plan/Do phase to make improvements
- Take action using the PDCA or DMAIC/DMADV cycle

![Kaizen Maturity Continuum](www.shmula.com)

**Fig. 3 Kaizen maturity continuum [4]**
CONCLUSION

In conclusion, relations can be shown between Kaizen and Lean manufacturing. Both Kaizen and Lean manufacturing want to reduce or eliminate waste, provide a smooth workflow, and provide customer satisfaction. Lean manufacturing was inspired by Kaizen to a large degree. Companies who combine Kaizen with Lean manufacturing empower their employees to improve processes, build customer relationships, develop defect-free products, and collaborate with suppliers. 

Comparison of continuous improvement Kaizen with innovation points to the different applications. Kaizen is advantageous in slow growth economies, where gradual changes are constant, and long-term effects are lasting.

Innovations: Better suited for fast-growth economy, abrupt changes are volatile and short-term effect is dramatic.
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