

# Integrating DMAIC with Kaizen Events Ensures Continuous Improvement

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**Abstract:** *Kaizen generates small improvements as a result of coordinated continuous efforts by all employees. Kaizen events bring together a group of process owners to map out an existing process and identify improvements that are within the scope of the participants. The Companies can make breakthrough improvements in existing processes through DMAIC; Kaizen can be effective which applied continuous improvement utilizing the rigor and discipline of DMAIC. Kaizen event and DMAIC together become elements of the larger quest for improvement. The purpose of this paper is to explore Kaizen events implementation under DMAIC mechanism. The goal was to explore how Kaizen event this evolution and the relative weight of factors as the methodology developed.*

**Keywords:** Six Sigma, Kaizen, Kaizen event

## 1. Introduction

Kaizen events can lead an organization to achieve that an effective continuous improvement culture can be achieved through Kaizen events cycle. To generate a Kaizen event, everyone involved to think about work improvement– in terms of present condition, desired state and how to reach that state. Through Six Sigma DMAIC, organizations make breakthrough improvements in existing processes. The research is to review the literature pertaining to the main features of DMAIC and the characteristics of Kaizen event, and to develop an exploratory framework of the Kaizen event cycle, with a focus on the interconnections the contents of Kaizen event schedule.

## 2. Literature Review

### 2.1 DMAIC

DMAIC methodology includes definition of measurement, analysis, improvement, and control, thus providing a structured framework for solving business problems by effective process execution [6]. Horal[4] described that the (DMAIC) quality technique was first applied in manufacturing operations and rapidly expanded to different functional areas such as marketing, engineering, purchasing and servicing. Anthony and Banuelas [1] conducted a case study on bulb manufacturing company to reduce the shell cracking during the manufacturing of bulbs and achieved dramatic improvements in defects by using DMAIC quality technique. Kim Yong et al. [5] have conducted a case study into a corporate research library of a telecom company in Korea to identify and remove ineffective components and unnecessary steps in library works and services.

Figure 1 displays a breakthrough strategy and the activities necessary to achieve the goals of each phase, The DMAIC methodology involves the following phases: teams work to clearly *define* those problems that are business related or essential to customer satisfaction. Next, baselines for *measuring* the current defects are established and goals for improving the *analytical* phase are set, with the aiming of

understanding root causes of why defect occur and identifying key process variables that cause defects. Finally, during the *improvement* phase, teams seek to optimal solutions, develop and test action plans for implementation, *control* planning and verifying long term capability.

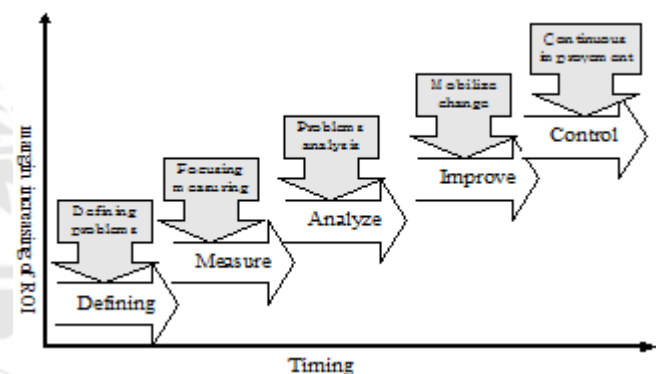


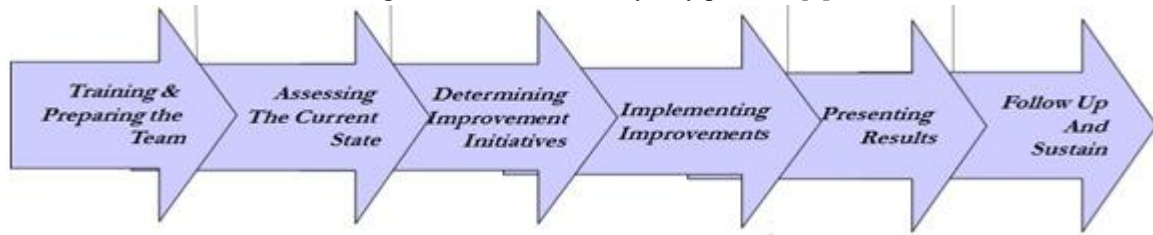
Figure 1: DMAIC methodology phase

### 2.2 Kaizen events

Kaizen events are to any action whose output is intended to be an improvement to an existing process. A Kaizen event is “a focused and structured improvement project, using a dedicated cross-functional team to improve a targeted work area, with specific goals, in an accelerated timeframe” [3]. Also known as a “rapid improvement event,” “accelerated improvement workshop,” and a Kaizen blitz [7].

Kaizen events processes are to gathers operators, managers, and owners of a process in one place, to maps the existing process (using a deployment flowchart, in most cases and Improves on the existing process. Kaizen events continue to gain popularity among many organizations as a process improvement initiative oftentimes implemented with lean practices, not only as stand-alone process improvement projects, but in the context of systematically deployed Kaizen event programs [8]. Kaizen which are getting people to hold a philosophy of continuous improvement can prove challenging. By scheduling a Kaizen event, all employees are being proactive and setting aside time to

make improvements, and are more than willing to contribute in any way possible [2].



**Figure 2:** Diagram of a Kaizen event

### 3. Integrating DMAIC with Kaizen events Methodology

Integrating DMAIC with Kaizen events methodology include build three steps of implementation approach, 28hours of execution process and integrate DMAIC with Kaizen eight steps.

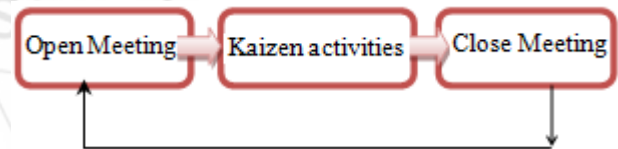
#### 3.1 Three Steps of Implementation Approach

Three steps of implementation approach include open meeting, kaizen activities and close meeting. The top management and Consultant need survey working status top grasp which Kaizen activities can be improved. The Consultant also needs to communicate with the top managers to understand the implementing Six Sigma expectations of top management.

- **Step 1- Open Meeting:** Instruction teacher(Kaizen Sensei) hold a kick-on 「Open Meeting」 activities and teach Kaizen skills.
- **Step 2- Kaizen Activities:** Kaizen Sensei instructs self-improvement teams (SITs) how to implement the improvement action on working site.
- **Step 3- Close Meeting:** The Kaizen seminar is held during close meeting. The SITs present improvement process and achievements in the Kaizen seminar. The Kaizen Sensei and top management comment the kaizen performance.

**Table 1:** Three steps of implementation approach

STEP	1	2	3
Topic	Open meeting	Kaizen activities	Close meeting
Event	<ul style="list-style-type: none"> <li>•Kaizen skills training</li> <li>•Existing status of Kaizen survey</li> </ul>	<ul style="list-style-type: none"> <li>•To find problem Roots</li> <li>•Implementing Kaizen project and confirm the performance</li> </ul>	<ul style="list-style-type: none"> <li>•Standardization maintaining</li> <li>•Kaizen report presentation data</li> </ul>



**Figure 3:** Kaizen event cycle

#### 3.2 Kaizen event schedule

Execution process is to implement 28 hours of Kaizen Event improvement cycle, and to establish of inter-departmental task of SITs. The SITs is organized about 7 employees who have one improvement leader and vice-leader. Kaizen Sensei is as a guide to instruct the SITs how to follow DMAIC with Kaizen eight steps principle. Kaizen event schedule is based on three steps which include open meeting, leader meeting and close meeting. Implementing hours and events are as followings.

**Table 2:** The contents of Kaizen event schedule

Period hours	Step	Topic	Kaizen Contents	Time
1 <sup>st</sup>	Open Meeting	Kaizen survey	<ul style="list-style-type: none"> <li>• Review the Kaizen activities and performance existing status.</li> <li>• New problems.</li> <li>• Kaizen topic report and goal settings.</li> <li>• Kaizen points instruction.</li> </ul>	1
2 <sup>nd</sup> ~3 <sup>rd</sup>		Training	Kaizen skills.	2
3 <sup>rd</sup> ~6.5 <sup>th</sup>		Kaizen tools	<ul style="list-style-type: none"> <li>• Value process map.</li> <li>• Time measurement table.</li> <li>• Standard operation procedure.</li> <li>• Products process capacity table.</li> <li>• Operation allocation table.</li> <li>• Operation process chart.</li> <li>• Process procedures chart.</li> <li>• Kaizen performance record report.</li> </ul>	2.5
3 <sup>rd</sup> ~7 <sup>th</sup>	Kaizen activities	1st Leader Meeting	<ul style="list-style-type: none"> <li>• Improvement process report.</li> <li>• Kaizen problems report.</li> <li>• Kaizen instruction</li> </ul>	0.5
7 <sup>th</sup> ~10 <sup>th</sup>		Roots findings	<ul style="list-style-type: none"> <li>• 5 GEN approaches</li> <li>• 5WHY approaches</li> </ul>	3

			<ul style="list-style-type: none"> <li>• Kaizen immediately report</li> </ul>	
10 <sup>th</sup> ~13.5 <sup>th</sup>		Kaizen	<ul style="list-style-type: none"> <li>• Implementing Kaizen project and confirm the performance effect</li> </ul>	3.5
13.5 <sup>th</sup> ~14 <sup>th</sup>		2nd Leader Meeting	<ul style="list-style-type: none"> <li>• Kaizen process, problems report and Kaizen instruction</li> </ul>	0.5
14 <sup>th</sup> ~17 <sup>th</sup>		Roots findings	<ul style="list-style-type: none"> <li>• Follow up roots factors</li> </ul>	3
17 <sup>th</sup> ~20.5 <sup>th</sup>		Kaizen	<ul style="list-style-type: none"> <li>• Implementing Kaizen project and confirm the performance effect</li> </ul>	3.5
20.5 <sup>th</sup> ~21 <sup>th</sup>	Close Meeting	Kaizen review	<ul style="list-style-type: none"> <li>• Kaizen process report</li> <li>• Kaizen problems report</li> <li>• Kaizen instruction</li> </ul>	0.5
21 <sup>th</sup> ~24 <sup>th</sup>		Kaizen report	<ul style="list-style-type: none"> <li>• Standard operation procedure</li> <li>• Operation allocation table</li> <li>• Value process map</li> <li>• Kaizen case</li> <li>• daily production management table</li> <li>• Kaizen performance trend</li> <li>• Kaizen performance table</li> </ul>	3
24 <sup>th</sup> ~26 <sup>th</sup>		Standard maintaining	<ul style="list-style-type: none"> <li>• Kaizen presentation</li> <li>• Future plans</li> </ul>	2
26 <sup>th</sup> ~28 <sup>th</sup>		Kaizen appraisal	<ul style="list-style-type: none"> <li>• Kaizen team report</li> <li>• Consultant Comment</li> <li>• Top management appraisal</li> </ul>	2

### 3.3 Integrating DMAIC with Kaizen eight steps

The Integrating DMAIC with Kaizen eight steps is to make Kaizen activities implementation systematical and logical. Five stages of Six Sigma DMAIC improvement are divided into Kaizen eight steps to formulate the improvement process and facilitate the implementation of improvement activities.

**Table 3:** Integrating DMAIC with Kaizen eight steps

DMAIC	Kaizen event
Define	STEP 1 : Problems settings
Measure	STEP 2 : Goal settings
Analyze	STEP 3 : Situational survey
	STEP 4 : Root cause investigation
Improve	STEP 5 : Kaizen action implementation
	STEP 6 : Confirm effect
Control	STEP 7 : Standard maintain
	STEP 8 : Future plan

### 4. Conclusions

Kaizen event include three steps which open meeting, Kaizen activities and close meeting meeting, but integrating DMAIC with Kaizen event model is a continuously improvement cycle. Kaizen event also need improvement skills to solve roots problems. To achieve excellent performance, the top management support and consultant instruction are absolutely important.

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