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Research Paper

The Achievements and Challenges of Kaizen Implementation: A Case Study on Asela Malt Factory

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Abstract

This study was meant to determine the status of the implementation of Kaizen in Asela Malt Factory and account for the improvements and challenges thereof. The design of the study was quantitative research method wherein SPSS was used for analyzing data elicited using questionnaire. The study specifically assessed the effectiveness of the implementation of Kaizen tools such as 5S, Deming Cycle, suggestion system, Fishbone Diagram and Pareto analysis. It was found that the Kaizen tools were implemented inconsistently. In addition the study revealed that there were some improvements with some variations. The study also made it evident that there were some challenges in the due process. Thus, Kaizen tools should be implemented continuously to identify the root causes of the problems, prioritize the problems according to their severity and thereby solve them step-by-step to further improve quality, productivity and profitability through design and innovation.

Keywords: - *Kaizen, Kaizen Tools, Innovation, Quality, Productivity*.

1. Introduction

The word Kaizen is derived from two Japanese words “Kai” which means change and “zen” which means for the better (Palmer, 2001). Thus, kaizen is simply mean "change for better" or it is also referred to as "continuous improvement". It is a philosophy that promotes small improvements made as a result of continuing effort through the involvement of everyone in the organization from the top management to the lower level employees (Mile and Amrik, 2000). Kaizen strategy has been successfully implemented by the Japanese industry after World War II (Imai, 1986). Kaizen was initiated in response to problem faced by the Japanese industry after the World War II such as limited resources and difficulties to obtain raw material (Mohd and Fatimah, 2016). Therefore, as a result of the limited resources, Japanese companies started to look for mechanisms of improving their production processes by minimizing wastes and optimizing process efficiencies.

The underlying principle of the Kaizen strategy is the recognition that management must seek to satisfy the customer and serve customer needs if it is to stay in business and make a profit. Improvements in such areas as quality, cost, and scheduling (meeting volume and delivery requirements) are essential. Kaizen is a customer-driven strategy for continuous improvement (Mile and Amrik, 2000). Initially Kaizen initiatives were led by Toyota Motor Company in their effort to become global leader in the automotive industry which tried to emphasize on incremental changes, low cost solution, employee empowerment and the development of organization that holds continuous improvement with emphasis on process improvement rather than the result (Imai, 1986).

Literature shows that there are no standard techniques used for implementation of Kaizen (Jignesh et al., 2014). However, Kaizen implementation uses various techniques known as “Kaizen toolbox”. Among these, the main toolbox includes: 5S, fishbone diagram, Pareto diagram, Deming cycle and suggestion system (Kobayashi, 2005; Osada, 1989; Kobayashi, 2005; Evans and Lindsay, 1999; Imai, 1986; Mile and Amrik, 2000; Lillrank and Kano, 1989; Kaoru Ishikawa, 1968). Furthermore, Kaizen was also implemented within different parts of the world in mechanical, biological and pharmaceutical industries (Altamirano, 2013; Ananthanarayanan, 2006; Chitre, 2010; Mallick et al., 2013; Pentti, 2014; Purdy et al., 2013) and mining industry (Aziza et al., 2018).

Having recognized Kaizen as a strategic tool, Ethiopia has established the “Ethiopian Kaizen Institute (EKI)” in 2011, by council of Ministers under the regulation No 256/2011 and since then started to implement Kaizen in the majority of private and government owned companies. Asela Malt Factory is among the companies which have implemented the Kaizen philosophy starting from 2013. The objective of this study is to assess kaizen implementation with respect to Kaizen toolbox namely: 5s, fishbone diagram, Pareto analysis, Deming cycle and suggestion system in Asela Malt Factory. More specifically, the study aims to assess the improvements achieved and the challenges encountered in the factory after Kaizen implementation.

2. Material and Methods

In the study, a quantitative research method has been employed in order to explore the relationships between variables. Both primary and secondary data were collected and used in the study. The primary data were collected through questionnaire and personal observation of the factory. The questionnaire includes closed and open ended questions that enable the respondents to address the issues with regard to Kaizen tools and the improvements and challenges that encountered the factory. Respondents were selected purposively among permanent employees of the factory based upon their experience, position and participation in Kaizen implementation. The secondary data were obtained from factory reports, different literatures and previous research works such as journals, periodicals and articles.

Among Kaizen implementer's of Ethiopian companies, Asela Malt Factory was selected as a case study since it began to implement the kaizen philosophy starting from 2013. Asela Malt Factory was established with the aim of producing malt for domestic breweries in 1984 with a capacity of 100,000 quintals annually. Currently, the factory has a capacity to produce and distribute 360,000 Quintals of malt to domestic brewers annually. Asela Malt Factory has 260 employees that include 256 permanent employees, one contract and three temporary employees. Since permanent employees have got exposure to see changes coming in the factory from time to time, only permanent employees were considered for the study.

Sample size was determined by using simple random sampling method and according to the following Slovin's formula:

$$n = \frac{N}{1 + N(e)^2} \tag{1}$$

Where, n = sample size, N = total population and e = sampling error at 85% level of confidence

$$n = \frac{256}{1 + 256(0.15)^2} = 38 \tag{2}$$

As a result, 50 questionnaires were distributed to the respondents and finally 42 questionnaires were filled and returned from the respondents. Thus, the response shows that the data was reliable at 85% level of confidence.

Scientific Package for Social Science (SPSS) and descriptive statistics tools such as frequency and percentage were used to analyze and present the data obtained from questionnaire. Additionally, the data gathered by observations were discussed in the result and discussion section.

3. Results and Discussion

3.1. Demographic characteristics of the respondents

Table 1 represents the demographic characteristics of the respondents. Table 1A represents qualification of the respondents, Table 1B represents position of the respondents in Kaizen implementation, Table 1C represents service duration of the respondents in the factory and finally Table 1D represents service duration of the respondents in kaizen implementation respectively.

Table 1: Demographic characteristics of the respondents

A. Qualification	**Frequency**	**Percentage**
1. Secondary School or Below	2	5%
2. Diploma or Certificate	6	14%
3. Bachelor Degree	25	60%
4. Master Degree or Above	9	21%
B. Position in Kaizen Implementation		
1. Kaizen Team Member	24	57%
2. Kaizen Team Leader	11	26%
3. Kaizen Facilitator	7	17%
C. Service Duration in Factory		
1. 3-5 years	8	19%
2. 6-10 years	13	31%
3. 12-16 years	5	12 %
4. 20-26 years	5	12 %
5. 29-35 years	11	26%
D. Service Duration in Kaizen Implementation		
1. 0-2 years	2	5%
2. 3-4 years	15	36%
3. 5-6 years	18	43%
4. 7-10 years	7	16%
Total	**42**	**100%**

Table 1A shows that 60%, 21% and 14% of the respondents are bachelor degree holders, master degree holders or above, and diploma or certificate holders respectively. Only the remaining 5% of the respondents have attended secondary school. Table 1B shows the position of the respondents serving in the Kaizen implementation. The data shows that 57%, 26% and 17% of the respondents are serving as Kaizen team member, Kaizen team leader and Kaizen facilitator respectively. The data also shows that almost all of the respondents had an involvement in Kaizen implementation. Table 1C shows the service duration of the respondents ranging from 3-35 years in the factory. The data shows only 19% of the respondents have the lowest service duration in the company which ranges from 3-5 years. The remaining 81% of the respondents have service duration above 6 years in the factory. Table 1D also shows the service duration of the respondents in Kaizen implementation. The data shows only 5% of the respondents have the lowest service year (i.e. below 2 years) and the remaining 95% of the respondents have service duration greater than 3 years in Kaizen implementation. The respondents with greater than 7 years of service duration in Kaizen implementation have the experience of Kaizen implementation before Kaizen was implemented in the factory.

3.2. Assessment of Kaizen Tools Implementation in the Factory

Table 2 represents the assessment of Kaizen toolbox (i.e. 5S, Deming cycle, suggestion system, fishbone diagram and Pareto diagram) implementation in the factory. The assessment indicates the mean and standard deviation of the Kaizen tools by using descriptive statistics of SPSS.

Table 2: Assessment of Kaizen Tools Implementation in the Factory

Descriptive Statistics					
Assessment on Kaizen Toolbox Implementation		Mean	Std. Deviation	Average Mean	Std. Deviation
5S	Sort	3.55	.739	3.75	0.790
	Set in Order	3.83	.696		
	Shine	3.95	.846		
	Standardize	3.68	.756		
	Sustain	3.74	.912		
Deming Cycle	Plan	3.37	.925	3.50	0.832
	Do	3.57	.712		
	Check	3.46	.745		
	Act	3.61	.946		
Suggestion System	Kaizen Board	3.33	1.248	3.12	1.158
	Checklist	2.90	1.068		
Fishbone Diagram		2.91	1.522	2.91	1.522
Pareto Diagram		3.00	1.518	3.00	1.518

Table 2 shows that 5S is the most frequently implemented Kaizen tool in the factory with some inconsistency as compared to the other tools. The data also shows that Deming cycle is also implemented at the second level even if few respondents reflected that it is not properly implemented yet in the factory. In case of suggestion system, fishbone diagram and Pareto diagram; some respondents had indicated that the tools were not implemented yet in the factory. But, the majority of the respondents had indicated that the tools were occasionally and frequently implemented in the factory. Furthermore, some respondents had stated that Deming cycle, suggestion system, fishbone diagram and Pareto diagram were rarely and very rarely implemented in factory.

However, the study shows that suggestion system was occasionally implemented in the factory. But according to Womack et al. (2007), good suggestion system encourages effective communication between the top management and the shop floor level employees. It also encourages the employees to contribute their improvement ideas based on the experience they have gained throughout their daily working life. In addition, the Kaizen tools enabled the Japanese companies to improve customer satisfaction, improve productivity index, achieve world-class standard, increase employee job satisfaction and improve company revenue was the Japanese suggestion system Chen and Tjosvold (2006) cited in (Mohd and Fatimah, 2016).

In addition, some respondents suggested that additional toolbox such as Just-in-Time (JIT) and Total Productive Maintenance (TPM) were implemented in the factory. From the personal observation, it was observed that Kaizen toolbox is inconsistently implemented in the factory. Especially the implementation of Deming cycle, suggestion system, fishbone diagram and Pareto diagram were not observed at the time the researchers visited the factory. But, some workers reflected that they may use the tools some times and they may leave using the tools at the other time as they wanted personally.

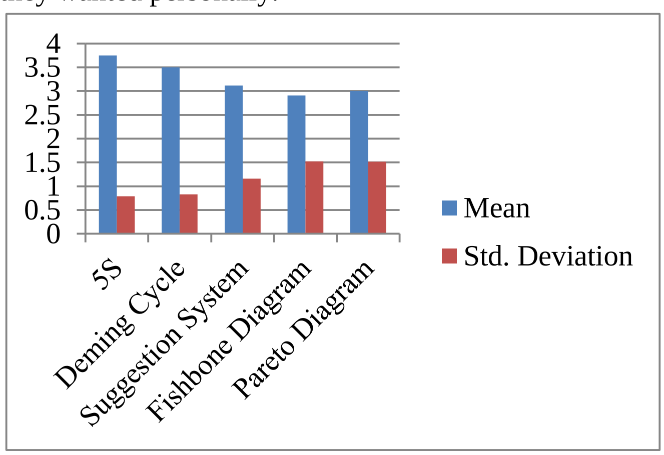

Figure 1: Average mean and standard deviation of Kaizen toolbox

Figure 1 shows the average mean and standard deviation of Kaizen toolbox implementation in the factory. From the graph, it is possible to understand the existence of Kaizen toolbox in the factory with some variations.

3.3. Assessment of the improvements achieved in the factory

Table 3 represents the assessment of the improvements achieved in the factory after Kaizen implementation. The assessment indicates the mean and standard deviation of the improvements calculated by using descriptive statistics of SPSS.

The result in Table 3 shows that majority of the respondents agreed that all the improvements were achieved in the factory. But, few respondents disagreed with the achievement of product quality improvement in the factory. Furthermore, some respondents added that the following additional improvements were achieved after Kaizen implementation in the factory. They are: reduction of costs, improvement of employee initiation to do jobs, improvement of modification works through innovation and improvement of profit to some extent with variation. In addition, it has been observed that the improvements achieved were not continued in the same fashion consistently. It also has been observed that the initiation of the management and many employees had declined throughout the implementation period of Kaizen principles.

Teece, (2007) suggests that if companies need to improve their competitiveness, they need to apply continuous improvement or Kaizen concept as one of the strategic tool in their organization. The benefits of Kaizen implementation are to achieve improvements related with costs, quality, flexibility (Bessant et al., 1994) and also productivity (Choi et al., 1997).

Furthermore, the main contributing factor to the successful implementation of Kaizen is top management's commitment in having a clear corporate strategy, policies and goals that can stimulate kaizen culture in the organization (Imai, 1986 and Puvansvaran et al., 2010). According to the study conducted by Garcia-Sabater and Marin-Garcia (2011) management involvement, clear objective setting and measurement, active workers involvement, existence of cross-functional teams, and clear organization structure are among the factors contributing to the success of Kaizen implementation. Additionally according to (Bateman, 2003), a Kaizen champion who has a good personal understanding in conducting Kaizen, and a high personal desire and commitment to lead the continuous improvement activities can become a critical change agent in an organization. According to this scholar, this is one of contributing factors toward successful Kaizen implementation. Effective communication and management skills are also crucial factors for the Kaizen champion (Nonaka & Takeuchi, 1995; Pagell, 2004).

Therefore, this study revealed some benefits obtained after Kaizen implementation with regard to quality, productivity and profitability in the factory. However, the study shows that the existence of some challenges after Kaizen implementation have been observed in the factory.

Table 3: Assessment of the improvements achieved in the factory after Kaizen implementation

Descriptive Statistics		
Assessment on the Achievements	**Mean**	**Std. Deviation**
Management and employee relationship improvement	4.00	.937
Employee and customer satisfaction	4.37	.662
Convenient workplace creation	4.21	.682
Resource utilization improvement	4.21	.750
Space utilization improvement	4.05	.623
Product defects/wastes reduction	4.00	.632
Product quality improvement	3.95	.731
Productivity improvement	4.07	.712

3.4. Assessment of the challenges encountered in the factory

Table 4 represents the assessment of the challenges encountered in the factory after Kaizen implementation. The assessment indicates the mean and standard deviation of the challenges calculated by using descriptive statistics of SPSS.

Table 4: Assessment of the challenges encountered in the factory after Kaizen implementation

Descriptive Statistics		
Assessment on the Challenges	**Mean**	**Std. Deviation**
Lack of commitment to implement kaizen continuously	2.83	1.124
Lack of responsible body for kaizen implementation	2.71	1.230
Employee resistance towards continuous improvement	2.24	.969
Lack of every employee involvement	2.74	1.178
High budget utilization for kaizen implementation	2.21	.963
Lack of continuous training on kaizen implementation	3.20	1.159
Complexity of paperwork after kaizen implementation	2.98	1.214

The result of Table 4 shows that majority of the respondents disagreed that the above challenges were encountered in the factory. But, some respondents agreed with the existence of lack of commitment to implement Kaizen continuously, lack of continuous training on Kaizen implementation and complexity of paperwork after Kaizen implementation. In addition, some respondents added additional challenges such as inability to reduce costs as needed, inconsistency in employee motivation through award, decline of employee morale through time and lack of cross-functional team spirit for proper design and innovation. Moreover, the challenges include: lack of regular participation of top management, need of all employees to be motivated through award, unnecessary motion within the factory, lack of on-job training for technicians, and inconsistency in the usage of Kaizen toolbox. Thus, it has been observed that since there was inconsistently in Kaizen toolbox implementation, the challenges are expected to be persistent.

4. Conclusion

This study aimed at assessing the implementation of Kaizen tools in Asela Malt Factory in terms of 5S, Deming Cycle, suggestion system, Fishbone Diagram and Pareto analysis. Based on the findings of the study, it can be concluded that 5S is the most effectively implemented tool. Similarly, the Deming Cycle is also implemented at the second level with some variations of concept among the respondents. However, the remaining tools, viz. suggestion system, fishbone diagram and pareto analysis are not properly implemented in the factory yet. It can also be concluded that despite the gap in implementing the Kaizen toolbox in the factory, the study revealed that there is improvement in quality, productivity and profitability to some extent with variation. The study also made it evident that there were some challenges in the process of implementing of Kaizen. The study also revealed that the commitment of the top management is the key factor in implementation Kaizen. Similarly, involving active workers and the existence of cross-functional teams can play a major role in effectively implementing Kaizen. Hence, to have a successful Kaizen implementation, Asela Malt factory shall make sure that its top management should show utmost commitment besides putting in place a practical Kaizen strategy and policy.

Finally, the researchers have forwarded their suggestions. Accordingly, Asela Malt factory should properly implement Kaizen tools in order to (1) identify the root causes of the problems by using fishbone diagram, (2) prioritize the problems according to their severity by using Pareto diagram, (3) solve the problems step-by-step through proper design and innovation by using 5S, Deming cycle, JIT and TPM; and (4) communicate the solutions by using suggestion system to further improve quality, productivity and profitability of the factory.

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