

The Study of the Relationship between Kaizen Practices and Operations' Performance Improvement in Zambian Manufacturing Companies

(Conference ID: CFP/119/2017)

Mutale D. Chanda
chichamuglo@yahoo.com

Former MBA student: The Copperbelt University

Senior Human Resources Management Officer

Ministry of General Education, Solwezi, Zambia

Abstract

Aim

There is strong evidence that Zambian manufacturing organizations are increasingly implementing Kaizen programs to help them improve quality, enhance delivery performance, and reduce costs. However, little empirical research has been conducted to examine the success of these programs. In Zambia, not many studies have been conducted to ascertain the extent to what the Kaizen activities have been understood and improved the operations' performance. The main purpose of this study was therefore to investigate the relationship between Kaizen practices and improvement in operations performance in Zambian Manufacturing companies. The study also sought to find out the extent of Kaizen practices implementation in these companies, determine the influence of Kaizen practices on human resources outcomes and the challenges faced by these companies in implementing Kaizen.

Methodology

Building on the extant Kaizen literature and structuration theory, this study investigates key Kaizen practices and operations' performance improvements in manufacturing companies. The study employed a cross-sectional descriptive research design with the target population being manufacturing companies in Lusaka and the Copperbelt region. The unit of analysis was a manufacturing company and a key informant was identified for each company. Thirty-three questionnaires were distributed and 31 companies responded. Based on the conceptual framework developed, hypotheses were formulated and tested using regression modeling approach.

Findings

The results showed that 5Ss (Sort, Order, Cleanliness, Standardisation and Self-discipline) was implemented to a great extent while Suggestion systems were implemented to minimal extent. Overall a Kaizen implementation had a positive effect on all the human resource attributes described in the knowledge, skills and attitude (KSA) framework. Employees' attitude was the most serious challenge the companies were facing and the least was lack of management support or leadership. Kaizen practices implementation is positively and significantly related to operations performance improvements in Zambian manufacturing companies.

Originality

This research is original work as it has never been done before in Zambia. Kaizen implementation is a new phenomenon in Zambia.

Key Worlds: Kaizen, Practices, Operations Performance

1. Introduction and Study Background

In the early 1990s, Zambia adopted a liberalized economy policy framework to avert the economic decline and poor industrial performance from the mid 1970s (GRZ, 2014). Following the liberalization of the economy and trade policies, the government concentrated on creating an enabling business environment for private players. This saw a significant improvement in macroeconomic indicators with the GDP growth rate averaging 3.9 by 1998. In 2000, the aspiration of Zambia as a nation was to become a prosperous middle-income nation by the year 2030. Hence, the government developed a long-term planning instrument known as the vision 2030. In aspiring for this vision, the nation has to build a strong and dynamic middle-income industrial nation that provides opportunities for improving the wellbeing of all (GRZ, 2014). According to the Zambia Development Agency ZDA (2014), the manufacturing sector currently account for about 11% of the Gross Domestic Product (GDP). To build an industrial nation that sees the aforementioned scenario, there is great need for improved productivity of the industries; quality improvement in the products and services produced; and enhanced efficiency and effectiveness which lowers the costs of production or operations in our industries (KIZ, 2015).Zambian manufacturing companies have also embraced Kaizen practices with a view to contributing in achieving the aspirations of becoming a prosperous middle-income nation through improved operations' performance. This study will explore the relationship between the Kaizen practices and improvement of operations' performance in Zambian manufacturing companies.

1.1 The Zambian Manufacturing Sector

Following the economic liberalization in the 1990s, the Zambian industrial sector underwent significant economic reforms to structurally adjust the economy so as to ensure dynamism, efficiency and competitiveness by the private sector (GRZ, 2014). There was a policy shift away from import substitution, protectionism, and heavy public sector involvement towards the promotion of a private sector led, market oriented economy. Consequently, most state enterprises were privatised. Since the mid-1990s, the performance of the manufacturing sector has been positive albeit with fluctuations (ZDA, 2014). The manufacturing activities in the country are undertaken by the private sector players with government providing a conducive business environment through policy guidance. Further, the government has put in place interventions support the manufacturing sector, such as the establishment of Multi-Facility Economic Zones (MFEZs) and Industrial Parks and provision of sector-specific investment incentives (ZDA, 2014). Government also promotes small and medium enterprises (SMEs) in labour intensive light manufacturing activities to promote growth of the industry.

1.2 Kaizen Concept

Kaizen is a Japanese word that has become very popular in many parts of the world. The word indicates a process of continuous improvement of the standard way of work (Chen et al., 2000). It is a compound word involving two concepts: Kai (change) and Zen (for the better) (Palmer, 2001). The term comes from Gemba Kaizen meaning 'Continuous Improvement' (CI). Continuous Improvement is one of the core strategies for excellence in production, and is considered vital in today's competitive environment. It calls for endless effort for improvement involving everyone in the organization (Malik and YeZhuang, 2006).

1.3 Rationale of the Research

Nderi (2012) argues that much as Kaizen transformed many Japanese companies into world class companies, its success outside Japan is highly contestable. Owing to the significant contribution of the manufacturing sector in Zambia, it is imperative to study the effectiveness of the improvement techniques such as Kaizen being implemented in the sector. Kaizen concept is a relatively new concept in Africa and Southern Africa in particular. In Zambia only thirty three (33) companies have adopted the philosophy. Studies of the relationships between kaizen implementation and organizational performance in some countries outside Japan have shown a relatively strong link in countries such as Kenya (Nderi, 2012; KAM, 2012), Tunisia (Kikuchi, 2008), Bangladesh (JICA and Unico International Corporation, 2009) and Desta et al (2014) also confirms the same findings in Ethiopia. However, no research as of yet has been conducted in Zambia. Therefore, being a relatively new concept in the Zambian context, research to ascertain the extent of to which kaizen activities have been understood and improved the operations' performance is needed. This research will therefore study the relationship between Kaizen implementation and improvement in operations performance in Zambian Manufacturing companies. The specific objectives of the study are as follows:

- To ascertain the extent to which kaizen practices are being implemented by Zambian Manufacturing companies;
- To determine the influence of Kaizen practices on human resources outcomes in Zambian manufacturing companies;
- To establish the challenges being faced by the Zambian Manufacturing companies in implementing Kaizen; and
- To determine the relationship between Kaizen implementation and improvement in operations' performance in Zambian manufacturing companies.

2. Literature Review

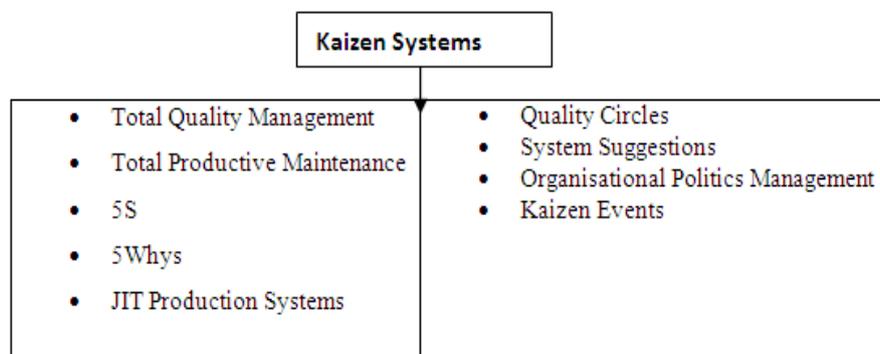
2.1 The Kaizen Concept

According to Titu et al., (2010) the kaizen philosophy originated in Japan where it was dedicated to improvement of productivity, efficiency, quality and business excellence. Kaizen is an internationally acknowledged method for continuous improvement involving small improvements in key processes in an organisation (Venkatesh, 2007; Titu et al., 2010). The principle behind is that a large number of small improvements are more effective in an organisational environment than a few improvements of large value. The Kaizen philosophy sits on three pillars for successful implementation; these are housekeeping, waste elimination and standardization (Thessaloniki, 2006). In manufacturing, kaizen relates to finding and eliminating waste in machinery, labour or production methods. Bassant and Caffyn (1994) further add that Kaizen is a process of focused and sustained innovation throughout the organization that is in the form of small incremental projects known as kaizen events. It means systematic way of small incremental changes toward betterment in each place and each department (Cheser, 1998). Although many firms have achieved process improvement through implementation of continuous improvement programmes, the initial improvement is easily eroded back to the pre-improvement level, especially if the three pillars are not adhered to (Bateman and David, 2002; Doolen et al., 2008; Mano et al., 2014). It is important to

note that Kaizen is not only restricted to manufacturing, the philosophy is a way of life which can be applied to any sector (Thessaloniki, 2006).

2.2 Kaizen Systems

Kaizen implementation is intertwined in the systems, which must work in a coordinated manner. There are a number systems and practices that belong to the kaizen philosophy. These include 5S, kaizen events, 5 why's, Total Preventive Maintenance (TPM), Just-In-Time (JIT) System (Doolen et al., 2008); others are Suggestion System, kaizen costing, Quality Control Circles (QCC) or Quality Circle (QC), Total Quality Management (TQM), Toyota Production System (TPS), kanban system, elimination of the seven kinds of wastes, and poke-yoke (error proofing). This study however, focused on 5S, kaizen events, 5why's, Total Productive Maintenance (TPM), Just-In-Time (JIT) Systems, Suggestion System and Total Quality Management (TQM), as they are considered the major distinct practices (Titu et al.,2010).



Source: Titu et al., 2010

These systems if well coordinated and implemented are fundamental techniques which can lead to improvement in efficiency and productivity of an organisation, while ensuring a conducive organisational climate for continuous improvement and innovations (Titu et al., 2010).

2.3 Kaizen and Manufacturing Operations Performance Improvement

In a globalised dynamic market, a company that needs to outsmart others should increase quality level of the services and products reduce costs and ensure that employees are highly motivated across the organisation (Titu et al., 2010). In today's contemporary management style, the relationship between manager and employee is very important and the Kaizen techniques have a major role to play in the reinforcement of this relationship since the achievements of a company are the result of the mixed efforts of each employee. Therefore, a link between kaizen practices and superior organisation performance is indissisable (Thessaloniki, 2006). Most of the studies that have focused on Japanese manufacturing have illustrated the importance of kaizen in improvement of organizational performance (Womack and Jones, 1996; Liker, 2004). Research shows that kaizen can be used a strategic instrument for achieving organisation objectives ((Titu et al., 2010). Further, Thessaloniki (2006) also found a strong link between kaizen practices and improvement in performance in the agriculture sector.

2.4 Studies from Other Countries

The findings of a study done in Tunisia on the effect of kaizen in some selected manufacturing firms found that, a number of companies that implemented kaizen were able to achieve numerically expressible quality or productivity improvement using existing machinery and equipment (Kikuchi, 2008). In Bangladesh, kaizen was piloted for the jute sector in “The Study on Potential Sub-Sector Growth for Export Diversification.” After six months, four model companies achieved an average of 11% production growth in their spinning sections and machine stoppage reduced by 45.7%. Nderi (2012) indicates that there is a strong positive relationship between kaizen implementation and operations performance improvement. This was in a study that was to establish the relationship between kaizen implementation and operations performance improvement in Kenyan manufacturing firms. The findings from the study show that companies that implement kaizen are likely to improve their operations performance (KAM, 2012). Desta et al. (2014) also confirms the same findings in Ethiopia.

2.5 Key Performance Indicators

Manufacturing Operations performance management is characterized by four key distinct performance dimensions, these are; cost/productivity, time/speed, operations flexibility and quality. Others include creativity, innovation and customer satisfaction (Thessaloniki, 2006). These four distinct classes of performance dimension coincide with the four basic components of cost, quality, speed and flexibility by which the manufacturing strategy of a firm is generally expressed (Doolen et al., 2008). Some of the purported human resource outcomes of kaizen event are increased employee knowledge of the need for improvement in the organization (Tanner and Roncarti, 1994; Butterworth, 2001), increased employee knowledge of the principles, tools, techniques of continuous improvement, development of problem solving skills (Kleinsasser, 2003), promotes teamwork in an organization and proficiency in lean manufacturing tools (Mika, 2002).

2.6 Challenges of Kaizen implementation

Many studies note that, in both Japan and abroad, especially in the cases of American and European companies, leadership is the single most important factor for successful implementation of kaizen (Imai, 1986; Kaplinsky, 1995). This implies that it is possible to apply kaizen in countries with different socio-cultural contexts but that application must be conducted under proper leadership and with adjustments that reflect the uniqueness of the targeted society. Shah and Ward (2003) argues that larger firms enjoy larger financial and human resources as well as economies of scale hence have better conditions for implementation of new techniques in their firms as compared to small or medium sized firms. In addition, managers’ misconceptions about continuous improvement are common sources of difficulty in kaizen implementation, since they often expect instant results, whereas in reality it takes time before the benefits of kaizen become visible (Titu et al., 2010). Aoki (2008) found out that lack of organizational capabilities that facilitate an incremental organization-wide innovation greatly hindered implementation of kaizen in Chinese firms (Alukal, 2007).

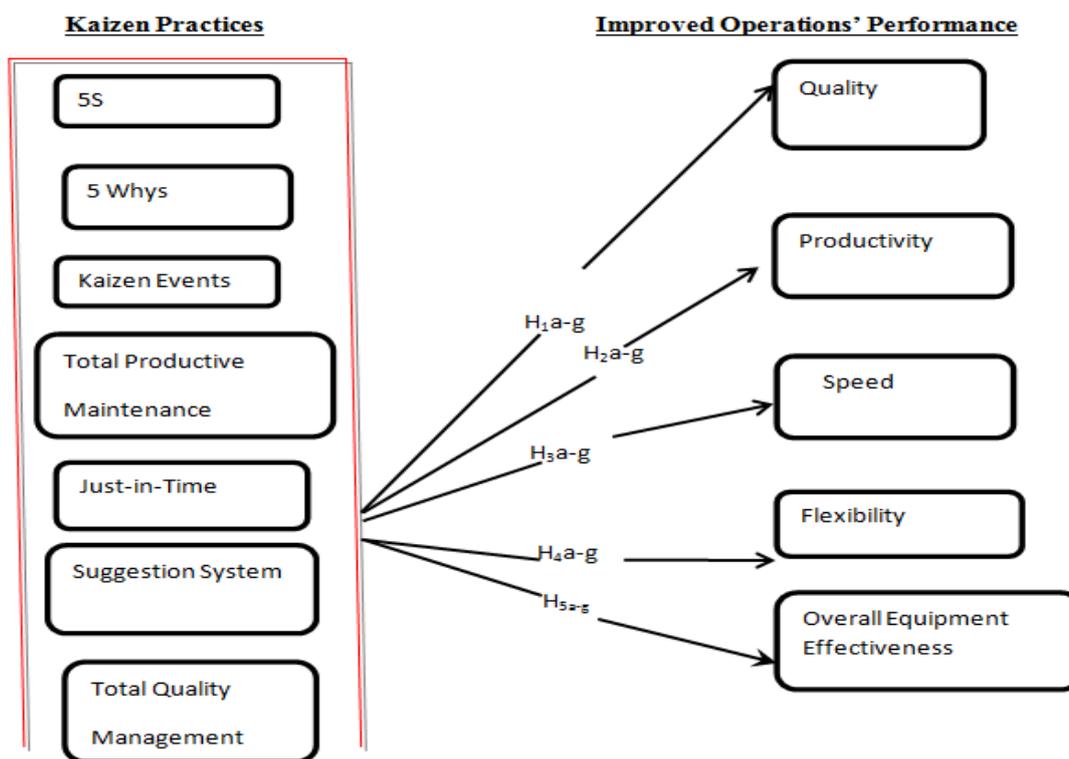
2.7 Conceptual Framework

2.7.1 Kaizen Practices

There are a large number of related and often overlapping techniques and practices that belong to the kaizen methodology or philosophy. However, this study focused on 5S, kaizen events, 5whys, Total Productive Maintenance (TPM), Just-In-Time (JIT) Systems, Suggestion System and Total Quality Management (TQM), as they are considered the major distinct practices for improved operations' performance (Imai 1986, 1997; Fujimoto 1999; Liker, 2004).

2.7.2 Operations Performance

The study used four key distinct performance dimensions of manufacturing operations performance management which include; cost or productivity, time or speed, operations flexibility and quality. These coincide with the four basic components of cost, quality, speed and flexibility by which the manufacturing strategy of a firm is generally expressed (Ward et al., 1995). In addition, Overall equipment effectiveness was also used to measure the equipment effectiveness.



2.7.3 Research Hypotheses

Based on the theoretical and conceptual framework in Figure 3.1, the proposed hypotheses of the study were as follows:

- Hypothesis 1: Kaizen practices (a-g) have a positive relationship with quality in Zambian manufacturing companies.

- Hypothesis 2: Kaizen practices (a-g) have a positive relationship with productivity of Zambian manufacturing companies.
- Hypothesis 3: Kaizen practices (a-g) have positive relationship with speed in Zambian manufacturing companies.
- Hypothesis 4: Kaizen practices (a-g) have positive relationship with flexibility in Zambian manufacturing companies.
- Hypothesis 5: Kaizen practices (a-g) have positive relationship with overall equipment effectiveness in Zambian manufacturing companies.

2.7.4 Operationalisation of the hypotheses

The variables were operationalised as follows:

2.7.4. 1 Kaizen Practices Operationalisation

This study measured seven practices of kaizen: 5S, kaizen events, 5whys, total productive maintenance, Just-In-Time, systems, suggestion system and total quality management. Respondents were asked to rate the extent to which the company had implemented the kaizen practices. This was measured by using 5-point Scale, Scale from 1- Minimal to 5- a great extent. **5S**- A way to visualize the working place, assuming the care of the workplace, on the basis of: selection, systematic, cleaning, standardization and self-discipline.

2.7.4.2 Operations Performance

This study measured operations' performance in terms of quality, cost or productivity, speed and flexibility. The respondents were asked to rate the improvement in the performance dimensions. Measurement of improved operations' performance consisted of 5-point scale, where 1(Minimal) (1) and 5 (Great Extent).

3. Methodology

3.1 Research Design

The study employed cross-sectional research design to determine the relationship among variables- Kaizen practices and improved operations' performance. The sampling design was the census. This was influence by the number of companies that had implemented kaizen in manufacturing industries. Data was collected in the months September and October, 2015.

3.2 Population and Sampling

In 2002, the government of the Republic of Zambia conducted a manufacturing survey which established that a high concentration (about 67%) of manufacturing companies were in Lusaka and Copperbelt (GRZ, 2014). Hence, the targeted population was the manufacturing companies in Lusaka and Coppebelt that had adopted and implemented Kaizen philosophy or concept. The Zambia Association of Manufacturers and Kaizen Institute in Zambia listed 33 companies that had

implemented Kaizen in Zambia (ZAM, 2014, KIZ, 2014). This formed the target population for the study. Questionnaires were distributed to all thirty three (33) but only thirty one (31) respondents and returned the fully answered questions. The primary data was collected using structured questionnaires which were administered to managers, operational managers or equivalent of selected manufacturing companies practicing Kaizen in Lusaka and Copperbelt. The questionnaire comprised of a five-point Likert scale that collected the respondents' responses to both operational performance items as well as for kaizen practices quantitatively.

4. Data Analysis and Findings

4.1 Response Rate

The study distributed questionnaires to Managers and Operational Managers. From thirty-three (33) questionnaires distributed, thirty-one (31) were filled by the respondents and collected while two were not returned. This represented a response rate of 93.9 % which was relatively a good rate.

4.2 Extent of Kaizen Practices Implementation

The results showed that 5S had highest extent of implementation with the mean of 4.01, Total quality management second with 3.96 and Kaizen Events third with 3.90, just-in-time fourth with 3.78, total productive maintenance fifth with 3.72 and 5whys sixth with 3.70. The suggestion system was least in extent of implementation with mean of 3.60. The results are shown in the table 1 below.

Table 1: Mean of Responses on Extent of Kaizen Practices Implementation

Kaizen Practice	Mean
5S	4.01
Kaizen Events	3.90
5Whys	3.70
Suggestions Systems	3.62
Total Productive Maintenance	3.72
Total Quality Management	3.96
Just –In-Time	3.78

4.3 Kaizen Implementation and Human Resource Outcomes

The study considered the influence of kaizen practices on human resource outcomes that included employee's attitude, employees' work area, participants, employee's skills, knowledge-understand need for change and knowledge-understand need for kaizen as per Knowledge, Skill and Attitude (KSA) framework.

4.3.1 Means on the Influence of Kaizen Practices on Employees' Attitude

The analysis indicated that being part of continuous improvement activities of the four items under consideration had highest mean of 4.48 and kaizen activities motivating one to perform better had lowest mean of 4.19. The overall mean was 4.25. This entails that participating in continuous improvement activities has influence on employees' attitude. The table 2 below shows the results.

Table 2: Means of Responses on the Influence of Kaizen Practices on Employees' Attitude

	Mean
Kaizen activities have increased my interest in work	3.90
I like being part of continuous improvement activities	4.48
Kaizen activities have motivated me to perform better	4.19
I would like to be part of kaizen activities in the future	4.42

4.4 Challenge of Kaizen Implementation

The table 3 below shows that employee attitude was the most challenge the companies were facing with the mean of 3.19. This was followed by financial constraints and insufficient participation by workers with the mean of 2.71 respectively. Ineffective training was third with the mean 2.55 and misconceptions about kaizen mean of 2.52. Ineffective kaizen performance measures had mean of 2.43, organisation structure mean of 2.42 and ineffective communication systems mean of 2.26. The least was lack of management support or leadership with mean of 2.16 and other unspecified areas with mean of 2.03. The results signified that the companies could do well if the employee attitude was to be change as there was management support or leadership.

Table 3: Means of Responses on Challenge of Kaizen Implementation

	Mean
Financial constraints	2.71
Lack of management support or leadership	2.16
Ineffective training	2.55
Employee attitude (e.g commitment)	3.19
Ineffective kaizen performance measures	2.43
Insufficient participation by workers	2.71
Ineffective communication systems	2.26
Organisation Structure	2.42
Misconceptions about kaizen	2.52
Others	2.03

4.5 Multiple Regressions

This section presents multiple regressions that were performed between five (5) dependent variables and seven (7) independent variables. Hypotheses were tested using a multiple regression as follows:

Table 4: A Multiple regression of Independent Variables and dependent Variables

Model	t-value	p-value	Comment
Kaizen Events	2.614	0.014	Supported
Total productive maintenance	2.254	0.032	Supported
Just-In-Time	2.905	0.007	Supported
Kaizen Events	2.928	0.007	Supported
Total Productive Maintenance	2.357	0.026	Supported
Just-In-Time	3.037	0.005	Supported
Total Productive Maintenance	2.383	0.024	Supported
Suggestion Systems	2.737	0.011	Supported

- a. Significance level of 0.01 or
- b. Significance level of 0.05

Table 4 shows that all of the five hypotheses were supported. These were analysed as detailed below:

The table indicates that, there was a significant positive relationship between Kaizen Events, total productive maintenance and quality ($t = 2.614, p < 0.05$) and ($t=2.254, p<0.05$) respectively. The table also indicates that, there was a significant positive relationship between just-in-time, Kaizen Events; and productivity ($t = 2.905, p < 0.05$) and ($t=2.928, p<0.05$) respectively. The table above shows that, there was a significant positive relationship between total productive maintenance, just-in-time; and speed ($t = 2.357, p < 0.05$) and ($t=3.037, p<0.05$) respectively.

The table further indicates that, there was a significant positive relationship between total productive maintenance and flexibility ($t = 2.383, p < 0.05$) . The table above also reveals that, there was a significant positive relationship between suggestion systems and overall equipment effectiveness ($t=2.737, p<0.05$).

4.4 Discussion of the Research Findings

The main focus of the discussion is to answer the four research questions below:

4.4.1 What is the extent is Kaizen Practices being Implemented by Zambian Manufacturing Companies?

The results show that, 5Ss was implemented to great extent, followed by total quality management, kaizen events, just-in-time, total productive maintenance and 5Whys. Suggestion systems were implemented to minimal extent. The great extent of 5S implementation may be attributed to its simplicity in implementation as it aims at using visual cues to achieve more consistent operational results (Osada, 1991). Kaizen events high extent of implementation may be attributed to its ability to impact both business performance as asserted by Cuscela (1998) as well as human resource outcomes (Laraia et al., 1999; Melnyk et al., 1998).

4.4.2 What is the influence of Kaizen activities on Human Resources Outcomes in Zambian Manufacturing Companies?

The results indicate that the greatest extent of influence was on knowledge as relates to understanding the need for change as well as understanding the need for kaizen, followed by influence on employee attitudes, skills and impact on work area. Impact on work area had the least extent of influence from kaizen activities. Overall kaizen implementation had a positive effect on all the human resource attributes described in the knowledge, skills and attitude (KSA) framework. This is indicated by the overall mean of 4.08. These findings are consistent with both empirical and theoretical findings of various studies on kaizen (Doolen et al., 2008; KAM, 2012).

4.4.3 What are the common Challenges being faced by the Zambian Manufacturing Companies in implementing Kaizen?

The results reveal that employees' attitude was the most challenge the companies were facing, financial constraints, insufficient participation by workers, ineffective training, misconceptions about kaizen, ineffective kaizen performance measures, organisation structure and ineffective communication systems. The least was lack of management support or leadership and other unspecified areas. The results signified that the companies could do well if the employee attitude was to be change as there was management support or leadership. These results are consistent with findings by Aoki (2008) on organizational capabilities that facilitate kaizen implementation, Karsten and Pennik (2007) on the difficulties of misconceptions about kaizen in its implementation as well as Kaplisky (1995) on the importance of training and skills development in implementation of continuous improvement methodologies such as kaizen. The financial constraints also posing a lesser challenge to kaizen implementation is consistent with arguments that kaizen is a low cost approach to process improvements and it involves the employees or workers (Imai, 1986).

4.4.4 How does Kaizen implementation relate to improvement in operations' performance in Zambian manufacturing companies?

The results indicate that all the five (5) hypotheses were supported showing the positive significant relationship between selected independent variables; and dependent variables with $p < 0.05$ and $p < 0.01$. Overall, the results indicate that kaizen implementation was related to operations performance improvement in Zambian manufacturing industries. This was consistent with the results reported by Cua et al. (2001), Shah and Ward (2003) and Jayram et al. (2008) who argue that Kaizen practices contribute substantially to the operating performance improvement of manufacturing companies. The results were also in agreement with the studies on the effect of kaizen on operations performance in Tunisia on selected firms Kikuchi (2008); and pilot study in Bangladesh in the jute sector (JICA and Unico International Corporation, 2009).

5. Conclusions

Following the first objective of the study, the findings showed that 5Ss was implemented to great extent, followed by total quality management, kaizen events, just-in-time, total productive maintenance and 5Whys. Suggestion systems were implemented to minimal extent. On the second objective of study, the findings indicated that the greatest extent of influence was on knowledge as relates to understanding the need for change as well as understanding the need for kaizen, followed by influence on employee attitudes, skills and impact on work area. Impact on work area had the

least extent of influence from kaizen activities. Overall kaizen implementation had a positive effect on all the human resource attributes described in the knowledge, skills and attitude (KSA) framework.

The results concerning the third objective of the study revealed that employees' attitude was the most challenge the companies were facing, financial constraints, insufficient participation by workers, ineffective training, misconceptions about kaizen, ineffective kaizen performance measures, organisation structure and ineffective communication systems. The least was lack of management support or leadership. The results signified that the companies could do well if the employee attitude was to be change as there was least management support or leadership. The results also indicated that a significant relationship between Kaizen practices and Operations performance measures. The results showed that the manufacturing Companies could improve their operations by adopting the Kaizen concept. This was showed by the moderate positive relationship between and dependent variables; and the p- values less than 0.05 and 0.01. Thus, objective four (4) was also accomplished.

6. Implications

In view of the findings of the research, there is need for more manufacturing companies to adopt and implement the kaizen practices with a view to improving the operations performance as evidenced by those that adopted and implemented the concept. The Kaizen Institute of Zambia (KIZ) need to do more sensitization on least implemented common practices to have a holistic approach to continuous improvement and should intensify registration, monitoring and evaluation of concept implementation and progress reports be share with relevant stakeholders timely. The government of the Republic of Zambia (GRZ) should consider implement promotional activities on kaizen philosophy in all economy sectors whether private or public and involve all concerned partners such as ZAM, ZDA and line Ministries. There is need to institutionalise the kaizen concept in all sectors.

6. REFERENCES

- [1] Alukal, G. (2007). Lean kaizen in the 21st century”, *Quality Progress*, Vol. 40 No. 8, pp. 69-70.
- [2] Aoki, K.(2008). Transferring Japanese Kaizen activities to overseas plants in China
- [3] Bassant, J & Caffyn, S (1994). Rediscovering Continuous Improvement, *Technovation*, 14(1), 17-29.
- [4] Bateman, N. and David, A. (2002). Process improvement programmes: a model for assessing sustainability. *International Journal of Operations & Production Management*, Vol. 22No. 5, pp. 515-26.
- [5] Chen J C, Dugger J., Hammer B,(2000). A Kaizen Based Approach for Cellular Manufacturing Design: A Case Study. *The Journal of Technology Studies*, Vol. 27, No. 2, 2000, pp.19-27
- [6] Doolen, L., et al., (2008). Kaizen events and organizational performance: a field study. *International journal of productivity and performance management*, Vol. 57 No.8, pp 637-658.
- [7] Fujimoto, T. (1999), *The evolution of a manufacturing system at Toyota*. Oxford University Press.
- [8] GRZ (2014): 2011-2012 Manufacturing Sector Survey Study Report. Ministry of Commerce Trade and Industry.
- [9] Imai, M. (1986), *Kaizen: The key to Japanese competitive success*, McGraw-Hill, New York, NY.
- [10] Imai, M. (1997), *Gemba Kaizen: a common sense, low-cost approach to management*, McGraw Hill, New York, NY.
- [11] *International Journal of Operations & Production Management*, Vol. 28 No. 6, pp. 518-539.
- [12] JICA & Unico International Corporation, (2009) “The Study on Potential Sub-sector Growth for Export Diversification in the People’s Republic of Bangladesh: Pilot Project Completion Report.” pp.1-38.
- [13] Kaplinsky, R. (1995). Technique and system: The spread of Japanese management techniques to developing countries. *World Development*. Vol. 23, No.1, pp.57-71
- [14] Kenya Association of Manufacturers, (2012), Industries Compete for Kaizen Awards, Newsletter of 23 July 2008. <http://www.kam.co.ke/?itemId=17&newsId=98>
- [15] Kenya Association of Manufacturers (KAM) (2012), Industries Compete for Kaizen Awards, Newsletter of 23 July 2008. <http://www.kam.co.ke/?itemId=17&newsId=98>
- [16] Kleinsasser, J. (2003). Kaizen seminar brings change to library, purchasing processes”, *Inside WSU*, p. 20, available at: <http://webs.wichita.edu/dt/insidewsu/show/article>
- [17] Laraia, A.C., Moody, P.E. and Hall, R.W. (1999). *The Kaizen Blitz: Accelerating Breakthroughs in Productivity and Performance*, The Association for Manufacturing Excellence, New York, NY

- [18] Liker, J. K., (2004), *The Toyota way: 14 management principles from the world's greatest manufacturer*. McGraw-Hill.
- [19] Liker, J. K., (2004), *The Toyota way: 14 management principles from the world's greatest manufacturer*. McGraw-Hill
- [20] Malik S A., & YeZhuang T, (2006). Execution of Continuous Improvement Practices in Spanish and Pakistani Industry: A Comparative Analysis., *IEEE International Conference on Management of Innovation and Technology, Vol. 2, 2006, Singapore. pp. 761-765.*
- [21] Mano Y, et al. (2014): Teaching KAIZEN to small business owners: An experiment in a metalworking cluster in Nairobi. *J. Japanese Int. Economies 33 (2014) 25-42*
- [22] Melnyk, S.A., Calantone, R.J., Montabon, F.L. and Smith, R.T. (1998). Short-term action in pursuit of long-term improvements: introducing kaizen events. *Production & Inventory Management Journal, Vol. 39 No. 4, pp. 69-76*
- [23] Mika, G.L. (2002), *Kaizen Event Implementation Manual*, Kaizen Sensei, Wake Forest, NC.
- [24] Nderi, M (2012): *The relationship between kaizen implementation and operations performance improvement: the case of Kenyan Manufacturing Firms*. MBA Thesis-University of Kenya.
- [25] Osada, T. (1991), *The 5S's: Five Keys to a Total Quality Environment*, Asian Productivity Organization, Tokyo
- [26] Chapman, C.D. (2005), "Clean house with lean 5S. *Quality Progress, Vol. 38 No. 6, pp. 27-32.*
- [27] Palmer V S.(2001). Inventory Management Kaizen, *Proceedings of 2nd International Workshop on Engineering Management for Applied Technology, 2001, Austin, USA. pp. 55-56.*
- [28] Thessaloniki, (2006): Kaizen Definitions and Principles in brief: A concept and tool for employee involvement accessed on www.michailolidis.gr on 29/02/2016
- [29] Titu, M., A et al., (2010): Applying the Kaizen Method and the 5S Technique in the Activity of Post-Sale Services in the Knowledge-Based Organization.
- [30] Venkatesh, J. (2007). An Introduction to Total Productive Maintenance (TPM). Available at: http://www.plantmaintenance.com/articles/tpm_intro.shtml
- [31] Ward, P.T., Duray, R., Leong, G.K. and Sum, C.C. (1995). Business environment, operations strategy, and performance: an empirical study of Singapore manufacturer. *Journal of Operations Management, Vol. 13 No. 2, pp. 99-115.*
- [32] ZDA (2014): Zambia Manufacturing Sector Profile, August 2014