

## **Analysis of Kaizen Implementation in Northern Ethiopia's Manufacturing Industries**

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### **Abstract**

*The Kaizen manufacturing processes in Japan have revolutionized the way enterprises deliver products to their customers. Given ambitions to advance, retain market share, and satisfy their domestic market while expanding into the international market, it has become a dream for many manufacturing companies similar to Japanese manufacturing enterprises to build a culture of continuous improvement. In other words, a number of foreign companies are striving to acquire the habit of improvement using kaizen, as well as to focus on a customer-driven strategy to improve productivity and the quality of products and services by continuously amassing marginal improvements over time. Mapping out a survey questionnaire, interviews, direct observation of the personnel who were directly involved with the implementation process, the effects of the newly introduced kaizen techniques at three case factories from the Northern Ethiopia were assessed. Based on key performance indicators that specifically relate to inputs, outputs and process factors of the kaizen management system the three pilot case companies were assessed to determine if 1) top managers and employees have a genuine concern for the short and long-term health of the company, 2) the companies' work teams have a mindset for action, 3) employees are committed to the companies' value systems, and 5) the employees' suggestions are used as leverage for improvement in the production process. The study found that the three pilot companies have reduced the costs of production, improved quality, reduced lead time, improved customers' satisfaction and have partially achieved three out of five (5S) kaizen steps: sorting, setting, and shining, but they have not yet achieved how to standardize and sustain self-discipline. The study also established that the executives of the three pilot cases don't seem to be committed to the kaizen teamwork. Though vital for continuous improvement, the front line workers are rarely asked to participate as a team.*

**Key words:** kaizen, customer-driven strategy, value system, leverage for improvement

### **Introduction**

Faced with emerging global competition and substantial changes in consumer needs, desires, and tastes, a number of enterprises today are using the Japanese management system known as Kaizen to

make adjustments to re-engineer their manufacturing processes to meet these needs. The dynamic kaizen strategy is an activity of continually revolving cycles of Plan, Do, Check and Act (PDCA) which focus on customer-driven processes to improve productivity and the quality of products and services by amassing marginal improvements over time.

A number of manufacturing industries in Ethiopia currently are not using methods that will achieve high productivity and excellent quality standards to make them more competitive in the globalized, international markets. Most of the initiatives taken for quality and productivity improvement are through top-down approaches without the best management skills. Many manufacturing companies are plagued by such problems as high quality rejects, high inventories, long lead time of production, high costs of production, and inability to cope with customer orders.

Given these problems and appreciating that kaizen, the manufacturing process used in Japan, has revolutionized the way enterprises deliver products to their customers, retain market share, and satisfy their domestic market and expand into the international market, a number of enterprises in northern Ethiopia are attempting to develop the habits of kaizen to focus on a customer-driven strategy to improve productivity and the quality of products and services by continuously amassing marginal improvements over time.

The implementation of the kaizen management techniques could enable enterprises in Northern Ethiopia to identify and solve their current manufacturing problems without employing high-tech approaches, only involving people on the shop floor in kaizen activities. Three pilot companies have been studied, the Mesfin Industrial Engineering PLC, Almeda Textile Factory PLC., and Sheba Leather and Tanning Industry PLC, which have implemented the kaizen management system to revitalize their management system. Thus, the central question of the study is: How efficient and effective are the kaizen strategic management initiatives, tools, and methods for improvement in these three pilot projects in Northern Ethiopia?

The purpose of this study is to: 1) map out the degree of awareness of three companies of the kaizen management strategy, 2) assess the mindset for action in the working teams of the three companies, 3) measure the institutionalization of the kaizen process to ensure continuous improvement in the production of quality products and services, 4) investigate how the organizational structure of the three companies accepts employee inputs and leverages their suggestions for improvement, 5) analyze the commitment of top managers at the three companies to the short and long-term health of their enterprises.

The awareness of kaizen, its implementation process, and the effects of using this strategic management system in the three companies are measured through performance indicators generated from questionnaires, interviews, direct observation, factory developed metric systems, and published records by the companies' resource planning and research centers.

### **Review of the Literature**

From the ashes of the Second World War, Japan through its culturally embedded, innovative management system has succeeded in rebuilding its economy and is now emulated by the community of nations (Waheed et al., 2010). For example, in the 1980s, the manufacturing industry in Japan showed significant growth through the adoption of the kaizen process of management strategies. Its key objective has been to embed the process into the work culture to achieve a never-ending drive toward increasing productivity,

efficiency, and quality improvement. Today, the kaizen management system is spreading throughout the world. It has become a goal for many manufacturing companies to build a culture of continuous commitment to improvement.

Many non-Japanese companies are initiating a kaizen management strategy without adequately taking into consideration its own cultural roots. Thus, they face many barriers while they are chasing this dream. As stated by Brunet and New (2003), it has not been clear hitherto how firms in other cultures can maintain the momentum for kaizen activities, nor how the concepts of target setting, control and incentives for participants fit into their overall management system. The Toyota Total Production System (TPS) sees problems as opportunities to improve, seeking root causes by asking what, why, and who questions. Companies from other cultures visualize problems as discrepancies between the current situation and the standardized ideal that can only be solved by management. In addition, while the Toyota TPS, sees that qualities are customer driven, other cultures view that whatever they supply to the market can be sold, thinking they have produced to the needs of consumers (see for example, Ohno, T. and Bodek, N, 1988; EPA, November 200; and Ahmed,S; Hasan,M; Fen,Y, 2005).

Despite these glaring and challenging problems, in order to stay competitive in an increasingly global market place and with an increase in customer demands, a number of foreign companies are forced to rethink their manufacturing and management approach to lower costs of production, minimize waste, improve productivity, boost quality, and achieve sustainability. Thus, if top management of kaizen companies in other cultures has the desire to thrive for a healthy long term, before starting on a kaizen transition, management needs to be passionately committed to undertaking an assessment of its own internal and external conditions. Also, it needs to see if it has tailored its activities to meet domestic and global customers. In addition, when transferred to other cultures, companies need to use dedicated cross-functional teams to improve a targeted manufacturing work area (Melnik et al., 1998, Kirby and Greene, 2003, and Heizer & Render, 2010).

Therefore, since well established kaizen strategies help companies to control cost, minimize workers motion, focus on zero defects and, more fundamentally, improve workers' skills by creating a cooperative atmosphere where everyone becomes fully aware of the key goals, each step of the kaizen process needs to be mapped out and measured to ensure economic value to its customers. As stated by Glover et al (2008) since kaizen teams apply structured process tools and human creativity with a goal of substantially improving the performance of the work area, process or product, the team workshop needs to be purposely designed to make jobs easier by taking them apart, studying them, and making improvements, creating a culture of continual improvement with well-designed outreach programs to everyone in the organization (Thessaloniki (2006).

Unlike the conventional approach which emphasizes individual work and mainly watches to see if the worker meets the performance objective of an industry, the kaizen techniques of production challenge the status quo and help workers internalize the work, with creativity and emphasis on institutionalizing the productivity process. For example, the conventional method of Total Quality Management (TQM) of production techniques is challenged because after a workshop "... staff were sent back to their regular duties and told to improve the quality of their work process. No one typically thought their process was broken so there wasn't much incentive to change anything" (EPA, November 2007).

In short, while the conventional approach emphasizes each worker's performance, in kaizen everyone is encouraged to contribute to job improvement. Being process-oriented, kaizen activities are

based on the assumption that a company's overall competitiveness will improve in the long run if individual variations are reduced. Therefore, before structuring the entire company to kaizen quality/productivity improvement practices, it needs to refine its methodology by "brain storming," that is, gathering a group of employees who will contribute spontaneously to list ideas to find a creative solution for a specific problem. Alex Faickney Osborn (1953) proposed that teams could double their creative output with brainstorming which works by focusing on a problem, and then coming up with as many solutions as possible and by pushing the ideas as far as possible.

A brainstorming team is composed of at least 12 members with a wide a range of disciplines and experiences. The team is chosen from the top management level, middle managers, and frontline workers from the target work area and includes outside experts to give their own objective initiatives. Then, the brainstorming team analyzes the vision (the future aspirations of the firm) until it clearly understands the mission statement that articulates the firm's reason for being, its basic purpose, and where it is going. Also, during the brainstorming sessions, all participants are to listen to and respect the ideas and viewpoints expressed by all the participants. In short, in a brainstorming session the ground rules need to include: 1) keeping an open mind to change; 2) maintaining a positive attitude; 3) never leaving in silent disagreement; 4) creating a blameless environment; 5) practicing mutual respect everyday; 6) treating others as you want to be treated; 7) one-person – one voice, regardless of position or rank; and 8) understanding that there is no such thing as a dumb question ( EPA, November 2007).

With a good understanding and internalized vision of the mission of the enterprise, the brainstorming team analyzes the current situation and identifies problems using the SWOT analyses of the Strengths, what it is good at doing, or a characteristic that gives an important capability; Weaknesses, what a company lacks or does poorly in comparison to others; Opportunities, the external trends waiting to be taken advantage of; and Threats, the external movements which may cause a problem or have a negative impact on the firm's business.

In short, the purpose of the pre-kaizen stage is to provide a clue to problem-awareness. In the problem awareness stage, each company is taught that while undertaking a SWOT analysis, the causes of high priority problems and needs are easily located within the objectives of the organization. As stated by GRIPS, the pre-kaizen awareness stage is supposed to create consciousness and "...foster positive attitudes and to promote teamwork and recognition for companies problems and individuals" (December 2011, p. 54). In addition to strong commitment and endorsement by high-level government and private officials, pre-kaizen awareness can cause a remarkable mind set change to take place through formal training of students at vocational schools, tertiary institutions, worker's unions, academia and the public at large. Some community support programs may provide donations, sponsorship and prizes to a wide range of community groups, schools and clubs that require a proactive, ongoing, community-engagement strategy. Furthermore, regular forums to share knowledge and ideas between the company and the broader community can be maintained through dissemination of publications and postings about productivity that may provide the company with a benchmark as it improves its productivity, skills and techniques when compared with similar companies (GRIPS, 2011).

Through a participatory program, a company can find solutions that are in line with the shared mission and goals of all team members. With the kaizen cross-functional teamwork approach, workers are not only empowered to challenge the status quo but also can gather the most conspicuous internal and external factors that could be become part of the work ethics necessary for productivity. The awareness

and consciousness created among the employees of a company can be translated into specific action at the workplace. In addition to generating support for the changes made during the transition, involving target area employees in the kaizen event is an investment in employee training and also introduces employees to specific tools and techniques of lean process improvement to sustain effectively the event-based changes, as well as to continue to generate future improvements (Bradley and Willett, 2004).

As outlined before, the most compelling reasons for the formation of empowering work teams are that it: 1) allows an organization to take advantage of the diverse backgrounds, and interests of team members, 2) results in a motivated and entrepreneurial workforce, 3) can be made to work well with teams, since everyone can participate on a team, and 4) creates a well-defined, planning process for giving responsibility to a group of people who know how to do their job well at their level (Thessaloniki (2006).

Once the root causes of problems in the process or value stream are identified during the pre-kaizen process, the team uses the following four pillars of kaizen activities to implement greater operational efficiency (the cost) and effectiveness (the extent to which customers' requirements are met). These are: a) housekeeping activities, b) waste elimination or elimination of non-value added materials, c) standardization of workplace environment, and d) mapping out Socio-economic and environmental effects of the company, and e) conducting follow-up action plans to evaluate the end results of the kaizen activities (Ministry of Industry, 2011).

- a) Housekeeping Activities: The beginning of the kaizen housekeeping journey of management starts by displaying a level of orderliness and clarity of the work area using the following Five Steps (5S). As stated by Imai, 5S is a set of techniques that provide a standard approach to good housekeeping and fosters an increase in quality and productivity (Imai, 1997 as quoted in Juhari et al (2011). If an organization wants to ensure continued competitiveness and achieve market growth, it needs to start with the following 5S system: a) sorting or gathering the spare materials needed by the company, selling what is not needed to a scrap dealer or putting them into trash; b) setting or straightening, keeping visible the remaining materials or parts to provide a pleasing appearance; c) shining and spreading the clean products; d) standardizing and consistently implementing the new process; and e) sustaining improvement using the Six Sigma targets for quality improvements, variation, and safety. Taking a "customer service" attitude kaizen attempts to present value stream mapping (VSM) to deliver the desired outcomes, services or products to customers, and improve staff morale and ascertain the transparency of the process.

Though a number of manufacturing firms try to carry out the 5S System, an ongoing process, the lack of sustained motivation is one of the factors that hinders the successful implementation of the 5S System. Therefore, to effectively apply the 5S System, Juhari, Abidin, and Omar (2011) suggest that communication for 5S, training for 5S, reward and recognition for 5S and top management support for 5S are vital factors that influence employees' motivation in the implementation of the 5S System. Given this, they suggest that management needs to pay attention and invent effective strategies to motivate their employees on a consistent basis. In their study they have ascertained that the four independent variables that influence employees' motivation for environmental improvement and the implementation of the 5S systems include, knowing the goals of the firm, management support, employee involvement and experiential training, and employees' reward and recognition.

b) Waste Elimination: Muda or elimination of non-value adding activities includes removing unnecessary wastes caused by people and machine. Muda or waste can accumulate because a company may have more than necessary equipment, materials or people for quantity production. The way to eliminate waste in any company is therefore to make employees aware in advance which steps add value to the product, and which steps do not. Generally, the seven types of deadly wastes (muda) as identified by the Toyota Production System (TPS) that accumulate in a company's production system are caused by 1) overproduction, 2) waiting, 3) transportation, 4) inventory, 5) over processing, 6) motion, and 7) production of defective parts. In addition, in the sugar plantation and production process, extra wastage is accumulated as a result of the infiltration of excessive nutrients into ground water or surface waters that naturally contribute to greenhouse-gas emissions (Lean in Government Series, November 2007).

- 1) Muda from overproduction occurs when a company produces too soon or too much product in order to be on the safe side in case of a machine's failure and/or employee absenteeism. As a result, trying to produce more than needed products creates misuse of raw materials, wasteful inputs of manpower, utilities, an increased burden on interest payments, added transportation, additional space needed to store excess inventory and administrative costs (See, Thawani, 2003 and Thessaloniki, 2006). As stated by Mezgebe, Asgedom, and Desta (2013) any company can minimize overproduction by trying to be consistent in understanding the heartbeat of the consumer, making demand assessments for the particular product even if the product has been commercialized for a long period of time. Demand is dynamic and tuning the production scheme accordingly is important, so continuous communication with customers is one way of reducing overproduction.
- 2) Waiting Waste: This occurs when the hands of the operator are idle, or when an operator's work is put on hold because of a lack of parts, waiting for the next piece to arrive. It can also happen when another worker slows up the line, anything that lengthens the lead time of the product from start to finish. As narrated by Thessaloniki, (2006) "Lead time begins when the company pays for its raw materials and supplies, and ends when the company receives payment from customers for products sold. Since lead time represents the turnover of money, a shorter lead time means better use of resources, more flexibility in meeting customer needs, and of course contributes to the lowering of operation costs.
- 3) Transportation: This is a non-essential part of operations. A company might use trucks, forklifts, or conveyors as a means of transportation. Unnecessary transport of damaged materials (muda) contributes to waste because transportation does not add value to the finished product. As stated by Thawani (2003) one way of minimizing waste is by incorporating the act of any process into the main line.
- 4) Inventory: An excess of final product, semi-finished product, raw materials and spare parts kept in inventory contributes to Muda of inventory. They do not add value. Instead, they add to the cost of operations by occupying space, requiring additional equipment and facilities such as warehouses and forklifts. As the products stored deteriorate over time they could eventually become obsolete. Excess items staying in inventory gather dust and their quality deteriorates over time. They are even at risk of damage through fire or

disaster. As suggested by Thessaloniki (2006) Just-in-time (JIT) production systems help to solve the Muda of inventory.

- 5) **Over-processing:** This type of Muda uses more resources, utilities, and materials, or uses the wrong set of tools, procedures or systems. Producing more quantity ahead of schedule creates waste because in manufacturing a longer line requires more workers, more work-in-process and a longer lead-time to produce outputs. As suggested by Thessaloniki (2006), many unneeded workers are likely to make a greater number of mistakes "...which leads to quality problems. More workers also mean that a longer lead-time will increase cost of operations" As Suggested by Thawani, (2003) elimination of Muda in processing can frequently be avoided by combining operations/steps.
- 6) **Motion:** Excessive movements by workers like walking, lifting, or carrying heavy objects, searching for lost items create waste. In short, Muda of motion is unproductive because it involves movements by workers not directly related to the job. such as poor workplace organization, resulting in poor ergonomics, for example excessive bending or stretching (Mezgebe, Asgedom, and Desta, 2013). Thus, "Workers should avoid walking, lifting, or carrying heavy objects that require great physical exertion because it is difficult, risky, and represents non-value added activities" (Thessaloniki 2006). Rearranging the workplace would eliminate unnecessary human movement and eliminate the requirement of having another operator to do his/her work more efficiently.
- 7) **Production of Defective Parts:** Muda of repairs/rejects interrupts production. It contributes to a great waste of resources and effort. In addition, rejects increase inspection work, require expensive rework or additional time to repair (Thessaloniki, 2006). The production of defective parts can cause dissatisfied consumers to complain about their defective product but also might create a skeptical attitude about other products the company may be producing in the future. In order to eliminate non-value added defective products, companies could retrain and redirect staff-time to higher-priority activities related to their core mission. A brief review of the types and descriptions of wastes are given in Table1.

Table 1 Type and description of wastes

#	Waste	Description
1	Overproduction	Producing too much or too soon, resulting from poor flow of information
2	Defects	Frequent errors, product quality problems, or poor delivery performance
3	Unnecessary inventory	Excessive inventory because of delay of information or products, resulting in the need for extra storage
4	Inappropriate processing	Going about a work process using the wrong set of tools, procedures or systems, when a simpler approach may be more effective
5	Excessive transportation	Excessive movement of people, information or goods, resulting in wasted time, effort and cost
6	Waiting	Long periods of inactivity for people, information or goods
7	Unnecessary motion	Poor workplace organization, resulting in poor ergonomics, for example excessive bending or stretching, or searching for frequently lost items

**Source:** See Shigeo Shingo; as quoted by Fawaz A.(2003), “*Lean Manufacturing Tools and Techniques in the Process Industry with a focus on Steel*”, Published PhD dissertation,, School of Engineering, University of Pittsburg, Pittsburg, USA, pp: 40-50. Mezgebe, T.T , Asgedom, B. H and Desta, A. 2013) “*Economic analysis of lean wastes: Case Studies of Textile and garment industries in Ethiopia.*”

In general, it was suggested by Thawani (2003) that unlike many western approaches such as Business Process Re-engineering, Six Sigma which calls for massive investments, the golden rules of Workplace Management (Gemba kaizen) is group effort for continuous incremental improvement that can be standardized by requiring each worker to:

- go to work place first (like a detective) when problems arise;
- investigate or check the object carefully (e.g. a customer complaint or defective item produced/pile loads of inventory);
- take temporary counter-measures promptly;
- find the root cause of the problem (e.g. if excess inventory check the purchasing system or the production management); and
- develop/amend an existing procedure/system to prevent its recurrence.

Thus, the adoption of a “zero defect” mindset in the employees of an organization is vital for spontaneously and automatically improving the operations of the firm. Standards are set by management and engineers. Companies with employee suggestions can bring about improvement as they are called to review the set standards periodically, collecting information and analyzing defects, and encouraging teams to conduct problem-solving activities to optimize performance, comfort, and safety to meet the company’s goals. As stated by Thessaloniki (2006) the standardization of improvement activities may include the following key features if employees: 1) represent the best, easiest, and safest way to do the job; 2) offer the best way to preserve know-how and expertise; 3) provide a way to measure performance; 4) provide a basis for both maintenance and improvement; 5) provide objectives and a basis for employee training and motivation; 6) create a basis for auditing or diagnosis; and 7) provide a means for preventing recurrence of errors and minimizing variability. Thus, the benefits of standardization could a) help the company optimize operations, save cost and improve profits, b) enhance customer satisfaction and increase sales, c) increase market share, and d) reduce negative impacts on the environment.

### **A Conceptual Framework**

Based on the review of the literature, the following conceptual model about the Japanese management system, kaizen, is developed from this review of the literature and establishes the interrelationships among the factors deemed to be integral to the dynamics of answering the research question. Since the kaizen journey begins with “housekeeping,” management must display a level of orderliness and clarity before kaizen is introduced. Then employees must take a SWOT analysis in order to have a clear understanding of the root causes of their company’s problems in order to become aware of the process, to foster positive attitudes and to promote teamwork. In addition the employees of a company that is planning to be engaged in a kaizen strategy need to be given training to expose them to the specific tools and techniques of lean process improvement. This will help them to effectively sustain event-based

changes as well as generate future improvements. Finally, the team of a group needs to use the following four pillars of kaizen activities: a) housekeeping activities, b) waste elimination or elimination of non-value added materials, c) standardization of the workplace environment, and d) evaluating the end results of the kaizen activities in order to implement even greater operational efficiency (cost-effect) and effectiveness (refers to the extent to which customers requirements are met).

### **SWOT Analysis**

As stated above, before starting on a kaizen event, management needs to be passionately committed to undertaking an assessment of the internal and external conditions of its company to determine how it has tailored its activities to meet the needs of its domestic and global customers. In short, with a good understanding of the mission and internalizing the vision, the brainstorming team needs to analyze the current situation to identify problems using the SWOT analyses. Specifically, using the SWOT framework, the team of each company analyzes the company's 1) strengths and its important capabilities, 2) weaknesses in comparison to others, 3) opportunities - external trends where advantages can be taken, and 4) threats - external movements which may cause a problem or have a negative impact on the firm's business. Using the SWOT "kick-off" strategy, the strengths, weaknesses, opportunities and threats of the three pilot companies are given below to see if the three pilot companies are successfully integrating the kaizen strategy.

Mesfin Industrial Engineering PLC (MIE) is a leading equipment manufacturing company in East Africa and is certified by the International Organization for Standardization (ISO) 9001-2000. As stated in the company's handbook, Mesfin Industrial Engineering PLC was established in 1992 with a starting capital of Birr 7 million (Mesfin Industrial Engineering PLC, June 2013). Currently MIE has close to one thousand employees out of whom 520 are permanent and the remaining are contract and temporary employees. It designs, manufactures and installs equipment and components for energy, mining, manufacturing, construction, and agriculture.

During the last 10 years, MIE has been engaged in the fabrication and supply of trailer related products to serve the transportation sector. About 90% of all types of trailers (dry & fuel trailers & semi-trailers, low beds, etc.) required by the local market have been supplied by MIE. Other fabricated products supplied by MIE include: 1) Penstock and transition elements for hydropower plants, 2) Fuel storage tanks for depots administered by the National Petroleum Reserve Depots Administration, 3) Ethanol tanks and sugarcane trailers for sugar factories, 4) Industrial cranes, 5) Fabricated components for cement factories, steel bridges for a railway line and 6) and other fabricated products for a number of electromechanical projects that have been executed during the last 15 years. However, MIE has not yet reached a level to compete successfully with international companies because of limited engineering and marketing capabilities. Cognizant of its limitations, MIE is planning to develop newer, critical industrial products in order to enter the huge local and international markets (Mesfin Industrial Engineering PLC, June 2013).

Table 1:SWOT Analysis of Mesfin Industrial Engineering (MIE)

STRENGTH	WEAKNESS
<ul style="list-style-type: none"> <li>• Certified by the International Organization for Standardization (ISO9001:2008);</li> <li>• A leading equipment manufacturing company in East Africa;</li> <li>• Has big fabrication facilities equipped with a variety of production machines, handling equipment and Non destructive Testing (NDT) equipment;</li> <li>• It has a welding training center and certifies welders;</li> <li>• Gives good value to customers ;</li> <li>• Huge capital with established and healthy relationships with banks;</li> <li>• High government support and protected market;</li> <li>• Highly marketable products.</li> </ul>	<ul style="list-style-type: none"> <li>• Inappropriateness of existing organizational structure for achieving objectives;</li> <li>• The organization is highly centralized and every decision needs higher management approval;</li> <li>• The time taken to give pro-forma invoice to customers is too long;</li> <li>• The time taken for customer orders to reach manufacturing department is too long;</li> <li>• The purchase lead-time is too long;</li> <li>• The final product delivery time is much longer than the agreed delivery time;</li> <li>• Limited production capability (design, marketing, production, maintenance...)</li> <li>• Limitations on the robust work force development; and</li> <li>• Long distance transportation.</li> </ul>
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> <li>• Huge market potential for engineering and industrial products;</li> <li>• Power generation and transmission lines;</li> <li>• Design, supply and construction of up to 100MW hydro power plant;</li> <li>• Design, supply and construction of 10,000 TCD sugar plants;</li> <li>• Manufacturing of train components and erection of railway lines in the east African market;</li> <li>• Assemble Cars, Buses and Trucks and possess an average of 50% national market share;</li> <li>• Establish a minimum of 50 vendors or subcontracting companies;</li> <li>• Create job opportunities for 10,000 employees directly or indirectly;</li> <li>• Become a USD 200 million annual turnover and USD 30 million annual profit generating engineering company;</li> <li>• Competitors may be slow to adopt new technologies ahead of the company; and</li> <li>• Strong synergy with sister companies.</li> </ul>	<ul style="list-style-type: none"> <li>• Development of technology may change our position;</li> <li>• High degree of competition may wipe out the market position the company has;</li> <li>• High inflation that could affect profits,</li> <li>• There is risk of loss due to continuous change in exchange rate;</li> <li>• Lack of foreign currency for letters of credit;</li> </ul>

2. Almeda Textile Factory PLC. Almeda is a vertically integrated factory consisting of spinning, weaving, knitting, woven processing, knit processing, woven and knit garmenting. It is designed with the capability to produce a variety of products and the flexibility to change to any type of textile product made up of 100% cotton or a poly-cotton blend of any ratio. For garments, woven and knit fabrics of various weights

can be converted to value-added products. The company created job opportunities for more than 5,500 employees. Of these, 79% of the employees are female (Alemda Textile Industry, June 2013).

The Almeda textile factory is in an advantageous position for textile and apparel production because, 1) Ethiopia has suitable agro-climatic conditions for the production of cotton, which supplies the main input of the sector, 2) relatively, Ethiopia has the availability of lower cost labor, and 3) global textile and apparel production and consumption is shifting to less developed countries (LDCs). As shown in **Table 2**, though the Alemda Textile Factory suffers due to the lack of highly trained human capital, very high labor turn-over, poor capacity utilization and capability of machineries, the factory is getting comprehensive government policy backing, and pragmatic support and incentives. The textile and apparel industry could be a catalyst for Ethiopian industrialization and the source of foreign currency because of the high demand for textile products at the international level

Table 2: SWOT Analysis of Alemda Textile Factory

STRENGTH:	WEAKNESS:
Advanced technology	Absence of skilled manpower that able to run effeciently the integrated technology
Vertically integrated factory /producing all products	High cost of production
Trainable work force	limited skill of maintenance team(electrical and mechanical)
ISO 9001:2000,WRAP certified	market incompetitiveness (quality,time,market information and price)
High Production flexibility	poor production planning,control& supervision performance(time,quality(20%-30% b-grade),capacity utilization & productivity)
	weak purchasing and supply management
	limited technical & Managerial skill of managers /engagement of department managers on routine duties
	ineffective training centre(poor staffing & equipment)
	Absence of proper costing system implementation for integrated textile factory
	Poor production
	High inventory cost of products and materials
	High Labor turnover(middle level)
	Under capacity utilization of existing plants
	Absence of motivational schemes for employees
	Absence of QMS implementation
OPPORTUNITIES:	THREATS:
Ever green demand of apparel textiles (high demand in domestic & foreign market)	Many countries textile and garment products follow export oriented industrial development strategy and competition in the world market is fierce;
low labour cost & availability of labour market	Erosion of preferential and differential market access before Ethiopia –Almeda textile builds the textile and garment industry base;
Government support for the sector	growing national copmettion due to migration of foreign investors to Ethiopia
market previlage to US, EU, Regional (Africa) market through AGOA,and COMESA.	Long distance from port andLand locked infrastructure
Fast economic growth of the country & availability	Difficult nature & dependency of the sector on many variables form foreign
High TAX throws on the readymade apparel importers (traders).	Uncertainty in the cost of inputs
The migration of the sector from the developed countries to Africa & Ethiopia in particular.	un necessary deliance on custome duty due to too much government procedures
Price imbalance between the imported(expensive) and inland(cheaper) produced apparels	Absnce of proper attention from government on building peroper human capital to fitt& challenge coming from the textiles(lack of coordination among the training centre & practical challengs of existing textile factory
Price sensitive & huge potential local consumer	

3. Sheba Leather Industry: Leather manufacturing industries in Ethiopia are getting more attention from the Government, because of ever-increasing demand from local and international markets. As the result, the level of investment in this industry is growing from year to year. Currently, there are 22 tanneries in the country. Most of the tanneries are engaged in production of semi-finished products. Over 70% of the products of these tanneries are exported to the international market (Sheba Leather Industry, PLC, June 2013). As shown in Table 3, being new and managed by highly trained young managers the Sheba Leather company has achieved economies of scale, though it suffers from the lack of timely decisions and is relatively weak in customer handling and communication systems.

Table 3, SWOT Analysis of Sheba Leather Industry

<b>STRENGTH</b>	<b>WEAKENS</b>
* Attracting new customers(increasing market share)	* Lack of timely decisions
* Relatively new machinery	* Weak retention and attraction capacity
* Increasing product mix	* Weak in customer relations
* Increased manpower capacity	* Delay in delivery time
* Increased factory capacity (economies of scale)	* Lack of communication facilities
* Young management	* Low qualified leather technicians
* Access to raw material	* Low quality product
<b>OPPORTUNITY</b>	<b>THREAT</b>
* International high demanded for products	* Inadequate supply of raw skin
* Tax free incentives	* Poor product quality
* Member of the largest Corporate company in Northern Ethiopia (i.e., EFFORT).	* Turnover of employees due to factory location
* Location is near to the raw skin market and is the only tannery in the region	* Fluctuations of product price
* Synergy to work with TESCO and Express Transit	* Possibility of drought and parasitic animal diseases
* Close relations with Tigray Agricultural marketing Agency and Bureau of Agriculture	* Far from port
* Good Government policy for development of livestock	* Far from the capital city
	* Unfair competition for raw skin

#### Data Source and Method of Collection

The study used different approaches for data collection and analysis. Direct observation, informal and formal interviews of both top management and lower level operators were used to collect information on the culture of the manufacturing industry, internal and external working environment, the supply chain system, capacity utilization, and the working structure of the enterprises.

The primary data for the study was collected from structured questionnaires administered to the employees of the three pilot subjects. The questionnaires were written in the local languages (i.e., Tigrigna and Amharic) after which they were reviewed by a focus group and distributed in person to managers and randomly selected shop floor workers/operators of the three case companies. Out of 40 employees in each company (a total of 120), about 73 percent (88) of the questionnaires were properly filled by the respondents and returned to the researchers. In addition, the annual, semi-annual, and quarterly reports available in the files of the company were reviewed to strengthen the data analysis.

Finally, digital camera and voice recorders were used to record various kaizen activities that were going on in the three companies.

**Data Analysis:**

The data were analyzed using descriptive statistics, diagrams, and Pareto analysis. The first analyses involve profiling the background of the respondents of the three pilot projects. Table 4, indicates the demographic characteristics of the respondents. Eighty-six percent of the respondents were male and 14 percent were females. Of these, 29%, 41% , 24% and 6% are shop floor workers/operators, shop floor managers, division managers/department heads and top level managers respectively. The educational background of the respondents indicates that a large number of the respondents are highly trained. About 60% are diploma or degree holders (that is, 13-18 years of education), and 32% have achieved their Masters’ Degree. In terms of ownership, three of the companies are privately owned (97%).

Table 4: Background Characteristics of Respondents (%)

Variable	Male	Fe- male		Opera- tor	Head Shop Floor Sup.	Dept. Head	Top Level Manager		5-8 yrs.	9-12 yrs	13-18 yrs	>1 8		Pr	Pu	P + P
Gender	86	14														
Position of Respondents				29	41	24	6									
Educational Qualification									6	2	60	32				
Ownership														97	2	1

As presented above, to achieve continuous quality and productivity improvement, a company has to focus on the commitment and understanding of its employees. Based on this assumption, the study assessed the feelings of the employees during the kaizen implementation process. As shown in **Figure 1**, 59% of the respondents accepted the kaizen philosophy with no confusion, whereas 49 % had accepted the kaizen philosophy with some confusion and hesitation. Based on this observation, we suggest that the companies should have designed their training strategy to create awareness about kaizen’s philosophy.

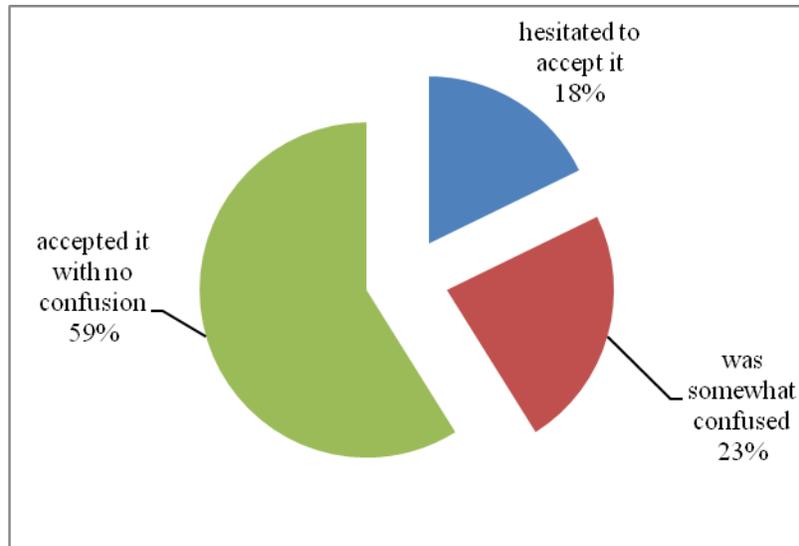


Figure 1: the employees' feelings about kaizen after it was introduced

After the implementation stage, 53% of the respondents felt that they had a very clear understanding of the kaizen strategy. There were 47% who had a moderate understanding, while for 6% of the respondents it was not clear. The implementation of the kaizen management philosophy requires strategic and operational or tactical level strategies for successful achievement. Not enough attention was given to low level workers, the manuals and books needed for training were not adequately prepared and the training was only for a short-period of time, the companies trained their workers either in-house or the training was conducted by other organizations. As shown in **Figure 2**, while seventy nine percent of the respondents indicated that they were trained in-house about the kaizen philosophy, six percent the respondents were externally trained by outside organizations. The remaining 15 percent were left to train themselves because the company was not willing to give them any training related to kaizen management strategy.

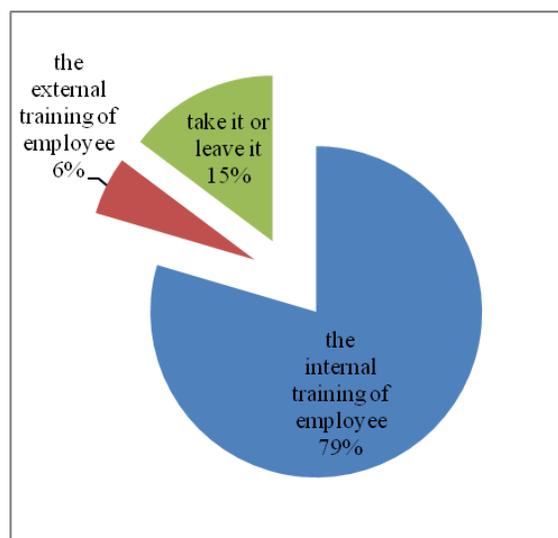


Figure 2: the types of kaizen management strategy

Similarly, though the beginning of kaizen starts by displaying a level of orderliness and clarity of the work area using the following Five 5 Steps (5S): a) sorting or gathering the spare materials needed by the company and selling what is not needed to scrap dealers or putting them into trash; b) setting or straightening and keeping visible the remaining materials or parts to provide a pleasing appearance; c) shining and spreading the clean products; d) standardizing and e) sustaining the new process. As a result of weak awareness training shown by the companies in **Figure 3**, there was also a lag in the implementation of the kaizen management system. That is, there was inconsistency in the usage of ratios of the kaizen tools and techniques during the implementation period. The companies were focused on the initial stage of the 5S (37%), regarded as the initial stage of the kaizen implementation. Instead of continuous practice within the kaizen techniques the respondents felt that they practiced only intermittently.

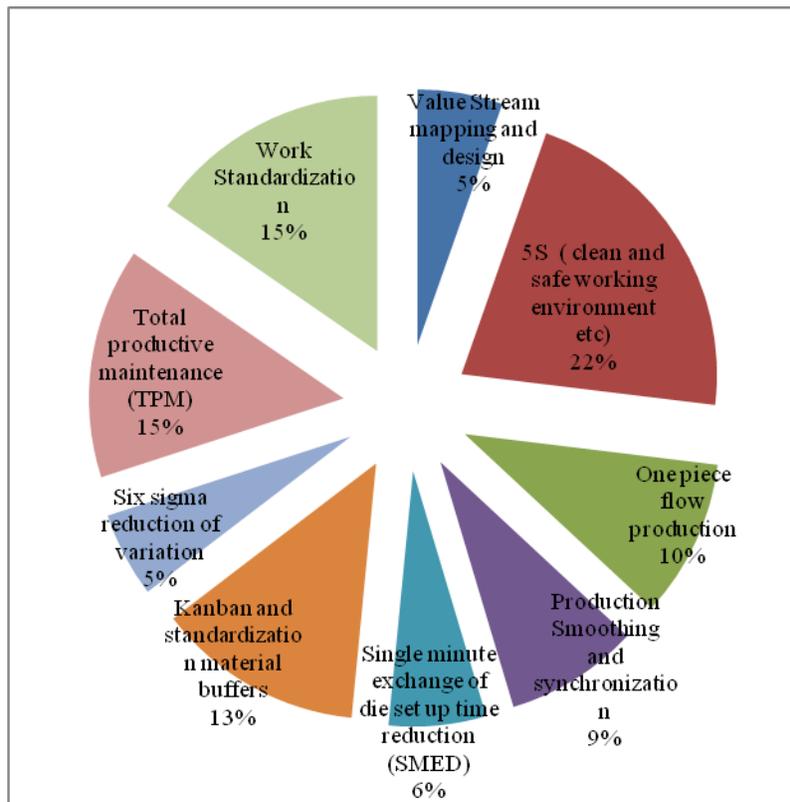


Figure 3: Proportion of employees response to the heavily used tools and techniques of kaizen

Being in the initial stage of the kaizen implementation, only 56 % of the respondents felt that kaizen contributed to some type of quality improvement, customer satisfaction, reduction of cost and lead time. Thirty-two percent of the respondents felt that the companies' involvement in kaizen increased staff involvement and innovation, but they were of the opinion that top management didn't seem to be a regular participant in the team work. In addition, after going through the kaizen training and implementation stage, 12 % of the respondents believed that kaizen would likely contribute to a reduction of the workforce (see Figure 4).

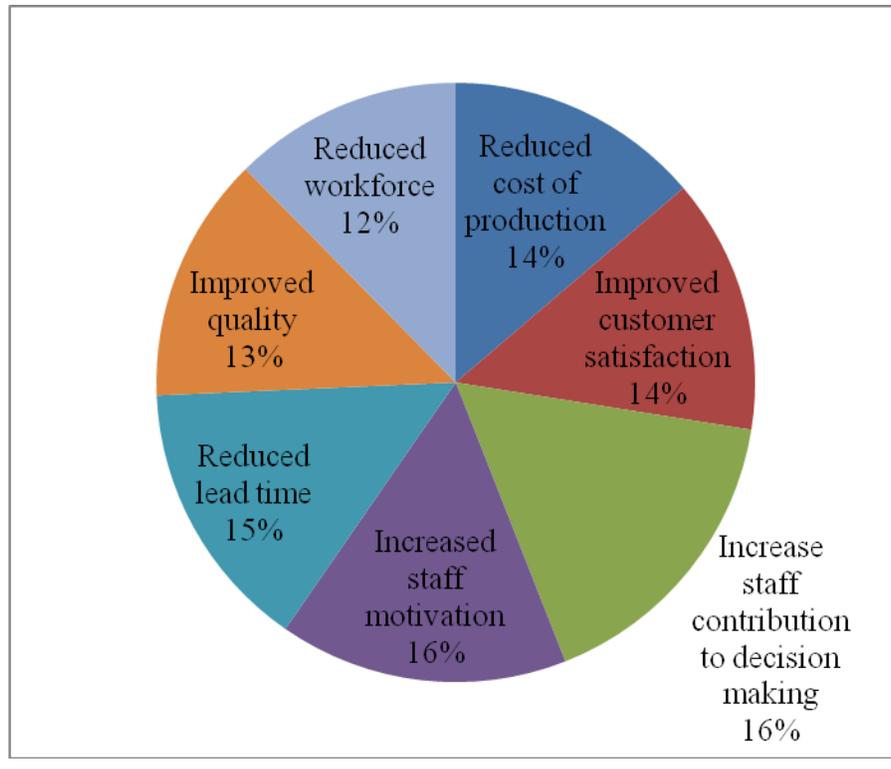


Figure 4: Kaizen's achievements

### Summary and Conclusions

From the ashes of the Second World War, Japan through its culturally embedded innovative management system has succeeded in rebuilding an economy that is emulated by the community of nations (Waheed, et al., 2010). For example, in the 1980s, the manufacturing industry in Japan showed a significant growth through the adoption of the kaizen process of management. The key elements of the Japanese management system and the kaizen strategy were embedded to achieve a never-ending journey towards increasing productivity, and efficiency, and to foster the spirit of quality improvement. In order to stay competitive in an increasingly global marketplace with increasing customer demands, by following Japan's example, a number of Ethiopian-based manufacturing companies are using the kaizen management approach to lower costs of production, minimize waste, improve productivity, boost quality, and achieve sustainability.

Three pilot companies (Mesfin Industrial Engineering, the Almeda Textile Factory, and the Sheba Leather Industry) in Northern Ethiopia that have embarked on the kaizen management strategy were analyzed using the SWOT analysis to understand their strengths and weaknesses, uncover opportunities open to them, and eliminate threats that they were facing. Then, their implementation of the kaizen strategy was assessed to see if the management and workers were passionately committed to undertaking the kaizen management philosophy. The companies were scrutinized to follow step-by-step the kaizen process-oriented methodologies. Were they physically implementing the kaizen strategies to re-engineer

themselves and improve the culture and leadership process? Was their level of productivity meeting the needs of domestic and global customers?

Based on interviews, observations, and the responses given to the questionnaires administered to a sample of the employees of the three pilot companies, it was found that the respondents didn't have the full capacity to accept the kaizen management system. If they had for example, by forming a kaizen cross functional teamwork approach, workers could have been empowered to challenge the status quo, gathering the most conspicuous internal and external factors that could be become part of the work ethics necessary for continuous improvement of productivity. Instead, it was found that some of the executive managers of the three pilot companies were themselves not committed to the kaizen teamwork because they didn't usually participate nor did they allow the shop floor workers or operators to participate in team group work.

In addition, the tools and techniques used by the pilot companies did not create lean enterprises that could have minimized waste. This might be because the internal and external training given to the employees was designed for very short periods of time and some of the managers and employees of the pilot companies were not yet fully committed to the kaizen management philosophy. Despite these weaknesses, however, it can be appreciated that though only partially committed to the kaizen management philosophy, the three pilot companies have marginally reduced the costs of production, improved quality, reduced lead time, improved customer's satisfaction and have tailored themselves to achieving action plans for the three kaizen steps (out of 5S), those of housecleaning strategies: sorting, setting, and shining but have yet to standardize and ultimately clean their inputs.

Thus the policy option that could emerge from this study is that before launching the kaizen strategy for improvement, firms need to take the time to review their performance and determine their strengths and weaknesses. In short, the three pilot companies in Northern Ethiopia need to assess carefully whether or not: 1) there is a synergistic relationship between the Japanese kaizen quality initiatives and the business environment of the firms, 2) they can modify and appropriately design the kaizen management system to suit the diversity of practical circumstances and conditions of the pilot firms, and adapt it to fit the companies' working cultures, 3) the workers of the firms are disciplined and motivated enough to go beyond formal job requirements and effectively participate in process improvement, 4) the firms' employees are ready to utilize the kaizen process and correct problems at the source, and 5) the companies are ready to improve their products and services on a continuing basis to meet customer's demand.

In addition to hiring experienced executives and furnishing incentives to employees, the employees of the enterprises need to be given intensive training so that they become committed to the kaizen standards that will enable their companies to optimize operations, save cost, improve profits, and enhance customer satisfaction (See Desta, 2012).

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