ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

The Mediation Effect of Teamwork on the Relationship between Management Commitment and Economic Outcome of Kaizen: The Case of Manufacturing Industry of Ethiopia

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A Thesis Submitted to the College of Business and Economics of Addis Ababa University in Partial Fulfillment for the Degree of Masters of Science in Economics (Development Economic)

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DECLARATION

I declare that this thesis titled "**The Mediation Effect of Teamwork on the Relationship between Management Commitment and Economic Outcome of Kaizen: The Case of Manufacturing Industry of Ethiopia** "is my original work. This thesis has not been presented for any other university and is not concurrently submitted in the candidature of any other degree. All sources of materials used for the thesis have been duly acknowledged.

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This is to certify that the thesis prepared by Kirubel Tadesse, titled "**The Mediation Effect of Teamwork on the Relationship between Management Commitment and Economic Outcome of Kaizen: The Case of Manufacturing Industry of Ethiopia"**, and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Economics (Development Economic) complies with the regulations of the University and meets the accepted standards concerning originality and quality.

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Kirubel Tadesse

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LIST of ACRONOMS and ABBREVIATIONS

AMOS = Analysis of Moment Structures

ANOVA = Analysis of variance

AVE = Average Variance Extracted

CFI = Comparative Fit Index

CMB = Common Method Bias

CFA = Confirmatory Factor Analysis

EFA = Exploratory Factor Analysis

QCC = Quality Control Circle

JICA = Japan International Cooperation Agency

JIT = Just-In-Time

MSV = Maximum Shared Variance

PDCA = Plan, Do, Check and Act

RMSEA = Roots-Mean-Square Error of Approximation

SEM = Structural Equation Modeling

SPSS = Statistical Package for the Social Sciences

5S = Sort, Set in order, Shine, Standardize and Sustain

TPM = Total Preventive Maintenance

TPS = Toyota Production System

TQM = Total Quality Management

ABSTRACT

There has been increased interest in the implementation of the Kaizen management philosophy for industrial development in Ethiopia. Accordingly, this study aimed to investigate the mediation effect of employee participation in teamwork in the relationship between management commitment and economic outcome of Kaizen in the manufacturing industry of Ethiopia. To realize these objective primary data was collected via questionnaire from 202 respondents in 26 manufacturing industries from textile, agro-processing, chemical and metal, and engineering sub-sectors. To analyze the data ANOVA, correlation, and Structural Equation Modeling (SEM) were employed using SPSS and AMOS software, version 23, to perform the test of difference, association, and cause and effect relationship respectively.

The finding of the study indicated that the mean value of employee participation in teamwork, management commitment, and economic outcome of Kaizen implementation were 3.42, 2.45, and 2.62, respectively. The study finding also indicated that the mean economic outcome of Kaizen implementation, management commitment, and employee participation in teamwork had statistically significant differences at a 0.1% level of significance on the four sub-sectors. The SEM result indicated that management commitment had a direct negative effect on the economic outcome of Kaizen implementation and had a direct positive effect on employee participation in teamwork, which was statistically significant at 0.1% level of significance. As well, employee participation in teamwork had a direct positive effect on the economic outcome of Kaizen implementation, which was statistically significant at 0.1% level of significance. In addition, management commitment had a statistically significant positive indirect effect on the economic outcome of Kaizen when the mediator variable, employee participation in teamwork introduced. Overall, the findings from this study implies that management commitment for Kaizen implementation only brings economic outcomes by promoting employee participation in teamwork. Therefore, manufacturing industries should enhance their management commitment focusing on promoting employee participation in teamwork to realize the economic outcome of Kaizen.

***Keywords**: Management commitment, Employee participation in teamwork, Economic outcome of Kaizen implementation*

CHAPTER ONE: INTRODUCTION

1.1.Background

In the competitive and dynamic business environment, organizations successes is becoming highly dependent on the degree of flexibility to the external environment and the extent effective and efficient in their internal operation (Farooqui & Ahmed, 2009). In such a competing market, every organization must evolve itself and adopt continuous improvement culture (Ohno, 1988).

Among other instruments such as business process reengineering, benchmarking, and the like, Kaizen has been recognized as a relevant tool and methodology and expected to serve to improve the implementing capacity of public and private agencies and companies, and enterprises in Ethiopia (JICA, 2011). Kaizen is one of these continuous improvement management tools that is widely used in the Ethiopian manufacturing industry. Currently, the tool is implemented in manufacturing companies in Ethiopia as a major tool to improve productivity and quality (EKI, 2011).

According to Imai (1986), Kaizen is defined as continuous improvement involving employees at all levels of an organization. As operationally defined in the three characteristics of the Kaizen system generally require that it be; continuous, nature that is a never-ending journey for quality and efficiency; usually incremental; participative, requiring workforce involvement and intelligence (Brunet & New, 2003).

Kaizen is considered a culture of sustained improvement targeting the elimination of waste in all systems and processes of an organization (Bhuiyan & Baghel, 2005). Shimada, (2013) stated that Kaizen provides a healthy workplace, satisfied customers, and increased financial returns for the organization. According to Fryer, Douglas & Alex, (2007) Kaizen is an approach that everybody in the organization works together for improving processes and reducing compliant to improve overall performance for the customer. It also indicated that it provides improved performance in quality, reduction of waste, reduced costs, and improved customer satisfaction (Desta, 2014).

According to Malloch (1997), Kaizen can be considered as having a spirit of improvement established on a spirit of cooperation among employees (Imai, 1997). Bessant, 2003), suggest the importance of teams as a fundamental design in this approach and is based on utilizing the ideas

of all people through total participation in Quality Control circle (Bessant, Caffyn, & Gallagher, 2001). Ishikawa, (1968), define Quality Control Circle (QCC) as a small group consisting of people from the same workplace that operate quality control activities autonomously. A circle is a volunteer group composed of members who meet to talk about workplace and service improvements and make presentations to their management with their ideas (Hosotani, 2015). The basic principles behind the quality control circle are to contribute to the improvement and development of the organization, to exercise human capability fully and explore hidden capabilities, to respect humanity and build a worthwhile to live in a happy positive environment (Ishikawa, 1968).

The success of any Kaizen practice relies significantly on the maturity level of senior management leadership and commitment (Rohilla & Chaudhary, 2016; Mekonen, 2018). Indeed, management practices such as promoting a vision focused on improving quality and setting ambitious goals are fundamental to effectively implement Kaizen (Farooqui & Ahmed, 2009; Rother, 2010). Also, for Kaizen implementation outcomes to happen management must be committed to providing the required resources, establish systems, procedures, and policies to align activities with strategic objectives (Formento, Chiodi, Cusolito, Altube, & Gatti, 2013).

The top management should demonstrate the commitment to the Quality circle activities on par with other organizational goals by integrating all the members of the Quality circle (Rohilla & Chaudhary, 2016) since team-based group problem solving is an important part of quality circle activity (Ishikawa, 1968). Besides, management must exert effort towards bringing a culture of continuous improvement in an organization through long-term effort (Hagos, 2017) and this is critical to sustaining Kaizen (Farooqui & Ahmed, 2009).

Organizations that implemented Kaizen are expected to continuously improve their performance both in terms of non-financial and financial terms. Studies done in the area indicated that organization in Ethiopia that implemented Kaizen have got significant economic benefit specifically: an 86% increase in labor productivity, 135% increment capital productivity, and a 59% increase in sales revenues (Abebe & Zerfu, 2014 as cited in Lemma, 2018). Another study conducted by Shimada (2013) also depicted that 28 private manufacturing firms that implemented Kaizen received an average economic benefit of approximately $30,500 per company by reducing overproduction, reducing the number of materials used, the efficient use of capital, and reductions

in operating times. Starting from 2011-2018 Kaizen has contributed to a gain of $ 105 million in Ethiopia (Mekonen, 2018).

However, research conducted at a company level indicated that; the contribution of Kaizen for the economic benefit in the implementing organizations ranges from significant (Shah & Ward, 2003; Narasimhan, Swink and Kim, 2006; Nderi, 2012; Mano et al., 2012; Desta, 2014; Shimada and Sonobe, 2018; Lemma, 2018; Hosono et al., 2020) to no contribution (Jayaram,Vickery, & Droge, 2008) and even in some cases negative contribution (Belekoukias & Kumar, 2014).

Hence, this study was conducted to further investigating the relationship among the variables management commitment, employee participation in teamwork and economic outcome of Kaizen in the manufacturing industries of Ethiopia.

1.2. Problem Statement

Kaizen is a popular continuous improvement tool implemented by the majority of the manufacturing industries in Ethiopia, however its economic outcome, and the critical factors that affect this economic outcome were not well studied yet. The existing few studies which try to measure Kaizen's outcome in terms of cost reduction, product quality, and performance improvement, were done based on data from a single company conducted by Desta, (2014); Hailu et al., (2017), and their findings cannot be generalized. Due to this reason, no enough evidence shows the economic outcome of Kaizen implementation and the impacting critical factors in the manufacturing companies.

Besides, there are inconsistencies among the findings of the existing studies concerning the effect of the critical success factors i.e. management commitment and employees' team participation, which are to be considered the bases of Kaizen philosophy on the economic outcome of Kaizen (Imai, 1986; Fukui, 2003; Mekonen, 2018). The studies identified managerial commitment as a key for successful implementation of Kaizen (Farooqui & Ahmed, 2009; Rother, 2009; Tapias et al., 2010; Amanuel, T. 2014; Anil & Satish, 2016; Netland. 2016; Abate and Mengesha, 2016; Hailu et al., 2017; Mekonen, 2018). Also, studies identified employees participation in teamwork as a key for successful implementation of Kaizen (O'hEocha, 2000; Withanachchi et al., 2007; Farooqui & Ahmed, 2009; Formento et al.,2013; Oropesa-vento et al., 2015; Abate Y. and Mengesha T., 2016; Rohilla & Chaudhary, 2016 and Hagos, 2017)

Concerning the relationship between employees' team participation and economic outcome of Kaizen; studies conducted by Paipa-Galeano et al., (2011); Browning and Heath, (2009) indicated the positive and significant effect of employee participation in teamwork on the economic outcome of Kaizen particularly on cost reduction. Other studies also confirmed that employee participation in teamwork has a significant positive effect on economic outcome particularly on quality improvement and operational efficiency (Pun et al., 2001; Anil & Satish, 2016; Rewers, Trojanowska, Chabowski, & Zywicki, 2016). On the contrary, a study conducted by Hailu et al., (2017) found employee team participation had no significant effect on the economic outcome, particularly on cost reduction. Likewise, a study conducted by Vento et al., (2016) identified the existence of the mediation effect of teamwork in the relationship between management commitment and economic outcome of Kaizen implementation.

With regard to the relationship between management commitment and economic outcome of Kaizen; studies conducted by García et al., (2014); Vento et al., (2015; 2016) found a positive and significant effect of management commitment on the economic outcome of Kaizen implementation and has a positive significant effect on quality performance by Babakus et al., (2003), Arumugam et al., (2008) that is a reflector of performance index Cronin and Taylor, (1992) and positive and significant effects on cost reduction (Hailu et al., 2017). Likewise, evidence found on management commitment courses results in the improvement of organizational performance towards the expected outcomes (Flynn et al., 1994; Bortolotti et al., 2015).

Moreover, studies conducted on the implementation of Kaizen have found mixed results. Thus, Kaizen practices have a positive impact on economic outcome study conducted by (Mano et al., 2012; Lemma, 2018; Hosono et al., 2020) and on overall organization performance by Fullerton et al., (2003); Marin-Garcia et al., (2008); Nderi, (2012); Shimada and Sonobe, (2018) and on eliminating waste by Shah and Ward, (2003); Narasimhan et al., (2006); Desta, (2014). Whereas, other studies found no impact Jayaram et al., (2008) and a lesser or even negative impact on operational performance (Belekoukias et al., 2014).

Therefore, this study was conducted to bridge identified knowledge and methodological gaps of the existing literature by further investigating the relationship between management commitment and economic outcome of Kaizen mediated by the variable, employee participation in teamwork

in Ethiopian manufacturing industry. To address the above problem statement, the following research questions were set.

1.3.Research Question

The study addressed the following research questions;

- What is the current level of Kaizen implementation in the manufacturing industry?
- To what extent management commitment affects the economic outcome of Kaizen?
- To what extent management commitment affects the employee participation in teamwork?
- To what level employee participation in teamwork affects the economic outcome of Kaizen?
- Does employee participation in teamwork mediate the relationship between management commitment and the economic outcome of Kaizen implementation?

1.4.The Objective of the Study

1.4.1. The General Objective of the Study

The general objective of the study was to investigate the mediation effect of employee participation in teamwork in the relationship between management commitment and economic outcome of Kaizen in the manufacturing industry of Ethiopia.

1.4.2. The Specific Objective of the Study

The study addressed the following specific objectives;

- To assess the level of Kaizen implementation in the manufacturing industry in terms of its economic outcome, management commitment, and employee participation in the team.
- To analyze the extent to which management commitment affects the economic outcome of Kaizen.
- To analyze the extent to which management commitment affects the employee participation in teamwork.
- To analyze the extent employees' participation in teamwork affects the economic outcome of Kaizen.
- To investigate the mediation effect of employee participation in teamwork in the relationship between management commitment and economic outcome of Kaizen implementation.

1.5.Scope and Limitation of the Study

The focus of the study were on 26 manufacturing companies of Ethiopia in which Kaizen was implemented including chemical, agro-processing, metal and engineering and textile sub-sectors. Methodologically, the study utilized the survey method and a quantitative research approach to investigate the relationships between variables. Though there are different factors, only the two factors which are management commitment and employee working in the teamwork were considered as critical success factors for the economic outcome of Kaizen implementation to investigate the relationship.

1.6.Significance of the Study

The study outcome was an important input to manufacturing companies to make the necessary adjustments and improvements in the implementation of Kaizen. More specifically, the findings will be helpful to managers in evaluating and developing the most appropriate course of action for fruitful implementation and sustainment of kaizen. The findings of the study will provide insight for other companies as learning and as a good reference to implement Kaizen. Additionally, the study may help other researchers who want to study further on the related topic.

1.7.Organization of the Study

The rest of the study structured as follows. Chapter 2 deals with the reviews the theoretical and empirical literature. Chapter 3 contends with the research methodology and chapter 4 deals with results and discussion of the study. Finally, chapter 5 presents the conclusion and recommendation of the study.

CHAPTER TWO: LITERATURE REVIEW

2.1. The Concept of Kaizen

The term "Kaizen" is a derivative of two Japanese ideograms, "kai," meaning change, and "zen," meaning good or for the better (JICA, 2011). The popular meaning is continual, incremental improvement of all aspects of a company (Imai, 1986). Moreover, according to Imai, it means continuing improvement in personal life, home life, social life, and working life. When applied to the workplace Kaizen means continuing improvement involving everyone managers and workers alike. Kaizen is the Japanese word for improvement or "change for the better" carrying the connotation in the industry of all the activities which take place in the Japanese workplace to enhance the operations and environment. Also, defend as a culture of sustained improvement aimed at eliminating waste in all organizational systems and processes, and involving all organizational participants (Singh & Singh, 2012).

The phrase "change for the better" implies any change that results in improvement which could be quality or other factors that customers or an organization judges to be of value such as innovation, ease of use, on-time delivery, durability, operations flexibility, customer satisfaction and low cost (Zimmerman, 1991).

Kaizen has two definitions, the broader and the narrower definition. The broader definition of Kaizen encompasses various production and quality management tools under the umbrella of the Kaizen philosophy (Imai, 1986). On the other hand, the narrower definition is an improvement of the workplace ("Gemba") derived from proposals from the workers based on quality control circle and a suggestion system; (Fukui, et al., 2003; Liker, 2004). This study adopted a broader definition of Kaizen.

It is one of the best initiatives which are related to the continuous improvement of operators' skills and productivity through reducing losses, waste elimination, improving efficiency, improving the process, and improving morale (Rewers, P., Trojanowska, J., Chabowski, P., & Żywicki, 2016). It not only ensures that manufacturing processes become leaner and fitter but eliminates waste where value can be added.

The foundation elements of Kaizen as given by Imai, (1986) are summarized as practices of employees participation in teamwork., self-discipline, improved morale, suggestions for

improvement, elimination of waste (Muda) and inefficiency, standardization of the processes and the Kaizen 5S framework for good housekeeping.

Karkoszka, T., & Honorowicz, J. (2009), summarized the principles of Kaizen in seven points, the first principle consider people as the most important asset of the organization that teamwork provides results and gives everyone a feeling of accomplishment. The second principle, everyone must be open to change and improvements. Ideas from workers, management, suppliers, and customers can lead to new, better, and easier ways of doing things. The third principle, gradual changes are easier to accept than complete overhauls and employees are more likely to accept gradual change. Small changes will demonstrate how a tiny improvement can provide real results. The forth principle, old ways of doing things may be comfortable, but not very efficient. Everyone in a company has to accept change is good and necessary for company survival. The fifth principle, making excuses is unacceptable if it is we have always done it this way and don't see why we have to change now. The six principle, if the job is right the first time, waste will be reduced. Waste accounts for as much as 35% or higher of the manufactured product. By eliminating waste, profits increase. The final principle, correct process errors immediately or they become larger. Equipment breakdowns and failures are a result of letting a minor problem become a major headache.

Imai (1986) noted that the concept of Kaizen is "so deeply ingrained in the minds of both managers and workers that they often do not even realize that they are thinking Kaizen". He further presents Kaizen as a pervasive global program that subsumes Total Quality Management, Toyota production system, and Total Productive Maintenance systems.

2.2. Kaizen Tools and Techniques

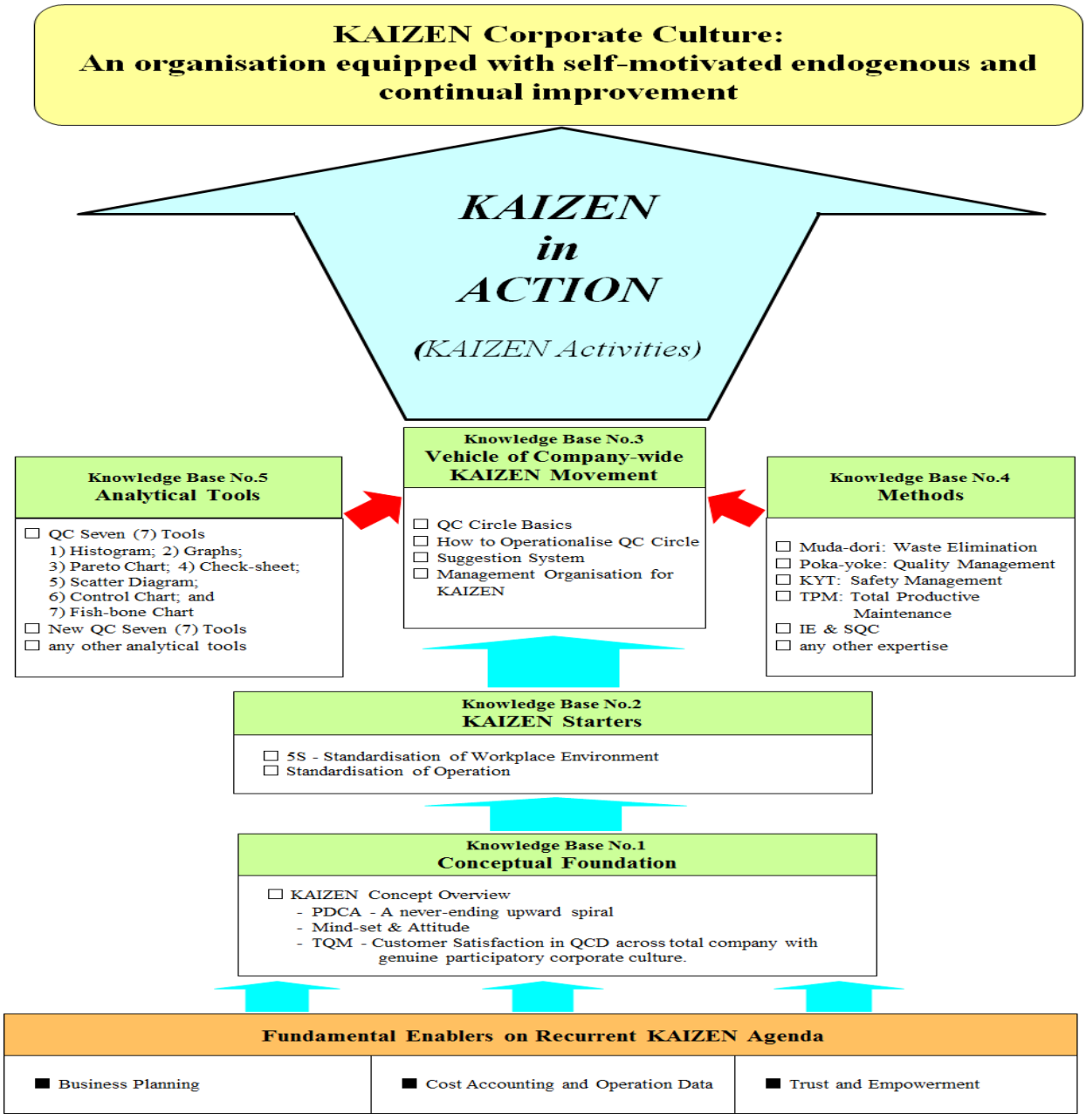
The Kaizen umbrella comprises the collection of Japanese improvement tools. That includes; total quality control, total productive maintenance, robotics, quality circle circles, customer orientation suggestion systems, automation, discipline at the workplace, Kanban, Just-In-Time, Zero Defects, new product development, small group activities, productivity improvement, statistical quality control, and cooperative labor/management relations (Imai, 1986).

There are number of related and often overlapping techniques/practices that belong to the Kaizen methodology. They include Total Preventive Maintenance (TPM), Just-In-Time (JIT) System, Quality Control Circles (QCC), Total Quality Management (TQM), Toyota Production System

(TPS), as they are considered the major techniques of Kaizen (Imai, 1997; Fukui, 2003; Liker, 2004; G.Mekonen, 2018).

The figure below summarizing different tools and techniques prepared by JICA study team as a roadmap of implementation of Kaizen in Ethiopia and divide above mentioned tools and techniques different in two 5 knowledge base (JICA, 2011).

Figure 2. 1: KAIZEN Tree: A System of Knowledge in Action (JICA, 2011)



The following can be considered as the major Kaizen tools and they are defined based on (Imai, 1997).

Total Quality Management has been developed as a strategy to aid management in becoming more competitive and profitable by helping it to improve in all aspects of the business. Management's role in TQM is to set up a plan to check the process against the result to improve the process, not to criticize the process based on the result. In Japan, TQM encompasses such activities as policy deployment, building quality assurance systems, standardization, training and education, cost management, and quality circles. Top management commitment and teamwork considered as the critical success factors for the implementation of total quality management(Matsoso & Benedict, 2015; Alefari et al., 2017).

Ohno (1982), who is a pioneer of JIT, defined JIT as having the right part at the right time and amount. It is one of the pillar in the Toyota production system that aims at eliminating non-value adding activities and achieving a lean production system flexible enough to accommodate the ever-growing need of customers. This production system is supported by such concepts as takt time (the time it takes to produce one unit) versus cycle time, one-piece flow, pull production, Jidohka (automation), U-Shaped cells, and setup reduction. To realize the ideal just-in-time production system, a series of Kaizen activities should carried out continuously to eliminate non-value-adding work in Gemba. JIT dramatically reduces cost, delivers the product in time, and greatly enhances company profits (Rivera-Mojica & Rivera-Mojica, 2014). According to this study, management commitment is identified as a critical success for Just in time practice.

Total productive Maintenance is a philosophy of continuous improvement and teamwork that focuses on how to maintain an equipment's basic condition to prolong its life span. It is a long-term program for the fundamental improvement of maintenance functions, which involves shop floor operators, maintenance personnel, management, and the entire organization. The main objectives of TPM implementation are to improve productivity, increase administration efficiency and eliminate the six big production losses which are breakdowns, setup and adjustment time, idling and minor stoppages, reduced speed, process defects, and yield losses (Saleem et al., 2012). The success of total productive maintenance is highly determined by the commitment of management (Ng et al., 2011; Torres, 2014)

Karkoszka and Honorowicz (2009), wrote that the bases of Kaizen are constituted by the 5S concept, defined by Japanese specialists as a set of good customs and manners. The first practice is Sort, means to remove all items from the workplace that are not needed for current use and keep what is needed. Following sort, arranging needed items so that they are easy to use and labeling them so that they are easy to find out and put away considers as set in order. Shine is the third practice that means making things clean and polished; no trash or dirt in the workplace. The forth practice is standardization, is the method that can be used to maintain the first three activities. Is about creating rule and standards for the sorting, set in order, and sinning activity to make them daily activity and discipline. The last one is Sustain, is about making a habit of properly maintaining the correct procedure. This is step aim to create a company culture for continuous improvement.

On the research conducted by Kazmierski, (2015) top management commitment and employee participation in teamwork are identified as critical success factors for successful implementation and sustaining 5s activity.

Deming cycle, is cycle that enables groups to improve their capacity and creates an opportunity to learn from their mistakes. The Deming cycle refers to the PDCA Cycle (Plan Do Check Act). This indicates planning for improvement, then do what has been planned, check if the planned target is achieved or not, at the final stage act/prepare a standard for the operation and horizontal learning. The model can be used for the ongoing improvement of almost anything and it contains the following four continuous steps: Plan, Do, Study, and Act (JICA, 2011).

A small group of an employee (3 to 12) who are performing in the same line of work and conduct meeting in regular base on the working hours called Quality Control Circle (QCC). Also, has leader usually their supervisor, and qualified to identify, prioritize, analyze and continuously strive to solve work-related problems by using statistical quality control techniques, a forward countermeasure to management, and where possible, implementing the solutions themselves (Fukui, 2003).

The basic principle of quality circle activity is to fully reveal human capability and eventually draw out the infinite possibility. The concept is fundamentally based on the respect of humanity

and build a pleasant, vital, and satisfying workplace (Ishikawa, 1968). Additionally, the quality control circle is considered as the willingly put effort to control and improve the quality of their work, product, and service by using members' wisdom, intelligence, and experience (Rohilla & Chaudhary, 2016). A quality control circle sometimes considers as a formal institutionalized mechanism applied to bring productive and participative problem-solving interaction among the employee's organization (Irhamna & Nurcahyo, 2018).

Quality circle activity aims to develop members' capabilities, and achieve self-actualization, make the workplace more pleasant, vital, and satisfying, improve customer satisfaction, and contribute to society(JUSE, 2008). Additionally, Gaikwad & Gaikwad, (2009) the aims of Quality Circle activity are motivate the employees, improve communication in the organization, build a happy and meaningful environment and develop a positive attitude and a sense of involvement in the decision-making processes. As a result, will reduce cost, enhance the quality, productivity, and customer satisfaction.

Ethiopian Kaizen institute adopts the implementation road map proposed by JICA figure 2.1 Kaizen Tree: A System of Knowledge in Action (JICA, 2011). Based on this road map, the extent of implementation to this date limited to the application of mostly to the basic tools and advanced tools called second-level Kaizen implementation. These helps the manufacturing companies to improve its day to day activities through the improvement of the workplace (5S), establishment quality control circle (QCC), elimination of waste (MUDA) and application of autonomous maintenance (Hagos, 2017).

2.3. Deming's Theory of Management

The purpose of Deming's theory of management is to transform is that improve and innovate the total system in the organization (including employees, customers, suppliers, stockholders, the community, and competitors) over the long term to allow all people to experience happiness in their work and self-importance in the outcome and optimize the total system in the organization. Improve and innovate the condition of society. Society includes local, regional, national, and international systems, the environment, public health, and the economic and social well-being of communities and countries (Gitlow & Gitlow, 2016).

According to Gitlow and Gitlow (2016), Deming developed a theory of management called this theory a system of profound knowledge, that helps individuals learn through the acquisition of process knowledge gained from experience coordinated by theory. The system of profound knowledge comprises four parts, appreciation of a system, theory of variation, theory of knowledge, and psychology, components are interdependent and do not stand alone.

2.3.1. Appreciation of a System.

A system is a collection of components that interact and have a common purpose. It is the job of top management to optimize the entire system toward its purpose. It is the responsibility of the management of the components of the system to promote the purpose of the entire system through team development so that teams are required to optimize their sub component (Gitlow & Gitlow, 2016).

2.3.2. Theory of Variation.

Variation is inherent in all processes. There are two causes the first one is special causes of variation that are external to the system which is the responsibility of employee participation in teamwork to determine and resolve special causes of variation. The second one is system causes of variation are due to the inherent design and structure of the system and is the duty of management to isolate and reduce system causes of variation.

There are two types of mistakes that can be made in the management of a system. The first mistake is treating a system cause of variation as a special cause of variation. This is by far the more common of the two mistakes; it is called tampering and will invariably increase the variability of the output of a system. The second mistake is treating a special cause of variation as a system cause of variation.

2.3.3. Theory of Knowledge.

According to Deming, knowledge is indicated by the ability to predict future events at the risk of being wrong and the ability to explain past events without fail. Knowledge is developed by stating a theory, using the theory to predict a future outcome, comparing the observed outcome with the predicted outcome, and supporting, revising, or even abandoning the theory. There is no true value of anything. Communication is possible when people share operational definitions. Experience is

of no value without the aid of theory. The theory allows people to understand and interpret experience, and it allows people to ask questions and to learn.

2.3.4. Psychology

Psychology helps one to understand employees, the interactions between people employees, and the interactions between employees and the system of which they are part. Management must understand the differences among intrinsic motivation, extrinsic motivation, and over justification. All people require different amounts of intrinsic and extrinsic motivation. It is the job of a manager to learn the proper mix of the two types of motivation for each of his or her people.

Therefore, management assists to create the total involvement system in the organization that results in a win-win environment to optimization the system and the performance of the organization (Gitlow & Gitlow, 2016).

2.4. Theory of participative management

Participative management states the association between the organization and its employees (Branch, 2002). Participative management, defined as joint decision-making by management and employees in the organization (Michael, 2008).

According to Branch (2002), participative management is considered as the involvement of employees to find the solution to complex and knowledge-driven work-related problems. This is considered as Japanese management and business philosophy in the 1970s. organization in Japanese that followed this philosophy result in improving product quality, productivity by adopting teamwork, team consciousness, quality circles, and led to greater economic outcome (Beer, 1990). Many studies have yielded a positive, correlation between participation and matters such as motivation, satisfaction, and task performance (Paul L. Koopman & Andre F.M. Wierdsma, 1998, Gitlow & Gitlow, 2016).

The cognitive model of participative proposes that participation in the decision-making process is a practical strategy, predicts a relationship between employee participation and productivity (Miller & Monge, 2016). The success of Kaizen is depending on the leadership styles (Schiffer, 2003).

2.5. The Link between Kaizen and Industrial Development

Empirical microeconomic studies come up with the existence of productivity differences among firms. According to Page (2020) firms differ in capability that the knowledge and working practices used by both managers and workers of firms in the course of the production. Sutton (2012), considers productivity and quality as two dimensions of capability. Productivity denotes a "cost shifter" that adjustment the way of production, minimization of wastage, and better supervision the workforce that decreases unit production costs. Quality denotes as “demand shifter” anything that moves the demand schedule outward at every price, including characteristics more than the technical excellence of the product.

Bruhn et al. (2010)**,** the managerial capital gap is quite significant in many developing countries, including Ethiopia. The study argues that managerial capital can affect the production function of firms in two ways. The first way is using better managerial inputs can improve the marginal productivity inputs like labor, physical capital, etc. and the other way is through motivating and retaining workers better that they improve machinery efficiency, maintaining quality and reducing defects., or may identify better marketing or pricing strategies when selling their services. The study also strongly argues that managerial capital is missing in developing countries and propose including managerial capital into the endogenous growth theory by making it part of the intercept shifter, A, in the production function: $y= A*k^{\alpha}*l^{(1-\alpha)}$.

Policy provision for productivity enhancement can be divided into three different levels: policies that support structural change, policies that support improve productivity within individual sectors, and policies that aim for productivity improvements at the firm level (Lemma, 2018). In addition, the firm-level productivity improvement can be achieved by implementing the standard Kaizen set of tools and techniques, which has a role in economic transformation.

Undoubtedly good management is a prerequisite for substantial productivity improvements and the major engine of economic growth through cultivating management capabilities(Otsuka et al., 2018). Kaizen is a management philosophy that helps organizations to improve product and service quality, decrease costs, and on-time delivery by using the continuous collaborative effort of managers and their workers (Imai, 2012). The philosophy helps to make employees work

efficiently and to continuously improve quality, increase productivity, reduce cost, and deliver on time (Otsuka et al., 2018).

Otsuka (2018) forward that Kaizen is an excellent entry point, the most effective first step toward industrial development that is badly needed for sustainable development, particularly when foreign direct investment (FDI) is made. According to Hidalgo et al. (2007) cited in Otsuka (2018), industrial development requires continuous process improvement, quality of product improvement, and production processes improvement at the beginning, rather than the sudden emergence of new industries. Which is aligning with the Kaizen development strategy of Ethiopia (Mekonen, 2018). A major source of industrial development, particularly in developing countries is technological progress, which in turn depends on learning useful knowledge from abroad. The acquisition of such missing knowledge will promote a structural change in Africa from a lower productivity sector to a higher productivity sector (Page, 2015).

According to Mekonen (2018), reported 48 Kaizen implemented companies on the period 2012–2013 and 2013–2014 resulted economic outcomes. From improvements in labor productivity ranging from 1.29% to 60%; improvements in capacity machinery utilization from 25% to 75%; reductions in defects from 57.1% to 5.0%; reductions in costs going from 6% to 33%; and gain additional workspace from 52.6 to 9053 square meters.

2.6. Factors Affecting the Successful Implementation of Kaizen

Different researchers identify different critical factors affecting the implementation outcome of Kaizen in different situations. The following table 2.1 summarize the findings of critical factors of successful Kaizen implementation

Table 2.1: Critical Factors of Successful Kaizen Implementation

NO	**Critical factors of Kaizen Implementation**	
1	Management commitment	O'hEocha, (2000); Withanachchi et al., (2007); Farooqui & Ahmed, (2009); Saleem et al., (2012); Formento et al., (2013); García et al., (2013;2014); Oropesa-vento et al., (2015); Anil & Satish, (2016); Abate Y. and Mengesha T., (2016);Rohilla & Chaudhary, (2016); Hagos, (2017); Alefari et al.,

		(2017);Hailu et al., (2017); Mekonen, (2018) van Assen, (2018); and Janjić et al., (2019)
2	Employees participation in teamwork	O'hEocha, (2000); Withanachchi et al., (2007); Farooqui & Ahmed, (2009); Formento et al., (2013); Oropesa-vento et al., (2015); Abate Y. and Mengesha T., (2016); Rohilla & Chaudhary, (2016) and Hagos, (2017)
3	Customer focus	Farooqui & Ahmed, (2009); Saleem et al., (2012); García et al., (2013); Oropesa-vento et al.,(2015); and Anil & Satish, (2016)
4	Employees empowerment	Anil & Satish, (2016) and Rohilla & Chaudhary, (2016)
5	Continual evaluation	Withanachchi et al., (2007) ; García et al., (2013); and Hailu et al., (2017)
6	Education and training	Farooqui & Ahmed, (2009); Saleem et al., (2012); Formento et al., (2013); García et al., (2013;2014); Oropesa-vento et al., (2015); Anil & Satish, (2016) and Rohilla & Chaudhary, (2016); (Rohilla & Chaudhary, 2016) and Hailu et al., (2017)
7	Effective communication	Saleem et al., (2012); García et al., (2013;2014); Oropesa-vento et al., (2015); Abate Y. and Mengesha T., (2016); Hailu et al., (2017); van Assen, (2018); and Janjić et al., (2019)
8	Recognition & rewarding	Formento et al., (2013); and Hailu et al., (2017)
9	Employee's attitude	O'hEocha, (2000); Hailu et al., (2017) and Hagos, (2017)

From the previous studies stated above, the following factors: management commitment and employee participation in teamwork are nominated as the critical factors that affect the economic outcome of Kaizen implementation.

The top management of the company has the most important role in implementing this Kaizen approach Farooqui and Ahmed, (2009); Saleem et al., (2012); Formento et al., (2013); Vento et al., (2016); Anil and Satish, (2016); Abate Y. and Mengesha T., (2016); Rohilla and Chaudhary,

(2016); Hailu et al., (2017); Hagos, (2017); G.Mekonen, (2018); van Assen, (2018) and Janjić et al., (2019), and every manager, then it goes down to rank-and-file employees (Imai, 1986). Since management is responsible for justifiably managing the available resources managerial commitment has an impact on economic benefits that an organization obtains (Huang et al. 2016). In studies, it has been demonstrated that management commitment improves service quality and therefore organization economic outcome enhanced (Karatepe and Karadas, 2012 cited by Vento, M. O., et.al, 2016 and Farooqui and Ahmed, 2009).

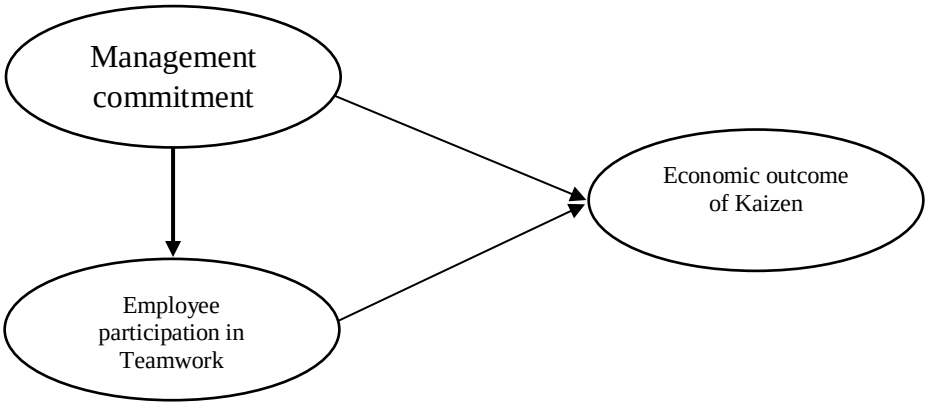
Employee participation in teamwork indicate the capability to organize the work in teams, to support Kaizen implementation (Barve et al, 2007). The team operates autonomously utilizing quality control techniques and other improvement tools to eliminate work-related waste (MUDAs), tap members' creativity through brainstorming, and along the way promote self and mutual development (JUSE, 2008). Group members have the responsibility to involve actively in all activities, communicate with each other honestly, share and respect ideas, provide constructive feedback, and overcoming any type of personal conflict (Terziovski, 2006; Oropesa-vento et al., 2015; Hosotani, 2015). Employee participation in teamwork results in cost reduction and positive outcomes of Kaizen (Pun et al., 2001; Farooqui & Ahmed, 2009; Zakuan et al 2010; Paipa-Galeano et al., 2011 and Anil & Satish, 2016).

The outcome implementation of Kaizen is considered as a better working environment, better product and service and cost reduction Imia, (1986) and has a positive impact on a firm's value-added, and gross profit Mano et al., (2012) and revenue from sales (Higuchi et al., 2015). Studies conducted on evaluations of the effect of the use of Kaizen in Ethiopia have shown that firms that implement the approach see a reduction in the number of costs, non-value-adding activities, and wasteful practices, with associated increases in value addition, customer satisfaction, profitability, and productivity (Kitaw, 2011; Desta, 2014; Hailu et al., 2017; Lemma, (2018); G.Mekonen, 2018) and increase labor productivity and capital productivity, and an increase in sales revenues (Abebe and Zerfu, 2014 as sited in Lemma, 2018; Shimada, 2013).

2.7. Conceptual framework

Based on the literature review, a conceptual framework was developed and a research model was proposed to examine the mediation effect of employee participation in teamwork in the relationship between management commitment and economic outcome of Kaizen implementation as shown in the following figure 2.2. In this theoretical research framework, the exogenous variables are managerial commitment and employee participation in teamwork and a endogenous variable is the economic outcome of Kaizen implementation.

Figure 2.2: Conceptual Framework



Source: Own model

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Research Design

According to Saunders et al. (2007), explanatory research design was used to undertake this study since it studies the cause and effect relationships among variables. Since the aim of the study is to test the hypothesis, the study employed a deductive research approach. The study was cross-sectional by its design and a quantitative research method was used to address the study objectives. According to (Bryman, 2012), a quantitative research strategy emphasizes quantification in the collection and analysis of data. This research method tries to get answers to the questions starting with how many, how much, to what extent (Rasinger, 2013). Additionally, this method is easily testable and can be repeated by others getting the same results. Besides, similar studies conducted in the area have used a quantitative approach (Oropesa-vento et al., 2015; Anil & Satish, 2016; Abate Y. and Mengesha T., 2016 and Hailu et al., 2017).

3.2. Target Population

In order to study the economic outcome of Kaizen, the companies have to undergo the second level Kaizen implementation that mostly experiences lean techniques and maturity time that could result in economic value. Based on the interview made with the Ethiopian Kaizen Institute research department on May 6, 2020, 26 industries are under this level of implementation performance.

Taking into consideration, the target population of the study was 26 industries: - 13 from textile, 5 from chemical, and 4 from each agro-processing, and metal and engineering sectors as shown in Table 3.1 below.

Table 3. 1: Distribution of selected manufacturing organizations by sector

Sub sectors	Number	Percentage (%)
Textile	13	0.50
Chemical	5	0.19
Metal and engineering	4	0.15
Agro-processing	4	0.15
Total	26	1.00

3.3. Sampling Procedure

The study employed census sampling on the target population of the study. From the targeted 26 manufacturing companies, a total of 390 employees were selected randomly from the total of

15,928 employees in the industries by using a formula developed by Yamane, (1965) for determining sample size from population size.

3.4. Sample Size

Yamane (1965) developed the following equation to yield a representative sample for proportions. Where n is the sample size, N is the population size, and e is the level of precision.

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

For this study, the number of samples is determined at a 95% confidence level and P=0.5 Therefore, the study sample size will be determined to be 390 and it is considered to be sufficient for the intended analysis.

In order to get balanced data from the selected industries, the study employed probability proportional to sample size sampling technique as indicated in the following Table 3.2 below.

Table 3. 2: Selected Sample size from each Industries

NO	Name of the industries	Population size	Sample size
1	Adama spinning Factory	495	12
2	Metal and Engineering Corporation	267	7
3	Ghion Industrial and Chemicals Plc	292	7
4	B &C Aluminum plc.	123	3
5	G7 trading	730	18
6	Feleke Garment Plc	125	3
7	Memnon Printing and Textile Industries Plc.	120	3
8	Bahir Dar Textile S.C	1022	25
9	Minaye packaging Plc.	300	7
10	Anbessa shoe S.C	1332	33
11	MAA Garment	888	22
12	Roha pack Plc.	180	4
13	Tana Flora Plc.	985	24
14	Abyssinia Flora Plc.	778	19
15	Hutuver Textile Plc	101	2
16	Angles Waving Plc	260	6
17	AA Bottle and Glass S.C	600	15
18	Adama Garment Industry	809	20
19	Kombolcha Textile S.C	768	19
20	Mesfin Industrial Engineering	1200	29
21	Horizon Addis Tyre S.C	797	20

22	Lucy Garment Industries Plc.	262	6
23	Almeda Textile Factory	1167	29
24	Saba Marble and Granite Plc.	367	9
25	Messebo Cement Factory Plc.	1438	35
26	Yirgalem Addis Textile Factory Plc	522	13
	Total	15,928	390

Source: own computation

After the sample size was determined, individual respondents were selected using simple random sampling by using the lottery method after developing the sampling frame.

3.5. Data Type and Sources

To address the study objectives, primary data was used. The primary data was collected from employees in the selected industries. The data used in this study was quantitative. Quantitative data was collected on management commitment, employee participation in teamwork, and the economic outcome of Kaizen that measures Kaizen implementation performance.

3.6. Data Collection Tools

A structured questionnaire was employed from empirical studies as stated in the variable definition and measurement part under the session below. Three experts, two Kaizen area experts, and one academician in the area of Continuous Improvement and Lean Manufacturing validated the questionnaire. All of them independently assessed the relevance, consistency, adequacy, clarity, content, knowledge, and structure of the written items. In addition, to improve the quality of the questionnaire, before collecting data from the actual sample the questionnaire was pretested on a few non-sampled respondents and the necessary modifications were made to the questionnaire based on the feedback obtained. The collection was administered by distributing the questioners to sampled respondents in the selected industries.

3.6.1. Definition of Variables and Measurements

3.6.1.1.Dependent Variables

The Economic Outcome of Kaizen

The economic benefits of Kaizen implementation are results that can be quantified and generate profits. It includes time-saving, reduced steps in processes, reduced distances for materials handling, fewer employees, reduced defective products, reduced waiting times and cycle times, and reduced inventory (Narasimhan et al., 2006; Nderi, 2012; Mano et al., 2012; Desta, 2014; Shimada & Sonobe, 2018; Lemma, 2018; Hosono et al., 2020)

The level of the economic outcome of Kaizen was a categorical variable measured by the combined score fifteen-item measured. Respondents were asked to rate the extent of their agreement with fifteen statements on a five-point scale with the degree of 'strongly disagree' and 'strongly agree'.

Economic outcomes are results that can be quantified. The outcome of Kaizen implementation included reduced unit manufacturing cost, increased level productivity, waste reduction (inventory, waiting times, transport, and operator's movements), reduced equipment failure, maximized profits, improved cash flow, and increased and improved economic stability Garcia-Alcaraz et al., (2016). In addition, better product and service and cost reduction Imia, (1986) and a positive impact on a firm's value-added, and increased gross profit Mano et al., (2012) and increased sales revenue (Higuchi et al., 2015). Studies conducted on evaluations of the effect of the use of Kaizen in Ethiopia have shown that firms that implement Kaizen got a reduction in costs, non-value-adding activities, and wasteful practices, with associated increases in value addition, customer satisfaction, profitability, and productivity (Kitaw, 2011; Desta, 2014; Hailu et al., 2017; Lemma, 2018; Mekonen, 2018), increase labor productivity and capital productivity, and an increase in sales revenues (Abebe and Zerfu, 2014 as cited in Lemma, 2018; Shimada, 2013; Mekonen, 2018).

Therefore, the economic outcome of Kaizen implementation in the organization was measured through the result in quality and productivity performance, operating performance, and financial performance. Fifteen validated items were adopted from Vento et al., (2015) with the average factor loading above 0.74.

3.6.1.1.Independent Variables

Management Commitment

Managerial commitment is commitment demonstrated by managers, which is the extent to which the industries' management invests money and time to support Kaizen implementation in the industries. It includes, spends time in the workplace, make investments in training tools that can support teams in identifying improvements, and recognize improvement initiatives, and the people who led them (Rahmanian & Rahmatinejad, 2013, Garcia-Alcaraz et al., 2016, Mekonen, 2018).

Management commitment was a categorical variable measured by using twelve items. Five validated items are adopted from Oropesa-vento et al., (2015) with the average factor loading above 0.75 and the rest of the items are from literature. Besides, respondents were asked to rate the extent of their agreement on a five-point scale with a degree of 'strongly disagree' and 'strongly agree'.

Numerous studies have found that management commitment plays a critical role in the provision of successful implementation of Kaizen with economic outcomes (Arumugam et. al., 2008; Rother, 2009; Tapias et al., 2010; Saleem et al., (2012); Amanuel, T. 2014; Netland. 2016; Huang et al. 2016; Abate Y. and Mengesha T., 2016; Vento et al.,2015; Anil & Satish, 2016; Hailu et al., 2017). In this study, management commitment was hypothesized to have a positive effect on the economic outcome of Kaizen implementation.

3.1.1. Mediation Variable

Employee Participation in Teamwork

The team is a small group of an employee (3 to 12) who are performing in the same line of work, and conduct meeting in regular base; and who are qualified to identify, prioritize, analyze and continuously strive to solve work-related problems by using statistical quality control techniques, a forward countermeasure to management, and where possible, implement the solutions themselves (Ishikawa, 1968, Fukui, 2003, Hosotani, 2015, Rahmanian & Rahmatinejad, 2013).

Employee participation in teamwork was a categorical variable measured by using ten items. Four validated items adopted from Oropesa-vento et al.,(2015) with an average factor loading value above 0.74, and the rest of the items are from the literature, and respondents were asked to point

out the extent to which they agreed to a five-point scale with the degree of 'strongly disagree' and 'strongly agree'.

Employees participation in teamwork is one of the main factors that affect outcomes of Kaizen implementation (Pun et al., 2001; Farooqui & Ahmed, 2009; Zakuan et al 2010; Paipa-Galeano et al., 2011; Formento et al., 2013); Anil & Satish, 2016; Abate Y. and Mengesha T., 2016; Rohilla & Chaudhary, 2016; Janjić et al., 2019; Hagos, 2017; Mekonen, 2018 and van Assen, 2018). Studies that tested the relationship have found a mixed result, that employee participation in teamwork has a positive association with the economic outcome of Kaizen (Anil & Satish, 2016). However, Hailu et al., (2017) found no relationship between teamwork and cost reduction, and Vento et al., (2015), found teamwork has no significant direct effect on the economic outcome of Kaizen. Accordingly, for this study employees' participation in teamwork was expected to have a positive effect on the economic outcome of Kaizen implementation.

On the other hand, the success of team Kaizen practice relies significantly on management leadership and commitment(Pun et al., 2001). The commitment of management by availing resources, offering encouragement, supervision, and reword make employees show more interest in participating in teamwork that results in the economic outcome Rohilla and Chaudhary, (2016); Vento et al.,(2015), found the significant indirect effect of management commitment on the economic outcome of Kaizen through employee participation in teamwork. Hence, for this study employees' participation in teamwork was expected to mediate the relationship between management commitment and the economic outcome of Kaizen implementation.

3.2. Model specification

Based on the conceptual framework the following research model was developed to examine the mediation effect of employee participation in teamwork in the relationship between management commitment and economic outcome of Kaizen.

Mediation analyses generally seek to partition the total effect of an exposure into its direct and indirect components. For employee participation in teamwork (TM), mediate the relationship between managerial commitment (MC), and economic outcome of Kaizen (EOK), as the mediation model is presented in Figure 3.1 and represented by the following three regression equations, as to the classic simple mediation model (Baron & Kenny, 1986).

$$E\,[EOK|TM] = \beta_{0*} + \beta_{tm*}TM. \quad (3.1)$$

$$E\,[MC|TM] = \alpha_0 + \alpha_{tm}TM, \quad (3.2)$$

$$E\,[EOK|TM, MC] = \beta_0 + \beta_{tm}TM + \beta_{mc}MC, \quad (3.3)$$

Where β_0 and α_0 constant coefficient, β_{mc} represent coefficient of management commitment and β_{tm} represent coefficient of employees involvement in team work. Errors are assumed to be normally distributed.

The estimated total and direct effects for a unit change in TM are $\hat{\beta}_{tm*}$ and $\hat{\beta}_{tm}$, respectively. The indirect effect of TM is commonly estimated using the difference of coefficients, $\hat{\beta}_{tm*} - \hat{\beta}_{tm}$ Sobel,(1982), or the product of coefficients, $\hat{\alpha}_{tm*}\hat{\beta}_{tm}$ (Baron & Kenny, 1986). For the simple mediation model, the two approaches agree and the total effect of TM on EOK is the sum of the direct and indirect effects: $\hat{\beta}_{tm*} = \hat{\beta}_{mc} + \hat{\alpha}_{tm}\,\hat{\beta}_{tm}$.

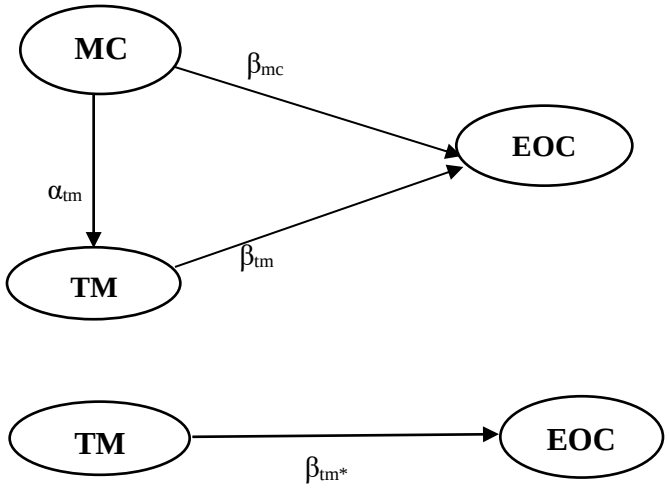


Figure 3.1: Mediation model for TM, mediate the relationship between MC, and EOK

The coefficients α_{tm}, β_{tm}, β_{mc}, and $\beta_{tm*}$are estimated from the system of three regression equations stated in the above.

3.3. Method of Data Analysis

For analysis, quantitative data analysis methods were applied. The quantitative analysis includes both descriptive and inferential statistics. Descriptive statistics like frequency, mean and standard deviation were used to describe the collected data. Inferential statistics, ANOVA with Post Hoc test were used to test the existing differences among sub-sectors using SPSS. In addition, Econometric Model (Structural Equation Modeling) were applied to validate the measurement model and predict relationship among different variables in the structural model. In the course of data entry and analysis, statistical package for social scientists (SPSS) and Analysis of Moment Structures (AMOS) version 23.0 were used for the purpose of data management.

CHAPTER FOUR: RESULT AND DISCUSSION

For the purpose of collecting primary data, 390 questionnaires were distributed to the sampled respondents. Out of the distributed questionnaires, 202 were returned and the response rate was 51.8%. The response rate was not as expected due to the occurrence of the COVID-19 pandemic disease and political instability in the country during the data collection period. Especially, Mesfin Industrial Engineering, MAA Garment, Almeda Textile Factory, Tana Flora Pls., Saba Marble and Granite Plc, Messebo Cement Factory, and Feleke Garment Plc. were industries that did not returned responses, which account for 38.7% of total responses.

4.1. Demographic Profile of Respondents

Table-4.1 below summarizes the respondents' profile. Of those who completed the survey, 131 (65.8%) were males and 68 (34.2.9%) were females. Regarding respondents' educational status 35 (17.6%), 100 (50.3%) and 63 (31.7%) were master's degrees, bachelor's degrees, and diploma holders, and the majority of the respondents were degree holders, respectively. In terms of position, 54 (27.1.3%), 44 (22.1%), 33 (16.6%), and 33 (16.6%) of the respondents were engineers, operators, administrative staff, technicians, and supervisors, respectively.

Table 4.1: Demography

Demographic variables	**Category**	**Frequency**	**Percent**
Sex	Male	131	65.8
	Female	68	31.7
Educational status	Diploma	63	32.1
	Bachelor's degree	100	50.3
	Masters	35	17.6
Organizational position	Engineer	54	27.1
	Operator	44	22.1
	Administrative staff	34	17.1
	Technician	33	16.6
	Supervisor	33	16.6

Source: Own computation

4.2. Assumptions of Structure Equation Modeling

In quantitative research, particularly when primary data is collected from surveys, a preliminary analysis or data screening is a critical step required in order to make sure that the data is usable, reliable, and valid for subsequent analyses (Roni, 2014; Lowry & Gaskin, 2014). In this study Assumptions of Structure Equation Modeling was carried out by using appropriate statistical methods to check unengaged respondents, sample size, missing values outliers, and normality assumption (Kumar, 2015).

4.1.1. Sample Size

Regarding sample size requirement for a structural equation modeling, Schumacher and Lomax (2010) argue that to achieve a precise calculation with CFA, a researcher needs 250 to 500 respondents while Comrey and Lee (1992) determine the sample size of 50 very poor, 100 poor, 200 fair, 300 good, 500 very good and 1000 excellent. Besides, Anderson, and Gerbing (1988) propose a sample size of 150 or more to achieve a minimum standard error. Accordingly, this study was conducted using 202 respondents, which were randomly chosen from 26 manufacturing industries, and this sample size is considered to fulfill the minimum to run structural equation modeling.

4.1.2. Missing Data

Casewise missing data were identified by running descriptive statistics and frequency tables in SPSS. Then percentages of missing variables per case were calculated. Based on the finding, 12 cases were missing less than 1% of the variables and were treated by imputation. Since the variables used in the study were the Likert scale, the imputation method used to replace the missing values were median with nearby points (Zhao et al., 2010).

The data set also checked for the variable with missing data and the maximum percentage of missing data was 2%. Since the missing values in each variable were less than 10%, all variables in the data set were retained (Gaskin, 2017).

4.1.3. Unengaged Respondents

The data was checked for unengaged respondents by examining the standard deviation of each case and the minimum standard deviation was 0.38. The minimum SD was above the cut point of 0.2 which indicates the absence of unengaged cases in the data set (Gaskin, 2017).

4.1.4. Assessment of Normality Assumption

Maximum likelihood estimation was employed in this study, as it is the standard estimation approach in most structural equation modeling programs (Byrne, 2010).

In this study, whether the data depart substantially from normality or not, were evaluated by assessing kurtosis and skewness values of each variable included in the analysis. According to Skarpness (1983), the kurtosis and skewness value greater than 2.2 or less than -2.2 is an indicator of departure from normality. (See Appendixes: Table-2) which depicted that the value of kurtosis and skewness ranges from positive from 1.386 to negative 0.757 and from negative 0.2 to negative 0.964 respectively, this indicated that all variables appear to exhibit no significant departure from normality.

4.3. Exploratory Factor Analysis

The exploratory factor analysis in this particular study deal with a sample for further analysis and the principal axis factoring method was employed as an appropriate extraction method (Peter Samuel, 2016). And Promax rotation, which is an oblique rotation, was used as it allows a degree of correlation as the maximum correlation coefficient of factor correlation matrix reached up to 0.543. The fixed number of the factor was to extract 3 factors. In addition, items factor coefficients were sorted by size and all factor coefficients less than 0.3 were suppressed.

Before passing to EFA, the appropriateness of data for EFA was tested. The adequacy of the sample size was tested through Kaiser-Meyer-Olkin (KMO) and the strength of the relationship among variables was assessed through Bartlett's test of sphericity (Pallant, 2013). The sampling is adequate if the value of Kaiser Meyer Olkin (KMO) is larger than 0.6 (Pallant, 2013). Tabel-4.1 below showed that the Measure of Sampling Adequacy test score was 0.897, and indicate that the sample size was adequate for EFA. In addition, Bartlett's Test of Sphericity is the test for the null hypothesis that the correlation matrix has an identity. The result was significant at a 1% level of

significance as shown in Table 4.1 below; indicating that the data do not produce an identity matrix and are thus acceptable for further analysis (Field, 2000; Pallant, 2013).

Table 4.2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.897
Bartlett's Test of Sphericity	Approx. Chi-Square	2511.771
	Df	276
	Sig.	.000

Source: Own computation

At the beginning of the exploratory factor analysis, 37 items load around 3 factors. The total variance was explained with 3 cross factor loading and 52 %, (see Table-4.2 below). And the analysis was started by removing items with low commonalities. The common item communalities magnitudes in the social sciences are low to moderate communalities of 0.40 to 0.70 respectively. An item having a communality of less than 0.40, indicated that it has a poor relationship with the remaining items, and should be dropped from the analysis or add similar items for future research (Velicer and Fava, 1998). Based on this recommendation, in this study, 13 items with communality score less than 0.4 were dropped and it was done by removing one item at a time starting from the lowest value and by re-running the analysis again.

Table 4.3: Total Variance Explained

Total Variance Explained							
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.295	30.396	30.396	6.817	28.405	28.405	6.330
2	4.786	19.943	50.339	4.330	18.041	46.446	4.029
3	1.809	7.537	57.876	1.339	5.579	52.025	4.807
4	1.097	4.571	62.447				
5	.807	3.361	65.809				

Source: own computation

Finally, 24 variables with 3 stable factors with the minimum loading of variables under each factor were found to be 0.478 (see Table-4.4 below). And the 3 extracted factors accounted for 52.025% of the total variance in the data. According to Streiner (1994), for the factors to be considered as stable the retained factors should have at least three items with loading greater than 0.4 (see Table-

4.4 below). And the proportion of the total variance explained by the retained factors should also be noted. As a rule, this should be at least 50%. In addition, the internal consistency analysis, Cronbach‟s alpha (α) value for the management commitment, employee participation in the team, and economic outcome of Kaizen was above 0.8. This reflects the reliability of the data collected.

Table 4.4: Factors with their indicators and loading

Factors with their indicators	**Loading**			**Cronbach's Alpha(α)**
Management Commitment	1	2	3	
Management uses team spirit and motivation approaches to sustain Kaizen activity	0.814			0.884
Management supervises the progress of Kaizen implementation in the company regularly.	0.782			
Management provides rewards and recognition for successful Kaizen implementation.	0.747			
A culture of continuous improvement (Kaizen) is developed in your company.	0.730			
Management often participates in Kaizen activities.	0.712			
Management provided the necessary resources required for Kaizen implementation	0.540			
Employee Participation in Teamwork				
The Kaizen promotion team gets support from the Kaizen office.		0.725		0.871
Kaizen promotion team often conduct meetings		0.658		
Members of the Kaizen promotion team are committed and motivated.		0.657		
Kaizen promotion team improved your sense of ownership to the company		0.634		
The Kaizen promotion team gets support from the facilitator.		0.661		
Kaizen promotion team members are acknowledged for their achievements and efforts in Kaizen activities.		0.488		
Economic Outcome of Kaizen				
Kaizen implementation in your company increased and improved the economic balance.			0.835	0.92
Kaizen implementation in your company maximized the profit.			0.891	
Kaizen implementation in your company improved the cash flows.			0.792	
Kaizen implementation in your company reduced the unit manufacturing cost.			0.771	
Kaizen implementation in your company reduced defective production.			0.738	

Kaizen implementation in your company decreased customer compliance.			0.695	
Kaizen implementation in your company lets you meet deadlines and qualities as promised to customers.			0.621	
Kaizen implementation in your company decreased the frequency of failures of equipment and machine.			0.611	
Kaizen implementation in your company increased the productivity of employees.			0.596	
Kaizen implementation in your company increased overall productivity.			0.580	
Kaizen implementation in your company improved the overall utilization of resources.			0.484	
Kaizen implementation in your company reduced in design and operation			0.478	
Extraction Method: Principal Axis Factoring. Rotation Method: Promax with Kaiser Normalization. a. Rotation converged in 6 iterations.				

Source: own computation

4.4. Confirmatory Factor Analysis

According to Brown (2014), in Structural Equation Modeling (SEM), the first phase of the analysis deals with the measurement model. The analysis is to test a priori hypotheses about relations between observed variables and latent variables. Alternatively, test whether the theoretically established measurement model has a good fit with the observed data. In addition, it was done by using Confirmatory Factor Analysis (CFA) using AMOS statistical software version 23. In addition, CFA was used in the same phase to confirm the validity and reliability of the measurement scales of the model.

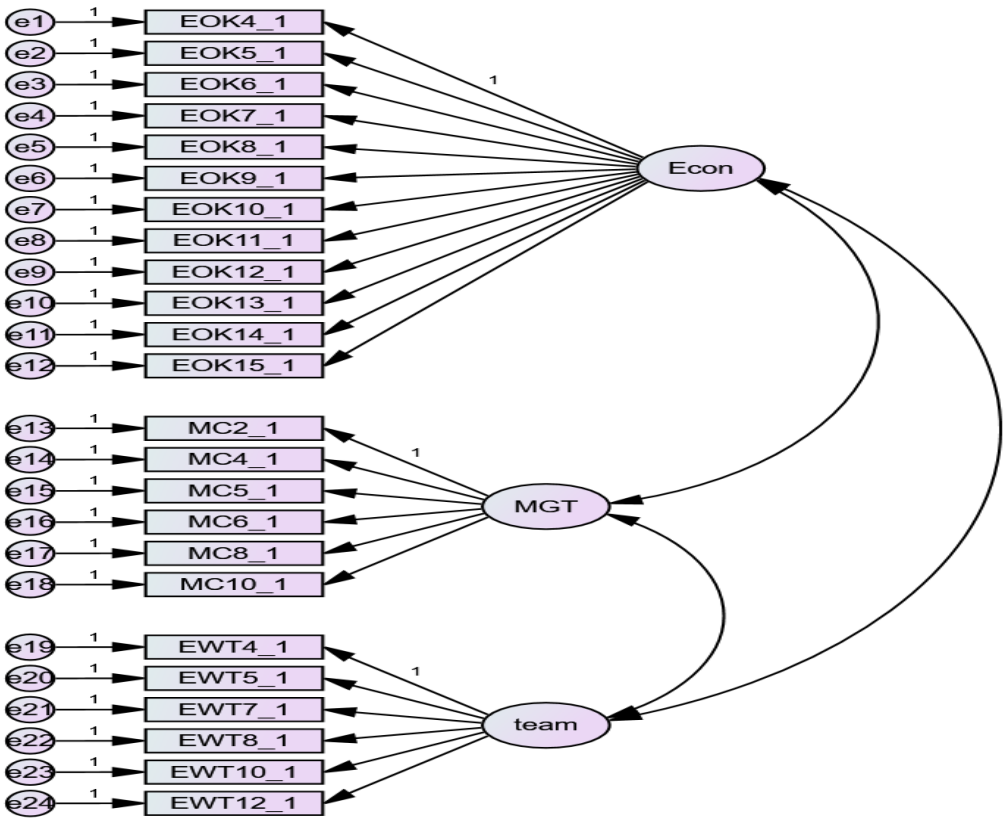
In this study, the Maximum likelihood (ML) estimation method was used in the CFA analysis. ML is the standard estimation approach in most structural equation modeling programs (Byrne, 2010). It provides standard errors (SEs) for each parameter estimate, which are used to calculate p-values (levels of significance) and provides confidence intervals, and its fitting function is used to calculate many goodness-of-fit indices.

4.4.1. Goodness of Fit Test

The first stage in confirmatory factor analysis was validating the measurement model using the goodness of fit measures. A goodness of fit test aims to test how well a theoretical model fits the empirical model. There is no single rule in testing modeling fit. Gerbing and Anderson (1992)

suggest three criteria: p-value of chi2, normed fit index (NFI), and relative fit index (RFI). Meanwhile, Hu and Bentler (1999) propose two criteria in assessing modeling fit: Comparative Fit Index (CFI) and Roots-Mean-Square Error of Approximation (RMSEA). Accordingly, this study used the CFI, RMSEA, NFI, and RFI for the assumption testing. Figure-4.1 below depicted the structure the theoretical factor of the measurement model. It was composed of 3 latent variables and 24 observed variables and each of the observed variables connected only to one latent variable. This theoretical model was identified by constraining one of the regression weights to form each factor into 1.

Figure 4. 1: Theoretical factor structure of the measurement model

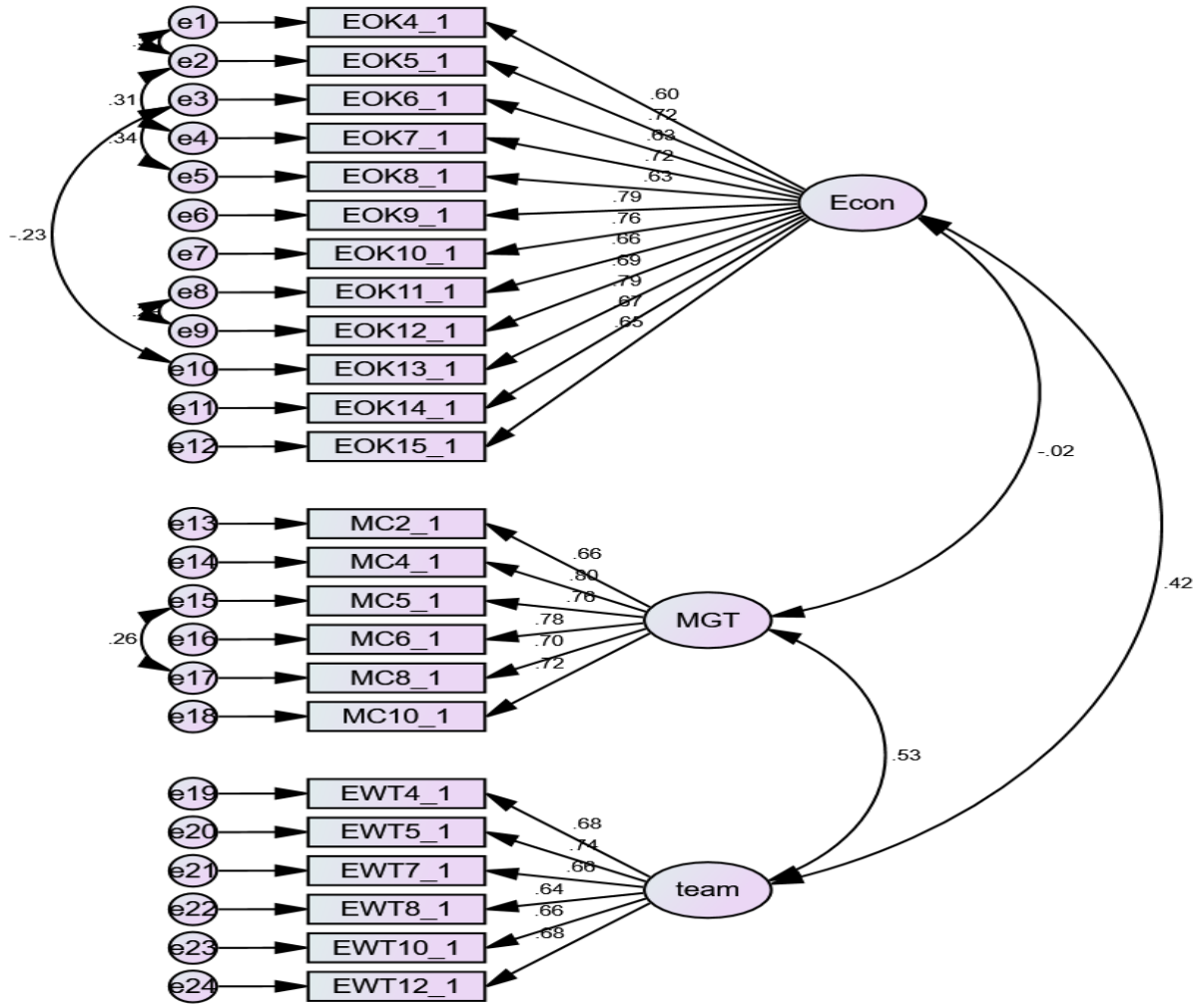


Source: Own computation

The model fitness was tested to see how well the proposed/theoretical model (in this case, the model of the factor structure) accounts for the correlations between variables in the dataset. In the beginning, some of the model fit measures (as shown in Tabel-4.5 below) were not acceptable CFI and PClose were 0.885 and 0.00 respectively and these values are under the threshold (Hu and Bentler, 1999). Indices were considered to improve the model fit modification. Based on the

modification indices suggestion latent factor, under management commitment and economic outcome of Kaizen error terms of observed variables were co-varied.

Figure 4.2: CFA final measurement model



Source: Own computation

Table 4.5: Model Fit Measures

Measure	**Estimate before**	**Estimate after modification**	**Threshold** (Hu and Bentler,1999)	**Interpretation**
CMIN	519.293	422.844	--	--
DF	249	243	--	--
CMIN/DF	2.086	1.740	Between 1 and 3	Excellent
CFI	0.885	0.924	>0.95	Acceptable
SRMR	0.08	0.078	<0.08	Excellent
RMSEA	0.074	0.061	<0.06	Acceptable
PClose	0	0.032	>0.05	Acceptable

Source: own computation

4.4.2. Validity and Reliability

4.4.2.1. Construct Validity

The construct validity defines that the items used to measure a given construct measure that constructs and nothing else and it consists of convergent and discriminant validity.

4.4.2.2. Convergent validity

Convergent validity ensures that the observed variables belong to the latent construct to be measured (Wang, French & Clay, 2015). Convergent validity is based on the correlation between responses of different variables in measuring the same construct (Peter, 1981). Subsequently, variables should be highly correlated with the latent construct (Engellant, Holland & Piper, 2016). The amount of factor loading is a fundamental consideration in determining convergent validity (Hair et al., 2019). Igbaria, Zinatelli, Cragg, and Cavaye (1997) demonstrate that a variable is good if the latent variable shows the factor loading of ≥0.50. Accordingly, in this study, the standardized factor loading (regression weight) of each observed variable found under each construct is greater than 0.6 (figure-4.2). In addition, all of the measurement items represented their factors significantly, as the critical ratio of every item exceeded the 1.96 value at a 1% level of significance; hence, all of the measurement items satisfied the convergent validity test. (Hair, Black, Babin, and Tatham, 2006).

4.4.3.3. Discriminant Validity

Discriminant validity was verified when average variance extracted (AVE) is greater than maximum shared variance (MSV) for all the constructs Hair et al, (2010); or the inter-factor correlations are less than the square root of the average variance extracted (AVE) (Fornell and Larcker, 1981). In this study, as indicated in Table-4.6 below the AVE for each construct was greater than the MSV and all the inter-correlations were less than the square root of the AVE. Therefore, the model satisfied the discriminant validity test.

4.4.3.4. Reliability of Construct

Reliability of construct checks the internal consistency of all indicators or internal homogeneity of a set of items to measure the concept. According to Joseph F. Hair, William C. Black, Barry J. Babin, (2015), for a construct is to be reliable Composed Reliability (CR) value should be greater

than 0.70. Each construct, as it is shown in Table-4.6 below, had a CR value greater than 0.70 indicating that all constructs of the model were reliable.

Table 4.6: Model Validity Measures

	CR	AVE	MSV	MaxR(H)	Econ	MGT	team
Econ	0.917	0.483	0.172	0.922	**0.695**		
MGT	0.877	0.543	0.280	0.881	-0.024	**0.737**	
team	0.834	0.457	0.280	0.837	0.415***	0.529***	**0.676**

Source: Own computation

4.5. Common Method Bias

Harman's single-factor test is the most widely known approach for assessing Common method bias (CMB) (Podasakoff & Organ, 1999). In this study, the test was employed to check if the majority of the variance can be explained by a single factor. It was done by constraining the number of factors extracted in Explanatory factor Analysis (EFA) to be just one (rather than extracting via Eigen Values) and examined the un-rotated solution. CBM is assumed to exist if a single factor emerges from un-rotated factor solutions explains more than 50% of the variance in the variables (Podasakoff & Organ, 1999). Table-4.7 below indicated that a single explains 30.39% of the variance that is less than the cut point indicating that CMB was not a major concern in this study.

Table 4.7: Total Variance Explained

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.295	30.396	30.396	7.295	30.396	30.396
2	4.786	19.943	50.339			
3	1.809	7.537	57.876			
4	1.097	4.571	62.447			
5	.807	3.361	65.809			

Source: Own computation

4.6. Kaizen Implementation Status in the Manufacturing Industry

Descriptive statistics such as mean scores, standard deviations, and inter-correlations of the study variables are provided in Table 4.8 below.

Table 4.8: Descriptive statistics and correlations of the study variable

	Variable	Mean	Std. Dev.	1	2	3
1	Employee participation in teamwork	3.42	0.60	1		
2	Management commitment	2.45	0.50	0.591**	1	
3	Economic outcome of Kaizen	2.62	0.54	0.459**	-0.023(ns)	1

** Correlation is significant at the 0.01 level (2-tailed). ns- not significant

Source: Own computation

As indicated in Table-4.8, the mean value of employee participation in teamwork was (Mean = 3.42, SD = 0.60) and management commitment was (Mean = 2.45, SD = 0.5) and economic outcome of Kaizen was (Mean = 2.62, SD = 0.54).

In terms of the correlation values, employee participation in teamwork and the economic outcome of Kaizen had was significant and had positive associations with each other (r 0.459 $p < 0.01$). The association between management commitment and the economic outcome of Kaizen was found statistically not significant with a 5% level of significance. Accordingly, there was a weak correlation between management support and performance (Heller, Drenth, Koopman, & Rus, 1988; Miller & Monge, 1986; Rooney, 1993; Strauss, 1982 as cited by Paul L. Koopman & Andre F.M. Wierdsma, 1998)

4.7. Economic Outcome of Kaizen by Sub-Sectors

Table 4.9 shows the economic outcome of Kaizen by sectors had significant difference among industry subsectors groups at 1% level of statistically.

Table 4.9: Economic outcome of Kaizen by sectors

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.509	3	1.503	5.313	.002**
Within Groups	55.165	195	.283		
Total	59.674	198			

**p<0.01

Source: Own computation

Based on the Post Hoc multiple comparison result (Table 4.10), the mean difference of economic outcome of Kaizen implementation in textile 2. 48 (SD 0.46) had statistically significant difference with chemical 2.78 (SD 0.57) by 1% level of significance. The result indicated that the chemical sector had the greater economic outcome of Kaizen implementation compared to the textile sector.

Table 4. 10: Economic outcome of Kaizen by sectors Tukey HSD

(I) Industrial sub-sector	(J) Industrial sub-sector	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Textile	Chemical	-.29736*	.08464	.003**	-.5167	-.0780
	Agro processing	.03308	.13786	.995	-.3242	.3903
	Metal and Engineering	-.28735	.12708	.111	-.6166	.0419
Chemical	Agro processing	.33044	.13997	.088	-.0323	.6932
	Metal and Engineering	.01001	.12936	1.000	-.3252	.3452
Agro processing	Metal and Engineering	-.32043	.16904	.233	-.7585	.1176

**p<0.01

Source: Own computation

4.8. Management commitment by sub-sectors

Table 4.11 shows management commitment by sectors had significant difference among industry subsectors groups at 1% level of statistically.

Table 4. 11: Management commitment by sectors

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.430	3	1.143	4.522	.004**
Within Groups	49.306	195	.253		
Total	52.736	198			

**p<0.01

Source: Own computation

Based on the Post Hoc multiple comparison result (Table 4.12), textile 2.53 (SD 0.40) had a statistically significant difference with the Metal and Engineering 2.09 (SD 0.51) by 1% level of significance. The result revealed that the textile sector had greater management commitment compared to the metal and engineering sector. In addition, chemicals 2.4 (SD 0.60) had a

statistically significant difference with metal and engineering 2.09 (SD 0.51) by 1% level of significance. Based on the result, the chemical sector had greater management commitment compared to the metal and engineering sector.

Table 4. 12: **Management commitment by sectors** Tukey HSD

(I) Industrial sub-sector	(J) Industrial sub-sector	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Textile	Chemical	.04461	.08002	.944	-.1628	.2520
	Agro processing	.09688	.13034	.879	-.2409	.4346
	Metal and Engineering	.43623*	.12014	.002**	.1249	.7475
Chemical	Agro processing	.05227	.13233	.979	-.2906	.3952
	Metal and Engineering	.39162*	.12230	.009**	.0747	.7085
Agro processing	Metal and Engineering	.33935	.15981	.149	-.0748	.7535

**p<0.01

Source: Own computation

4.9. Employee Participation in Teamwork by sub-sectors

Table 4.13 show employee participation in teamwork by sectors had significant difference among industry subsectors groups at 1% level statistically.

Table 4. 13: **Employee participation in teamwork by sectors**

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.682	3	2.561	7.724	.000**
Within Groups	64.649	195	.332		
Total	72.332	198			

**p<0.01

Source: Own computation

Based on the Post Hoc multiple comparison result (Table 4.14), textile 3.49 (SD 0.529) had statistically significant difference with the metal and engineering 3.04 (SD 0.54) and agro-processing 3.02 (SD 0.63) by 1% and 5% level of significance respectively. The result revealed that the textile sector had a greater result on employee participation in teamwork compared to both

metal and engineering and agro-processing sectors. In addition, chemicals 3.56(SD 0.62) had a statistically significant difference with agro-processing 3.02 (SD 0.63) and metal and engineering 3.04 (SD 0.54) by 1% level of significance respectively. Based on the result, the chemical sector had a greater result on employee participation in teamwork compared to both agro-processing and metal and engineering sectors.

Table 4.14: **Employee participation in teamwork by sectors** Tukey HSD

(I) Industrial sub-sector	(J) Industrial sub-sector	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Textile	Chemical	-.07018	.09163	.870	-.3076	.1673
	Agro processing	.46356*	.14924	.012*	.0768	.8503
	Metal and Engineering	.44193*	.13757	.008**	.0855	.7984
Chemical	Agro processing	.53374*	.15153	.003**	.1411	.9264
	Metal and Engineering	.51212*	.14004	.002**	.1492	.8750
Agro processing	Metal and Engineering	-.02162	.18300	.999	-.4958	.4526

*p<0.05 **p<0.01

Source: Own computation

4.10. Structural Model

The structural model of the SEM was applied to test the hypothesized causal relationship between the dependent and independent variables. In this study, the pictorial representation of the model was developed by connecting constructs from the measurement model by using arrows from the independent construct to dependent variables based on the established theory, (Figure-4.3).

Before running the model to test the hypothesis, the model was tested for the assumptions of linearity, Multicollinearity, Heteroscedasticity, and assumptions that error terms are independently and normally distributed.

Linearity of the relationship between each independent variable and the dependent variable were checked using visual inspection of the scattered plot (see Appendix Figure: B4) which indicates that there are linear relationship between independent and dependent variables. Additionally, to test the linearity assumption curved estimation was done for all the relationships in the model (see

appendix Table B10:11:12) and determined that all the relationships were sufficiently linear (Gaskin, 2017).

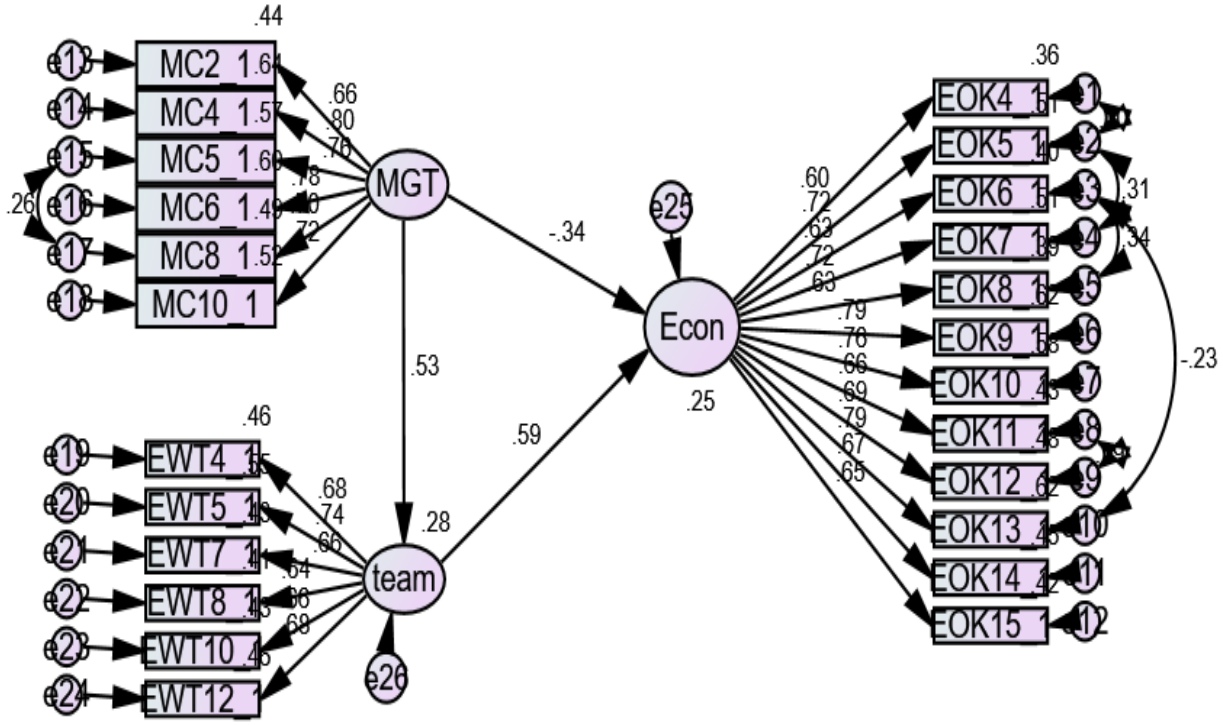
The independent variables were also evaluated for Multicollinearity by using variance inflation factor (VIF). According to Gaskin (2017), the VIF value for independent variables is recommended not to be greater than 10. The tested result indicated that the VIF value for the independent variables were less than 2 and the tolerance values were greater than 0.1(see appendix Table: B6) indicating that the variables satisfy Multicollinearity assumptions.

The other basic assumption tested was the constant variance of error terms across observations. So, it is vital to check whether the error term has an unequal variance or not. The study applied both the Breusch-Pagan and Koenker test with the null hypothesis of homoscedastic variance. The probability (prob> chi2) = 0.0858 and (prob> chi2) = 0.1015 (see appendix Table: B9) of respective tests suggests no evidence to reject the constant variance (null hypothesis) (Gujarati, 2012). Thus, there was no problem with heteroscedasticity.

Furthermore, test the assumption that the residuals are independent (or uncorrelated), the Durbin-Watson statistic was conducted and the statistic showed that this assumption met, as the obtained value was close to 2 (Durbin-Watson = 1.93).

Finally, the assumption of values of the residuals are normally distributed and was tested by looking at the P-P plot for the model (see appendix Figure: B2). The assumption hold, the closer the dots lie to the diagonal line, the closer to normal the residuals are distributed.

Figure 4.3: Structural Model of SEM



Source: own computation

The model fitness was tested to see how well the proposed/theoretical model. As shown in Tabel-4.15 below a model was acceptable and these values are under the threshold (Hu & Bentler, 1999).

Table 4.15: Model Fit Measures

Measure	Estimate	Threshold	Interpretation
CMIN	422.844	--	--
DF	243	--	--
CMIN/DF	1.740	Between 1 and 3	Excellent
CFI	0.924	>0.95	Acceptable
SRMR	0.078	<0.08	Excellent
RMSEA	0.061	<0.06	Acceptable
PClose	0.032	>0.05	Acceptable

Source: own computation

4.11. Regression Results

The adjusted R^2 result indicates that both management commitment and employee participation in teamwork account for 25 % of the variation in the economic outcome of Kaizen implementation. Similarly, Management commitment accounts for 28 % of the variation in employee participation in teamwork.

H1- Management commitment will have a statistically significant positive direct effect on the economic outcome of Kaizen implementation;

Management commitment had a statistically significant negative effect on the economic outcome of Kaizen implementation at a 1% level of significance with a standardized beta value of -0.339 (see Table 4.15 below). This result indicated that, when management commitment increases by one standard deviation, the standard deviation of the economic outcome of Kaizen decrease by 0.339 units. The economic return of this investment, management commitment, is obtained only through promoting effective teamwork in the industry. When this investment fails to promote teamwork, then it will have a negative effect on the economic outcome of the industry by raising its expenses (Michael, 2008; Rahmanian & Rahmatinejad, 2013; Miller & Monge, 2016; Garcia-Alcaraz et al., 2016; Mekonen, 2018). Thus, H1 was not supported.

H2- Management commitment will have a statistically significant positive effect on employee participation in teamwork;

Management commitment had a statistically significant positive effect on organizational commitment at a 1% level of significance with a standardized beta value of 0.529 (see Table 4.15 below). This result indicated that, when management commitment increases by one standard deviation, the standard deviation of employee participation in teamwork increase by 0.529 units. This finding was consistent with the findings of (Vento et al., 2015). Thus, H2 was supported.

H3- Employee participation in teamwork will have a statistically significant positive effect on the economic outcome of Kaizen implementation;

Employee participation in teamwork had a statistically significant positive effect on the economic outcome of Kaizen implementation at a 1% level of significance with a standardized beta value of 0.594 (see Table 4.15 below). This result indicated that, when employee participation in teamwork

increases by one standard deviation, the standard deviation of economic outcome of Kaizen increase by 0.594 units. This finding was consistent with the findings of (Huang, 1997; Anil & K.P., 2016). Thus, H4 was supported.

Mediation Test

To test for the mediation effects of employee participation in teamwork on the relationship between independent variables (management commitment) on the dependent variable economic outcome of Kaizen implementation, according to Baron and Kenny (1986), three conditions must hold. First, the independent variable must be shown to affect the mediator. Second, the independent variable must be shown to affect the dependent variable. Third, the mediator must affect the dependent variable. According to Baron and Kenny (1986), when the effect of the independent variables on the dependent variable after controlling for the mediator is zero, full mediation is said to exist. Partial mediation occurs when the effect of the independent variable on the dependent variable becomes significantly smaller with the inclusion of the mediator. But in recent literature in the area like; Mackinnon et al., (2000); Hayes, (2009); Zhao et al., (2010); Rucker et al., (2011); Shrout and Bolger, (2014), the requirement for a significant total effect before examining indirect effects be abandoned. Furthermore, the absence of a direct effect after controlling for an initial mediator should not lead to conclusions of 'full' mediation. Rather, the researcher's exploration of mediation should be guided by theory. If there are theoretical reasons to predict the presence of an indirect effect or multiple indirect effects, researchers should explore these effects regardless of the significance of the total or direct effect.

The mediator effect of employee participation in teamwork in the relationship between management commitment and economic outcome of Kaizen implementation.

First, it was found that management commitment had statistically significant and positively associated with employee participation in teamwork at a 1% level of significance with the standardized beta value of 0.529. Also, found that without the mediator variable, management commitment had a direct negative statistically significant effect on the economic outcome of Kaizen at 1% level of significance with standardized beta value -0.339. Lastly, results indicated that the mediator, employee participation in teamwork, had a statistically significant positive direct effect on the economic outcome of Kaizen at a 1% level of significance with a standardized beta value of 0.594. Figure-4.3 displays the results.

Table 4.15: **Standardized regression weight for the direct, indirect, and total effect**

Path name	Direct regression weight	Indirect regression weight	Total regression weight
MGT-->Econ	-0.339**	0.314**	-0.024(ns)
team-->Econ	0.594**	-	
MGT-->team	0.529**	-	

**p<0.01 ns=not significant

Source: own computation

Since both the paths were significant, mediation analyses were tested using the bootstrapping method with bias-corrected confidence estimates (Mackinnon, Lockwood, &Williams, 2004; Preacher & Hayes, 2004). In this study, the 95% confidence interval of the indirect effects was obtained with 5000 bootstraps resample (Preacher& Hayes, 2008). Results of the mediation analysis showed the existence of a statistically significant indirect effect at a 1% level of significance with a standardized beta value of 0.314 (see table 4.16 above), which confirmed the mediating role of employee working in the team in the relationship between management commitment and economic outcome of Kaizen. This finding was consistent with the findings of Vento et al., (2015) and Pun et al., (2001). When the mediator variable introduced the direction and magnitude of the direct effect of management commitment on the economic outcome of Kaizen was changed from -0.339 to 0.314.

CHAPTER-FIVE: CONCLUSION AND RECOMMENDATION

5.1. Conclusion

The economic outcome of kaizen implementation has a significant variation between chemical and textile manufacturing companies. Chemical manufacturing companies have greater economic outcome of kaizen implementation compared to the textile sector. when the researcher compare employees' participation in team and management commitment in the manufacturing companies that are under different sub-sectors , both textile and chemical manufacturing companies have greater management commitment and employees' participation in team compared to metal and engineering manufacturing companies. In addition, chemical manufacturing companies have greater employee participation in teamwork compared agro-processing.

The economic outcome of kaizen implementation significantly depend on employees' team participation; as employees' participation in the team increases, the economic outcome of kaizen also increases. Employees' team participation in turn significantly depends on management commitment; as the management commitment towards kaizen implementation increases employees' team participation also increases. Finally, though the direct effect of management commitment on the economic outcome of kaizen is negative, it has a significant positive indirect effect through employees' team participation. Management commitment for kaizen implementation only brings economic outcome by promoting employee working in team.

The significant meditation effect of employees' team participation on the relationship between management commitment and economic outcome of kaizen is the novel contribution of the study. This finding offers valuable insight in guiding manufacturing companies' management and practitioners for improving the economic outcome of their kaizen implementation.

5.2. Recommendations

In order to enhance the economic outcome of kaizen implementation in manufacturing industries, the manufacturing companies' management should improve their employees' team participation by enhancing the management commitment towards kaizen implementation. The following recommendation are forwarded to the manufacturing companies' management, concerned policy makers and capacity building institutions based on the study findings.

The manufacturing companies' management should enhance their leadership commitment towards kaizen implementation to improve employees' team participation by:

- establishing a strong planning, monitoring and evaluation system to continuously improve their employees' team participation though enhancing the management commitment towards kaizen implementation;
- enhancing team building skills of the companies' leaders though different mechanisms like providing training and coaching etc.;
- enhancing change management skills of the companies' leaders in order to effectively lead the kaizen implementation initiatives in their companies;
- establishing strong kaizen promotion team structure encourage cross-functional links between the management and encourage horizontal learning among the teams,
- empowering small teams/quality circles/ by:
    - delegating power in problem solving process,
    - building teams capacity based on identified gaps in monitoring and evaluation practice of the company,
    - fulfilling necessary resources and inputs for teamwork activitys, and
    - establishing strong management follow up and support system for teams;
- building team work culture in their companies by:
    - promoting the kaizen philosophy in the company
    - incorporating team work as a performance appraisal criteria, and
- benchmarking and learning from companies who achieve better economic outcome from kaizen implementation.

In order to enhance the economic outcome of kaizen implementation in the manufacturing industry, policy makers should:

- promote quality and continues improvement initiatives in the manufacturing industries,
- strengthen the follow up and support made on the implementation of kaizen activities in the manufacturing industries, and
- facilitate experience sharing and benchmarking from different countries' manufacturing industry kaizen best practices

To enhance the economic outcome of kaizen implementation in the manufacturing industry, capacity building institutions should:

- prepare customized capacity building training programmers for industries,
- establish knowledge sharing platform for companies to share experiences, challenges and the way forward to improve their kaizen implementation, and
- Conduct research work on the kaizen implementation of the manufacturing industry and disseminate the findings.

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Appendixes

Appendix a: Research Questionnaire

ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

Research Questionnaire

Dear respondents!

This study is designed to gather information on **"FACTORS AFFECTING THE ECONOMIC OUTCOME OF KAIZEN IN MANUFACTURING INDUSTRY OF ETHIOPIA"** for the partial fulfillment for the Degree of Masters of Science in Economics. Your genuine response has significant value for the completion of this thesis and the information you provide will be only used for academic study and will be kept strictly confidential. You do not need to write your name or personal-related issues.

Thank you for your help in this important research! If you have any questions or comments, please contact the email: kirubelt3@gmail.com & cellphone 0911445794.

SECTION I: Background information. (Please tick where appropriate)

a) What is the name of your company? _____

b) What is your company industrial subsector? Textile [ ] Chemical [ ] Agro processing [ ] Metal [ ] Medical [ ] Others [ ]

c) What is your gender? Male [ ] Female [ ]

d) What is your current position in your company?
Engineer [ ] Technician [ ] Operator [ ] Supervisor [ ]
Administrative staff [ ] Manager [ ]

e) What is your level of education?

First Degree [ ] Second Degree [ ] Third Degree [ ]

f) What is your level of experience?

Less than 2 years [ ] 2–5 years [ ] 6–10 years [ ] More than 10 years [ ]

g) What is the number of employees in your company?

0-50 [ ] 51-100 [ ] 101-200 [ ] 201-500 [ ] More than 500[ ]

Part-II: Factors affecting the economic outcome of Kaizen

The questions ask you to describe how much you agree or disagree with statements. Please put a tick (√) mark parallel to a number from 1 to 5 using the scale below.

1 = strongly disagree
2 = disagree
3 = undecided
4 = agree
5 = strongly Agree

NO		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
	Management Commitment	1	2	3	4	5
1	Management provided adequate Kaizen training for employees.					
2	Management provides the necessary resources required for Kaizen implementation programs (financial resources, meeting spaces, time).					
3	Management established policies, objectives, and Quality control circle structure in the company.					
4	Management supervises the progress of Kaizen implementation in the company.					
5	Management uses team spirit and motivation approaches to sustain Kaizen activity					
6	Management often participates in Kaizen activities.					
7	Kaizen issues are reviewed at management meetings.					
8	Management provides rewards and recognition for successful Kaizen implementation.					
9	The opinions of company customers are taken into account to make changes at work?					
10	A culture of continuous improvement (Kaizen) is developed in your company.					
	Employee participation in teamwork	1	2	3	4	5
1	Quality control circles s are organized strongly to propose suggestions for improvement of products, processes or to					

	solve problems, etc.					
2	All employees are involved in the Quality control circles structure.					
3	Members of Quality control circles s are committed and motivated.					
4	Quality control circles set goals for improvement.					
5	Kaizen promotion gets support from the facilitator.					
6	Kaizen promotion gets support from the Kaizen office.					
7	Quality control circles s are heterogeneous in skill set.					
8	Quality control circles s improved your sense of ownership to the company.					
9	Involving in the Quality control circles improves your capability to perform different jobs easily.					
10	Kaizen group members are acknowledged for their achievements and efforts in Kaizen activities.					
11	Quality control circles used to solve work-related problems					
12	Kaizen promotion often teams conduct meetings.					
	Economic outcomes of Kaizen implementation	1	2	3	4	5
1	Kaizen implementation in your company reduced waste/Muda in areas such as inventories, waiting times, transport, and movement of workers…					
2	Kaizen implementation in your company reduced material transporting distance.					
3	Kaizen implementation in your company reduced non-value-adding steps in the production process.					
4	Kaizen implementation in your company reduced in design and operational cycle time.					
5	Kaizen implementation in your company decreased frequency in failures of equipment and machine.					
6	Kaizen implementation in your company improves the overall utilization of resources.					
7	Kaizen implementation in your company increased the productivity of employees.					
8	Kaizen implementation in your company increased overall productivity.					
9	Kaizen implementation in your company reduced the unit manufacturing cost.					
10	Kaizen implementation in your company maximized the profits.					
11	Kaizen implementation in your company improved the cash flows.					
12	Kaizen implementation in your company increased and improved the economic balance.					
13	Kaizen implementation in your company reduced defect production.					

14	Kaizen implementation in your company decreased customer compliance.					
15	Kaizen implementation in your company meets deadlines and qualities as promised to customers.					

Please provide any additional information that you consider important regarding the Kaizen implementation process in your company.

_____
_____
_____
_____
_____
_____
_____
_____
_____

Thank you

Appendix b: Results

Table b1 Replace Missing Values

Result Variables

	Result Variable	N of Replaced Missing Values	Case Number of Non-Missing Values		N of Valid Cases	Creating Function
			First	Last		
1	q1_1	0[a]	1	201	201	MEDIAN(q1,2)
2	q2_1	0[a]	1	201	201	MEDIAN(q2,2)
3	q4_1	1	1	201	201	MEDIAN(q4,2)
4	q5_1	1	1	201	201	MEDIAN(q5,2)
5	q6_1	1	1	201	201	MEDIAN(q6,2)
6	MC1_1	0[a]	1	201	201	MEDIAN(MC1,2)
7	MC2_1	0[a]	1	201	201	MEDIAN(MC2,2)
8	MC3_1	0[a]	1	201	201	MEDIAN(MC3,2)
9	MC4_1	0[a]	1	201	201	MEDIAN(MC4,2)
10	MC5_1	0[a]	1	201	201	MEDIAN(MC5,2)
11	MC6_1	1	1	201	201	MEDIAN(MC6,2)
12	MC7_1	1	1	201	201	MEDIAN(MC7,2)
13	MC8_1	0[a]	1	201	201	MEDIAN(MC8,2)
14	MC9_1	0[a]	1	201	201	MEDIAN(MC9,2)
15	MC10_1	0[a]	1	201	201	MEDIAN(MC10,2)
16	EWT1_1	4	1	201	201	MEDIAN(EWT1,2)
17	EWT2_1	1	1	201	201	MEDIAN(EWT2,2)
18	EWT3_1	0[a]	1	201	201	MEDIAN(EWT3,2)
19	EWT4_1	1	1	201	201	MEDIAN(EWT4,2)
20	EWT5_1	0[a]	1	201	201	MEDIAN(EWT5,2)
21	EWT6_1	0[a]	1	201	201	MEDIAN(EWT6,2)
22	EWT7_1	1	1	201	201	MEDIAN(EWT7,2)
23	EWT8_1	0[a]	1	201	201	MEDIAN(EWT8,2)
24	EWT9_1	0[a]	1	201	201	MEDIAN(EWT9,2)
25	EWT10_1	1	1	201	201	MEDIAN(EWT10,2)
26	EWT11_1	0[a]	1	201	201	MEDIAN(EWT11,2)
27	EWT12_1	0[a]	1	201	201	MEDIAN(EWT12,2)
28	EOK1_1	0[a]	1	201	201	MEDIAN(EOK1,2)
29	EOK2_1	0[a]	1	201	201	MEDIAN(EOK2,2)
30	EOK3_1	0[a]	1	201	201	MEDIAN(EOK3,2)
31	EOK4_1	0[a]	1	201	201	MEDIAN(EOK4,2)
32	EOK5_1	0[a]	1	201	201	MEDIAN(EOK5,2)
33	EOK6_1	1	1	201	201	MEDIAN(EOK6,2)

34	EOK7_1	0[a]	1	201	201	MEDIAN(EOK7,2)
35	EOK8_1	0[a]	1	201	201	MEDIAN(EOK8,2)
36	EOK9_1	3	1	201	201	MEDIAN(EOK9,2)
37	EOK10_1	0[a]	1	201	201	MEDIAN(EOK10,2)
38	EOK11_1	0[a]	1	201	201	MEDIAN(EOK11,2)
39	EOK12_1	1	1	201	201	MEDIAN(EOK12,2)
40	EOK13_1	1	1	201	201	MEDIAN(EOK13,2)
41	EOK14_1	1	1	201	201	MEDIAN(EOK14,2)
42	EOK15_1	0[a]	1	201	201	MEDIAN(EOK15,2)

a. The input variable contains no embedded missing values or there are too few valid cases for the specified half span. No missing cases are replaced.

Table b2 skewness and kurtosis

Variable	min	max	skew	kurtosis
EWT12_1	1	5	-0.368	-0.301
EWT11_1	1	5	-0.599	0.319
EWT10_1	1	5	-0.452	-0.242
EWT8_1	1	5	-0.609	0.06
EWT7_1	1	5	-0.451	-0.386
EWT6_1	1	5	-0.289	-0.43
EWT5_1	1	5	-0.462	-0.199
EWT4_1	1	5	-0.476	-0.303
EWT3_1	1	5	-0.591	-0.038
EWT2_1	1	5	-0.649	-0.03
EWT1_1	1	5	-0.616	0.146
MC10_1	1	5	-0.626	-0.205
MC8_1	1	5	-0.456	-0.369
MC7_1	1	5	-0.912	1.386
MC6_1	1	5	-0.664	-0.002
MC5_1	1	5	-0.518	-0.496
MC4_1	1	5	-0.608	-0.21
MC3_1	1	5	-0.748	0.351
MC2_1	1	5	-0.964	1.288
MC1_1	1	5	-0.912	1.386
EOK15_1	1	5	-0.629	-0.184
EOK14_1	1	5	-0.203	-0.757
EOK13_1	1	5	-0.368	-0.66
EOK12_1	1	5	-0.222	-0.472
EOK11_1	1	5	-0.349	-0.632
EOK10_1	1	5	-0.35	-0.231
EOK9_1	1	5	-0.341	-0.373

EOK8_1	1	5	-0.347	-0.403
EOK7_1	1	5	-0.399	-0.28
EOK6_1	1	5	-0.629	0.223
EOK5_1	1	5	-0.508	-0.116
EOK4_1	1	5	-0.593	0.094
EOK3_1	1	5	-0.616	0.034
EOK2_1	1	5	-0.616	0.021
EOK1_1	1	5	-0.586	-0.197

Table b3: Communalities

Communalities

	Initial	Extraction
MC2_1	.448	.452
MC4_1	.572	.610
MC5_1	.636	.637
MC6_1	.550	.565
MC8_1	.562	.549
MC10_1	.552	.550
EWT4_1	.480	.471
EWT5_1	.528	.514
EWT7_1	.466	.456
EWT8_1	.485	.452
EWT10_1	.458	.468
EWT12_1	.512	.466
EOK4_1	.477	.410
EOK5_1	.635	.591
EOK6_1	.594	.455
EOK7_1	.615	.586
EOK8_1	.542	.410
EOK9_1	.622	.610
EOK10_1	.649	.669
EOK11_1	.551	.526
EOK12_1	.596	.580
EOK13_1	.611	.596
EOK14_1	.493	.460
EOK15_1	.494	.404

Extraction Method: Principal Axis Factoring.

Table b4 Factor Correlation Matrix

Factor Correlation Matrix

Factor	1	2	3
1	1.000	-.060	.390
2	-.060	1.000	.399
3	.390	.399	1.000

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

Table b5 Reliability Statistics

Reliability Statistics of management commitment

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.885	.884	10

Reliability Statistics of teamwork

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.872	.871	12

Reliability Statistics of out of Kaizen

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.919	.920	15

Table b6: Test of Multicollinearity

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	team	.651	1.537
	MGT	.651	1.537

Table b7: Test of correlation

Correlations

		team	MGT
team	Pearson Correlation	1	.591**
	Sig. (2-tailed)		.000
	N	199	199
MGT	Pearson Correlation	.591**	1
	Sig. (2-tailed)	.000	
	N	199	199

**. Correlation is significant at the 0.01 level (2-tailed).

Table b8: Descriptive statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Team	199	1.23	4.59	3.4250	.60441	-.564	.172	.163	.343
MGT	199	.81	3.30	2.4577	.51608	-.946	.172	.564	.343
Econ	199	1.30	3.79	2.6222	.54898	-.452	.172	-.446	.343
Valid N (listwise)	199								

Table b9: Test of Heteroscedasticity

```
Run MATRIX procedure:

 BP&K TESTS

 ==========

Regression SS
   5.9020

Residual SS
 432.0799

Total SS
 437.9819

R-squared
    .0135

Sample size (N)
  199
```

```
Number of predictors (P)
    1

Breusch-Pagan test for Heteroscedasticity (CHI-SQUARE df=P)
    2.951

Significance level of Chi-square df=P (H0:homoscedasticity)
    .0858

Koenker test for Heteroscedasticity (CHI-SQUARE df=P)
    2.682

Significance level of Chi-square df=P (H0:homoscedasticity)
    .1015


Run MATRIX procedure:

 BP&K TESTS

 ==========

Regression SS
   5.9020

Residual SS
 432.0799

Total SS
 437.9819

R-squared
    .0135

Sample size (N)
  199

Number of predictors (P)
    2

Breusch-Pagan test for Heteroscedasticity (CHI-SQUARE df=P)
    2.951

Significance level of Chi-square df=P (H0:homoscedasticity)
    .2287

Koenker test for Heteroscedasticity (CHI-SQUARE df=P)
    2.682

Significance level of Chi-square df=P (H0:homoscedasticity)
    .2616
```

Figure b1: Histogram of Regression Standardized Residual

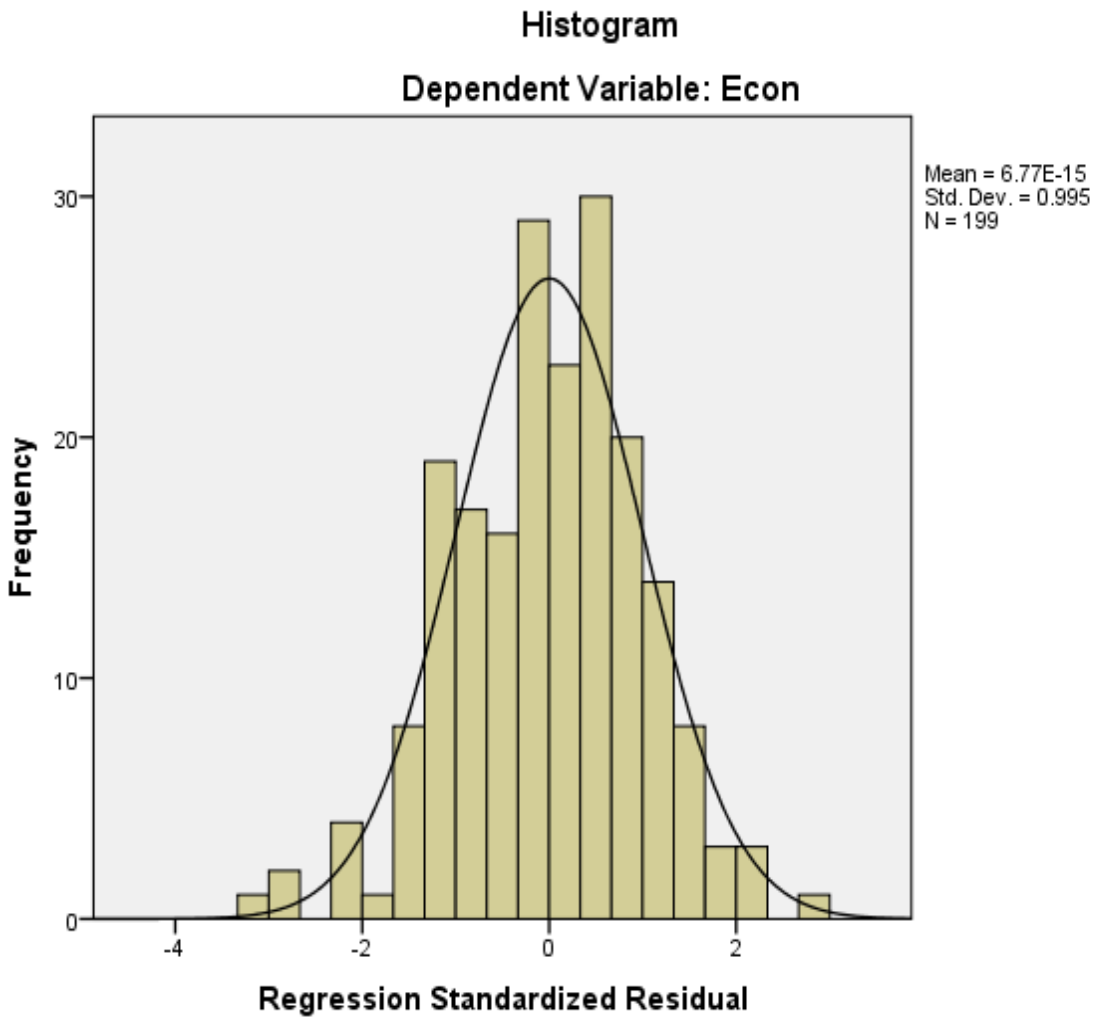

Figure b2: PP Plot of Regression Standardized Residual

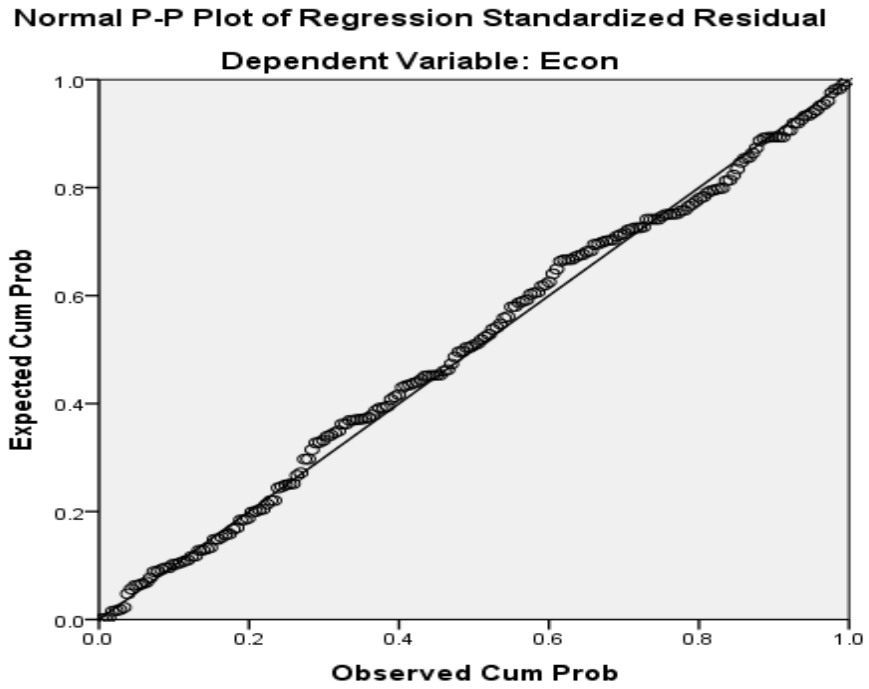

Figure B3: Scatterplot of Regression Standardized Residual

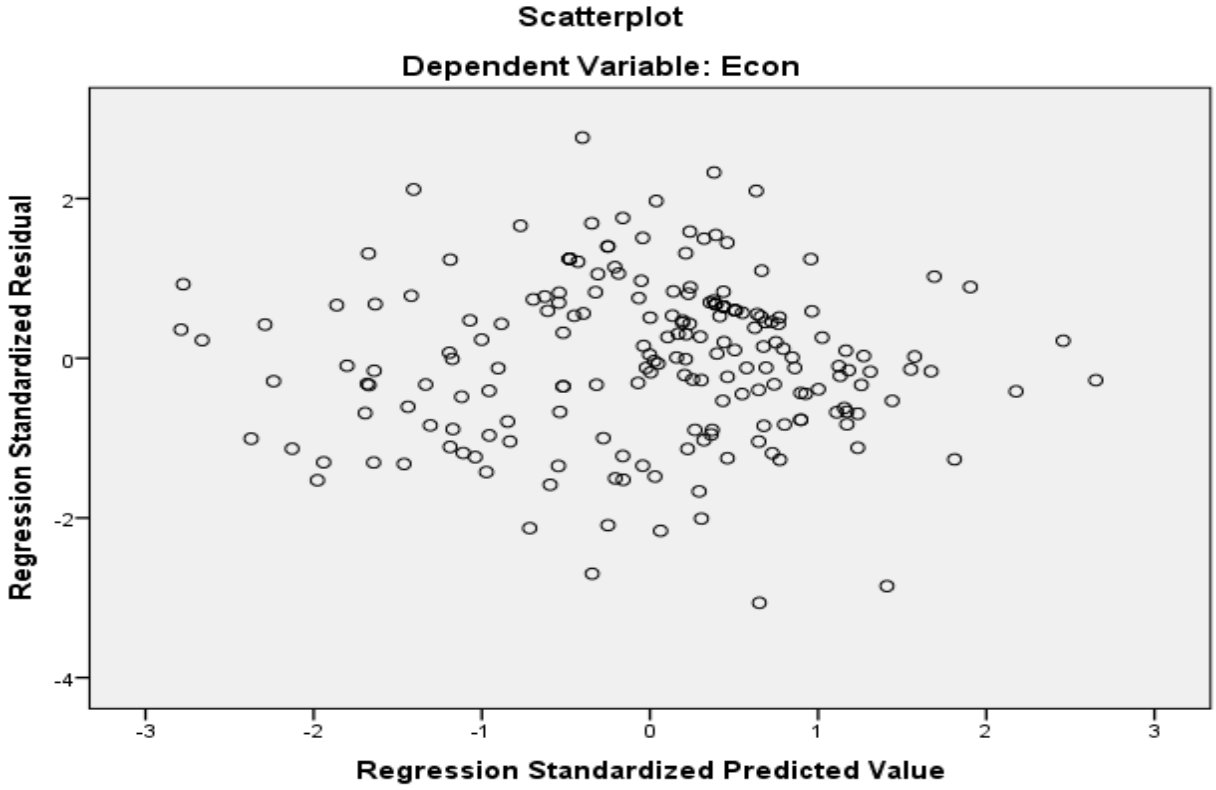

Figure b4: Scatterplot (Matrix) =team MGT Econ

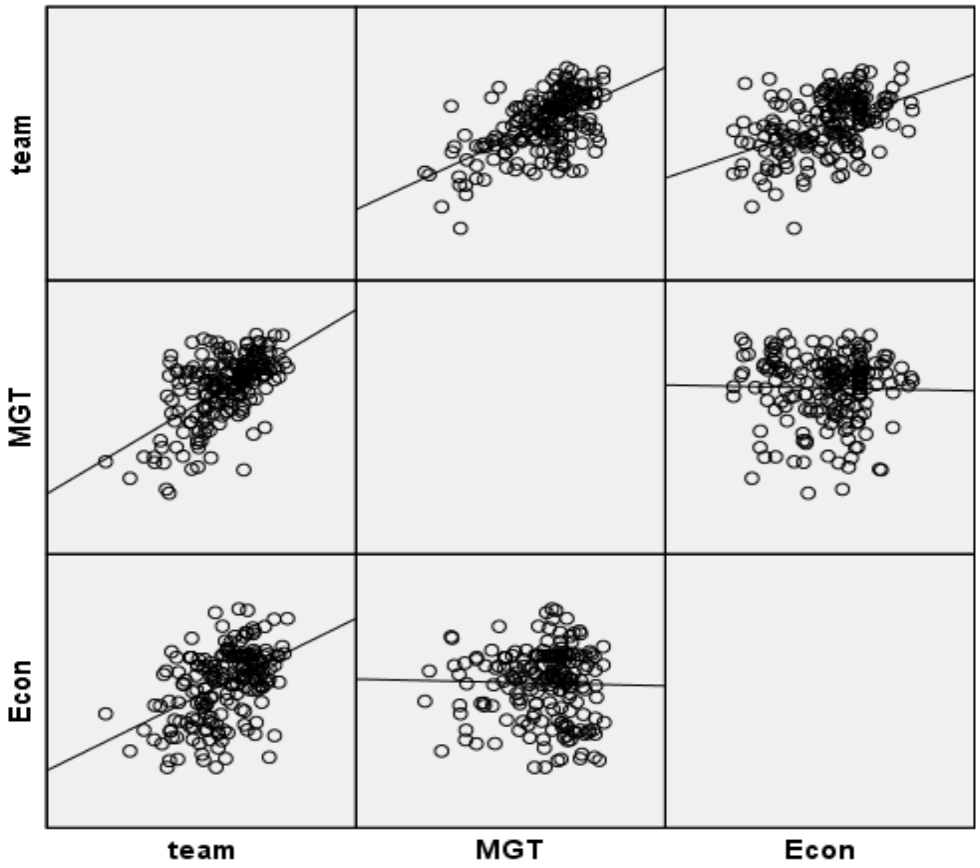

Table b10: Model Summary of Curved Fit

Model Summary and Parameter Estimates

Dependent Variable: Econ

	Model Summary					Parameter Estimates		
Equation	R Square	F	df1	df2	Sig.	b1	b2	b3
Linear	.916	2161.569	1	198	.000	1.021		
Logarithmic	.884	1515.394	1	198	.000	2.777		
Inverse	.868	1301.528	1	198	.000	5.481		
Quadratic	.957	2207.208	2	197	.000	2.459	-.544	
Cubic	.958	1504.283	3	196	.000	3.266	-1.229	.141
Compound	.900	1786.711	1	198	.000	1.441		
Power	.869	1314.578	1	198	.000	.994		
S	.856	1172.763	1	198	.000	1.965		
Growth	.900	1786.711	1	198	.000	.365		
Exponential	.900	1786.711	1	198	.000	.365		
Logistic	.900	1786.711	1	198	.000	.694		

The independent variable is MGT.

Table b11: Model Summary of Curved Fit

Model Summary and Parameter Estimates

Dependent Variable: Econ

	Model Summary					Parameter Estimates		
Equation	R Square	F	df1	df2	Sig.	b1	b2	b3
Linear	.961	4883.378	1	198	.000	.755		
Logarithmic	.963	5108.854	1	198	.000	2.138		
Inverse	.873	1364.505	1	198	.000	8.039		
Quadratic	.967	2867.224	2	197	.000	1.156	-.111	
Cubic	.967	1905.625	3	196	.000	1.351	-.227	.017
Compound	.951	3850.840	1	198	.000	1.312		
Power	.952	3958.116	1	198	.000	.768		
S	.854	1155.875	1	198	.000	2.870		
Growth	.951	3850.840	1	198	.000	.271		
Exponential	.951	3850.840	1	198	.000	.271		
Logistic	.951	3850.840	1	198	.000	.762		

The independent variable is the team.

Table b12: Model Summary of Curved Fit

Model Summary and Parameter Estimates

Dependent Variable: team

	Model Summary					Parameter Estimates		
Equation	R Square	F	df1	df2	Sig.	b1	b2	b3
Linear	.970	6430.280	1	198	.000	1.364		
Logarithmic	.950	3770.820	1	198	.000	3.737		
Inverse	.825	936.077	1	198	.000	6.939		
Quadratic	.980	4844.866	2	197	.000	2.281	-.347	
Cubic	.980	3271.392	3	196	.000	2.870	-.847	.102
Compound	.972	6815.231	1	198	.000	1.620		
Power	.951	3871.436	1	198	.000	1.322		
S	.832	981.221	1	198	.000	2.462		
Growth	.972	6815.231	1	198	.000	.483		
Exponential	.972	6815.231	1	198	.000	.483		
Logistic	.972	6815.231	1	198	.000	.617		

The independent variable is MGT.

Table b13: Beginning Model Fit Measures before Modification

Measure	Estimate	Threshold	Interpretation
CMIN	519.293	--	--
DF	249	--	--
CMIN/DF	2.086	Between 1 and 3	Excellent
CFI	0.885	>0.95	Need More DF
SRMR	0.080	<0.08	Acceptable
RMSEA	0.074	<0.06	Acceptable
PClose	0.000	>0.05	Terrible

Model Fit Measures after Modification

Measure	Estimate	Threshold	Interpretation
CMIN	422.844	--	--
DF	243	--	--
CMIN/DF	1.740	Between 1 and 3	Excellent
CFI	0.924	>0.95	Acceptable
SRMR	0.078	<0.08	Excellent
RMSEA	0.061	<0.06	Acceptable
PClose	0.032	>0.05	Acceptable

Cutoff Criteria*

Measure	Terrible	Acceptable	Excellent
CMIN/DF	> 5	> 3	> 1
CFI	<0.90	<0.95	>0.95
SRMR	>0.10	>0.08	<0.08
RMSEA	>0.08	>0.06	<0.06
PClose	<0.01	<0.05	>0.05

Table b14: Unstandardized Regression Weights

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
EOK4_1	<---	Econ	1.000				
EOK5_1	<---	Econ	1.186	.124	9.601	***	
EOK6_1	<---	Econ	1.017	.138	7.384	***	
EOK7_1	<---	Econ	1.169	.144	8.130	***	
EOK8_1	<---	Econ	1.004	.137	7.345	***	
EOK9_1	<---	Econ	1.302	.151	8.654	***	
EOK10_1	<---	Econ	1.324	.156	8.490	***	
EOK11_1	<---	Econ	1.228	.161	7.637	***	
EOK12_1	<---	Econ	1.188	.150	7.926	***	
EOK13_1	<---	Econ	1.329	.153	8.661	***	
EOK14_1	<---	Econ	1.185	.153	7.765	***	
EOK15_1	<---	Econ	1.211	.160	7.554	***	
MC2_1	<---	MGT	1.000				
MC4_1	<---	MGT	1.456	.154	9.484	***	
MC5_1	<---	MGT	1.525	.168	9.057	***	
MC6_1	<---	MGT	1.435	.155	9.283	***	
MC8_1	<---	MGT	1.315	.155	8.468	***	
MC10_1	<---	MGT	1.379	.158	8.746	***	
EWT4_1	<---	team	1.000				
EWT5_1	<---	team	1.070	.121	8.842	***	
EWT7_1	<---	team	1.034	.129	8.009	***	
EWT8_1	<---	team	.940	.120	7.824	***	
EWT10_1	<---	team	.930	.116	8.019	***	
EWT12_1	<---	team	1.044	.127	8.211	***	

Table b15: Regression Weights

Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
EOK4_1	<---	Econ	.601
EOK5_1	<---	Econ	.716
EOK6_1	<---	Econ	.635
EOK7_1	<---	Econ	.718
EOK8_1	<---	Econ	.626
EOK9_1	<---	Econ	.786
EOK10_1	<---	Econ	.763
EOK11_1	<---	Econ	.659
EOK12_1	<---	Econ	.693
EOK13_1	<---	Econ	.789
EOK14_1	<---	Econ	.672
EOK15_1	<---	Econ	.648
MC2_1	<---	MGT	.665
MC4_1	<---	MGT	.797
MC5_1	<---	MGT	.756
MC6_1	<---	MGT	.775
MC8_1	<---	MGT	.699
MC10_1	<---	MGT	.720
EWT4_1	<---	team	.677
EWT5_1	<---	team	.741
EWT7_1	<---	team	.658
EWT8_1	<---	team	.640
EWT10_1	<---	team	.659
EWT12_1	<---	team	.677

Covariances: (Group number 1 – Default

Table b16: Test mean difference- One-way ANOVA

Descriptives

Econ

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Textile	86	2.4843	.46542	.05019	2.3845	2.5841	1.30	3.35
Chemical	73	2.7817	.57830	.06769	2.6467	2.9166	1.31	3.79

Agro-processing	18	2.4512	.66019	.15561	2.1229	2.7795	1.74	3.73
Metal and Engineering	22	2.7717	.50065	.10674	2.5497	2.9936	1.56	3.28
Total	199	2.6222	.54898	.03892	2.5454	2.6989	1.30	3.79

Test of Homogeneity of Variances

Econ

Levene Statistic	df1	df2	Sig.
2.469	3	195	.063

ANOVA

Econ

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.509	3	1.503	5.313	.002
Within Groups	55.165	195	.283		
Total	59.674	198			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Econ

Tukey HSD

(I) What is your company industrial sub-sector?	(J) What is your company industrial sub-sector?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Textile	Chemical	-.29736*	.08464	.003	-.5167	-.0780
	Agro processing	.03308	.13786	.995	-.3242	.3903
	Metal and Engineering	-.28735	.12708	.111	-.6166	.0419
Chemical	Textile	.29736*	.08464	.003	.0780	.5167
	Agro processing	.33044	.13997	.088	-.0323	.6932
	Metal and Engineering	.01001	.12936	1.000	-.3252	.3452
Agro-processing	Textile	-.03308	.13786	.995	-.3903	.3242
	Chemical	-.33044	.13997	.088	-.6932	.0323
	Metal and Engineering	-.32043	.16904	.233	-.7585	.1176
Metal and Engineering	Textile	.28735	.12708	.111	-.0419	.6166
	Chemical	-.01001	.12936	1.000	-.3452	.3252
	Agro-processing	.32043	.16904	.233	-.1176	.7585

*. The mean difference is significant at the 0.05 level.

Table b17: Test mean difference- Oneway ANOVA

Descriptives

Econ

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Textile	86	2.4843	.46542	.05019	2.3845	2.5841	1.30	3.35
Chemical	73	2.7817	.57830	.06769	2.6467	2.9166	1.31	3.79
Agro-processing	18	2.4512	.66019	.15561	2.1229	2.7795	1.74	3.73
Metal and Engineering	22	2.7717	.50065	.10674	2.5497	2.9936	1.56	3.28
Total	199	2.6222	.54898	.03892	2.5454	2.6989	1.30	3.79

Test of Homogeneity of Variances

Econ

Levene Statistic	df1	df2	Sig.
2.469	3	195	.063

ANOVA

Econ

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.509	3	1.503	5.313	.002
Within Groups	55.165	195	.283		
Total	59.674	198			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Econ

Tukey HSD

(I) What is your company industrial sub-sector?	(J) What is your company industrial sub-sector?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Textile	Chemical	-.29736*	.08464	.003	-.5167	-.0780
	Agro processing	.03308	.13786	.995	-.3242	.3903

	Metal and Engineering	-.28735	.12708	.111	-.6166	.0419
Chemical	Textile	.29736*	.08464	.003	.0780	.5167
	Agro processing	.33044	.13997	.088	-.0323	.6932
	Metal and Engineering	.01001	.12936	1.000	-.3252	.3452
Agro-processing	Textile	-.03308	.13786	.995	-.3903	.3242
	Chemical	-.33044	.13997	.088	-.6932	.0323
	Metal and Engineering	-.32043	.16904	.233	-.7585	.1176
Metal and Engineering	Textile	.28735	.12708	.111	-.0419	.6166
	Chemical	-.01001	.12936	1.000	-.3452	.3252
	Agro-processing	.32043	.16904	.233	-.1176	.7585

*. The mean difference is significant at the 0.05 level.

Table b18: Test mean difference- Oneway ANOVA

Descriptives

team

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Textile	86	3.4900	.52928	.05707	3.3766	3.6035	2.24	4.43
Chemical	73	3.5602	.62132	.07272	3.4153	3.7052	2.13	4.59
Agro-processing	18	3.0265	.63066	.14865	2.7129	3.3401	1.23	4.04
Metal and Engineering	22	3.0481	.54692	.11660	2.8056	3.2906	1.68	3.76
Total	199	3.4250	.60441	.04285	3.3405	3.5095	1.23	4.59

Test of Homogeneity of Variances

team

Levene Statistic	df1	df2	Sig.
.562	3	195	.641

ANOVA

team

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.682	3	2.561	7.724	.000
Within Groups	64.649	195	.332		
Total	72.332	198			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: team

Tukey HSD

(I) What is your company industrial sub-sector?	(J) What is your company industrial sub-sector?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Textile	Chemical	-.07018	.09163	.870	-.3076	.1673
	Agro processing	.46356*	.14924	.012	.0768	.8503
	Metal and Engineering	.44193*	.13757	.008	.0855	.7984
Chemical	Textile	.07018	.09163	.870	-.1673	.3076
	Agro processing	.53374*	.15153	.003	.1411	.9264
	Metal and Engineering	.51212*	.14004	.002	.1492	.8750
Agro processing	Textile	-.46356*	.14924	.012	-.8503	-.0768
	Chemical	-.53374*	.15153	.003	-.9264	-.1411
	Metal and Engineering	-.02162	.18300	.999	-.4958	.4526
Metal and Engineering	Textile	-.44193*	.13757	.008	-.7984	-.0855
	Chemical	-.51212*	.14004	.002	-.8750	-.1492
	Agro-processing	.02162	.18300	.999	-.4526	.4958

*. The mean difference is significant at the 0.05 level.

Figure b5: Structural Model of SEM without Mediation

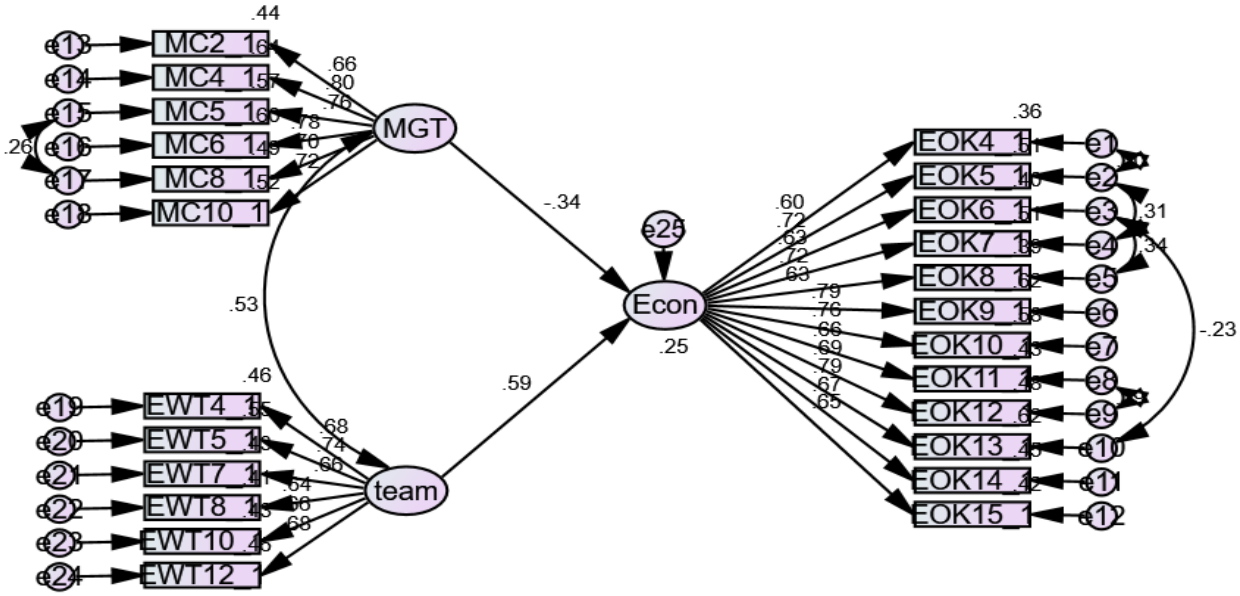

Table b19: Model Fit Measures

Measure	Estimate	Threshold	Interpretation
CMIN	422.844	--	--
DF	243	--	--
CMIN/DF	1.740	Between 1 and 3	Excellent
CFI	0.924	>0.95	Acceptable
SRMR	0.078	<0.08	Excellent
RMSEA	0.061	<0.06	Acceptable
PClose	0.032	>0.05	Acceptable

Cutoff Criteria*

Measure	Terrible	Acceptable	Excellent
CMIN/DF	> 5	> 3	> 1
CFI	<0.90	<0.95	>0.95
SRMR	>0.10	>0.08	<0.08
RMSEA	>0.08	>0.06	<0.06
PClose	<0.01	<0.05	>0.05