

**PROCESS IMPROVEMENT AND PERFORMANCE OF LARGE
MANUFACTURING FIRMS IN NAIROBI CITY COUNTY, KENYA**

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DECLARATION

The below signature affirms that this is purely my work and has not been presented for an academic award in any other institution.

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The research project has been submitted for presentation with my approval as my university supervisor.

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DEDICATION

I wish to dedicate this project to God Almighty my creator, my strong pillar, my source of inspiration, wisdom, knowledge and understanding. He has been the source of my strength throughout this program and on His wings only have I soared. I also dedicate this work to my Aunt Evelyn Mathai, who has encouraged me all the way and whose encouragement has made sure that I give it all it takes to finish that which I have started.

To my late parents, Michael and Grace, I thank you for creating me, bringing me up, imparting strength and confidence in me which has led to be who I am today, I will forever cherish and be grateful to you. To my unborn baby you are the inspiration behind all my efforts, I hope you will be proud of your mum someday

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ABBREVIATIONS AND ACRONYMS

FDI	Foreign Direct Investment
GDP	Gross Domestic Product
KAM	Kenyan Association of Manufacturers
MDGs	Millennium Development Goals
MTP	Medium Term Plan
PI	Process Improvement
TPM	Total Productive Maintenance
TPS	Toyota Production Systems
TQM	Total Quality Management

ABSTRACT

Firms are set to achieve good performance via process improvement activities. These process improvement activities ensure firms have a notch higher when it comes to competition with their competitors. This makes firms ready for market battles even with opportunist firms that might edge out their market segment through substitute good or services. However, without good management and controls in place to sustain and continuously improve these activities may not result to any benefits. The objective of this research was to determine process improvement and performance of large manufacturing firms in Nairobi City County. The specific objectives of study were: to determine the extent of implementation of process improvement in large manufacturing firms in Nairobi City County, Kenya; to establish the effect of process improvement on performance of large manufacturing firms in Nairobi City County, Kenya. The study adopted the descriptive research design. The population to be used for the study was all the large-scale manufacturing companies in Nairobi City County, Kenya which are 230. The sample size was 70 respondents. The study collected primary data through the use of research questionnaire. Outcomes showed that there was a positive and significant effect between total quality management, just in time, kaizen events and five S and firm performance. However, total product management and five whys had a positive and insignificant effect with firm performance. The study concluded that total quality management leads to improvement in firm performance. In addition, improvement in just in time practices, five S strategies would lead to improvement in performance. Manufacturing firms should greatly implement the total quality management practices so as to boost their performance. In addition, firms should strive to improve on firm structure, staff involvement/commitment/awareness to TQM and make available enough facilities to eliminate the obstacles that hinder proper use of TQM practices.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The resources in the world today are getting scarce and expensive to get, the competition on the same resources is becoming tougher and tougher by day. On the other hand, note there is a trend whereby the price of finished goods is expected to go down and at the same time customer requirements are increasing and changing at a very high rate. What is becoming the rescue to the conflicting trend in our world of manufacturing and service delivery is the concept of process improvement. Process improvement advocates for relentless effort in adjusting production line/service models in order to survive (Christina, 2012).

This study is based on two theories which include constraints theory and the production theory. The constraints hypothesis argues that each system of composite and the manufacturing processes comprises in interlinked activities. Each one of these activities hinders the system as a whole (Moore & Scheinkopf, 1998). The production hypothesis elaborates the values that a firm makes decision on how much their produce sells. It also explains how each product is produced and how much labour and raw material each product will require (Maurer, 2012).

The expectations of Kenya's manufacturing sector as it is stated in the development plan of vision 2030, is to ensure differentiated, vigorous and a sector that is aggressive and have the capacity of backing up the socio-economic development agenda of the country.

This can only be achieved by creation of jobs, generation of riches, FDI attraction and giving the necessary motive of attaining the Millennium Development Goals. However there has been stagnation of the contributions of the manufacturing sector towards the nation gross domestic product at 10%. This is expected to rise by 10% by 2030 (KNBS, 2018). Large manufacturing firms in Nairobi City County, Kenya form the majority of large manufacturing firms in the country and their performance will play a vital task in helping the country achieve vision 2030. Large firms manufacturing have started realizing the importance of process improvement practices as evidenced by their increased adoption in the last 10 years (KAM, 2018).

1.1.1 Process Improvement

Process improvement is defined as continuous incremental improvements in all aspects of the company (Imai, 1986). It applies the phrase “change for the better” which implies any alteration that result in enhancement which can be superiority or other features that an association judged to be beneficial that includes invention, less time delivery, toughness, easiness of flexibility, satisfaction of customers and low prices (Elger & Smith, 2005). Process improvement is a logic that spotlights on the procedure and results also. It is an umbrella idea that, when actualized precisely adapts the working environment, evacuates superfluous diligent work (both mental and physical), it trains staff to do fast tests utilizing logical techniques (Abdolshah & Jahan, 2006).

For a company to be successful with process improvement, there is the most effective way of starting the process and ensure the cycle is endless. Process improvement practitioners have several methodologies and tools to apply during their day to day work, which depends on the challenges or strategy the company is adopting to forge ahead.

TQM is one of the widely used process improvement methodology which advocates for company wise involvement in quality activities. It's based on three key items; Make customer happy through quality improvement, build the culture of continuous improvement and thirdly everybody needs to be involved in improving the company –this is enabled through creating respect to employees hence culture of cooperation towards certain goals (Rahman & Bullock, 2005).

Toyota production systems is another methodology highly used which has five key pillars namely; standard work, Just in time, lean Kaizen, Jidoka and total production maintenance. Standard work pillar emphasizes on using same way of doing things rather than each supervisor coming with his own ways of work which may not be same with next supervisor. According to Kaoru Ishikawa, a company should retain its standard way of work even a certain employee as shown a superior technique of which he uses alone. The second pillar insists on materials/items to be delivered only when required which is enabled through continuous flow considering take time based on pull system. Kaizen is one of the most mentioned word in the world today which basically means continuous improvement in English (Abdolshah & Jahan, 2006).

1.1.2 Firm Performance

According to Richard, Yip, Johnson and Devinne (2009), firm performance is ability of an organization in achievement of its mission by having proper management, governance, and continuous rededication to results attainment. Yahaya and Lamidi (2015) consider performance as a theme that continuously happens in paradigm of management. The effectiveness of an organization can be measured through examination of the activities it

conducts so as to attain its goals. The most notable aspects that can be used to gauge the performance of an organization are the outputs and their effects (Bien, 2002).

Firm performance measures how well or poorly an entity is putting its resources into use. It measures the level at which financial objectives are being met. It measures the efficiency applied by an entity in the use of its assets to create profits. It can be used to compare the performance of various firms or can be used to compare the performance of the same firm in different periods of time (Aosa & Machuki, 2011). Financial viability is the firm's ability to survive. It implies that the firm's financial resources inflow must exceed the outflow. The factors that improve the firm's financial viability include positive cash flow, financial surplus and multiple sources of funding (IDRC, 1999).

No consensus has been reached on the best or even the most sufficient measure of firm performance. This is because, there are many varied views of what desirable outcome of organizational effectiveness and because performance is often characterized by theory and research purposes being performed. Performance measurement targets the internal processes to determine effectiveness and efficiency of an action with a given set of metrics. Performance measurement indicators will act as proxies for various phenomena in the organization (Henri, 2003). Some use financial measures as a criterion to judge the success or fail of a decision or action (Richard et al., 2009).

1.1.3 Large Manufacturing Firms in Nairobi City County

Nairobi is Kenya's capital and hub for manufacture regionally or nationally. It is located strategically and also has developed infrastructure making the destination attractive for

firms which are manufacturing . Nairobi's large manufacturing firms mostly depend in imports (Kagechu, 2013). Firms face a number of challenges that include, work related challenges that emanate from the work environment, limited access to the market, start-up capital and high labour costs among others. Currently, there are 230 large scale manufacturing firms in Nairobi City County that are distributed across twelve sectors (KAM, 2018).

Large manufacturing firms play significant roles in the Kenyan economy. They fill savings, trade and revenue gaps while introducing sophisticated technological knowledge which is desirable and productive in Kenya. In addition, they engage in corporate social responsibility activities that help to empower the local communities in education, health and environmental conservation. According to the Consumer insight report (2017), Kenya is the Second most preferred destination for large manufacturing firms seeking to expand their operations. The group ranked Kenya at 23.17% after Nigeria which had a score of 29.57%. Globally, Kenya was ranked fifth behind Saudi Arabia, Vietnam and Argentina which has a score of 24.69% 24.72% and 24.72% respectively (KAM, 2018).

Despite the importance of the large manufacturing firms in Nairobi County, Kenya, they are facing a myriad of challenges such as stiff competition from cheap imports, lack of skilled man power and inadequate infrastructure to conduct production efficiently. The government and other policy makers have recognized this and various intermediations are projected in the Vision 2030 and its first MTP which will result to nation being economical and wealthy internationally. The pursued goals in the MTP include; to increase the product share in the market from 7% to 15%, enforce the capacity of domestically manufactured products, to advance the gap of the goods for the new and

present markets and to raise the exploitation of research and development results (KAM, 2018).

1.2 Research Problem

Firms are set to achieve good performance via process improvement activities (loch et al., 2003). These process improvement activities ensure firms have a notch higher when it comes to competition with their competitors (Garvin, 1998). This makes firms ready for market battles even with opportunist firms that might edge out their market segment through substitute good or services. However, without good management and controls in place to sustain and continuously improve these activities may not result to any benefits (Berwick 1995). TPS enabled Toyota to come up with several continuous improvement ideas like redesigning power unit which lead to saving of up to US \$ 20 on each unit sold. It reduced the scale of printing and cut down on printing paper by half. Moving items employees are using during working time helped cut down to motion waste. Work instructions were developed for employees to use the same technique. Toyota reduced scrap by half after coming up with a different way of applying dye and other ideas.

Most large manufacturers in Nairobi City County, Kenya have no knowledge of the main administrative procedures like process improvement despite the technological niche. The managerial capability may be upgraded faster ever since process improvement gears are established in a way to be esteemed by all the workforces, and its vital procedure is not very complex. Nevertheless, fewer trials are there in realizing process improvement in Kenya and its ultimate performance soaring by the industries of manufacturing.

Although there are studies done before in this area, the findings are quite valid. Brunet and New (2003) concentrated on diverse process improvement schemes, tactics and practices which comprises of Japanese manufacturing systems in Vietnam. The context was different and so the findings cannot be used to generalize the local context. Desta (2014) conducted a study in Ethiopia on process improvement implementation and performance of the manufacturing industry and concluded that process improvement leads to cost reduction, quality improvement and customer satisfaction. This study was however narrow in scope than the current study as it did not cover TQM, 5S and TPM. Alharasia (2017) found that JIT system has positive effect on operative excellence in industrial organizations, thus attaining competitive advantage.

In Kenya studies done on process improvement have mostly concentrated on only one aspect of process improvement which is Kaizen events and include its implementation and relationship to organizational performance; the results show a significant relationship (Nderi, 2012). Anot (2015) established that kaizen had different level of sustainability in Kenyan manufacturing firms with the element of improved maintenance practices exhibiting the highest degree of sustainability and lower levels of inventory demonstrating the lowest level of sustainability. Watetu (2016) concluded that kaizen has an impact on operational performance. This local studies left out other aspects of process improvement and their influence on performance.

Although different studies have been executed on the subject of process improvement in the context of manufacturing, the extent to which process improvement is implemented and its implications on performance of large manufacturing firms in Nairobi City County, Kenya has not been covered. Consequently, this research sought to find out the level of

implementation and effects of process improvement on performance of large manufacturing firms in Nairobi City County. Thus, this study strived to respond to this research question: what is impact of process improvement on performance of large manufacturing firms in Nairobi City County, Kenya?

1.3 Research Objectives

Objective of research was to determine process improvement and performance of large manufacturing firms in Nairobi City County.

The specific objectives of study were:

- i) Determining implementation extent of process improvement in large manufacturing firms in Nairobi City County, Kenya;
- ii) To establish the impact process improvement has on performance of large manufacturing firms in Nairobi City County, Kenya.

1.4 Value of the Study

Study Findings from the foundation for implementing effective process improvement practices. The research will offer awareness to the manufacturing firms in Kenya and other regions global regions that have implemented process improvement practices but have not conducted Post Implementation Review, those planning to implement and those who would like to get insight on how process improvement practices works.

The finding of the research forms a forthcoming position to academics and scholars who can think of doing a research in similar field. The research will also be useful to scholars and researchers to identify further areas of study by emphasizing on related topics that need more exploration and revising the empirical literature to inaugurate study niche.

This study will help policy makers to understand how process improvement practices impact the performance of Kenyan manufacturing firms since they will develop mechanisms that can be applied in performance improvement regarding manufacturers which will contribute to economic development and development in the nation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Focus is made on the chapter in regards to review of literature that has been done in the past. The available past studies provided the base of the exploration and comprises of the broad framework of process improvement practices, performance and review of empirical studies. The chapter also provided the conceptual framework.

2.2 Theoretical Literature Review

The section presents theories which are relevant which denoted arrangement of ideas that occurs (Sarkis, 2011). This study was informed by theories of constraint and production.

2.2.1 The Theory of Constraints

Anchoring theory in this case of study was the Theory of Constraints (TOC) as postulated by Goldratt, an Israeli physicist, in 1984. It has evolved over time and today it is an important factor within the field of management practice (Moore & Scheinkopf, 1998). Goldratt explained this theory as a methodology of classifying the major limiting factor or factors that act as hindrances in achieving the set goals. TOC takes scientific way of improvement; it theorizes that every composite system, as well as manufacturing procedures, made up of numerous connected actions.

It has the following dominant set of tools: a method for distinguishing and getting rid of constraint, the Thinking Processes and a technique for shaping performance and guidance of management verdict. An outstanding the inherent characteristic of TOC is, it

essentially prioritizes step up activities just like Kaizen which is actually Continuous Improvement. The theory's principles focus on improving the throughput from the system, by increasing throughput, the end results are improved (Chen & Lin, 2008).

The TOC approach to constraint management includes identifying the systems constraint and exploiting it. TOC is a philosophy about change thus application of TOC tools can dramatically, systematically and routinely smooth the transition and reduce discomfort (Chrisoph, 2005). Blocher, Chen and Lin (2008) asserts that firms using TQC can achieve the following benefits: reduced lead time, improved operations, fall in inventory and increased return on investment. In Kaizen workers have knowledge about detecting constraints, how to improve processes and reduce costs (Ngeta, 2009).

2.2.2 Production Theory

This hypothesis was proposed by Charles and Douglas (1928). According to this hypothesis, production makes use of resources to come up with service of good that is suit for the use or interchange in the economy market. According to Chapman (2005) this may comprise of engineering, storage, shipment, and packing. This hypothesis is an effort to elaborate the values that an organization makes decision on how much each product sells, how much it will produce, the raw material required and fixed capital good that will be employed. This hypothesis involves association amongst the process of goods and the productive aspect prices. It also comprises of the association between the commodity prices and the productive aspect prices and the commodities quantities and dynamic aspects on the other side (Fujimoto, 1999).

There are three layers of categorizing numerous decision of an organization. The main layer comprises of the choices made on the production method of a certain quantity of output plant of specified equipment and size. It comprised of the short-run cost minimization problem (Shah & Ward, 2003). The second layer comprises of the amounts of goods to yield in a stated plant. The last layer related to the long-run profit maximization. It concerns with the resolve of the most gainful size and equipment of plant

2.3 Process Improvement Practices

The process improvement has various techniques and practices. These techniques include; error proofing, kaizen events, Quality Control Circles, Just-In-Time system, kaizen costing, Suggestion System, Toyota Production System, Total Preventive Maintenance, Kanban system, 5 why's and elimination of the seven types of wastes. The current study focused on total preventive maintenances, 5S, Just-In Time Systems kaizen events, Suggestion System, 5 why's and TQM which are perceived as the distinct practices/techniques. Fujimoto (1999); Imai (1997; 1986); Liker (2004); Fukui et al. (2003) have all emphasized the need to use these techniques for improvement of performance.

The 5S is a scheme whose goal is minimizing surplus and elevating efficiency and excellence through upholding logical workstation and using graphic cues to accomplish further reliable functioning outcomes (Osada, 1991). The 5S also aims at inserting the standards of administrative neatness, normalization and workplace discipline in its prevailing configuration. Chapman (2005) established that 5S is a business scheme for

handling and an establishing manufacturing operation that needs minimal human strength, venture and period to enhance goods with minimal deficiencies.

The 5-why's system is a well-designed and factual based to identify the challenges and the solution that focuses on defects minimization and elimination (Alukal, 2007). Total Preventive Maintenance is a scheme of maintenance that focuses on preventing machines from breaking down. It is executed through autonomous maintenance. Autonomous maintenance are the actions intended to encompass workers in upholding their own apparatus governing the upkeep section. It joins the protective and analytical upkeep tactics with stress on worker contribution and it assimilates defensive upkeep, condition-based upkeep and projecting preservation happenings. According to Kutucuoglu et al. (2011) dependable tools is viewed as the key sponsor to the presentation and effectiveness of engineering schemes, particularly in a vibrant and stimulating surroundings. Kutucuoglu et al. (2011) further argued that TPM lays attention on refining tools efficiency, efficiency, workstation protection and ecological issues, and removing manufacture damages.

JIT is an invention scheme intended at eradicating non-value tallying activities of all styles and attaining a slim construction scheme elastic to put up with variations in customer updates. According to Ward and Shah (2003) JIT comprises of practices intended at minimizing waste that is in excess in line with the cost streams such as lot scope lessening, cycle period decrease, rapid exchange and creation development manufacturing. A kanban system is incorporated by JIT and denotes to a tool of communication in the JIT construction and catalogue control system, progressive at

Toyota. A kanban is devoted to assumed number of goods in the construction line, coaching the transfer of an assumed amount (Ohno, 1988; Imai, 1997).

TQM characterizes a various administration practices, ideas and approaches to advance the way an association undertakes business, makes its harvests, and interrelates with its workers and clientele. QCC actions act as an essential portion of TQM. QCC is a unimportant collection of workforces who jointly find difficulties, deliberate various preparations, and propose a resolution. QCCs gladly achieve development actions inside the workstation, as fragment of an organization package of joint schooling, excellence regulator, development and production upgrading. TQM integrates poke bondages or fault systems and the latter denote a scheme of eradicating faults which is the outcomes of inexactness (Ahire et al., 1996; Rahman & Bullock, 2005).

2.4 Empirical Literature Review

Munywoki (2018) on his study aimed at establishing effects of Just-In-Time (JIT) adoption on operational performance of cement companies in Kenya. This researcher employed multivariate regression model for studying the relationship between employee training, information communication technology, top management support and level of payroll and operational performance of major Kenyan cement companies. Initially, the study objective, made establishment of JIT in cement manufacturing companies having been implemented to a great extent. The second objective established among the factors that enhanced JIT implementation includes; top management support, Information Communication and Technology (ICT), training and level of payroll. JIT lead to reduction in waste, lead time, stock out, cost of production and production time.

Anot (2015) undertook studies regarding link between kaizen sustainability and operational performance in Kenyan manufacturing firms. Survey findings depicted that kaizen practices had changing grades of firms performance with the characteristic of enhanced upkeep practices having the utmost degree of sustainability and facet of lower record stages having the slightest performance degree. On trials met in kaizen application, lack of organization backing, unsuccessful exercise and lack of good message about kaizen postured the utmost test whereas workers' obligations and financial restraints postured the slightest test. Results further displayed that kaizen practices sustainability in Kenyan engineering companies mostly is performance associated.

Sadique and Walob (2014) researched TQM effect regarding different measures of performance. In addition, the study came across several barriers and reasons of the TQM implementation in Nigeria. The research established that various elements of TQM interfere with final result of the outcomes. The obstacles faced by firms in implementing TQM are the inadequate information and commitment by employees, insufficient employee involvement, insufficient of resources and inappropriate business structure. The conclusion was that firms should strive to improve on firm structure, staff involvement/commitment/awareness to TQM and make available enough facilities to eliminate the obstacles that hinder proper use of TQM practices.

Gitonga (2014) did a study on the managerial preparing mediation and its effect on business execution. The research found that even fleeting vital making advance organization polishes. The research looked to examine the effects of educating the very fundamentals of process improvement, a modest, realistic way to deal with administration

underlining the decrease of squandered materials and exercises, to proprietors of little endeavors on their business execution.

Kariuki (2013) found that many manufacturing firms are experiencing various challenges. Some of the challenges comprises of resistance of workers to process improvement practices because of work environment changes. The study further established that the driving force of process improvement in manufacturing firms was technology.

Mathenge (2012) also established that team work, training, management support and employee education level are the major factors that affect quality standard implementation in Kenyan flower industry. Ngware (2006) argued that the top organization must generate, apportion and sustain superiority management goals and standards so as to effectively execute superiority management system. In addition, the top administration should also show commitment to issues of quality since they influence the effectiveness of quality management practices. The study concluded that there is need for top administration to set apart enough resources for quality issues to be implemented successfully.

Soni and Muthengi (2005) did a study on the Kaizen system's effectiveness and its enhancement on financial performance. The study found that Kaizen process cannot be easily mastered. In addition, the principles of Kaizen can be defined simply and their application learnt through cross functional kaizen teams. However, the Kaizen teams are needed to be committed, study and persevere. Time after time the direction by

knowledgeable specialists is often quoted as key of success, and as with majority of organization development procedures, the rewards are corresponding with investments.

2.5 Research Gaps

Several researches have researched impacts of process improvement in regards to performance performance. Literature above indicated that process improvement practices may not be unanimously valid in all organizations contexts (Boyle, 2011). Wayhan and Balderson (2007) among other researchers indicated that there was a mixed finding on the association between process improvement and performance. According to Furlan (2011), not all firms implement process improvement manufacturing initiatives indicate the development on the operational performance.

In addition, many researchers stated that process improvement have an effect on performance. A study by Motwani (2003) indicated that process improvement practices eradicate wastes and advance process. Rahman et al. (2010) also showed that process improvement practices help in the reduction of lead time in production and intensify velocity and movement within supply chain. Zayko et al., (1997) also stated that process improvement practices can help to minimize the human effort, time of product development and space of manufacturing.

In Kenya studies done on process improvement have mostly concentrated on only one aspect of process improvement which is Kaizen events and include its implementation and relationship to organizational performance; the results show a significant relationship (Nderi, 2012). According to Ouma, Njeru and Juma (2015) in their study on kaizen's impact regarding cost level management in Kenyan Pharmaceutical Industry established

that Kaizen had a statistically considerable relationship with the cost level management. Anot (2015) investigated kaizen sustainability and manufacturing firms performance in Mombasa County and established that kaizen had fluctuating level of sustainability in Kenyan manufacturing firms. This local studies left out other aspects of process improvement and their influence on performance.

2.6 The Conceptual Framework

In this study, five indicators are extracted for measuring the independent variable being TQM, TPM, Five S, Just-In-Time and Five Why's. Independent variable is process improvement practices and the dependent variable is firm performance of big firms in the manufacturing sector in Kenya's city, Nairobi. Process improvement practices are perceived to improve firm performance of firms which are in the manufacturing sector regarding cost reduction, flexibility and efficiency of asset utilization.

Figure 2.1: Conceptual Model

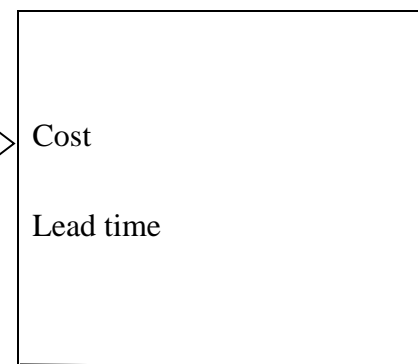
Independent variables

Process improvement practices



Dependent variable

Firm performance



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter contained information about design of the research, population and sample which is to be selected to be surveyed. Techniques that were used in collecting the data and analyzing it and presenting it are highlighted here.

3.2 Research Design

A descriptive design of research was used during this study. The design was adopted as the researcher had interest in the affairs state in a specific field and the variables should not be manipulated In accordance to Mugenda and Mugenda, 2003 this research design will help in hypothesis testing so as to give answers to questions regarding the subject under study.

3.3 Population of the Study

Population under study was large-scale manufacturing companies situated in Kenya's Nairobi City. There were 230 (Appendix II) large scale manufacturing firms in Nairobi (KAM, 2018). This survey considered Nairobi since largest manufacturing firms are based in Nairobi and thus gave a large population that the sample can be derived from.

3.4 Sampling Design

This research applied stratified random sampling. Stratified random sampling is accepted since the population is heterogeneous; hence the population was divided into

homogenous strata. The target population comprised of twelve strata; each being a sector in the large scale manufacturing firms. Kothari (2004) states that for a sample to be representative of the population, it atleast should be 10% of target population. 30% of the target population was sampled for this study giving a total of 70 respondents which was considered appropriate for the study.

Table 3.1: Sample Population (Source: KAM (2018))

Sector	Target Population	Sample
Construction, Building & Mining	5	2
Foods, Tobacco and Beverage	45	14
Chemicals and related products	29	9
Electrical and Energy	18	5
Rubber and Plastics	30	9
Textiles, Apparel	24	7
Furniture, Wood and Timber Products	12	4
Medical Equipment and Pharmaceuticals	12	4
Hard Metal and Allied	20	6
Footwear and leather products	7	2
Motor vehicle accessories and assembly	8	2
Paper and related products	20	6

Total	230	70
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3.5 Data Collection

Primary data was utilized because of its efficiency, flexibility, accuracy and inexpensiveness in nature (Mugenda & Mugenda, 2003). Primary data was collected via use of research questionnaire targeting 1 operation manager or their representative in each firm. The respondents were selected because they have functional knowledge and are involved in implementation of process improvement practices in manufacturing firms. The research instrument was divided into 3 sections, requiring responses to different dimensions based on the Likert type scale for purposes of enabling easy rating /ranking of answers, and data analysis; and a closing open ended section.

The first section, A, consisted of a brief background regarding the biographic information of the organization. The second section, B, focused on dimensions of implementation of process improvement practice in selected large manufacturing firms in Nairobi. Third section, C, made focus regarding big manufacturing firms performance in City of Nairobi in Kenya. Fourth section, D is a semi structured section on additional information regarding process improvement practices' impacts towards manufacturing firms performance. The drop and pick later technique was adopted during questionnaire administration. A register was kept to keep track of those questionnaires that have been returned and those still in the process.

3.6 Data Analysis

Data gathered was then screened for consistency, accuracy, uniformity and completeness in preparation of analyzing it. Descriptive and Inferential statistics were applied in analysis of data collected.

To address Objective I: To establish extend of implementation of process improvement in big manufacturing firms situated at Nairobi, descriptive statistics were used.

To address Objective II: To determine impact of process improvement on performance of large manufacturing firms in Kenya's Nairobi city, both correlation and regression analysis was executed. Prior to correlation and regression analysis, diagnostic test, that is, linearity, normality, multi collinearity, and homoscedasticity were undertaken in confirming regression model assumptions. The following regression model was used.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \epsilon$$

Where;

Y = Firm performance indicators i.e. Cost reduction, Responsiveness, Flexibility, Reliability and Efficiency of asset utilization

α – This is a constant i.e. it is the Y value when all the variables (X_1, X_2, X_3, X_4, X_5 and $\beta_6 X_6$) equal zero

β_1, \dots, β_6 = Regression coefficient of the six variables

X_1 – Five S, X_2 – TQM, X_3 – Just- in- Time, X_4 – TPM, X_5 – 5 Whys, X_6 -Kaizen events

ϵ (Extraneous) - Error term

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

The chapter provided findings summary from data collected while using the questionnaire as the data collection instrument. This research used descriptive and inferential statistical tools in data analysis. The conceptualized relationship in the conceptual framework guided the study results. The study results are presented in tables and diagrams.

4.2 Response Rate

The questionnaires that were given out were 70. However, not all of them were returned. 55 out of the 70 were given and this represented 78.58% which is adequate for this research as displayed in table 4.1. Babbie (2004) argued that return rates of 50% are acceptable to analyze and publish, 60% is good and 70% is very good.

Table 4.1 Response Rate

Questionnaires	Frequency	Percentage
Returned	55	78.58%
Non returned	15	21.42%
Total	70	100%

Research data (2019)

4.3 General Information

This section presents the data collected from each sub sector, the number of respondents, the results in terms of statistics and the implications of the results analysed.

4.3.1 Number of Employees in The Firm

The results in table 4.2 below showed that 56% of the firms had 36 – 50 employees, 24% of the firms had 21 – 35 employees, 15% of the firms had 11 – 20 employees while 5% of the firms had 5 – 10 employees. This implies that most manufacturing firms were big firms because of the number of the high number of employees in the firms.

Table 4.2	Percent	Valid Percent
5 – 10 employees	6	6
11 – 20 employees	15	15
21 – 35 employees	24	24
36 – 50 employees	56	56
	100	100

Research data (2019)

4.3.2 Subsector

The outcome in table 4.3 showed 21.82% of respondents were from foods, Tobacco and Beverage sector, 14.44% were from the Chemicals and related products, 10.91% were from Electrical and Energy, 7.27% of the respondents were from the Textiles, another 7.27% were from Apparel sector, another 7.27% were from Medical Equipment and Pharmaceuticals, another 7.27% were from Hard Metal and Allied sector, another 7.27% were from Paper and related products, 3.64% were from Motor vehicle accessories and assembly, another 3.54% were from Footwear and leather products, another 3.54% were

from Footwear and leather products, Furniture, another 3.54% were from Wood and another 3.54% were from Timber Products Construction, Building & Mining sector.

Table 4.3: Subsector

	Frequency	Percent
Construction, Building & Mining	2	3.64
Foods, Tobacco and Beverage	12	21.82
Chemicals and related products	8	14.55
Electrical and Energy	6	10.91
Rubber and Plastics	5	9.09
Textiles, Apparel	4	7.27
Furniture, Wood and Timber Products	2	3.64
Medical Equipment and Pharmaceuticals	4	7.27
Hard Metal and Allied	4	7.27
Footwear and leather products	2	3.64
Motor vehicle accessories and assembly	2	3.64
Paper and related products	4	7.27
Total	55	100

Research data (2019)

4.4. Descriptive Statistics

The results revealed that 80% stated that their organization had implemented process improvement practice while only 20% who stated that their organization had not implemented process improvement practice.

Table 4.4: Organization implemented process improvement practice

	Frequency	Percent
No	11	20
Yes	44	80
Total	55	100

Research data (2019)

The defendants were requested to state the extent to which their organization had implemented process improvement practices. The outcome as displayed in table 4.4 showed that 61.8% of the defendants stated that their organization had implemented total quality management to a high extent. In addition, outcome displayed that 74.6% of the defendants stated that their organization had implemented Just-In-Time to a high extent.

Outcomes also showed that 54.5% of the respondents also displayed that their firm had implemented total product management. It was also revealed that 78.2% of the respondents also displayed that their firm had implemented Five S. Outcomes also showed that 78.2% of the respondents also displayed that their firm had implemented Kaizen Events. It was also revealed that 74.5% of the respondents also displayed that their firm had implemented the five whys.

The defendants were requested to specify the degree to which the performance dimensions have been improved by process improvement practice in their firm.

Outcomes as shown in table 4.5 above revealed that 61.80% stated that process improvement practice improved time to market to a high extent. Outcomes also displayed that 72.7% stated that process improvement practice reduced lead time to a high extent. In addition, outcome displayed that 70.9% stated that process improvement practice improved input per worker to a high extent. Outcomes also displayed that 65.5% stated that process improvement practice increased equipment utilization to a high extent.

Outcomes further displayed that 60.0% stated that process improvement practice reduced employee supervision to a high extent. In addition, outcome displayed that 63.6% stated that process improvement practice reduced time taken to note errors to a high extent. Outcomes further displayed that 70.9% stated that process improvement practice increased customer satisfaction to a high extent. In addition, outcome displayed that 83.7% stated that process improvement practice increased staff morale to a high extent. Outcomes further displayed that 74.5% stated that process improvement practice reduced waste to a high extent.

Outcomes further displayed that 63.6% stated that process improvement practice improved product quality to a high extent. In addition, outcome displayed that 63.6% stated that process improvement practice improved product quality to a high extent. Outcomes further displayed that 54.5% stated that process improvement practice improved competitiveness to a high extent. In addition, outcome displayed that 76.4% stated that process improvement practice reduced product cost to a high extent.

4.5 The effect of process improvement on performance of large manufacturing firms in Nairobi City County

The study sought to determine effect of process improvement on performance of large manufacturing firms in Nairobi City County, Kenya.

Table 4.5 Regression Results

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	1.599	0.458		3.49	0.001
TQM	0.177	0.068	0.275	2.624	0.012
JIT	0.313	0.069	0.484	4.561	0
TPM	-0.015	0.041	-0.035	-0.366	0.716
Five S	0.191	0.058	0.335	3.313	0.002
five whys	0.139	0.094	0.156	1.474	0.147
Kaizen events	0.246	0.096	0.27	2.573	0.013

Research Data (2019)

Firm Performance=1.599 + 0.177 total quality management + 0.313 just in time + 0.191 five S + 0.246 Kaizene events

Outcomes displayed a positive and significant effect between total quality management and firm performance ($r=0.177$, $p=0.012$). These findings agreed with that of Sadique and Walob (2014) who argued that firms should strive to improve on firm structure, staff involvement/commitment/awareness to TQM and make available enough facilities to eliminate the obstacles that hinder proper use of TQM practices. Results further showed that there was a positive and significant effect between just in time and firm performance ($r=0.313$, $p=0.000$). There was a positive and insignificant effect between total product management and firm performance ($r=-0.015$, $p=0.716$). In addition, a positive and

significant effect between five S and firm performance was displayed ($r=0.191$, $p=0.002$). Results further showed that there was a positive and insignificant effect between five whys and firm performance ($r=0.139$, $p=0.147$). There was a positive and significant effect between kaizeb events and firm performance ($r=0.246$, $p=0.013$). These findings agreed with that of Anot (2015) who found that kaizen practices sustainability in Kenyan engineering companies is significantly associated to performance. Model summary results were presented in Table 4.6.

Table 4.6: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.764a	0.584	0.533	0.44303

Outcomes in Table 4.6 displayed that the R squared was 0.584. This implied that process improvement practices led to improvement of firm performance by 58.4%. ANOVA results were presented in Table 4.7.

Table 4.7: ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	13.251	6	2.208	11.252	.000b
Residual	9.421	48	0.196		
Total	22.672	54			

Anova outcomes displayed that the F statistic was 11.252 while the p value was 0.000 which was less than 0.05. This was a clear indication that process improvement practices had an influence on firm performance.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This segment contained summary of the study findings, conclusions drawn from the research outcomes and recommendations drawn from the research conclusions. Limitations of the study and areas of further research were discussed.

5.2 Summary

Research outcome showed that most manufacturing firms had implemented the total quality management practices. Additionally, most manufacturing firms had implemented just in time strategies. The results displayed that most firms had implemented total product management and also the five S. In addition, outcomes displayed that most firms had put into place the kaizen events and the five whys.

Outcomes also showed a positive and significant effect between total quality management and firm performance. In addition, a positive and significant effect between just in time and firm performance was displayed. Outcomes also indicated that there was a positive and insignificant effect between total product management and firm performance.

In addition, outcomes also displayed a positive and significant effect between five S and firm performance. A positive and insignificant correlation between effect and firm performance was also displayed. Outcomes also displayed a positive and significant correlation amongst effect and firm performance. The outcomes also displayed process improvement practices had a positive and significant influence on firm performance.

5.3 Conclusion

The study made conclusion that there was a positive and significant effect between total quality management and firm performance. This implied that an improvement in total quality management leads to improvement in firm performance.

This study furthermore concluded presence of a positive and significant effect amongst just in time and firm performance. This implied that improvement in just in time practices would lead to improvement in performance.

From findings of study, conclusion was made of there being a positive and insignificant effect amongst total product management and performance. Implication was made that improvement in just in time practices would lead to no significant change in firm performance.

The study further concluded that there was a positive and significant effect between five S and performance. This implied that improvement in five S strategies in an organization would lead improvement in firm performance.

The study further concluded existance of a positive and significant effect amongst kaizen event and firm performance. This implied that improvement in kaizen eventes had no significant change on firm performance.

The study further concluded that there was a positive and significant effect between five whys and firm performance. This implied that improvement in five whys would lead improvement in firm performance

5.4 Recommendations for policy and practice

From the study conclusions there was a positive and significant influence between total quality management and firm performance. Manufacturing firms should therefore greatly implement the total quality management practices so as to boost their performance. In addition, firms should strive to improve on firm structure, staff involvement/commitment/awareness to TQM and make available enough facilities to eliminate the obstacles that hinder proper use of TQM practices.

From the study conclusions, there was a positive and significant effect between just in time and firm performance. Manufacturing firms should therefore greatly implement the total quality management practices so as to boost their performance.

From the study findings, the study concluded that there was a positive and insignificant effect between total product management and firm performance. manufacturing firms should therefore not put a lot of emphasis on the total product management practices.

From the research conclusions, there was a positive and significant effect between five S and firm performance. The research therefore recommends that manufacturing firms should always ensure that the five S have been put in to place.

From the research conclusions, there was a positive and significant effect between five whys and firm performance. The research therefore recommends that manufacturing firms should always ensure that the five whys have been put in to place.

5.5 Limitations of the Study

Some of the respondents feared of their confidentiality while answering the questions. However, the researcher assured them that the information will be used for academic purposes only. In addition, non response from some of the respondents was also a great limitation in the study. Some respondents were not willing to answer the questions. The researcher had to make regular follow up both on mail and phone calls.

In addition the study was limited to the large scale manufacturing firms in Nairobi which may not be a representative all the manufacturing firms in Kenya. In addition, the study sampled the population. The sample may not have been a representative of the whole sample.

5.6 Areas of Further Study

Further study should focus on the research gaps identified in this study. The current study focused on process improvement and performance of large manufacturing firms in Nairobi City County. This study was done in Nairobi county only. A further study can be conducted and focus on other counties in Kenya for purposes of comparisons.

In addition, this study was done in Kenya. Therefore, a similar study can be conducted in other east African countries for purposes of comparisons. In addition, the study focused on large manufacturing firms only. Further study can focus on small and medium process improvement and performance of large manufacturing firms in Nairobi City County.

Since the R squared was 58.4% it seems there are other process improvement practices that were not addressed by the study. Other studies should therefore focus on other process improvement that affect performance of large manufacturing firms.

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APPENDICES

Appendix I: Research Questionnaire

Instructions

The below questionnaire has been designed to collect information on process improvement on and performance of large manufacturing firms in Nairobi City County, Kenya. You are therefore required to respond to the questions below to the best of your understanding and with honest. The findings of the study will purely be used only for the purposes of the study and not any other malicious gains

Instructions

1. Make sure that you tick in the space provided
2. Provide additional comments where necessary

SECTION A: BACKGROUND INFORMATION

1. Name of the business? (Optional)

2. Which year was the business registered?

3. How many employees do you have in your firm?

Less than 5 [] b) 5 – 10 employees [] c) 11 – 20 employees [] d) 21 –
35 employees [] e) 36 – 50 employees []

4. In which sub-sector does your firm belong?

Construction, Building & Mining []

- Foods, Tobacco and Beverage []
- Chemicals and related products []
- Electrical and Energy []
- Rubber and Plastics []
- Textiles, Apparel []
- Furniture, Wood and Timber Products []
- Medical Equipment and Pharmaceuticals []
- Hard Metal and Allied []
- Footwear and leather products []
- Motor vehicle accessories and assembly []
- Paper and related products []

SECTION B: IMPLEMENTATION OF PROCESS IMPROVEMENT PRACTICES

5. Has your organization implemented process improvement practice?

Yes [] No []

6. Kindly tick appropriate box that indicates the extent to which your organization has implemented process improvement practices. Use the following scale: 5) Very high extent 4) High extent, 3) Moderate extent, 2) Low extent, 1) Very low extent,

Process Improvement Practice	SCALE				
	1	2	3	4	5
Total Quality Management (TQM)					
Just-In-Time (JIT)					
Total Productive Management (TPM)					
Five S					
Kaizen Events					
Five Whys					

PART C: FIRM PERFORMANCE

7. On a scale of 1-5 show the degree of how the following performance dimensions have been improved by process improvement practice in your firm. Use the following scale: 5) Very high extent 4) High extent, 3) Moderate extent, 2) Low extent, 1) Very low extent,

PERFORMANCE MEASURES	1	2	3	4	5
Improved time-to-market					
Reduce lead time					
Improve input per worker					
Increase equipment utilization					
Reduced employee supervision					
Reduce time taken to note errors					

Increased customer satisfaction					
Increased staff morale					
Reduced waste					
Improved product quality					
Improved competitiveness					
Reduced product cost					

THANK YOU VERY MUCH

Appendix II: List of Large Manufacturing Firms in Nairobi City County, Kenya

Building, Mining and Construction (5)

1. Athi River Mining Ltd
2. Bamburi Cement Limited
3. Bamburi Special Products Ltd
4. Central Glass Industries
5. Flamingo Tiles (Kenya) Limited

Food, Tobacco and Beverage (45)

1. Africa Spirits Limited
2. Agriner Agricultural Development
3. Agro Chemical and Food Company Ltd
4. Alpine Coolers Limited
5. Arkay Industries Ltd
6. Belfast Millers Ltd
7. Broadway Bakery Ltd
8. Brookside Dairy Ltd
9. Bunda Cakes and Feeds Ltd
10. Buzeki Dairy Limited
11. C. Dormans Ltd
12. Candy Kenya Ltd
13. Capwell Industries Limited
14. Chirag Kenya Limited
15. Deepa Industries Limited
16. Edible Oil Products
17. Europack Industries Limited

18. Farmers Choice Ltd
19. Githunguri Dairy Farmers Co-Operative Society
20. Global Fresh Ltd
21. Global Tea and Commodities (K) Limited
22. Gonas Best Ltd
23. Green Forest Foods Ltd
24. Happy Cow Ltd
25. Insta Products (EPZ) Ltd
26. Jambo Biscuits (K) Ltd
27. Kabianga Dairy Ltd
28. Kakuzi Ltd
29. Kapa Oil Refineries Limited
30. Kenafric Industries Ltd
31. Kenblest Limited
32. Kenya Nut Company Ltd
33. Kenya Sweets Ltd
34. Kenya Tea Development Agency
35. Kenya Tea Growers Association
36. Kevian Kenya Ltd

37. Kwality Candies and Sweets Ltd
38. Lari Dairies Alliance Ltd
39. London Distillers
40. Mafuko Industries Limited
41. Mayfeeds Kenya Limited
42. Milly Fruit Processors Ltd
43. Mini Bakeries (Nbi) Ltd
44. Mjengo Ltd
45. Mombasa Maize Millers

Chemical and Allied (70)

1. Basco Products (K) Ltd
2. Bayer East Africa Ltd
3. Beiersdorf East Africa Ltd
4. Blue Ring Products Ltd
5. BOC Kenya Limited
6. Buyline Industries Limited
7. Canon Chemicals Limited
8. Canon Chemicals Limited (Former United Chemicals) Ltd
9. Carbacid (CO2) Limited
10. Chemicals and Solvents (EA) Ltd
11. Chrysal Africa Limited
12. Coates Brothers (E.A.) Limited
13. Continental Products
14. Coopers K Brands Ltd

15. Coopers K- Brands Ltd
16. Coopers Kenya Ltd
17. Crown Berger Kenya Ltd
18. Crown Gases Ltd
19. Crown Paints (Kenya) Ltd
20. Darfords Enterprises Ltd
21. Deluxe Inks Ltd
22. Desbro Kenya Limited
23. Diversey Eastern and Central Africa Limited
24. Eastern Chemicals Industries
25. Elex Products Ltd
26. Eveready Batteries East Africa Ltd
27. Faaso Exporters Ltd
28. Galaxy Paints and Coating Co. Ltd
29. Grand Paints Ltd

Energy, Electricals and Electronics (34)

1. Alloy Steel Casting Ltd
2. Amedo Centre Kenya Ltd
3. Assa Abloy East Africa Limited
4. Aucma Digital Technology Africa Ltd
5. Avery East Africa Ltd
6. Baumann Engineering Limited
7. Biogas Power Holdings (EA) Ltd
8. Centurion Systems Limited
9. East African Cables Ltd
10. Holman Brothers (E.A) Ltd

11. Iberafrica Power (EA) Ltd
12. International Energy Technik Ltd
13. Karan Biofuel Ltd
14. Kenwest Cables Ltd
15. Kenya Power Ltd
16. Libya Oil Kenya Limited (Formerly Mobil Oil Kenya)
17. Manufacturers and Suppliers (K) Ltd
18. Marshall Fowler (Engineers)

Plastic and Rubber (30)

1. ACME Containers Ltd
2. Afro Plastics (K) Ltd
3. Betatrad (K) Ltd
4. Bluesky Industries Ltd
5. Bobmil Industries Ltd
6. Brush Manufacturers
7. Cables and Plastics Ltd
8. Canaaneast Company
9. Complast Industries Limited
10. Coninx Industries Ltd
11. Dune Packaging Limited
12. Dynaplas Limited
13. Elgon Kenya Ltd
14. Eslon Plastics of Kenya Ltd
15. Five Star Industries Ltd
16. Fleya Kenya Limited
17. General Plastics Limited

18. Hi-Plast Ltd
19. Jamlam Industries Ltd
20. Jumbo Chem
21. Kamba Manufacturing (1986) Ltd
22. Kenpoly Manufacturers Limited
23. Kenrub Ltd
24. Kentainers Ltd
25. Kenya Suitcase Manufacturers Limited
26. King Plastic Industries Ltd
27. Kinpash Enterprises Ltd
28. L.G. Harris and Co. Ltd
29. Laneeb Plastic Industries Ltd
30. Metro Plastics Kenya Limited

Textile and Apparels (24)

1. Adpack Limited
2. Alltex EPZ Ltd
3. Alpha Knits Ltd
4. Ashton Apparel EPZ Ltd
5. Bedi Investments Limited
6. Brilliant Garments
7. Fantex (K) Ltd
8. Kamyn Industries Limited
9. Kavirondo Filments Ltd
10. Kema (EA) Limited
11. Ken-Knit (Kenya) Ltd

12. Kenwear Garment Manufacturers
13. Kikoy Co. Ltd
14. Le Stud Limited
15. Leena Apparels Ltd
16. Lifeworks Shukrani Limited
17. Longyun Garments
18. Midco Textiles (EA) Ltd
19. New Wide Garments (K) Ltd
20. Ngecha Industries Ltd
21. Senior Best Garments Kenya EPZ Ltd
22. Shin-Ace Garments Kenya (EPZ) Ltd
23. Spin Knit Limited
24. Spinners and Spinners Ltd

Timber, Wood and Furniture (12)

1. Comply Industries Ltd
2. Economic Housing Group Ltd
3. Elburgit Enterprises Ltd
4. Fine Wood Works Ltd
5. Furniture International Limited
6. Kenya Wood Limited
7. Newline Ltd
8. Panesars Kenya Ltd
9. PG Bison Ltd
10. Rai Plywoods (Kenya) Ltd
11. Rosewood Furniture Manufacturers

Pharmaceutical and Medical Equipment (12)

1. African Cotton Industries Ltd
2. Alpha Medical Manufacturers Ltd
3. Beta Healthcare International
4. Biodeal Laboratories Ltd
5. Biopharma Ltd
6. Cosmos Limited
7. Dawa limited
8. Elys Chemical Industries Limited
9. Gesto Pharmaceuticals Ltd
10. Glaxo Smithkline Kenya Ltd
11. KAM Industries
12. Laboratory and Allied Limited

Leather and Footwear (7)

1. Alpharama Limited
2. Bata Shoe Company (Kenya) Ltd
3. Budget Shoes Limited
4. C and P Shoe Industries Ltd
5. Leather Industries of Kenya Limited
6. Sandstorm Africa Limited
7. Zingo Investments Limited

Motor Vehicle and Accessories (8)

1. Alamdar Trading Company Limited
2. Associated Battery Manufacturers (EA) Ltd
3. Associated Vehicle Assemblers Ltd
4. Auto Ancillaries Ltd
5. Auto Springs Manufacturers Ltd Company
6. Autofine Filters and Seals Ltd
7. Automotive and Industrial Battery Manufacturers
8. Banbros Ltd

Paper and Board (20)

1. Paper House of Kenya Ltd
2. Adpak International Limited
3. Allpack Industries Ltd
4. Andika Industries Ltd
5. Associated Paper and Stationery Ltd
6. Autolitho Ltd
7. Bag and Envelope Converters
8. Bags and Balers Manufacturers (K) Ltd
9. Cempack Solutions Ltd
10. Chandaria Industries Ltd
11. Colour Labels Ltd

12. Colour Packaging Limited
13. Colourprint Ltd
14. D.L Patel Press Ltd
15. De La Rue Currency and Security Print Ltd
16. Dodhia Packaging Limited
17. East Africa Packaging Industries Limited
18. Elite Offset Ltd
19. Ellams Products
20. Ellams Products Ltd

Source: KAM (2018)