KAIZEN PRINCIPLES AND EMPLOYEE PERFORMANCE IN DAVIS & SHIRTLIFF LIMITED, NAIROBI CITY COUNTY KENYA.

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A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF BUSINESS IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE IN MASTER OF BUSINESS ADMINISTRATION (STRATEGIC MANAGEMENT) IN KENYATTA UNIVERSITY

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DECLARATION

This research project is my original work and has not been presented for a degree or other award in any other university. No part of this research project should be reproduced without authority of the author or/and Kenyatta University.

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SUPERVISOR'S APPROVAL

I confirm that the work in this project was carried out by the candidate under my supervision.

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DEDICATION

I dedicate this research project to my parents, siblings, husband, daughters and son for their constant support and presence that contributed to the efficient completion of this research. Thank you and God bless.

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ABBREVIATIONS AND ACRONYMS

ADKAR	Awareness, Desire, Knowledge, Ability, Reinforcement
ANOVA	Analysis of Variance
DMAIC	Define, Measure, Analyze, Improve & Control
D&S LTD	Davis & Shirtliff Limited
ISO	International Standards Organization
JIT	Just-In-Time
KAM	Kenya Association of Manufacturers
KPI	Key Performance Indicator
MESA	Manufacturing Enterprise Solutions Association
NACOSTI	National Commission for Science and Technology
PDCA	Plan, Do, Check, Act
QC	Quality Circle
SPSS	Statistical Package for Social Science
TQM	Total Quality Management
VIF	Variation Inflation Factor

OPERATIONAL DEFINITION OF TERMS

Employee performance	Observable behaviour done by people at work in line with effectiveness, efficiency, productivity and knowledge management to achieve organizational goals.
Just In Time Practices	Kaizen principle formulated to manage task completion, reduce operational cycle time, improve inventory management and scheduling activities.
Kaizen principle	Continuous process for efficiency and quality, always improving, incremental, participative and requiring workforce intelligence and orientation.
Lean Manufacturing	Kaizen practice with goals of eliminating all forms of wastes in business processes by improving product development and job skills, enhancing waste control and management of safety.
Manufacturing firm	Business involved in transformation of raw materials into finished or semi-finished goods by use of labour, machines and tools.
Quality Circle	Small employees group performing same functions and regularly meet to improve team work and delivery of objectives, enhance communication and solve problems.
Six Sigma DMAIC	Kaizen principle involved in incremental improvement of processes by minimizing work errors, improving employee presentation, activities completion and job knowledge thus deliver service/goods at customer convenience.

ABSTRACT

Globally, firms are well known for their dependence on employees to achieve their objectives. Kenyan companies are vital due to their substantial impact to the economic development of the country thus gradually gaining attention in improving quality management for competitive advantage and superior employee performance. The study sought to investigate kaizen principles and their influence on employee performance in Davis & Shirtliff Limited in Nairobi, Kenya. This project sets out to establish whether kaizen practices like quality circles, six sigma DMAIC, just in time practices and lean manufacturing practices can affect employee performance in Davis & Shirtliff Ltd by increasing efficiency, effectiveness skills/knowledge achievement and productivity. The study adopted descriptive research design where respondents described their experiences on the kaizen principles to improve employee performance in Davis & Shirtliff Ltd. The target population was 288 employees in Davis & Shirtliff Ltd. Stratified proportionate sampling method was applied to select each strata sample from sample size of 165 employees as participants from Davis & Shirtliff Ltd. The study adopted self-administered questionnaires as the main data collection instrument. A pilot study was undertaken to pre-test the questionnaire for its validity and reliability. Data findings were based upon the variables and reasons for conducting the research. Data analysis was done using quantitative approach with the aid of Statistical Package for Social Science (SPSS) version 23. Descriptive statistics (in form of percentages, means and measures of dispersion) and inferential analysis was employed in the data analysis. Cronbach's coefficient of alpha tested the reliability with results being; quality circle 0.811, lean manufacturing practice 0.802, just in time practices 0.791 and six sigma DMAIC 0.728. Analysis using multiple regression was applied to show the strength of the association between the dependent and independent variables. The findings were presented in frequency tables and charts with explanations right after. There was 78.8% response rate. ANOVA demonstrates that the independent variables statistically significantly predict the dependent variable. Quality circles, six sigma DMAIC and lean manufacturing practices are the kaizen principles which are statistically significant in employee performance from the multiple regression analysis as compared to just in time practices. Just in time practice lower influence could be attributed to low levels of awareness and responsiveness within the firm. The study revealed that quality circles improve delivery of objectives by employees and also lead to compliance towards the firm objectives. It was also established that six sigma DMAIC influences completion of activities by employees at minimized costs and also leads to faster flow of operations. Opting for lean manufacturing practices minimizes wastages by employees and also that it provides simple comprehensive steps for employees on waste reduction. The study thus recommended that the management of Davis & Shirtliff Ltd should check on the quality circles on at regular intervals to ensure that they work best for the company. The management should set policies and guideline to be observed to ensure that six sigma DMAIC is adhered to in the company. Also the study recommends that the personnel responsible with checking on just in time practices to be reliable and of high integrity to ensure that it is it is done in accordance to the listed procedure. The company should conduct more training on soft skills and adoption of kaizen principles within the whole organization on a regular basis based on a criterion to be developed by the company.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Firms can only win a competitive advantage through employees and to the extent that they are supported to perform (Obisi, 2011). Employee performance is vital in human resource integration as it addresses how performance is approached generally in organizations (Dutta & Pinder, 2011). Due to changing global trends, for firms to remain relevant in the market, they focus internal operations like efficiency, profitability, effectiveness, productivity, knowledge management and team work (Marilyn, 2011). Employee comfort in the work place has been realized as vital by firms as it leads to increased productivity, retaining of quality personnel and competitive edge is maintained (Gutnick, 2007). Successful companies acknowledge that their achievements relate to their capacity to communicate, track and manage their staff and engage in reward programs with individuals or team performance to maintain the workforce focus.

The MESA (Manufacturing Enterprise Solutions Association) firm, over past years sponsored research to aid manufacturing firms identifying the most vital metrical of employee performance and assist those making decisions to discern performance enhancements on metrical, which they found to be; improved quality, efficiency, compliance, reduced maintenance, increased flexibility and innovation, reduced costs and improved profitability, improved customer experience and responsiveness (Schmidt, Otto & Kusmaul, 2010).

Employee performance must involve plans which provide balance, credible measures including expected results, appropriate measures, i.e. cost effectiveness, quality, timeliness and quantity. To gain credibility, performance expectations must be: timely

communicated; specific, understandable and clear; measurable, verifiable and result oriented, propel continuous productivity improvement and be reasonable and attainable

(Chadler, 2008).

To improve on employee performance, thus overall organization performance, there are incremental kaizen principles like quality circles, just in time practices, six sigma DMAIC and lean manufacturing practices, which can be adopted in manufacturing firms. (Bhoi, Desai & Patel, 2014). For companies to constantly be competitive, maintain the market share in its international market, continuous improvement through kaizen adoption is vital for overall industrial performance (Saad & Yusoff, 2015).

1.1.1 Employee Performance

An employee is a person paid or hired to perform specific tasks or provide labour and work under someone else's control on what is to be done and how it is to be done (Murray, 2017). Performance is the competency of a firm to transform the resources within it in an efficient and effective manner to achieve its goals. Employee performance consists of observable employees' behavior at work in a manner aligned to contribute towards the firm standards, goals and objectives (Noordzij, 2013). It entails employee motivation by goal setting, progress measurement, relaying feedback, coaching for improved performance and achievements rewarding (Tse & Chiu, 2014).

Employee performance measures on efficiency, effectiveness and customer retention rate, have to be well managed for the successful return on investment, sustainability, competitiveness and profitability of firms (McKinsey, 2006). Employee performance

propels employees to use their private information to make better organizational decisions (Williamson, 2008). Due to the incorporation of the information/ideas from employees, productivity, quality of products and flexibility of the organization improves (Preuss & Lautsch, 2002). Potential benefits accruing from greater employee performance in firms requires their interests to be well aligned with organization's interests (Ogden, 1992). If employees are given opportunities to make work-relevant decisions and be informed adequately on issues that concern them, then the individuals and the organization will reap the performance benefits (Shadur, 1999).

Performance can be measured through quantitative data collection with key focus on performance indicators like effectiveness, efficiency, skills/knowledge achievement and productivity. When a firm has the ability to appropriately compensate the employees, train them, gauge their efficiency and effectiveness, identify their strength and weaknesses, then business will be more productive and successful. Efficiency in employees is through supporting them by training and motivation in order to qualitatively and practically improve (Abassi & Soltani, 2014). Effectiveness in employees in the global market leads to their retention and low turnover effect on a firm. Knowledge/Skills enhancement ensures employees efficiently use the firm's diverse resources such as materials, labour, capital and information to achieve firm survival, competitiveness and superior value proposition (Torabi & El-Den, 2017). Productivity is increased by high performance practices that transfer power to employees. The main reason for measuring and managing employee performance is maintaining increased employee efficiency in order to maintain employees work at a highly efficient rate. (Cappelli & Neumark, 2001).

1.1.2 Kaizen Principles

Kaizen is Japanese philosophy in which 'Kai' means change and 'Zen' means "good" the whole purpose of which is betterment of work and improving the organization efficiency. In the Japanese language, kaizen means "continuous improvement" and in practice, it seeks to involve all the participants of the process that is being analyzed at a relatively low cost for the company (Imai 2012). Operationally, the kaizen system has three characteristics; it is a continuous process for efficiency and quality, requires participatory employee involvement and it is incremental in nature as it does not involve reorganization (Brunet & New, 2003). Kaizen involves small but continuous improvement which can improve the overall productivity in huge multiplication.

Kaizen involves providing standard establishment, maintenance and finally improvement. In this context, a standard is the guiding procedures, policies or rules management establishes for its operations. The guidelines enable successful performance by employees, though if not able to adhere, then the top leaders are forced to train the employees or review the standards (Wittenberg, 1994). For organizations to maintain their leading positions in the market, they must increase quality of their services, reduce costs and motivate the employees to implement the organization performance orientation, based on report done by International MultiConference of Engineers and Computer Scientists (Castillo, Ao & Feng, 2010). Kaizen is distinguished as the best method of improving performance among all the techniques as it involves little implementation cost. Nowadays, organizations carry on seeking innovative ideas for improving their processes and retaining a competitive edge by incorporating the philosophy of kaizen.

There are efficient kaizen practices that can be used to improve and measure employee performance indicators. Just in Time (JIT) practices is a kaizen principle

designed to efficiently achieve delivery time, get the right quality and reduce cost in the production process in order for the firm to deliver goods/services as per consumer desire and timeline. This reinforces efficiency in employee performance. Quality circles (QC) are small groups of employees performing similar organizational functions and regularly meet to engage employees to discuss cost, delivery and quality, to provide solutions to problems, among other issues (Deming, 1950). This reinforces skills/knowledge achievement with regards to company products and services thus elevated employee performance. Lean manufacturing is a kaizen practice with goals of identifying and eliminating all forms of wastes that are non-value added activities in business processes, as well as creating value at the end for customers and other stakeholders. It involves continuous improvement of products, safer processing practices, minimizing waste, and value (Pettersen, 2009). Lean manufacturing practices can be used to measure and improve on productivity in employee performance. Last but not least, the six sigma DMAIC kaizen practice involves defining, measuring, analyzing, improve and controlling processes leading to process improvement initiative. It can be launched in a firm to improve effectiveness in employee performance.

1.1.3 Davis & Shirtliff Limited

The Davis & Shirtliff (D&S) Ltd founded in Kenya in 1946 dominates in the East African locality in supply of water and energy associated facilities. It's an African company with its business activities evolving around six core commodity categories; boreholes, water pumps, solar equipment, water treatment, generators and swimming pools. It is involved in manufacture and assembly of specific products in its range of the six core products.

D&S Ltd is Kenyan based operating through Kenyan branches network and regional subsidiaries in Tanzania, Uganda, Ethiopia, South Sudan, Rwanda and Zambia. D&S Ltd administers high standard facilities obtained from broad range of firms as well as manufacturing and assembly of various water related machinery and products. Complemented with over 700 trained professional staff, it has focused on infrastructure investment on its 10,000m^2 coverage to well-resourced workshops, modern offices, extensive spare parts stocks, expansive workshops, manufacturing, training and administrative facilities, a fleet of trucks and a fully integrated ICT network.

Since its initial launching, the strategic direction of D&S has been propelled by an elaborate strategic philosophy. D&S guiding principle is that "One person working alone is limited in their endeavours. Many people working together have no limit to their achievement" (HRMIS, 2018). The paramount corporate objectives are to provide an outstanding level of customer service, close and mutually beneficial partnerships with suppliers, productive and gratifying employees' careers and growth of the company asset base whilst simultaneously making an invaluable input to the locality and its environs (HRMIS, 2018).

The Davis & Shirtliff Group pursues growing into an excellent firm that can be benchmarked to the best international standards by establishing remarkable corporate performance, professionalism and integrity and to illustrate that an indigenous African firm can contest majestically in its exclusive areas of activity.

The company is ISO 9001:2008 certified and demonstrates the quality focus in its core values of integrity, quality and 'Altiora peto'. Altiora Peto is a Latin phrase meaning seeking higher things or improvement must be a continuous process. It

focuses on high quality standards in its operations to facilitate building competitive advantage. Since introduction, D&S Ltd has been strategically driven by a clearly defined philosophy that an individual working alone is limited in performance but a team has no limit to achievement (Davis, 2014).

D&S Ltd requires continuous fostering of kaizen practices in order to improve employee performance indicators due to its demand to manage its employees and resources. The company's office efficiency is highly advanced, having installed a strong financial information system that facilitates quick customer service and customer data retrieval. The company's team of sales and service engineers are available to visit different sites to provide pre and post-sales service. The company has highly competent staff since all the sales staff are graduate engineers in various disciplines, and have exceptional levels of product knowledge and experience. In support of the back-up service it has a fully equipped training center, used to train in excess of 1,500 customers annually (HRMIS, 2018).

1.2 Statement of the Problem

The Kenblachard Companies report of 2000 discussed the employee performance impediments and concluded that only 60% of workforce was operating at 65% of their potential. The remaining 40% of employees' potential could be exploited by determining the determinants of employee performance, of which most firms are faced with the dilemma of the factors which influence employee performance (Gitonga, Jean & Kingi, 2016). In Davis & Shirtliff Ltd, poor individual employee performance affects the productivity of individual and group employees which can put the company at a risk. Measures and actions to improve employee's performance should be put, thus performance assessment becomes actionable, clear, measurable,

concise and informative (Uma, 2013). D&S Ltd is not quite efficient in adoption of formal policies designed specifically to inhibit employee performance constraints thus enhance performance in employees, however it's more inclined to improvement of quality performance in its processes. A lot of focus has also been put by the executives on external environmental factors affecting performance. Financial and accounting measures have been used in assessing performance in D&S Ltd. Knowledge base on performance assessment needs an upgrade. The fact that the accounting strategies are cost based and backward looking provides little employee motivation (Manzoni & Islam, 2009).

A kaizen study practiced in selected Japan firms brings to a conclusion that kaizen uniquely evolves in each firm due to changes in the business environment of the firm. There is considerable reliance of D&S Ltd to acquire its goals as a vitality in the worker performance within the changing business environment. This yields insights into kaizen's sustainability, for the firm's competitive advantage (Brunet & New, 2003). Study of impact of kaizen on the D&S Ltd worker's performance shall ensure that kaizen improves employee's welfare. Kaizen improves employees' working condition, improves on their programs and strengthens their social capital in firms (Shimada & Sonobe, 2010).

Even though studies of employee performance and kaizen principles have been done independently, so far there are very few studies that relate kaizen principles with employee performance and specifically to firms in Kenya. This constituted a gap in knowledge that the proposed study intended to fill. The identified gap was captured in the following question: What is the effect of kaizen principles on employee performance in Davis & Shirtliff Ltd?

1.3 Research Objectives

1.3.1 General Objective

To determine the influence of kaizen principles on employee performance in Davis & Shirtliff Ltd in Nairobi, Kenya.

1.3.2 Specific Objectives

The study had the following research objectives:

i) To establish the effect of quality circles on employee performance in Davis & Shirtliff Ltd.

ii) To examine the extent to which adoption of six sigma DMAIC process affects employee performance in Davis & Shirtliff Ltd.

iii) To determine the effect of just in time practices on employee performance in Davis & Shirtliff Ltd.

iv) To establish the effect of lean manufacturing practice on employee performance in Davis & Shirtliff Ltd.

1.4 Research Questions

The researcher was guided by the following research questions:

i) To what extent does quality circles influence employee performance in Davis & Shirtliff Ltd?

ii) To what extent does six sigma DMAIC process influence employee performance in Davis & Shirtliff Ltd?

iii) To what extent does just in time practices influence employee performance in Davis & Shirtliff Ltd?

iv) To what extent does lean manufacturing practice influence employee performance in Davis & Shirtliff Ltd?

1.5 Significance of the Study

This study aims to highlight some of the kaizen concepts to improve performance of employees in Davis & Shirtliff Ltd. This study will be beneficial to the diversified participants in the Kenyan industry like workers, suppliers, customers and employers. Employee performance when influenced by kaizen, is vital for firms as focusing on it aims at improvements in efficiency, effectiveness, skills/knowledge achievement and productivity for the employees and company owners. Improved retention, problem solving and commitment in team members shall increase employer's stake to be strengthened and more committed to perform. Study endures to expose improved competitiveness for the company due to increase in efficiency, higher quality products with fewer faults, increase in profits, increase in effectiveness, lower costs, increase in knowledge/skills and improvement in productivity.

Bodies like Kenya Association of Manufacturers (KAM), which are involved in promoting trade and investment, recognize the great contribution firms have brought to the economic growth through kaizen practices hence it is in their best interest to ensure processes run smoothly and the right policies are put in place to regulate the industrialists in Kenya.

This research will aid academicians to acknowledge kaizen and its importance on employee performance in firms. The research will help to establish new prospective investigative interest for researchers to undertake by giving statistics on the influence of independent variables on achievement of the purpose of this proposal hence a way for further research.

1.6 Scope of the Study

This study focused on the effect of kaizen principles on employee performance in Davis & Shirtliff Ltd in Nairobi City County due to factors like efficiency,

effectiveness, skills/knowledge achievement and productivity, thus the adoption of specific kaizen practices to improve performance of employees.

The scope was narrowed to D&S Ltd which is highly staffed with 700 professional staff directly or indirectly involved in manufacturing, requiring further improvement in their performance across all divisions. D&S Ltd was established in 1976, but the study focuses from the year 2011 to date due to its fluctuation in employee performance during that period, which manifests through employee absenteeism, high employee turnover ratio, increased competition from other firms and fluctuations in financial performance.

The study adopted descriptive research design with target population of 288 employees in Davis & Shirtliff Ltd. Stratified proportionate sampling method was applied. The study adopted self-administered questionnaires as the main data collection instrument. Data analysis was done using quantitative approach with the aid of Statistical Package for Social Science (SPSS) version 23.

This study embraced three theories that explain the reason as to why the research problem under this study exists. The theories highlighted in this study are performance theory, goal setting theory and the ADKAR model, and how they relate to the study. A clear understanding of employee performance in D&S Ltd and how kaizen affects the performance was the main concern why the study was performed.

1.7 Limitations of the Study

Employees in D&S Ltd manifested resistance to give information as some were adamant to respond to the questionnaire. Some respondents declined to provide information for fear that information used could be stigmatizing to them or might show a negative image on the organization. Some respondents also provided biased

information as they provided data in favour of their review and needs. To counter this the researcher made it clear to the respondents that their view will be clutched with absolute confidentiality and will be exclusively used for scholarly aspirations.

1.8 Organization of the Study

The project was presented in five chapters. Chapter One highlighted the background of the study, statement of the problem, research objectives, research questions, significance of the study, scope of the study, limitations of the study and organization of the study. Chapter Two presented relevant literature established on the study intentions as it highlights on theoretical review, empirical review, summary of research gaps and the conceptual framework. Chapter Three highlighted the research design, target population, sampling design, data collection instruments and procedures, pilot study, operationalization and measurement of study variables, data analysis and presentation and finally the ethical considerations. Chapter Four entailed data analysis, presentation and the analysis. Chapter Five presented summary of the findings, conclusions drawn from the data findings, recommendations and areas for further studies.

CHAPTER TWO: LITERATURE REVIEW

This chapter frames the theoretical background of the research done by other scholars and how they affect employee performance in Davis & Shirtliff Ltd. It also entails empirical studies that had been done by other researchers on kaizen principles. The conceptual framework emphasizes association between the dependent and independent variables. A literature review entails to search, identify and understand relevant information to the topic under research (Polit, 1999).

2.1 Theoretical Review

2.1.1 Performance Theory

In Elger's research he comments that people are capable of extraordinary accomplishments while pointing to an example of Gandhi who managed a peaceful upheaval that freed India from colonists (Elger, 2008). Elger defines performance as an ongoing journey to desired achievement and not a destination. The theory of performance establishes and relates six foundational concepts to form a framework explaining performance and the performance improvements which include; context, knowledge level, skills level, identity level, personal factors, and fixed factors (Goleman & Daniel, 2007). Each level characterizes the effectiveness or quality of performance and a summary of worthy accomplishment produced from high level performances as shown in table 2.1 as follows;

Table 2.1: Accomplishment from High Level Performances

Quality increases	Results or products are more effective in meeting or exceeding the expectations of stakeholders.
Cost decreases	Amount of effort or financial resources to produce a result goes down; amount of waste goes down.
Capability increases	ability to tackle more challenging performances or projects increases
Capacity increases	ability to generate more throughput increases
Knowledge increases	depth and breadth of knowledge increases
Skills increase	Abilities to set goals, persist, maintain a positive outlook, etc. increase in breadth of application and in effectiveness.
Identity and motivation increases	Individuals develop more sense of who they are as professionals; organizations develop their essence.

Source: Goleman & Daniel (2007)

This theory is vital in firms whereby competencies like regulation and recognition add value to performance of individuals. The theory therefore supports the research on kaizen influence to employee performance as it aids in exploring the possibilities for creating claims to performance in firms. The theory emphasizes the great relevance of individual performance and the overall employees' performance which can be translated to success in firms.

2.1.2 Goal Setting Theory

This theory suggests that employees establish individual goals that are vital to motivate employee performance to a superior form. Individuals and firms perform better when they set more difficult goals (Locke & Latham, 2006). Goals are

modified to be more realistic, or performance is improved realistically, in case the goals are not achieved. Individuals or firm performance can decrease in case goals are easily achievable. The goal of the whole performance management system will be achieved upon performance improvement (Salaman, 2005).

According to researchers, the correlation between enhanced firm outcomes and goal setting is positive in firms working efficiently (Spaulding & Simon, 1994). The main principles that facilitate better performance due to goal setting are commitment, clarity, task complexity, challenge and feedback (Locke & Latham, 2006). According to the goal-setting theory, the four mediating mechanisms namely; task strategies, direction persistence and effort, all affect performance when achieving goals (Koppes, 2014).

Continuous improvement in performance standards and objectives should be backed by commitment analysis, used to round up objectives (Moynihan, 2008). Commitment analysis assists to determine goals and objectives continuous pursuit which drives firms to enhanced productivity (Krausert, 2009). Goal setting has however been mentioned as costly and time due to factors like; time involvement, selection of people with right skills and knowledge, the expenses incurred productivity of the organization and the training necessity for right career development (Julnes, 2007).

This theory is important in firms as setting goals are part of lean manufacturing practices and DMAIC practices used to improve overall employee performance.

2.1.3 The ADKAR Model

Jeff Hiatt developed the ADKAR model of research done by Prosci in 1998, which was a tool first used to ensure that the process of change occurs efficiently with the desired results during organizational change (Hiatt, 2013). ADKAR focuses on the element of change on people, specifically ensuring the employees involved support and believe in the change. The model then moves to focus at the business dimension of change, as once the people are behind it, the processes must then be focused on. The development of the model, carried out by the US research organization Prosci, was based on a 14 year period of study, across 59 countries, narrowing down to 900 organizations (Prosci, 2009).

According to research, success of the firm entailed mobilizing employees to propel a change strategy using five main steps to ensuring employee support; Awareness of the change need and requirement, Desire to propel change and participate in it, Knowledge on ways of propelling the change, Ability to regularly involve change and Reinforcement of change to ensure implementation (Prosci, 2009).

The model of ADKAR is a useful tool for kaizen implementation in firms by helping individuals to be at par and plan for the process of change, and also monitoring their reactions as the process of change occurs. The model is of assistance in measuring the effectiveness and efficiency of the process of change in employees. Progress of employees can then be gauged to individuals, and correction then reinforced. This theory emphasizes the great relevance of employee performance to lead a firm to its success.

2.2 Empirical Review

2.2.1 Quality Circles and Employee Performance

A study explored the outcome of participative technique of QC on plenty employee performances which involved 42 independent samples from 36 studies. Mean effect sizes were moderate for work performance which suggested QCs affected work performance to a great degree. For manufacturing firms involved in management of quality, the results suggested that quality interventions have a tremendous outcome on work performance. The conclusions on the study provide a positive context on the significance of QCs quality interventions take on productivity (Pereira & Osburn, 2007).

In a non-ferrous foundry firm in BHEL, Hyderabad, a QC identified an unhealthy, smoke polluted environment. Managerial maturity also recognized that work quality and productivity would be influenced by such unhygienic conditions in the environment. However the repeated issue that had no solution for several years was resolved by members of the quality circle, who methodically assessed the problem, revealed a solution and implemented it with employees' cooperation within six months. (Sobti, 2016).

Case study was done on supervisory management and quality circles performance in a manufacturing firm. Investigations were done on two QCs and it was concluded that in a conducive organizational set up where senior management is supportive, effect of quality improvement initiatives majorly affect employee support and management commitment (Goulden, 1995).

Research was done on successful implementation of QCs in United States (US) manufacturing firms. Descriptive model was developed to test the proposition that

QC implementation improves productivity and product quality in US companies. Questionnaires were administered to 550 firms. Research findings indicated that successful implementation of QC improves productivity in the work place (Won, 1990).

An empirical study on 115 randomly collected QCs was done to investigate the effect of QC in the work place conducted in Bangalore India. Primary data was collected through structured questionnaires and interviews from regular QCs and secondary data was collected from journals, books, articles and previous training programs. It was concluded that QCs establishment led to sound health of firm, employee participation for self-interest, participation for rewards and recognition and also for appraisal purpose (Balasaraswathi, John & Ganesh, 2013).

Case study of QC on employee work behaviour was done on 4 organizations in central Iowa. Data on absenteeism, turnover, productivity and grievance were collected over 24 months on a sample of 250 QC members and 221 non-QC members. Repeated measures analysis of variance (ANOVA) was utilized with the input of data. Positive results on employee work behaviour was detected on QC members which was not demonstrated by non QC members (Buch, 2000).

2.2.2 Six Sigma DMAIC Process and Employee Performance

A case study done by the American Society for Quality (ASQ) and Metrus Group in 2010 indicated that manufacturing firms obtaining the best marks for tremendous implementation initiatives of quality and positive business results due to adoption of DMAIC process are the ones that; attain top leadership support, expand a culture that is focused on quality and efficiently administer employee input to performance. The correct initiatives teach employees waste elimination, achieve cost savings and build

process consistency. The result is less absenteeism and higher satisfaction of employees (Scotty, 2016).

Case study on solar manufacturing firm in India with approximately 850 employees embarking on six sigma over 7 years yielded improvements in its printing processes by 4%, saving over $140,000 per year. It also had reduction in rework/rejection rate from 18% to nearly 5%, thus saving over $65,000 per year. Tools used were control charts, histograms, hypothesis tests. Six sigma positively affected business performance due to improvement in customer satisfaction (Antony, Gijo, Kumar & Ghadge, 2014).

Empirical case study on application of six sigma DMAIC to improve business processes was done at an automobile manufacturing facility. The study utilized both qualitative and quantitative data and revealed that six sigma improved the business ordering process (Ellis, 2016).

Case study on electrical firm in northern India employing around 12,000 employees with 3 years incorporation of six sigma DMAIC in their organizational structure ended up having improvement in productivity of over 55%, reduction of rework from 16% to less than 3% and customer satisfaction. Tools and techniques employed included pareto analysis, hypothesis tests, cause and effect analysis. Senior management realized six sigma DMAIC should not be restricted to manufacturing, but can be extended to other business units (Antony, Gijo, Kumar & Ghadge, 2014).

Case study on industrial compressor firm with 60 employees implementing six sigma DMAIC since 2007 employed tools like cause and effect analysis, hypothesis tests, ANOVA and graphical tools. The study established improvement in on-time delivery,

reduction in lead time for supplier bill processing and reduction in raw material from 45 days to less than 30 days (Antony, Gijo, Kumar & Ghadge, 2014).

Study was done to investigate impact of adopting six sigma DMAIC on corporate performance of a firm. Sample of 84 respondents was used to respond to wide variety of industries over a 10-year period. Results indicated that adopting six sigma positively impacts organizational performance mainly through the efficiency with which employees are deployed (Moeller & Shafer, 2012).

2.2.3 Just in Time Practices and Employee Performance

Studies have explored the relationship between JIT practices and performance outcomes in manufacturing firms through meta-analysis of correlations approach. Based on deep assessment of 1992 to 2008 literature, the results support a positive relationship between JIT manufacturing practices and inclusive general performance. Based on the findings however, not all sole JIT practices are correlated with all types of performance outcomes. This study illustrates that JIT practices disclose the dominant significance on performance outcomes for individuals and asserts the role of moderating factors in the relationship between JIT practices and performance (Mackelprang, 2009).

Descriptive research study was done on JIT implementation and its potential benefits by managers in Portugal. Data was collected through mail questionnaires sent to 100 firms results showed JIT utilized resources in the most efficient ways and increased quality. Rather than use JIT as a means of solving operations related issues, the Portuguese firms used JIT as an ideology (Alves & Moreira, 2008).

Ex-post facto quantitative research with non-experimental design was done in cement industry of Pakistan to determine JIT implementation. Sample consisted 400 operations managers through convenience sampling. Questionnaires based on 5 point Likert scale were administered. The study examined and established factors having positive relationship with JIT implementation in Pakistan cement industry i.e. total quality control, production plan, supply chain integration, inventory management. (Qureshi, Iftikhar, Bhatti, Shams & Zaman, 2013).

An empirical study was done on industrial firms in Jordan on JIT practice and its significance on successful operational works. Study was settled to 14 manufacturing firms using questionnaires administered to 168 respondents (managers and departmental heads for production and logistics). Multiple regression analysis was used to test the study hypothesis. Study established that JIT system (entailing supplier's quality, equipment layout, set-up reduction; pull production) has positive impact on operational excellence in industrial firms, thus gaining competitive advantage. The results of this study however cannot be generalized on other sectors like food and pharmaceuticals, as it is applied to the Jordanian industrial firms especially at Al-Karak governance (Al harasia, 2017).

An empirical study of JIT implementation combined with Total Quality Management (TQM) in manufacturing firms in United States done through nationwide survey contributed to increased productivity, employee involvement, cost reduction, quality enhancement, management commitment and supplier participation. The study indicated that firms implementing the strategies of JIT and TQM have 40% more quality certifications than other firms (Sriparavastu & Gupta, 1997).

2.2.4 Lean Manufacturing Practices and Employee Performance

An empirical study was done on Indian automobile industry to verify influence of lean manufacturing practices on operational performance. Self-administered questionnaires were analyzed using factor analysis and structural equation modeling. The study established positive and compelling relationship between lean manufacturing and operational performance. Waste elimination, employee awareness and involvement, visual management contributed further achievement of lean manufacturing in Indian automobile manufacturing industry (Amal & Umarali, 2017)

An empirical study of 24 Swedish medium sized (50-250 employees) manufacturing firms implementing lean manufacturing on working condition effects was done quantitatively on 282 people (from 85 managers, 51 production supervisors, 99 workers and 77 white collar workers). Questionnaires were administered and results indicated that the physical work environment improved, there was increase in work safety for personnel and also slight increase in stress due to lean practices (Brannmark, 2014).

A study was done in Indian foundry industry to illustrate the influence of lean implementation for improvement in productivity in waste elimination. Survey questionnaire was employed for data collection from 71 professionals from the Indian foundry industry. Descriptive statistics was acquired to establish the importance of lean waste issues. Reliability analysis and exploratory factor were conducted to measure and verify. Study concluded the need for lean manufacturing practices to fulfill work requirements in the Indian foundry industry (Prasad, Khanduja & Sharma, 2016).

An exploratory research was done on the effect of lean manufacturing practices and environmental management on business performance in 309 manufacturing firms using analysis of a moment structure (AMOS) software. Findings indicated that previous lean manufacturing practices are positively related to environmental management practices. Enhanced environmental performance diminishes unfavourable effects of environmental management practice on market and financial performance. (Yang & Modi, 2011).

An empirical study done in ceramic tile industry in Spain on 76 companies to determine use of lean practices, their relationship with plant size and influence on operational performance of companies in the industrial sector. Questionnaires were administered and as per the findings, the degree of lean practice is dependent on firm's size and there were interactions between magnitude of use of lean practice solely and the operational gauges (Bonavia, 2006).

2.3 Kaizen Principles and Employee Performance

Case study on manufacturing industry in Turkey was done to examine the effect of kaizen on employee performance. Qualitative data collection was done using 600 questionnaires, of which 352 questionnaires were returned. The study was done for the purpose of assisting businesses in costs, productivity and quality. It was concluded in this study that performance factors positively affected by kaizen were; management satisfaction by 35%, job satisfaction and customer orientation by 13%, and last but not least, process analysis and continuous improvement by 33% (Karahan & Tetik, 2012).

Descriptive study on effect of kaizen on company performance was done to a selection of Japanese companies, with Nippon Steel Corporation (NSC) being the base model. The study involved collection of quantitative data through questionnaires. The study

concluded that kaizen yields improved performance and sustainability targets in the operation management system for industrial firms (Brunet & New, 2003).

An empirical research was done in Spain on firms dealing in automotive components to explore the possibility of improving production performance to the mangers and operators. Qualitative data was obtained from 11 industries over a period of 9-12 months period. Conclusions indicated that the companies studied initiated measures to improve performance in light of kaizen and through relied support from the managers and the Chief Executive Officer (CEO). The study was limited to the fact that it was more generalized and required further findings (Marin-Garcia, Garcia-Sabater & Bonavia, 2009).

A field study was done in Japan to measure impact of kaizen on organization performance and human resource outcomes. Quantitative survey and qualitative interviews were conducted to obtain results for the study. It was concluded that sustained improvements on business performance was majorly affected by kaizen than on human resource outcomes which rely on management support (Aken, Doolen, Farris, Huwe & Horley, 2008).

2.4 Summary of Research Gaps

Table 2.2: Summary of Research Gaps

Author and Year	Study focus	Methodology	Study findings	Gaps
Schmidt, Otto & Kusmaul, (2010)	Employee performance metrics	Comprehensive literature review & Preliminary survey	Main performance metrics are improved quality, efficiency, compliance, flexibility & responsiveness.	The model is not tested.
Duta & Pinder, (2011)	Characteristics of employee management practices in firms	Descriptive research	Performance measures should be weighted on return of assets and sales growth	Focus on financial performance
Biswas, (2011)	Relationship of transformational leadership and psychological climate with employee performance	Descriptive research	Job satisfaction as employee performance factor is affected by transformational leadership & psychological climate	Focus on leadership style & organization climate as main performance influences
Abdussalaam & Majid, (2015)	Effect of performance based pay to employee performance	Cross sectional survey	Positive relationship between performance based pay & employee performance	Retrospective orientation, short term, conflict oriented & lack of strategic focus
Pereira & Osburn, (2007)	Effect of QCs participative technique on employee performance	Comprehensive literature review & Preliminary survey	Positive outlook on effects of QCs interventions on productivity	Focus on participatory quality performance
Sobti, (2016)	Effect of QC on productivity & work quality	Exploratory research	Cooperation of employees in QC leads to problem resolutions & increased	No conclusive evidence provided in the study. No varying levels of depth on

			productivity	study.
Goulden, (1995)	Supervisory management & QCs performance in manufacturing firms	Case study	QC leads to supportive senior management, impact quality improvement initiatives & management commitment	Single case study limitation. Focus on senior employees.
Won, (1990)	Successful implementation of QCs in US manufacturing firms	Descriptive research	QC improves productivity & product quality in firms	Study generalization
Balasaraswathi, John & Ganesh, (2013)	Effect of QC in the work place	Descriptive research	QC establishment has led to sound health of the firm, employee participation for self-interest & participation for reward	No focus on organizational levels. Focus put more on firm rather than employees
Buch, (2000)	QC effect on employee behaviour	Case study	Positive results in absenteeism, turnover, grievances & productivity detected on QC members	Each factor requires further research to validate findings
Scotty, (2016)	Effect of adoption of DMAIC in manufacturing firms	Case study	Manufacturing firms receive greatest scores on outstanding implementation of initiatives of quality & absolute business outcome	Operational performance focus
Antony, Gijo, Kumar & Gadge, (2014)	Effect of adoption of DMAIC on business performance	Case study	DMAIC yields improvements, rework reduction and increased firm savings	Focus on quality performance
Ellis, (2016)	Effect of adoption of DMAIC on	Case study	Improvement of business ordering	Focus on firm processes

	business processes		processes	
Antony, Gijo, Kumar & Gadge, (2014)	Effect of Six Sigma DMAIC on organizational structure	Case study	Improvement in productivity, rework reduction & customer satisfaction	Focus on operations and structure
Antony, Gijo, Kumar & Gadge, (2014)	Effect of DMAIC in manufacturing firms	Case study	On-time delivery, lead time reduction and raw material reduction	Focus on quality & operational performance
Moeller & Shafer, (2012)	Impact of adoption of six sigma DMAIC on corporate performance	Case study	Positive impact on organization performance through efficiency in deploying employees	Focus on corporate performance & no focus to organizational levels
Mackelprang, (2009)	Relationship between JIT practices & performance outcomes	Exploratory research	JIT have greatest impact on individual performance outcome as compared to group	Further research to be done on moderating variables
Alves & Moreira, (2008)	JIT implementation & its benefits to managers	Descriptive research	JIT utilized resources efficiently & increased quality	JIT has been used as philosophy rather than solution for performance related problems
Al harasia, (2017)	JIT system & its impact on operational excellence in industrial firms	Descriptive research	JIT system (supplier quality, equipment layout, pull system) had positive effect on operational excellence thus competitive advantage of firm	Results generalized and cannot be used on other industrial sectors. Focus on competitive performance.
Qureshi, Iftikhar, Bhatti, Shams & Zaman,	JIT implementation in cement	Descriptive research	Total quality control, production plan, inventory	Study generalization

(2013)	industry		management, led to right implementations in firms	
Sriparavastu & Gupta, (1997)	JIT & TQM effect on performance in manufacturing firms	Comprehensive literature review & Preliminary survey	Increase in productivity, employee involvement, cost reduction, quality improvement & management commitment	Interdependence of JIT & TQM for firm performance.
Amal & Umarali, (2017)	Influence of lean manufacturing practiceson operational performance	Descriptive	Waste elimination, employee awareness & visual management	Focus on operational performance
Brannmark, (2014)	Effect of lean manufacturing on work conditions	Descriptive	Physical work environment improved, increase in personnel work safety & slight increase in stress	No focus on organization levels
Prasad, Khanduja & Sharma, (2016)	Importance of lean manufacturing practices for improvement in productivity in waste elimination	Descriptive	Minimized waste & increase in productivity	Focus on quality & operational performance
Yang & Modi, (2011)	Impact of lean manufacturing & environmental management on business performance	Exploratory research	Improved environmental performance thus better market practice & financial performance	Focus on non-conclusive financial performance
Bonavia, (2006)	Use of lean practices, their relationship with plant size and effect on operational	Case study	There is correlation between degree of use of lean manufacturing in isolation of the	Focus on operational performance. Further research to be done and moderating

	performance.		operational indicators	variables introduced

Source: Author (2018)

2.5 Conceptual Framework

This study attempts to establish whether kaizen practices have any effects on employee performance in Davis & Shirtliff Ltd. The aspects of QCs, six sigma DMAIC, JIT and lean manufacturing practices are the independent variables while employee performance is the dependent variable. The conceptual is summarized in Figure 2.1 as follows;

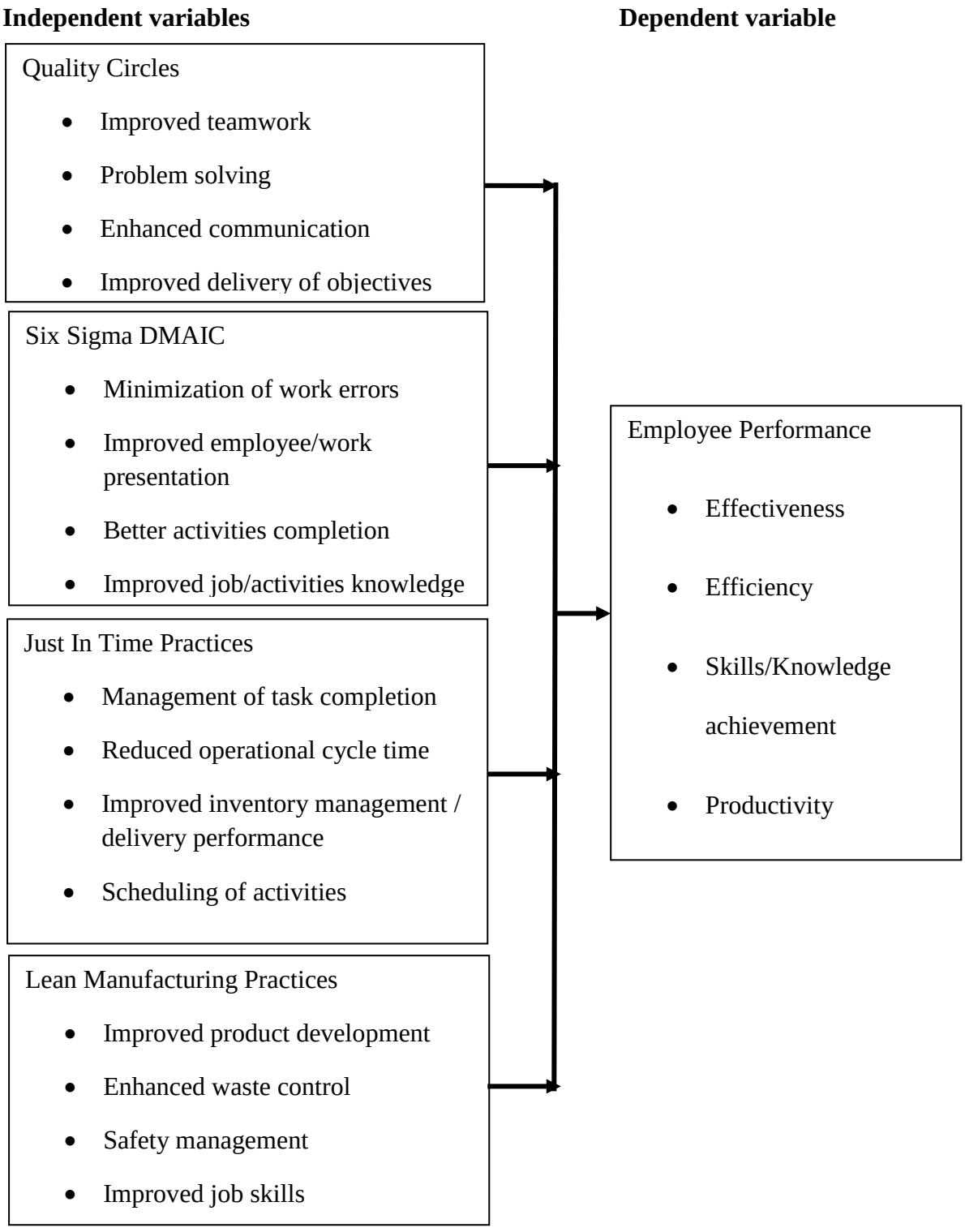

Figure 2.1: Conceptual Framework

Source: Author (2018)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlined detailed assessment about research methods and procedures to be adopted in order to get accurate and maximum information related to the subject matter under research. It defined the research design, target population, sampling design and the data collection instruments and procedures that were applied for data analysis.

3.2 Research Design

The study adopted descriptive research design in examining impact of kaizen on employee performance in Davis & Shirtliff Ltd. It's a systematic approach of gathering descriptive data regarding attributes of a sample of a population, current customs, circumstances or requirements. Descriptive design establishes and measures the cause and effect of relationships between variables (Cooper & Schindler 2003). Descriptive design was adopted by the study to facilitate researcher to assemble great and deep information on the population being studied. The descriptive survey design method is appropriate in exploring how different kaizen principles affect performance of D&S Ltd.

A descriptive research design enabled the researcher to conduct analysis and measurement of the population required for quantitative experimentation since it provides important indicators as to the variables to be quantitatively tested. The study involved collecting quantitative data from employees in D&S Ltd over a period of one month.

3.3 Target Population

Population is a whole number of elements where a sample is chosen (Bryman, 2012). This study targeted employees in D&S Ltd in Nairobi. D&S Ltd employees are assigned to several divisions contributing to success of the firm; sales, technical, service, administration, commercial/business development and supply. There are 288 employees based in D&S Ltd head office Nairobi, who were the target population in this study.

Table 3.1: Study Population

Target Population	Frequency	Percentage %
Sales	16	6%
General Commercial/ Business Development	28	10%
Service	47	16%
Technical	70	24%
Supply	72	25%
Administration	55	19%
Total	**288**	**100%**

Source: HRMIS (2018)

3.4 Sampling Design and Technique

A sample is defined as the section of the target population chosen for study. The objective of sampling is to secure a sample which will be representative of the entire population (Saunders, Thornhill & Lewis, 2003).

Stratified proportionate random sampling was applied in carrying out the study to ensure each subgroup/strata within the population receives proper representation within the sample. The sample size of each stratum is proportionate to the population size of the stratum (Thompson, 2012). Using the sampling table, from research advisors (2006), with the size of population being 288 (as per Table 3.1), at a margin of error of 5%, confidence interval of 95%, the sample to be used is 165 respondents.

Stratas identified in this study, as shown on Table 3.2 are the divisions in D&S Ltd, which hold several departments across them. The divisions are; Sales division, General Commercial/Business Development division, Service division, Technical division, Supply division & Administration division.

From table 3.1 sampling frame, using stratified proportionate random sampling, each strata's sample size was determined by the following equation:

$n_h = (N_h / N) * n$

Where; n_h is the sample size for stratum *h*,

N_h is the population size for stratum *h*,

N is total population size, 288.

n is total sample size, 165.

The sampling fraction was obtained by the equation; n/N = 165/288

Table 3.2: Stratified Proportionate Sample Calculation

Department	**No. of people in Strata**	**Proportion of each group**	**Strata Sample**	**Percentage %**
Sales	16	=(16÷288)x165	9	6%
General Commercial/ Business Development	28	=(28÷288)x165	16	10%
Service	47	=(47÷288)x165	27	16%
Technical	70	=(70÷288)x165	40	24%
Supply	72	=(72÷288)x165	41	25%
Administration	55	=(55÷288)x165	32	19%
Total	**288**		**165**	**100%**

Source: Author (2018)

3.5 Tools and Instruments

Primary data collection method was through structured closed form of questionnaires personally administered by the researcher and research assistants. A questionnaire is an instrument used for data collection during research studies in form of questions that bring out the required information. The respondents were provided with closed ended questionnaires. Questionnaires were of five-point Likert scale with pre-implied answers from strongly agree, neutral point at the center to strongly disagree for each variable testing. The questionnaire had three parts. Section A contained general data on the respondent and the firm. Part B focused on specific kaizen principles geared towards employee performance whereas section C focused on the employee performance. No secondary data was collected.

Data was collected by presenting letter for transmission of data collection instruments to respondents when issuing the questionnaires. This was done after obtaining permits from Kenyatta University graduate school and National Commission for Science, Technology & Innovation (NACOSTI). The questionnaires were issued and collected through enumerators and also pick and drop system.

3.6 Pilot Study

A pilot study is a test administered in preparation to the comprehensive research with the aim of pre-testing a research instrument (Dikko, 2016). In this research, the pilot study involved conducting an initial test with 10 participants/employees in D&S Ltd. The selected participants were asked to fill-in the questionnaire and give a criticism to the questions. The result from this pilot study assisted to get a general feeling of participants. The pilot study also aided in determining the reliability and validity of the instrument. Suggestions from the pilot survey were considered in the final questionnaire.

3.6.1 Validity of the Research Instrument

Validity is involved with the sincerity of the deductions that are derived from a study (Bryman, 2012). For internal validity, the variables were thoroughly evaluated to ascertain that relevant indicators were matched with each variable and the appropriate data would be collected using the right research instrument.

For external validity, relevant and representative sample was chosen to ensure the outcome was comprehensive to the whole population. The researcher submitted the questionnaire to the project supervisor for professional valuation hence content validity of the data collection instrument was established.

3.6.2 Reliability of the Research Instrument

Reliability is the grading of the magnitude to which a research instrument produces consistent results upon repeated trials (Ngechu, 2004). The Cronbach's coefficient of alpha was used to measure the internal consistency of the research instruments with a result of a number between 0 and 1. The acceptable values of alpha ranges from 0.70 to 0.95 (Tavakol & Dennick, 2011).

3.7 Operationalization and Measurement of Study Variables

This section explains the variables used in this study and the methods to assess them as summarized in the following table;

Table 3.3: Operationalization and Measurement of Study Variables

Objective	Variable	Operationalization	Indicator	Measurement
To determine the influence of kaizen on employee performance in Davis & Shirtliff Ltd.	**Dependent Variables** Employee Performance	The extent of improvement of employee performance in relation to the success criteria, usually effectiveness, efficiency, skills /knowledge achievement and productivity to achieve organizational goals.	♦ Effectiveness within the firm	**Ordinal Scale** ♦ Objectives achievement ♦ Task management ♦ Team performance
			♦ Efficiency within stipulated time frame	**Ordinal Scale** ♦ Time management ♦ Communication management ♦ Achievement of targets & deadlines effectively
			♦ Skills/Knowledge achievement	**Ordinal Scale** ♦ Increase in skills /knowledge base ♦ Enhancement due to educative programs ♦ Functional & technical skills achieved
			♦ Productivity	**Ordinal Scale** ♦ Capacity/labour utilization ♦ Creation of opportunities and programs ♦ Pay increase, growth and promotions

Objective	Variable	Operationalization	Indicator	Measurement
Objective 1: To establish the effect of quality circles on employee performance in Davis & Shirtliff Ltd.	**Independent Variables** ♦ Quality Circles	Small employees group performing same functions and regularly meet to improve team work and delivery of objectives, enhance communication and solve problems.	♦ Improved teamwork	**Ordinal Scale** ♦ Proper delegation ♦ Timely completion of activities ♦ Team cohesion
			♦ Problem solving	**Ordinal Scale** ♦ Reduced grievances ♦ Faster solutions for problems ♦ Improved work standards
			♦ Enhanced communication	**Ordinal Scale** ♦ Better feedback ♦ Efficient communication channel ♦ Faster remittance of information
			♦ Improved delivery of objectives	**Ordinal Scale** ♦ Compliance to objectives ♦ Delivery of objectives ♦ Ease of communicating objectives
Objective 2: To examine the extent to which adoption of six sigma DMAIC process affects employee performance in Davis & Shirtliff Ltd.	♦ Six Sigma DMAIC	Kaizen principle involved in incremental improvement of processes by minimizing work errors, improving employee presentation, improving activities completion and job knowledge thus deliver service/goods at customer convenience.	♦ Minimization of work errors	**Ordinal Scale** ♦ Reduced defect rate ♦ Product yield increase ♦ Minimized errors
			♦ Improved employee/work presentation	**Ordinal Scale** ♦ Simpler flow process ♦ Work place tidiness ♦ Faster operations flow
			♦ Better activities completion	**Ordinal Scale** ♦ Completion at minimized

Objective	Variable	Operationalization	Indicator	Measurement
				costs ♦ Accuracy in completion ♦ Completion as per directives
			♦ Improved job/activities knowledge	♦ Knowledge of products ♦ Knowledge of activities ♦ Understanding job process
Objective 3: To determine the effect of Just In time practices on employee performance in Davis & Shirtliff Ltd.	♦ Just In Time Practices	Kaizen principle formulated to manage task completion, reduce operational cycle time, improve inventory management and scheduling activities.	♦ Management of task completion	**Ordinal Scale** ♦ Applying right procedures ♦ Timely completions ♦ Cost reduction in task completion
			♦ Reduced operational cycle time	**Ordinal Scale** ♦ No production time delays ♦ No product reworks ♦ Faster operational processes
			♦ Improved inventory management / delivery performance	**Ordinal Scale** ♦ Timely product/services deliveries ♦ Delivery of right batches and quantities of products/services ♦ Right quality of product/service
			♦ Scheduling of activities	♦ Flow of activities ♦ Improved work integration ♦ Increased speeds at executing activities
Objective 4: To establish the effect of lean manufacturing	♦ Lean Manufacturing	Kaizen practice with goals of eliminating all forms of wastes in business processes by improving	♦ Improved product development	**Ordinal Scale** ♦ Product innovation ♦ Improved production and

Objective	Variable	Operationalization	Indicator	Measurement
practice on employee performance in Davis & Shirtliff Ltd.	practices	product development and job skills, enhancing waste control and management of safety.		product quality ♦ Satisfaction of customer tastes & preferences
			♦ Enhanced waste control	**Ordinal Scale** ♦ Minimal wastages ♦ Improved green energy management ♦ Right quality without compromise on quantity
			♦ Safety management	**Ordinal Scale** ♦ Clear safety procedures ♦ Proper handling of machines & operatives ♦ Reduced accidents
			♦ Improved job skills	♦ Skills on machine operations ♦ Knowledge on soft skills and software usage ♦ rect skills application based on job description

Source: Author (2018)

3.8 Data Analysis and Presentation

Data analysis entails compiling data collected, organizing it and structuring its main elements for efficient and easy communication of the results (Yin, 2008). Data analysis purpose is to respond to the study research questions. Data collected from the questionnaires was monitored to ensure that they have been correctly and completely filled. The data was assembled, classified and tabularized, ready for the analysis. Statistical Package for Social Science (SPSS) version 23 computer software was used to assist in the data analysis. Analysis of the data used quantitative approaches.

Descriptive statistics (in the form of means, percentages, and dispersion measures) and inferential analysis were acquired in the analysis of data. The findings were displayed on frequency distribution charts and tables.

Correlation analysis was used to determine if there was a relationship between the dependent and the independent variables. Multivariate regression analysis was used to determine the weight of the relationship association between dependent and the independent variables. The equation was:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where: Y is the dependent variable (employee performance),

β_0 is the regression coefficient

β_1, β_2, β_3 and β_4 are the slopes of the regression equation,

X_1 is Quality circles

X_2 is DMAIC process

X_3 is Just in Time practices

X_4 is Lean manufacturing practices

ϵ is a random error term normally distributed about a mean of 0 and for the aim of computation, the ϵ is assumed to be 0.

Model diagnostic tests were done to determine the appropriateness of the multiple regression model before performing inference. The procedures enabled the researcher to find out the validity of assumptions of the regression model and decide whether the researcher can affirm to subsequent inference results.

3.9 Ethical Consideration

The researcher upheld study ethics while carrying out the research. The researcher obtained permit letters from the university graduate school and NACOSTI, and sought permission from D&S Ltd before proceeding to collect data. The respondents were informed in detail on the study purpose. The researcher made it clear the study objectives to the respondents with a commitment that the data given is for academic purpose only. The respondent contributed voluntarily to the study and their information kept private and confidential. APA format was applied in referencing of the documents used in this study.

CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter analyses, interprets and presents the study findings based on the study purpose of determining the influence of kaizen principles on employee performance in Davis & Shirtliff Ltd in Nairobi City County, Kenya.

4.2 Questionnaire Response Rate

The study targeted 165 respondents drawn from divisions in D&S Ltd. The divisions for the study were; sales division, general commercial/business development division, service division, technical division, supply division & administration division. Out of the selected 165 respondents 130 responses were obtained, achieving a 78.8% response rate.

Mugenda (2012) states that a 50% response rate is acceptable, 60% is good and above 70% is rated very well. The commendable response rate was adequate after the questionnaires were administered by the researcher, who also recruited two research assistants who personally visited and called the respondents to remind them to fill in the questionnaires and submit them.

4.3 Reliability Analysis

The Cronbach's coefficient of alpha was used to measure the internal consistency of the research instruments with a result of a number between 0 and 1. There acceptable values of alpha should be > 0.70 (Tavakol & Dennick, 2011). Reliability of the constructs is shown in table 4.1.

Table 4.1: Reliability Analysis

Scale	Cronbach's Alpha	Number of Items
Quality circles	0.811	12
Six Sigma DMAIC process	0.728	12
Just in Time practices	0.791	12
Lean manufacturing practice	0.802	12
Average	0.783	

Source: Survey Data (2018)

Cronbach Alpha was established for every objective which formed a scale. The table shows that Quality circles had the highest reliability (α= 0.811), followed by lean manufacturing practice (α=0.802). Just in time practice followed (α=0.791) and then six sigma DMAIC process (α=0.728). This demonstrated that all the four variables were reliable since their reliability values, averaging at 0.783 exceeded the ideal target of 0.7, consequently the study was reliable.

4.4 Demographic Characteristics of Respondents

This section entails the respondents' bio data. The study findings are discussed as shown in each of the section.

4.4.1 Respondents Age

Respondents were asked to indicate their ages; the study findings were as shown in the figure 4.1

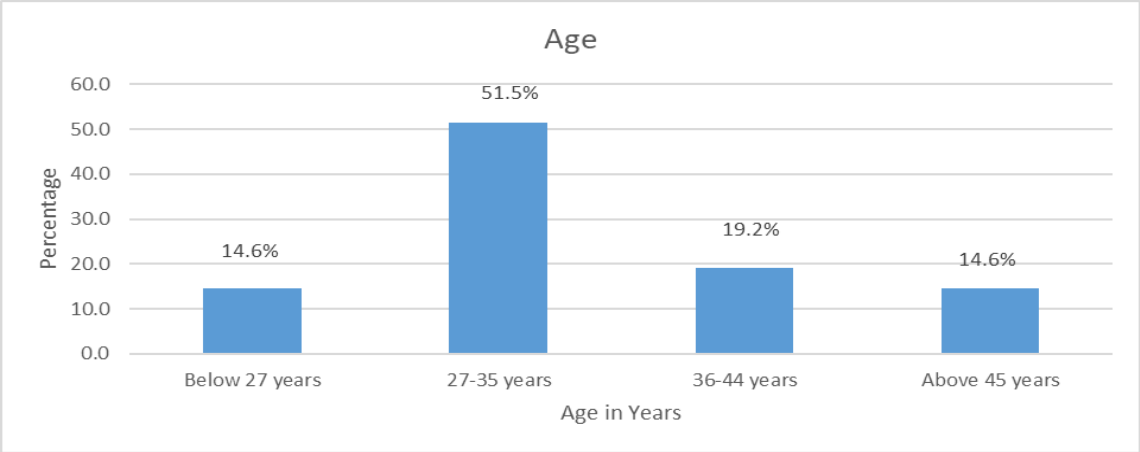

Figure 4.1: Respondents Age

Source: Researcher (2018)

As was shown in the figure 4.1, 51.5% of the respondents indicated that they were in the age gap of 27 to 35 years, 19.2% of the respondents indicated that they were in the age gap of 36 to 44 years, 14.6% of the respondents indicated that they were aged below 27 years and also a similar 14.6% of the respondents indicated that they were aged above 45 years. This shows that the study involved respondents from all the age gaps with the majority of the respondents being in the age gap of 27 to 35 years.

4.4.2 Highest Level of Academic Qualification

Respondents were asked to indicate their highest level of education. The study findings were as shown in the figure 4.2

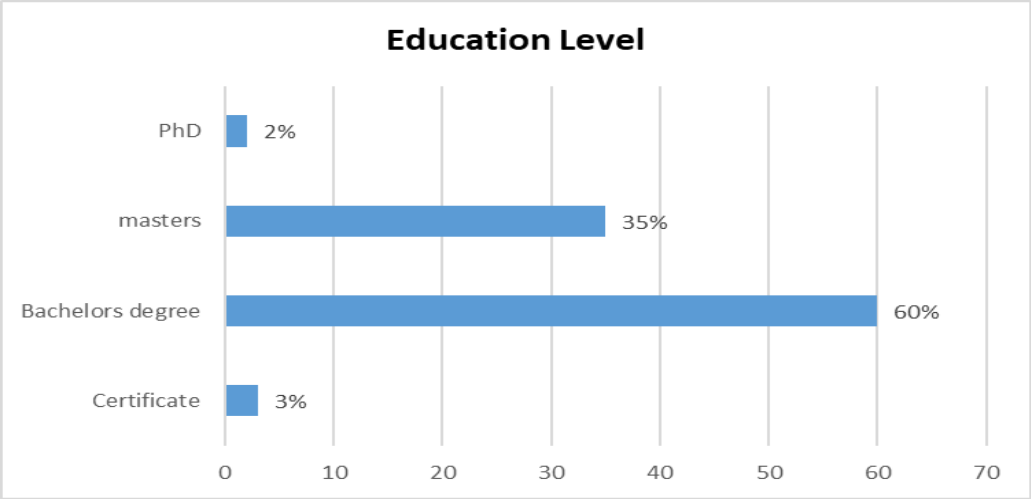

Figure 4.2: Highest Level of Academic Qualification

Source: Researcher (2018)

As was shown in the figure 4.2, 60% of the respondents indicated that they had a bachelor's degree, 35% indicated that had a master's degree, 2% of the respondents indicated that they had a PhD and 3% of the respondents indicated that they had a certificate for their highest education level. This shows that the study involved respondents whom majority had a bachelor's degree and had adequate knowledge to give the best information sought by this research.

4.4.3 Departmental Position within Davis & Shirtliff Ltd

The researcher asked the respondents to indicate their departmental position within Davis & Shirtliff Ltd. The study findings were as shown in the table 4.2

Table 4.2: Departmental Position within Davis & Shirtliff Ltd

Department	Frequency	Percentage
Sales	9	6.9
Service	24	18.5
Supply	6	4.6
Administration	4	3.1
Technical	72	55.4
Commercial	15	11.5
Total	**130**	**100.0**

Source: Researcher (2018)

As was shown in the table 4.2, 55.4% of the respondents indicated that they were working in technical department, 18.5% indicated that they were in service department, 11.5% of the respondents indicated that they were working in commercial department, 6.9% of the respondents indicated they were working in sales department, 4.6% indicated that they were working in supply department and 3.1% indicated that they were working in administration department. Thus the study focused on all the departments with majority being from technical department.

4.4.4 Type of Employee

Respondents were requested to indicate the type of employee they were in Davis & Shirtliff Ltd. The study findings were as shown in the table 4.3

Table 4.3: Type of Employee

Type of employment	Frequency	Percentage
Full-Time	110	85
Casual	9	7
Contracted	7	5
Interns	4	3
Totals	**130**	**100**

Source: Researcher (2018)

As was shown in the table 4.3 the study showed that 85% of the respondents indicated that they were full time employees in the company. Further 7% were casual workers, 5% under contract while only 3% were interns. This shows that majority of the employees in the study were all full time employees of the company and were well suited for the study research.

4.4.5 Years worked in Davis & Shirtliff Ltd

Respondents were asked to indicate the number of years that they had worked in Davis & Shirtliff Ltd. The study findings were as shown in the figure 4.3

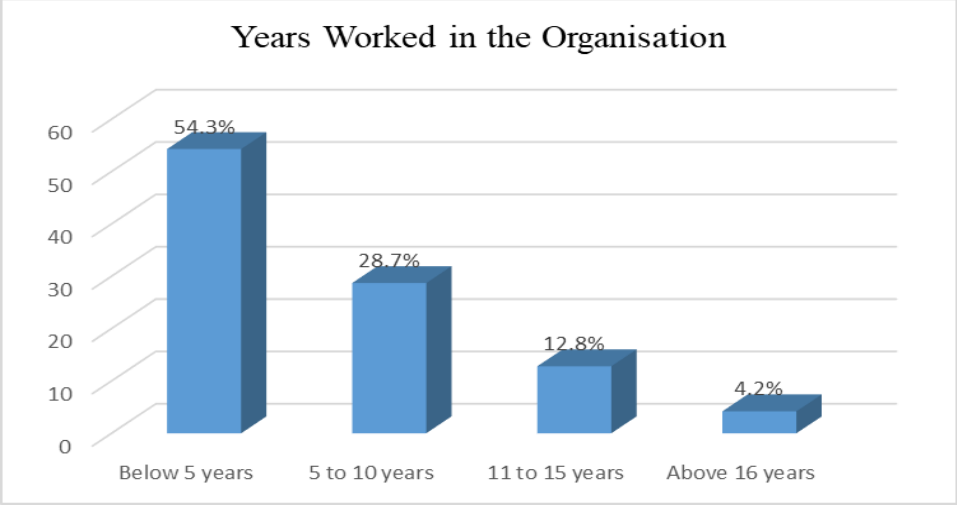

Figure 4.3: Years Worked in Davis & Shirtliff Ltd

Source: Researcher (2018)

As was shown in the figure 4.3, 54.3% of the respondents indicated that they had worked at Davis & Shirtliff Ltd for a period of below 5 years, 28.7% of the respondents indicated that they had worked at Davis & Shirtliff Ltd for a period of 5 to 10 years, 12.8% had worked for 11 to 15 years while 4.2% had worked for above 16 years. This shows that the employees have been in the company for quite some time and have adequate knowledge of their personal productivity either and at individual level or at group level.

4.5 Influence of Quality Circles on Employee Performance

This study objective sought to find out the influence of quality circles on employee performance. The study findings were as shown in each of the section.

4.5.1 Extent Davis & Shirtliff Ltd has adopted Quality Circles

Respondents were asked the extent to which Davis & Shirtliff Ltd has adopted Quality Circles. The study findings were as shown in table 4.4

Table 4.4: Extent Davis & Shirtliff Ltd has adopted Quality Circles

Extent	Frequency	Percentage
Moderate extent	10	7.7
Great extent	110	84.6
Very great extent	10	7.7
Total	**130**	**100**

Source: Researcher (2018)

As was shown in the table 4.4, 84.6% of the respondents indicated that to a great extent Davis & Shirtliff Ltd has adopted Quality Circles, 7.7% of the respondents indicated that to a very great extent Davis & Shirtliff Ltd has adopted Quality Circles and also a similar 7.7% of the respondents indicated that Davis & Shirtliff Ltd has adopted Quality Circles to a moderate extent. This shows that Davis & Shirtliff Ltd has adopted Quality Circles to a great extent as was shown by majority of the respondents.

4.5.2 Statements on Quality Circles and its Influences Employee Performance

Respondents were asked to indicate their level of agreement on the listed statements about Quality Circles and how it influences employee performance in Davis & Shirtliff Ltd. A scale whereby 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree was used. The study findings were as shown in the table 4.5

Table 4.5: Statements on Quality Circles and Influences on Employee Performance

Statement	1	2	3	4	5	Mean	Standard Deviation
Quality Circles propel proper delegation of duties	10	0	70	50	0	3.231	0.803
Quality Circles assist in timely completion of activities	10	0	30	20	70	4.077	1.211
Quality Circles improve team cohesion	10	0	40	70	10	3.538	0.933
Opting for Quality Circles leads to reduced grievances	0	10	40	70	10	3.615	0.741
Quality Circles ensure faster solutions to work related problems	10	0	0	40	80	4.385	1.081
Quality Circles improve the work standards for employees	10	0	60	50	10	3.385	0.927
Quality Circles lead to better communication feedback amongst employees	0	10	40	50	30	3.769	0.894
Quality Circles offer efficient communication channels	0	10	0	30	90	4.538	0.846
Quality Circles propel faster remittance of information	10	0	20	90	10	3.692	0.914
Quality Circles lead to compliance towards the firm objectives	0	10	10	50	60	4.231	0.894
Quality Circles improve delivery of objectives by employees	0	10	0	110	10	3.923	0.618
Quality Circles enhance ease of communicating objectives	10	0	10	40	70	4.231	1.124
OVERALL						**3.885**	**0.916**

Source: Researcher (2018)

As was shown in the table 4.5 majority of the respondents agreed strongly that; quality circles offer efficient communication channels for employees, as this was shown by a mean of 4.538 and a standard deviation of 1.124. Also respondents agreed that; quality

circles ensure faster solutions to work related problems as was indicated by a mean of 4.385 and a standard deviation of 1.081, also that quality circles lead to compliance towards the firm objectives as was shown by a mean of 4.231 and a standard deviation of 0.894 and also respondents agreed that quality circles enhance ease of communicating objectives this was shown by a mean 4.231 and a standard deviation 1.124.

Additionally, respondents agreed that; quality circles assist in timely completion of activities as was shown by a mean of 4.077 and a standard deviation of 1.211, also that quality circles improve delivery of objectives by employees as was shown by a mean of 3.923 and a standard deviation of 0.618, respondents also agreed that quality circles lead to better communication feedback amongst employees as was shown by a mean of 3.769 and a standard deviation of 0.894. Respondents also agreed that quality circles propel faster remittance of information this was shown by a mean of 3.692 and a standard deviation of 0.914, also respondents agreed that opting for quality circles leads to reduced grievances as was shown by a mean of 3.615 and a standard deviation of 0.741 and also that quality circles improve team cohesion as was shown by a mean of 3.538 and a standard deviation of 0.933.

Further the respondents were neutral that; quality circles improve the work standards for employees this was shown by a mean of 3.385 and a standard deviation of 0.927. The respondents were also neutral that quality circles propel proper delegation of duties as this was shown by a mean of 3.231 and a standard deviation of 0.803. The study findings agree with those of Goulden (1995) as he asserted that in a conducive organizational set up where senior management is supportive, effect of quality improvement initiatives majorly affect employee support and management commitment

4.5.3 Extent to which Quality Circles Influence Employee Performance

Respondents were asked to indicate the extent to which quality circles influence employee performance in Davis & Shirtliff Ltd, Nairobi. The study findings were as shown in the table 4.6.

Table 4.6: Extent to which quality circles influence employee performance

Extent	Frequency	Percentage
Moderate extent	50	38.5
Great extent	70	53.8
Very great extent	10	7.7
Total	**130**	**100.0**

Source: Researcher (2018)

As was shown in the table 4.6, 53.8% of the respondents agreed to a great extent that quality circles influence employee performance, 38.5% indicated to a moderate extent and 7.7% indicated to a very great extent. This shows that to a great extent quality circles influence employee performance in Davis & Shirtliff Ltd as was indicated by majority of the respondents.

4.6 Influence of Six Sigma DMAIC on Employee Performance

This study objective sought to find out the influence of six sigma DMAIC on employee performance. The study findings were shown in each of the section.

4.6.1 Extent Davis & Shirtliff Ltd Has Adopted Six Sigma DMAIC Principle

Respondents were asked to indicate the extent to which Davis & Shirtliff Ltd adopted six sigma DMAIC principle. The study findings were as shown in the table 4.7

Table 4.7: Extent Davis & Shirtliff Ltd has Adopted Six Sigma DMAIC Principle

Extent	Frequency	Percentage
Moderate extent	60	46.2
Great extent	70	53.8
Total	**130**	**100.0**

Source: Researcher (2018)

As was shown in the table 4.7, 53.8% of the respondents indicated that to a great extent Davis & Shirtliff Ltd adopted six sigma DMAIC principle, and 46.2% of the respondents indicated that to a moderate extent Davis & Shirtliff Ltd adopted six sigma DMAIC principle. This shows that Davis & Shirtliff Ltd had adopted six sigma DMAIC principle by a great extent as was indicated by majority of the respondents.

4.6.2 Statements on Six Sigma DMAIC and how it Influences Employee Performance

Respondents were asked to indicate their level of agreement on statement about six sigma DMAIC and how it influences employee performance in Davis & Shirtliff Ltd. A scale whereby 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree was used. The study findings were as shown in the table 4.8

Table 4.8: Statements on Six Sigma DMAIC and how it Influences Employee Performance

Statement	1	2	3	4	5	Mean	Standard Deviation
Six Sigma DMAIC ensures reduced defect rates by employees	0	50	10	40	30	3.385	1.216
Six Sigma DMAIC leads to employees increasing product yield	0	50	30	40	10	3.077	1.001
Six Sigma DMAIC ensures minimization on errors by employees	0	0	40	60	20	3.615	1.007
Six Sigma DMAIC allows for simpler flow	0	10	10	60	50	4.154	0.867
Six Sigma DMAIC improves the work place tidiness	0	10	20	40	60	4.154	0.952
Opting for Six Sigma DMAIC leads to faster flow of operations	0	10	20	100	0	3.615	0.839
Six Sigma DMAIC influences completion of activities by employees at minimized costs	10	0	50	60	10	3.462	0.933
Six Sigma DMAIC offers for accuracy by employees in completion of activities	0	10	50	60	10	3.538	0.749
Six Sigma DMAIC leads to completion of work as per directives	0	3	45	80	2	3.623	0.561
Six Sigma DMAIC lead to increased knowledge on products	0	20	30	30	50	3.846	1.103
Six Sigma DMAIC improves employee knowledge of their activities	12	2	2	94	20	3.831	1.020
Six Sigma DMAIC propels understanding	0	10	10	100	10	3.846	0.664
OVERALL						**3.679**	**0.909**

Source: Researcher (2018)

As was shown in the table 4.8, majority of the respondents agreed that; six sigma DMAIC allows for simpler flow of processes this was shown by a mean of 4.154 and a standard deviation of 0.867, six sigma DMAIC improves the work place tidiness as was shown by a mean of 4.154 and a standard deviation of 0.952. Additionally, respondents agreed that; six sigma DMAIC propels understanding of job processes this was shown by a mean of 3.846 and a standard deviation of 0.664 and that six sigma DMAIC lead to increased knowledge on products as was shown by a mean of 3.846 and 1.103.

Additionally, the respondents agreed that six sigma DMAIC leads to completion of work as per directives as was shown by a mean of 3.623 and a standard deviation of 0.561.

Respondents also agreed that six sigma DMAIC ensures minimization on errors by employees this was shown by a mean of 3.615 and a standard deviation of 1.007 and that Opting for six sigma DMAIC leads to faster flow of operations this was shown by a mean of 3.615 and a standard deviation of 0.839. Respondents also agreed that Six Sigma DMAIC offers for accuracy by employees in completion of activities as was shown by a mean of 3.538 and a standard deviation of 0.749. Additionally, the study revealed that respondents were neutral that; six sigma DMAIC influences completion of activities by employees at minimized costs as was shown by a mean of 3.462 and standard deviation of 0.933, also respondents were neutral that six sigma DMAIC ensures reduced defect rates by employees as was shown by a mean of 3.385 and a standard deviation of 1.216. Additionally, respondents were neutral that six sigma DMAIC leads to employees increasing product yield this was shown by a mean of 3.077 and a standard deviation of 1.001.

The study findings agree with those of Antony, Gijo, Kumar & Ghadge, (2014), they argued that Six Sigma positively affected business performance due to improvement in satisfaction. Also the findings concur with those of Ellis, (2016) who indicated that six sigma improved the business ordering process.

4.6.3 Extent to which Six Sigma DMAIC Influences Employee Performance

Respondents were asked to indicate the extent to which six sigma DMAIC influence employee performance in Davis & Shirtliff Ltd. The study findings were as shown in the table 4.9

Table 4.9: Extent to which Six Sigma DMAIC Influence Employee Performance

Extent	Frequency	Percentage
Moderate extent	20	15.4
Great extent	110	84.6
Total	**130**	**100**

Source: Researcher (2018)

As was shown in the table 4.9, 84.6% of the respondents to a great extent indicated that six sigma DMAIC influence employee performance in Davis & Shirtliff Ltd and 15.4% of the respondents indicated to a moderate extent. The study indicates that by a great extent six sigma DMAIC influence employee performance in Davis & Shirtliff Ltd as was indicated by majority of the respondents. The study findings agree with those of Moeller & Shafer (2012) he asserted that adopting six sigma DMAIC positively impacts organizational performance mainly through the efficiency with which employees are deployed.

4.7 Influence of Just in Time Practices on Employee Performance

This study objective sought to find out the influence of just in time practices on employee performance, the study findings were as shown in each of the section as follows.

4.7.1 Extent to which Davis & Shirtliff Ltd has adopted Just in Time practices

The respondents were asked to indicate the extent to which Davis & Shirtliff Ltd adopted Just in Time practices. The study findings were as shown in the table 4.10.

Table 4.10: Extent to which Davis & Shirtliff Ltd has Adopted Just in Time Practices

Extent	Frequency	Percentage
Little extent	40	30.8
Moderate extent	50	38.5
Great extent	40	30.8
Total	**130**	**100**

Source: Researcher (2018)

As was shown in the table 4.10, 38.5% of the respondents indicated that to a moderate extent Davis & Shirtliff Ltd adopted Just in Time practices, 30.8% indicated to a great extent, and also a similar percentage of 30.8% indicated to a little extent. This shows that Davis & Shirtliff Ltd adopted Just in Time practices by a moderate extent as was shown by most of the respondents.

4.7.2 Statements on Just in Time Practices and How it Influences Employee Performance

Respondents were asked to indicate their level of agreement on statements on Just in Time practices and how it influences employee performance in Davis & Shirtliff Ltd, Nairobi. A scale whereby 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree was used. The study findings were as shown in the table 4.11.

Table 4.11: Statements on Just in Time Practices and How it Influences Employee Performance

Statement	1	2	3	4	5	Mean	Standard Deviation
Opting for Just in Time leads to employees applying the right procedures at work	0	10	20	100	0	3.692	0.608
Just in Time propels timely completions of tasks by employees	0	10	70	50	0	3.308	0.608
Just in Time saves on cost by the time tasks are completed	0	40	50	30	10	3.077	0.920
Just in Time leads to minimal or no delays in production	0	60	20	50	0	2.923	0.920
Just in Time reduces employee reworks on products	0	32	25	71	1	3.318	0.857
Just in Time offers faster operational processes	10	10	30	70	10	3.462	1.013
Just in Time influences timely deliveries of products/ services by employees	10	40	30	20	30	3.154	1.297
Just in Time improves delivery of right quantities of products/services by employees	0	10	60	60	0	3.385	0.627
Just in Time influences better quality on products/services	0	10	80	30	10	3.231	0.894
Just in Time facilitates flow of activities for employees	10	40	20	50	10	3.077	1.145
Just in Time leads to improved work integration within employees	0	50	40	20	20	3.077	1.076
Just in Time increases speeds in employees executing activities	0	50	20	60	0	3.077	0.920
OVERALL						**3.232**	**0.907**

Source: Researcher (2018)

As was shown in the table 4.11, the study shows that majority of the respondents agreed that; opting for just in time practices leads to employees applying the right procedures at work as was shown by a mean of 3.692 and a standard deviation of 0.608. The study also

showed that respondents were neutral that; just in time offers faster operational processes as was shown by a mean of 3.462 and a standard deviation of 1.013, also that just in time improves delivery of right quantities of products/services by employees as shown by a mean of 3.385 and a standard deviation of 0.627, also that just in time reduces employee reworks on products as was shown by a mean of 3.318 and a standard deviation of 0.857. Respondents indicated that just in time influences better quality on products/services as shown by a mean of 3.231 and a standard deviation of 0.894. Further the respondents indicated that, just in time influences timely deliveries of products/ services by employees as was shown by a mean of 3.154 and a standard deviation of 1.297, also that just in time facilitates flow of activities for employees which was shown by a mean of 3.077 and a standard deviation of 1.145, just in time leads to improved work integration within employees this was shown by a mean of 3.077 and a standard deviation of 1.076.

Respondents were also neutral to the following statements; that just in time increases speeds in employees executing activities as shown by a mean of 3.077 and a standard deviation of 0.920, also respondents indicated that just in time saves on cost by the time tasks are completed as shown by a mean of 3.077 and a standard deviation of 0.920. Additionally, the study indicated that Just in Time leads to minimal or no delays in production as was shown by a mean of 2.923 and a standard deviation of 0.920.

The study findings agrees with those of Mackelprang (2009) who indicates that just in time that JIT practices manifest the major impact on performance outcomes for individuals and asserts the role of moderating factors in the relationship between JIT practices and performance.

Also the study findings agrees with those of Sriparavastu & Gupta (1997) asserting that JIT implementation combined with Total Quality Management (TQM) in manufacturing firms contributed to increased productivity, employee involvement, cost reduction, quality enhancement, management commitment and supplier participation.

4.7.3 Extent to which Just in Time Practices Influences Employee Performance

Respondents were asked to indicate in general the extent to which Just in Time practices influence employee performance in Davis & Shirtliff Ltd. The study findings were as shown in the table 4.12.

Table 4.12: Extent to which Just in Time Practices Influence Employee Performance

Extent	Frequency	Percentage
Little extent	40	30.8
Moderate extent	50	38.5
Great extent	40	30.8
Total	130	100.0

Source: Researcher (2018)

As was shown in the table 4.12, 38.5% of the respondents indicated that to a moderate extent Time principle influence employee performance in Davis & Shirtliff Ltd, 30.8% indicated to a little extent and also 30.8% of the respondents indicated that to a great extent Time principle influences employee performance in Davis & Shirtliff Ltd. This shows that Just in Time practices influences employee performance in Davis & Shirtliff Ltd to a moderate extent as was shown by most of the respondents.

4.8 Influence of Lean Manufacturing Principle on Employee Performance

This study objective sought to find out the respondent's response on the influence of lean manufacturing principle on employee performance. The study findings were as shown in each of the sections.

4.8.1 Extent to which Davis & Shirtliff Ltd has Adopted Lean Manufacturing

Respondents were asked to indicate the extent to which Davis & Shirtliff Ltd adopted Lean Manufacturing. The study findings were as shown in the table 4.13.

Table 4.13: Extent to which Davis & Shirtliff Ltd has adopted Lean Manufacturing

Extent	Frequency	Percentage
Moderate extent	10	7.7
Great extent	90	69.2
Very great extent	30	23.1
Total	**130**	**100.0**

Source: Researcher (2018)

As was shown in the table 4.13, 69.2% of the respondents indicated that to a great extent Davis & Shirtliff Ltd adopted lean manufacturing, 23.1% indicated to a very great extent and 7.7% indicated to a moderate extent. This shows that Davis & Shirtliff Ltd adopted lean manufacturing by a great extent as was shown by majority of the respondents.

4.8.2 Statements on Lean Manufacturing and How it Influences Employee Performance

Respondents were asked to indicate their agreement level on lean manufacturing and how it influences employee performance in Davis & Shirtliff Ltd. A scale of 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree was used. The study responses were as presented in the table 4.14.

Table 4.14: Statements on Lean Manufacturing and How it Influences Employee Performance

Statement	1	2	3	4	5	Mean	Standard Deviation
Opting for Lean Manufacturing leads to employees spearheading product innovation	10	10	40	40	30	3.538	1.156
Lean Manufacturing leads to improved production and quality product by employees	0	10	40	70	10	3.615	0.741
Lean Manufacturing ensures employees satisfy customer tastes and preferences	0	10	80	40	0	3.231	0.578
Opting for Lean Manufacturing minimizes wastages by employees	0	10	40	40	40	3.846	0.952
Lean Manufacturing provides simple comprehensive steps for employees on waste reduction	10	0	40	50	30	3.692	1.070
Lean Manufacturing leads to better management on green energy by employees	50	0	0	50	30	3.077	1.692
Lean Manufacturing offers clear safety procedures for employees	0	10	30	60	30	3.846	0.867
Lean Manufacturing facilitates proper handling of operatives and machinery by the employees	10	0	10	90	20	3.846	0.952
Lean Manufacturing reduces firm accidents to employees	0	10	40	50	30	3.769	0.894
Lean Manufacturing improves employees skills on machine operation	0	10	50	40	30	3.692	0.914
Lean Manufacturing improves knowledge on soft skills and software usage	0	10	50	50	20	3.615	0.839
Lean Manufacturing leads to correct skills application based on the job description	0	10	10	80	30	4.000	0.787
OVERALL						**3.647**	**0.954**

Source: Researcher (2018)

As was shown in the table 4.14, majority of the respondents agreed that; lean manufacturing leads to correct skills application based on the job description this was shown by a mean of 4.000 and a standard deviation of 0.787, also that lean manufacturing

facilitates proper handling of operatives and machinery by the employees this was shown by a mean of 3.846 and a standard deviation of 0.952. Also respondents agreed that lean manufacturing offers clear safety procedures for employees this was shown by a mean of 3.846 and a standard deviation of 0.867, additionally respondents indicated that opting for lean manufacturing minimizes wastages by employees this was shown by a mean of 3.846 and a standard deviation of 0.952.

Respondents agreed that; lean manufacturing reduces firm accidents to employees this was shown by a mean of 3.769 and a standard deviation of 0.894 also that lean manufacturing improves employee's skills on machine operation this was shown by a mean of 3.692 and a standard deviation of 0.914. Also respondents agreed that lean manufacturing leads to improved production and quality product by employees this was shown by a mean of 3.615 and a standard deviation of 0.741, also respondents agreed that lean manufacturing improves knowledge on soft skills and software usage this was shown by a mean of 3.615 and a standard deviation of 0.839.

Further the respondents agreed that; opting for lean manufacturing leads to employees spearheading product innovation this was shown by a mean of 3.538 and a standard deviation of 1.156. Also the respondents were neutral that lean manufacturing ensures employees satisfy customer tastes and preferences this was shown by a mean of 3.231 and a standard deviation of 0.578 also that lean manufacturing leads to better management on green energy by employees this was shown by a mean of 3.077 and a standard deviation of 1.692. The study findings agrees with those of Amal & Umarali (2017) as they indicated that waste elimination, employee awareness and involvement,

visual management contributed more on the success of lean manufacturing in Indian automobile manufacturing industry.

4.8.3 Extent to which Lean Manufacturing Influences Employee Performance

Respondents were asked to indicate the extent to which Lean Manufacturing principle influence employee performance in Davis & Shirtliff Ltd. The study findings were as shown in the table 4.15

Table 4.15: Extent to which Lean Manufacturing Principle Influence Employee Performance

Extent	Frequency	Percentage
Moderate extent	30	23.1
Great extent	50	38.5
Very great extent	50	38.5
Total	**130**	**100.0**

Source: Researcher (2018)

As was shown in the table 4.15, 38.5% of the respondents indicated that to a great extent lean manufacturing principle influence employee performance in Davis & Shirtliff Ltd, 38.5% of the respondents indicated to a very great extent and 23.1% of the respondents indicated to a moderate extent. This shows that lean manufacturing principle influences employee performance in Davis & Shirtliff Ltd by a great extent as was indicated by most of the respondents.

Table 4.16: Summary on Dependent Variables Influence on Employee Performance

Kaizen Principle	Sample Size	Mean	Standard Deviation
Quality Circles	130	3.885	0.916
Six Sigma DMAIC	130	3.679	0.909
Just In Time Practices	130	3.232	0.907
Lean Manufacturing practices	130	3.647	0.954
OVERALL		**3.885**	**0.916**

Source: Researcher (2018)

As was shown in the table 4.16, the study indicates that majority of the respondents agreed that; quality circle influences employee performance as was shown by a mean of 3.885 and a standard deviation of 0.916, six sigma DMAIC influences employee performance as was shown by a mean of 3.679 and a standard deviation of 0.909 and also lean manufacturing influences employee performance as was shown by a mean of 3.647 and a standard deviation of 0.954. However the study also showed that respondents were neutral that just in time practices influences employee performance as shown by a mean of 3.232 and a standard deviation of 0.954.

4.9 Employee Performance

The section sought to find out the respondent's opinion on the employee performance. The study findings were as presented in each of the sections.

4.9.1 Statements on Employee performance in Davis & Shirtliff Ltd

Respondents were asked to indicate their level of agreement about employee performance in Davis & Shirtliff Ltd. A scale whereby 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree was used. The study findings were as presented in the table 4.17

Table 4.17: Statements on Employee Performance in Davis & Shirtliff Ltd

Statement	1	2	3	4	5	Mean	Standard Deviation
Targeted objectives are met by employees at the end of the financial year based on the annual plan	0	10	50	70	0	3.462	0.637
Tasks are well managed by employees in work processes	0	10	10	110	0	3.769	0.578
Employees engage in teamwork to perform tasks	10	0	50	50	20	3.538	1.013
Employees manage their time efficiently at work	0	50	20	50	10	3.154	1.030
There is a well-established communication management system for the employees	0	50	10	50	20	3.308	1.140
Deadlines and targets are efficiently met within departments	10	0	30	80	10	3.615	0.927
Skills and knowledge-base in employees are increased	10	0	0	60	60	4.231	1.053
Enhancement in employees achieved due to educative programs	10	0	0	50	70	4.308	1.070
Increase of functional and technical skills of employees	10	0	0	90	30	4.000	0.964
There is maximum utilization of employees labour capacity	0	10	40	40	40	3.846	0.952
Employees are involved in creation of opportunities and programs for themselves	0	50	40	30	10	3.000	0.964
Increase in employees pay, growth and promotions	40	10	40	30	10	2.692	1.329
OVERALL						**3.577**	**0.971**

Source: Researcher (2018)

As shown in the table 4.17, majority of the respondents agreed that; enhancement in employees is achieved due to educative programs as shown by a mean of 4.308 and a standard deviation of 1.070, also that skills and knowledge-base in employees are

increased as shown by a mean of 4.231 and a standard deviation of 1.053. Additionally, respondents agreed that there is increased functional and technical skills of employees as was shown by a mean of 4.000 and a standard deviation of 0.964, also that there is maximum utilization of employees' labour capacity as shown by a mean of 3.846 and a standard deviation 0.952.

Further the respondents were neutral that targeted objectives are met by employees at the end of the financial year based on the annual plan which shown by a mean of 3.462 and a standard deviation of 0.637, and that there is a well-established communication management system for the employees as shown by a mean of 3.308 and a standard deviation of 1.140.

Respondents were also neutral that; employees are involved in creation of opportunities and programs for themselves as was shown by a mean of 3.000 and a standard deviation of 0.964 and that it results to an increase in employees pay, growth and promotions this was shown by a mean of 2.692 and a standard deviation of 1.329. The study findings agree with those of Preuss & Lautsch (2002) that incorporation of the information from employees, the productivity, quality of products and flexibility of the organization improves. The findings also agree with those of Ogden (1992) that potential benefits accruing from greater employee performance in firms requires their interests to be well aligned with organization's interests.

4.9.2 Extent to which Employee Performance Requirements are met

Respondents were asked to indicate their level of agreement relating to the extent in which employee performance requirements are met in Davis & Shirtliff Ltd. The study findings were as presented in the table 4.18

Table 4.18: Extent to which Employee Performance Requirements are met

Extent	Frequency	Percentage
Moderate extent	50	38.5
Great extent	80	61.5
Total	**130**	**100.0**

Source: Researcher (2018)

As was shown in the table 4.18, 61.5% of the respondents indicated that to a great extent employee performance requirements are met in Davis & Shirtliff Ltd whereas 38.5% of the respondents indicated to a moderate extent. This shows that employee performance requirements are met in Davis & Shirtliff Ltd to a great extent as was indicated by majority of the respondents.

Respondents were asked to indicate what they would recommend to be done in order to improve employee performance in Davis & Shirtliff Ltd. Majority of the respondents indicated that there should be the adoption of the kaizen principles, establishment of a working system flow and clear separation of duties (clear division of labour or clear specialization of labour). Majority of the respondents also indicated that there should be a more objective approach to employee motivation, fairness in recognitions /commendations.

Also the study indicated that majority of the respondents indicated that there should be more training on soft skills, training and adoption of Kaizen within the whole organization also that Davis & Shirtliff should focus on employees' strength when offering tasks.

4.10 Inferential Statistics

The results for the inferential statics are presented in this section, which comprises correlation and regression analysis.

4.10.1 Correlation Analysis

Correlation analysis was used in this study to determine a two-way linear association between dependent and independent variables of the study. These results are in table 4.19.

Table 4.19: Correlations Coefficient Table

		Employee performance	Quality circles	Six Sigma DMAIC	Just in Time practices	Lean manufacturing
Employee performance	Correlation Coefficient	1.000	.653	.633	.602	.648
	Sig. (1-tailed)	.	.476	.439	.335	.958
Quality circles	Correlation Coefficient	.653	1.000	.142	.037	001
	Sig. (1-tailed)	.000	.	.000	.003	.002
Six Sigma DMAIC process	Correlation Coefficient	.633	.142	1.000	.046	.008
	Sig. (1-tailed)	.002	.001	.	.000	.000
Just in Time practices	Correlation Coefficient	.602	.037	.046	1.000	.124
	Sig. (1-tailed)	.002	.000	.001	.	.002
Lean manufacturing practices	Correlation Coefficient	.648	001	.008	.124	1.000
	Sig. (1-tailed)	.000	.001	.003	.000	.

Source: Researcher (2018)

The correlation summary shown in table 4.19 shows that the association between the dependent and the independent variables was significant at the 95% confidence level and that they had a positive correlation. This means that strengthening the independent variables leads to an increase in the dependent variable.

The outcome of the Pearson's correlation coefficient illustrated the significant positive relationship between employee performance and quality circles (ρ =0.653, p-value<0.476). This insinuates that if quality circle is further propelled, employee performance will increase hence improve. There is a significant positive relationship between employee performance and six sigma DMAIC (ρ =0.633, p-value<0.439), hence if six sigma DMAIC is strengthened, employee performance will increase. There is a significant positive relationship between employee performance and just in time practices (ρ =0.602, p-value<0.335), hence if just in time principle is strengthened, employee performance will increase. There is a weak significant positive relationship between employee performance and lean manufacturing practices (ρ=0.648, p-value<0.958).

The above findings affirm those of Brunet and New (2003) who revealed that the kaizen system has three characteristics; it is a continuous process for efficiency and quality, requires participatory employee involvement and it is incremental in nature as it does not involve reorganization.

4.10.2 Diagnostic Tests

This section analyses the diagnostic tests conducted for the data collected in the study. They included the Multicollinearity Test, Normality Test and Test for Heteroscedasticity.

4.10.2.1 Multicollinearity Test

The study sought to identify the collinearity among the independent variables using tolerance and variation inflation factor (VIF) statistics of the predictor constructs, as shown in Table 4.20

Table 4.20: Tolerance and VIF Measures

Collinearity Measures	Tolerance	VIF
Quality Circles	0.847	1.248
Six Sigma DMAIC process	0.811	1.322
Just in Time practices	0.823	1.200
Lean manufacturing practice	0.785	1.227

a. Dependent Variable: Employee Performance

Source: Researcher (2018)

The study adopted the Menard (2012) threshold value who stated that variance inflation factor of 4.0 to represent high multicollinearity status. From Table 4.20 Quality circles had a VIF of 1.248, six sigma DMAIC process had a VIF of 1.322, just in time practices had a VIF of 1.200 while Lean manufacturing practice had a VIF 1.227. The findings illustrated that all the independent variables realized a high tolerance value, which clarifies that the beta values of the regression equation of the independent variable would be stable with low standard error terms. Tolerance is regarded as part of the denominator in calculating the confidence limits on the partial regression coefficient. The VIF of independent variables that exceed 10 as a rule of thumb is considered collinear (Porter & Gujarat, 2009). Therefore, gauging on this rule of thumb suggests that there was no collinearity among the independent constructs.

4.10.2.2 Normality Test

This test sought to establish the normal distribution for the employee performance which was tested for Gaussian distribution using numerical and graphical methods. According to Indiana (2011) many data analysis methods like t-test, ANOVA and regression analysis depend on the assumption that data was sampled from a Gaussian distribution.

Table 4.21: Kolmogorov-Smirnov and Shapiro-Wilk tests for Employee Performance

	Kolmogorov-Smirnov[a]		Shapiro-Wilk		
	Df	**Stats Sig**	**Dif**	**Sig**	**Statistics**
Employee Performance	3	0.088	3	.200*	.956

a. Lilliefors Significance Correction

**** Lower bound of true significance***

Source: Researcher (2018)

The computed values of Kolmogorov-Smirnov and Shapiro-Wilk test illustrate inconsequential statistics with p-value of 0.200, signifying that employee performance is normally distributed. Broadly, the distribution seems normally distributed. On the basis of the calculated insignificant test statistics, normality of the dependent variable was maintained. According to the findings by Shelvin & Miles (2010), the significance test result for such data is regarded as fairly accurate.

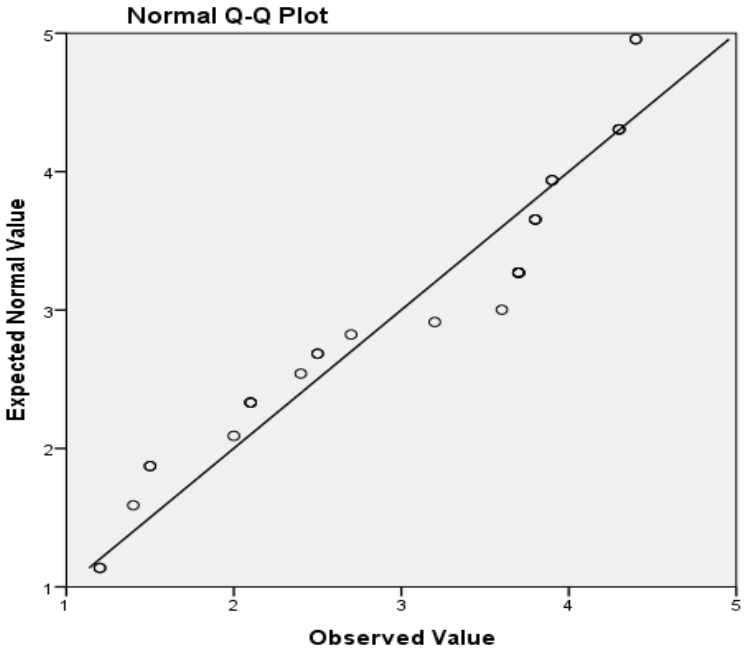

Figure 4.4: Normal Curve Plot

Source: Researcher (2018)

Further, the figure 4.4 shows the visualized distribution of random variables of difference between an empirical distribution and theoretical distribution of employee performance. At very low values of the variable, some minimal deviation from normality is considered normal.

4.10.2.3 Test for Heteroscedasticity

The study tested for the heteroscedasticity using the Breusch-Pagan/Cook-Weisberg test. The results are as follows;

Table 4.22: Breusch-Pagan/Cook-Weisberg test Results

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity
Ho: Constant variance Variables: fitted values of employee performance Chi^2 (1) = 0.22 Prob > chi^2 = 0.7134

Source: Researcher (2018)

From the findings, the chi-square value was small, illustrating heteroscedasticity was not a problem (or at least if that was a problem, it was not a multiplicative function of the predicted values). Also, it was revealed that the p value of 0.7134 was greater than 0.05 significant levels implying that there was no violation of homoscedasticity. One of the important assumptions of linear regression is that, there should be no heteroscedasticity of residuals (Shelvin & Miles, 2010).

4.10.3 Regression Analysis

The research determined the fit of the regression equation using the coefficient of determination to get the strength of the influence between the dependent and independent variables.

4.10.3.1 Model Summary

The model summary illustrates the R, R^2, adjusted R^2, and the standard error of the estimate, which can be used to determine how well a regression model fits the data.

Table 4.23: Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.901[a]	.811	.798	.88195

a. Predictors: (Constant), Quality circles, Six Sigma DMAIC, Just in Time practices and Lean manufacturing.

Source: Researcher (2018)

This model summary shows the R^2, the adjusted R^2 and the standard error of estimate. "R" the multiple correlation coefficient (measure of the quality of the prediction of the dependent variable). "R^2" is a statistical measure of how close the data are to the fitted

regression line. It is also known as the coefficient of determination, or the coefficient of multiple determinations for multiple regressions. "Adjusted $R^{2"}$ is coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variable.

From the findings in the above table the value of adjusted R^2 was 0.798, an indication that there was variation of 79.8% on employee performance due to quality circles, six sigma DMAIC process, just in time practices and lean manufacturing practice at 95% confidence level. R is the correlation coefficient which shows the relationship between the study variables, and from the findings shown in the table above there was a strong positive relationship between the study variables as shown by 0.901.

4.10.3.2 ANOVA Results

ANOVA is used to determining the degree of difference or similarity in groups of data. This helps to tests whether the overall regression model is a good fit for the data.

In this ANOVA analysis, the dependent variable is employee performance. There are significant relationships between the dependent variable and the independent variables quality circles, six sigma DMAIC process, just in time practices and lean manufacturing practice.

Table 4.24: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.404	4	0.101	6.3125	.018[b]
Residual	2	125	0.016		
Total	2.404	129			

a. Dependent Variable: Employee Performance

b. Predictors: (Constant), Quality circles, Six Sigma DMAIC, Just in Time practices and Lean manufacturing

Source: Researcher (2018)

Table 4.24 sums up the observed means for each dependent variable across experimental state and the associated F ratios and *p* values obtained from the one-way ANOVAs conducted for the primary analyses. From the findings, the p-value was 0.018 which is less than 0.05 and hence the model is good in predicting how the four independent variables (Quality circles, Six Sigma DMAIC process, Just in Time practices and Lean manufacturing practice) influence employee performance. Further, the F-calculated (6.3125) was more than the F-critical (2.53). This illustrates that the model was capable of forecasting the impact of the independent variables on the dependent variable. When t calculated is greater than t critical, the null hypothesis is rejected.

4.10.3.3 Regression Coefficient

Multiple regression analysis was conducted to find the relationship between employee performance and the independent variables; quality circles, six sigma DMAIC process, just in time practices and lean manufacturing practice.

Table 4.25: Coefficient of Correlation

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.161	0.129	0.99	9.00	.000
Quality circles	1.482	.064	1.21	23.16	.039
Six Sigma DMAIC process	0.942	.050	0.65	18.84	.004
Just in Time practices	1.218	.040	1.05	30.45	.041
Lean manufacturing practice	2.106	.059	1.54	35.69	.016

Source: Researcher (2018)

Table 4.25 gives the coefficients that guide in establishing the regression line. The table gives the coefficients of each variable and the extent to which it influences the dependent variable and which in this case is employee performance. The table also includes the significance level of each variable in the study.

The established regression equation was; $Y=1.161 + 1.482X_1 + 0.942X_2 + 1.281X_3 + 2.106X_4$

Where: Y is the dependent variable (employee performance),

β_0 is the regression coefficient

β_1, β_2, β_3 and β_4 are the slopes of the regression equation,

X_1 is Quality circles, X_2 is Six Sigma DMAIC process, X_3 is Just in Time practices and X_4 is Lean manufacturing practice.

ε is an error term, assumed to be zero.

Employee performance = 1.161 +1.482 Quality circles (X_1) + 0.942 Six Sigma DMAIC process (X_2) + 1.218 Just in Time practices (X_3) +2.106 Lean manufacturing practice (X_4). The beta shows the magnitude or the strength of each dependent variable. This shows the extent to which the dependent variable will change when the independent variable is increased by one unit in each case.

From the above regression model, holding quality circles, six sigma DMAIC process, just in time practices and lean manufacturing practice, employee performance would be 1.161. It's established that a unit increase in quality circles, would cause an increase in employee performance by a factor of 1.482. A unit increase in six sigma DMAIC process would cause an increase in employee performance by a factor of 0.942. A unit increase in just in time practices would cause an increase in employee performance by a factor of 1.218 and a unit increase in lean manufacturing practice would cause an increase in employee performance by a factor of 2.106.

This clearly shows that there is a positive relationship between quality circles, six sigma DMAIC process, just in time practices, lean manufacturing practice and employee performance. The study further revealed that the P-value were less than 5% in all the variables, which shows that all the independent variables were statistically significant and thus in position to make conclusion for the study.

CHAPTER FIVE: SUMMARY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings from chapter four, conclusions and recommendations for practice, based on the study topic on kaizen principles and employee performance in Davis & Shirtliff Ltd, Nairobi City County, Kenya. Further researches on the problem are suggested at the end of this chapter.

5.2 Summary of the Findings

This research sets out to establish whether kaizen practices like quality circles, six sigma DMAIC, just in time practices and lean manufacturing can contribute to the enhancement of employee performance in Davis & Shirtliff Ltd by increasing efficiency, effectiveness skills/knowledge achievement and productivity. The study adopted descriptive research design where respondents described their experiences on the kaizen principles to improve employee performance in Davis & Shirtliff Ltd, Nairobi City County, Kenya.

The target population was 288 employees in Davis & Shirtliff Ltd. Stratified proportionate sampling method was applied to select each strata sample from sample size of 165 employees as participants from the manufacturing industry. As the main data collection instrument, the study adopted self-administered questionnaires. The questionnaire validity and reliability was pre-tested by performing a pilot study.

Data findings were based upon the variables and reasons for conducting the research. Data analysis was done after quantitative approach using Statistical Package for Social Science (SPSS) version 23. Descriptive statistics (in form of means, percentages and measures of dispersion) and inferential analysis were employed in the data analysis.

Analysis using multiple regression was enforced to illustrate the strength of the relationship between the dependent and independent variables.

5.2.1 Influence of Quality Circles on Employee Performance

On this study objective the study revealed that Davis & Shirtliff Ltd has adopted quality circles as was shown by majority of the respondents. Further the study revealed that; quality circles; offer efficient communication channels, ensure faster solutions to work related problems, lead to compliance towards the firm objectives and also enhance ease of communicating objectives. Additionally, the study revealed that quality circles; assist in timely completion of activities, improve delivery of objectives by employees and leads to better communication feedback amongst employees.

Further the study revealed that quality circles; propel faster remittance of information and opting for quality circles leads to reduced grievances. The study also indicated that quality circles improve team cohesion. The study indicated that quality circles; improve the work standards for employees and also that they propel proper delegation of duties. Also the study revealed that to a great extent quality circles influence employee performance in Davis & Shirtliff Ltd.

5.2.2 Influence of Six Sigma DMAIC on Employee Performance

On this objective the study revealed that Davis & Shirtliff Ltd had adopted six sigma DMAIC principle. Also the study revealed that six sigma DMAIC; allows for simpler flow of processes, improves the work place tidiness, propels understanding of job processes, lead to increased knowledge on products and also leads to completion of work as per directives. Additionally, the study revealed that six sigma DMAIC: ensures minimization on errors by employees opting for six sigma DMAIC leads to faster flow of operations. Further the study revealed that six sigma DMAIC; offers for accuracy by

employees in completion of activities and that it influences completion of activities by employees at minimized costs, ensures reduced defect rates by employees and also leads to employees increasing product yield. Further the study revealed that by a great extent six sigma DMAIC influence employee performance in Davis & Shirtliff Ltd.

5.2.3 Influence of Just in Time Practices on Employee Performance

On this objective the study revealed that Davis & Shirtliff Ltd adopted just in time practices by a moderate extent. Also the study revealed that opting for just in time practices; leads to employees applying the right procedures at work, offers faster operational processes, improves delivery of right quantities of products/services by employees and reduces employee reworks on products.

Additionally, the study revealed that just in time practices; reduces employee reworks on products and influences better quality on products/services. Further the study revealed that just in time; influences timely deliveries of products/ services by employees and facilitates flow of activities for employees. Also the study revealed that just in time leads to improved work integration within employees and increases speeds in employees executing activities. In addition, the study revealed that just in time saves on cost by the time tasks are completed and leads to minimal or no delays in production. The study also found out that just in time practices influence employee performance in Davis & Shirtliff Ltd by a moderate extent.

5.2.4 Influence of Lean Manufacturing Principle on Employee Performance

The study revealed that Davis & Shirtliff Ltd adopted lean manufacturing by a great extent. Also the study revealed that lean manufacturing; leads to correct skills application based on the job description, facilitates proper handling of operatives and machinery by the employees, and it offers clear safety procedures for employees. Also the study

revealed that lean manufacturing; minimizes wastages by employees, reduces firm accidents to employees, improves employee's skills on machine operation.

In addition, the study revealed that lean manufacturing; leads to improved production and quality product by employees, improves knowledge on soft skills and software usage, leads to employees spearheading product innovation. The study also indicated lean manufacturing; ensures employees satisfy customer tastes and preferences and leads to better management on green energy by employees. The study research also indicated that lean manufacturing principle influence employee performance in Davis & Shirtliff Ltd by a great extent.

5.3 Conclusion

On the effect of quality circles on employee performance in Davis & Shirtliff Ltd, the study concludes that quality circles; propel proper delegation of duties, assist in timely completion of activities, ensure faster solutions to work related problems and that quality circles lead to better communication feedback amongst employees.

The second objective of the study was to examine the extent to which adoption of six sigma DMAIC process affects employee performance in Davis & Shirtliff Ltd. The study concludes that six sigma DMAIC; ensures reduced defect rates by employees, leads to employees increasing product yield and also that leads to employees increasing product yield.

On the effect of just in time practices on employee performance in Davis & Shirtliff Ltd. The study concludes that just in time; propels timely completions of tasks by employees, reduces employee reworks on products and leads to employees applying the right

procedures at work. Also the study concludes that just in time practices influences better quality on products/services.

With respect to the effect of lean manufacturing practice on employee performance in Davis & Shirtliff Ltd, the study concludes that lean manufacturing; leads to employees spearheading product innovation, leads to improved production and quality product by employees and also that it ensures employees satisfy customer tastes and preferences.

5.4 Recommendations

Regarding the first objective of the study which was to establish the effect of quality circles on employee performance in Davis & Shirtliff Ltd, the study revealed that quality circles improve delivery of objectives by employees and also lead to compliance towards the firm objectives. The study thus recommends that the management of Davis & Shirtliff Ltd should adopt and implement quality circles in their company. The quality cycles should be checked on a regular interval to ensure that they work best for the company.

On the study's second objective the study revealed that six sigma DMAIC; influences completion of activities by employees at minimized costs and also leads to faster flow of operations. Thus the study recommends that the management of Davis & Shirtliff Ltd should uphold six sigma DMAIC, the management should set policies and guideline to be observed to ensure that six sigma DMAIC is adhered to in the company.

Regarding the influence of just in time the study revealed that; leads to improved work integration within employees and influences timely deliveries of products/ services by employees. Thus the study recommends that the management of the company should ensure that guidelines on just in time are adhered to. Also the study recommends that the personnel responsible with checking on just in time practices to be reliable and of high

integrity to ensure that it is it is done in accordance to the listed procedure. The company should consider to create further awareness on just in time practices to increase its levels of awareness and responsiveness within employees.in their performance.

On influence of lean manufacturing, the study revealed that opting for lean manufacturing minimizes wastages by employees and also that it provides simple comprehensive steps for employees on waste reduction. Thus the study recommends that companies' management should adopt fully lean manufacturing in their processes to ensure that the employees work is made more efficient and deliver products and services that will satisfy the customers.

The study research recommends that the management of the company should establish clear working system flow and clear separation of duties. Also the management should set a more objective approach to employee motivation and that there should be fairness in recognitions/commendations. Also the study research recommends that the management of the company should conduct more training on soft skills and adoption of kaizen principles within the whole organization on a regular basis based on a criterion to be developed by the company.

Further the study recommends that the management of the companies should focus on employees' strength when offering tasks this will ensure that the appropriate and best candidates are offered tasks that they are more competent and fit in.

5.5 Suggested Areas for Further Studies

This study was limited to determine the influence of kaizen on employee performance in Davis & Shirtliff Ltd in Nairobi City County, Kenya. The researcher recommends further study of employee performance on other industries in the economy. This is because Davis

& Shirtliff Ltd, which deals in supply, manufacture and assembly, was the main focus in this study; hence the findings may not be generalized across other industries in Kenya, i.e. agricultural farms.

The researcher recommends that Davis & Shirtliff should adopt policies designed to loosen employee performance constraints by enhancing educative kaizen programs to further propel employees' knowledge base.

The researcher recommends a further research on other alternative kaizen principles, not limited to Deming's PDCA/Shewhart cycle, the 5S model, kanban, visual management, and how they influence employee performance in firms in Nairobi City County, Kenya.

It is recommended that a further research should be done to cut across small to medium sized public firms in Nairobi City County, Kenya, to determine influence of kaizen principles on employee performance.

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APPENDICES

Appendix I: Letter for Transmission of Data Collection Instruments

ANNE CLAIRE OLANG,

P.O. BOX 44881-00200,

NAIROBI.

Dear Sir/Madam,

RE: DATA COLLECTION FOR STUDY ON KAIZEN PRINCIPLES AND EMPLOYEE PERFORMANCE IN DAVIS & SHIRTLIFF LTD, NAIROBI

Thank you for agreeing to take part in this research. I am a bona fide student at Kenyatta University undertaking degree of Masters of Business Administration in Strategic Management, registration no. D53/CTY/PT/37956/2016. I am conducting a study on **Kaizen Principles and Employee Performance in Davis & Shirtliff Ltd, Nairobi**. The research is guided by the following objectives:

1. To establish the effect of quality circles on employee performance in Davis & Shirtliff Ltd.
2. To examine the extent to which adoption of six sigma DMAIC process affects employee performance in Davis & Shirtliff Ltd.
3. To determine the effect of just in time practices on employee performance in Davis & Shirtliff Ltd.
4. To establish the effect of lean manufacturing practice on employee performance in Davis & Shirtliff Ltd.

I kindly request for your assistance to help fill in the questionnaire during my data collection. Be assured that the answers you provide will be strictly confidential and will only be used for the purpose of this research. The respondent's information shall also be kept private. In case of questions or clarification, contact the undersigned.

Yours Faithfully,

Anne Claire Olang. Tel: 0723727480. Email: anneolang@gmail.com.

Appendix II: Questionnaire for Davis & Shirtliff Ltd Employees

This questionnaire is intended to collect data on kaizen principles and their impact to employee performance in Davis & Shirtliff Ltd, Nairobi City County, Kenya. Please complete it as honestly and give as much details as possible. Where possible tick appropriately.

KAIZEN PRINCIPLES AND EMPLOYEE PERFORMANCE IN DAVIS & SHIRTLIFF LTD, NAIROBI CITY COUNTY, KENYA.

PART 1: GENERAL INFORMATION

1. Kindly indicate your age.

   Below 27 years ( ) 27-35 years ( )

   36-44 years ( ) Above 45 years ( )

2. What is your highest level of academic qualification?

   Certificate ( ) Diploma ( ) Bachelor's Degree ( )

   Master's Degree ( ) PhD ( ) Others (*Please specify*) _____

3. What is your departmental position within Davis & Shirtliff Ltd?

   Sales ( ) Service ( ) Supply ( ) Administration ( )

   Technical ( ) Commercial ( ) Others (*Please specify*) _____

4. What type of employee are you in Davis & Shirtliff Ltd?

   Full-time ( ) Casual ( )

   Contracted ( ) Intern ( )

5. How many years have you worked in Davis & Shirtliff Ltd?

   Below 5 years ( ) 5-10 years ( )

   11-15 years ( ) Above 16 years ( )

PART 2: INFLUENCE OF QUALITY CIRCLES ON EMPLOYEE PERFORMANCE

6. To what extent has Davis & Shirtliff Ltd adopted Quality Circles?

   Very great extent ( ) Great extent ( ) Moderate extent ( )

   Little extent ( ) No extent ( )

7. Below are several statements on Quality Circles and how it influences employee performance in Davis & Shirtliff Ltd, Nairobi City County, Kenya. Please indicate the degree to which you agree with each. (Please use a scale of 1-5 where; 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree)

Statement	**1**	**2**	**3**	**4**	**5**
Quality Circles propel proper delegation of duties					
Quality Circles assist in timely completion of activities					
Quality Circles improve team cohesion					
Opting for Quality Circles leads to reduced grievances					
Quality Circles ensure faster solutions to work related problems					
Quality Circles improve the work standards for employees					
Quality Circles lead to better communication feedback amongst employees					
Quality Circles offer efficient communication channels					
Quality Circles propel faster remittance of information					
Quality Circles lead to compliance towards the firm objectives					
Quality Circles improve delivery of objectives by employees					
Quality Circles enhance ease of communicating objectives					

8. In general, to what extent does quality circles influence employee performance in Davis & Shirtliff Ltd, Nairobi?

   Very great extent ( ) Great extent ( ) Moderate extent ( )

   Little extent ( ) No extent ( )

PART 3: INFLUENCE OF SIX SIGMA DMAIC ON EMPLOYEE PERFORMANCE

9. To what extent has Davis & Shirtliff Ltd adopted Six Sigma DMAIC principle?

   Very great extent ( ) Great extent ( ) Moderate extent ( )

   Little extent ( ) No extent ( )

10. Below are several statements on Six Sigma DMAIC and how it influences employee performance in Davis & Shirtliff Ltd, Nairobi City County, Kenya. Please indicate the degree to which you agree with each. (Please use a scale of 1-5 where; 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree)

Statement	**1**	**2**	**3**	**4**	**5**
Six Sigma DMAIC ensures reduced defect rates by employees					
Six Sigma DMAIC leads to employees increasing product yield					
Six Sigma DMAIC ensures minimization on errors by employees					
Six Sigma DMAIC allows for simpler flow of processes					
Six Sigma DMAIC improves the work place tidiness					
Opting for Six Sigma DMAIC leads to faster flow of operations					
Six Sigma DMAIC influences completion of activities by employees at minimized costs					
Six Sigma DMAIC offers for accuracy by employees in completion of activities					
Six Sigma DMAIC leads to completion of work as per directives					
Six Sigma DMAIC lead to increased knowledge on products					
Six Sigma DMAIC improves employee knowledge of their activities					
Six Sigma DMAIC propels understanding of job processes					

11. In general, to what extent does Six Sigma DMAIC influence employee performance in Davis & Shirtliff Ltd, Nairobi?

    Very great extent ( ) Great extent ( ) Moderate extent ( )

    Little extent ( ) No extent ( )

PART 4: INFLUENCE OF JUST IN TIME PRACTICES ON EMPLOYEE PERFORMANCE

12. To what extent has Davis & Shirtliff Ltd adopted Just in Time practices?

    Very great extent ( ) Great extent ( ) Moderate extent ( )

    Little extent ( ) No extent ( )

13. Below are several statements on Just in Time practices and how it influences employee performance in Davis & Shirtliff Ltd, Nairobi City County, Kenya. Please indicate the degree to which you agree with each. (Please use a scale of 1-5 where; 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree)

Statement	**1**	**2**	**3**	**4**	**5**
Opting for Just in Time leads to employees applying the right procedures at work					
Just in Time propels timely completions of tasks by employees					
Just in Time saves on cost by the time tasks are completed					
Just in Time leads to minimal or no delays in production					
Just in Time reduces employee reworks on products					
Just in Time offers faster operational processes					
Just in Time influences timely deliveries of products/ services by employees					
Just in Time improves delivery of right quantities of products/services by employees					
Just in Time influences better quality on products/services					
Just in Time facilitates flow of activities for employees					
Just in Time leads to improved work integration within employees					
Just in Time increases speeds in employees executing activities					

14. In general, to what extent does Just in Time practices influence employee performance in Davis & Shirtliff Ltd, Nairobi?

    Very great extent ( ) Great extent ( ) Moderate extent ( )

    Little extent ( ) No extent ( )

PART 5: INFLUENCE OF LEAN MANUFACTURING PRINCIPLE ON EMPLOYEE PERFORMANCE

15. To what extent has Davis & Shirtliff Ltd adopted Lean Manufacturing?

    Very great extent ( ) Great extent ( ) Moderate extent ( )

    Little extent ( ) No extent ( )

16. Below are several statements on Lean Manufacturing and how it influences employee performance in Davis & Shirtliff Ltd, Nairobi City County, Kenya. Please indicate the degree to which you agree with each. (Please use a scale of 1-5 where; 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree)

Statement	**1**	**2**	**3**	**4**	**5**
Opting for Lean Manufacturing leads to employees spearheading product innovation					
Lean Manufacturing leads to improved production and quality product by employees					
Lean Manufacturing ensures employees satisfy customer tastes and preferences					
Opting for Lean Manufacturing minimizes wastages by employees					
Lean Manufacturing provides simple comprehensive steps for employees on waste reduction					
Lean Manufacturing leads to better management on green energy by employees					
Lean Manufacturing offers clear safety procedures for employees					
Lean Manufacturing facilitates proper handling of operatives and machinery by the employees					
Lean Manufacturing reduces firm accidents to employees					
Lean Manufacturing improves employees skills on machine operation					
Lean Manufacturing improves knowledge on soft skills and software usage					
Lean Manufacturing leads to correct skills application based on the job description					

17. In general, to what extent does Lean Manufacturing principle influence employee performance in Davis & Shirtliff Ltd, Nairobi?

    Very great extent ( ) Great extent ( ) Moderate extent ( )

    Little extent ( ) No extent ( )

PART 6: EMPLOYEE PERFORMANCE

18. Below are several statements on Employee performance in Davis & Shirtliff Ltd, Nairobi. Please indicate the degree to which you agree with each. (Please use a scale of 1-5 where; 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree)

Statement	**1**	**2**	**3**	**4**	**5**
Targeted objectives are met by employees at the end of the financial year based on the annual plan					
Tasks are well managed by employees in work processes					
Employees engage in teamwork to perform tasks					
Employees manage their time efficiently at work					
There is a well-established communication management system for the employees					
Deadlines and targets are efficiently met within departments					
Skills and knowledge-base in employees are increased					
Enhancement in employees achieved due to educative programs					
Increase of functional and technical skills of employees					
There is maximum utilization of employees labour capacity					
Employees are involved in creation of opportunities and programs for themselves					
Increase in employees pay, growth and promotions					

19. In general, to what extent are employee performance requirements met in Davis & Shirtliff Ltd, Nairobi?

    Very great extent ( ) Great extent ( ) Moderate extent ( )

    Little extent ( ) No extent ( )

20. What would you recommend to be done in order to improve employee performance in Davis & Shirtliff Ltd?

……..……

……..……

……..……

THANK YOU FOR YOUR ASSISTANCE

Appendix III: Sample Size Chart

Required Sample Size[†]

from: The Research Advisors

Confidence = **95.0%** 3.841459 Confidence = **99.0%** 6.634897

Population Size	Probability of Success	Degree of Accuracy/Margin of Error				Degree of Accuracy/Margin of Error			
		0.05	**0.035**	**0.025**	**0.01**	**0.05**	**0.035**	**0.025**	**0.01**
10		10	10	10	10	10	10	10	10
20		19	20	20	20	19	20	20	20
30		28	29	29	30	29	29	30	30
50		44	47	48	50	47	48	49	50
75		63	69	72	74	67	71	73	75
100		80	89	94	99	87	93	96	99
150		108	126	137	148	122	135	142	149
200		132	160	177	196	154	174	186	198
250		152	190	215	244	182	211	229	246
300		169	217	251	291	207	246	270	295
400		196	265	318	384	250	309	348	391
500		217	306	377	475	285	365	421	485
600		234	340	432	565	315	416	490	579
700		248	370	481	653	341	462	554	672
800		260	396	526	739	363	503	615	763
900		269	419	568	823	382	541	672	854
1,000		278	440	606	906	399	575	727	943
1,200		291	474	674	1067	427	636	827	1119
1,500		306	515	759	1297	460	712	959	1376
2,000		322	563	869	1655	498	808	1141	1785
2,500		333	597	952	1984	524	879	1288	2173
3,500		346	641	1068	2565	558	977	1510	2890
5,000		357	678	1176	3288	586	1066	1734	3842
7,500		365	710	1275	4211	610	1147	1960	5165
10,000		370	727	1332	4899	622	1193	2098	6239
25,000		378	760	1448	6939	646	1285	2399	9972
50,000		381	772	1491	8056	655	1318	2520	12455
75,000		382	776	1506	8514	658	1330	2563	13583
100,000		383	778	1513	8762	659	1336	2585	14227
250,000		384	782	1527	9248	662	1347	2626	15555
500,000		384	783	1532	9423	663	1350	2640	16055
1,000,000		384	783	1534	9512	663	1352	2647	16317
2,500,000		384	784	1536	9567	663	1353	2651	16478

Source: Research Advisors (2006)

Appendix IV: Graduate School Approval

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 30th August, 2018

TO: Ann Claire Olang
C/o Business Administration Dept.

REF: D53/CTY/pt37956/2016

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board of 9th May, 2015 entitled "Kaizen principles and employee performance in Davis and shirtliff Limited, Nairobi city county Kenya

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

KENYATTA UNIVERSITY OFFICE OF DEAN 18 SEP 2018 GRADUATE SCHOOL P.O. BOX 43844

ELIJAH MUTUA
FOR: DEAN, GRADUATE SCHOOL

C.c. Chairman, Department of Business Administration

Supervisors:

1. Dr. Linda Kimencu
   C/o Department of Business Administration
   Kenyatta University

EM/jm

Appendix V: NACOSTI Permit

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/18/46471/25666**

Date: **4th October, 2018**

Anne Claire Olang
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Kaizen principles and employee performance in Davis & Shirtliff Ltd, Nairobi"*** I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **4th October, 2019.**

You are advised to report to **the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

The County Director of Education
Nairobi County.