THE EFFECT OF INTERNAL ENVIRONMENT ON PRINTING QUALITY PERFORMANCE IN NAIROBI CENTRAL BUSINESS DISTRICT

BY

Dominic Oloo Menya

This project is submitted in partial fulfilment of the requirements for the award of a Master Degree in Business Administration from St. Paul's University.

AUGUST 2018

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MBA/NRB/2545/16

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Dr. Charity Muraguri – St. Paul University

Dr. Stephen Macharia – Karatina University

AUGUST 2018

DECLARATION

This project is a product of my own work and is not the result of anything done in collaboration. It has not been previously presented to any other institution for any other purpose. I agree that this project may be available for reference and photo copying at the discretion of the University.

DOMINIC OLOO MENYA Signature…… Date……

Registration Number MBA/NRB/2545/16

We confirm that the work reported in this thesis project was carried out by the student under our supervision.

Dr. Charity Muraguri Signature…… Date……

St. Paul University

Dr. Stephen Macharia Signature…… Date……

Karatina University

DEDICATION

This Research Project is dedicated to those who have a special place in my heart and my entire family members, especially my wife Linet, daughters Terry, Vince and my son Mark.

ACKNOWLEDGEMENT

I would like to extend my appreciation to my family, colleagues, friends and all those who contributed towards the completion of this research project.

I am thankful to my supervisors, Dr. Charity Muraguri and Dr. Stephen Macharia whose encouragement, guidance and support from the initial to the final level enabled me to develop an understanding of this project.

My regards and blessings to all the printing firms that assisted in finding content for this project.

I register my gratitude to the St. Paul's University fraternity for the support and corporation they provided whenever I needed it in the course of my programme. Above all I honour God for giving me good health and all that I will need to make this programme.

ABSTRACT

The study examined the background of the printing business by analysing the quality issues that lead to quality print production by analysis of factors affecting quality performance in the printing industry in Nairobi Central Business District. Specific objectives are skills, human resource (HR), insufficient capital and use of out-dated equipment. Also included are research questions: establishing skills possessed by printing managers and technical staff to quality, quality of materials to quality, lack of capital to quality and use of poorly maintained equipment to quality. Theories in quality are fishbone theory developed on how companies should handle quality improvement, PDCA theory of ratio-quality equal to result of work effort over total cost, and Quality Trilogy theory on quality planning, quality control and quality improvement. The researcher used descriptive method because it helped in collection of data. The study also used survey method of descriptive research. Data was collected from a population of 101 printing companies in Nairobi Central Business District (NCBD). The study sampled from 30 individual printing firms and the sample method used was random process. Data collection tool was questionnaires. The researcher and his assistant physically distributed the research questionnaires hard copies face to face to respondents. To analyse data the researcher reviewed raw data from the field, and sorted them out to determine their accuracy. Descriptive analysis and inferential research was employed. Findings were, equipment had the highest reliability at 0.964, followed by materials at 0.912, skills at 0.856, and capital at 0.785. This indicates that all the four independent variables were reliable measures of performance as their reliability values exceeded the prescribed threshold of 0.7. From variables, the results were, one (1) unit of quality which is 0.107 units of skills leads to 0.769 of quality, while 0.252 units of material leads to 0.769 of quality, 0.294 units of capital leads to 0.769 of quality and 0.535 units of equipment leads to 0.769 of quality. From the outcome of the analysis, the study recommended based on outcome that all printing firms must adhere and improve on variables as the ones which were investigated by the researcher so as, to achieve quality production.

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ABBREVIATIONS AND ACRONYMS

C.B.D	–	Central Business District
E.A	-	East Africa
ERP	-	Enterprise Resource Planning
H.R	-	Human Resource
ISO QMS	-	ISO Quality Management Systems
MBWA	-	Management by Walking About
N.C.B.D	–	Nairobi Central Business District
PDCA Theory	-	Plan, Do, Check, Act
POS	-	Point Of Sale
Q.P.S	-	Quality Production and Systems
QA	-	Quality Assurance
QC	-	Quality Control
T.Q.M	-	Total Quality Management

OPERATIONAL DEFINITION OF TERMS

Ancillary services	Operations which take place in the post press section (Porter, 2010)
Bespoke	Measurement used to set a required standard in printing (Porter, 2010)
Commercial printers	Printers who produce products for trade/business purposes (Miles & Donna, 2010)
Enhancement finishing	Any Document finished with an aesthetic touch or appeal to view (Porter, 2010)
Etching	A process of using an acid bath to prepare raised image area on letter press image carrier (Miles & Donna, 2010)
Flexography	Major conventional printing process (Ian, 2011)
Gravure	Major conventional printing process (Ian, 2011)
Hue	It's the strength of the ink in the relationship of the amount of pigment and the amount of the vehicle (Mortimer, 2011)
Ink fitness/grind	Ability where a printer encounters problems from a batch of ink which is not well ground (Mortimer, 2011)
Ink on paper incompatibility	Acceptance of ink on paper during print on press (Mortimer, 2011)
Letterpress	Major conventional printing process (Ian, 2011)
Lithography	Offset printing process (Ian, 2011)
Offset printing	A machine printing process where image is transferred from blanket to plate and finally to the paper (Ian, 2011)

Photo emulsion	Coating that is sensitive to light and is applied on plate to form image areas (Mortimer, 2011)
Plate less/nonimpact process	A printing process that does not require a plate or any impression (Mortimer, 2011)
Post press	A section in the printing press where printed jobs from the press are finished and ready for delivery (Miles & Donna, 2010)
Prepress	A section in the printing factory installed with equipment and has the objective of preparing soft copies and hard copies to feed the pressroom for production (Miles & Donna, 2010)
Press	A printing equipment or machine (Miles & Donna, 2010)
Pressroom	A room in the printing factory with installed printing machines to produce printed jobs (Miles & Donna, 2010)
Printing	A process by which text and images are made to appear for visual presentation (Miles & Donna, 2010)
Printing plate	Image carrier (Kipphan, 2012)
Quick printing	A printing method that prints very fast (Kipphan, 2012)
Screen printing	Major conventional printing process (Kipphan, 2012)
Sheet fed machine	A printing machine that picks and prints one single sheet at a go (Miles & Donna, 2010)
Sheets	Printed or blank paper (Miles & Donna, 2010)
Short run	A job producing less than 1,000 copies (Kipphan, 2012)

CHAPTER ONE

1.0 INTRODUCTION

This chapter defines what printing is all about, the process printing undergoes, and it highlights various printing technologies and how to enhance quality printing. The chapter also highlights printing from global perspective, continentally in Africa and in Kenya with specific reference to Nairobi Central Business District.

1.1 Background of the Study

The study entails analysis of skills to image quality printing, printing materials to quality performance, capital to image quality production and performance of equipment to image quality performance. Globally conventional printing is a process of reproducing an image by means of impression. Non-impact printing is a process of producing images by not using any impression. Examples include ribbon on paper, laser, LED, ink jet, solid ink, thermal wax transfer and dye sublimation printers. Combination of conventional offset and now digital print capabilities provide for flexible production of quality printed products globally. Globally, printed quality products are supplied with good images because of content work flow solutions being matched with binding, distribution and mailing solutions to provide an efficient integrated and quality production capabilities.

Globally, quality printing workflow systems are becoming applied in a wide range, to improve productivity and quality control. Image printing have developed globally by market leading companies fighting to meet the demand for quality printed products. The printing work have been integrated, printing processors, jobs and units are being addressed.

Production of printed products has increasingly changed from craftsman's trade to industrial production. As in other industrial sector, computer integrated manufacturing is becoming vital, even in the printing world. It impacted in the prepress processes and accelerated workflow.

According to FESPA (2016), in Africa print industry is wide open and growing to fight challenges. According to Robert Franco, managing director of Graphical Supply World (GSQ) says in the past, even screen printing products had to be imported and shipped. But today most African countries have started to import the large format printers for the same and hence they can print from them locally, especially where technology have become reliable. African countries still tend to have small markets, but it's believed they will grow over time as technology becomes affordable and reliable.

Chamia Yapo, publisher of sign Africa and joint organiser of FESPA AFRICA says challenges include: lack of funding printing skills amongst the natives in Africa. Hence businesses rely on suppliers to provide training. Another challenge includes fluctuating and unstable economies. Also included as challenges are lack of finance to invest in new technology, high import duties through unreliable suppliers in some countries, lack of raw printing materials, slow none payment by consumers, and corruption in the government. And above all is poor and unreliable infrastructure which is a requirement in today's printing world, such include unstable power supply, lack of internet and Wi-Fi connection. Other challenges include organization not investing in product development and thus failing on innovative ideas.

Printing in Kenya houses some of the leading brands, such as HP, Epson, canon, Samsung and Heidelberg of Germany amongst others. These companies print all kind of products a consumer may require, and they have machines that can handle short run and long run or bulk production.

The machines from the leading companies' mentioned play a significant role in the production of proof samples and items like business cards, posters, magazines, covers, packaging items, books amongst others. Screen printing section in Kenya has made it possible for individuals and corporates to easily carry out publicity among other promotions, by incorporating items like customized t-shirts, caps, banners amongst others. The companies house graphic design department which play a vital role in production of art works and proof samples before the commencement of printing production. These companies are the leading suppliers of offset papers, computer papers, suppliers of stationary to a number of schools and corporates.

Human resource skills is a key requirement in the printing industry to print a given job in the prepress, press or post press. The study is based on how printing skills through training, experience, apprentice, practices and attachments will result in higher quality printing image production. Skills with quality printing process in printing are known to result in better image production, low waste, less wastage, spoilage, few job returns with little need for mass inspection and higher customer retention rates (Harshel, 2012).

According to Bauer & Gaskell (2014), industries around Kenya require relevant skills to produce quality goods and services in the printing industry. People no longer tolerate substandard image products or services, particularly when they know another company will produce the quality they desire (Miles & Donna, 2010). In printing, it is therefore important to meet needs of the customers and produce prints at a profit, create more jobs by enhancing an atmosphere in which the business will continue to prosper.

According to Deming (1986), management practices are the reasons why quality performance does not succeed in printing industries. He stated that quality, productivity and peoples pride

through training can improve leadership skills. Its knowledge that quality, printing which meets standards in brings repeat orders.

The study also reflects on printing materials which lead to quality. All printing materials must be sourced from reliable sources for quality to be achieved. Printing material is a good segment of study for quality standards to be achieved. Besides sourcing from reliable suppliers, the ingredients used to process or manufacture printing materials must be those that have passed production tests. The printing materials used in the printing industry, just to mention a few include:- paper, inks, adhesives and chemicals. Paper is the core substrate in lithography. If it's sourced, processed from substandard back ground, rest assured quality will never be achieved in that printing project. Poor printing materials, can read to trouble shooting such that quality is comprised due to consistent stoppage of the machine. The end result is that deadlines are never met and occasionally jobs are rejected.

The study also looks at capital, which is a vital ingredient in holding quality in the printing industry. Lack of sufficient capital can lead to compromising quality standard in this industry. Capital can be saved from various major financial institutions such as commercial banks, savings and loan, credit Unions, insurance companies and mutual funds. Capital can also be sourced from government.

Printing equipment are key to quality achievement. The machines besides being of state of art, needs to be routinely maintained and serviced. The printing industry, like any other industry continues to undergo technological changes in terms of printing machines and equipment. Most machines in today's printing industry are computerised, and if a firm invests in such a machine certainly quality standards will be enhanced. Many of the printing processes which were once

handle manually, must today be automated to influence quality in various stages of printing presses (Cornelison, 2013).

In the prepress, printing firms must consider computer software and graphics. Machine operators must use computer touch tables to make adjustments. Firms need also to start to invest in the digital printing to cope with "print on demand jobs". The digital machines are also capable to handle graphic images before printing to enhance quality. Digital printing machines are transforming quality in printing processes in the print industry, and eliminating the conventional lengthy processes.

The study also highlights that ancillary machines are available and can contribute to attract new customers because of their quality (Department of labour, 2016).

1.1.1 Analysis of Quality

Quality performance is key to an organization, division, or a process as applied in the printing industry. Quality in the printing industry can be assessed through measurements of physical products, statistical sampling of the output of processes, or through surveys of purchasers of goods or services. Also referred to as quality of service.

Quality is about meeting customer needs and expectations. Customer needs include performance, appearance, availability, delivery, reliability, maintainability, cost effectiveness, price, etc. If the product or service meets all those needs, it passes the quality test; if it does not, the quality is sub-standard. Quality can be defined as "getting things right the very first time and every time" (Brunner, 2015). Quality is delighting the customer by fully meeting their needs and expectations (Cole, 2011). Companies must find out what these needs and expectations are, how they evolve over time, culture, etc., and plan to meet them.

1.1.2 Trends of quality in printing industry

In 2015, digital print accounts for 13.9% of all print and printed packaging in value terms, but just 2.5% of total world volume. Not only that, but the offset to digital transition is accelerating, however; in 2020 digital will be 17.4% of value and 3.4% of all print and printed packaging volume (Smithers Pira, 2015). Digital is growing because it can offer advantages that offset print cannot provide. The market trends are majorly categorized into economics, business models and applications. Digital printing will continue to grow. Mono web fed electrophotography is being superseded by full-colour inkjet; but despite this competition, the volume and value of electrophotography will continue to rise as colour applications grow. Innovative users will find more applications and niches to exploit the advantages of digital – some at the expense of offset printing, but also by opening totally new opportunities (Verma, 2015).

The innovative value added to these jobs by its new digital equipment that is allowing the print service provider to differentiate itself, becoming a valued supplier to the customer, rather than one that is simply competing with rivals on price. The digital work commands high margins meaning that overall the account is very profitable (Smithers Pira, 2015).

1.1.3 Printing Companies in Kenya

Printing industry has a number of printing companies worldwide. In the UK approximately 170,000 people are employed in well over 10,000 companies. It's difficult to identify any part of Kenya's national economy that is not served by the printing industry other than challenging technological environment. Companies in Kenya often experience intense local, national or international competition (Print Promotion Newsletter, 2014). The companies include: Examples of printing companies include: - Herald publishing house, Ramco Packaging Limited, Kul Graphics Limited, Kenyalitho, Colour labels and the Government printing press.

In East Africa, printing companies are well established to serve the region, for example Herald publishing House prints spiritual books, books on health, and literature on family values. The literature on family values are printed and published in various languages. Herald publishing house is at Kendu Bay, Kenya. It is owned and operated by Seventh Day Adventist Church (Eastern Africa Division); it serves East Africa with the literature being used in as far as Rwanda, Burundi and Zaire. Herald Publishing House uses offset printing process, and they print on paper and boards.

Most of the printing companies print on paper, boards, cartons, cardboards, textiles, metals, plastics and on foils just to mention a few. The major products amongst others which are printed by the printing companies include, metal containers, cans, labels, books, packages, wrappers, plastics, greeting cards, newspapers, brochures, catalogues, posters, calendars, diaries, security seals, sugar packaging packets and self-adhesive levels to mention a few.

The major printing processes commonly used are: - Lithographic, Gravure, Flexographic and Letter Press. It should be noted that printing is also undergoing rapid technological changes and therefore various non-impact printing techniques are arising in the business environment. Examples include, inkjet and other digital printing state of art technology have sprung up.

It’s equally important to note that printing companies are undergoing a rapid industrial revolution by virtue of technological changes to invent cheaper, faster, and modern methods. By virtue of the changes the companies compete to process high fidelity productions. The printing industry has seen huge changes over the past decade so as to keep in line with the philosophy of providing the highest quality. The industry also employees the highest level of skills combined with modern technology to ensure customer satisfaction. The companies tend to build the motto

of “One Stop Print Packaging Solution” where they work with their customers from concept/design stage to the final product. They also offer advice and provide product of high quality, unique/fresh and which would stand out of the shelves at a competitive price. Some of the printing companies also specialize in security printing.

1.2 Statement of the Problem

The printing sector in Kenya is amplified as a sector of chaotic, disorder and operating in an informal manner leading to poor print quality production. Many printing jobs from this sector get rejected when they reach consumers or customers. This has been a concern to all printing stakeholders because, when printed jobs are rejected it means revenue also goes down because customers don’t pay. This results in the firm not meeting its objectives in terms of not paying for its overheads. The core of this research is that the printing firms in Kenya lack the combination of issues to be investigated as to why printed jobs from printing organizations in the Nairobi Central Business District produce poor or substandard printed images, leading to the printed jobs being rejected by consumers.

This kind of status of the printing firms in Nairobi leaves a lot to be desired in terms of quality printing. Leading printing firms in Nairobi such as government printing press, Kenya literature Bureau and East Africa packaging industries just but to mention a few have suffered great loses even with hired quality experts and by opening quality departments to help in the management of quality, but still there is quality problem in these firms.

Poorly printed documents which don’t meet quality standards tend to be a problem when color is not well managed during operations since the defect will be experienced on printed documents such as books, magazines, posters and other related stationaries. The people who are highly

affected by substandard production of documents include, the scholars, the packaging industries, the marketing industries and other related fields. It is therefore important to study quality print production to reduce the wastage of many other resources such as time, including finances.

1.3 Objectives of the Study

1.3.1 General Objective

To analyse the effect of internal environment on printing quality performance in Nairobi Central District.

1.3.2 Specific Objectives

a) To establish employee skills on quality to printing image quality production in businesses in Nairobi, Central Business District, Kenya.

b) To establish printing materials to quality image production in the printing processes in printing factories in Nairobi.

c) To investigate capital to quality image production in print establishments in Nairobi.

d) To establish printing equipments to quality image production in Nairobi.

1.4 Research Questions

The main reason for this research was to analyse the effect of internal environment on printing quality performance in Nairobi Central District

a) To what extent does lack of skills affect the quality of printing products in businesses in Nairobi?
b) How do materials used affect quality production in printing premises in Nairobi?

c) How does insufficient capital affect quality production in print establishments in Nairobi?

d) What are the effects of out-dated equipment on print production products in printing firms Nairobi?

1.5 Significance of the Study

The study highlights the requirements that manufacturers of printing machines or equipments need to know relating to challenges faced by the printers. For example, are the equipment providing a competitive advantage compared with other equipment from other manufactures?

The study provides solutions to printing management quality issues, solutions to technical skills, policies, practices, roles and responsibilities regarding printing production networks. To the printers the study is to set a policy of implementation that administers uniform and consistent allocation of printing materials, capital and equipments. The study focuses the printing firms who stand to benefit because this document highlights areas of concern as quality maintenance is concerned. Staff in print organisation will use literature written in this document to improve their quality standards during production. The study, focuses on scholars in high schools, who can access the content of this document to learn about printing, hence proceed to colleges and universities offering print courses.

Another focus group are the print chemical suppliers, they stand to benefit from this document because they will be able to intensify supplies of quality chemicals which don't compromise quality during print production processes.

1.6 Scope of the Study

The geographical scope of the study was 101 printing firms, 30 firms were sampled which represented 30% of the industry in the Nairobi Central Business District. The area was identified because it houses majority of the printing businesses in Nairobi.

The contextual scope of the study was based on the objectives which were: to establish the significance of employee skills on the quality of printing products in businesses in Nairobi; to establish the effect of paper materials used on the quality production in the printing processes in printing factories in Nairobi; to investigate the effect of capital on quality production in print establishments in Nairobi and. to establish the effect of equipment on the quality of printed products in printing firms in Nairobi.

1.7 Limitations of the Study

Company policies prohibited some respondents from giving some information freely as expected by the researcher; hence enough data was not collected. In some offices, the employees were not allowed to discuss with the researcher for the purpose of upholding company policies. Some respondents filled the questionnaires just for the sake of filling and did not to give reliable information hence affecting the collected data.

Some respondents demanded to be paid before filling the questionnaires. The researcher was not in a position to meet this cost. It was recommended that the research be carried in other towns, but the implication of time and cost could not allow this process considering the time to submit the work to the university for academic purposes.

1.8 Justification of the Study

Being interested in a career path in quality control, the researcher believes this study will serve as the launching point for determining the direction print quality should follow at one given time of production, to be considered during production should include the skills required by the personnel to produce quality products. Also to be noted should be quality products used for printing jobs, for example paper should be of quality and sourced from a reliable supplier. Other materials include ink, chemicals and adhesives all of which should be sourced and tested before production commences, with the objective of achieving quality. The study should also analyse the printing equipment being used in this industry and where possible to be "state of the art" for quality achievement purposes. Capital is a major requirement for quality to be achieved, in the sense that it enhances acquisition of better raw materials.

The researcher and others, would like to help lead the print industry in Quality Production and Systems (QPS). A full understanding on the pros and cons of a Total Quality Management (TQM) system and its ability to create a state of cohesiveness within print industry businesses which will guide many decisions researchers will make for the benefit of the future of the print industry.

Descriptive design approach was adopted on a target population of 101 printing firms in the Nairobi Central Business District (NCBD). Random sampling technique was applied in settling for the sample size of about 30 printing companies, which represents over 30% of the population of printing companies in the NCBD. Primary data was obtained through administering questionnaires with both open and closed ended questions.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Quality is about meeting customers' needs and expectations by producing products or providing a service that has zero defects. In the process of achieving quality of a product there is need to use quality materials, quality equipment and skilled human resource. This chapter presents a theoretical and empirical review of the relevant literature and previous studies done in on quality in the printing industry.

2.1 Theoretical Review

The era of environment protection and personalization has become increasingly prominent and clients not only focus on the beauty of the created designs on paper or desktop but also pay more attention to the quality of printed/reproduced image on substrates. The density of ink on a substrate will be very appealing and enhance sales of a product because of the compatibility of the ink with the substrate. This part of this proposal explores quality performance theories in the printing industry.

2.1.1 Fishbone Theory

This theory was proposed by Kaoru Ishikawa (1968). It states that qualities are those which put emphasis on the human side of production. They include Pareto analysis, cause and effect diagrams of quality, stratification, check sheets, histograms, scatter charts and process control charts (Bowen, 2013). The theory is based on the big problems, what causes the problems? How is the data made up? How often does the problem occur or appears? What do overall variations

look like? What are the relationships between factors? And finally, which variations to control and how to control it?

He believed that these tools should be known widely, if not by everyone in an organization and used to analyse problems and develop improvements. When these seven basic tools are used together, they form a powerful kit in quality management in the printing process. In a printing situation, fishbone theory should put more emphasis in the skills of the human resource, so that printed products to reflect on a company's business image. Financial companies provide financial capital to printing businesses for example banks, hence they demand to assist printing firms to use the financial resources they provide to make them acquire quality raw materials, train the human resource on printing skills and to help the printers meet their indirect and direct overheads. Others include ability to work with technology, use softwares and focus on quality. The theory to printing equipment highlights how skills can be a central measure when using equipment to produce printed jobs. As fishbone is a quality process, printing also being a process quality can be controlled in every stage of production for example prepress, press and post press.

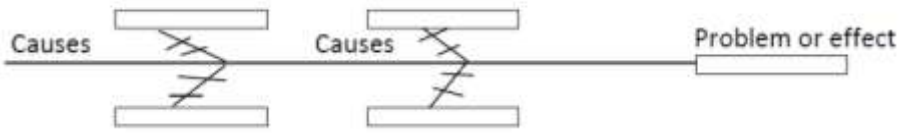


Figure 2.1: Ishikiwa fishbone or cause and effect (1968)

Fishbone theory is applicable to printing in areas where problems are identified. Being a tool used to analyse causes to problems relating to quality, in printing it is applicable in identifying the underlying factors relating to how lack of skills in human resource can adversely affect printing quality. So understanding Fishbone Theory assist printers to improve their skills by

eliminating factors which cause failures to print and improve skills relating to factors considered to be contributing to success, and to help develop printing actions that sustains corrections, such as seminars, trainings, workshops and others. By understanding this theory, the printers can brainstorm to identify possible causes to printing quality failures emanating from lack of human skills. Fishbone will make printers to visualise techniques to improve quality on printed products.

2.1.2 PDCA Theory

It was developed by Deming (1986) and it states that management is responsible for 94% of quality problems. Deming develop a fourteen-point plan which is a complete philosophy of management that can be applied to small or large organizations whether in public or private or service sectors. These include: Creation of constant of purpose towards improvement of products and service, adoption of new philosophy, ceasing dependence on mass inspection among others (Bowen, 2013).

He believed that the adoption of and action on the fourteen points was a signal that management intended to stay in business. He also encouraged a systematic approach to problem solving and prompted the widely-known Plan, Do, Check, Act (PDCA) cycle.

Plan what is needed, Do it, Check that it works and Act, to correct any problems or improve performance.

The PDCA is also known as the Deming cycle

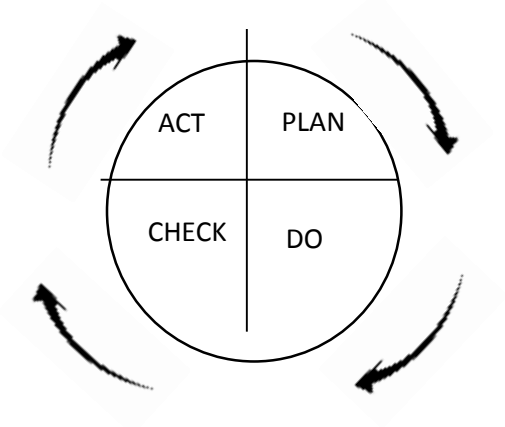


Figure 2.2: Deming Cycle (1986)

This is a universal improvement methodology, the idea being to constantly improve and thereby reduce the difference between the requirements of the customers and performance of the process (Bright Hub, 2013).

In the process of producing quality prints to the customers, there is a requirement that management does the planning, they do it by implementing what has been planned, monitors what has been implemented and finally taking corrective action for improvement. This theory in environmental factors and in printing assists the printers to plan on how a given job will go through various stages. For example how a job will be positioned at prepress, how to plan for it as it proceeds from the printing machine. This theory can assist in planning subsequent quality printing operations. The 'DO' part of this theory assists the printer to test the printing materials which is a requirement and mandatory. To be tested include paper materials, adhesives, printing inks, printing plates image carriers. For the printer, the 'CHECK' part of this theory, can be handled by viewing the tests analysed results where the printer will assess if the test done on materials yielded quality production standards. The 'ACT' part of this theory is based on what planning, testing, and reviewing (Check) results have yielded.

2.1.3 Quality Trilogy Theory

Juran Quality Trilogy Theory includes quality planning, quality control and quality improvement. This theory emphasized that good quality management require that actions to be planned out, improved and controlled. The process achieves control at one level of quality performance, and then plans are made to improve the performance on a project by project basis using tools and techniques such as Pareto analysis. This activity eventually achieves breakthrough on to an improved level which is again controlled to prevent any deterioration.

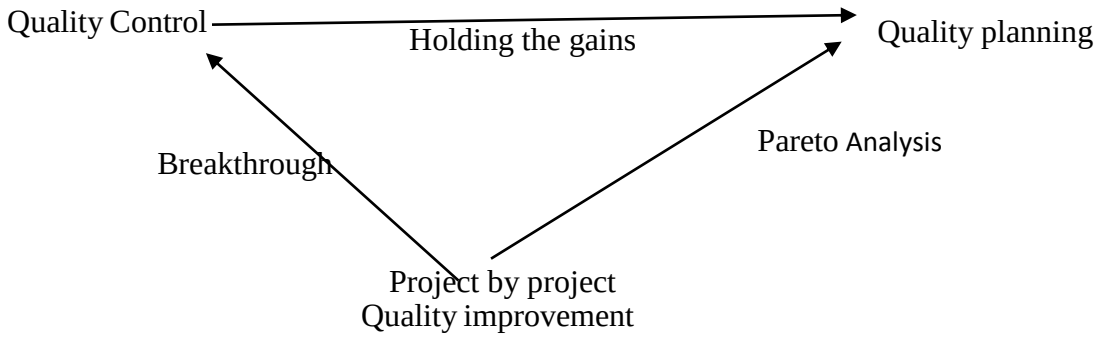


Figure 2.3: Quality Trilogy (1988)

Quality is associated with customer satisfaction and dissatisfaction with the product and emphasized the necessity for on-going quality improvement through a succession of small improvement projects carried out throughout the organization.

His ten steps to quality improvement which include build awareness of the need and opportunity for improvement, set goals for improvement organize to reach the goals, provide training among others are still very effective in quality performance in printing industry (Miles et al, 2010).

Juran not only concentrated on the end customer but on other external and internal customers. Each person along the chain from product designer to final user is a supplier and a customer

(Juran, 1988). As this theory undergoes processes, printing also undergoes processes such as planning, in which the design of products take place by the planners. Planning takes place through processes at optimal effective cost. Planning must get rid of chronic waste of materials. At planning stage the printer needs to internalise and determine his customer's needs, for example responding to customer's product features at minimum production cost. In printing, plans used, must meet quality goals and all the operating condition requirements.

One of the processes in trilogy is control, and therefore printers must have control on material wastage and unit measurements for printing paper sizes, inks, adhesive measurement and other ingredients during print production. Through this theory, the printers need to interpret actual produced jobs against samples supplied by customers. Printing technicians must ensure the equipment produce products of specific sizes with standard shades as required, with correct quality and quantities. With feedback from consumers the printer will realize need in areas of improvement.

2.2 Empirical Literature Review

This covers the scientific literature in a field that is defined by an author and is usually achieved by reference to previous reviews. These are past studies finding a relation with the variables of the topic.

2.2.1 Employee Skills and Quality Performance

Print quality requires excellent skills in an individual. Since printing materials, are generally expensive, correct handling and control can only be carried out by skilled personnel. Skills in an individual may be achieved through training, experience or intuition (Akhade, 2013).

Quality work is always achieved by the knowledgeable skilled employee. An organization may acquire and provide healthy state-of-the art equipment and provide a healthy and safe work environment but if the employee is not knowledgeable and skilled, there would be no quality work produced (Leo, 2014). Self-confidence, positive attitude are interpersonal traits that one should possess in addition to the training and experience so as to always produce quality prints. Some important skills that a printing expert should possess among others may include; ability to convey information effectively to others, this should be both orally and written. Failure to do this may lead to breakdown in communication thus jeopardizing quality at the end to the chain. Ability to coordinate work, for quality results is a printer's major responsibility (Patrick, 2013).

Workers who enter the printing industry are typically trained informally on the job. The length of time required for training an employee should impart various skills, which translate to being occupationally sound for maximum quality utilization (Opara, 2016). Workers who usually begin as helpers, then advance to skilled craft jobs and eventually may be promoted to senior levels as supervisors make quality be enhanced in all printed jobs (Milano, 2015).

Education backgrounds vary among workers entering the printing industry including helpers or assistants tend to have a high school or vocational school background while management trainees usually should have a college degree. Have a college degree or related qualification so as to have better communication skills and to be computer literate. So as to enhance quality work in presses (Sakyi, 2016).

2.2.2 Printing Materials and Quality Performance

According to William Eisner, printers by large volume and variety of inks and substrates coming to them, they don't do inspection and the results are of substandard quality on printed jobs. On

the press, it is too late to control quality in the production chain and to find out that there is an ink-on-paper incompatibility or that paper will not function as well as it should be and this compromises quality (Miles et al, 2010).

According to Songa, (2014), quality of materials for print production leads to quality printed image. Whether the substrate is wood, egg, paper, cloth, leather etc. the quality is very vital. In process of selection and subsequent acquisition of these materials and others not included here such as printing ink, fountain solution, adhesives etc. the printer should be cognizant of their properties, characteristics and compatibility with the printing processes. Failure to which there would be definite losses to the organization (Kimunga, 2009).

According to Holmes (2015), materials management entails the planning, selection, purchasing, inventory control, handling, storage and distribution of all materials used in the printing production process. Successful quality management requires a sound technical knowledge on materials combined with on press ability of the printer. First, he/she must purchase materials to meet the scheduled use dates, as quality strategy. Second, he/she must purchase and store materials commensurate with quality.

Pascarella & Terenzini (2016) state materials control is a coordinating function in the procurement and distribution of materials to relevant areas or processes, and the control of all the stock retained for future allocation. Effective production of quality depends not only on human skills and technology, but also on all the materials used in the printing production processes (Richard, 2010).

According to Lindberg (2014), highly trained staff and the latest technology will have little effect on quality if the correct materials are not in the correct place at the right time. If the materials

purchased prove to be unsuitable for scheduled use and the product's end purpose and quality not achieved, financial loss and client/printer frustration will occur because such jobs will be rejected. The method of materials management used for the control of all the printing materials can have a great quality effect on productivity and profitability (Afolabi, 2015).

The prime duty of materials management is to analyse individual and collective job requirements in terms of all the materials to be used meeting quality specifications in the production processes.

Afolabi (2015) states that quality is an attitude of mind. Advanced technology and pieces of quality-testing and equipment will only function well, if skills and calibration methods allow. However, it is important to remember that the difference between a successful printer and an unsuccessful printer may be that the successful printer has given serious consideration to quality standards that are related to customer requirements (Mortimer, 2011).

2.2.3 Capital and Quality Performance

Schneider & Turk (2014) state that most printing firms fail to prosper because they do not have sufficient funds to run their businesses. The firms also fail to succeed because of poor management. The insufficient source of funds forces printing organizations to start to shop for more sources. Mismanagement can be tackled by putting in strict management information system to streamline control of funds (Gaskell, 2014). Capital in business usage is mostly taken to mean total assets required to operate a business and the money needed to acquire such assets, it means all the accumulated wealth used to produce additional wealth e.g. debtors and accounting claims. Capital is the total amount of share value paid in company's books of account. Working capital refers to that part of capital which is needed for financing current

requirement of the company. Every company needs working capital for holding current assets like raw materials and semi-finished goods (Gupta, Sharma, & Bhalla, 2013).

Johnson and Christensen (2018) add that the adequacy of working capital helps in raising credit standing of a business concern because of better terms of goods purchased, lower cost of manufacturing on account of receipts of cash discounts, favourable rates of interest on bank loans. Barros (2015) state determinants of working capital will include nature of business, length of period of manufacture, volume of business, the proportion of the cost of raw materials to total cost, the use of manual labour or mechanization, the need to keep large stocks of raw materials or finished goods, terms of credit etc. Therefore, other methods of financing must be considered and they include: - hire purchase, leasing, amalgamation with another printer, and loans from shareholders or other interested parties (Songa, 2014).

2.2.4 Print Equipment and Quality Performance

Printing equipment from design to post press is very significant as far as quality print is concerned. The surest way of achieving quality in print production is to ensure that the equipment used is maintained once and always so that they have high efficiency in production of a printed image (Gatobi & Esther, 2014).

Diener & Suh (2017) say that well maintained equipment is no doubt the cornerstone of print quality. Printing technology comprises the machinery, equipment and methods used to create a printed product, and it is therefore a crucial element in the company's organizational strategy. Every printer must, at some time, consider the purchase of new technology or equipment, to replace out-dated equipment and obsolescent methods, because of wear, or, more importantly, because of a change in the company's production aims and objectives (Ramirez et al., 2015).

According to Nyongesa, (2014), the advance of quality technology and the consequent changes in the printing industry are rapid, and the result is that equipment becomes obsolete in shorter periods of time than was previously expected. The technology currently used in the industry is expensive, and invested capital is tied up for a long time. The installation of an inadequate or investing in technology not investigated becomes a constant quality problem for the purchaser every time limitations are experienced (Kipphan, 2012).

For companies wishing to remain in the technological forefront of production, prior to any investment in technology, a number of criteria should be considered and thoroughly examined: An analysis of the work to be produced be noted, e.g. basic, high-quality, the range e.g. The operation's required, the turnaround time, e.g. the scheduled time allowed by normal production conditions, the work volume, e.g. the average production length (Porter, 2010).

Johnson, Ratto & Lestelius (2014) state that technological flexibility refers to a range of quality work that can be completed in line with the minimum amount of mechanical adjustment. Examples of print technology are the abilities to number and quality perforate inline, surface or spot coat, convert printing from four colours on one side to two on both side and perfect, and use a varying number of stations on a finishing and trimming line. Increasingly, more production operations are being brought inline, resulting in a demand on technology manufacturers and suppliers to develop technology with ever increasing flexibility. The amount of mechanical adjustment required to accommodate varying production specifications is very important; some older technology can be adjusted to varying demands, this obviously will reduce company profits and quality, and add to materials wastage. Production requirements and the degree of flexibility that these requirements demand from the technology should be carefully considered and analysed before purchase of any equipment (John & David, 2016).

Services are in their nature different from products and the corresponding quality dimensions are also different than those for products. Quality dimensions are determinants of perceived service quality (Parasuraman et al., 2010). Services are characterized by intangibility, heterogeneity and simultaneous production and consumption (Parasuraman et al., 2010; Schneider & Chung, 2014;Schneider, 2015). This makes it harder for the consumer to evaluate the quality of services and for the selling company to measure the quality of their services (Parasuraman et al., 2010). A product's quality can more or less be objectively measured and compared to other similar products. Service quality, on the other hand, cannot be measured by only studying the outcome of the service process because the experience during the service delivery also has an influence on the perceived service quality (Parasuraman et al., 2010). This has been clarified by making a distinction on "what" is delivered and "how" it is delivered. Similar reasoning is also found in (Grönroos, 2011). How the service is delivered is also called interactive quality since it is affected by all encounters between the service deliverer and the customer (Lehtinen, 2012). This interactive part of the service process also means that the customer normally is participating in the service production (Schneider & Chung, 2014). Consequently, the customer also affects the service process and the outcome of the service.

Closely related to the aspect of participation is the way value is created. In the service-dominant logic the value is created in-use (Gebauer, 2010) and the customer is therefore a co-creator of value (Vargo & Lusch, 2013). This is different from the goods-dominant logic that suggests value-in-exchange and that the value is embedded in the product and transferred by the exchange (Gebauer et al., 2010). From the service-dominant logic the service company offer value propositions, and then the value is realized first when the service is used (Vargo & Lusch, 2013).

Several tools have been developed in attempts to measure service quality, but maybe no tool has received more attention than the survey tool SERVQUAL developed by Parasuraman et al. (2010). The tool initially comprised 10 different dimensions of service quality, which after further quantitative empirical research was reduced into five dimensions; reliability, assurance, tangibles, empathy and responsiveness (Parasuraman et al., 2010). While the researchers' ambition was to withdraw generic quality dimensions, other researchers such as (2014), Babakus and Boller (2013) and Chowdhary and Prakash (2011) argues that the relevance of different service dimensions depends on the type of service and the industry context. Other researchers such as Ganguli and Roy (2010) also confirm this view, having identified other dimensions for certain services. Akhade et al. (2013) share the same opinion and claim that it is still not possible for researchers to propose generic service quality dimensions which will be applicable for all service sectors. Rosen & Karwan (2009) also provided empirical evidence that the relative importance of service quality dimensions varies between different services.

Most services included in previous studies of service quality have little in common with services typically provided by a business to business (B2B) manufacturing company. For instance, Carman (2014) studied pest control, dry cleaning, an acute care hospital, a dental school and a tire store. Rosen and Karwan (2009) included a restaurant, a bookstore, healthcare and lecture teaching at a university. Furthermore, Wiseniewski (2010) studied the public service sector and Kitapci et al. (2013) did research on supermarket customers.

The print researcher, in this context researches about quality in the printing industry because the previous researchers did not research on anything to do with the printing industry. Also the previous researchers in their areas of research never highlighted quality on the skills of human resource in those industries, they never highlighted on raw materials where applicable, the

researchers also neglected to highlight on capital and at no point in their research work did they discuss or mention the equipment and machines used in the various industries. And this is the quality gap that has made the printing researcher to research on, quality in printing industries. The research will contribute to assist the printing firms, the scholars of the printing industry, the printing materials and chemical manufacturers, not to forget the printing equipment maintenance group and printing equipment manufacturers (Kenya Professional Printers Association Report, 2010).

2.3 Conceptual Framework

Rebbecca & Iain, (2012) argued that the major aim of research should be to generate a theory from data. Conceptual frame work is a foundation on which the entire research study will be based. It seeks to relate, develop, describe and elaborate the networks of associations amongst the variables that were identified and relevant to problem situation. In order to hold knowledge, the theory should provide a conceptual framework, so that knowledge can be interpreted for empirical application in a diverse manner.

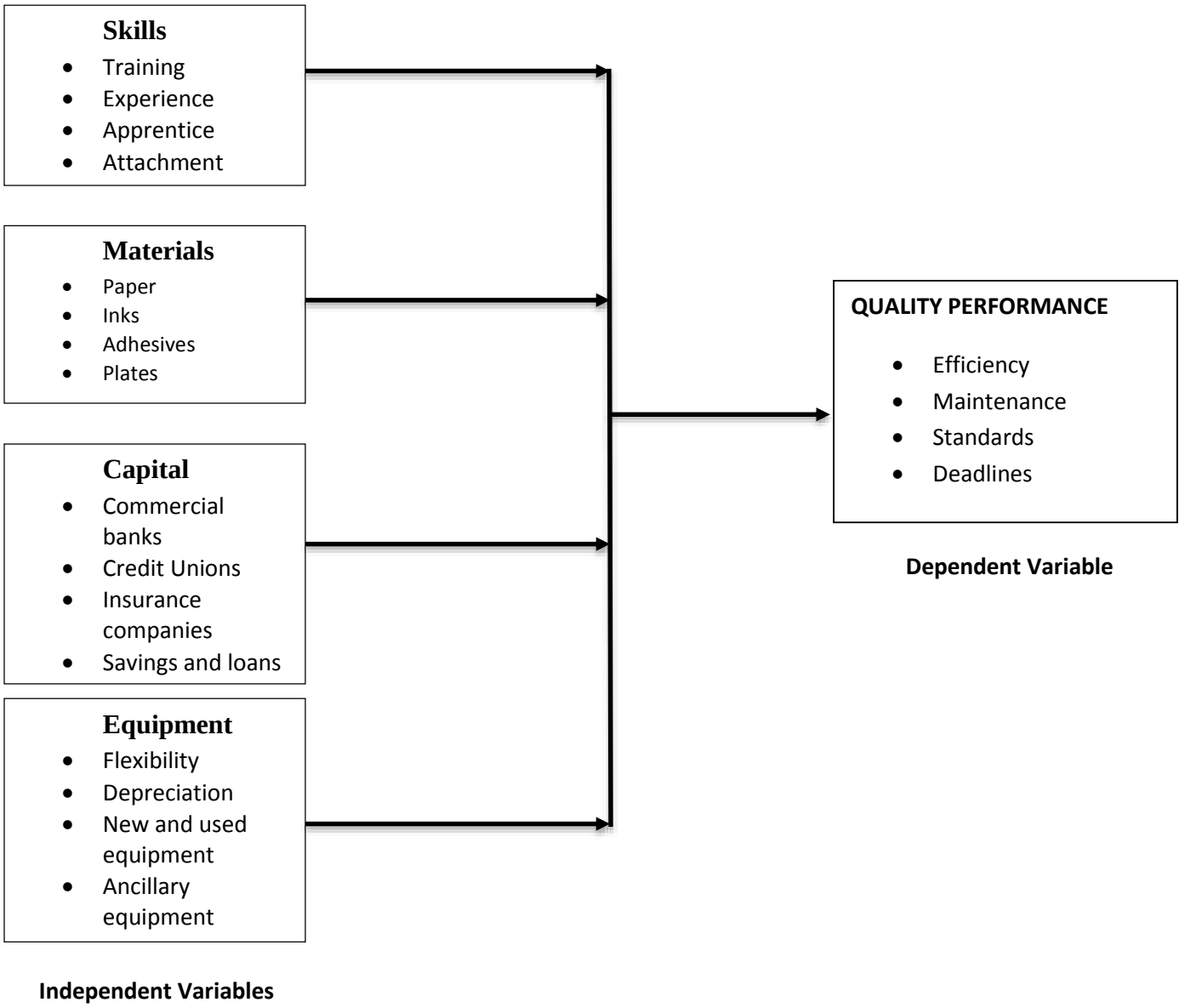


Figure 2.4: Conceptual Framework

Source: Author (2017)

2.4 Research Gap

Areas of concern that needed to be addressed were; training of human resource for print production technologists, procurement of quality printing equipment, materials and monitoring of quality processes in the printing industry.

2.5 Summary

The application of theories in printing are explained in the literature review, the information on quality, different theories on quality improvement have been highlighted. Also explained are the various variables in the study, including the importance of skills of employees in overall quality of prints, the effect of capital in ensuring the quality in print industry. Previewed is the importance of cost, quality of raw materials and equipment used in the industry. The gap to the print industry include how to go paperless by providing printed materials and also to provide information to printing companies on quality technology analysis. The printers also need to provide information when it is still current, this is important because conventional systems of printing takes a long period of time, such that by the time information reaches the consumer it is considered obsolete.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter outlines the research design that was applied to address the research problem and the research objectives of the study, which also included target population, sample design and procedures that were used by the researcher. The researcher highlighted the data collection instruments and the methods of collecting data. The researcher explained the reliability (validity) of the instruments that were used to collect data. This chapter explains how reliable the research will be should the same be conducted by another researcher. The chapter considers ethical consideration data analysis presentation and interpretation.

3.1 Research Design

According to Sekaran and Bougie (2010) there is no such thing as a perfect research design and in this case explanatory and descriptive research design was adapted. Survey method of descriptive research was used to carry out the research. According to a study by Milano (2013) survey method was seen to be effective in capturing the factors affecting quality in the printing industry. This method was applied as it determined and report the way things are (Mugenda & Mugenda, 2003, Jackson, S.L. 2009). Survey method was used because it is an effective method that has been successfully utilised in various research studies in the printing industry, one of them being a survey of printing industries in California (Cornelison, 2013). Descriptive design – The researcher looked at the analysis of quality performance in the printing industries in Nairobi.

3.2 Target Population

The target population is the entire group a researcher is interested in; the group about which the researcher wishes to draw conclusions (Statistics Glossary-sampling). According to Mugenda & Mugenda (2013), it is often impossible to study the whole of the target population and therefore researchers identify and define an experimentally accessible population.

Researcher collected data from a population of printing firms in NCBD. Since they were about 300 printing establishment in this region, the researcher collected data from 90 printing companies which represented over 30% of the population of printing companies in NCBD.

Table 3.1: Location and Number of Printing Firms in NCBD

Street	**Number of firms**
Ngariama Road	63
Kijabe Street	80
Haile Selassie Avenue	78
Kilome Road	79
TOTAL	**300**

Source, Survey Data (2017)

3.3 Sampling and Design

A sample is a group of units selected from a larger group, the population (Mugenda & Mugenda, 2013). The random sampling procedure was administered. By studying the sample, it is hoped to draw valid conclusions about the larger group. Each individual was chosen entirely by chance and each member of the population had an equal chance of being included in the sample. Every possible sample of a given size has the same chance of selection; i.e. each member of the

population is equally likely to be chosen at any given stage in the sampling process (Statistics Glossary-basic definitions)

The researcher sampled from 90 individual printing firms. The managers, printing machine technicians and the quality control assurance team were given questionnaires to respond to. The sampling method was through random process, which helped the researcher get the total number of respondents from the firms. In these firms the researcher collected data from two production managers, two quality assurance personnel and four machine operators.

The following formula, as provided by Israel (2011), was used to calculate the sample size in this study. A 95% confidence level and a level of precision of ±10.5 were assumed. Therefore the total sampled respondents were 120.

Where:

n = Sample Size

N = Population Size

e= Level of Precision

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

$$n = \frac{300}{1+300(\pm 10.5)^2} = \frac{300}{1+300(110.25)} = \frac{300}{1+33075} = \frac{300}{33076} = 110.25$$

n = 110.25$\pm$10.5; therefore n = 120 or 100

Table 3.2: Sample Size

Street	**Number of Firms**	**Sample Size**
Ngariama Road	63	32
Kijabe Street	80	48
Haile Selassie Avenue	78	27
Kilome Road	79	13
TOTAL	**300**	**120**

3.4 Data Collection

The study used a questionnaire to collect the required data. A questionnaire is a data collection instrument that is set out in a formal way and questions designed to elicit the desired information. It consists of a list of structured questions, un-structured questions and Likert scale ones. Close ended questions have the advantage of collecting viable quantitative data while open-ended questions allow the respondents freedom of answering questions and the chance to provide in-depth responses. Questionnaires were preferred because they were efficient, cheap and easy to be administered. Respondents were managers, technical employees and quality assurance personnel of selected printing businesses. The questionnaires were filled by managers, technical employees and quality assurance staff of each selected firm.

3.4.1 Data Collection Instruments

The questionnaire included both structured and unstructured questions. Three sets of questionnaires with different sections were prepared, one to the managers, another to the quality assurance personnel and two others to the technical staff. Section one obtained general information from the respondents, section two and three contained questions on skills and

materials respectively. Section four on the manager's questionnaire contained questions on capital while section four on the technical staff questionnaire contained questions on equipment. Lastly, section five the manager's questionnaire contained questions on equipment. The quality assurance personnel's' questionnaire had one section which contained questions on quality. There were 8 questionnaires which were distributed to each printing firm within the NCBD. This translated into 960 questionnaires distributed to the 120 sampled printing firms.

3.4.2 Data Collection Methods

The researcher and his assistant physically distributed the research questionnaire hard copies face to face to the respondents. Copies of the prepared questionnaires were printed enough to carter for the sample. The questionnaires were administered through drop and pick method. This method allowed respondents time to read and fill the questionnaires. If the researcher had to wait for the questionnaires to be filled there and then, respondents would not fill them diligently and keenly due to their normal and daily duties. This gave the respondents time to concentrate on the questionnaires.

3.4.3 Pilot Test

According to (Higgins JPT, 2011), pilot test involves examining the logical relationships that should exist between assessment measures, where the instrument measures what is supposed to be measured and performs as it is designed to perform.

The researcher forecasted that the instruments (questionnaires) used to be credible, since they were on the areas concerning the title of the research and were responded to by professionals working in the printing establishments.

The instruments achieved the results by performing a pilot test by distributing the instruments to a smaller group in work place and getting feedback from the group prior to going to the field for actual data collection.

3.5 Reliability

According to Shuttleworth (2013), an instrument of reliability is a way of ensuring that any instrument used for measuring experimental variables gives the same results every time. If in future the same research will be conducted in the same area using same instruments, the researcher believes that the same results will be obtained by the future researcher. This will make the research reliable.

3.5.1 Test of Reliability

Reliability (Pilot Test) is the tendency towards consistency and therefore, different measures of the same concept or the same measurements repeated over time should produce the same results (Sekaran & Bougie, 2010). The Cronbach index alpha is the most important index of internal consistency and is attributed as the mean of correlations of all the variables, and it does not depend on their arrangement. A pilot test was done by distributing the instruments to a smaller group in work places and getting feedback from the group prior to going to the field for actual data collection.

The reliability of the research instrument was assessed by computing the Cronbach alpha coefficient for all the items in the questionnaire. The Cronbach alpha coefficient ranges between 0 and 1 with higher alpha coefficient values being more reliable. A Cronbach alpha coefficient value of 0.7 and above is acceptable and reliable (Sekaran & Bougie, 2010). The results for the questionnaire items are summarized in table 3.3.

Pilot Test Results

Table 3.3: Results of Reliability Test

Variable	No. of Items	Cronbach Alpha Coefficient	Comment
Skills	6	0.856	Reliable
Materials	7	0.912	Reliable
Capital	7	0.785	Reliable
Equipment	6	0.964	Reliable
Quality	5	0.872	Reliable

Source: (Pilot Study Data, 2017)

Table 3.3 shows that equipment had the highest reliability at 0.964, followed by materials at 0.912, skills at 0.856, and capital at 0.785. This indicates that all the four independent variables were reliable measures of performance as their reliability values exceeded the prescribed threshold of 0.7 as recommended by Sekaran and Bougie (2010).

3.6 Test of Validity

Validity is concerned with the integrity of the conclusions that are generated from a piece of research. It is the degree to which an instrument measures what it purports to measure. It estimates how accurately the data in the study represents a given variable or construct in the study (Mugenda & Mugenda, 2003). Validity suggests fruitfulness and refers to the match between a construct, or the way a study conceptualizes the idea in a conceptual definition, and the data. To establish the validity of the research instrument the study will seek opinions of experts in the field of study especially the study's supervisors and lecturers in the school of social sciences. This will facilitate the necessary revision and modification of the research instrument thereby enhancing its validity. Mugenda and Mugenda (2003) noted that the usual

procedure in assessing content validity of a measure is to use a professional or expert in a particular field. In this study, quality control technicians in the printing firms in Nairobi central business district were used to perform validity test of the questionnaires as they are the specialists who are familiar with quality standards.

3.7 Data Analysis and Interpretation

The researcher, for the purpose of analysis reviewed raw data from the field, sorted them out to determine their correctness (for example spelling mistakes, omissions, wrong arithmetic's, to ensure completeness, relevance, consistency and uniformity.) and hence analysed them by assigning them specific values for the purpose of analysis. A descriptive analysis was employed. Descriptive statistic was used to summarize the data. This included percentages and frequencies. The Statistical Package for the Social Sciences (SPSS) was used for the data analysis. The analysis procedure was done using coding or tallying. After analysing of the data, it was presented by use of bar graphs, pie charts, tables and histograms. After presentation of the data the researcher interpreted the data using verbal explanation. The researcher used the mathematical model:

$$Y = X_1 + X_2 + X_3 + X_4 + \varepsilon$$

Where

Y = Dependent variable (Represents Quality)

X_1 = Skills (First Independent Variable)

X_2 = Materials (Second independent variable)

X_3 = Capital (Third independent variable)

X_4 = Equipment (Fourth independent variable)

ε = Degree / margin of error

3.8 Ethical Considerations

The researcher upheld ethical issues to make sure that no person would be compromised in the process of the research being carried out. In case of documentary proof for the researcher, the researcher ensured that an authority letter was obtained from the university so as to instil confidence in the respondents.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF FINDINGS

4.0 Introduction

This chapter presents the findings of the study and discusses these findings. The objective of the study was to analyse factors affecting quality performance in the printing industry in Nairobi Central Business District. The factors examined were employee skills, materials, capital, and equipment. The study adopted a descriptive research design. The data collected was analysed using the Statistical Package for the Social Sciences (SPSS) and the findings are presented in this chapter using frequency tables, bar graphs, pie charts and histograms.

4.1 Response Rate

Table 4.1 shows the response rate that was achieved in this study. The study achieved a 93.33 per cent response rate.

Table 4.1: Response Rate

Category	**Expected Responses**	**Actual Responses**	**Percentage (%)**
Manager	30	24	20
Quality Assurance Personnel	30	30	25
Technical Personnel	60	58	48.33
Total	**120**	**112**	**93.33**

Source: (Survey Data, 2017) n=112

From table 4.1 it can be seen that that the response rate for the managers was 20 per cent, for the quality assurance personnel 25 per cent and for the technical personnel 48.33 per cent. Thus the total response rate achieved in this study was 93.33 per cent.

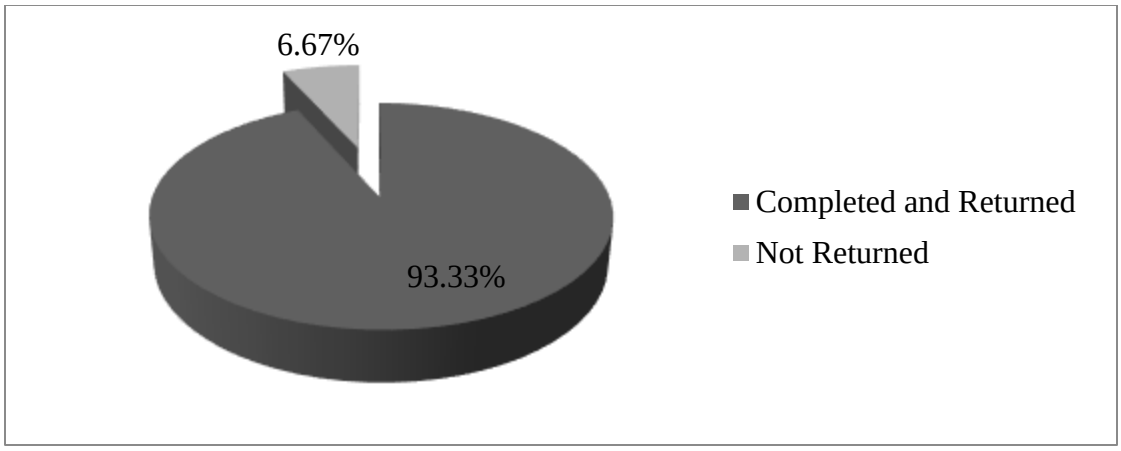


Figure 4.1: Response Rate

Source: (Survey Data, 2017)

From figure 4.1 it can be seen that the completed and returned questionnaires accounted for 93.33 per cent while the questionnaires that were not returned accounted for 6.67 per cent of the total sample.

4.2 Background Information

4.2.1 Technicians Background Information

The first section of the technicians' questionnaire gathered information about the background of the respondents. The technicians were asked to indicate their age, gender, whether they had trained in the printing profession, and their duration of work in the printing industry. Their responses are shown in this sub section. Figure 4.2 shows the technicians age group. It can be seen that majority of the technicians were between the ages of 25 to 40 years (74.59%), followed by those who were more than 40 years old (16.95%), and lastly by those who were less than 25 years old (3.47%). This indicates that most of the technical employees working in the printing industry are aged between 25 to 40 years.

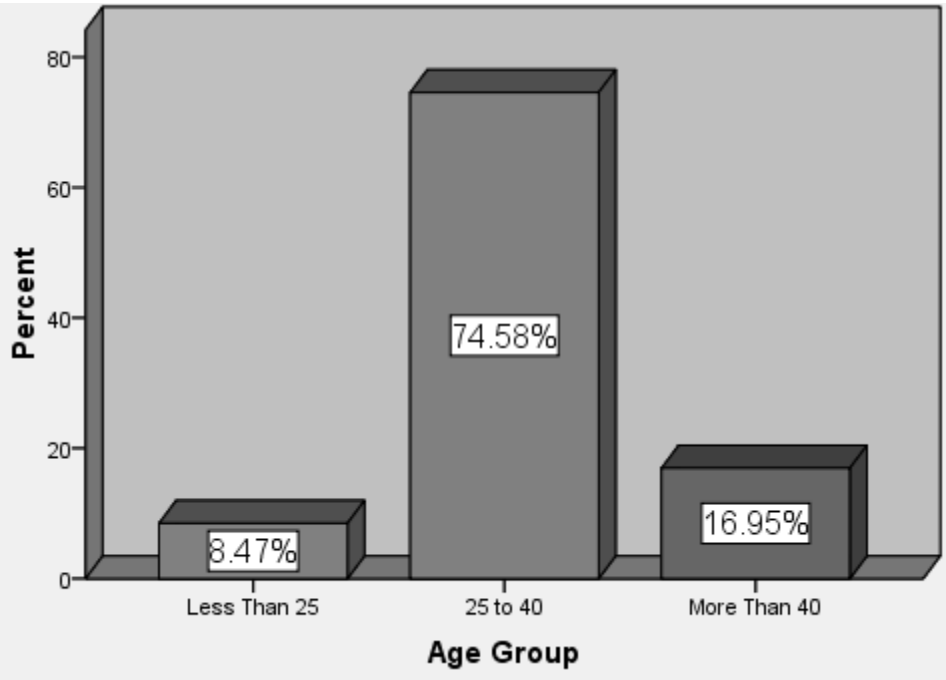


Figure 4.2: Age Group of the Technicians

The second question asked the technicians to indicate their gender. Their responses are shown in figure 4.3. From this figure it can be seen that majority of the technicians were male (75.86%) while the rest were female (24.14%). This may be an indication that the printing industry is dominated by men and not women.

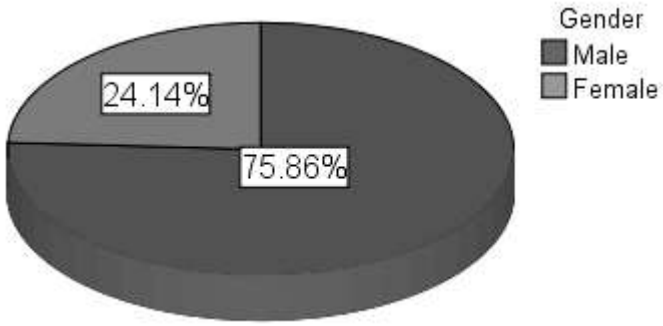


Figure 4.3: Gender of the Technicians

The third question asked the technicians to indicate whether they had any training in the printing profession. Their responses are shown in figure 4.4 below. As can be seen from the figure majority of the technicians (91.07%) had undergone training in the printing profession while only a few of them (8.83%) had not. This may be due to the technical nature of the printing industry and the required equipment.

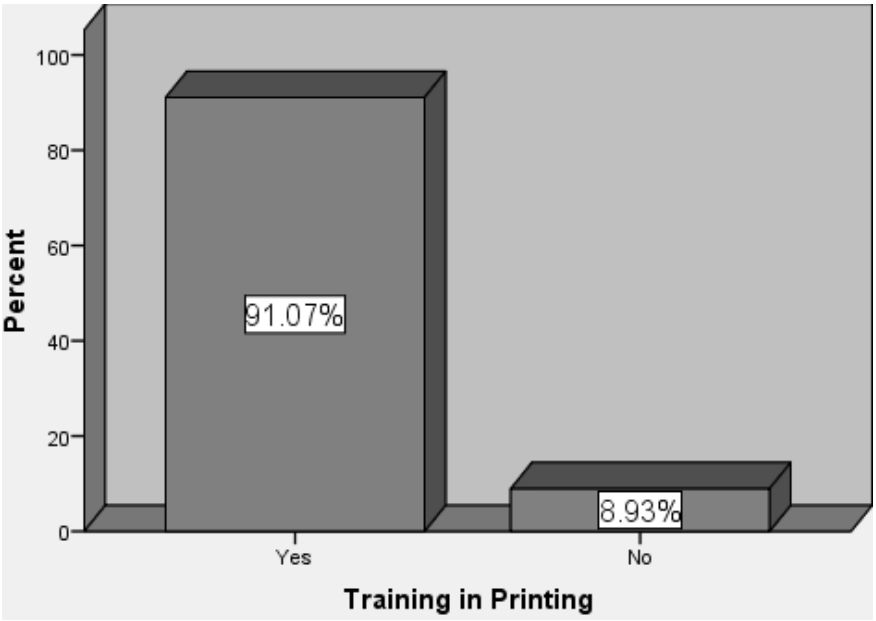


Figure 4.4: Training in Printing Profession

The technicians were then asked to indicate the duration of work in the printing industry. Their responses are shown in figure 4.5. It can be seen from the figure that majority of the technicians (41.82%) had been working in the printing industry for between 6 to 10 years, followed by those who had been working in the industry for five years or less (36.36%), then by those who had been working for between 11 to 15 years (12.73%), then by those who had been working for more than 20 years (7.27%), and lastly by those who had been working for between 16 to 20 years (1.82%).

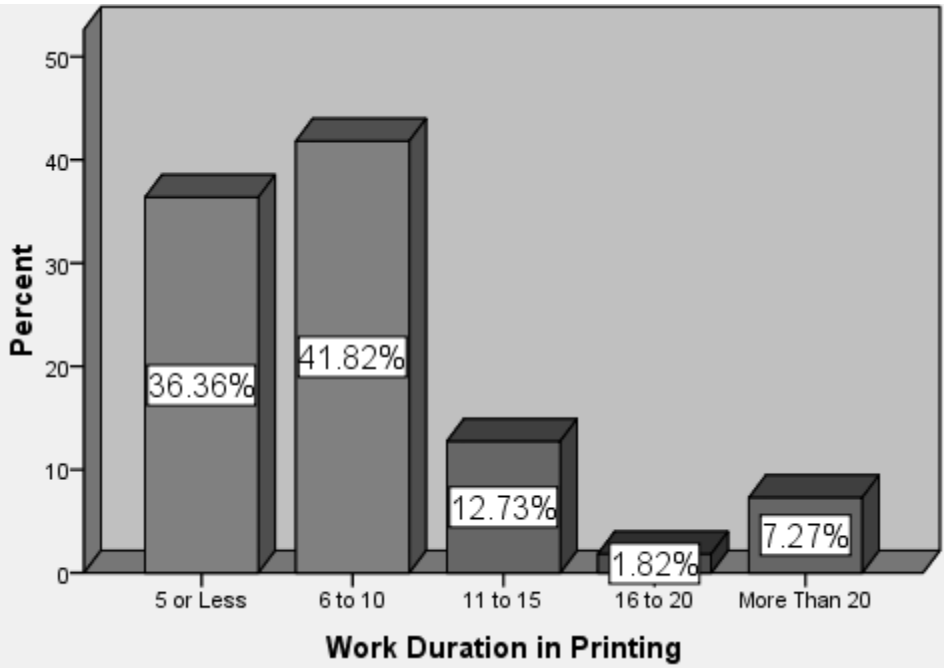


Figure 4.5: Work Duration in Printing

4.2.2 Managers Background Information

The first section of the managers' questionnaire also gathered information about the background of the respondents. Their responses are shown in this sub section. The first question asked the managers to indicate their age. Figure 4.6 shows the managers age group. It can be seen that majority of the managers were between the ages of 25 to 40 years (58.33%), followed by those who were more than 40 years old (33.33%), and lastly by those who were less than 25 years old (8.33%). This suggests that also the managers working in the printing industry are aged between 25 to 40 years.

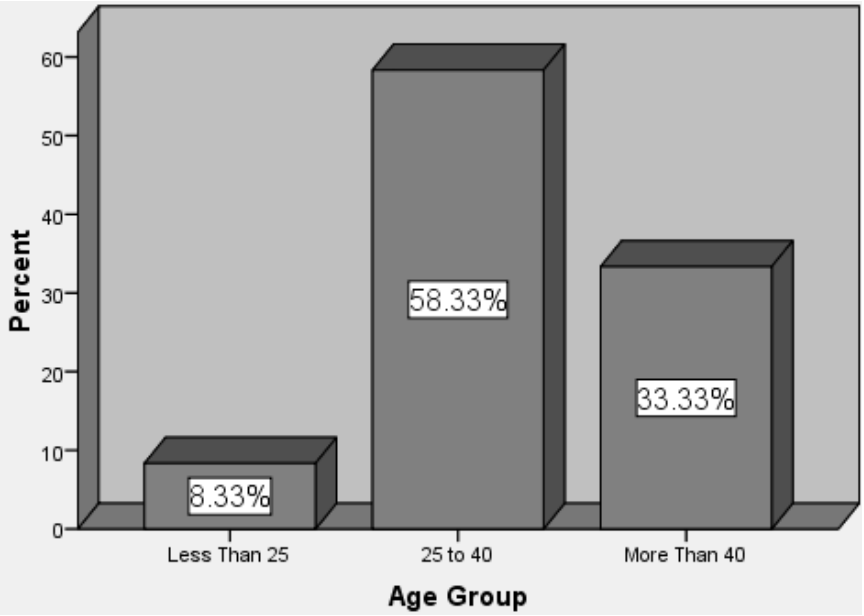


Figure 4.6: Age Group of the Managers

The second question asked the managers to indicate their gender. Their responses are shown in figure 4.7. From this figure it can be seen that majority of the managers were male (87.50%) while the rest were female (12.50%). This may be an indication that management in the printing industry is mainly composed of men.

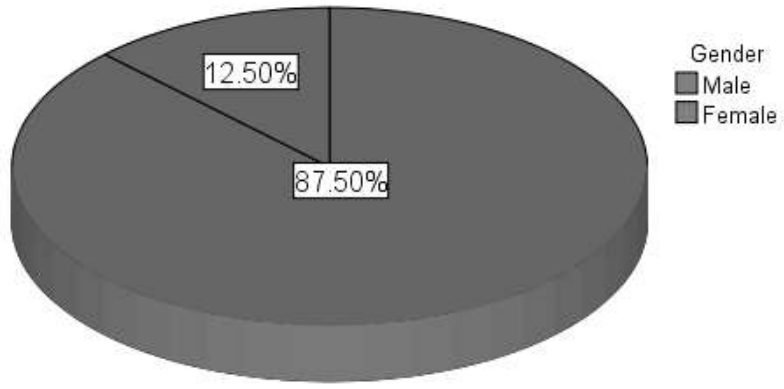


Figure 4.7: Gender of the Managers

The managers were then asked to indicate whether they had any training in the printing profession. Their responses are shown in figure 4.8. It can be seen from the figure that majority of the managers (95.83%) had undergone training in the printing profession, while only a few had not (4.17%).

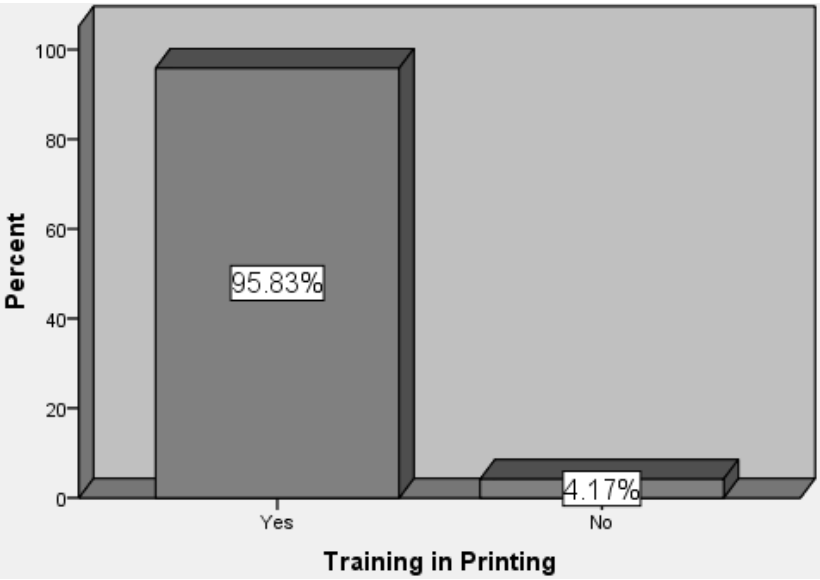


Figure 4.8: Training in Printing Profession

The managers were then asked to indicate the duration of operation. Their responses are shown in figure 4.9. It can be seen from the figure that majority of the managers (54.17%) had been operating for between 11 to 15 years, followed by those who had been operating for 6 to 10 years (20.83%), then by those who had been working for 5 years or less (12.50%), then by those who had been working for more than 20 years (8.33%), and lastly by those who had been working for between 16 to 20 years (4.17%).

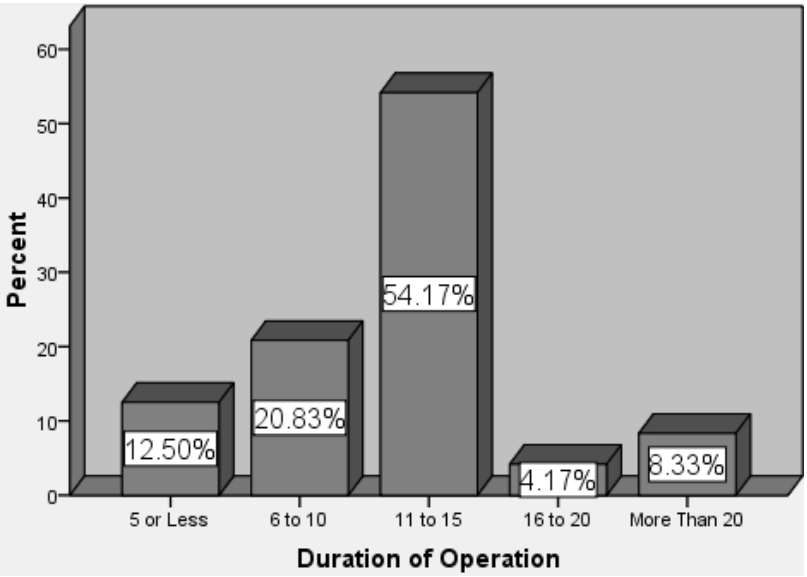


Figure 4.9: Duration of Operation

The managers were then asked to indicate whether they had any training in management. Their responses are shown in figure 4.10. It can be seen from the figure that majority of the managers (87.50%) had undergone training in management, while some of them had not (12.50%).

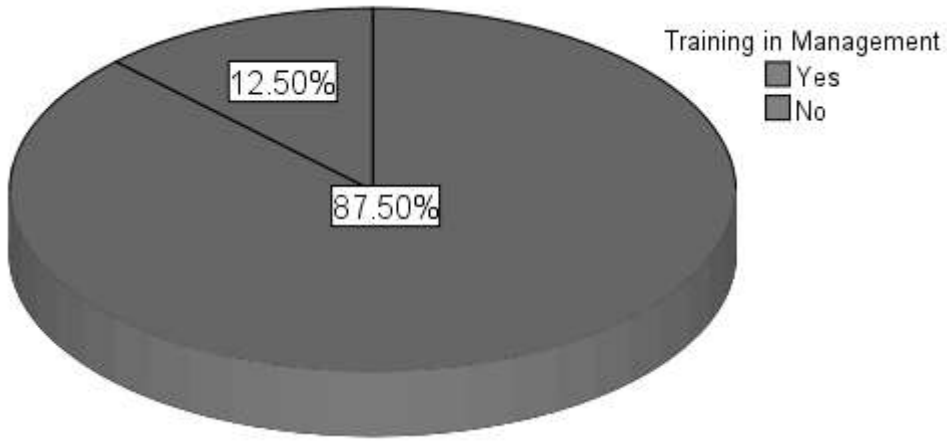


Figure 4.10: Training in Management

The managers were then asked to indicate the number of employees in their firm. Their responses are shown in figure 4.11. It can be seen from the figure that majority of the firms (66.67%) had between 51 and 100 employees, while the rest had between 1 to 50 employees (33.33%).

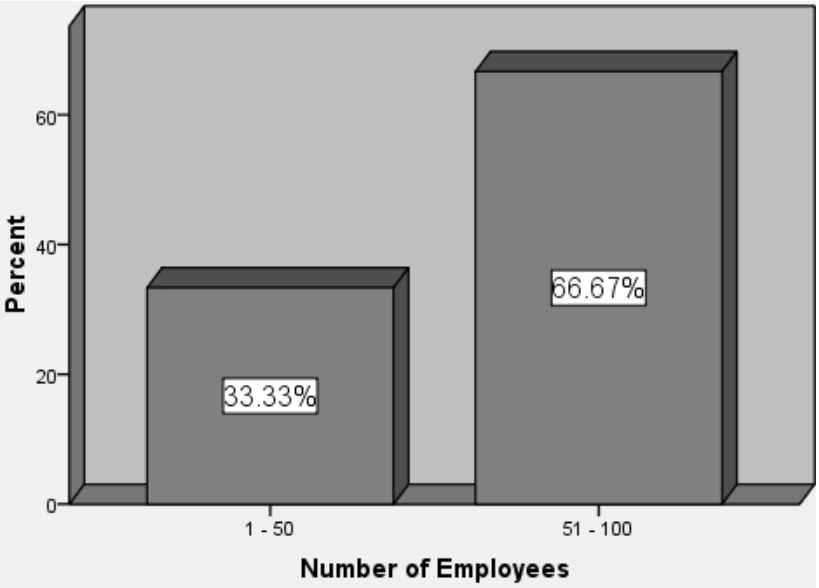


Figure 4.11: Number of Employees

The managers were then asked if their business was affected by employee turnover. Their responses are shown in figure 4.12. It can be seen from the figure that majority of the managers (91.67%) agreed that their business was affected by employee turnover while the rest did not agree (8.33). some of the ways mentioned in which employee turnover affected their business included; not meeting deadlines, late delivery, reduced orders, low production, and having to increase salaries.



Figure 4.12: Is your business affected by employee turnover?

The managers were then asked to note down the causes that they thought contributed to rejection of printed work. Some of the mentioned causes include: use of poor quality materials, poor quality of printed image, late delivery, poor colour shade, poor registration, poor material usage, and poor quality of end product. These agree with findings noted during the literature and empirical review as detailed in chapter two of this report. The managers were then asked to explain how quality retains customers in their organization. One of the ways that was mentioned by many of them was that the customers kept coming back with other orders. Another was that they recommended the organizations to other people who gave them new business. Another was that they congratulated them for doing a good job.

4.3 Descriptive Statistics

4.3.1 Skills and Quality

The second section of the managers' questionnaire gathered information concerning the significance of employee skills on quality of products. The managers and technicians were asked to indicate their degree of agreement or disagreement with various statements on skills, training

and how these affect quality of products. Their responses are shown here. Table 4.2 shows managers' responses regarding significance of skills on quality.

Table 4.2: Managers' Opinions on Significance of Skills on Quality

Statement	Percentages (%)						Mean	SD
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total		
All employees are trained in printing technology	0	4.2	16.7	58.3	20.8	100.0	3.96	.751
All employees have certificates in printing technology	0	4.2	25.0	54.2	16.7	100.0	3.83	.761
Due to inadequate skills, printing jobs take long to be produced	0	4.2	8.3	50.0	37.5	100.0	4.21	.779
Employees skills attract customers to the firm	0	4.2	16.7	66.7	12.5	100.0	3.88	.680
All skilled employees get promoted	0	0	8.3	70.8	20.8	100.0	4.13	.537
All skilled employees go for refresher training	0	0	4.2	70.8	25.0	100.0	4.21	.509
All skilled employees understand quality	0	0	12.5	66.7	20.8	100.0	4.08	.584

Source: (Survey Data, 2017) n=30

Majority of the managers (58.3%) agree with the statement that all employees are trained in printing technology, followed by those who strongly agree (20.8%), then by those who are neutral (16.7%), and lastly by those who disagree (4.2). Majority of them (54.2%) agree with the

statement that all employees have certificates in printing technology, followed by those who are neutral (25.0%), then by those who strongly agree (16.7%), and lastly by those who disagree (4.2%). Many of them (50.0%) also agree that due to inadequate skills, printing jobs take long to be produced, followed by those who strongly agree (37.5%), then by those who are neutral (8.3%), and lastly by those who disagree (4.2%).

Majority of the managers (66.7%) agree with the statement that employees skills attract customers to the firm, followed by those who are neutral (16.7%), then by those who strongly agree (12.5%), and lastly by those who disagree (4.2). Majority of them (70.8%) agree with the statement that all skilled employees get promoted, followed by those who strongly agree (20.8%), and lastly by those who are neutral (8.3%). Many of them (70.8%) also agree that all skilled employees go for refresher training, followed by those who strongly agree (25.0%), and lastly by those who are neutral (8.3%). Also, majority of them (66.7%) agree with the statement that all skilled employees understand quality, followed by those who strongly agree (20.8%), and lastly by those who are neutral (12.5%).

As was earlier explained in chapter two, print quality requires excellent skills in the individual. These skills in an individual may be achieved through training or experience. Thus quality work is always achieved by the knowledgeable skilled employee. Some important skills include communication, coordination, mathematical and computer skills (Sakyi, 2012).

Quality work is always achieved by the knowledgeable skilled employee. An organization may acquire and provide healthy state-of-the art equipment and provide a healthy and safe work environment but if the employee is not knowledgeable and skilled, there would be no quality work produced. Self-confidence, positive attitude are interpersonal traits that one should possess

in addition to the training and experience so as to always produce quality prints. Some important skills that a printing expert should possess among others may include; ability to convey information effectively to others, this should be both orally and written. Failure to do this may lead to breakdown in communication thus jeopardizing quality at the end to the chain. Ability to coordinate work, for quality results is a printer's major responsibility (Patrick, 2013).

The technicians were asked how their skills contribute to growth of the printing business. Some of the common responses included: by producing quality products, by developing and improving printing industry, by sourcing quality printing materials, by waste reduction, by increased production output and by achieving customer satisfaction. They were also asked what level they would like to be trained in. Many of them indicated they would like to be trained to a degree level with a few indicating masters level, Very few of them indicated certificate or diploma levels, and some just noted that they wanted some training in digital printing and in new state of art technology.

The technicians were then asked to indicate their agreement with some statements on significance of skills on quality. Their responses are presented in table 4.3.

Table 4.3: Technicians' Opinions on Significance of Skills on Quality

Statement	Percentages (%)						Mean	SD
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total		
All employees are trained in printing technology	22.4	41.4	12.1	17.2	5.2	98.3	2.40	1.178
Skills contribute to growth of printing business	3.4	5.2	43.1	44.8	1.7	98.3	4.33	.740
Training in print technology improves production printing businesses	0	1.7	3.4	41.4	51.7	98.3	4.46	.657
Training prepares technical employees for promotions	0	1.7	19.0	44.8	32.8	98.3	4.11	.772
All levels of training employees on digital equipment is more productive to print business	1.7	6.9	12.1	50.0	27.6	98.3	3.96	.925
Short refresher training programs for technical employees is good for the organization	0	3.4	5.2	34.5	55.2	98.3	4.44	.756

Source: (Survey Data, 2017) n=60

From table 4.3 it can be seen that indeed the skills of an employee have a lot of significance when it comes to producing quality printed products. This is as is explained in chapter two of this research report that in order to produce product of a high print quality, this requires excellent skills in the individual producing these products. These skills in an individual may be achieved through training or experience.

Workers who enter the printing industry are typically trained informally on the job. The length of time required for training an employee should impart various skills, which translate to being occupationally sound for maximum quality utilization. Through experience and further training

workers may advance to more responsible positions. Workers who usually begin as helpers, then advance to skilled craft jobs and eventually may be promoted to senior levels as supervisors.

Education backgrounds vary among workers entering the printing industry. Helpers or assistants tend to have a high school or vocational school background while management trainees usually have a college degree. In general, job applicants must be high school graduates with mathematical, verbal and communication skills and be computer literate.

Thus quality work is always achieved by the knowledgeable skilled employee. Some important skills include communication, coordination, mathematical and computer skills.

4.3.2 Materials and Quality

The managers were asked to indicate the possible remedies in place for waste reduction. They wrote down various remedies that included: regular maintenance of equipment, training of the employees, using materials of high quality, purchasing print papers in ready sizes, proper servicing of equipment, training on materials management, timely disposal of equipment before it becomes obsolete, and sourcing from reliable suppliers.

They managers were then asked to comment on the quality of materials. Their responses are shown in table 4.4.

Table 4.4: Quality of Materials

Quality of Materials	**Frequency**	**Percentage (%)**
Very Good	2	6.7
Good	13	43.3
Average	9	30.0
Poor	6	20.0
Very Poor	0	0.0
Total	**30**	**100.0**

Source: (Survey Data, 2017) n=30

The general picture that was seen from the responses to this question was that a variation of responses across the various organizations. However, the general process involved the following steps: get quotations from suppliers, choose the one you want, place an order via phone call or form, receive and pay for the materials. They were also asked to comment on quality of materials used in their organization. This is shown in table 4.4. Majority of them (43.3%) said their materials were of good quality, followed by those who said they were of average quality (30.0%) then by those who said they were of poor quality (20.0%), and lastly by a few who said they were of very good quality (6.7%).

They were then asked to explain two major sources of waste in their organization. From their responses the major sources of waste that were identified were: unskilled handling of materials, lack of proper equipment maintenance, incomplete jobs or spoilt jobs, poor storage, poor transport system, and late delivery of materials.

Table 4.5 indicates the managers' degree of agreement on various statements that indicate the effects of materials on quality. Ratings according to Likert, Mean and Standard Deviation are indicated in the table.

Table 4.5: Managers' Opinions on Materials to Quality

Statement	Percentages (%)						Mean	SD
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total		
Poor quality printing materials can be a problem to an organization	0	4.2	4.2	54.2	33.3	95.8	4.22	.736
All material produce quality jobs	0	8.3	4.2	58.3	25.0	95.8	4.04	.825
Different printing materials experience different problems	0	8.3	29.2	33.3	25.0	95.8	3.78	.951
Material waste percentage can be estimated	0	4.2	25.0	54.2	16.7	100.0	3.83	.761
All waste materials can be recycled	0	4.2	8.3	50.0	37.5	100.0	4.21	.779
All printing materials have quality remedies	0	4.2	20.8	54.2	20.8	100.0	3.92	.776
All printing materials undergo a requisition process	0	0	12.5	58.3	29.2	100.0	4.17	.637
All printing materials must meet quality standards	0	0	4.2	62.5	33.3	100.0	4.29	.550

Source: (Survey Data, 2017) n=30

Quality of materials for print production leads to quality printed image. Whether the substrate is wood, egg, paper, cloth, leather etc. the quality is very vital. In process of selection and subsequent acquisition of these materials and others not included here such as printing ink, fountain solution, adhesives etc. the printer should be cognizant of their properties,

characteristics and compatibility with the printing processes. Failure to which there would be definite losses to the organization (Kimunga, 2009).

The technicians gave the following reasons for waste reduction: to increase profits, to reduce production costs, and to improve productivity. Their degree of agreement or disagreement with various statements on effects of materials on quality is shown in table 4.6. Ratings according to Likert, Mean and Standard Deviation are indicated in the table.

Table 4.6: Technicians' Opinions on Materials to Quality

Statement	**Percentages (%)**						**Mean**	**SD**
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Total**		
High quality printing materials are recommended for print production jobs	1.7	1.7	10.3	48.3	32.8	94.8	4.15	.826
Waste percentage of materials affect printing businesses	0	3.4	0	53.4	36.2	93.1	4.31	.668
Poor conditions of printing equipment can affect quality of printing materials	1.7	0	3.4	31.0	58.6	94.8	4.53	.742
Printing machines operator can improve quality of print on printing material during production	1.7	6.9	6.9	37.9	41.4	94.8	4.16	.977
Regular maintenance of printing equipment can boost quality production on a printed material	1.7	3.4	39.7	48.3	1.7	94.8	4.45	.662
Storage facilities can affect quality printing materials	0	3.4	3.4	39.7	46.6	93.1	4.39	.738
Our storage of printing materials can affect a printing organization	0	3.4	19.0	39.7	32.8	94.8	4.07	.836

Source: (Survey Data, 2017) n=60

From table 4.6 it can be seen that indeed materials affect quality of printed products. This is as is explained in chapter two of this research report that the quality of materials for print production determines the quality of the printed image. Whether the substrate is wood, egg, paper, cloth, leather etc. the quality is very vital. In process of selection and subsequent acquisition of these materials and others not included here such as printing ink, fountain solution, adhesives etc. the printer should be cognizant of their properties, characteristics and compatibility with the printing processes.

4.3.3 Capital and Quality

The managers were asked to explain the various sources of capital that they acquire capital through. From their responses we find that the sources of capital include personal savings, retained profits, bank loans, bank overdraft, sale of shares, sale of property, hire purchase, amalgamation and equity.

They were then asked how taxation affects capital in their organization. The indicated that taxation affected their organization in various ways including; reducing their profit margin, "eating into" their profits if one defaults as defaulters attract high fines. Although some indicated some positive effects on their organization especially the improvement of road conditions on their streets of location and operation. Table 4.7 shows the managers degree of agreement with various statements that are concerned with the effect of capital on quality. Ratings according to Likert, Mean and Standard Deviation are indicated in the table.

Table 4.7: Managers' Opinions on Capital to Quality

Statement	Percentages (%)						Mean	SD
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total		
Amount of capital invested in a printing firm affects the quality production	8.3	0	16.7	62.5	12.5	100.0	3.71	.999
Sources of capital contribute to success of printing business	0	4.2	12.5	62.5	20.8	100.0	4.00	.722
Insufficiency of capital contributes to printing organization problems	4.2	4.2	8.3	50.0	29.2	95.8	4.00	1.000
Taxation affects capital in printing business	4.2	4.2	4.2	45.8	41.7	100.0	4.17	1.007
Owner occupier building premises increases capital boost to printing organization	0	0	20.8	54.2	25.0	100.0	4.04	.690
Financial knowledge controls capital expenditure in printing business	0	4.2	4.2	37.5	54.2	100.0	4.42	.776
Banking transactions improves the image of printing business	0	4.2	20.8	37.5	37.5	100.0	4.08	.881

Source: (Survey Data, 2017) n=30

From the tables above it can be seen that indeed capital has an effect on the quality of the end product in the printing industry. This is as is explained in chapter two of this research report that printers are faced with an economic challenge by the volume and variety of inks and substrates that they require. Before they go to press, they need to be able to predict the on-press printing characteristics of these materials because press time is expensive.

Most printing firms fail to prosper because they do not have sufficient funds to run their businesses. The firms also fail to succeed because of poor management. The insufficient source

of funds forces printing organizations to start to shop for more sources. Mismanagement can be tackled by putting in strict management information system to streamline control of funds. Capital in business usage is mostly taken to mean total assets required to operate a business and the money needed to acquire such assets, it means all the accumulated wealth used to produce additional wealth e.g. debtors and accounting claims. Capital is the total amount of share value paid in company's books of account. Working capital refers to that part of capital which is needed for financing current requirement of the company. Every company needs working capital for holding current assets like raw materials and semi-finished goods (Gupta, Sharma, & Bhalla, 2013).

4.3.4 Equipment and Quality

The managers were asked to indicate the cost of maintaining their printing equipment. Their responses were very varied. Most of them indicated that the cost of maintaining their equipment was between 0 to half a million shillings, some of them indicated that it was between half a million to one million shillings, while only a few indicated that it was over one million. This shows that maintaining printing equipment is a costly thing.

They were then asked to indicate their degree of agreement or disagreement with some statement on quality. The following table, table 4.8 shows their responses. Ratings according to Likert, Mean and Standard Deviation are indicated in the table.

Table 4.8: Managers' Opinions on Equipment to Quality

Statement	Percentages (%)						Mean	SD
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total		
Equipment output increases production of print products	0	8.3	37.5	41.7	12.5	100.0	3.50	1.022
State of art equipment accelerate meeting production deadlines	0	4.2	29.2	45.8	20.8	100.0	3.83	.816
Use of printing equipment for long affects production quality standard	4.2	4.2	16.7	41.7	29.2	95.8	3.91	1.041
Suppliers of printing equipment are available locally	4.2	4.2	37.5	12.5	41.7	100.0	3.83	1.167
Printing machines are maintained regularly	0	0	20.8	37.5	41.7	100.0	4.21	.779
Printing equipment are both conventional and digital	0	4.2	4.2	29.2	62.5	100.0	4.50	.780
Printing equipment can cause problems during production	0	4.2	12.5	45.8	37.5	100.0	4.17	.816

Source: (Survey Data, 2017) n=30

From table 4.8 it can be seen that indeed materials affect quality of printed products. This is as is explained in chapter two of this research report that printing equipment from design to post press is very significant as far as quality print is concerned. The surest way of achieving quality in print production is to ensure that the equipment used is maintained once and always so that they have high efficiency in production of a printed image (Gatobi & Dr. Esther, 2014).

The technicians were queried on the condition of the printing equipment they used. Their responses are shown in table 4.9.

Table 4.9: Condition of Printing Equipment

Condition of Printing Equipment	Frequency	Percentage (%)
Very Okay	2	3.4
Okay	20	34.5
Average	22	37.9
Bad	14	24.1
Very Bad	0	0.0
Total	58	100.0

Source: (Survey Data, 2017) n=60

Majority of them (37.9%) said that the equipment was average, followed by those who said that it was okay (33.5%), then by those who said that it was bad (24.1%), with very few indicating that it was very good (3.4%). Printing equipment from design to post press is very significant as far as quality print is concerned. The surest way of achieving quality in print production is to ensure that the equipment used is maintained once and always so that they have high efficiency in production of a printed image (Gatobi & Dr. Esther, 2014).

Well maintained equipment is no doubt the cornerstone of print quality. Printing technology comprises the machinery, equipment and methods used to create a printed product, and it is therefore a crucial element in the company's organizational strategy (Nyongesa, 2014).

They were also asked to indicate how often they maintained or serviced the printing equipment. Their responses are shown in table 4.5.

Table 4.5: Frequency of Servicing Equipment

Frequency of Servicing Equipment	Frequency	Percentage (%)
Yearly	2	3.4
Monthly	26	44.8
Weekly	18	31.0
Daily	12	20.7
Total	0	0.0

Source: (Survey Data, 2017) n=60

Majority of them (44.8%) said they serviced monthly, followed by those who said weekly (31.0%), then by those who said daily (20.7%), with very few indicating yearly (3.4%).

Well maintained equipment is no doubt the cornerstone of print quality. Printing technology comprises the machinery, equipment and methods used to create a printed product, and it is therefore a crucial element in the company's organizational strategy. Every printer must, at some time, consider the purchase of new technology or equipment, to replace out-dated equipment and obsolescent methods, because of wear, or, more importantly, because of a change in the company's production aims and objective (Nyongesa, 2014).

The technicians were then asked to explain why state of art printing equipment is important in printing production. They indicated that using state of art equipment brings about efficiency, reduces production costs, increases print quality, reduces or minimizes wastage, assists in error detection, brings about flexibility in working conditions, increases production speed, and it saves time.

They were then asked to explain how poor maintenance of equipment is an expense to a printing firm. They indicated that it is an expense to a printing firm because it leads to poor production, low production, time wastage during production, increased repair costs, material wastage, breakdowns, loss of customers because of various reasons such as not meeting deadlines, inconsistent production and lack of customer satisfaction.

Table 4.11 shows technicians' degree of agreement with various statements on the effects of equipment on quality. Ratings according to Likert, Mean and Standard Deviation are indicated in the table.

Table 4.11: Technicians' Opinions on Effects of Equipment on Quality

Statements	**Percentages (%)**						**Mean**	**SD**
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Total**		
Regular replacement of printing machine accessories improves printing quality	1.5	8.8	11.8	32.4	29.4	83.8	3.95	1.042
Maintenance training is important to technical employees	0	0	4.4	32.4	47.0	83.8	4.51	.601
Periodical disposal of worn out machine accessories is important in enhancement of quality print	4.4	2.9	11.8	41.2	23.5	83.8	3.91	1.023
Disposal of an equipment after its obsolesce period is good to a printing company	0	2.9	13.2	47.1	20.6	83.8	4.02	.744
Efficiency of printing equipment to the company is vital in quality enhancement	1.5	1.5	7.4	32.4	38.2	80.9	4.29	.854
State of art equipment enhances quality production in printing business	1.5	1.5	4.4	29.4	47.1	83.8	4.42	.823

Source: (Survey Data, 2017) n=60

From the tables above it can be seen that indeed equipment condition an effect on the quality of the end product in the printing industry. This is as is explained in chapter two of this research report that well maintained equipment are the cornerstone of print quality. Printing technology comprises the machinery, equipment and methods used to create a printed product, and it is therefore a crucial element in the company's organizational strategy.

The advance of technology and the consequent changes in the printing industry are rapid, and the result is that equipment becomes obsolete in shorter periods of time than was previously expected. This trend is likely to continue for the foreseeable future. The technology currently used in the industry is expensive, and invested capital is tied up for a long time. The installation of an inadequate or investing in technology not investigated becomes a constant problem for the purchaser every time limitations are experienced (Kipphan, 2012).

4.3.5 Quality

The first question in the quality assurance personnel questionnaire asked them to explain how quality can be maintained during press run. Some of their responses included: proper use and maintenance of blankets with printing layer, conforming to the set printing standards, even moisture distribution by dampers, sourcing from right suppliers, monitoring ink and water balance, correct usage of paper transfer gripper, and correct setting of joggers, side lays and pile height governors.

The following table, table 4.12 shows quality assurance personnel’s degree of agreement with various statements on quality production and performance. Ratings according to Likert, Mean and Standard Deviation are indicated in the table.

Table 4.12: Quality Production and Performance

Statement	Percentages (%)						Mean	SD
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total		
Print product prices are based on quality	0	0	9.7	67.7	22.6	100.0	4.13	.562
All printing materials before printing are subject to quality tests	0	0	35.5	64.5	0	100.0	3.65	.486
Quality in printing is best achieved through Digital and electronic printing process	0	0	71.0	25.8	3.2	100.0	3.32	.541
Quality in printing is achieved though institutions training	0	0	16.1	38.7	45.2	100.0	4.29	.739
Quality is about conforming to set standards	0	0	0	9.7	90.3	100.0	4.90	.301

Source: (Survey Data, 2017) n=30

The quality assurance personnel were also asked to explain how sub-standard materials contribute to poor quality print products. They indicate that poor quality materials do not allow for proper registration of prints, they result in poor image quality, they cause show-through of ink, they cause delays due to machine stoppages, they make roller rubbers to react and crack, and they also cause paper to change colour shade.

Quality is associated with customer satisfaction and dissatisfaction with the product and emphasizes the necessity for on-going quality improvement through a succession of small improvement projects carried out throughout the organization.

4.4 Inferential Statistics

4.4.1 Employee Skills

Regression was first done on each of the individual variables and then multiple regression done on all the variables. The first variable was skills. Table 4.13 show the summary regression results for the effect of skills on quality.

Table 4.13: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.546[a]	.298	.273	.795
a. Predictors: (Constant), Employee Skills				

Source: (Survey Data, 2017) n=30

Table 4.13 shows the values for R (the multiple correlation coefficients), R^2 (the coefficient of determination), adjusted R^2 (adjusted coefficient of determination), and the standard error of the estimate. The coefficient of correlation (R) was 0.546 which indicates a strong direct/positive correlation between the independent variables and the dependent variable variables. The coefficient of determination (R^2) was 0.298 indicating that skills explain 29.8% of the variability of our dependent variable, quality.

Table 4.14 presents the Analysis of Variance (ANOVA) results for skills. The F ration value in our study was 11.864. It was seen that the independent variables significantly represent the dependent variable quality as the significance value of F (0.000) as indicated in the column labeled “sig” is less than 0.001.

Table 4.14: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.500	1	7.500	11.864	.000a
	Residual	17.700	28	.632		
	Total	25.200	29			
a. Predictors: (Constant), Employee Skills						
b. Dependent Variable: Quality						

Source: (Survey Data, 2017) n=30

ANOVA table indicates an F of 11.864 at 0.000 level of significance implying that the validity of employee skills is significant.

Table 4.15 presents details of the model parameters. This is provided as the beta values (B).

Table 4.15: Skills Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.600	.599	1.450	2.673	.012
	Employee Skills	.500	.145	.546	3.444	.002

Source: (Survey Data, 2017) n=30

Table 4.15 above shows the predictor variables provided as the Beta values (B) The first variable (constant) represents the constant, also referred to as the Y intercept, the height of the regression line when it crosses the Y axis. In other words, this is the predicted value of skills when all other variables are 0. 0.5 units of employee skills lead to 1 unit of quality.

4.4.2 Printing Materials

The second variable was materials. Table 4.16 show the summary regression results for the effect of materials on quality.

Table 4.16: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.401[a]	.160	.130	.869
a. Predictors: (Constant), Quality of Materials				

Source: (Survey Data, 2017) n=30

Table 4.16 shows the values for R (the multiple correlation coefficients), R^2 (the coefficient of determination), adjusted R^2 (adjusted coefficient of determination), and the standard error of the estimate. The coefficient of correlation (R) was 0.401 which indicates a direct/positive correlation between the independent variables and the dependent variable variables. The coefficient of determination (R^2) was 0.160 indicating that materials explain 16.0% of the variability of our dependent variable, quality.

Table 4.17 presents the Analysis of Variance (ANOVA) results for skills. The F ration value in our study was 5.349. It was seen that the independent variables significantly represent the dependent variable quality as the significance value of F (0.000) as indicated in the column labeled “sig” is less than 0.001.

Table 4.17: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.042	1	4.042	5.349	.000a
	Residual	21.158	28	.756		
	Total	25.200	29			
a. Predictors: (Constant), Quality of Materials						
b. Dependent Variable: Quality						

Source: (Survey Data, 2017) n=30

ANOVA table indicates an F of 5.349 at 0.000 level of significance implying that the variable of printing materials is significant.

Table 4.18 presents details of the model parameters. This is provided as the beta values (B).

Table 4.18: Materials Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.000	.710	1.985	2.818	.009
	Quality of Materials	.421	.182	.401	2.313	.028

Source: (Survey Data, 2017) n=30

Table 4.18 above shows the predictor variables provided as the Beta values (B) The first variable (constant) represents the constant, also referred to as the Y intercept, the height of the regression line when it crosses the Y axis. In other words, this is the predicted value of materials when all other variables are 0. 0.421 units of printing materials will lead to 1 unit of quality.

4.4.3 Capital

The third variable was capital. Table 4.19 show the summary regression results for the effect of capital on quality.

Table 4.19: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813[a]	.661	.649	.552
a. Predictors: (Constant), Available Capital				

Source: (Survey Data, 2017) n=30

Table 4.19 shows the values for R (the multiple correlation coefficients), R^2 (the coefficient of determination), adjusted R^2 (adjusted coefficient of determination), and the standard error of the estimate. The coefficient of correlation (R) was 0.813 which indicates a strong direct/positive correlation between the independent variables and the dependent variable variables. The coefficient of determination (R^2) was 0.661 indicating that capital explains 66.1% of the variability of our dependent variable, quality.

Table 4.20 presents the Analysis of Variance (ANOVA) results for skills. The F ration value in our study was 54.655. It was seen that the independent variables significantly represent the dependent variable quality as the significance value of F (0.000) as indicated in the column labeled “sig” is less than 0.001.

Table 4.20: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.663	1	16.663	54.655	.000a
	Residual	8.537	28	.305		
	Total	25.200	29			
a. Predictors: (Constant), Available Capital						
b. Dependent Variable: Quality						

Source: (Survey Data, 2017) n=30

ANOVA table indicates an F of 54.655 at 0.000 level of significance implying that the variable capital of is significant.

Table 4.21 presents details of the model parameters. This is provided as the beta values (B).

Table 4.21: Capital Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.796	.392	.780	2.028	.052
	Available Capital	.809	.109	.813	7.393	.000

Source: (Survey Data, 2017) n=30

Table 4.21 above shows the predictor variables provided as the Beta values (B) The first variable (constant) represents the constant, also referred to as the Y intercept, the height of the regression line when it crosses the Y axis. In other words, this is the predicted value of capital when all other variables are 0. 0.809 units of capital will lead to 1 unit of quality.

4.4.4 Equipment

The fourth variable was equipment. Table 4.22 show the summary regression results for the effect of equipment on quality.

Table 4.22: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.753[a]	.567	.552	.624
a. Predictors: (Constant), Equipment Condition				

Source: (Survey Data, 2017) n=30

Table 4.22 shows the values for R (the multiple correlation coefficients), R^2 (the coefficient of determination), adjusted R^2 (adjusted coefficient of determination), and the standard error of the estimate. The coefficient of correlation (R) was 0.567 which indicates a strong direct/positive correlation between the independent variables and the dependent variable variables. The coefficient of determination (R^2) was 0.552 indicating that equipment explains 55.2% of the variability of our dependent variable, quality.

Table 4.23 presents the Analysis of Variance (ANOVA) results for skills. The F ration value in our study was 36.699. It was seen that the independent variables significantly represent the dependent variable quality as the significance value of F (0.000) as indicated in the column labeled “sig” is less than 0.001.

Table 4.23: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.294	1	14.294	36.699	.000a
	Residual	10.906	28	.389		
	Total	25.200	29			
a. Predictors: (Constant), Equipment Condition						
b. Dependent Variable: Quality						

Source: (Survey Data, 2017) n=30

ANOVA table indicate an F of 36.699 at 0.000 level of significance implying that the variable of equipment is significant.

Table 4.24 presents details of the model parameters. This is provided as the beta values (B).

Table 4.24: Equipment Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.688	.494	.605	1.393	.175
	Equipment Condition	.794	.131	.753	6.058	.000

Source: (Survey Data, 2017) n=30

Table 4.24 above shows the predictor variables provided as the Beta values (B) The first variable (constant) represents the constant, also referred to as the Y intercept, the height of the regression line when it crosses the Y axis. In other words, this is the predicted value of equipment when all other variables are 0. 0.794 units of printing equipment will lead to 1 unit of quality.

4.4.5 Combined Variables

Multiple regression allowed the researcher to determine the overall fit of the model and the relative contribution of each of the independent variables to the total variance explained. The multiple regression results are presented here. Table 4.25 provides the values for R (the multiple correlation coefficients), R^2 (the coefficient of determination), R^2 (adjusted coefficient of determination), and the standard error of the estimate, which were used to determine how well the regression model fits the data: The coefficient of correlation (R) was 0.885 which indicates a very strong direct/positive correlation between the independent variables and the dependent variable variables. The coefficient of determination (R^2) was 0.783 indicating that the independent variables explain 78.3% of the variability of our dependent variable, quality.

Table 4.25: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.885[a]	0.783	0.748	0.468
a. Predictors: (Constant), Equipment Condition, Quality of Materials, Employee Skills, Available Capital				

Source: (Survey Data, 2017) n=30

The next table, table 4.26, presents the Analysis of Variance (ANOVA) results. The F-ratio in the table tests whether the overall regression model is a good fit for the data. The F value in our study was 22.508. It was seen that the independent variables significantly represent the dependent variable quality as the significance value of F (0.000) as indicated in the column labeled "sig" is less than 0.001.

Table 4.26: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.723	4	4.931	22.508	0.000[a]
	Residual	5.477	25	0.219		
	Total	25.200	29			
a. Predictors: (Constant), Equipment Condition, Quality of Materials, Employee Skills, Available Capital						
b. Dependent Variable: How would you rate the quality of the products produced during that last production job.						

Source: (Survey Data, 2017) n=30

The next table, table 4.27, presents details of the model parameters. These are provided as the beta values (B).

Table 4.27: Combined Regression Table

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.769	0.567	-0,748	-1.356	0.187
	Employee Skills	0.107	0.106	0.116	1.006	0.324
	Quality of Materials	0.252	0.120	0.240	2.110	0.045
	Available Capital	0.294	0.169	0.296	1.743	0.094
	Equipment Condition	0.535	0.151	0.508	3.540	0.002

Source: (Survey Data, 2017) n=30

Thus the equation for predicting quality of products from employee skills, quality of materials, available capital and equipment condition is:

$$- 0.769\ Y = 0.107X_1 + 0.252\ X_2 + 0.294\ X_3 + 0.535X_4$$

This is the regression model that was estimated through the results of regression analysis that has been presented above.

Explanation:

One unit of quality which is 0.107 units of skills leads to 0.769 of quality, while 0.252 units of materials leads to 0.769 of quality, 0.294 units of capital leads to 0.769 units of quality. And 0.535 units of equipment leads to 0.769 units of quality.

This implies that equipment play the major role in the quality of printing.

Where: Y – Quality performance

X_1 – Skills

X_2 – Materials

X_3 – Capital

X_4 – Equipment

ε – Error

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter summarizes the study, provides conclusions based on the summary and gives the recommendations based on the conclusions. The objective of the study was to analyse factors affecting quality performance in the printing industry in Nairobi Central Business District.

5.1 Summary

5.1.1 Skills

Some of the contributions of employee skills to growth of business included; producing quality products, developing and improving printing industry, sourcing quality printing materials, waste reduction, increased production output and achieving customer satisfaction. Possible remedies for waste reduction included: regular maintenance of equipment, training of the employees, using materials of high quality, purchasing print papers in ready sizes, proper servicing of equipment, training on materials management, timely disposal of equipment before they becomes obsolete, and sourcing from reliable suppliers.

It was seen that inferential analysis indeed the skills of an employee have a lot of significance when it comes to producing quality printed products because coefficient correlation was 29.8%. This was also explained in chapter two of this research report that in order to produce product of a high print quality, this requires excellent skills in the individual producing these products. These skills in an individual may be achieved through training or experience. Thus quality work is always achieved by the knowledgeable skilled employee.

The skills and functions required for effective printing management include: planning and organizational skills, strategy and policy making skills, initiative, innovation, technical capacity, system thinking, production planning, communication and information and technology management skills.

5.1.2 Materials

It was also seen at inferential analysis that indeed materials affect quality of printed products at 16.0%. This is as is explained in chapter two of this research report that the quality of materials for print production determines the quality of the printed image. Whether the substrate is wood, egg, paper, cloth, leather etc. the quality is very vital. In process of selection and subsequent acquisition of these materials and others not included here such as printing ink, fountain solution, adhesives etc. the printer should be cognizant of their properties, characteristics and compatibility with the printing processes. The study found that management of printing materials is an important function in printing firms. Successful management requires technical knowledge and ability.

5.1.3 Capital

Capital was also seen at inferential analysis to have an effect on the quality of the end product in the printing industry at 66.1%. This is as is explained in chapter two of this research report that printers are faced with an economic challenge by the volume and variety of inks and substrates that they require. Before they go to press, they need to be able to predict the on-press printing characteristics of these materials because press time is expensive. Working capital has a direct connection with cash flow. For the printing firms, an adequate amount of working capital was seen to be vital for their operation.

5.1.4 Equipment

The condition of the printing equipment was another factor that was found at inferential analysis to have 55.2% effect on the quality of the end product in the printing industry. This is as is explained in chapter two of this research report that well maintained equipment are the cornerstone of print quality. Printing technology comprises the machinery, equipment and methods used to create a printed product, and it is therefore a crucial element in the company's organizational strategy. Printing equipment was seen to be very significant as far as quality of the printed products are concerned. It was seen that the surest way of achieving quality print products was to ensure that the printing equipment were well maintained.

5.2 Conclusion

5.2.1 Skills

In conclusion, we have seen that the skills of an organizations employees are significant as it greatly affects the quality of printed products that he or she can produce. Skills in an individual may be gained through training or experience

5.2.2 Materials

We have also seen that print materials also have an effect on the quality of printed products. Therefore, correct handling, usage and storage of these materials is vital to producing high quality printed products. These printing materials are usually expensive and correct handling, use and storage is important. The qualities of printing materials determine the quality of the printed image. Whether the substrate is wood, egg, paper, cloth, leather etc. the quality is very vital.

5.2.3 Capital

Capital is also another predictor of print product quality. Printers are faced with an economic challenge by the volume and variety of inks and substrates that they require and thus they require an adequate amount of working capital to meet these needs.

5.2.4 Equipment

Finally, the condition of the printing equipment is another factor that was found to have an effect on the quality of the end product in the printing industry. Well maintained equipment are the foundation of quality in the printing industry.

5.3 Recommendations

The following recommendations if properly implemented and regularly evaluated will ensure that organizations in the printing industry consistently produce high quality print products efficiently and effectively. The organizations should ensure that they create a training and education programme that should regularly train and educate their employees on the various developments and technologies in the printing industry. This should include materials management seminars and training sessions to educate the employees on how to properly handle materials. Materials should be sourced (bought) from reliable suppliers who have a good history of honesty and consistency and who have maintained a trustworthy supply service so that only high quality materials are bought for use. The management should ensure that they keep an agreeable amount of working capital that will be enough to cater for sudden and increased requests for production. Proper and regular maintenance and servicing of equipment should be greatly emphasized so as to eliminate downtime and wastages / costs due to malfunctioning or broken down machines.

5.4 Suggestions for Further Research

From this study, a suggestion for further research can be a study on the challenges that printing firms face in switching from the old printing technologies to the new state of the art technologies and the feasibility of doing so for an average printing firm in Kenya.

From this study there is still need for further research in the line of quality print production, in this study labour turn over contributed 91.6% and indeed the managers agreed that this affected their business (Figure 4.11). Further research should be conducted on skills which at regression, results indicated that skills had 29.8% variability. So, further research can be conducted to get the remaining 78.8%. Correlation for materials indicated only 16%, and therefore a further research to get the remaining 84% is necessary. For capital it was 66.1%, so further research should find the gap difference of 34%. For equipment coefficient of determination was 0.55% (R^2) which is 55.2% and therefore a further research to find the difference of 44.8% is necessary.

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APPENDICES

APPENDIX A: UNIVERSITY LETTER OF APPROVAL

ST. PAUL'S UNIVERSITY

Private Bag 00217 LIMURU, KENYA
Email: office@spu.ac.ke
Website: www.spu.ac.ke

Tel Office: + 254(0) 20-2020505/10
Mobile: + 254(0) 728 - 669000
(0) 736 - 424440

7th April 2017

National Commission for Science and Technology,
P.O. BOX 30623-00100,
Nairobi.

Dear Sir/Madam,

Re: Recommendation for Dominic Oloo Menya to conduct a Masters of Business Administration (MBA) research.

This letter confirms the above named person is a second (final) year student of the MBA Programme at St. Paul's University.

The final year consists of a major research work leading to a dissertation comprising 20,000 words. The student's selected topic is *'Analysis of factors affecting quality performance in the printing industry in Nairobi Central Business District".*

The research will take place in Nairobi County from April 2017 to May 2017.

Kindly grant this student the required permit.

Yours Faithfully,

Dr. Sammy Githuku
Director, Postgraduate Studies

APPENDIX B: NACOSTI RESEARCH AUTHORIZATION LETTER



NATIONAL COMMISSION FORSCIENCE, TECHNOLOGY ANDINNOVATION

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

9th Floor, Utalii House
Uhuru Highway
P.O.Box 30623-00100
NAIROBI-KENYA

Ref:No. **NACOSTI/P/17/20095/16404**

Date: **25th April, 2017**

Dominic Oloo Menya
St. Paul's University
P.O. Private Bag - 00217
LIMURU.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Analysis of factors affecting quality performance in the printing industry in Nairobi Central Business District,"*** I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **24th April, 2018.**

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

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

The County Director of Education
Nairobi County.

National Commission for Science, Technology and Innovation is ISO9001:2008 Certified

APPENDIX C: RESEARCH CONDUCT PERMIT



CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit.
2. Government Officer will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one (1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

National Commission for Science, Technology and Innovation

RESEACH CLEARANCE PERMIT

Serial No. A 13812

CONDITIONS: see back page

THIS IS TO CERTIFY THAT:
MR. DOMINIC OLOO MENYA
of ST PAULS UNIVERSITY, 0-100
Nairobi,has been permitted to conduct research in *Nairobi County*

on the topic: *ANALYSIS OF FACTORS AFFECTING QUALITY PERFORMANCE IN THE PRINTING INDUSTRY IN NAIROBI CENTRAL BUSINESS DISTRICT*

for the period ending:
24th April,2018

Permit No : NACOSTI/P/17/20095/16404
Date Of Issue : 25th April,2017
Fee Recieved :Ksh 1000

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation

APPENDIX D: QUESTIONNAIRES

I am a post graduate student at St. Paul's University Limuru pursuing a Master's Degree in Business Administration. I am currently carrying out a research on Analysis of quality performance in the printing industry in Nairobi Central Business District. I request you to fill in the attached questionnaire while answering the questions to the best of your knowledge. I promise to keep the information collected confidential and not to interfere with any process of your work. Kindly assist me to have them filled in order to make my research successful.

QUESTIONNAIRE TO PRINTING MANAGER

SECTION I – GENERAL INFORMATION

Please answer the following questions by ticking the appropriate box or filling the gap.

1. Your age

   Less than 25 year ☐ between 25 and 40 ☐ More than 40 years ☐

2. Gender: Male ☐ Female ☐

3. Are you trained in the printing profession? Yes ☐ No ☐

4. For how long have you operated this business? ☐ Years

5. Have you attended any managerial training? Yes ☐ No ☐

6. (i) How many employees do you have? ☐

   (ii) Is your business affected by employee's turnover? Yes ☐ No ☐

   If yes, state how?

   _____

   _____

   _____

7. Explain the causes contributing to rejection of printed work.

_____

_____

_____

_____

8. Explain how quality retains customers to your organization

_____

_____

_____

SECTION II – SKILLS

To establish the significance of employees skills on the quality of printing products in NCBD.

	Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	All employees are trained in printing technology					
2	All employees have certificates in printing technology					
3	Due to inadequate skills, printing jobs take long to be produced					
4	Employees skills attract customers to the firm					
5	All skilled employees get promoted					
6	All skilled employees go for refresher training					
7	All skilled employees understand quality					

8. How do the skills you possess contribute to the growth of this printing business?

_____

_____

_____

_____

9. What level would you like to be trained in?

_____

_____

_____

SECTION III – MATERIALS

To establish the effect of materials used on the quality production in the printing processes in printing firms in Nairobi.

10. What are the possible remedies in place for waste reduction?

_____

_____

_____

_____

11. Explain requisition process of acquiring materials

_____

_____

_____

12. Comment on quality of materials used in your organization

_____

_____

_____

13. Explain TWO major sources of waste in your organization

_____

_____

_____

	Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Poor quality printing materials can be a problem to an organization					
2	All material produce quality jobs					
3	Different printing materials experience different problems					
4	Material waste percentage can be estimated					
5	All waste materials can be recycled					
6	All printing materials have quality remedies					
7	All printing materials undergo a requisition process					
8	All printing materials must meet quality standards					

SECTION IV – CAPITAL

To investigate the effect of capital on quality production in print establishments in Nairobi.

9. Explain any FOUR sources of capital in your organization

_____

_____

_____

_____

10. How does taxation affect capital in your organization?

_____

_____

_____

	Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Amount of capital invested in a printing firm affects the quality production					
2	Sources of capital contribute to success of printing business					
3	Insufficiency of capital contributes to printing organization problems					
4	Taxation affects capital in printing business					
5	Owner occupier building premises increases capital boost to printing organization					
6	Financial knowledge controls capital expenditure in printing business					
7	Banking transactions improves the image of printing business					

SECTION V – EQUIPMENT

To establish the effect of equipment on the quality of printed products in printing firms in Nairobi.

7. What is the cost of maintaining your printing equipment?

_____

_____

_____

	Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Equipment output increases production of print products					
2	State of art equipment accelerate meeting production deadlines					
3	Use of printing equipment for long affects production quality standard					
4	Suppliers of printing equipment are available locally					
5	Printing machines are maintained regularly					
6	Printing equipment are both conventional and digital					
7	Printing equipment can cause problems during production					

QUESTIONNAIRE FOR THE QUALITY ASSURANCE PERSONNEL

SECTION VI – QUALITY PERFORMANCE

1. How would you rate the condition or availability of the following during the last production job in your organization?

Statement	**Very Poor**	**Poor**	**Average**	**Good**	**Very Good**
Employee Skills					
Quality of Materials					
Available Capital					
Equipment Condition					

2. How would you rate the quality of the products produced during that last production job in your organization?

Very Poor ☐ Poor ☐ Average ☐ Good ☐ Very Good ☐

3. Explain how quality can be maintained during press run

_____
_____
_____
_____

4. Explain how substandard materials contribute to poor quality print products

_____
_____
_____
_____

	Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	Print product prices are based on quality					
6	All printing materials before printing are subject to quality tests					
7	Quality in printing is best achieved through Digital and electronic printing process					
8	Quality in printing is achieved though institutions training					
9	Quality is about conforming to set standards					