

The impact of product quality on the performance of a manufacturing company

C Masindi

 **orcid.org 0000-0002-2335-9097**

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Supervisor:

Mr B Manda

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Student number: 23921099

ABSTRACT

The study is an investigation on the impact of product quality on the performance of a tech-manufacturing company and was conducted at a manufacturing company which reported high Non-Product Conformance Costs between years 2014 – 2017.

Total Quality Management is an approach of engaging in business through maximization of company's competitiveness and continually improving the quality of products and services, people and the environment. An increase in operational productivity might increase current profitability but also expose the company to risks if resources like machines and employees are over utilized.

The elements of product quality are thus examined qualitatively to gain an in depth understanding of the meanings ascribed to the ratings of the components of product quality in 14 questions, five Likert scale questionnaire. A total of 14 participants were sufficient to reach the point of saturation in this study. The study concludes that the market and company performance of the company are indeed positively impacted by product quality.

There is a strong relationship between the product quality and market performance. Elements of product quality such as leadership, accountability, resources, subcontractors, company culture, ownership, skills, knowledge, experience can positively or negatively impact the market and performance of a company based on the majority 5 (43%) respondents whom have worked for 10 years in the company. The impact of product quality can be reflected through growth, sustainability on the market and business profitability.

Thus, manufacturing companies are recommended to pursue superior product quality as a driver of market and company performance. In addition and adoption of a bottom-up quality approach would benefit the company studied in terms of creating an organisation wide culture of quality and concern about company performance. Future studies need to apply a quantitative approach to capture a large sample and even compare two or more branches of a multinational company to understand the underlying differences in quality approaches.

Key Words

Product Quality, Total Quality Management, Profitability Company Performance and Customer Satisfaction

LIST OF ABBREVIATIONS

Abbreviation	Meaning
ASQ	American Society for Quality
B.C.	Before Christ
DV	Dependent Variable
EM	Energy Management
ISO	International Organization for Standardization
IV	Independent Variable
KPI	Key Performance Indicators
LMV	Low Medium Voltage
NCC	Non-Conformance Cost
NCR	Non- Conformance Report
PDCA	Plan, Do, Check & Act
QMS	Quality Management System
RCA	Root Cause Analysis
TQM	Total Quality Management

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CHAPTER 1: NATURE AND SCOPE OF THE STUDY

1.1 Introduction

Obsession with quality and the demand best for performing products is inevitable. Competitive organisations are those that are able to provide quality at a reasonable cost and in a speedy manner. The future is almost unpredictable as current global changes continue to affect all areas of business including quality management. This study focussed on assessing the impact of product quality on the manufacturing company's performance and was based on a case study of a single manufacturing company.

1.2 Background of the study

This study aimed at investigating the product quality performance within manufacturing as well as its impact on the market and the company performance. O'Neill, Sohal & Teng (2016) indicated that to satisfy customers and meet their requirements, manufactures need not only to improve their performance but to also ensure their products were of a better quality and delivered at shorter lead times. O'Neill *et al.* (2016) further reiterated that due to tough competition, customers would become kings and never allow inferior products. This reiteration suggests that company performance, both market and profit wise, can be enhanced by focusing on product quality and the associated metrics such as cost, speed of delivery and process efficiency. Business are challenged to refocus their direction by moving away from cutting manufacturing costs in ways that undermine quality; the focus is leaning more towards responding to customer needs and quality. Quality can be perceived from the customer stand point as well as from the business point. The convergence and divergence of customer and business perspective of product quality can potentially produce different market and company performance outcomes.

1.3 Decision Making and Quality Management

Decision makers managing market and subsequently company performance are not faced with straight forward decision choices on product quality due to changing perceptions and market trends. Yet there has been a proliferation of successful business models focused on telling customers what they need as opposed to customers telling companies what they need. An old adage illustrates this predicament: if Ford had asked customers what they needed at the time, they would have said a fast horse not a car. The business perception of product quality perspective also related to the solutions approach to product quality born out of the business strategic drive towards innovation and technological advancements. Quality management is thus a construct of interest to decision makers and academia.

1.3.1 Economic Conditions, Quality and Managing an Organisation

Goetsch and Davis (2014) indicated that trends that can affect the future of quality management were amongst others globalization, higher customer expectations, economic pressures and management approaches. Goetsch and Davis (2014) further argued that the future of quality management was characterized by total management commitment, market driven business, high commitment to leadership, basic improvement and the four quality objectives which included: customer satisfaction, cost leadership, effective human resources management and supplier integration.

1.3.2 Quality Management Practices, Organisational Culture and Financial Performance

Parvadavardini, Divadasan & Vivek (2016) argued that there was a positive relationship between quality performance, quality management practices and financial performance. On the other hand Valmohammadi and Roshanzamir (2015) reiterated that performance of a company was directly impacted by total quality management and culture. The authors highlighted the fact that management should be aware of cultural differences within companies as they impacted on total quality management and performance. A qualitative approach will be used as basis to conduct this study at a manufacturing company.

According to Ross (2017), there is a strong relationship between quality, profitability and market share. Ross (2017) further reiterated that in the presence of high quality and big market share profitability is guaranteed and there was a very strong relationship between profitability and quality. Where a company's market and organization's performance is below par it may be useful to examine its product quality variables against its performance. It is within this background that this study investigated the impact of product quality on the performance of a manufacturing company.

1.4 Background of the Company/ Research Site

The company is a multinational electrical engineering company which provides products systems and solutions in the areas of automation, digitalisation and electrification.

The company manufactures air and gas insulated switchgears and medium voltage outdoor systems. The company has operated in South Africa for over 150 years and plays a very important role in the country's infrastructure, economic and social development. The company has made significant contributions to the country's economy through its corporate and industrial activities in key industries such as manufacturing, mining, transportation and automotive.

Over 60% of the company's revenue is generated from the state-owned enterprises (SOE's) and Municipalities. The company's strategies are aligned to the National Development Plan (NDP) policy goals which are focused on infrastructural development, creation of employment opportunities and eradication of poverty and inequalities.

The company has developed a six-pillars framework to measure its contribution into the South African economy and society; these pillars are 1. Drive the economy, 2. Develop local jobs and skills, 3. Create value-adding innovations, 4. Sustaining the environment, 5. Improving quality of life, and 6. Support transformation. The company has embarked on a long-term commitment supporting transformation through creating employment, skills development and supporting small businesses. The foundation of the National Development Plan (NDP) policy is to create localised jobs with 90% of jobs forecasted to come from SMME's by 2030 Company A (2017).

The company has created value for the future by coming up with seven strategic principles of quality management. These principles include customer and business focus, personal commitment to every activity, check early and learn fast, real time data openness, prevention risk management and systematic improvement, quality competence for everybody and value quality manager as a business team member Company A (2017).

Various functions were selected to form part of the study within the factory. The factory manager is responsible for the entire Low and Medium voltage factory. The operations manager is responsible for engineering, quality, production and logistics departments. The quality department consists of quality management which is responsible for the Quality Management System (ISO 9001). The head of Quality Management reports to the factory manager while the head of quality control reports to operations manager. On the other hand, the subcontractors at the factory serve as a support function to production and report directly to production department.

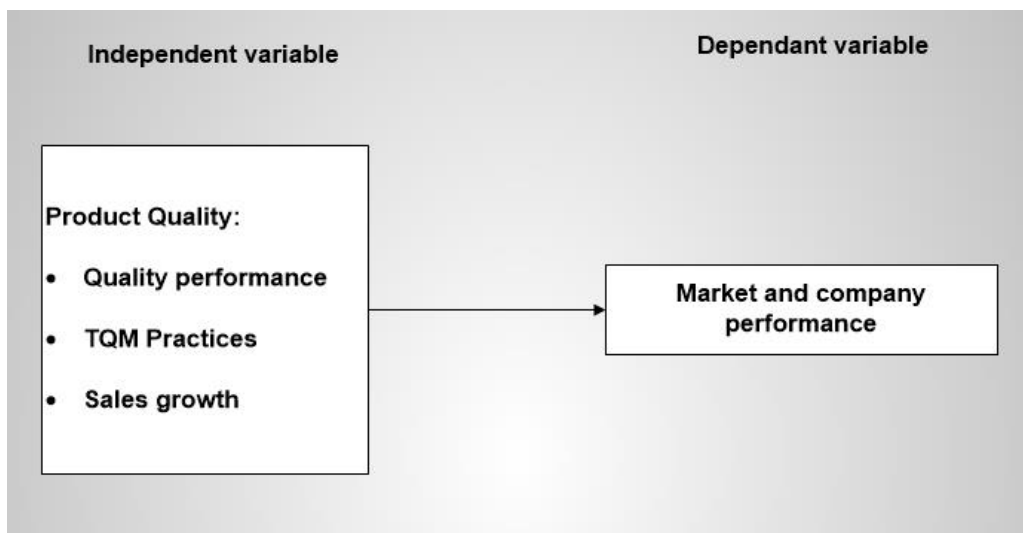
1.5 Problem Statement

Based on data derived from the company between 2014-2017, the number NCC's and NCR's was high. This raises concern regarding the quality of manufactured switchgears used for various industrial applications and the company performance. Lack of intervention might constrain in the company's ability to retain existing customers and attract further trading opportunities. The study aimed to investigate the impact of product quality on company performance.

1.6 Conceptual framework

The following is the conceptual framework in figure 1 provides the basis of literature and it serves as a map of the key considerations of the study. The framework below consists of Independent variables and the dependent variable.

Figure 1: Theoretical Framework



Source: The researcher

The given theoretical framework is a demonstration that product quality factors play a role in market and financial performance of an organisation. These factors are quality performance of products, application of Total Quality Management Practices and sales growth as an indication of market performance. These factors are important as predictor variables and key in establishing an understanding of the IV (Independent Variable) and DV (Dependent Variable). Further analysis and justification of this theoretical framework is given in chapter two of this dissertation.

1.7 Research objectives

- To contribute new insights about product quality and company performance to the research fields of operations management and manufacturing.
- To explore product quality performance in relation to company market and financial performance
- To investigate and discuss the impact of product quality on market and company performance
- To identify and analyse the perceptions of product quality and manufacturing performance in an organizational context.

1.8 Importance and benefits of the proposed study

Over and above the research objectives of this study there are some reasons why it is important and how it can add value to the practice of product quality management. The following are the benefits of the current study:

- Identification of possible root causes of poor quality of manufactured products
- Propose quality improvement strategies and solutions to the existing problems
- Propose better methods of improving the quality of products
- Suggest methods of implementing quality awareness culture in the factory
- Identifying necessary skills that can help in improving quality of products in a manufacturing environment and
- Identify factors that will help the company improve its manufacturing performance

1.9 Delimitations

1.9.1 Delimitation (scope)

The study was limited to a single company which is a factory situated in Gauteng. They were fourteen interviewee participants in this study.

1.10 Literature review

The literature is discussed in chapter 2 and covers aspects related to history of quality, quality performance, market and financial performance, product quality, TQM practices and quality culture and quality management in manufacturing. These topics are mainly used within the study to emphasize the main objectives of the study.

1.11 Research design

The research study used a qualitative approach. According Bryman and Bell (2014), one of the biggest challenges of qualitative research is lack of transparency with regards to sampling since it is difficult to establish how many interviewees are selected.

Grounded theory was used to process data. The researcher was faced with the challenges of retrieving reliable and quality data from the company due to restructuring that was taking place at the time of the study.

The researcher also believes that the selected population was suitable and gave a positive contribution to the study.

1.12 Data collection

Data was gathered through semi structured interviews. Some participants were emailed questionnaires and given the opportunity answer questions provided. According to Bryman and Bell (2014) in a semi structured interview the researcher asks a set of questions on specific topics of the study. Depending on how the interviewee understands the question a response will be provided.

Initial contacts were made, and appointments were secured with participants. The questionnaires were administered to participants prior to interview to allow them to prepare. The participants were informed by the researcher about the purpose of the interview. A letter of consent agreement granting participation to conduct the study was given to participants. Emailed questionnaires were completed and returned to the researcher for further processing.

1.13 Research Procedure

For this study, theoretical sampling and saturation was used. In theoretical sampling, data is collected through observing, interviewing and collecting documents until saturation has been reached. Once saturation has been reached the researcher generates hypothesis from data collected. The process of theoretical sampling consists of 1. General research question, 2. Sample theoretically, 3. Collect data, 4. Analyse data, 5. Theoretical saturation and 6. Generate hypothesis Bryman and Bell (2014).

1.14 Sample size

The study was focused on qualitative research and data was collected from interviews and data gathered from the company. The interview process relied on a saturation process which indicated that enough information has been gathered from data collected.

The company is a global organization that consists of a population of about 1400 employees in South Africa. The study was conducted at the factory which is situated in Gauteng with a total population of about 120 employees. A sample size of 14 employees was used from the factory population of 120 employees since the researcher only targeted knowledgeable and experience participants for the study.

1.15 Sampling strategy

The study used convenience sampling due to of accessibility of the of the participants and the organizational context in which the study was conducted. The context of the organization allows for learning, has intensive quality focus and this enables most employees to have good knowledge of the topic of this study and its associated questions. Sampling strategy according to Bryman and Bell (2014) is easily accessible and available to the researcher.

The study used a convenience sampling technique in which those members of the population accessible to the researcher are selected as participants of the study. Convenience sampling technique are non-probability sampling techniques which are normally used in qualitative research Bryman and Bell (2014)

1.16 The study population

Population which formed part of this study was from a multinational engineering company situated in Gauteng and consisted mainly of Factory Manager, Business Administration Manager, Engineering Manager, Production Manager, Quality Manager, Project Commercial Managers, Project Managers, Order Managers, Engineers, Section supervisors, Technicians and Procurement Manager. The study targeted employees who have been working at the factory for longer than 2 years. Valuable information was obtained from the selected sample of the population since it was knowledgeable, experienced and understood daily operations of the business with regards to quality practices, product management and overall business performance.

1.17 Data analysis method

The study data analysis technique was based on the grounded theory. Grounded theory according to Bryman and Bell (2014) relates to collecting data and systematically analyse it through a defined process. Grounded theory uses tools such as theoretical sampling, coding, theoretical saturation and constant comparison to process data. The researcher used transcripts from data collected during interviews and coded them according to theoretical significance.

Depending on the concept or suitability of theory, data is coded through Open, Axial or Selective coding practices. Open coding- is a concept used for key words phases and sentences, Axial coding- is a set of procedures that links codes to contexts, consequences, patterns of interactions and causes Selective coding- is a process of selecting the main category and comparing it to other categories and validating their relationship. The researcher used data extracted from the

company's NCC reports and KPI's during 2014-2017 to further analyse data. Due to sensitive nature of information the company data cannot be part of this report.

1.18 Research ethics

The study was approved by NWU Ethics committee on 31 October 2018. Ethics in Commerce Research Committee (ECRC) of the North West University (NWU) is a process that intends to evaluate and confirm ethical clearance of research within a commerce context. It also focusses on advisory and training capacity. The committee processes all research requests on Masters, PHD levels and projects linked with the Faculty of Economics and Management Sciences of the NWU. According to Bryman and Bell (2014), the following ethical considerations is considered:

- The impact of data protection: in this study it was declared to participants that their contacts, names and profiles won't be published on the dissertation and, all data collected would be used for this academic s research study.
- The role of reciprocity in determining the relationship between the participants and the researcher
- Conflicts of interest and the need to declare sources of funding

Storing and collecting digital data and the practices of sharing raises concerns regarding confidentiality and other ethical related issues. Within business research the participants are informed about the principles of informed consent and the research process.

The participants were given informed consent letter which is attached on annexure. All data related to this study was handled in an ethical manner to ensure privacy of all participants.

1.19 Research instrument

A pre-developed introductory questionnaire consisting of 14 questions was used to steer discussions during data collection. On the other hand, an interview protocol consisting of 9 questions was also developed to addressing the following research objectives:

- Determine product quality performance and manufacturing performance
- Determine the impact of product quality on market and company performance
- Establish perceptions of product quality and manufacturing performance

1.20 Outline of Mini-Dissertation

Chapter 1: Nature and scope of the study- It introduces the research background and the research topic. It also presents the problem statement, research objectives and the research question. This chapter also entails the chapter outline of this dissertation.

Chapter 2: Literature review- It gives provides an in-depth analysis of key concepts related to quality, quality performance, culture and challenges within manufacturing. On this chapter the history of quality is revisited briefly and the role of quality advocate organisations is discussed.

Chapter 3: Research Methodology-It indicates the methodology used to conduct the research and includes: research design, instruments used, data collection and analysis methods discussion and validity of the research study. The compilation of this chapter was based on the fundamental objectives of this study and the design of the study.

Chapter 4: Results and analysis- It presents the results of the study and discussion. Analysis is provided with the results and discussions of the research.

Chapter 5: Conclusion and recommendations- This final chapter contains conclusions of the research study conducted and recommendations for possible future research study.

1.21 Chapter summary

This chapter provides a brief background description of the company, problem statement, core research question, research objectives, importance and objectives of the study, delimitations, research design, sampling, sample size, sampling strategy, the study population, data collection method, data analysis and research ethics. It concludes with an overview of the structure and gave an overview of the next chapters.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The literature covers mainly aspects related to the research problem and provides an in-depth analysis of the role of quality within a manufacturing environment. The purpose of this literature review is to provide an overview of key concepts related to quality, quality performance, culture and challenges within manufacturing.

2.2 History of quality

According to Mitra (2016), quality has been in existence for immemorial times. The ancient Egyptians have always demonstrated a commitment to quality through construction of their pyramids and the Greeks have set high standards on arts and craft which dates to the fifth century before Christ (B.C.). Such commitments to quality have subsequently affected the architectural construction of Rome as their built cities, churches, bridges and roads which continue to inspire today's societies.

In the nineteenth century where production of goods and services were predominately controlled by a single person, a group or family owned business had the responsibility of controlling the quality of goods and services through a single person, group or family. Mitra (2016) further stated that during 1920 when the second industrial revolution started with the concept of mass production, workers became skilled at operations and controlled the quality of work they produced.

The next of evolution of quality control was from 1920 to 1940, where inspectors checked the quality of a product after coming out of the production line. At this stage standards were then set and inspectors compared the quality of products against set standards. At the same period the concepts of statistical control and also known as control charts were developed and gained popularity in the United States Mitra (2016).

The next stage of quality evolution escalated during the World War II. In 1950 inspection plans and military standards were developed by the military and the American Society of Quality (ASQ). The author further stated that the philosophy of statistical quality control was embraced by the Japanese when W. Edwards Deming visited and lectured in Japan with new ideas in 1950. At that stage Japanese engineers and top management were convinced of statistical process control as means of gaining competitive advantage in the market.

The other stage of quality evolution was when J.M. Juran another pioneer of quality visited Japan in 1954 and emphasized on the strategic role played by top management in achieving a quality program. The Japanese then made a mass commitment on training and education program Mitra (2016).

Finally a study by Evans and Lindsay (2013), indicated that technology growth and increase in complexity of products, quality has been recognized as a key to global competitiveness throughout industry.

2.3 Quality

According to Mitra (2016), quality is a dynamic process associated with services, product, people and environments that meet the needs and expectations of customers and helps in producing superior value of products and services. Mitra (2016) further stated that the rationale for quality was normally found in the need to compete on global market place. Countries that compete on the global marketplace see their quality improving and those that do not, see theirs declining.

Goetsch and Davis (2014), have identified the key elements of total quality as follows:

- **Strategically based**- which indicates that companies have a strategic plan containing vision, mission, objectives and activities. Such strategic plans give companies competitive advantage in the market place
- **Customer focus**- which states that customers are driven internally through the quality of a product and externally through people, processes and environment
- **Obsession with quality**- the company is obsessed with meeting and the exceeding customer's expectations
- **Scientific approach**- meaning that employees are empowered, the approach is also used to structure work and solve problems
- **Long term commitment**- this refers to an organisation's plan about quality. This entails the short-term actions, medium term steps on quality assessment and the lifelong promise of an organisation to the customer about quality.
- **Team work**- This refers to skills, synergy and the ability of organizational members to work together in small and big production teams. This also means that effort and skills required to manage quality are the responsibility of every department.

- **Continuous process improvement**- which indicates that to grow, quality systems must be improved
- **Education and training**- which indicates that people need to be improved continuously.
- **Freedom through control**- which looks at empowering people and highlights the fact that detractors see employee empowerment as loss of management control
- **Unity of purpose**- based from history management and employees were opponents and TQ is applied as unity of purpose where wages and benefits are equally important for all and
- **Employee involvement and empowerment**- which looks at promotion of ownership culture.

2.4 Quality performance

According to Goetsch and Davis (2014), the most common errors made when starting quality initiatives are: poor leadership and senior management delegation, deployment process, narrow dogmatic approach and confusion related to education, training, awareness, skills building and inspiration. Goetsch and Davis (2014) further stated that trends that could affect the future of quality management were amongst others globalization, higher customer expectations, economic pressures and management approaches. Future quality management was characterized by total management commitment, market driven business, high commitment to leadership, basic improvement and the four quality objectives which include: customer satisfaction, cost leadership, effective human resources management and supplier integration

Total quality is an approach of engaging in business through maximization of company's competitiveness and continually improving the quality of products and services, people and the environment. Goetsch and Davis (2014) further argued that total Quality success was affected by inappropriate leadership for quality, lack of customer focus, no planning for quality, inappropriate human resources (HR) development and inappropriate leadership for quality. Companies positioning themselves in the global market place through total quality see their business grow and those that do not see theirs decline. Goetsch and Davis (2014).

According to Colledani, Horvath & Angius (2015), product quality performance was affected by excessive production lead times. The introduction of production control policies could however help in directly control lead times and improve results. A research study conducted by Parvadavardini *et al.* (2016), indicated that there was a positive relationship between quality performance, quality management practices and financial performance.

Studies by Valmohammadi and Roshanzamir (2015) indicated that performance of a company was directly impacted by total quality management and culture. The authors highlighted the fact that management should be aware of cultural differences within companies as they impacted on total quality management and performance.

According to Price (2017), the enemy of quality resided within the manufacturing company and the outcomes of quality were affected by internal behavior. The author indicated that people needed to be developed to help the company grow. To make things happen management needs to create high positive energies, talent development and motivation. The author further indicated that successful companies focused on creating partnerships between people at various levels internally and different operations globally. To increase efficiency in company everyone should pull in the same direction as this is more likely to result in motivation, prosperity, happiness and pride.

2.5 Market and financial performance

According to O'Neill *et al.* (2016), to satisfy customers and meet their requirements, manufactures need not only to improve their performance but to also ensure their products are of a better quality and delivered at shorter lead times. O'Neill *et al.* (2016) further reiterated that due to tough competition, customers would become kings and never allow inferior products. It is time that businesses refocus their direction by moving away from cutting manufacturing costs and start responding to customer needs. Lack of flexibility of business and failure to detect weaknesses in some business areas will result in poor performance and financial losses.

According to Jacobs, Kraude, & Narayanan (2016), an increase in operational productivity might increase current profitability but will also expose the company to risks if resources like machines and employees that are over utilized. Operational productivity includes several inputs such as labor, facilities, inventory and equipment which are managed by operational managers to maximize the company's outputs. The authors reiterated that input efficiency does not guarantee financial success however it is a critical component of financial performance in manufacturing companies.

According to Wang, Dou, Zhu, & Zhou (2015), innovation, information and relational capabilities were direct contributors to the company's market and financial performance. Companies with appropriate dynamic capabilities often create superior market value since collaboration leverages Company's capability in innovation, information and relationship management for value creation and sustainable competitive advantage. Kroes and Manikas (2014) indicated that a company's cash flow policy that manages working capital was directly linked to operations. Belekoukias,

Garza-Reyes & Kumar (2014) further reiterated that elimination and prevention of quality defects positively contributed to quality, speed, dependability and cost performance of companies.

2.6 Product quality

According to Black and Kohser (2017), manufacturing is an action of making goods and services to satisfy the human wants and needs. Value in manufacturing is obtained through application of physical and mental labor. The system converts inputs into products intended for customers. Black and Kohser (2017), indicated that goods were material or tangible items while services were non-tangible items that customers could buy to satisfy their needs, desires or wants e.g. transportation, education, banking, financial, health services etc. These goods were manufactured through fabrication or processing. Fabrication consists of manufacturing of a product from raw materials such as parts, assemblies or components.

According to Hartley (2017), competition is needed as it forces business to focus on the reason for their existence. When competition promotes focus and constant persuasion of an organisation's mission it is a favorable form of competition. Business profitability is dependent on having the right product on the market at the right time. On the other hand, company performance was dependent on having world class, reliable and marketable products that satisfied customer needs. Hartley (2017) further indicated that to achieve product quality management needs assure the following:

- Manufacture products that customers will be prepared to pay for
- Make products available to the market on time without exceeding costs
- Have flexible products that are easy to manufacture and modify
- Have products that are easy to design and assemble

According to Hill (2017), productivity is a measurement of a relationship between inputs (labor, resources, capital and raw material) and outputs (products or services) capacity utilization, expense rates, production methods and process technology.

2.7 TQM practices

According to Ross (2017), Total Quality Management (TQM) is an integration of all processes and functions within a company with the aim of achieving continuous improvement and customer satisfaction. The author further indicated that total quality management was a system approach which interacted with several elements of a company. A company system consisted of

subsystems which were all functional elements that constituted life cycle of a product. The functional elements were design, planning, manufacturing, dispatch and customer service. These subsystems were managed through customer focus which used quality tools and involved employees.

The current global market challenges requires companies to put additional measures for survival through cost reduction and quality improvement. Ross (2017) identified the themes related to total quality management as:

- **Cultural change**- aimed at customer focus through employee involvement, ethical behavior and the spirit of continual improvement
- **Enablement of tools of change**- use of tools such as education, training, recognition, communication, team work, management behavior and customer satisfaction programs
- **Cost if quality**- aimed at measurement of quality failures quality process monitoring
- **TQM implementation**- aimed at defining the mission of the company, outputs, customers, understanding and communicating customer requirements, develop supplier specifications that take into consideration customer's objectives and determination of plans to achieve such objectives
- **Management behavior**- aimed at encouraging management to act as role models, use of quality mechanisms and processes, fosters communication, feedback and supportive working environment

According to He, Lai, Sun & Chen (2014) supplier integration has a positive impact on product performance on global industries.

A study by ReVelle (2016) in order to survive in the new market conditions companies need to be agile. An agile company can reorganize its workforce, management, facilities and its operations and customise products that satisfy customer and new market needs. An agile company has the following capabilities:

- **Strategic**- able to fragment big markets into small ones and in this way respond efficiently to the needs of different customer groups within a market.
- **Competition**- it manages competition through insight from customer perceptions and product experience or feedback. An agile company encourages feedback and designs products with high involvement of the user.

- **Production**- this refers to making products based on market requirements and specifications. Products should be adaptable, repairable and be able to function with other products especially if they are tech-based.
- **Design**- It designs solutions that customers are prepared to pay for based on the value of the product and its ability to address a customer's need. This also entails designing what the customer wants and based on customer's feedback.
- **Organise**- It is proficient, responds and adapts quickly to changes, it is a company that is dynamic and embraces technological principles in production and quality management.
- **Exploit**- It constantly scans the environment to score from the technological opportunities that arise and to constantly utilise any gaps in the market e.g. under supply of certain solutions.
- **Leverage**- It assess its resource capabilities both locally and globally. This kind of a company looks at partnerships, supplier development and improving its own supply chain environment.
- **Work**- it encourages the spirit of entrepreneurship, creativity and new ideas. The work environment of an agile company is risk tolerant and encourages input from employees at all levels.
- **Partnership**- strategic partners are identified by an agile company and resource capabilities are developed in partnership arrangements.

ReVelle (2016) further stated that as radical changes were happening in the 21st century, companies need to maneuver rapidly in every aspect of business environment which also include the manner of producing goods and services.

2.8 The quality Gurus

According to Ross (2017), the causes of poor quality as believed by the pioneers of quality management are systems. Deming a pioneer known for developing a system of statistical quality techniques in Japan from early 1950's has developed a philosophy that begins with top management and insists that companies need to adopt the 14 points of his system at all levels. To achieve excellence quality must be built into the product at all levels.

Deming's 14 points as cited by Ross (2017) include the following:

1. **Create consistence of purpose with a plan** - It aims at consistence to of purpose for continuous improvement. Uncompromised commitment to quality needs to be maintained by top management. Quality instead of short term profit should be the heart of the company's purpose. Quality will follow when becomes the objective and purpose
2. **Adopt the new philosophy of quality** - The recent times demand continuous increase in quality to survive global competition. Poor workmanship, inferior materials, poor service and defective products need to be rejected. Defects must be eliminated instead of reducing them. The new quality culture must reflect a commitment to quality and be supported by all employees
3. **Cease dependence on mass inspection** - Quality cannot be inspected in, it must be built from the start. Defects discovered during inspection cannot be avoided. Effectiveness and efficiency have been lost as continuous process improvement. Continuous process improvement reduces costs that incurred and were supposed to have been avoided at the first place
4. **End practice of choosing suppliers based on price** - Least cost is not necessarily the best one. Buying from supplier based on low cost rather than a quality. Cost basis defeat the need for long term relationship. Supplier evaluation on quality needs to be done through statistical tools.
5. **Identify problems and work continuously to improve the system** - Continuous improvement is always about looking for tools of improvement. Improvement is a never-ending journey that results from studying a process and not a not defects found during the inspection
6. **Adopt modern methods of training on the job** - Training is aimed at teaching employees the best methods to achieving quality and the use quality tools like statistical quality control
7. **Change the focus from production numbers from quantity to quality** - The production focus on volumes instead of quality results in defects and reworks and often results in inferior quality of products at higher costs
8. **Drive out fear**- Employees need to feel secure so that quality can be achieved. Fear of reporting problems, asking questions, suggesting will the needed spirit of openness

9. **Break down barriers between departments** - This result when employees perceive themselves as specialists in a certain area or department without considering other areas which results in barriers between departments. Productivity and quality can be achieved when there is coordination, open communication based on company goals
10. **Stop requesting improved productivity without methods to achieve it** - Continuous improvement should replace motivational or inspirational slogans, exhortations, signs and workforce targets. The root cause of lower productivity and quality is management systems and not employees. Employees get frustrated when tasked to achieve results that management system prevents them from achieving
11. **Eliminate work standards that prescribe numerical quotas** - Focus on quotas may encourage and reward people for numerical targets at the expense of quality.
12. **Remove barriers to pride of workmanship** - A major barrier to pride of workmanship is a merit or appraisal system based on quotas and targets. Appraisal system which attempts to affect performance needs to be replaced by systems that aim to overcome obstacles because of inadequate material, training or equipment
13. **Institute vigorous education and training** - Training should not only be emphasised on job methods but also on tools and techniques of quality control, team work and quality culture
14. **Create a structure in top management that will emphasise the proceeding 13 points every day** - Transformation in management style and structure is needed to establish quality culture in a company

Duran as cited by Ross (2017), Promoted the concept known as managing business process quality, a method used for execution of quality improvements. Duran is a quality Guru known for promotion of concept know as Managing Business Process Quality which is a method used for execution of quality improvement.

Duran's ten points of improvement are as follows:

1. **Build awareness of opportunities to improve:** this refers to Internal communication and training of teams on quality and improvement.
2. **Set goals for improvement:** Goals should have specific time frames which are short, medium and long term.
3. **Organize to reach goals:** this entails planning, resource allocation and reporting on mile-stones.
4. **Provide training:** extensive training and skills transfer about continuous improvement is essential given the constant introduction of new tools and practices.
5. Carry out projects to solve problems: ad hoc problems arise and require joint efforts in resolving them.
6. **Report progress:** tracking of mile-stones is essential to achieving the set goals about production, quality management and continuous improvement.
7. **Give recognition:** success, discoveries, clever ideas and excellence should be recognized and even rewarded as it is necessary. This encourages teams, subordinates to expand their thinking and creativity around continuous improvement.
8. **Communicate results:** use of consultative meetings, internal circulars and reports can create transparency into the organisation's progress on continuous improvement.
9. **Keeping scores:** ratings, figures and measurements of the continuous improvement projects are essential to ensuring ease in tracing problem areas and for developing best suitable improvements.
10. **Maintain momentum:** by making annual improvement part of regular systems and processes of the company.

Philip Crosby is another quality Guru known for having achieved great commercial success through promotion of his views of quality. Philip Crosby is also known for arguing that poor quality costs companies an average of 20% of revenues which could be avoided by adoption of good quality practices.

Philip Crosby further states that quality is free because small costs of prevention will always be lower than costs of detection, correction and failure.

Crosby 14 points

1. **Management commitment-** Top management must become convinced of the need for quality and must clearly communicate this to the entire company by written policy stating that each person is expected to perform according to the requirement or cause the requirement to be officially changed to what the company and the customers really need.
2. **Quality improvement team-** Form a team composed of department heads to oversee improvements in their departments and in the company.
3. **Quality measurement-** Establish measurements appropriate to every activity to identify areas of improvement in their departments and in the company.
4. **Cost of quality-** Establish measurements appropriate to every activity to identify areas needing improvement.
5. **Quality awareness-** Raise quality awareness among employees as they must understand the importance of product conformance and the costs of nonconformance
6. **Corrective action-** Take corrective actions because of steps 3 and 4.
7. **Zero defect planning-** Form a committee to plan a program appropriate to the company and its culture.
8. **Supervisor training-** all levels of management must be trained in how to implement their part of the quality improvement program.
9. **Zero defects day-** schedule a day to signal that a company has the new standard.
10. **Goal setting-** Individuals must establish improvement goals for themselves and their groups.

11. **Error cause removal-** Employees should be encouraged of informing management of any problems that prevent them from performing error free work.
12. **Recognition-** Give public, non-financial appreciation to those who meet their quality goals or perform outstandingly.
13. **Quality councils-** Composed of quality professionals and team chairpersons, quality councils should meet regularly to share ideas, problems and experiences.
14. **Do it all over again-** Repeat steps 1 to 13 in order the never-ending process of quality improvement Ross (2017)

2.9 The Culture of Quality in Manufacturing

According to Marias (2016), defects in manufacturing process were part of the package of doing business especially in electrical assembly industry. However not identifying the root cause of problems puts productivity and quality at risk. Bellak (2016) argued that although there have been lots of efforts by companies to create quality culture, those efforts die quickly due to lack of awareness in platforms such as monthly meetings, production meetings, tool box talks, bulletins, notice boards, newsletters, intranet, etc. Management needs to set up stages towards building a quality culture. Some of the strategies to set up a stage were:

- **Stop beating the drum:** this refers to taking action steps other than issuing warning signs only.
- **Create mechanisms to collect and approve ideas:** Online surveys for suggestions and policies that encourage sharing of ideas are advisable in building a culture of quality.
- **Create a team mentality:** the mindset of team effort and working in synergy helps in getting a lot done than a situation where employees work in silos while doing more or less the same task or activity.
- **Recognize success** and people behind them and be aware of recent developments. This refers to nurturing creative talent and supporting the trailblazers in creative thinking and quality improvement.

A research study by Wu (2015) found that one of the most highlighted problems in the implementation of quality culture in an organization related to resistance to change. Furthermore, the author indicated that a little is known on how quality culture could influence quality performance of an organization. On the other hand, Evans and Lindsay (2013) indicated in their

recent study that the global, domestic markets and international competition has made global companies realize that their survival is dependent on of products and services.

Countries such as Korea and India have added huge efforts in increasing quality awareness through conferences, seminars, radio shows, advertisements and school contests. On the other hand, Brazil and Spain have engaged in publication of quality books in their respective home language and ensure easy accessibility. Furthermore several translations into Chinese and Spanish have been made, professional groups have united to form Middle East Quality Association and Business Schools offering undergraduate programs and Master's degree programs in Quality management have been established. Mitra (2016) indicated that culture motivated employees more often than ever, create a favorable work environment which results in them manufacturing a good quality product that delights the customer. The author further argued that customer perceptions were affected by internal and external factors such as corporate culture, products, services delivered and market share.

According to Wu (2015), the most common problem in quality management implementation was basically related to cultural resistance to change. Anything that breaks within the chain of quality management will affected the quality of products or services. Mitra (2016), stated that future quality management was characterized by total commitment, market driven, commitment to lead people and improvement.

According to Hartley (2017), in highly competitive environment, companies need to change their business focus by responding to customer needs. In highly competitive environment, customers were no longer tolerating even minor faults; instead they are looking for better products that are less expensive somewhere else. Harvey, Buckley, Heames, Zinko, Brouer, & Ferris (2007) highlighted the need of major change in corporate culture since it recognises future tasks and objectives to be met. The author further emphasized that cultural change has never been an easy task as it requires everyone's support. It also requires clear vision from top management and ability to give priority to achieving world class performance, clear understanding of customer needs, leadership in design and manufacturing and business competence.

2.10 Quality Management in Manufacturing

Mitra (2016) stated that future quality management was characterized by total commitment, market driven, commitment to lead people and improvement.

In addition, Wu (2015) indicated that there were four objectives that characterise the future of quality management; customer satisfaction, cost leadership, effective human resources management and supplier management. Wu (2015) further indicated that there were several obstacles towards success of total quality management such as; inadequate human resources development, lack of leadership, lack of planning, inadequate resources for quality and lack of customer focus of quality.

Quality processes- ISO 9001 has adopted process approach when developing, implementing and improving the effectiveness of a quality management system which enhances customer satisfaction through meeting customer requirements. It is therefore important for companies to understand and manage interrelated processes as a system to improve performance (ISO 9001 International Standard 2015).

A study by Oakland (2014) indicated that quality processes could be traced back through services used by any company. A process was the conversion of inputs into outputs with the aim of meeting customer's needs and expectations. Whatever we do is a process, and there is a process in every area within the company. Process inputs and outputs could be examined with the objective of identifying gaps and seeking improvements. Once a process is capable of meeting requirements, it then needs to be monitored and controlled to ensure consistence in delivering its outputs. For a company to be effective each element of a process needs to be functional since it can negatively affect performance. ISO 9001 Standard emphasizes that a process approach could be applied to all business processes through PDCA cycle and risk-based thinking. PDCA Cycle simply means- **Plan-** establish objectives and plan resources needed to deliver the product or service according to customer requirements and taking into considerations risks and opportunities. **DO-** Implement your plan, **Check-** monitor and measure the results of your processes and **Act-** take necessary actions to improve performance.

Quality assurance- As highlighted by Mitra (2016), quality is not just an individual's responsibility, it is everyone's who is directly or indirectly involved in manufacturing of goods or provides services. The author further stated that quality must not only be demonstrated on paper through written procedures, it needs to be implemented as planned. The objective of a quality assurance of a company is to assure the effectiveness of a quality management system.

Quality control- A study by Donauer, Peças, & Azevedo (2015) stated that the most important elements in manufacturing were failure analysis and improvement. The authors further indicated that this could be achieved through availability of data for analysis and use of suitable knowledge, tools and techniques for this purpose. Ngambi and Nkemkiafu (2015), argued that although quality control and inspection have a remarkable impact on cost reduction, no TQM practices have a significant impact on customer satisfaction. Munoz (2013) further argued that quality control is an effective system of coordinating quality improvement.

Quality performance- A study by Wu (2015) argued that quality performance of a company was mainly influenced by quality culture. The author further states that there is a chain effect between the quality culture and performance and any breakage in the chain could have a negative impact on quality performance. According to Evans and Lindsay (2013), TQM has changed the way companies view customers, human resources, services and manufacturing processes. Evans and Lindsay (2013) further argued that leadership played a very important role in guiding companies, creating strategic plans and gathering important data to make important business decisions. Performance excellence is according to the author an approach that resulted in delivery of improved value to customer and it also contributed to company's stability as well as improvement of the company's capabilities.

2.11 Quality, Profitability and Market Share

According to Ross (2017), there was a strong relationship between quality, profitability and market share. The author further reiterated that in the presence of high quality and big market share profitability was guaranteed and there was a very strong relationship between profitability and quality. Furthermore, the author indicated that growth was driven by profitability, quality and market share.

There were benefits related to quality such as customer loyalty, improved market share, increased stock prices, reduced service calls, higher prices and increased productivity. Success of any business requires commitment from every employer which includes includes middle management and above all top management who needs to set the stage of success Ross (2017).

Quality defects- According to Singh, Chandra & Al-Haddad (2014) power quality problems directly or indirectly affect all concerned in particular manufactures and customers. These power quality problems were mostly caused by human errors or natural conditions. Natural problems were faults, lightening, weather conditions and equipment failure while manmade problems are mainly caused by system, process or operation failure. Mitra (2016) argued that defects were associated with quality characteristics or standards of a product. The following are some areas

that quality concerns itself with and it is for these areas that all people in an organisation need to ensure quality in internal and external processes.

Costs of quality- According to He, Wang, He & Xiao (2016), one of the most important and difficult tasks in manufacturing was the optimization of product failure rate at an infant stage. Furthermore they suggested that an effective way of assessing an infant failure rate was by incorporating overall quality variation with Weibull distribution model. Jamshidi and Esfahani (2014) indicated that without efficient employees manufacturing would be faced with high priced products and low quality.

Personal competence and training- In any company employees were a critical component of a management system; hence training and education played a vital role in their performance. Implementation of education and training programs was a key successful factor for the development of employees in a company. It is therefore crucial for companies to assess job competence on a regular basis and report results as these assessments give an employer a clear guide on how to implement development plans. Implementation of E-Learning allows a huge number of employees to be trained in a cost effective manner, as it decreases costs associated with attendance and travel. Brettel, Klein & Friederichsen (2016).

Quality improvements- According to Brettel *et al.* (2016), improvements in quality occur when issues are permanently eliminated. The authors emphasized that problems arise because of imperfect processes and not from imperfect employees. Furthermore the result of his studies indicate that 85% of industry problems were caused by processes and only 15% by employees due to poor performance, hence the need for companies to focus on systems which consists of a number of processes. Mitra (2016) argued that quality improvement was a never-ending process as it minimised variability of processes and decrease nonconformities. The author further argued that quality improvement should be an objective of all companies and employees.

2.12 Conclusion to the literature review

Quality of products and services have a direct impact on the company profit, reputation and growth. It is important to understand that everyone has a responsibility towards achieving more quality in our products and services. Companies need to understand that customers are the most important assets of any business. It is therefore imperative that customer's needs and expectations be achieved through the establishment and maintenance of good quality systems that can deliver error free processes and products. Management in companies have the responsibility to establish processes that can deliver quality and create a culture of trust and learning which can ultimately contribute to performance improvement.

2.13 Summary of literature review

This chapter outlined the history of quality, quality performance, market and financial performance, product quality and TQM practices and quality culture within manufacturing. The following chapter discusses the research methodology used in this study and concludes with a summary.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Research methodology

This chapter provides the discussion of the research design and methods used to gather data. The sample, the population data collection techniques and methods are discussed. The chapter ends with a summary.

3.2 Introduction

The following section outlines data collection method, sample size and analysis, measuring instrument and data analysis. The researcher was granted permission to conduct research by the company. The conceptual framework of the methodology for this study is illustrated in figure 2 below.

Figure 2: Conceptual Framework of the Methodology Data Analysis



Adapted from source: Bryman and Bell (2014)

In this research study the data collection procedure was based on the qualitative nature of the study. Interview questions were developed, and interview participants identified based on set criteria. The data procession entailed transcribing of field notes, recorded interviews and reports read. The data analysis was done in this study following a systematic process of coding, identifying themes and extrapolating meaning based on the research questions. Results and findings are discussed with conclusions provided.

3.3 Measuring instrument

An interview protocol consisting of 9 questions was also developed to conduct the interview and addressing the following research objectives:

- Determine the product quality performance
- Determine the manufacturing performance
- Determine the impact of product quality on market and company performance

- Establish perceptions of product quality and manufacturing performance

The set of questions asked were open ended and aimed at giving interviewees an opportunity to address questions to the best of their knowledge. Responses were recorded, field notes taken, and themes identified for analysis. The set of questions that were asked are shown below on table 1.

3.4 Interview protocol

The setting of the interview process consisted of a few steps. First, questions were reviewed and passed. Second, pilot interviews were done, and revision done to the set of questions. Third, interviewees were selected by means of convenience sampling and identification based on roles in the quality management spectrum. Fourth, appointments were secured with the interviews. Fifth, interviews were done with consent read out to participants, field notes taken, and interviews tape recorded for transcription and analysis. The table 1 below shows the set of questions used in the interviews.

Table 1: Interview questions

Ref.	Questions
1	Quality can be referred to accurate dimensions, colour, reliability, delivery speed, rejection rates, product field failures, reworks etc. In your opinion how do you rate the quality of switchgears manufactured in this factory?
2	Kindly indicate the reasons for rating quality like that in question 1.
3	Manufacturing process: Taking into consideration all processes involved in the manufacturing of a switchgear, ranging from planning, engineering, incoming goods, mechanical and electrical assembly, testing to dispatch. Does the manufacturing process measure and adhere to all the aspects (accurate dimensions, colour, reliability, delivery speed, rejection rates, and product failure rates) of product quality? Kindly substantiate your answer.
4	Is the targeted performance of your department affected by the quality of the switchgears produced? Please explain how you get affected. Give specific examples.
5	Explain in your own words the reasons for good or bad product quality. How do these reasons affect the quality mentioned?
6	Do you have confidence in the existing manufacturing processes to produce quality product (accurate dimensions, colour, reliability, delivery speed, rejection rates, product failure rates) according to customer requirements? Please explain in your own words.
7	Do you think that product quality (internal rejections, field failure rates, reworks) affect the market position? How and to what extent?
8	What two things /issues would you change in your department or the current manufacturing process to enhance quality and improve performance? Do you think such initiatives would have a big impact?

Ref.	Questions		
9	In your opinion, to what extent is manufacturing performance affected by product quality? Please support/ explain your choice.		
	Not at all	Somehow affected	To a large extent

3.5 Data collection

Data was gathered through semi-structured interviews. Some participants were emailed questionnaires and given the opportunity answer questions provided. According to Bryman and Bell (2014), in a semi structured interview the researcher asks a set of questions on specific topics of the study. Depending on how the interviewee understands the question a response will be provided. Initial contacts were made, and appointments were secured with participants. The questionnaires were administered to participants prior to interview to allow them to prepare. The participants were informed by the researcher about the purpose of the interview. A letter of consent agreement granting participation to conduct the study was given to participants. Emailed questionnaires were completed and returned to the researcher for further processing.

3.6 Sample size

All participants were current or previous employees of Company A and consisted of Factory Manager, Business Administration Manager, Engineering Manager, Production Manager, Quality Manager, Project Commercial Manager, Project Manager, Order Manager, Engineer, Section supervisors Technicians and Procurement Manager.

Table 2 below presents distribution of age group and number of years employed in the company.

Table 2: Distribution of age group and number of years employed

Participants	Age group			Years in the company		
	18-30	31-40	41-65	0-5	six-10	> 10
R 1			X		X	
R 2		X		X		
R 3	X				X	
R 4		X				X
R 5		X		X		
R 6			X		X	
R 7		X		X		
R 8			X		X	
R 9		X			X	

Age group				Years in the company		
Participants	18-30	31-40	41-65	0-5	six-10	> 10
R 10			X			X
R 11			X			X
R 12		X			X	
R 13			X			X
R 14			X			X
Totals	1	6	7	3	6	5
Percentage %	7%	43%	50%	21%	43%	36%

Table 3 presents distribution by occupation. This table provides evidence on the diverse occupational backgrounds that participated in the study. Quality is an organisation wide matter and it requires resource coordination across departments. It is against this background that the interviewees were distributed across occupations, levels and departments.

Table 3: Distribution by occupation

Occupation			
Participants	Technician	Engineer	Project manager/supervisor/Manager/other
R 1			X
R 2		X	
R 3			X
R 4			X
R 5			X
R 6			X
R 7			X
R 8		X	
R 9			X
R 10			X
R 11	X		
R 12	X		
R 13			X
R 14			
Totals	2	2	10
Percentage %	14%	14%	71%

The following table shows the educational level of the participants. The technical nature of the questions asked in the interview made it important to consider the knowledge background of the

selected participants. The table 4 below shows that majority of the participants had higher education qualifications.

Table 4: Distribution by educational background

Participants	Education			
	Matric	Certificate	Diploma	Degree
R 1				X
R 2				X
R 3				X
R 4				X
R 5			X	
R 6				X
R 7			X	
R 8				X
R 9				X
R 10		X		
R 11			X	
R 12		X		
R 13				
R 14	X			
Totals	1	2	3	8
Percentage %	7%	14%	21%	57%

3.7 Data processing

Data processing was done through sorting qualitative data according in excel spreadsheet and display data in tables and graphical formats. According to Kruger (2005), theme identification is one of the most important things in qualitative research. Themes can be identified by reviewing field notes. The author further indicated that techniques such as word analysis, reading larger units, intentional analysis of linguistic features, secondary analysis and the physical manipulation of texts can be used for theme identification. Results of the research can be best represented through bar or pie chart. A study by Bryman and Bell (2014), indicated that analysis of data enables the researcher to record demographic information of the respondent and provide information related to the study.

Introductory questions

This part of the study used five Likert scale to process introductory questions see table 3-5 below. The purpose of the use of a Likert scale was to quantify some aspects of this study with regards to the questions of the study and to gather understanding of the factors of quality practices and its management. Table 5 presents introductory questions.

Table 5: Introductory questions

Questions	Strongly disagree	Slightly disagree	Disagree	Agree	Strongly agree	Rating in percentage	Rating
	Scores/Rating						
	1	2	3	4	5		
Q1	0	2	3	7	2	50%	Agree
Q2	0	3	4	7	0	50%	Agree
Q3	0	1	7	6	0	50%	Disagree
Q4	1		3	7	3	50%	Agree
Q5	0	0	0	4	10	71%	Strongly agree
Q6	2	4	6	1	1	43%	Disagree
Q7	9	1	3	1	0	64%	Strongly disagree
Q8	1	1	2	8	2	57%	Agree
Q9	3	2	6	1	2	43%	Disagree
Q10	1	5	4	3	0	38%	Slightly disagree
Q11	3	3	5	3	0	36%	Disagree
Q12	0	0	3	7	4	50%	Agree
Q13	0	2	3	5	3	39%	Agree
Q14	1	2	4	4	3	29%	Agree & disagree

Main questions

With regards to Question 1, collected data was placed in a descriptive format in excel spreadsheet where participants were asked to rate the quality of switchgears manufactured at the factory as a way of using a practical case to understand the experiences of participants with regards to quality production and total quality management practices in the enterprise. Table 6 presents the rating on Likert scale on question 1.

Table 6: Question 1 rating on perception

Question 1				
	Poor	Average	Good	Very good
Rating		X		

Question 2 participants were asked to describe the reason for rating Question 1. Responses were placed on a table and results presented on a pie chart. **Question 3** participants were asked to rate the manufacturing process of the factory. Data was place into Excel table. Table 7 presents the rating on manufacturing processes

Table 7: Rating manufacturing process

Question 3		
Rating	Frequency	Percentage
Yes	9	54%
No	5	36%

Question 4 participants were asked to rate the target performance of their department, explain how they were affected and give specific examples. Table 8 presents the rating of target performance of each individual department.

Table 8: Rating of target performance of each individual department

Question 4		
Rating	Frequency	Percentage
Yes	11	79%
No	3	21%

Question 5 participants were asked to give reasons for rating the product quality see table 3-9 and results were presented on a pie chart. Table 9 presents the product quality rating on Likert scale.

Table 9: Rating of product quality

Q5	Poor	Average	Good	Very good
Frequency	1	7	5	1
Percentage	7%	50%	36%	7%

Question 6 participants were asked to rate the level of confidence in the manufacturing process see table 3-10 and results were presented on a pie chart on the findings. The following table provides frequency regarding level of confidence in the manufacturing process and feedback on responses. Table 10 presents the frequency rate for level of confidence in manufacturing performance.

Table 10: Level of confidence in the manufacturing process

Question 6	
Level of Confidence in existing processes	
Yes	No
12	2
Frequency	Frequency
12	2
Percentage	Percentage
86%	14%
Feedback	Feedback
Positive customer feedback after FAT	Lack of training
Decent processes	Inadequate HR processes
Work according to processes and approved instructions	Lack of motivation
Self confidence	Lack of recognition

In **Question 7** participants were asked to rate the extent to which product quality affected the market position. Table 11 presents the frequency rating on the market position.

Table 11: Market position

Response	Frequency	Percentage
Yes	14	100%
No	0	0%

In **Question 8** participants were asked to indicate two things/ issues that they would change in their department or current manufacturing process to enhance quality or improve performance. Table 12 presents recommendation for performance improvement.

Table 12: Possible improvement that will enhance quality or performance

Question 8
Issues to be changed or for performance improvement
Get HR to align their processes with business strategies
Automate and digitalise internal processes such as test fields, wiring, crimping and labelling
Develop software to check incomplete test fields
Follow C2C processes
Improve production plan, procurement and engineering processes- to prevent incorrect bill of materials, missing parts and other issues
Improve quality culture
Invite customer to witness quality gates
Employ and retain skilled employees
Improve leadership at the factory
Pay employees well
Employ specialists in all departments
Look at subcontractor management
Recognise employees
Have stronger order and project management who are technically qualified
Allow sufficient time to procure critical and long lead items

In **Question 9** participants were asked to express their opinion with regards to the level in which manufacturing performance was affected by product quality. Table 13 presents the frequency on the rating of manufacturing performance and product quality

Table 13: Rating of impact of manufacturing performance on product quality

Question 9		
Impact of product quality on manufacturing performance		
Rating		
Not at all	Somehow affected	To a large extent
Frequency		
0	2	12
Percentage		
0%		
	Not doing it right the first time	Failing to check own work-ownership culture
	Lack of motivation	High rework costs
		Delivery time affected
		Components damaged or burnt during testing
		Possibility of factory closure
		Rework and ordering of wrong components
		No connection between sales and operations
		Lack of understanding
		Poor quality affects performance, jobs and finance
		Non-systematic manufacturing process results in errors, omissions, missing parts and incorrect ordering of components

3.8 Summary

This chapter outlined research methodology approach used in this study. It displayed the numbers of sample, the population and data collection techniques employed. The following section discusses results and findings.

CHAPTER 4: RESULTS AND ANALYSIS

This chapter concludes the research study and gives a summary of findings and discussions.

4.1 Introduction

According to Bryman and Bell (2014), there are several qualitative strategy frameworks used for data analysis process. The most commonly used are analytic induction, thematic analysis and grounded theory. The Grounded theory framework was applied by the researcher to conduct the research study. Grounded theory framework has been defined as a theory derived from systematically collected data through the research process. Bryman and Bell (2014).

The Grounded theory process as indicated by Bryman and Bell (2014) consists of:

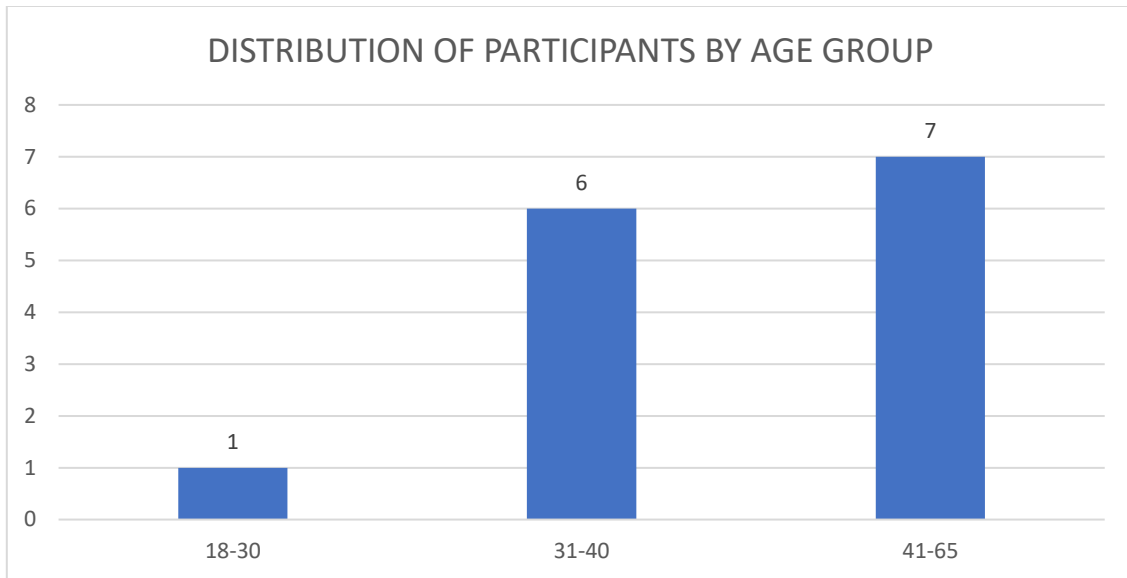
- Listening to interviews and writing notes: The data collection process was through interviews and these are systematically reported on this chapter.
- Studying written notes: notes made during interviews were used to inform transcriptions as these were official field notes.
- Create a database: all recordings and field notes are stored for reference purposes, these were used in the analysis done on this chapter.
- Coding line by line: the information and details provided by interviewees were considered to inform the development of key themes and coding on this chapter.
- Comparing codes: themes, topics and key codes are discussed and analysed on this chapter.
- Developing categories: there were many categories on this study and those applicable in this context were identified and given priority in the analysis.
- Writing memos: these served as summaries of key findings from the interviews and were mainly used to help their researcher to extrapolate meaning from the interviews within the short space of time available.

This section of the study presents results from gathered from participants on introductory and interview questions.

Distribution of the participants

The point of saturation was reached after interviewing 14 participants aged between 18 years to 65 years. The participants have an average experience of 4,67 years working for the company. The Distribution profile of participants by age group is represented in figure 3 below.

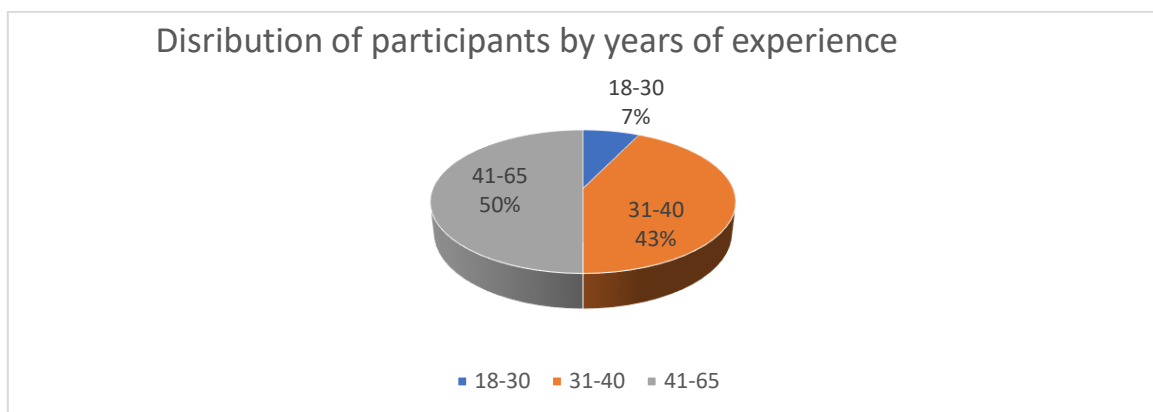
Figure 3: Distribution of participants by age group



Source: The researcher

Most participants (50%) in this study are between the ages of 41-64. The profile of participants by experience is represented in figure 4 below. Figure below presents distribution of participants by number of years working in the company.

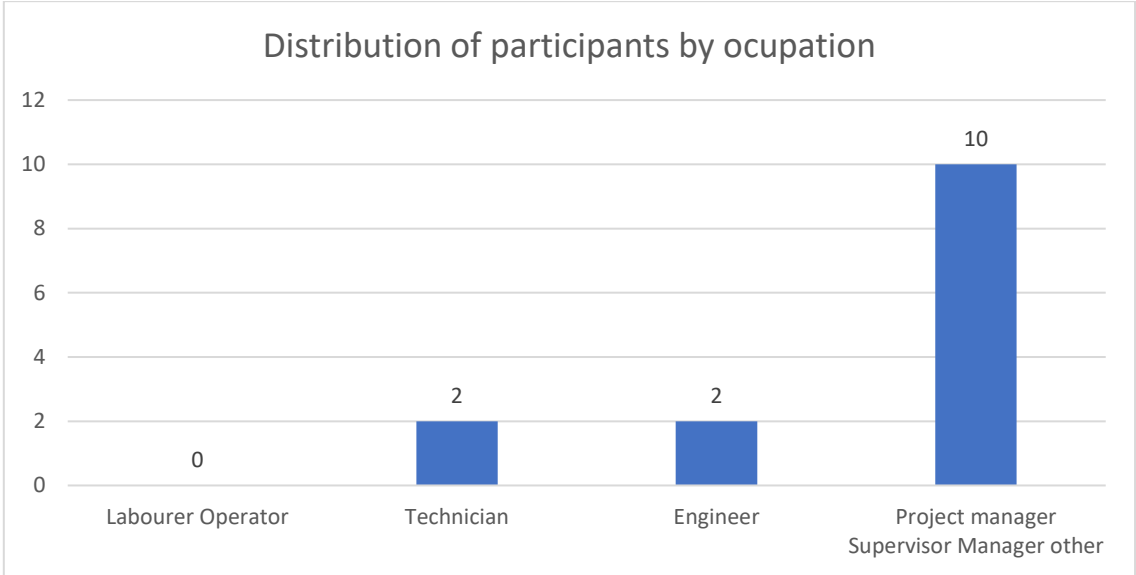
Figure 4: Distribution of participants by years of experience



Source: The researcher

Majority of participants (43%) have been working in the company for longer than 10 years. This shows their experience in the context of quality management and they were in a better position to relay their experiences to company performance and quality. The figure 5 below presents distribution of participants by occupation.

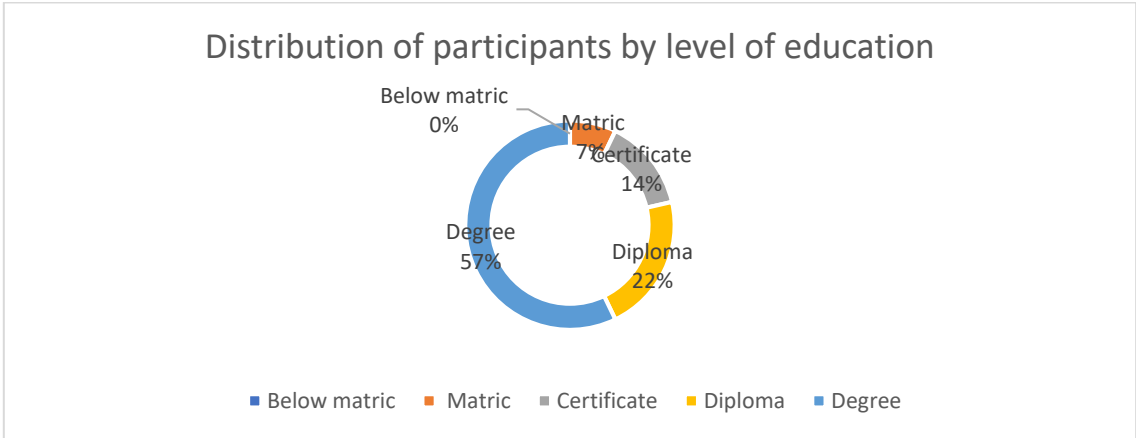
Figure 5: Distribution of participants by occupation



Source: The researcher

Majority of participants (72%) were managers, there were no participants from the operators' category. The insight provided by managers as senior decision makers on quality explained high level decision making. The problem is that this follows a top bottom approach to quality than most information coming from operators which would balance the understanding of quality through a bottom-up approach. Figure 6 below presents distribution of participants by level of education.

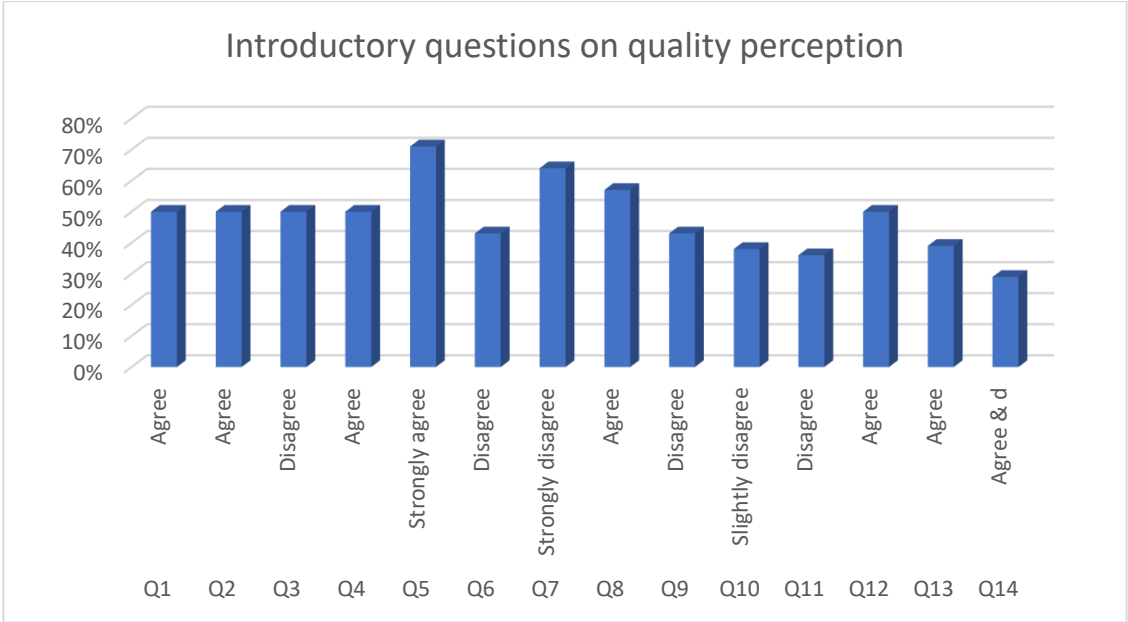
Figure 6: Distribution of participants by level of education



Source: The researcher

The educational profile indicated that majority of participants (57%) had a highest qualification of a degree level followed by diploma (22%) and Certificate (14%). There were no participants below matric level. Figure 7 presents outcomes of perception of quality within the factory based on data collected from introductory questions.

Figure 7: Introductory questions on quality perception



Source: The researcher

Introductory questions were developed to measure perception of quality within the factory environment. Figure 7 is an indication of different views that participants have on quality perception within the factory.

Themes

Various themes were identified from processing data collected in this study. Participants were interviewed on topics related to quality, manufacturing processes, target performance, level of confidence in existing processes, impact of quality on market position and market performance.

These interview questions were generated from the conceptual framework with the aim of aligning with the main objectives of the research and answering the core research question: **What is the impact of product quality on company market and company performance?**

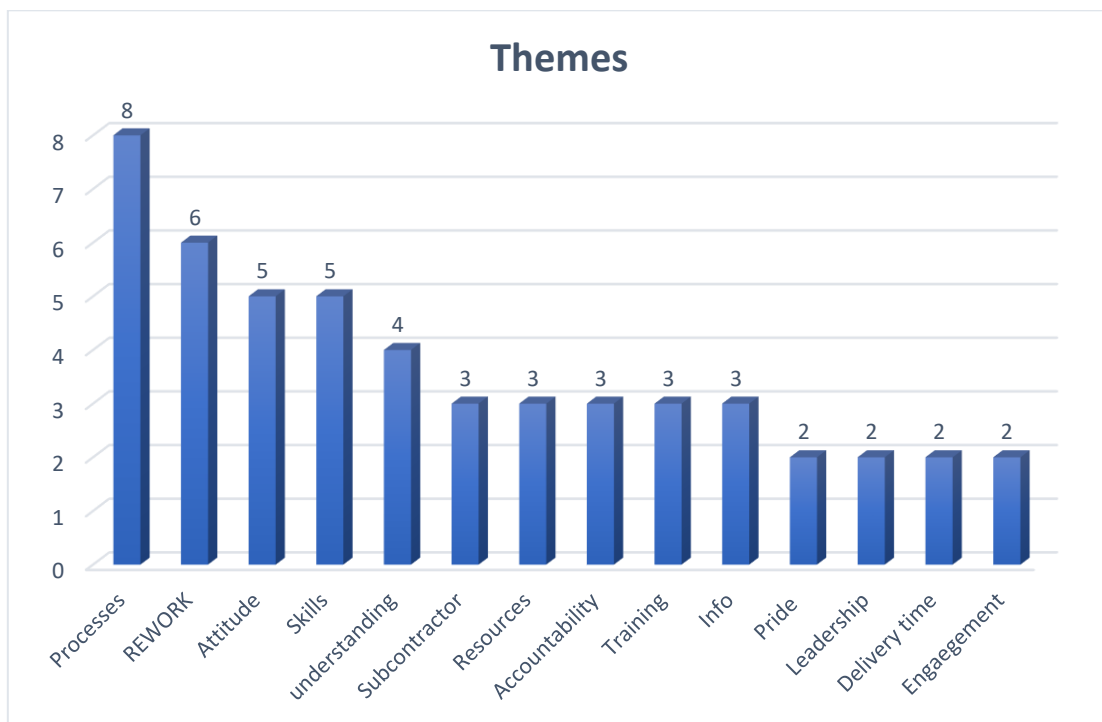
The objectives of the study are as follows:

- To contribute new insights about product quality and company performance to the research fields of operations management and manufacturing.

- To explore product quality performance in relation to company market and financial performance
- To investigate and discuss the impact of product quality on market and company performance
- To identify and analyse the perceptions of product quality and manufacturing performance in an organizational context.

Figure 8 below presents frequency of issues picked across the whole research.

Figure 8: Themes



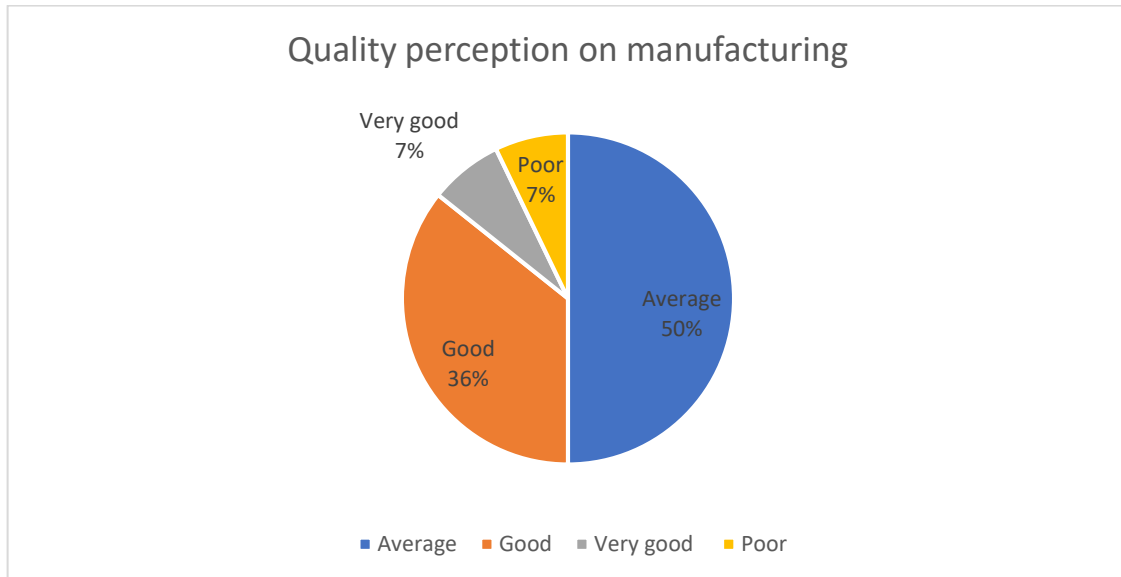
Source: The researcher

According to Bryman and Bell (2014), the aim of themes is to identify patterns and describe patterns across data. Themes above were identified during the research study conducted.

Product quality

Figure 9 below indicate the level of perception of quality product. The experiences of the respondents on production and product quality are captured on this chart.

Figure 9: Perception on quality gears manufactured



Source: The researcher

Majority of participants (50%) believe that the quality of gears manufactured at the factory are of average quality, followed by (36%) who believed that the quality of switchgears was good. On the other hand (7%) believed that the quality was very good while the remaining (7%) believed that the quality was poor. Participants who rated good based their arguments on the following:

- Employees work according to given specifications
- There was a positive customer feedback
- There was good feedback from field related operations

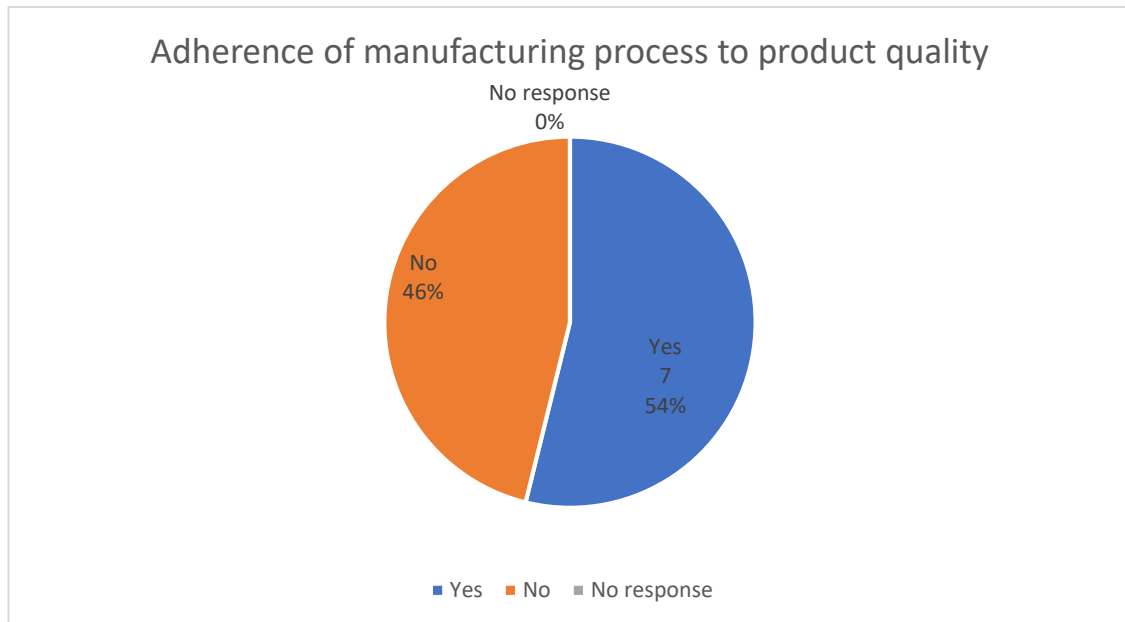
Participants who rated poor indicated the following reasons:

- High NCC costs
- Incorrect ordering of components and delays

Quality performance

Figure 10 below shows rate of adherence of manufacturing processes to product quality.

Figure 10: Adherence of manufacturing process to product quality



Source: The researcher

Majority of participants (54%) believed that manufacturing processes measured and adhered to all aspects of product quality and 46% did not believe. Those participants who indicated that manufacturing processes adhered to all aspects of product quality highlighted the following facts:

- Incoming goods process was “ok”
- There was good record keeping
- There was detailed planning
- There was a good process although not followed

Those participants (46%) who indicated that product quality did not adhere to product quality have highlighted the following facts: Incorrect ordering of materials

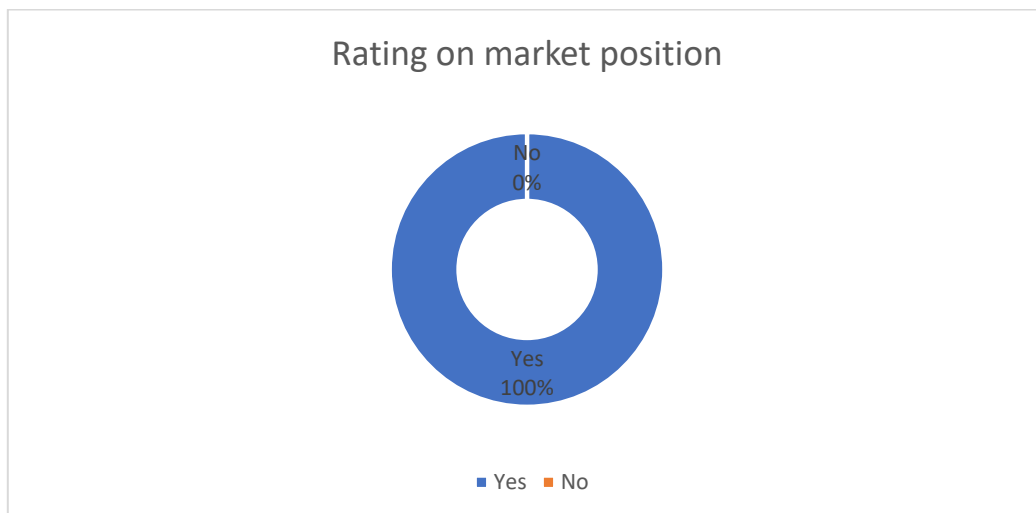
- Inadequate root cause analysis
- Lack of communication

- Lack of motivation
- High NCC costs
- Lack of understanding
- Poor leadership
- Incorrect information (drawings, BOMs)

Market position

Figure 11 below shows the rating in which product quality will affect market position. Market position refers to the ranking of an enterprise as a clients' choice in a given market.

Figure 11: Rating on market position



Source: The researcher

All participants (100%) believe that the product quality will affect the market position. The following were the reasons stated by the participants:

- Rework costs
- Delays
- Rejection during FAT
- Customer loss of trust
- Rework at customer side

- Subcontracting
- Lack of skills

Company and market performance

Figure 12 below shows the impact of product quality on manufacturing performance.

Figure 12: Impact of product quality on manufacturing performance



Source: The researcher

Majority of participants (86%) believed that manufacturing performance will be affected by product quality to a large extent and only (14%) believed that it will be somehow affected.

4.2 Discussions

The following provide discussions on themes based from main questions of this study.

Product quality

Questions, 2 and 5 required participants to explain the reason for rating of product quality manufactured in the factory in the way they did. The following were extracts from majority of participants who rated the quality of switchgears average:

“time was wasted on repetitive work, designers need to understand installation process, people are not trained on assembling and testing, time was wasted due to inappropriate instructions”

Another remarked that:

“The quality of people that inspect products is not of an acceptable standard, there is lack of pride in factory, subcontractor’s contractors contribute to average quality because they do not have pride in their work.”

And another said:

“Work is done in a rush the quality side is overlooked during manufacturing, there are lots of delays people rush to cover for lost time as a result quality is affected.”

Based on above explanation from participants the quality of the product is of an average standard. These findings corroborate with findings from previous studies conducted by Price (2017) which indicate that the enemy of quality resides within the manufacturing company and the outcomes of quality were affected by internal behaviour. To make things happen management need to create high positive energies, talent development and motivation. As advocated by Hartley (2017), product quality management needed ensure:

- manufactured products which customers were prepared to pay
- flexible products which were easy to manufacture and modify
- product availability on the market without excessive costs
- products that were easy to manufacture and design

Thus, participants are of the view that product quality is affected by lack of training, people’s attitudes, inadequate designs, lack of motivation, loss of skilled workers, inadequate equipment, lack of accountability and subcontracting.

Manufacturing processes

Questions 3 evaluated manufacturing process and **question 6** required participants to evaluate employee’s confidence in own manufacturing processes. Adherence to processes- these were responses from the participants:

“There are good processes, people just need to do it right the first time”

Another participant said:

“there are reliability issues, products just get delivered without adherence to given processes/standards, people just do tick exercises on the check sheets without checking the actual work, we have late deliveries due to supplier’s internal processes,”

Question 6 were asked to rate the level of confidence on manufacturing processes.

“Yes, I do have confidence, bad managers will affect the process and workers depend on their managers, managers need to understand the business and own the processes.”

another participant said:

“I do not believe in the existing processes as people just get employed without being trained, there were people in the wrong positions, HR does not align with business processes.”

Findings from this study indicated that majority of participants believed in the existence of good manufacturing processes, however these processes were such as customer to customer (C2C) were not followed during manufacturing. Non-adherence to product quality could have a negative impact on product quality and performance. These findings corroborate with findings from Oakland (2014) which indicated that which indicated that for a company to be effective each element of a process needed to be functional since it could negatively affect performance.

Thus, participants are of the view that manufacturing processes are good they are simply not being implemented in the factory this results in defects being picked later in the process at test stage, high product failure rate during manufacturing, inadequate purchasing of materials and incorrect bill of materials on the other hand most participants do have confidence in the existing processes and those who do not have highlighted the following reasons: lack of training, inadequate HR processes, lack of motivation and recognition.

Product quality and market position

Question 7 evaluated the link between product quality and the market position. all participants believed that in fact product quality would affect the market. The following extracts were responses obtained from participants:

“delays will negatively impact the customer, there will loss of reputation”,

“product failure is escalated through bad news vs good product, a brand is damaged by incompetent people,”

According to responses obtained from all participants product quality will indeed affect the market. Previous studies by Goetsch and Davis (2014), indicated that future quality was characterised by total management commitment to market driven business, basic improvement and high commitment to leadership. On the other hand Parvadavardini et al (2016), indicated that there was strong relationship between quality performance, quality management practices and financial performance. Wang, Dou, Zhu, & Zhou (2015) indicated that indicated that relational capabilities, information and innovation were direct contributors to the company’s market and financial performance.

Participants are of the view that product quality would affect the market for the following reasons: high costs of reworks, delays, customer loss of trust, component failure, lack of skills and use of cheap labour to cover for high NCC costs.

Performance improvement

Questions 8 Was about performance improvement where respondents were asked to indicate two things that would enhance quality and improve performance. Various issues were mentioned such as: get human resources HR to align with business processes, automate and digitalise internal processes, develop software to check incomplete test fields, follow C2C process, improve procurement and engineering processes, production plan to prevent incorrect bill of materials, missing parts and other issues, improve quality culture, employ and retain skilled workers, look at subcontractor management and allow sufficient time to procure long lead items.

Participants are of the view that change management, change of subcontracting model, improvement on quality inspection approach, alignment between engineering and procurement processes, digitalisation and automation of test field, customer involvement in internal processes, improvement of leadership style, HR processes and company culture, employment of specialists in every department, return of skilled employees, employment of new technologies, employee recognition and early planning prior to design will improve the current manufacturing process and performance.

Question 9 here participants were asked to explain the reason why the extent to which product quality would affect product quality. Majority of participants indicated that product quality would be affected to a large extent. The following were extracts from participants:

“Failing to check own work, high rework costs, lack of connection between sales and operations, lack of understanding and non-systematic manufacturing process which results in error, omission, missing parts and incorrect ordering of components”.

According to responses from participants manufacturing performance will be affected by product quality to a large extent. Failure to deliver on time due to product failure affects the customer as they also fail to meet their own objectives. Previous studies by Belekoukias et al. (2014), indicated that elimination and prevention of defects positively contributes to quality, speed, dependability and cost performance of companies.

Participants are of the view that manufacturing performance is affected by product quality to a large extent due to: failure to check own work, failure to doing it right the first time, inadequate incoming goods inspections, component failure during tests, lack of skills and non-systematic manufacturing processes.

4.3 Conclusion and chapter summary

This section of the study presented results from gathered from participants on introductory and interview questions. Details and brief analysis has been provided on the key questions of the study. These also show that quality production and market expectations are a general concern for the workforce. This an interesting indicator of organisation wide awareness and commitment to quality. However, there are areas that still fail the enterprise to realising a full quality potential. These areas include the lack of intensive involvement of lower level employees in the designing of quality strategies as workers on the floor. This is demonstrated by the low interest of general workers in participating in the study. But also, the sense of top-down approach to quality. There is a need for consultative quality management approaches and ensuring that all employees have an equal chance in contributing ideas about quality management and product improvement. The following chapter discusses conclusions and recommendations.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents conclusions of the study and recommendations. The implications, value of the study, limitations and directions for future research are included on this chapter.

5.2 Conclusion

The aim of the study was to investigate the impact of product quality performance on the manufacturing company. The findings from interviews conducted suggest an existence of a strong relationship between product quality and market and financial performance. This is also supported by Ross (2017), who also suggested an existence of a strong relationship between quality, profitability and market share. He *et al.* (2016), indicated that cost of quality was one of the most important and difficult tasks in manufacturing is the optimization of product failure rate at an infant stage. It is concluded that product quality positively affects market performance in turn affecting company performance. Companies that do well in the market have higher performances their products are perceived of a higher quality.

The product quality performance at manufacturing is average, which is the ideal standard requirement for optimum performance, positively driven by improvement on product failure rate, decrease in returns and negatively affected by reworks, lack of training, lack of experience, subcontractor management, inadequate design processes, lack of accountability, inadequate procurement processes, inadequate equipment, lack of monitoring processes, lack of management involvement, loss of skilled workers, high number of subcontractors high NCC costs, and inadequate root cause analysis (RCA) factors. The negative factors have an overpowering effect on quality performance of the products and thus are critical.

Manufacturing performance is affected product quality performance due to reworks, high NCC costs, delays, failure during factory acceptance tests (FAT) and subcontracting.

The product quality does have an impact on the market to a large extent due to failure to check own work, inadequate incoming goods inspections, inadequate procurement processes, delays, component failure, lack of skills, inadequate communication between sales and operations and non-systematic manufacturing processes. It is therefore concluded that there is a high impact of product quality on market and company performance due to reworks, high NCC costs, delays, failure during factory acceptance tests (FAT) and subcontracting.

Manufacturing performance is affected by product quality due to late placement of orders, unclear customer specifications, overpromising by sales department, late deliveries, lack of pride, poor workmanship, inadequate root cause analysis (RCA), lack of quality awareness, lack of ownership, inferior material quality, outsourcing, lack of quality culture from suppliers, inadequate planning, lack of early detection of quality problems, late deliveries, long, long lead items and reworks.

5.3 Recommendations

Companies must improve product quality in order to improve market and organisational performance. Various recommendations were raised by participants during the interview process through the following question: "What two things would you change in your department or current manufacturing process to enhance quality or improve performance?"

- Change management
- Place managers who are capable of enforcing processes
- Digitalise and automate test fields to reduce human error
- Change the model of subcontractor cost through fixed cost

Based on the study conducted the researcher would like to recommend the following:

- The company needs to review subcontractor management
- HR policies related to employment of adequate skills need to be looked at
- Old equipment needs to be replaced with the new one
- Increase supervision of trainees
- Quality awareness sessions and training need to be introduced.

Further Recommendations: Analysis Based

The above recommendations come from an interview questions. However, from an analysis position of this study, two recommendations can be made about quality improvement with regards to its impact on company performance. First is that, product quality is not an only factor that drives company performance, but it can have detrimental effect on a manufacturing company that has poor product quality. It is recommended that an organisation wide training approach on quality is

applied from training a cleaner to an expert company technician about quality. This will help build a strong culture of quality within the organisation before doing the same with the external. Although internal members of the organisation aren't the clients that buy the production they still play a key role as members of the organisation and as people who make up the organisational culture. Secondly, feedback from external clients is essential on product quality and early involvement of quality managers, procurement officers and technicians of the buying organisation is essential in picking up product errors and cutting out slack in the production process. Incentives for quality production and company performance can improve quality attainment both internally and externally which can improve company's performance financially and in the market. The involvement of over 70% of managers in quality management in the company studied is impressive however, this is still problematic as it creates a top down approach to quality which can be a challenge to get quality to the bottom group of employees in a company. Hence a bottom up quality approach would be beneficial for the company studied in this research.

5.4 Value of the study

This research study is valuable in the context of the organisation studied. It has documented interviews and experiences of ordinary members of the organisations and those of team leaders. It has provided a platform for expression about product quality and its perceived impact on overall company performance. This study if carefully read and further meaning extrapolated has a potential to improve dialogues about quality production at the company concerned. This study is not generalisable to other organisational context, but it points out a direction about quality production, management of quality and some tools that should be considered in a quality management practice specifically in a context of a manufacturing enterprise.

5.5 Implications, Limitations of the study and Directions for Future Research

This study's recommendations are that a bottom-up approach about quality production should be adopted and that more training on quality be made accessible to all members of staff in the company concerned. Failure to do this will create problems in developing a consistent culture of quality for both the internal and external clients of the company. This study was conducted in one multinational organisation in the region of South Africa. It cannot be generalisable given the sample size, but it can be replicated elsewhere to find different results or to make comparisons. Future research should investigate a larger sample and take a nature of a quantitative study that can compare quality production factors in multinational company by comparing two or more of its regions.

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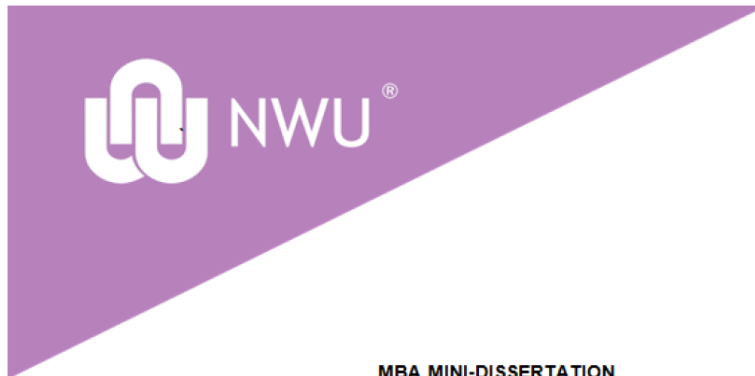
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ANNEXURES

ANNEXURE A: INTERVIEW PROTOCOL



MBA MINI-DISSERTATION

Interview Protocol

The Impact of Product Quality on the Performance of a Manufacturing Company

Dear participant:

I would like to thank you for willing to participate in the interview aspect of my study. The aim of my study is to understand, to qualify the product quality performance, determine the manufacturing performance and the impact of product quality of market and company performance.

Please note that the survey is completely anonymous and confidential. I would like to ask for permission to record the conversation. You are more than welcome to stop the recording if you want to take something off the record.

Section A: Demographics

1.1 Age group	18-30	31-40	41 -65		
1.4 How long have you been working for the company	0-5 Years	6-10 years		>10 Years	
1.2 What is your occupation?	Labourer/Operator	Technician	Engineer	Project Manager/Supervisor/ Manager/other	
1.3 What is your educational background?	Below Matric	Matric	Certificate	Diploma	Degree

Section B: Introductory Questions

Kindly tick ✓ the appropriate box or provide an answer were applicable.

Ref	Questions	Strongly disagree	Slightly Disagree	Disagree	Agree	Strongly agree
		1	2	3	4	5
1	I find information on product quality readily available at my workplace					
2	I find my manager talking more about quality than production					
3	I find my work mates more concerned about production than product quality					
4	I am quite proud to tell people that our products are of high quality					
5	I would feel very upset if I hear that the quality I produced is unacceptable to a customer.					
6	Making production is more important to me					
7	I will easily ignore quality problems if I am the only one aware of it					
8	I always highlight quality problems to my manager freely					
9	The Quality Department is too demanding					
10	Instead of competing with one another, functional groups cooperate to reach shared goals.					
11	We study the best practices of other companies to get ideas about how we might do thing better.					
12	We work to continuously improve our products and services.					
13	When problems with quality are identified, we take quick action to solve them.					
14	We invest in the development of innovative ideas.					

Section C: Interview questions

Ref.	Questions
1	Quality can be referred to accurate dimensions, colour, reliability, delivery speed, rejection rates, product field failures, reworks etc. In your opinion how do you rate the quality of switchgears manufactured in this factory?
2	Kindly indicate the reasons for rating quality like that in question 1.
3	<p>Manufacturing process: Taking into consideration all processes involved in the manufacturing of a switchgear, ranging from planning, engineering, incoming goods, mechanical and electrical assembly, testing to dispatch.</p> <p>Does the manufacturing process measure and adhere to all the aspects (accurate dimensions, colour, reliability, delivery speed, rejection rates, and product failure rates) of product quality? Kindly substantiate your answer.</p>
4	Is the targeted performance of your department affected by the quality of the switchgears produced? Please explain how you get affected. Give specific examples.
5	Explain in your own words the reasons for good or bad product quality. How do these reasons affect the quality mentioned?
6	Do you have confidence in the existing manufacturing processes to produce quality product (accurate dimensions, colour, reliability, delivery speed, rejection rates, product failure rates) according to customer requirements? Please explain in your own words.
7	Do you think that product quality (internal rejections, field failure rates, reworks) affect the market position? How and to what extent?
8	What two things /issues would you change in your department or the current manufacturing process to enhance quality and improve performance? Do you think such initiatives would have a big impact?
9	In your opinion, to what extent is manufacturing performance affected by product quality? Please support/ explain your choice.

ANNEXURE B: INFORMED CONSENT LETTER

INFORMED CONSENT for participation in the study

Date: August 2018



Private Bag X6001, Potchefstroom
South Africa 2520
Tel: 018 299-1111/2222
Web: <http://www.nwu.ac.za>
NWU School of Business & Governance
RESEAECHER: C.MASINDI
St No. 23921099
<http://commerce.nwu.ac.za/business-school>

Dear participant

You are invited to participate in a research study conducted by Cells Masindi. The purpose of this study is to quantify the product quality performance, determine the manufacturing performance and assess the rate of the impact of product quality on manufacturing performance as a partial fulfilment of the Master of Business Administration degree.

The information below provides you as respondent with clear information related to the research project. This allows you to make an informed decision as to whether you would like or not to take part in this study.

Title of the Project: The impact of product quality on the manufacturing performance of a company

Institution: North West University Business School.

Ethics Reference Number: NWU-00748-18-S4

Benefits of the study:

- Identification of possible root causes of poor quality of manufactured products
- Propose quality improvement strategies and solutions to the existing problems
- Propose better methods of improving the quality of products
- Suggest methods of implementing quality awareness culture in the factory
- Suggest better methods of managing subcontractors
- Identifying necessary skills that can help in improving quality of products in a manufacturing environment and

Declaration by participant:

By signing below, I agree to take part in the research study titled: **An Assessment of the Impact of Product Quality on the Manufacturing Company Performance.**

I declare that:

- I have read this information/it was explained to me by a trusted person in a language with which I am fluent and comfortable
- The research was clearly explained to me
- I have had a chance to ask questions to both the person getting the consent from me, as well as the researcher and all my questions have been answered
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part
- I may choose to leave the study at any time and will not be handled in a negative way if I do so
- I may be asked to leave the study before it has finished, if the researcher feels it is in the best interest, or if I do not follow the study plan as agreed to

Signed at (*place*) on (*date*) 20....

.....

Signature of participant

.....

Signature of witness

Declaration by researcher:

I C. Masindi declare that:

- I have explained the information in this document to all participants, including (respondent to fill in his/her name).
- I did not use an interpreter
- I encouraged him/her to ask questions and took adequate time to answer them or I was available should he/she want to ask any further questions
- The informed consent was obtained in the presence of an independent person
- I am satisfied that he/she adequately understands all aspects of the research, as described above
- I am satisfied that he/she had time to discuss it with others if he/she wished to do so

Signed at on August 2018

.....

Signature of researcher

.....

Signature of witness

ANNEXURE C: ETHICAL CLEARANCE LETTER APPROVAL LETTER



Private Bag X6001, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Web: <http://www.nwu.ac.za>

Economic and Management Sciences Research
Ethics Committee (EMS-REC)
Tel: 018 299-1427
Email: Bennie.Linde@nwu.ac.za

31 October 2018

Prof SP van der Merwe
Per e-mail

Dear prof van der Merwe,

FEEDBACK – ETHICS APPLICATION: C MASINDI (23921099) – MBA

Your application for ethical clearance – *The impact of product quality on the performance of a manufacturing company* – has been evaluated on the 26th of October 2018.

Outcome:

The application is approved as a low-medium-risk study.

Ethics number (A):

Yours sincerely,



Prof B Linde
Chairperson: Economic and Management Sciences Research Ethics Committee (EMS-REC)

Original details: (11153431) C:\Fakulteit\Bestuur\Kwaliteitsbestuur\Etik\26 October 2018\C Masindi\26 October 2018

File reference: 9.1.5.3

ANNEXURE D: EXAMPLES OF EXTRACTS OF TRANSCRIPTIONS

	Q1: How do you rate the quality of switchgears manufacture in the factory	Q2: Kindly indicate the reason for you rate in question 1
R1	Average	Peoples attitude contribute to poor quality Designs were not properly done There is lack of understanding between what is being manufactured and the design
R2	Good	Outsourced processes do not adhere to specifications Test results are always cooked Product failures get picked out later in the process
R3	Good	There are no reworks on site except for legacy projects
R4	Good	Our products look good. There were issues on the previous panels installed on site

ANNEXURE E: CERTIFICATE OF ENGLISH EDITING



ABC SOLUTIONS

ACADEMIC AND BUSINESS COACHING SOLUTIONS

ADDRESS

WEST END BUILDING
3RD FLOOR, OFFICE 30310
51 LEASK STREET
KLERKSDORP, 2670

CONTACTS

C : 073 700 0192
D : 083 536 6821
E : MAKETHEMUC@YAHOO.CO.UK
W : WWW.CALLINKINVESTMENTS.CO.ZA

Monday, 19 November 2018

CERTIFICATE OF ENGLISH EDITING

To whom it may concern

This is to certify that the mini-dissertation with the title THE IMPACT OF PRODUCT QUALITY ON THE PERFORMANCE OF A MANUFACTURING COMPANY, to be submitted by CELLS MASINDI (23921099), to the NORTH-WEST UNIVERISTY, has been edited for language by ABC Solutions, a division of Cal Link Investments. Neither the research content nor the author's intentions were altered in any way during the editing process.

ABC Solutions guarantees the quality of English language in this paper, provided our editor's changes are accepted and further changes made to the paper are checked by our editor. The referencing and sources were checked, as far as was possible, as per the university's referencing guidelines. The final corrections and adjustments remain the responsibility of the author.

Callen W Maketshemu (MBA, DME, MACP)

Lead Academic and Business Coach, ABC Solutions

Cell: +27 73 700 0192/066 237 0561

Mail: maketshemuc@yahoo.co.uk

ANNEXURE F: PROOF READING

Michael Sizwe Mkwanzazi, Mr

26 Winchester Rd, St Antony's College, University of Oxford

Oxford, OX2 6JF

sizwe.mkwanzazi@education.ox.ac.uk

+44 7902 360 998

20 November 2018

TO WHOM IT MAY CONCERN

RE: PROOF READING OF A MANUSCRIPT TITLED – ‘THE IMPACT OF PRODUCT QUALITY ON THE PERFORMANCE OF A MANUFACTURING COMPANY’

This serves to confirm that I have offered to proof read and give feedback on the readability of the above stated manuscript. I completed the reading of the manuscript. The following was pointed from my side.

- The abstract could be improved by ensuring that it represents the different chapters of the study and that it tells a single story of the document.
- Missing abbreviations be added as some abbreviations were on the manuscript but not on the table recording the abbreviations. The abbreviations had to be organised in alphabetical order.
- Chapters 1, 3 and 5 needed some extension as they did not a complete story in terms of key concepts and the thread about product quality vs company performance. Chapter 5 did not indicate the implications of the study, limitations and directions for future research.
- Standard formatting of tables, graphs and captions was identified as essential.

If the above changes and those tracked on the document are taken into consideration the manuscripts quality and overall readability will improve as well as the subject matter. For further inquiries I can be reached on the contact details indicated on the letterhead.

Kind regards



Sizwe Mkwanzazi

DPhil Education Candidate

University of Oxford United Kingdom

[NDip., BTech., PGDip., MTech. (cum laude), MSc.]

20.11.2018