DURBAN UNIVERSITY OF TECHNOLOGY

QUALITY MANAGEMENT INITIATIVES ON PRODUCTION LEVELS, QUALITY AND STAFF PERFORMANCE OF A MANUFACTURING COMPANY

DEROSHA MOODLIER

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Abstract

In the context where customers around the world become so demanding, manufacturing operations focus on performance, availability, usability, scalability, effectiveness, and efficiency among other things; customer centric approaches are explored by companies to satisfy their customersTherefore, in light of limited resource availability, the ever-changing market demands, and the necessity for organizational competitiveness in a globalized world, enhancing operational processes is fundamental for modern businesses. This entails the continuous improvement and adaptation of firms to sustain productivity and meet customer satisfaction. This study aims to assess the influence of quality management initiatives on production, quality, and personnel performance. The study utilises a mixed-method research approach where the general process is to identify in a problem, determining research questions, collecting data, analysing qualitative and quantitative data, and interpreting results. The study finds that the quality initiatives taken by the business influences all the dependent variables “production, quality, and personnel performance”. Thus, customer feedback is always critical the organisation in improving quality. In addition, customer strategy has been designed to focus on customer needs and delivery of products/services beyond customer expectations. The results also indicate that there is consistent communication between the company and customers, and all employees behave in ways that show the importance of customers to satisfy customers’ needs and expectations. Lastly the results show that there is a considerably higher than the average production rate before implementation of quality initiatives. Based on these results, the researcher recommends revisiting the managerial decision making process with regard to the selection and implementation of quality management initiatives. The company should continue to provide resources for employee re-education and training and train the majority of its staff on how to apply quality improvement techniques. The company should promote serviceability to support the system and maintain the business resilience with regards to taking corrective and preventive actions.

Keywords: Performance, Quality, production, quality management initiatives, performance, customer satisfaction, feedback, responsiveness, training, information analysis.

DECLARATION

I wish to declare that this study “Quality Management Initiatives on Production Levels, Quality and Staff Performance of a Manufacturing Company” was carried out by me and submitted in fulfilment of the requirement for MPhil (Quality) at the Department of Quality and Operations Management, at the Durban University of Technology. I hereby confirm that this study is my original work which has not been submitted to any university.

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Table of Contents

LIST OF ABBREVIATIONS

QMI: Quality Management Initiatives

CSFs: Critical Success Factors

KPIs: Key Performance Indicators

ISO: International organisation for Standardisation

GDP: Gross Domestic Product

Stats SA: Statistics South Africa

KZN: KwaZulu-Natal

PDCA: Plan-Do-Check-Act

TQM: Total Quality Management

DMAIC: Define, Measure, Analyse, Improve, and Control

A3: A standard paper size

8D: eight disciplines

PONC: Price of Nonconformance.

6 C's: Comprehension, Commitment, Communication, Competence, Correction, and Continuance.

CFI: Corporate Finance Institute

SPSS: Statistical Packages Social Sciences

FEED: Feedback

FOC: Focus

INFO: Information

MAN: Management.

TED: Training and education

RES: Responsiveness to customers

PP: Personal Performance.

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

The essence of contemporary business operations revolves around enhancing operational processes, taking into account the challenges posed by limited resource availability, the dynamic nature of the marketplace necessitating continuous improvement and adaptation by firms, and the globalized landscape demanding increased productivity to maintain organizational competitiveness and satisfy customers (Matthews and Marzec, 2017). An organization's alertness to quality improvement is likely to be reflected in the steps taken to anticipate and respond to the quality challenges it faces. Empirically, quality management is observed through different principles and practices. The commitment of organizations to maintain quality principles is grounded on the need to achieve the purpose of operations which is to ensure that products and services delivered meet or exceed customers' requirements and satisfies their needs. Aptly, the implementation of quality initiatives is likely to elevate quality, improve customer satisfaction and business performance. In this context, quality management is an evolutionary process where production is limited in scale and complexity. Against this backdrop, it becomes imperative for organizational members to ensure the sustainability of the quality of the product (Aftab and Khan, 2014:41).

Therefore, managers and staff at various levels within an organization should prioritize the understanding and implementation of effective managerial decisions related to the selection and execution of quality management initiatives. As an organization faces challenges such as customer complaints and low productivity, managerial interventions are necessary to oversee all activities and tasks aimed at achieving a desired level of excellence. The inability of the organization to effectively respond to and address customers' persistent complaints and noted issues requires a re-evaluation and reinforcement of management's commitment to continuous improvement. Despite designing a quality policy, and creating and implementing quality improvement initiatives, the organization's long-term quality management orientation must be evaluated through the implementation of short-term initiatives.

In order to attain both short-term and long-term quality objectives, it is essential for an organization to involve all stakeholders in endeavours and choices focused on enhancing processes, products, services, and even the overall company culture. This study aims to assess the influence of the implementation of quality management initiatives on production levels, customer satisfaction, and staff performance. Notably, it is a strategic and operational mistake in today's business environment to ignore the cost of quality failure; this failure is likely to result in customer dissatisfaction. To sustain a business, Nel (2017:178) notes that the relationship between prevention and appraisal costs reduces the quality failure cost in the organization. This introduction aims to provide the context of this study and the delineation of the problem under investigation. It further outlines the aims and objectives of the study and the significance of conducting this research. In addition, this chapter provides the delimitation of the study with regard to the scope and geographical context of the study. Finally, the chapter presents the structure of the dissertation.

1.1 CONTEXT OF THE RESEARCH

The KwaZulu-Natal manufacturing sector is recognized as a significant contributor to the South African economy. The province is classified as the second largest in the country after the Gauteng province with its manufacturing sector contributing 20% of employment to the province (Trade and Investment in KwaZulu-Natal, 2020). The chemicals manufacturing sector, being one of the great industries in the province, attracts the attention of policymakers, but also exerts pressure on individual organizations' efforts to realize the effectiveness of their strategic and operational decisions. As such, ensuring the existence of quality management decisions has become crucial for addressing quality issues and improving productivity at sectoral and organizational levels.

To enforce a culture of quality, an organization's primary emphasis is always to meet and exceed the customers' expectations and needs (Smit et al., 2017:43). Understanding the customers' requirements and needs is likely to result in customer loyalty, which in turn increases production and revenue. According to Goetsch and Devis (2010:39), a manufacturer must consistently provide superior value to customers in terms of cost, quality, and service. In this context, an organization's commitment towards quality

management should reflect the steps or initiatives it takes in addressing, among other things, the customers' orders, reducing wastage and defects, and sustaining an acceptable production level. Bazara (2018:3) confirms that a shift in thinking and the way organizations choose to operate is likely to have an overall positive effect on individual employee productivity. Gul et al. (2012:20) state that alignment and cohesion in employees' work are achievable when they are provided with guidance in terms of the nature of the business, shareholders, target market, and customer's demands and needs. This is to say that clear standard operating procedures and policies are paramount if employees are to effectively embrace quality initiatives toward achieving quality objectives. According to Thawesaengskultha (2010:156), factors such as attitude towards quality, management/leadership role, how quality information is gathered and analyzed, staff training on customer responsiveness, and responsiveness are important triggers of improvement and performance when an organization implements quality management initiatives. In the context, Ahmad, Iteng, and Abdul Rahim (2017:279) reiterate that the quality of products produced is a key factor in measuring the success and performance of any manufacturing organization. An organization should initiate and implement quality management initiatives that have a greater impact on manufacturing performance. Consequently, an organization is likely to focus its efforts on implementing quality initiatives that prioritize customer satisfaction and the ongoing improvement of the organization's performance. However, to achieve customer satisfaction, an organization must identify areas within the organization where improvement is required, for example, information about customer complaints and appropriate responses to resolve them (Strydom, 2011:170). The expectation of success in the implementation of quality initiatives is based on the organization's efforts in gaining an understanding of customers and their requirements (Nel, 2017:163).

For Juran, there is a need to identify problems faced by the organization, determine the root causes of the problems, determine possible solutions, and establish controls towards realizing and maintaining quality gains (Goetsch and Devis, 2010:19). However, despite the continuously improved quality initiatives implemented in an organization, performance evaluation is essential to determine their effectiveness. Significantly, despite the

implementation of several noteworthy initiatives aligned with quality management approaches like Lean Manufacturing, Six Sigma, and Kaizen, the organization did not achieve the anticipated benefits in terms of continuous improvement (McLean, Antony, and Dahlgaard, 2017:227). It is therefore important to take cognizance of the critical success factors that contribute to the successful implementation of those initiatives and to redirect management efforts accordingly. Consequently, Neyestani and Juanzon (2016:32) state that the management of an organization must use necessary tools such as critical success factors (CSFs), quality tools, and performance measures (KPIs) within the broader quality framework to evaluate organizational quality objectives. A set of standard performance measures is likely to play a significant role in verifying and analyzing the implementation of quality management initiatives. Although there are various tools utilized throughout the production process and other stages of the value chain to enhance operational efficiency and product quality, the advantages derived from successful continuous improvement initiatives are evident in terms of cost efficiency, waste reduction, and product quality enhancement (Janjic, Bogicevic, and Krstic, 2019). The next section clearly outlines the problem under investigation in this study.

1.2 RESEARCH PROBLEM

An organization's alertness to quality improvement should be reflected in the steps taken to anticipate and respond to the quality challenges it faces. This study is based on a chemical manufacturing organization that has experienced an increased number of complaints regarding the quality of products manufactured and delivered to customers (Management Report, 2019/2020). The chemical manufacturing company in question produces different grades of metal powders which are produced based on customer requirements with regards to the application and use of these powders. Specification of these metal powders refers to particle size, oxygen content, carbon content, binder content, and impurities (inorganic elements).

Five Different Grades of Powders produced are as follows:

- Type 1 – Powder has a particle range of <1µm
- Type 2 – Powder has a particle range between 1.2 µm to 1.8µm
- Type 3 – Powder particle size range < 1µm however contains a binding agent

- Type 4- Powder particle size range between 1.2 µm to 1.8 µm, however, contains a binding agent
- Type 5 – Powder particle size ranges between 2 µm to 3 µm

An evaluation conducted by management to identify the causes of the non-conforming products indicated that a change in the management approach had to be made to ensure that the organization improves the quality of its products to make them more sustainable.

It is relevant to note the remarks of O'Flynn and Moberly (2017:2) who indicated that it is critical to determine what activities or working approaches are needed towards realizing a desired change in an organization.

In light of the above, quality management initiatives were introduced by the organization to address and reduce quality complaints. These initiatives comprised the following:

- Quality Policy – a quality policy was drawn up with the goal of the company committing to being a leading quality manufacturer of chemicals. To achieve this goal, the company undertook to satisfy customer requirements and expectations regarding the quality of the product as well as seeking to understand and address relevant external and internal issues
- Quality Objectives were drawn up. These objectives included reacting to problems quickly and systematically as well as supporting the development of external providers of product services.
- To support the quality objectives great emphasis was placed on continuous improvement.
- A quality officer was appointed to achieve the following:
  - Ensuring that the Quality System is established, implemented, and maintained following ISO requirements, and reporting to top management on the performance of the Quality System,
  - Maintaining and controlling all Quality system documents and records, and externally produced documents and journals held by the company,

- Collecting and presenting to the management team, feedback from interested and affected parties,
- Presenting results from improvement, corrective and preventive actions, contractor/supplier problems,
- Providing training in Quality matters to all staff,
- Ensuring the adherence of activities and their corresponding outcomes to planned arrangements through regular auditing,
- Dealing with suggestions for improvements made by any member of staff or interested parties, and making appropriate recommendations to the management team,
- Ensuring that the Quality management system including the policies is reviewed regularly, communicated to and understood by all staff,
- Providing training in Quality matters to all employees, contractors, customers, visitors, and other interested parties where the lack of such training.

- Quality Culture – the organization embarked on driving quality culture using daily meetings across all departments to discuss topics about quality. Employees were sensitized on Quality awareness through the use of briefings, training seminars, notice boards, graphs, reports, and toolbox talks.
- Quality Control Testing and Analysis – critical control points in the production process were identified.
- Problem-Solving Techniques such as the fish bone diagram were rolled out and all employees were encouraged to make use of trouble shooting techniques.

Despite these changes, complaints from customers persisted. Additionally, management revealed that there has been a decline in the number of products produced from 5 to 3 (Management Report 2019/2020). The manufacture of the two products which were halted was the Type 1 metal powder with a particle size range, which was less than 1µm and the Type 4 metal powder with a particle size range between 1.2µm to 1.8µm containing a binding agent.

The Organization's Management Report (2019/2020) further noted a decline in production levels by 6%, on an annualized basis. To continuously diagnose the activities which, lead

to poor quality, as indicated by Kaizen (Yadav, et al., 2020:3), reasons for customer dissatisfaction need to be methodologically identified and analyzed. Any management reviews must recognize efficiency and effectiveness considering the cost-benefit analysis of the quality improvement initiatives. In this context, multiple complaints should inform the company regarding the successfulness (or not) of quality management initiatives. The fact that there was no direct reason provided for the poor quality of the products of the Organization, should have necessitated an investigation towards gaining insight. Moreover, the ongoing challenge pertaining to quality gives rise to inquiries regarding the organization's production levels and also brings up concerns about the quality and performance of the staff in terms of their capability to effectively implement existing quality management initiatives. In the words of Juran, it is important to identify problems to determine the root causes, determine a possible solution, and establish controls that maintain quality gains (Goetsch and Devis, 2010:19).

The problems and customer complaints that led to the decline in quality in the organization under study were:

- Particle Size which is a key characteristic of the metal powder was outside the customer specification range. The customer requested powder to be in the range of <1um, however, upon arrival, the customer analyzed the product and found the value to be greater than 1um. The powder was then rejected by the customer and the product had to be shipped back to South Africa, which resulted in huge financial implications for the organization.
- Packaging – labeling issues and weight discrepancies of the finished product. The customer found that the product they had received was not of the correct specified weight as per the contractual agreement and was not per the Certificate of Analysis provided. Each batch delivered was short in quantity. The weight of the product that the customer received was far less than what they had paid for. The shortage of products resulted in the customer not having enough material to fulfill orders to their customers. There were instances were some drums contained incorrect product labels and caused shipping issues as the labels are checked at the harbor before shipping.

- Binder Value - The Binder added to the metal powder was found to be in a range that was outside the specification limit. The customer had to be compensated for receiving off-spec material and the organization was found to be in breach of the contractual agreement. The customer eventually utilized the off-spec material. However, the customer was inconvenienced and had to amend their production process to utilize material that did not conform to the specification sheet. This was a huge inconvenience for the customer and the customer had to invest extra time with the team to amend their process to allow for the off-spec material to be utilized.
- Delivery time - product reached the customer late. There were delays in the production process due to receiving raw material late which in turn caused delays in production. The customer had to shut down their production process due to having to wait for the product to arrive. The customer claimed compensation due to their plant stoppage.
- Oxygen Content – the customer received a product that was outside the agreed specification limit. This resulted in defects in their product. Upon investigation, it was established that the high oxygen content in the metal powder resulted in the customer producing defective tools.
- Poor Quality Pallets – Upon the arrival of the product to the customer the pallets used to package the powders were found to be broken. Upon investigation, it was found that the pallet supplier did not produce a certificate stating the pallet specification.
- Lower molecular weight of the binding agent (shorter chain length) than the original binding agent.
- No control limits in the laboratory - gross weight checks for finished product drums packaged for the customer which was a result of no formal procedure/ work instruction for laboratory gross weight checks for drums packaged to be sent to the customer.
- No control or designated area for the different types of binding agents resulted in the incorrect binding agents being used for the specified metal powder.

- No designated machinery for the different types of products.
- Delays in providing customers with samples.
- No formal procedure/ work instruction for the handling of samples for customers.
- No formal procedures/ work instructions for packing samples for customers.
- No formal procedure for controlling and adjusting critical process parameters.
- No formal communication channels when amending process parameters.

The following initiatives were implemented to address the problems mentioned above:

- The organization appointed a Quality officer to investigate each of the complaints by making use of Corrective Action Reports to identify the root cause of the problems mentioned above.
- Work instructions were drawn up and distributed to the relevant departments.
- Critical Quality control points were identified in the production process.
- More samples were taken by the laboratory and additional laboratory analysis was carried out to identify whether the product was within the specification limits.
- Process parameters were amended to control critical parameters such as particle size, oxygen content, and binder content.
- Designated areas were demarcated for the different binding agents to prevent the use of the incorrect binder.
- Designated machinery was assigned for the five different types of metal powders Visual Awareness - The machinery for each of the different product types was color-coded to prevent operators in production from using the incorrect machine.
- Visual Awareness - Colour coding of all possible equipment/labels/machinery relating to the specific product.

However, despite the continuous improvement initiatives put in place in the organization under study, within the framework of quality management approaches such as Lean Manufacturing, Six Sigma, and Kaizen, the organization may still not achieve the

expected benefits as continuous improvement efforts experience constraints (McLean, Antony and Dahlgaard, 2017:227). It is therefore critical to focus on factors that impede the successful implementation of those initiatives and to redirect efforts to deliver hard metals to meet the expectations of customers in terms of quantity and quality required. This process requires adjustment of the conditions under which each batch is produced and identifying products that do not meet the specifications of the customers. This ranges from raw material or inputs used such as gases and chemicals which are required to turn raw material into finished goods or metal powders. Various cost reduction projects were embarked upon such as the reduction in the cost of operations to improve efficiency in the production process, laboratory cost reduction, a project to reduce scrap generated, a project aimed at reducing human errors, and a project to deal with customer complaints. These projects were crucial in the organization.

The quality of products manufactured remains critical for the competitiveness of any manufacturing organization. Managerial decisions about the types and effectiveness of quality management initiatives implemented must preoccupy managers and employees at different levels within the company. Any quality management initiatives are unlikely to make a positive impact if they overlook customers' requirements, employee engagement, and organizational performance (Nel, 2017:163). The problem under investigation focuses on the case of a chemical manufacturing organization based in KwaZulu-Natal that has recently recorded several complaints from customers and a drop in the production levels within the organization despite the implementation of quality management initiatives. The persistent complaints from customers and the inability of the organization to effectively respond and address customers' complaints necessitated a proper examination of the effectiveness of quality management initiatives implemented. Notably, the organizational system dynamics associated with the implementation of quality initiatives need to effectively consider the human capacity involved in the organization's quality objectives to ensure the production of both the desired quantity and quality in alignment with customer expectations. It should be also noted that there are at least two aspects that could be influencing the quality of the cobalt powder which the organization produces using a process that comprises several stages. The two aspects

are the functioning of the machinery to the specifications set for it and the performance of the personnel who monitor the process. The second aspect involves monitoring the process which is the task of the management and is supposed to be a practice aimed at maintaining the quality levels set by the organization. Therefore, quality initiatives must cater to both aspects. The company report 2018-2020 reflects on the cost reduction initiatives. On one hand, there is an attempt to capture an opportunity to implement a barcoding system which may facilitate the aim of keeping better track of exactly what the company always has in stock and to upscale the shop floors by broadening their knowledge of the production process, as well as technical competence which is crucial in the optimal running of the production. On the other hand, the emphasis is on capturing an opportunity to maximize the effects of Lean Production. This is realized through integrating human resource efforts that emulate a strong organizational culture, which promotes a unified and enhanced approach for competitive advantage through increased production outputs. To implement management interventions, the company seems to build its quality philosophy around the well-known quality techniques of Kaizen and Lean manufacturing. In contrast, it remains unclear how the implementation of quality initiatives leads to the anticipated positive outcomes in terms of employee performance, quality performance, and productivity.Therefore, this study aims to assess the influence of the implementation of quality management initiatives on production levels, customer satisfaction, and personnel performance.

1.3 AIM AND OBJECTIVES OF THE STUDY

When a company expresses a need for change and implements a change, an evaluation is required to determine whether such a decision resulted in improvements. The improvements are expected to be seen in the quality of the product, employees' performance, and even the production capacity of the company. The study aims to assess the influence of quality management initiatives on production, quality, and personnel performance. This aim will be achieved through the following objectives:

1. To evaluate the implementation of quality management initiatives against some prescribed protocols.

2. To evaluate the effect of the implementation of quality management initiatives on quality performance.
3. To assess the impact of the quality management initiatives implementation on production levels in the study's selected organization.
4. To evaluate the effect of the implementation of quality management initiatives on staff performance.
5. To propose a continuous improvement strategy based on the findings of the study.

1.4 SIGNIFICANCE OF THE STUDY

Globalization and high competitiveness characterize the business environment in which any organization operates. Achieving performance standards seen in efforts to meet customer requirements becomes important for retaining customers and sustaining the organization's operations (Goetsch and Devis, 2010:4). Covid-19 crisis and the market volatility have added to the challenges that face manufacturing organizations. However, it is noted that the manufacturing sector contributes a greater share of 14% of South African gross domestic product (GDP) (Stats SA, 2019). It is imperative for a chemical manufacturing organization to produce quality products or services and to ensure employees' performance. Any chemical manufacturing organization should always be keen to observe quality standards and respond to customer demands. In this perspective, staff involvement and commitment to change are regarded as a cornerstone to achieving short and long-term quality objectives in the organization. Njuguna and Bett (2018:94) indicate that quality management initiatives are related to organizational performance. In this context, evaluating the implementation of quality management initiatives provides necessary information that can be used for future decisions making, especially as any change requires an investment of resources. Against this backdrop, while determining the success of the quality strategy, an organization needs to assess how effective the quality initiatives were concerning the production levels as well as the staff and quality performance. Furthermore, it is salient for staff to be evaluated in terms of the role they played in the implementation of quality initiatives at different levels of an organization. According to Reed et al. (2014:1046), it is acknowledged that effectively engaging diverse stakeholders in program development remains a notable challenge; however, this obstacle could potentially be overcome through research and expertise. The outcome of

this study is likely to provide the basis for possible adjustments to ensure continuous improvements and satisfaction of customers. To enhance evidence-based decision, an organization should adopt a factual approach to decision-making. This study will provide an improved understanding of organizational performance based on verified and analyzed data. The empirical results will be able to identify mechanisms that are likely to produce desired results and justify the effectiveness of past decisions. Factual decision-making is vital to understanding and resolving complex management problems for business sustainability.

1.5 DELIMITATION OF THE STUDY

The delimitation of this study may be based on geographical considerations or the scope of the study. The delimitation must be considered to interpret the results of the study in a clear context. The study focuses on a chemical manufacturing organization located in KwaZulu-Natal (KZN). The chemical manufacturing sub-section always strives to remain competitive locally and internationally. The KwaZulu-Natal province is one of the three provinces together with Gauteng, Western Cape that constitutes the manufacturing hubs of South Africa. The staff of one of the companies in the KZN province will constitute the population for this study. The research methodology of the study is presented in the next section.

1.6 RESEARCH METHODOLOGY

The study will adopt an empirical quantitative approach toward achieving its stated aim and objectives. A cross-sectional survey design is utilized which will guide the data collection process in the selected manufacturing organization. The primary data for the study will be collected using a survey in the form of questionnaires distributed to the study's participants. Due to the large population size of the study, the quantitative approach is deemed suitable, as administering questionnaires to a large sample is relatively cost-effective compared to the logistical challenges of conducting interviews with participants (Cooper and Schindler 2011:163). Additionally, considering that this research focuses on employee performance, which can be seen as a sensitive topic, participants may be more inclined to provide their input anonymously through a questionnaire rather than engaging in an interview.

The population for the study includes managers and non-managers within the organization who are directly affected in their day-to-day operations by the change management process that resulted in the implementation of quality management initiatives. The findings of the conducted empirical study will be presented, analyzed, and examined. Descriptive statistics, such as graphs, tables, and charts, will be utilized to present the results derived from the quantitative data collected from the respondents. The quantitative analysis will consist of a variety of descriptive and inferential statistical tests such as correlation, ANOVA, regression as well as validity and reliability tests. These tests will be used to determine the appropriateness of items used to measure the variables and the validity and to generalize the results to achieve the objectives of the study. These tests will further help to establish and identify patterns in the relationship between variables.

1.7 RESEARCH STRUCTURE

Chapter 1: Overview of the study

This chapter provided an overview of the study and outlined the background of the study and the research problem. The chapter further stated the aim and objectives of the study and finally, it presented the significance and scope of the study.

Chapter 2: Literature Review

The literature review chapter will review existing research on the influence of quality management initiatives on production, quality, and staff performance. The critical evaluation of the secondary data will facilitate the building of the conceptual framework to be used in the study.

Chapter 3: Research Methodology and Design

Within this chapter, we will delve into the examination of several key elements, including research methodology and design, sampling technique, questionnaire design, and the data analysis techniques intended for the empirical study. Furthermore, we will justify the selection of the research design based on its rationale.

Chapter 4: Presentation, Analysis, and Discussion of Results

The findings of the empirical study will be presented, analyzed, and discussed. This will be accomplished by utilizing descriptive statistical tools such as graphs, tables, and charts, with a specific emphasis on analysing the quantitative data obtained from the questionnaires. Additionally, various suitable statistical tests will be employed to analyse the data, followed by the interpretation of the results.

Chapter 5: Conclusion and Recommendations

In this chapter, the primary findings of the study will be presented, addressing the stated objectives. Concluding remarks and recommendations for enhancing quality will also be provided. Furthermore, the chapter will outline the limitations of the study and offer suggestions for potential future research areas.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The concept of quality is more than just product quality. It includes people, processes, and any other aspects of an organization that works towards achieving customer satisfaction (Hoyer, Brooke and Hoyer (2001:56). This description has been validated in the early characterization of quality concepts by many quality experts such as Deming, Juran, Crosby and Ishikawa. In Deming's book "Out of the Crisis", Goetsch and Davis (2010:4), stated that quality is defined by "an agent who is the judge of quality, such as production workers or plant managers, and through them, the company loses or keeps the business." As such, customers' requirements and expectations of a high degree of quality in products or services (Nel, 2017: 139) were likely to exert pressure on organizations to ensure that decisions align with continuous quality improvements. Liu et al. (2020:3) indicated that quality, productivity, customer satisfaction, and profitability were important criteria and objectives in successful total quality management programs.

Lobo, Matawie and Samaranayake (2012:106) emphasized that the performance output of an organization was a function of customer satisfaction. This chapter reviews the critical literature and discusses the theoretical context of the study focusing on different quality management approaches. The chapter further explores previous studies which have focused on themes related to the topic under investigation in this study. Building from the extant literature, this researcher will construct the conceptual framework relevant to this study. The following sub-headings will be critically discussed in this chapter: quality management initiatives, production variation, quality, and staff performance with particular reference to manufacturing organizations.

2.2 THEORETICAL BACKGROUND OF THE STUDY

Quality has been defined by many authors with a common consideration of "customer satisfaction" as an integral concept (Goetsch and Davis, 2010:5). Kumar, Raju and Kumar (2016:142) noted that customer's needs should be transformed into measurable characteristics and that quality might be defined in terms of "fitness for the purpose of a product; degree of customer satisfaction; accuracy in meeting the specification or design

of a product; meeting the standards or norms and degree of excellence." Longenecker, et al. (2016:1) confirmed that manufacturers could respond to quality challenges by attempting to implement various "quality improvement processes". The quality of literature should be in line with and focus on the approaches advocated by quality "gurus" such as Deming, Crosby and Juran, among others. According to Sony, Naik and Theresa (2019:420), businesses should focus on improvements utilizing every possible opportunity; whether in the context of financial crises or concerning quality costs. The business improvement initiatives should be implemented for the competitiveness and operations performance of the organization.

However, the management of many organizations is faced with the challenges of creating a work environment conducive to quality improvement from the worker's perspective. Goetsch and Davis (2010:197) asserted that the implementation of change was likely to necessitate the removal of structural inhibitors to change and enabling of employees through training and recognition. It is also stated that making changes could require an understanding of both 'hard' and 'soft' management changes. Hard management changes place emphasis on rules, standardization, conformity, discipline, stability, and formality, whereas soft management changes focus on aspects of knowledge, sharing/diffusion, reflection, engagement, empowerment, and intelligence gathering for managerial changes. The approaches and theoretical perspectives of pioneers in quality management are discussed in the next section.

2.3. CONCEPTUALISING QUALITY MANAGEMENT

2.3.1 Deming's View of Quality Improvement

According to Deming's viewpoint, organizations could enhance quality and decrease costs by adopting continuous process improvement and considering manufacturing as a cohesive system rather than separate components.In this context, the author proposed a framework of 'Plan-Do-Check-Act (PDCA) cycle' using Six Sigma processes. In addition, Deming's theory on quality (the 'fourteen points of management) which call for awareness of quality in all processes' was introduced through Total Quality Management (TQM). The approaches selected by Deming have been instrumental in the development of quality improvement in organizations. Agrawal (2019:1161) opined that the core elements of

Deming's theory rested on a profound knowledge system which entailed an understanding of an organization as a system with variation as well as variability in product or services, and the responses which ensured that management could be able to observe and understand the behavior of its employees. Deming offered organizations and managers the fourteen key principles for transforming business effectiveness as presented in his book "Out of the Crisis" (1982). These principles constituted the fundamental advice provided by Deming to assist management to enhance organizational performance in the context of quality. Regardless of the size or industry, the fourteen principles were relevant for small or large companies, operating in the service industry or manufacturing. These principles taken from Mandru et al. (2011) are presented below:

- Create constancy of purpose toward improvement of product and service to become competitive, to stay in business, and to provide jobs.
- Adopt the new philosophy: we can no longer live with commonly accepted levels of delays, mistakes, and defective workmanship.
- Cease dependence on mass inspection to achieve quality; require instead statistical evidence that quality is built in.
- End the practice of awarding business based on the price tag; instead, minimize total cost.
- Find problems. It is management's job to constantly improve the system of production and service, to improve quality and productivity, and thus constantly decrease costs.
- Institute training on the job.
- Institute leadership. Leadership aims to help people, machines, and gadgets to do a better job.
- Drive out fear so that everyone may work effectively for the company.
- Break down barriers between departments. People must work as a team.
- Eliminate slogans, exhortations, and targets for the workforce asking for zero defects and new levels of productivity (they create adversarial relationships).

- Eliminate work standards (quotas) on the factory floor. Eliminate management by numbers, and numerical goals. Substitute leadership.
- Remove barriers that rob workers of pride in workmanship.
- Institute a vigorous plan of education and self-improvement.
- Put everybody in the company to work to accomplish the transformation. Transformation is everybody's job (Aftab and Khan, 2014:42).

To summarize the theme of process improvement, the methodologies in Table 2.1 further indicate that improvement in the quality of products and processes remains crucial for any organization to survive and grow in competitive markets (Atigre, Shah and Patil, 2017:123).

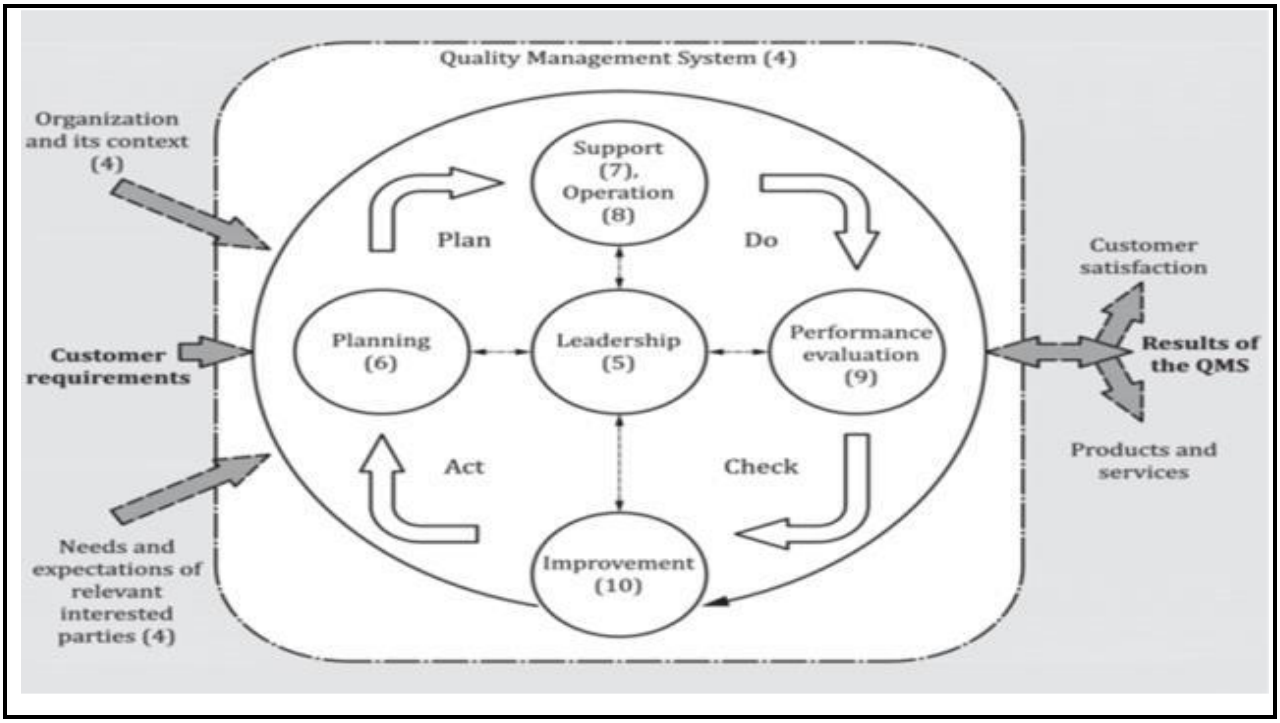
Table 2. 1: Process Improvement Methodology PDCA, DMAIC, A3 and 8D

PDCA Agrawal (2019)	**DMAIC** Goetsch and Davis (2010)	**A3** Schwagerman III and Ulmer (2013)	**8D** Atigre, Shah and Patil, (2017)
Plan	Define	Clarify the problem.	Create a team and collect information.
	Measure	Breakdown the problem	Describe the problem
		Set a target	Define containment Actions
	Analyze	Analyzes the root causes.	Analyze the root cause
		Develop countermeasures	Define possible corrective actions
Do	Improve	See countermeasures	Implement corrective actions
Check	Control	Evaluate results and processes	Define the action to avoid recurrence.
Act		Standardized success	Congratulate your team

The DMAIC model of continuous quality improvement is based on defining the current situation and desired situation, as well as defining the potential advantages of the problem. The second step of the DMAIC model is to measure, by identifying causes and qualifying problems, before analyzing causes and improving through identifying solutions; and finally executing an effective control system (Ifrim, et al., 2020:1101).

As stated by Patil, Naik, Shinde and Raut (2021:416), the 2015 version of ISO 9001 was evidence of a stronger focus on the organizational role players aiming at the business more organizational efficiency in its operations through the improvement of the customer satisfaction. The approach was perceived as a sequential research endeavour that focused on risk-based thinking with the objective of evaluating the influence of quality management systems on the organization's performance effectiveness.

Figure 2. 1 : P-D-C-A Cycle for ISO 9001:2015



Source: ISO 9001:2015

2.3.2 Juran's View of Quality Improvement

Kumar, et al. (2016:145) indicated different focal points of quality improvement according to Juran.

- Developed "Juran's Trilogy": quality planning, quality control, and quality improvement.
- Believed cultural resistance or resistance to change is the primary reason for quality problems.
- Six Sigma is based on statistical work by Juran (Six sigma = 3.4 defects per million).
- Quality - Fitness for use of the product.

2.3.3 Crosby's View of Quality Improvement

Crosby's response to the quality crisis was the principle of "Doing It Right the First Time" (DIRFT), which considered the following to be the Absolutes of Quality Management:

- Quality is conformance to requirements.
- Defect prevention is preferable to quality inspection and correction.
- Zero Defects is the quality standard.
- Quality is measured in monetary terms – the Price of Nonconformance (PONC).

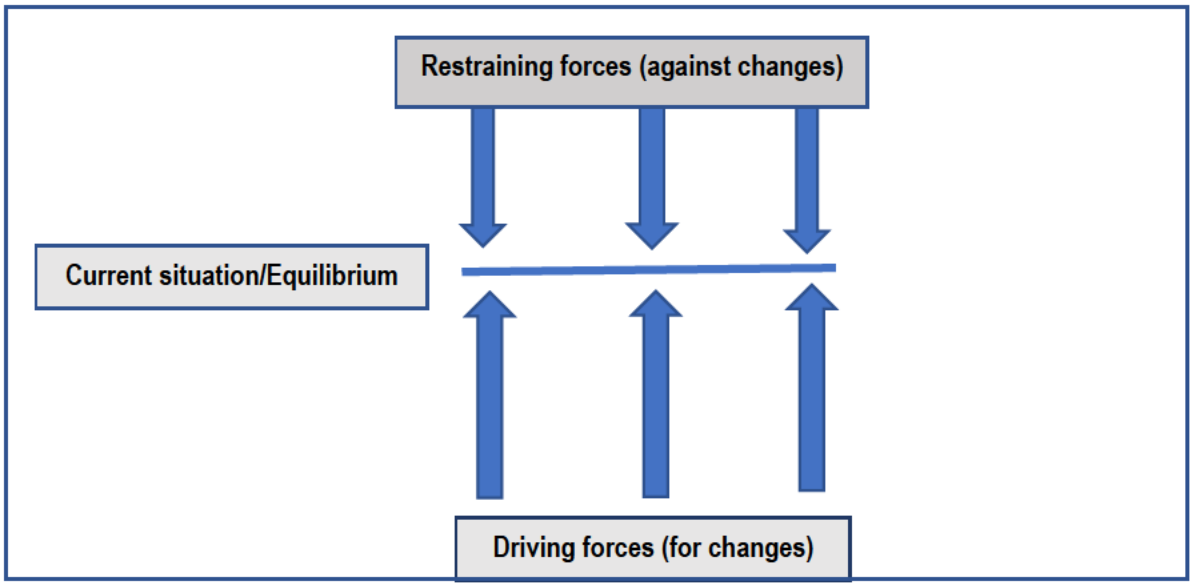
The 6Cs of Crosby provided a clear focus for organizations to implement meaningful quality strategies. Any organization is required to go through a process to maintain a zero-defect product using the 6 C's, which stands for comprehension, commitment, communication, competence, correction, and continuance (Kumar et al., 2016:147).

2.3.4 Kurt Lewin's Model of Change

This model is based on utilizing investigative and analytical tools to identify problems before implementing problem-solving approaches. Kurt Lewin's model emphasized the use of "force-field analysis" as a powerful method for gaining a comprehensive understanding of the various forces influencing potential organizational change issues (Lazenby, 2018). In an organization, the current level of performance can be seen as a state of equilibrium between driving forces that promote progress and restraining forces

that hinder it. Equilibrium exists when the driving forces advocating for change are counterbalanced by the restraining forces opposing change. Change occurs when there is an imbalance between the sum of the restraining forces against change and the sum of the driving forces for change. Hussain et al. (2018:124) affirmed that employee involvement aimed to enhance members' input into decisions affecting organizational performance and employee well-being. Such participation is likely to result in high-quality change and should prevail over resistance to the implementation of quality initiatives. Khan (2011:181) emphasized the importance of management demonstrating a genuine commitment to change by establishing essential workplace arrangements to address health and safety concerns while also attending to productivity and quality issues.

Figure 2. 2: Force-field Analysis



Source: Lazenby (2018)

Kurt Lewin's model of understanding change suggested a simple five-step procedure applied to change analysis:

Step 1: Define the problem

Step 2: Define the change objective

Step 3: Identify the driving forces

Step 4: Identify the restraining forces

Step 5: Develop the comprehensive change strategy

These steps can aid in the endeavour to implement changes that are expected to bring about improvements. Therefore, the implementation of quality initiatives should occur within the broader context of organizational change. Hussain et al. (2018:126) discovered that leadership style played a significant role in the outcomes of organizational change processes, employee satisfaction, and performance. The subsequent section offers a comprehensive overview of quality management initiatives.

2.4 QUALITY MANAGEMENT INITIATIVES (QMI)

2.4.1 Introduction

This section critically reviews a set of selected factors that condition the identification and implementation of quality initiatives in a chemical manufacturing organization. These factors of quality management initiatives were identified as the trigger for organizational improvement and performance. They include attitude towards quality, management/leadership role, quality information, and analysis, staff training on customer responsiveness, and responsiveness to customers (Thawesaengskultha, 2010:156). According to Njuguna and Bett (2018:84), the quality of management initiatives refers to the various facets of initiatives implemented by an organization to meet their customers' expectations regarding the quality of goods, delivery, pricing, and services. Empirically, quality management is observed through practices. These practices are reenforced by decisions of managers about organizational improvements (Valmohammadi and Roshanzamir, 2015:168). Building on the conceptual framework of the study conducted by Thawesaengskultha (2010:156) regarding quality management and improvement initiatives, the variables noted in this section constitute the independent variables of this study and will be further critically discussed in the next sections.

2.4.2 Factors of Quality Initiatives

Georgescu et al. (2018), it is believed that implementing a comprehensive quality system is a significant strategy for organizational transformation. This strategy entails making changes at all levels of the enterprise, beginning with the management system as a whole and extending to transforming attitudes and behaviours among employees. To implement

a quality program, the organization is likely to focus on developing a new attitude towards customers, reducing management layers, linking quality and information to customer needs and problems, and training employees in customer responsiveness.

2.4.2.1 Developing a New Attitude toward Customers

As per Newman (2017), customer service should not be limited to a specific department but rather treated as an attitude. This indicates that customer service can significantly impact a customer's overall experience with a business. Davidson (2022) suggests that adopting a positive mindset can empower individuals to achieve success, including in customer service interactions. Therefore, individuals who possess a positive mental attitude tend to attract positive changes. Consequently, developing a new attitude towards customers involves enhancing problem-solving skills, cultivating positive thinking, maintaining composure during interactions, prioritizing the establishment of strong customer relationships, and ensuring that customers perceive the business as authentic through their demeanor (Davidson, 2022; Newman, 2017). Therefore, it is crucial for businesses to provide training or coaching to their service staff, emphasizing the importance of delivering the most encouraging service possible (Newman, 2017).

Developing a fresh perspective in customer service is crucial due to its wide-reaching positive impact on customers. By adopting a new attitude, service teams can effectively shape customer behaviour and exert greater influence. It is essential for the service staff to focus on the positive aspects and constructive interactions they have with customers, rather than dwelling solely on occasional negative encounters. Moreover, by cultivating a new attitude in customer service, the service staff establishes a tone that extends to all their interactions, ultimately influencing customers as well. It is a known fact that when service staff solely fixates on irritable, disgruntled, and demanding customers they encounter throughout the workday, it leads to feelings of dread and fatigue that carry over to the following day, fostering an aversion towards work. These negative attitudes then escalate, potentially leading the service staff to become impolite and resistant. According to Michelle Gorlier and Michel (2020), developing a new attitude toward customers should consider the following:

- Show the importance of customer service,

- Implement interdepartmental process flows,
- Switch to more “distant” tools,
- Give agents leeway to bend policies,
- Create an upbeat environment,
- Get creative and be flexible,
- Be honest about mistakes,
- Keep up your hobbies and morning routine,
- Lean on your team for support,
- Focus on keeping the tone positive,
- Learn techniques to keep negative thoughts at bay, and
- Build self-awareness.

Nonetheless, Newman (2017) stressed the significance of cultivating a fresh outlook in customer service that permeates throughout the entire organization. This approach fosters a culture of cooperation, collaboration, and an unwavering commitment to ensuring customer satisfaction. Furthermore, it facilitates improved communication and cooperation among employees, enabling each team to comprehend the intricacies associated with customer interactions and consequently offer timely assistance and support.

2.4.2.2 Reducing Management Layers

Risher (2018) asserts that streamlining or eliminating organizational layers can enhance workforce management and performance, promote accountability, reduce costs, and improve productivity. This approach can also expedite decision-making processes by minimizing the number of individuals involved in approvals and reviews, allowing front-line employees to assume decision-making responsibilities. Ashkenas (2012) further emphasizes that one of the most impactful changes a business can implement is expanding spans of control, a straightforward adjustment that empowers employees, simplifies the organizational hierarchy, streamlines processes, and reduces expenses. By increasing spans of control, organizations can subsequently condense the number of hierarchical layers or levels. This not only significantly reduces costs associated with

managerial positions but also facilitates the seamless flow of ideas and information throughout the organization (Ashkenas, 2012).

Furthermore, Risher (2018) highlights that the process of flattening organizations diminishes bureaucratic tendencies and hierarchical management, resulting in enhanced responsiveness to market dynamics and stakeholder needs. However, when an excessive number of layers exist, communication from the top to the bottom of the organization becomes akin to the childhood game of telephone, where messages undergo alterations as they pass through various individuals. Moreover, upward communication becomes constrained as well, as managers at each level tend to modify data, pose new inquiries, or halt progress altogether. This distortion of communication often disconnects senior managers from the ground reality. To address these communication breakdowns, increasing spans of control and condensing hierarchical layers prove beneficial. Additionally, Ashkenas (2012) argues that reducing management layers typically leads to cost savings. However, unless managers modify their approaches in working with their subordinates, performance will suffer, resulting in mounting pressure to hire additional staff, perpetuating a counterproductive cycle. Hence, when executives employ changes in spans and layers to drive empowerment, simplification, and cost reduction as secondary outcomes, it paves the way for a fundamentally more productive organization.

2.4.2.3 Linking Quality and Information to Customer Needs

According to Patel (2022), most businesses focus on innovations and fail to align their brand with customer needs. Therefore, linking quality and information to customer needs should be the focal point of every business toward building a solid customer base. Customer needs related to quality and information can be defined as the influential factors that trigger them to buy a product or service (Patel, 2022). For Alton (2016), businesses consider the quality of the products and services they offer because they know how important it is to their customers. However, for customers the requirements for satisfaction of their needs include the following:

- **Longevity:** This implies the duration the product performs its function.
- **Fulfilment of needs:** This consists of identifying whether or not the product fulfils a specific need or solves a specific problem for the customer.

- **Cost versus Need:** Customers are required to identify the product costs compared with how much they want or need them.
- **Security:** The safety level of the product, customers may want to know whether or not they feel comfortable using it.
- **Usability:** This involves the ease of use associated with the product.
- **Efficiency**: The product's ability to save the customer money, help the environment, or streamline a process.

Therefore, to identify customer needs, it is significant to be aware of the reasons behind their decision-making. Thus, by linking quality and information to customer needs, Patel (2022) provides the steps to follow to meet customer needs successfully. These steps consist of the following:

- **Identify:** Follow customer needs analysis via surveys, interviews, focus groups, or social listening,
- **Distribute:** Once identified, the needs can be distributed across the right teams and departments,
- **Create:** Tailor product features, and create detailed content which speaks about customer needs, and
- **Collect:** Obtain customer feedback regularly to learn how business efforts meet their expectations.

In view of the aforementioned points, it is crucial to recognize that a customer's primary expectation is to value the quality of a product before making a decision to continue shopping. Subsequently, the demand for quality products arises. Hence, when companies consistently offer high-quality products, they establish a benchmark for satisfying customers in the retail sector (Patel, 2022). Moreover, customers tend to return when a product exhibits good quality, irrespective of its price. A quality product fosters unwavering customer loyalty, leading to increased sales opportunities. When customers encounter a product they trust, they become repeat purchasers and enthusiastic advocates, recommending the product or service to others. Patel (2022) revealed that ultimately, companies should always prioritize product quality, as it remains the foremost

consideration for customers. The subsequent subsection explores the challenges related to employee training in enhancing customer responsiveness.

2.4.2.4 Training Employees on Customer Responsiveness

As per Decker (2022), customer service training refers to the coaching provided to employees with the aim of enhancing customer support and satisfaction. Therefore, an effective customer service training program should encompass activities aimed at improving interpersonal communication, product knowledge, conflict resolution, crisis management, and other relevant areas. It is an iterative process that involves imparting skills, competencies, and tools necessary for serving customers better, enabling them to derive greater value from products and services. Moreover, any employee involved in customer interactions and dealings is eligible for customer service training. Decker (2022) further highlighted the significance of customer service as an opportunity for companies to connect with customers, address their concerns, and demonstrate care. Hence, when customer service is executed proficiently, it can leave a lasting impression on customers. Consequently, training the customer support team holds equal importance to training the marketing or sales teams.

Furthermore, Decker (2022) emphasized the reasons why training employees on customer responsiveness is important. Accordingly, the reasons businesses should invest in a customer service training program include:

- **Happy customers become brand advocates**: It is not uncommon for businesses to view their customer service teams as an afterthought. Once a consumer becomes a customer and pays for a business product or service, he/she becomes a customer. After receiving a good product accompanied by excellent service customers are happy, and delighted customers become the best advocates for a company, even better than most talented marketers. They become the best asset of a company for bringing in new business. In this light, customer service teams need to deliver beyond their, already, high expectations.
- **Remarkable customer service is a competitive advantage for the business**: Remarkable customer service provides excellent customer service

that makes it easy for a customer to choose over other brands and services. This is why it is important to provide top-notch customer service and train employees to provide that quality service. It is also essential for gaining an edge over competitors and making the business the natural choice when customers are looking for products and services.

- **Great customer service increases retention:** Decker (2022) stated that customer service is a key player in the game of customer retention. If a customer has a pressing question about a business product and reaches out to the customer service team, what makes them feel happy and willing to stick around could be a well-researched answer sent by a service representative dedicated to their success. Customers might be satisfied with their interaction with the company and customer service team and go on to promote the business as one with great products and services.

Thus, the discussion related to customer service training is very important. Employees should be trained to deal with the reasonable needs of customers. This implies that responsiveness should be continuously improved through the channel of communication (Taifa and Vhora, 2019:148). This was corroborated by Samson and Terziovski, (1999:393), Nair (2006:953), and Sahoo (2020:1424) who indicated that a manufacturing organization should focus on identifying weaknesses in quality management strategies through information and analysis. These researchers also proposed that management should direct their efforts to achieve customer satisfaction through the implementation of appropriate staff training and to ensure quality readiness for continuous improvement.

Kaizen focused on the importance of employee skills (Sraun and Singh, 2017:229) and McLean, Antony, Dahlgaard (2017:227) confirmed that the implementation of quality initiatives necessitated a certain level of training delivered to the workforce. Concerning the international standards of the ISO 9000:2005 and ISO 9004:2009 series, the eight basic principles were classified as paramount in guiding any organizational quality initiatives. The application of these practices in the manufacturing sector was based on the commitment of a company to implement quality processes to supply quality products to customers. The standards addressed the context in which the quality management

initiatives might be implemented to achieve organizational objectives (Popecsu, Mandru, and Gogoncea, 2017:23). The classification of the quality management principles are as follows:

The first principle: is the orientation of the manufacturer's activities to the client (to meet the current and future needs of the client).

- The second principle is the desire for leadership.
- The third principle: involvement of all employees in the process of quality assurance within the framework of production and sales.
- The fourth principle: process management.
- The fifth principle: systematic approach to management of the manufacturer's activity.
- The sixth principle: orientation of the manufacturer to continuous improvement of all of its internal and external processes.
- The seventh principle: adoption by the management of the manufacturer of managerial decisions based on objective facts.
- The eighth principle: mutually beneficial relationship of the manufacturer with all suppliers (Nel, 2017:163).
- The following sections will focus on dependent variables namely production level, quality and staff performance.

2.5 PRODUCTION LEVELS AND QUALITY INITIATIVES

2.5.1 Introduction

The number of outputs to be produced is always a function of the demand for the product. The quality concept should be always linked to the quantity of goods produced and good quality products. As stated by Gidey, Beshah, and Kitaw (2014:48), whenever there is a deviation in production, it becomes crucial to assess the effectiveness of the quality program employed. It can be argued that the cost factor may also affect the capacity of an organization to produce a required volume of outputs. According to Rothman, Tillmann, and Toniati (2016:279), the scheduling of production and assembly shifts can be adjusted based on the quantity of units produced, by adding or reducing shifts considering the fixed costs involved in operating a shift. As a result, modifying the number

of shifts can lead to distinct variations in the number of units manufactured. However, what and how the product or service is produced was likely to be crucial for customer satisfaction. Juran proposed that an organization should first ascertain “who the customers are” and establish their needs before embarking on production (Juran 1986:6; Goetsch and Davis, 2010:15-18). In the choice of appropriate approaches to be implemented, the use of lean manufacturing tools should address the aspect of production levels as these might affect the customer base of the organization.

To this end, good leadership has serious implications for any change initiatives within the organization, in the sector, and even outside the sector (Salomon and Steyn, 2017:3). The number of outputs to be produced is always the function of the demand for the product. The quality concept should always be linked to the quantity of goods produced and the good quality of products. As stated by Gidey, Beshah, and Kitaw (2014:48), whenever there is a change in production, it is essential to assess the effectiveness of the implemented quality program.It can be argued that the cost factor may also affect the capacity of the organization to produce the required volume of outputs. According to Rothman, Tillmann, and Toniati (2016:279), manufacturers that operate in shifts have the flexibility to modify the production volume by adjusting the number of shifts. Since there are fixed costs involved in running a shift, it is economically viable to maximize its capacity. As a result, any reduction or increase in the number of shifts leads to distinct changes in the quantity of units produced. However, quality remains crucial for customer satisfaction. Hence, a study conducted by the quality expert, Juran proposed that the organization should first ascertain who the customers are, and their needs before embarking on production (Juran 1986:6; Goetsch and Davis, 2010:15-18). In this context, decreased production is likely to be the result of a loss of customers or a reduced customer base of the organization. As Salomon and Steyn (2017:3) asserted; a good leader keeps an eye on what is going on in the organization, changes within the sector and outside the sector, and what are the implications for the organization.

2.5.2 Quality Performance and Quality Initiatives

The success in the implementation of any quality management initiative maybe observed through the organization’s quality performance. Forza and Flippini (1998:4) simply

described quality performance as (1) quality conformity and (2) customer satisfaction. In this context, the quality management initiatives are likely to address issues such as defects, customer complaints, costs related to quality failure, and the impact on the competitiveness of the organization (Nel, 2012:178). Ali, Holiman and Gorondutse (2020:1518) found that there was a significant relationship between the quality practices of an organization and its performance. Taifa and Vhora (2019:147) pointed out that the productivity improvement process should include several factors in an attempt to achieve the maximum reduction of unnecessary time for higher improvement. Khorasani and Almasifard (2017:135) referred to Taylor's principles which stated the following:

- "Worker's performance study, job knowledge collection, and find out improved ways of doing a task.
- The performing task methods of codification into standard procedures.
- Worker allocation is based on their skills and abilities; and training to enable them to perform better.
- Define a level of acceptance for each task and set a payment system with a reward for the performance above acceptable level".

Gidey, Beshah and Kitaw (2014:49) emphasized that quality was the primary focus to meet customer specifications whereas productivity was used as an approach to achieving the targets set by organizations through labour productivity. An organization's alertness to quality improvement was likely to be reflected in the steps taken to anticipate and respond to the quality challenges it faces. Empirically, quality management is observed through practices. These practices are reinforced by managers' decisions about organizational improvements (Valmohammadi and Roshanzamir, 2015:168). This study will build its conceptual framework on the study conducted by Thawesaengskultha (2010:156) regarding quality management and improvement initiatives. It is critical to note that different quality approaches as well as quality standards are used to direct any implementation of quality management initiatives in an organization. As stated by Rue and Byars (2007:450) and Bazara (2018:3), Six Sigma, Kaizen, Quality at the Source, Continuous improvement, Lean Manufacturing Approaches for improving the quality of products or services are not mutually exclusive. They are, indeed, complementary in their

purpose to achieve manufacturing performance in reducing all types of wastages in the operations. To implement a quality programme, the organization is likely to focus on (1) developing a new attitude towards customers; (2) reducing management layers, (3) link quality and information to customer needs and problems, (4) training employees to customer responsiveness, and (5) this responsiveness should be continuously improved through the channel of communication (Taifa and Vhora, 2019:148).

This was corroborated by Samson and Terziovski, (1999:393), Nair (2006:953), and Sahoo (2020:1424) who indicated that a manufacturing organization should focus on identifying a gap in quality management strategies through information and analysis. These researchers also proposed that management directs their efforts to customer satisfaction and implements appropriate staff training and quality readiness for continuous improvement. Kaizen which focused on the importance of employee skills (Sraun & Singh, 2017:229), and McLean, et al., (2017:227) confirmed that the implementation of quality initiatives necessitated that a certain level of training is delivered to the workforce. The variables noted in this section constitute the independent variables of this study. The following sections will focus on dependent variables, namely, production level, quality, and staff performance.

a) Quality Performance

The success in the implementation of any quality management initiative may be observed through the organization's quality performance. Forza and Flippini (1998:4) simply described quality performance as (1) quality conformity and (2) customer satisfaction. In this context, the quality management initiatives are likely to address issues such as defects, customer complaints, costs related to quality failure, and the impact on the competitiveness of the organization (Nel, 2012:178).

b) Quality conformity

Bhanot, Venkateswara, and Deshmukh (2017:4415) argued that this factor is crucial in ensuring competitiveness, particularly when expanding operations and delivering products at globally recognized quality standards. This presents a significant challenge for the manufacturing industry. Rue and Byars (2007:450) and Bazara (2018:3)

highlighted that approaches such as Six Sigma, Kaizen, Quality at the Source, continuous improvement, and Lean Manufacturing are not mutually exclusive. Instead, they complement each other in their aim to enhance manufacturing performance by minimizing various forms of waste in operations.

c) Customer satisfaction

Chau (2021:15) suggested that customer satisfaction should serve as a metric for evaluating the effectiveness of quality management initiatives implemented by the company. Consequently, Bhanot et al. (2017:4414) emphasized that manufacturing firms that embrace sustainable practices experience enhanced product quality and market share, leading to increased profits. This is because improving corporate image and market competitiveness are essential aspects of sustainable manufacturing initiatives. Merih (2017:2) added that quality can be measured and valued based on meeting customer requirements.

2.5.3 Staff Performance and Quality Initiatives

Goetsch and Davis (2010:152) found that a positive staff attitude was likely to promote and improve customer relationships with the organization. In terms of the implementation of quality management initiatives, Kaizen refers to employees engaging in continual self-improvement activities and their ability to contribute to team improvement (Goetsch and Davis, 2010:495). The staff quality performance can be conceptualized in employees' suggestions as schemes to address customer complaints in terms of realization and feedback (Martinez-Lorente, Dewhurst and Gallego-Rodriguez 2010: 3229). Quality was understood, primarily, as meeting customer specifications and productivity and it was used as an approach to achieving the targets set by organizations through labour productivity (Gidey, et al., 2014:47). Ifrim, et al. (2020) stated that staff should be accountable within an organization through the perspective of improving the quality of the products and services.

Aftab and Khan (2014:40) reiterated that management techniques employed to enhance quality and productivity in organizations should be based on a comprehensive management approach aimed at engaging employees from top to bottom. This will provide a structure for implementing effective quality and productivity initiatives that could

boost the profitability and competitiveness of an organization. It is observed that positive staff attitudes promote and improve customer relationships within the organization. In terms of the implementation of quality management initiatives, Kaizen refers to employees engaging in continual self-improvement activities and their ability to contribute to a team's improvement (Goetsch and Davis, 2010:495). The staff quality performance can be conceptualized as suggestion schemes of employees to address customer complaints in terms of realization and feedback (Martinez-Lorente, Dewhurst and Gallego-Rodriguez 2010: 3229). Quality is primarily concerned with meeting customer specifications and productivity and it is used as an approach to achieving the targets set by organizations through labour productivity (Gidey, Beshah and Kitaw, 2014:49).

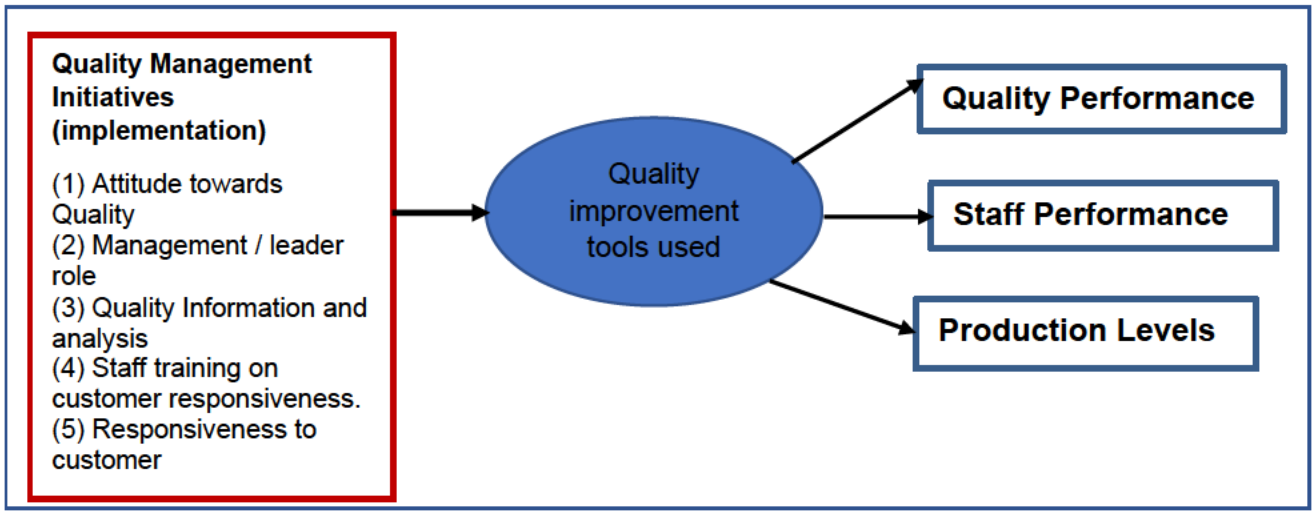
2.6 STUDY MODEL

Thawesaengskulthai (2010:156) indicated that the limitations in the selection of quality and improvement initiatives were based on the perception and past experiences of managers. In addition, the quality management decisions were to be linked to the availability of information required. In this context, the framework below is based on historical information about the organization as well as on the strategic focus and quality policy of the organization. Based on the selection of the Quality Management and Improvement Initiatives Model developed by Thawesaengskulthai and the literature reviewed, this study adopted the conceptual framework, outlined below (Fig 1), as the one to be used. El-Garaihy (2020:12) highlighted that the purpose of performance measurement is to stimulate the formulation of objectives, identify future actions at different levels (tactical, operational, and strategic), and evaluate performance. Performance measurement holds significant importance within an organization as it enhances the efficiency of the supply chain and the flow of products.

To effectively manage integrated supply chains, it is necessary to establish suitable performance measurement systems. These systems monitor the effectiveness and efficiency of the members involved, aiming to accomplish organizational objectives. Additionally, in line with this, the implementation of continuous process improvement is supported by robust measurement systems. These systems enable managers to focus on reducing the factors causing process variations.The primary purpose of any business

is about making a profit. Thus, an organization has to show competence by manufacturing a given order and adopting a profitable approach and mindset. Notably, profit is an indicator used for measuring other variables such as costs assigned to the products or services produced (Gidey, et al., 2014:48).

Figure 2. 3: Quality Management Initiatives on Production, Quality and Staff Performance



Source: Adapted from Thawesaengskulthai (2010:156) and Lobo, Matawie and Samaranayake (2012:107).

To implement quality management initiatives, an organization should consider its quality culture, leadership, and staff. Lobo, et al. (2012:1006) opined that quality leadership, customer focus and satisfaction, quality information and analysis and human resource development were important constructs of quality management practices.

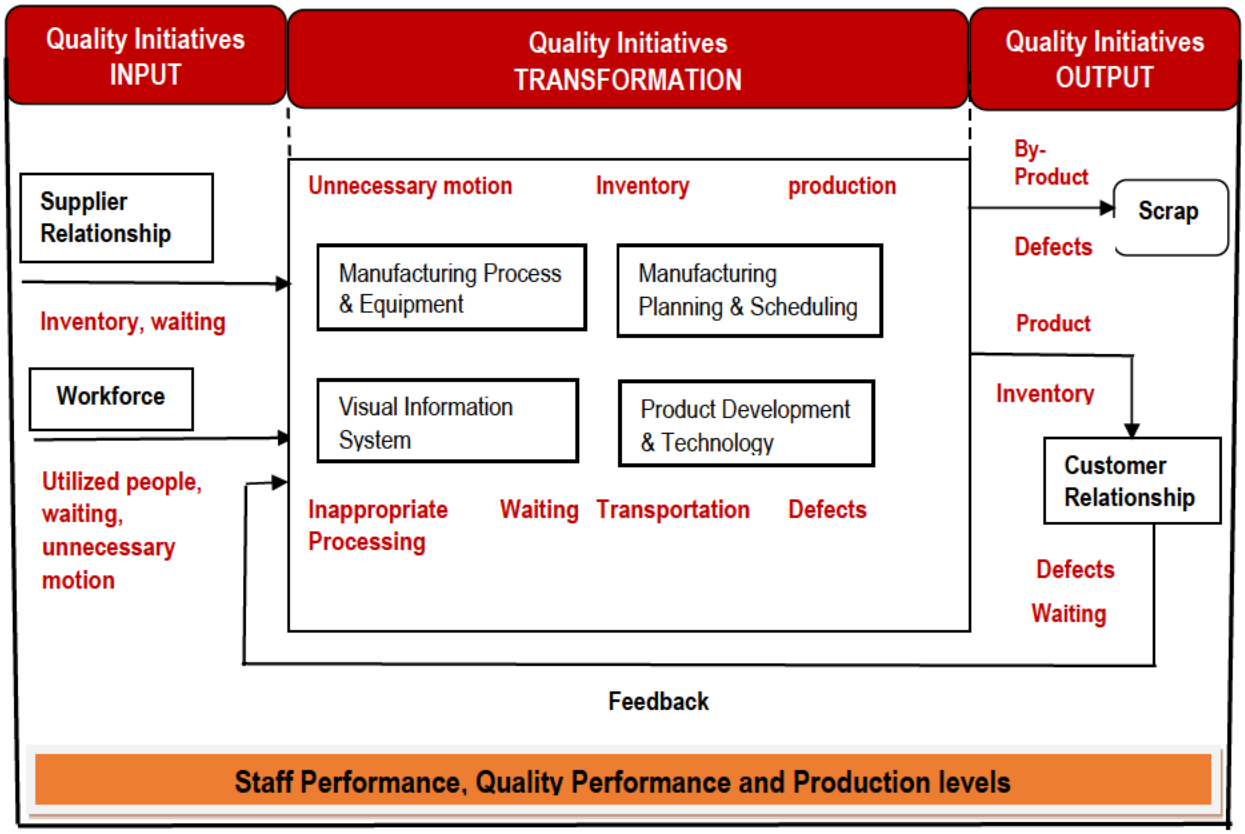
2.7 CONCEPTUAL FRAMEWORK

Thawesaengskulthai (2010:156) indicated that the limitations in the selection of quality and improvement initiatives were based on the perception and past experiences of managers. In addition, the quality management decisions were to be linked to the availability of information required. In this context, the framework below is based on historical information about the organization as well as on the strategic focus and quality policy of the organization. Based on the selecting quality management and improvement

initiatives model developed by Thawesaengskultha and the literature reviewed, the study adopts the following conceptual framework as the one to be used.

Janjic, Bogicevic and Krstic (2019:19) found that companies regardless of the geographical location or countries faced problems in gaining advantages in the context of applying and maintaining improvements in their business, mostly for reasons regarding their production processes and employee performance. Evans (2017) stated that employee performance could be achieved through employee commitment and teamwork that could foster employee motivation and success through the opportunities to learn and to practice new skills. Enhancing the workforce's knowledge, skills and motivation should improve employee performance, quality performance and customer satisfaction. In this context, Abusa and Gibson (2011) indicated that people management was one of the critical factors of TQM that has a significant contribution to both financial and operational performance. Any quality initiatives implementation should be emphasized employee participation and empowerment, and the use of self-managed teams (Pambreni, et al., 2019:1399). Janjic, et al., (2019:19) found that quality improvements should provide a clear orientation of employees for unconditional acceptance to ensure the long-term sustainability of the company. Thus, there should exist the flow of information both vertically and horizontally, the authorization of employees and the skills necessary for decision-making. Among other things, Janjic, et al., (2019:18) confirmed that leadership commitment and support, organizational culture, freedom for employees to take initiatives, and rewarding and training employees were found to be the result of the implementation of quality initiatives in the company. Aftab and Khan (2014:40) stated that TQM should provide a comprehensive and unified management approach for all sections and employees at different levels working across an organization. Furthermore, the approach should provide a structure for implementing effective quality and productivity initiatives that could enhance organizational performance. Figure 2.3 below shows those interrelated organizational sub-systems or units contributing to quality conformance or no-conformance.

Figure 2. 4: Quality Initiatives and Manufacturing Performance Areas



Source: Adapted from Abdul Wahab, Mukhtara and Sulaiman, (2013:1297)

Figure 2.4 shows how an organization may absorb resources but creates less or no value. Abdul Wahab, et al. (2013:1298) defined waste as an absence of quality resulting from how humans, machines, and processes are utilized to achieve organizational goals. On this, the problems with the quality of products and services should be identified from inputs, manufacturing process, and outputs and delivery stages, in which are located production levels, waiting, transportation, unnecessary motion, inappropriate processing, and defect (Abdul Wahab, et al., 2013:1297). Notably, the identification of problems could determine the space where improvement is needed and quality interventions are crucial to focus on the root causes of problems. For example, waiting is directly related to lead time which contributes to customer satisfaction, same as unnecessary motion which

addresses issues with both the human aspects and the layout of the manufacturing processes.

CHAPTER 3: RESEARCH METHODOLOGY AND DESIGN

3.1 INTRODUCTION

According to Rajasekar (2013:5), research methodology is a systematic approach to addressing a research problem and encompasses the principles and techniques employed in conducting research. It involves the various procedures used by an investigator to describe, explain, and predict phenomena. Additionally, research methodology serves as a guide and work plan for conducting a study with the aim of obtaining relevant information (Rajasekar, 2013). In this particular study, a mixed-method research approach will be employed. Creswell (2015:4) defines the mixed-method approach as a comprehensive research process that involves identifying a problem, formulating research questions, collecting data, analysing data, and interpreting the results.

3.2 RESEARCH DESIGN

In order to accomplish the objectives of this study, a mixed-methods approach was employed, combining a cross-sectional survey and interview designs to gather data from the chosen organization. The survey method will enable the collection of numerical data, utilizing questionnaires or structured interviews to capture trends, with the aim of generalizing findings from a sample to a larger population. The case study approach, on the other hand, involves an in-depth exploration of activities or processes over a sustained period, utilizing various data collection methods to gather detailed information (Creswell, 2009:13).

Primary data for this study will be obtained through a survey, utilizing a self-administered questionnaire distributed to the study participants. This survey will be designed to gather relevant information in an efficient and cost-effective manner, aligning with the conceptual structure of the research design, as described by Kumar and Ranjit (2005). Both questionnaires and interviews will be utilized for data collection purposes.

Given the large population size of the study, the quantitative approach is deemed suitable. This choice is based on the cost-effectiveness of administering questionnaires to a large sample compared to the logistical challenges of conducting individual interviews with

each participant (London University, 2014:10). Additionally, considering that the research focuses on employee performance, a potentially sensitive topic, participants may be more willing to provide their input through an anonymous questionnaire rather than engaging in personal interviews.

3.2.1 Target Population

The literature defines a research population as the set of elements from which a sample is selected for participation (Singh and Mangat, 2013:11). O'Leary (2004:102) similarly defines population as the complete membership of a specific category of individuals, objects, or events. Likewise, Sekaran (2006:265) characterizes the target population as the group of interest to which the researcher intends to apply the research findings. According to Sekaran and Bougie (2009), the population represents the entire set of people, events, activities, or objects that the researcher aims to investigate. In this study, as presented in Table 1, the population consists of both managers and non-managers within the organization who are directly affected by the change management process leading to the implementation of quality management initiatives.

Table 3. 1 shows the breakdown of the target population

Production and shop floor employees	Laboratory Employees	Maintenance Employees	Management Category Employees
35	8	10	10

3.2.2 Sampling Design

According to Sharma (2017:749), “sampling is the process of selecting units (for example, people, organizations) from a population of interest so that by studying the sample researchers may fairly generalize their results back to the population from which they were chosen.” According to Laher and Botha (2012:89), there are two categories of sampling methods available: probability sampling and non-probability sampling.This study will use a purposive questionnaire. Purposive or judgmental sampling is mostly

used where the total population of interest is of a manageable size such as a group whose members share a given characteristic under study (Creswell, 2014:158). Brand and Kinash (2010), research methods refer to various techniques or tools employed to gather and analyse data, aiding researchers in accomplishing their objectives. The authors emphasize that methods encompass the specific techniques or processes employed by researchers to conduct their studies, while methodology pertains to the overall discipline or knowledge base that utilizes these methods. Consequently, based on this perspective, non-probability sampling has been chosen as the sampling design for the current study.

Sekaran (2011: 252) explains that non-probability sampling comprises a set of techniques that assist researchers in selecting units from a population of interest for study. Consequently, for this particular investigation, a sample of 200 respondents/participants has been targeted for both interviews and questionnaire administration. This method simplifies the identification of every unit within the population, as each unit does not have an equal opportunity to participate in the study, and the researcher's subjective judgment guides the sample selection process. As Alvi (2016: 13) affirms, judgmental sampling is utilized, enabling the selection of a sample tailored to a specific purpose. This approach facilitates the researcher's ability to choose suitable respondents who possess expertise and can offer valuable insights to the construction industry, aiding in responsible decision-making regarding construction development investments.

3.2.2.1 Sample Size

In this study, the researcher planned to conduct interviews and administer questionnaires to all staff members, including managers, within the organizations involved in the construction industry. Patten and Newhart (2017) define sampling as the process of selecting research participants from a population and making decisions regarding the settings and behaviours to be observed. Cooper and Schindler (2012) argue that the size of the sample depends on the variability of the population parameters being studied and the level of precision desired by the researcher. Several principles influence sample size determination, such as population variance, desired precision, interval range, confidence level, number of subgroups, minimum sample size requirements for subgroups, and

maintaining precision when the calculated sample size exceeds five percent of the population (Saunders et al., 2012).

In research, two primary categories of sampling methods are commonly employed: probability and non-probability methods. Probability methods are based on randomness and probability theory, while non-probability methods are not. Probability samples meet the criteria for utilizing probability theory to accurately generalize findings to the population, unlike non-probability samples (Kobus, 2012). However, this does not imply that non-probability samples are inherently unrepresentative. While researchers can determine the probability or odds of representing the population accurately with a probabilistic sample, non-probabilistic alternatives offer a wide range of considerations (Trochim, 2006). Moreover, Trochim (2006) emphasizes that researchers can estimate confidence intervals for their obtained results.

3.2.2.2 Probability Sampling

A probability sampling method, according to Trochim (2006), is any method of sampling that utilizes some form of random selection. To have a random selection method, one must set up some process or procedure that assures that the different units in one's population have equal probabilities of being chosen. Humans have long practiced various forms of random selection, such as picking a name out of a hat or choosing the short straw (Trochim, 2006). Types of probability sampling designs include simple random sampling, systematic sampling (interval random sampling), stratified sampling (may be proportionate or disproportionate), and cluster sampling/one-stage. Kobus (2012) explains these sampling methods as follows:

- Simple random sampling

  This approach involves the concrete selection of the sample by generating a specific quantity of random numbers, which represents the sample size. The population elements associated with these numbers are then chosen to form the sample. The key aspect of this method is that the numbers must be determined in a random manner.

- Systematic sampling

A systematic sample is obtained by systematically progressing through the sample frame and selecting every kth element. To introduce an element of randomness in the process, the initial starting point is selected randomly.

- Stratified sampling

This sampling technique involves dividing the population into distinct and non-overlapping groups that share similar characteristics. Within each group, independent sampling is performed. The groups, known as strata, can be created based on natural subgroups.

- Cluster sampling

This approach bears similarities to stratified sampling as it involves dividing the population into non-overlapping groups. However, these groups, known as clusters, are typically smaller in size compared to the strata. The cluster sampling method entails randomly selecting a certain number of clusters, from which either all elements or randomly chosen numbers are included as part of the sample.

3.2.2.3 Non-Probability Sampling

With non-probability samples, researchers may or may not represent the population well, and it will often be hard for them to know how well they have done so. In general, researchers prefer probabilistic or random sampling methods over non-probabilistic ones and consider them to be more accurate and rigorous. However, according to Trochim (2006) in applied social research, there may be circumstances where it is not feasible, practical, or theoretically sensible to do random sampling. The purpose or judgment sampling was used for this study, the selection of respondents from the students, probability sampling was used. Purposive or judgmental sampling was used as the total population of interest share a similar characteristic was studied (Creswell, 2014) . Kobus (2012) states that non-probability methods do not rely on randomly selecting elements from the population, but despite this, it is still possible to draw significant conclusions about the population. The following are the types of non-probability sampling methods:

- Convenience sampling

This approach pertains to selecting population elements based on their easy and convenient availability.

- Quota sampling

To employ this sampling technique, the researcher initially needs to identify specific categories of individuals that should be included in the sample, along with the desired number of participants in each category. The sampling process is then carried out using methods such as convenience sampling until the predetermined quotas have been fulfilled.

- Purposive sampling

This sampling method is employed in unique circumstances where sampling is conducted with a specific objective in mind, such as studying attitudes.

- Snowball sampling.

This sampling technique is frequently utilized when the population is challenging to locate or when the research focus is on a closely interconnected group of individuals (Welman et al., 2007).

3.2.3 Data Collection Methods

A questionnaire was used to collect data from the sample. A Likert scale method was used to design the questionnaire. Likert scales: respondents will be asked to state the extent to which they agree or disagree with statements (Welman, Kruger and Mitchell, 2005:30). All items that are on the questionnaire were generated from the reviewed literature in this study. The questionnaire was e-mailed to participants of a sample drawn from the population of personnel of the selected chemical organization in KwaZulu-Natal. This step was taken to ensure that the questions are in line with the purpose and objectives of this study. It is important to note that the primary goal of conducting a census is to gather information about the population and its various characteristics (Baffour, Benard, & King, 2012). The entire population of sixty-three employees directly involved in the implementation of management quality initiatives in the organization participated and completed the questionnaire. It is important to indicate that the final version of the questionnaire was presented to respondents after the literature review chapter of the study was completed. The questionnaire used in this research was pilot tested on the employees that did not form part of the sample. As this is a census study, respondents were selected from a similar chemical manufacturing organization. Five participants were

used in the pilot study; the number included laboratory, management and floor shop employees. The responses of the participants in the pilot study were used to assess the effectiveness of the design of the questionnaires. The researcher assessed whether the responses met the research expectations. As stated by Creswell (2011: 69), data collection involves acquiring valuable information regarding the fundamental qualities produced through a particular process. In qualitative research, data is typically gathered from a smaller sample, which enables a comprehensive and profound understanding of the phenomenon being studied. Collecting qualitative data involves directly interacting with individuals on an individual basis and engaging with them in a group setting to capture their perspectives, interpretations, and understandings of situations, as well as their constructions of reality (Punch and Oancea, 2014).

As part of the research process, personally administered questionnaires were utilized, incorporating a combination of closed and open-ended questions (Sekaran and Bougie, 2009: 212). In addition to questionnaire administration, interviews in the form of personal or face-to-face interactions were employed as a supplementary method for collecting data.Information from interviewees was transcribed by the researcher in terms of facilitating the one-on-one conversation. According to Pietersen and Maree (2007: 345), the closed-ended questions are used for the following advantages:

- They are simple and quick to answer
- Coding and statistical analysis are straightforward
- Sensitive questions are answered without difficulty

3.2.4 Research Variables

According to Lapan and Quartaroli (2009:61), a variable is any characteristic or attitude that can differ across people or things. Variables could be either categorical (how they differ being based on distinct categories) or quantitative which is likely to be measured across a scale, represented by numerical values. In addition, interval, nominal and ratio scales were used to measure the influence of the independent variable (Implementation of the quality management initiatives) on the dependent variables (production level, quality, and staff performance) to determine and evaluate the proportion of the difference

and the variation of dependent variables. This section discusses the independent variable (IV) and dependent variables (DV) of the study. As represented by the conceptual framework, firstly, the quality management initiatives (IV) were measured by factors such as the attitude towards quality, management/leader role, quality information, and analysis, staff training on customer responsiveness, and responsiveness to the customer. The second aspect, quality performance (dependent variable), was evaluated by considering factors such as the proportion of defects, the expenses related to warranty claims, the overall cost of maintaining quality, and an evaluation of the defect rate compared to the industry benchmark. Thirdly, staff performance (DV) includes aspects such as improvement teams and more specifically suggestion schemes (realization and feedback) (Dekier and Grycuk, 2014:6). Lastly, production level (DV) emphasizes that production variation and was observed by the increase or decrease of output in relation with the implementation of quality management initiatives.

3.2.5 Pilot test

According to Calitz (2009: 256), a pilot test serves as a scaled-down version of a full-scale study, acting as a trial run to prepare for the complete research project. It provides the researcher with a clear understanding of the research topic, questions, techniques, methods, and the structure of the research timeline. Additionally, the pilot test serves as both a feasibility study and a means to pre-test instruments, questionnaires, and interviews. In the current study, a pilot test was conducted to identify any flaws, limitations, or weaknesses in the design of the interviews and questionnaires. It allowed the researcher to make necessary revisions before the actual implementation of the study. The pilot test also aided in refining research questions, considering issues such as question inaccuracies, question skips, timing, and respondent interest and attentiveness (de Vaus, 2014: 116). Furthermore, the pilot test was employed to assess the validity and understandability of the questions to be used in the main research. Questionnaires were tested based on the types of information they can provide in response to the defined aim and objectives of the research, findings from available literature on the construction industry, and ethical practices on corporate governance in the construction industry. The intent was to ascertain if the questions posed were easily understandable. Notably, the

respondents involved in the pilot test did not form part of the sample respondents in the main research.

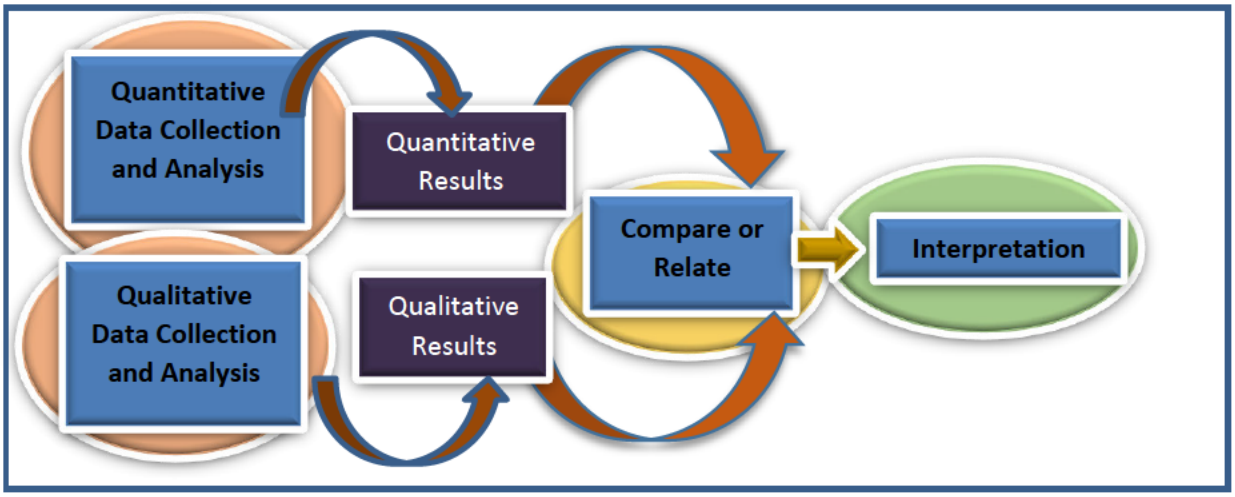
A very common and useful approach in survey research will measure how respondents feel or think about something by using scales (Pietersen and Maree, 2007:155). The In this study, the Likert scale measuring instrument will be employed to assess the degree of agreement or disagreement among the participants regarding statements. The Likert scale consists of a five-point scale, with options ranging from "Strongly Disagree" (1) to "Strongly Agree" (5) (Sekaran and Bougie, 2009: 141, 152).

3.3 DATA ANALYSIS

The findings of the conducted empirical study were presented, examined, and deliberated using descriptive statistics, which were presented in the form of graphs, tables, and charts. These statistical representations were utilized to analyze the quantitative data gathered from the survey participants. A variety of statistical tests like validity and reliability tests were used based on their appropriateness. These tests assisted the researcher to establish and identify patterns in the relationship between variables. Notably, data analysis in mixed-methods research relates to the type of research strategy chosen for the procedures. The analysis occurred both within the quantitative (descriptive and inferential numeric analysis) and the qualitative (description and thematic text analysis) approach and often between the two approaches (Creswell, 2009). Analysis of the data employed the recent version of Statistical Package for Social Sciences (SPSS version 22.0). This approach proved beneficial in analyzing the data provided by the respondents and interpreting specific numerical information within the tables and graphs. These visual representations facilitated a more accessible comprehension of the data analysis process, particularly when explaining the significance of ethical practices in the construction industry of South Africa. The data analysis involved the utilization of tables, graphs, descriptive statistics, inferential statistics, charts, and frequencies. The researcher employed both qualitative and quantitative approaches through the use of SPSS and Nvivo thematic data analysis to draw conclusions from the data.

In mixed-methods research, data collection typically involves the use of questionnaires and interviews, as outlined by Creswell (2011: 69-70). These data are then analyzed using four fundamental mixed-methods designs: convergent parallel design, explanatory sequential design, exploratory sequential design, and embedded design. For this study, the convergent parallel design framework was employed, emphasizing the integration of data through considerations of interaction, priority, timing, and mixing. Following this framework, both quantitative data collection and analysis, as well as qualitative data collection and analysis, were conducted. This involved capturing descriptions, exploring relationships, making comparisons, and even making predictions.

Table 3. 2 : Mixed Methods Designs for Data Analysis



Source: Creswell (2011: 69): Designing and conducting mixed methods research

As indicated by Creswell (2015:4), the provided Figure 1 illustrates that mixed approaches or methods adhere to the overall research process, encompassing the identification of a problem, formulation of research questions, data collection, data analysis, and interpretation of results. The converged parallel design framework of mixed methods will be employed to handle elements from both quantitative and qualitative research within this study.

3.4 VALIDITY AND RELIABILITY

Two main criteria for testing the accuracy of the measuring tools, validity and reliability, are used to test how well questions are structured to measure what is intended to be measured and to test for accuracy and consistency. To test reliability and validity in this study, Cronbach's Alpha was used to test the questionnaire at a 0.75 significance level. To assess the consistency of a measuring method when applied to a different sample under identical conditions, reliability becomes crucial (Middleton, 2019:9). In the same context, Gaiser and Schreiner (2009:69-70) state that validity refers to the extent in which the instrument measured what it was supposed to measure, while reliability refers to the process of ensuring that findings of the research are consistent even when the same instrument is used at the different times or administered to different subjects from the same population. Hansen (2005) highlights validity, reliability, and triangulation as the three essential constructs that contribute to ensuring rigor in research. Validity and reliability are crucial considerations in all studies, as they directly impact the accuracy, dependability, and credibility of the gathered information (Simon, 2011).

3.4.1 Validity

Validity focuses on ascertaining whether the selected data-gathering procedures achieve what it should achieve (Hansen, 2005). Validity, therefore, refers to the degree to which data provide relevant information about the research phenomenon being explored. De Vaus (2014:95) suggests that a valid question accurately measures what it intends to measure, as indicated by the question, "How valid is it?" In this study, the researcher took appropriate measures to ensure that procedures were diligently followed to obtain relevant information from valid questions that pertain to the phenomenon being investigated. The researcher also prioritized the maintenance of quality, rigor, and trustworthiness throughout the data interpretation process. It is indeed crucial for a measuring instrument to be considered valid when it accurately measures what it intends to measure, and reliable when the responses exhibit consistency and stability.

3.4.2 Reliability

Reliability, as defined by Hansen (2005), pertains to the truthfulness of data and the replicability of results. It involves the consistency of outcomes obtained from multiple

participants in the research process. Ensuring reliability necessitates that the same question yields consistent responses when posed to the same individual on different occasions, assuming their circumstances remain unchanged. The question, "How reliable is it?", serves as a guide for the researcher in assessing the accuracy of the gathered data. Any question that fails to elicit consistent responses is deemed unreliable or ambiguous, and vague wording may lead to inconsistent answers as respondents interpret the question differently on different occasions (de Vaus, 2014: 95).

To establish both validity and reliability in this study, the Cronbach Alpha test was employed, utilizing standardized questionnaires. This approach strengthens the study's validity and reliability, as mentioned by Mohsen (2011: 53-54), by assessing the questionnaire's accuracy, internal consistency, and reliability. Additionally, measures were taken to enhance the accuracy of the information gathered. Respondents were given ample time and were not coerced or pressured during the administration of questionnaires or interviews. Furthermore, the expertise of a professional statistician was enlisted to ensure the accuracy of the statistical data analysis, thereby bolstering the reliability and credibility of the study

3.5 ETHICAL CONSIDERATIONS

The researcher implemented an ethical standard aimed at creating a sense of ease and comfort for participants and interviewees. This criterion encompassed demonstrating respect towards the individuals involved, ensuring their protection from any harm, maintaining a professional appearance during data collection, and fostering a friendly demeanour towards participants. Furthermore, measures were taken to safeguard the privacy of respondents by anonymizing their names in the presentation and analysis of data. Furthermore, for the integrity and purpose of this study, collected data was stored and treated professionally, aimed at complying with research ethical requirements as stipulated in section C Ethics of the proposal. To comply with the ethical requirement, efforts were made to ensure that participants remained anonymous and their personal information was not shared. They were not required to include their names on the

questionnaire and the researcher ensured that all information was stored securely on electronic devices which will be kept for 5 years and disposed of thereafter.

The researcher as well as the supervisor of the research project will have access to the data. The application of the Gatekeeper letter was sent to the top management of the company. Confidentiality and anonymity are terms frequently used in research involving human subjects. According to (Simpson and Cherouvis, 2015), confidentiality is an agreement between parties made via the consent process. This implies a careful treatment of information (data) disclosed in a trust relationship and with the expectation that it will not be divulged without permission to others in ways inconsistent with the understanding of the original disclosure. In this research, the researcher undertook to keep the contributions of respondents confidential, unless they explicitly agreed otherwise (preferably in writing). Anonymity refers to the fact that no identifiers (e.g., name, address, telephone number) are collected that link information/records/samples to the individual from whom they were obtained, and privacy, therefore, implies that an individual's control over the extent, timing, and circumstances of sharing him/herself (physically, behaviourally, or intellectually) with others (Simpson and Cherouvis, 2015). Furthermore, researchers must protect the privacy of subjects and must safeguard the privacy of subjects during recruitment for the study and data collection. Data must be stored securely and in a form that prevents, where possible, the identification of individuals. Thus, for this study, the names of participants were kept confidential and anonymous. Information and data collection were saved and reserved during the progression of the study. The gathered information and data will be stored and destroyed 5 years after research completion.

CHAPTER 4: DATA ANALYSIS AND INTERPRETATION OF FINDINGS

4.1 INTRODUCTION

This study examines the influence of quality management initiatives on production levels, quality, and personnel performance. As such, the objectives of the study are:

- To evaluate the implementation of Quality Management initiatives specifically introduced to reduce quality complaints against prescribed implementation protocols available, using historical data obtained from the Company for evaluating staff performance.
- To assess the impact of quality management initiatives in the reduction of quality complaints implemented by the company using historical data obtained from the Company; survey staff to determine their perception of the quality management initiatives implemented by the Company; and
- To propose a continuous improvement strategy based on the study's findings obtained from analysis and discussions based on the previous objectives.

This chapter focuses on the analysis of information linked to each defined objective. It includes sections that deal with the analysis of demographic data, implementation of quality management initiatives, and staff performance. The section that follows analyzes the biographical data.

4.2 RESPONSE RATE

A total of 63 questionnaires were distributed to respondents, and all of them were completed, resulting in a response rate of 100%. However, it should be noted that the desired response rate for the study was set at 70%, which was considered acceptable in order to ensure a fair representation of the respondents from the chemical manufacturing organization.

4.3 THE RESEARCH INSTRUMENT

The research instrument consisted of 63 items with a level of measurement at a nominal or an ordinal level. The questionnaire was divided into 3 sections, which measured various themes and sub-themes discussed in this chapter. However, the Tests used in

this study included descriptive statistics, regression analysis, and factor analysis. These Tests are described as follows:

- **Descriptive statistics:** Descriptive statistics include means and standard deviations, as well as frequencies, which are represented in tables or graphs. According to Simplilearn (2022), descriptive statistics describe, show, and summarize the basic features of a dataset found in a given study, presented in a summary that describes the data sample and its measurements. It helps analysts or researchers to understand the data better. In this study, charts, and graphs explain descriptive statistics. It represents the available data sample, while standard deviation is measured dispersed in statistics to analyze the extent to which data is spread from the mean or average.
- **Regression analysis:** According to CFI Team (2022), Linear Regression estimates the coefficients of the linear equation, involving one or more independent variables that best predict the value of the dependent variable. In addition, regression analysis is a set of statistical methods used for the estimation of relationships between a dependent variable and one or more independent variables. It can be utilized to assess the strength of the relationship between variables and for modeling the future relationship between them. Regression analysis includes several variations, such as linear, multiple linear, and nonlinear. The most common models are simple linear and multiple linear. Nonlinear regression analysis is commonly used for more complicated data sets in which the dependent and independent variables show a nonlinear relationship. This study used a simple linear model that determines the kind of relationship between independent and dependent variables.

An independent variable is a factor that could impact the dependent variable (Cote, 2021); for example, “I want to understand the impact of customer satisfaction on product quality.” In this case, customer satisfaction is the independent variable, and product quality is the dependent variable. Identifying the dependent and independent variables is the first step toward regression analysis. According to Cote (2021), one of the cardinal rules of statistically exploring relationships is to never assume that correlation implies causation.

In other words, just because two variables move in the same direction does not mean one caused the other to occur. However, if two or more variables are correlated, their directional movements are related. If two variables are positively correlated, it means that as one goes up or down, so does the other. Alternatively, if two variables are negatively correlated, one goes up while the other goes down. Therefore, a correlation's strength can be quantified by calculating the correlation coefficient, sometimes represented by "r". The correlation coefficient falls between a negative one and a positive one.

- r = -1 indicates a perfect negative correlation.
- r = 1 indicates a perfect positive correlation.
- r = 0 indicates no correlation.

Furthermore, CFI Team (2022) shows that Linear Model Assumptions consider that Linear regression analysis is based on six fundamental assumptions: the dependent and independent variables show a linear relationship between the slope and the intercept; the independent variable is not random; the value of the residual (error) is zero; the value of the residual (error) is constant across all observations; the value of the residual (error) is not correlated across all observations; and the residual (error) values follow the normal distribution. According to CFI Team (2022), Regression Analysis – Simple Linear Regression is a model that assesses the relationship between a dependent variable and an independent variable. The simple linear model is expressed using the following equation: $Y = a + bx + \epsilon$; where:

Y – Dependent variable
X – Independent (explanatory) variable
a – Intercept
b – Slope
ϵ – Residual (error).

- One sample t-test: Tests whether a mean score is significantly different from a scalar value. According to Prabhakaran (2020), the purpose of the One Sample T Test is to determine if a sample observation could have come from a process that follows a specific parameter (like the mean). Also, the purpose of the T-Test is to

test if the null hypothesis can be rejected or not. The null hypothesis usually assumes that there is no difference between the sample means and the hypothesized mean (comparison mean). Depending on how the problem is stated, the alternate hypothesis can be one of the following 3 cases:

Case 1: H1: $\bar{x} \neq \mu$. Used when the true sample mean is not equal to the comparison mean. Use Two Tailed T Test.

Case 2: H1: $\bar{x} > \mu$. Used when the true sample mean is greater than the comparison means. Use Upper Tailed T Test.

Case 3: H1: $\bar{x} < \mu$. Used when the true sample mean is lesser than the comparison means. Use Lower Tailed T Test.

Where $\bar{x}$ is the sample mean and μ is the population mean for comparison.

- **Factor analysis**: This determines groupings in the items of a construct. According to Rummel (2022), Factor analysis can be applied to explore a content area, structure a domain, map unknown concepts, classify or reduce data, illuminate causal nexuses, screen or transform data, define relationships, test hypotheses, formulate theories, control variables, or make inferences. Consideration of these various overlapping usages will be related to several aspects of the scientific method: induction and deduction; description and inference; causation, explanation, and classification; and theory.

Hence, when using SPSS, a p-value of .000 indicates a very small value and is reported as p<.001, while a p-value of, for example, .017 is reported as p=.017. For a newly developed construct, a reliability coefficient of 0.70 or higher is deemed acceptable.

SECTION A: ANALYSIS OF DEMOGRAPHICS DATA

The analysis of biographical data comprises the following sub-sections:

- Age and Gender Categories
- Department and Experience

4.4.1 Age and Gender Categories

The present study focuses on a chemical manufacturing organization located in KwaZulu-Natal. The staff of this single company was used as the population for the study. The age and gender categories of the staff are displayed in Figure 4.1. It is combining both the age and gender categories.

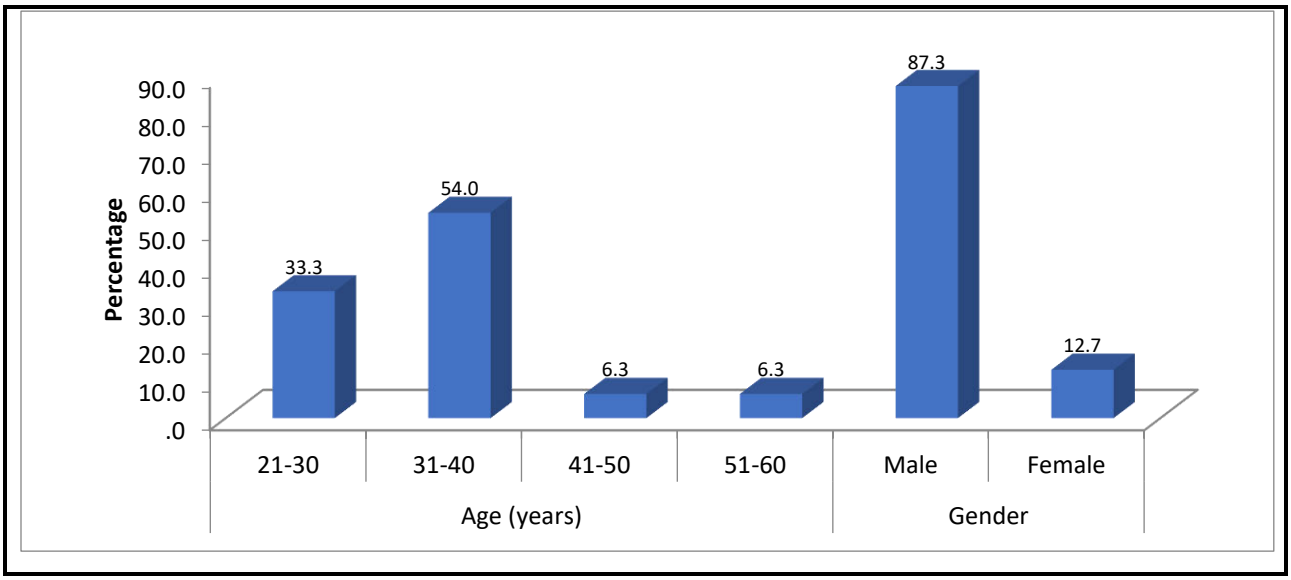


Figure 4. 1 Age of respondents

4.4.1.1 Age Category

Figure 4.1 illustrates the age of respondents as well as their gender. The age category included respondents of age beginning from 21 to 60 years old. Figure 4.1 shows that 54% of respondents who participated in this study were of the age category falling between 31 to 40 years old. However, 33.3% of respondents were between 21 to 30 years old, 6.3% were between 41 to 50 years old, and 6.3% of the respondents were 51 to 60 years old. Figure 4.1 also reveals that around 66.6% of respondents were matured enough to understand the aim and objectives of this study and provide accurate and valid answers to the research questions. In addition, in reference to Figure 4.2 below, it can be assumed that respondents from the age of 21 to 60 years old have had enough experience, knowledge, and ability to provide quality information to this study. The sub-section that follows discusses gender categories in reference to the study participants.

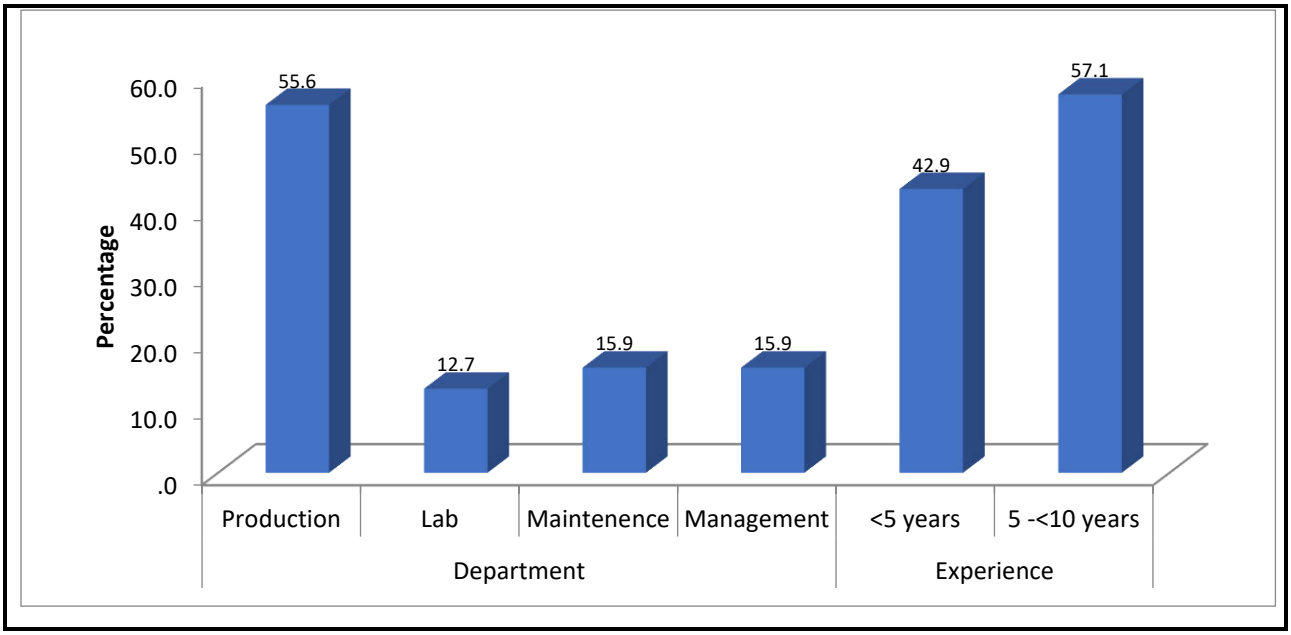
4.4.1.2 Gender category

The discussion related to the gender category is combined with the age category in Figure 4.1. Specifically, this sub-section deals with gender categories. Figure 4.1 demonstrates that males (87.3%) have been in large excess over females (12.7%). It shows a huge gap of inequality in terms of gender participation in this study and translates to an understanding that the chemical manufacturing organization located in KwaZulu-Natal employed more males than females, or that males were more interested to participate in this study than females. On this, depending on the policy of the chemical organization, it is suggested that gender balance should be considered whether in terms of employment or in terms of the participation rate in different types of research to be conducted in the future. The consequences of male dominance in this organization could be that the voice of minority females or their participation in the organizational production process may not be valued significantly. Additionally, the opinions of the female minority make less difference as compared to male opinions. Thus, an innovative approach may be required to equilibrate gender in this organization. The next section discusses personnel experience in departments.

4.4.2 Department and Experience

In total four departments, comprising production, lab, maintenance, and management departments were involved in examining the influence of quality management initiatives on production levels, quality, and personnel performance. Furthermore, personnel experience was also considered to evaluate the implementation of Quality Management initiatives that were specifically introduced to reduce quality complaints against prescribed implementation protocols available, to evaluate staff performance, and to assess the impact of quality management initiatives in the reduction of quality complaints received by the company. This section is divided into two sub-sections. The first one explores the organization of the department, and the second sub-section focuses on the experience of the personnel. Figure 4.2 illustrates both the department under study and personnel experience.

Figure 4. 2 Department and Experience



4.4.2.1 Department

Figure 4.2 indicates that 55.6% of respondents that participated in this study were from the production department, 15.9% were from the maintenance department, 15.9% were from the management department, and 12.7% were from the lab department. It shows that the majority of respondents were from the production department. The reason for targeting most participants or respondents from the production department is that the chemical manufacturing organization has been experiencing an increased number of complaints regarding the quality of products that they manufactured and delivered to customers (Management Report, 2019/2020). Therefore, it was important to have various views from the production department to identify the causes of the non-conforming products to ascertain what changes in the management approach had to be made for the organization to sustainably improve the quality of its products.

4.4.2.2 Experience

The scale of experience of personnel from the chemical manufacturing organization included the trend beginning from less than 5 of experience to another trend comprising between 5 and less than 10 years of experience. Figure 4.2 demonstrates that 57.1% of respondents have had work experience between 5 to less than 10 years and that 42.9%

of respondents have had work experience of less than 5 years. The motive for the evaluation of personnel experience in the chemical manufacturing organization was to address and reduce quality complaints, to improve the working approaches, which were needed to contribute to the necessary changes in manufacturing, and to ensure that change should lead to the required desired results or possible adjustments (O'Flynn and Moberly, 2017:2). In addition, the level of experience was investigated because the approaches to change that were initiated by the management did not ally the complaints from customers.

Furthermore, management revealed that there has been a decline in the number of types of products manufactured (Management Report 2019/2020). The organization's management Report (2019/2020) depicted that there was a decline in production levels from an overall annual achievement of up to 75% to 69%. Therefore, it was very crucial to investigate the level of experience of personnel to diagnose the factors that led to poor quality (Yadav, et al., 2020:3). As will be demonstrated further below, customer dissatisfaction needed to be systematically identified and analyzed. Thus, the persistent quality problems raised the question of quality production levels in the organization as well as staff performance regarding the implementation of quality management initiatives. The section that follows discusses the implementation of quality management initiatives.

4.5 SECTION B: IMPLEMENTATION OF QUALITY MANAGEMENT INITIATIVES

4.5.1 Introduction

Njuguna and Bett (2018:84) described the quality of management initiatives as different aspects of quality initiatives undertaken by an organization to satisfy their customers in terms of the quality of goods, delivery, price, or services. Empirically, quality management is observed through practices enforced by management decisions about organizational improvements (Valmohammadi and Roshanzamir, 2015:168). In addition, Samson and Terziovski, (1999:393), Nair (2006:953), and Sahoo (2020:1424) indicated that a manufacturing organization should focus on identifying a gap in quality management strategies through information and analysis. It was stated earlier that to implement a quality programme, the organization should focus on the factors such as developing a

new attitude towards customers; reducing management layers; linking quality and information to customer needs and problems; training employees on customer responsiveness; and this responsiveness should be continuously improved through the channel of communication (Taifa and Vhora, 2019:148). The next section discusses production across the years 2016 to 2021.

4.5.2 Production across years 2016 to 2021

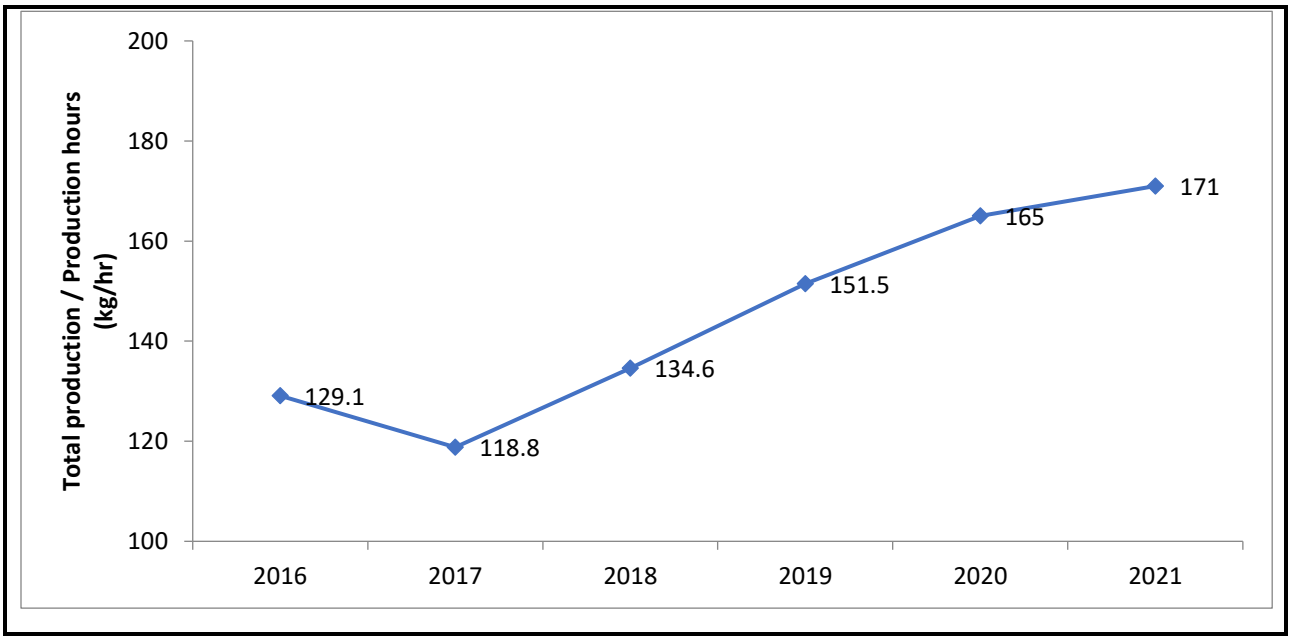
Table 4.1 illustrates total production (kg) across the years 2016 to 2021. Notably, considering COVID-19, the level of production would have been affected, and the production figures affected by shutdowns were scaled up to get the number of production hours in these years. Table 4.1 and Figure 4.3 illustrate production across the years 2016 to 2021.

Table 4. 1 Production across years 2016 to 2021

YEAR	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Total Production (kg)	697 000	589 000	875 000	841 000	725 000	600 000
Total No of Production Hours	5399	4958	6500	5550	4393	3508
Kg /hr	***129.1***	***118.8***	***134.6***	***151.5***	***165***	***171***

Table 4.1 describes the Production across years 2016 to 2021, which is graphically represented in Figure 4.3 below.

Figure 4. 3 Production across years 2016 to 2021



The results for production for the period 2016 to 2021 are represented in Figure 4.3 and Table 4.1 illustrates that implementation happened early in 2019 and late in 2019. Results display an independent samples t-test that indicates the average production rate post-implementation (162.5 kg/hr), which is significantly greater than the average production rate pre-implementation (127.5 kg/hr), t (4) = -4.733, =0.009). In addition, results demonstrate an independent samples t-test that indicates the average production rate post-implementation (168 kg/hr), which is significantly greater than the average production rate pre-implementation (133.5 kg/hr), t (4) = -3.312, =.030). The next section explores customer focus.

4.5.3 Customer Focus

In chapter 2, it was discussed that to implement quality management initiatives, an organization should consider its quality culture, leadership, and staff. Lobo, et al. (2012:1006) opined that quality leadership; customer focus and satisfaction; quality information and analysis; human resource development were important constructs of quality management practices. However, the test used to determine sig agreement disagreement for customer focus is the one-sample t-test. As it was stated further above,

the one-sample t-test is a statistical hypothesis test used to determine whether an unknown population mean is different from a specific value. In addition, N, Mean, Std. Deviation, and Std. Error Mean can be viewed in Tables that are placed in the appendices. The interpretation to understand the significant results consists of the following:

- For the significant results (p<.05) in Figure 4.4 below, we looked at [one-sample statistics] to see the size of the mean value. This suggests that if sig and mean <3 it can be interpreted as sig disagreement; but if sig and mean >3 can be interpreted as sig agreement.

Figure 4. 4 Customer focus

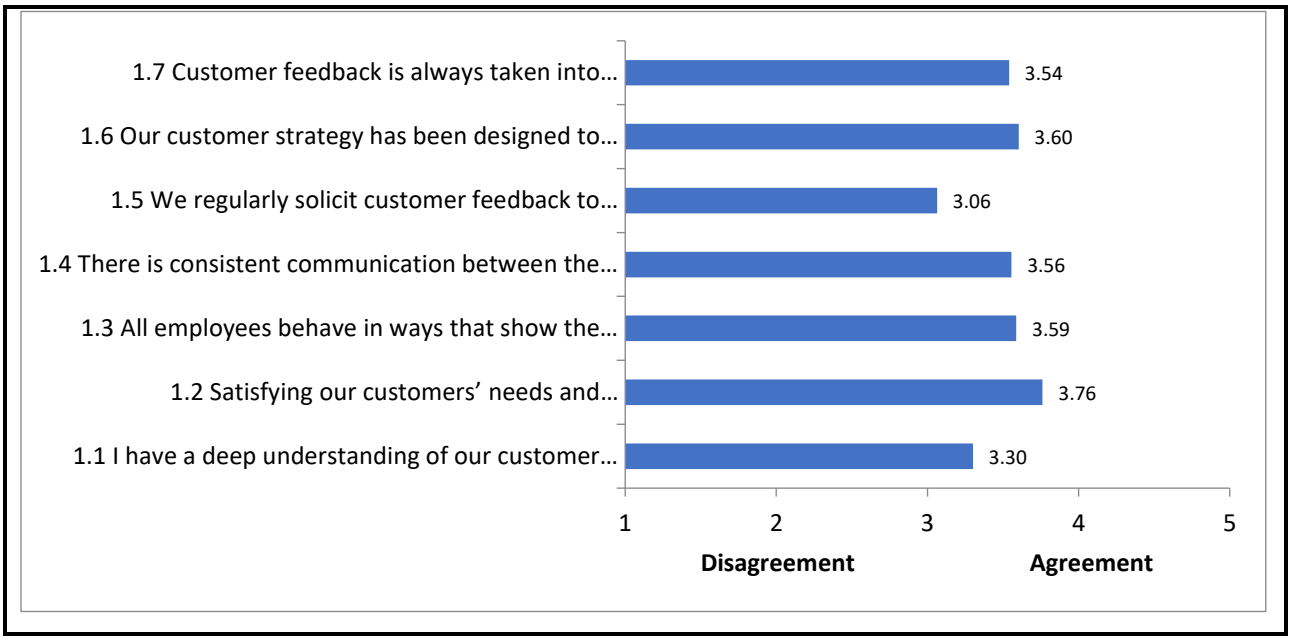


Figure 4.4 and Table 4.2 explain the significance of results based on customer focus in the chemical manufacturing organization. So, for this analysis, all items except q1.5 show significant agreement. There is neither sig agreement nor sig disagreement to q1.5. As can be observed in Figure 4.3, q1.7; q1.6; q1.4; q1.3; q1.2; and q1.1 are positive (>3), which means that respondents have agreed to the statements related to each question suggested to them. In other words, results reveal that respondents have approved that customer feedback is always into consideration, customer strategy has been designed to focus on customer needs and deliver products/services beyond customer expectations,

there is consistent communication between the company and customers, all employees behave in ways that show the importance of customers to satisfying customers' needs and expectations, which is important to the company, and that the company have a deep understanding of customer needs, and look at means/approaches or methods they might use to develop over the years.

Table 4. 2 Responses as Frequency (%)

Item	Responses as Frequency (%)					N	Mean (SD)	T	Df	p-value
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree					
1.1 I have a deep understanding of our customers' needs and how they might develop over the years	-	18 (28.6)	15 (23.8)	23 (36.5)	7 (11.1)	63	3.30 (1.010)	2.370	62	.021*
1.2 Satisfying our customers' needs and expectations is important to us	-	-	19 (30.2)	40 (63.5)	4 (6.3)	63	3.76 (-.560)	10.803	62	<.001*
1.3 All employees behave in ways that show the importance of customers.	-	8 (12.7)	19 (30.2)	27 (42.9)	9 (14.3)	63	3.59 (.891)	5.229	62	<.001*
1.4 There is consistent communication between the company and customers.	-	9 (14.3)	18 (28.6)	28 (44.4)	8 (12.7)	63	3.56 (.894)	4.932	62	<.001*
1.5 We regularly solicit customer feedback to improve products/services	9 (14.3)	17 (27.0)	6 (9.5)	23 (36.5)	8 (12.7)	63	3.06 (1.318)	.382	62	.704

1.6 Our customer strategy has been designed to focus on customer needs and deliver products/services beyond customer expectations	-	8 (12.7)	15 (23.8)	34 (54.0)	6 (9.5)	63	3.60 (.834)	5.743	62	<.001*
1.7 Customer feedback is always taken into consideration.	-	-	34 (54.0)	24 (38.1)	5 (7.9)	63	3.54 (.643)	6.660	62	<.001*

Table 4.2 represents response frequency (%). The analysis to determine a composite variable measure the construct applied to factor analysis. The factor analysis demonstrates that items/questions group together well. The reliability of these groupings is checked using Cronbach's alpha. An alpha >0.7 is considered to indicate reliability. Consequently, a ProMax rotation was utilized to perform factor analysis on the set of 7 items. This analysis revealed the extraction of two factors, which together explained 72.52% of the variation in the data. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) yielded a value of 0.798, indicating that the data was suitable for reliable and successful extraction. Additionally, the Bartlett's test showed significance, further supporting the adequacy of the data. The rotation process reached convergence after 3 iterations. The factor loadings are summarized in Table 4.3 below.

Table 4. 3 Factor loadings – Customer focus

	Factor	
	1	2
1.1 I have a deep understanding of our customer's needs and how they might develop over the years	.974	
1.5 We regularly solicit customer feedback to improve products/services	.938	
1.4 There is consistent communication between the company and customers.	.904	
1.7 Customer feedback is always taken into consideration.	.741	
1.3 All employees behave in ways that show the importance of customers.		.831
1.6 Our customer strategy has been designed to focus on customer needs and deliver products/services beyond customer expectations		.718
1.2 Satisfying our customers' needs and expectations is important to us		.638

Cronbach's alpha was employed to assess the reliability of these factors, as demonstrated in Table 4.3. However, the frequency of responses affirms that the organization has a deep understanding of customer needs, therefore, satisfying customers' needs and expectations is an important factor for the organization. In addition, the frequency of response also demonstrates that all employees are committed to behaving in ways that show the importance of customers and that there is consistent communication between the company and customers. Furthermore, customer strategy has been designed to focus on customer needs and deliver products/services beyond customer expectations. Thus, customer feedback is always taken into consideration for product and service improvement. The factors and their assigned labels are summarized in Table 4.4 below.

Table 4. 4 Customer focus

Factor	**Construct**	**Items included**	**Variance extracted**	**Cronbach's alpha**
1	Feedback (FEED)	1, 4, 5, 7	51.57	.912
2	Focus (FOC)	2, 3, 6	20.95	.748

Analysis shows that both these composite variables are reliable (alpha >0.7). Composite variables are created by computing the mean of the agreement scores for all the items encompassed within the variable. These composite variables are analyzed to determine if there is significant agreement or disagreement. Test used= one-sample t-test. Therefore, Table 4.5 and Table 4.6 , describe respectively One-Sample statistics and One-sample Test.

Table 4. 5 One-Sample Statistics

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
FEED	63	3.3651	.88653	.11169
FOC	63	3.6508	.63197	.07962

Table 4. 6 One-Sample Test

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
FEED	3.269	62	.002	.36508	.1418	.5883
FOC	8.174	62	.000	.65079	.4916	.8100

Table 4.5 and Table 4.6 indicate that there is sig agreement that feedback from customers is used; and that the importance of customers is a focus of the company. In addition, sig agreement shows that there is consistent communication between the company and customers; and that customer feedback is always taken into consideration. Furthermore, these tables describe that all employees behave in ways that show the

importance of customers; and that customer strategy has been designed to focus on customer needs to deliver products/services beyond customer expectations. Thus, the sig agreement indicates also that satisfying customers' needs and expectations are important to the chemical manufacturing company.

4.5.4 Information and Analysis

4.5.4.1 Introduction

According to Thawesaengskultha (2010:156), attitude towards quality, management/ leader role, quality information and analysis, staff training on customer responsiveness, and responsiveness are some of the factors that trigger improvement and performance, towards implementing quality management initiatives in a company. In addition, Strydom (2011:170) stated that to achieve customer satisfaction, the organization must identify areas where improvement is required, for example, information about customer complaints and appropriate responses to resolve them. Evaluating the implementation of quality management initiatives provides necessary information that can be used for decisions making, especially when and where change requires an investment of resources. The section that follows discusses the information and analysis (Figure 4.5).

Table 4. 7 Information and analysis

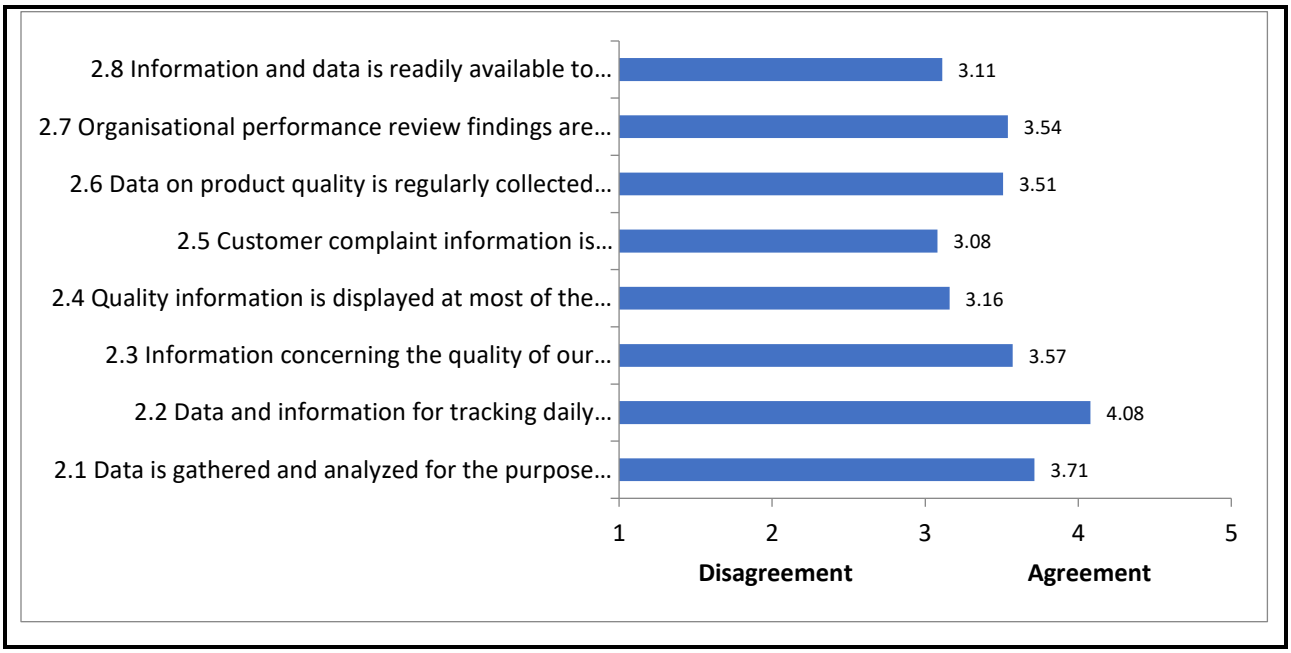


Figure 4.7 is linked to Table 4.8, which describes the information and analysis aspect of the chemical manufacturing company.

Table 4. 8 Information and analysis

Item	Responses as Frequency (%)					n	Mean (SD)	t	Df	p-value
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree					
2.1 Data is gathered and analyzed to improve quality in the company.	-	8 (12.7)	9 (14.3)	39 (61.9)	7 (11.1)	63	3.71 (.831)	6.819	62	<.001*
2.2 Data and information for tracking daily operations and performance are collected and analyzed.	-	8 (12.7)	8 (12.7)	18 (28.6)	29 (46.0)	63	4.08 (1.052)	8.144	62	<.001*
2.3 Information concerning the quality of our primary product is readily available.	-	-	35 (56.6)	20 (31.7)	8 (12.7)	63	3.57 (.712)	6.370	62	<.001*
2.4 Quality information is displayed at most of the workstations	9 (14.3)	-	32 (50.8)	16 (25.4)	6 (9.5)	63	3.66 (.096)	1.150	62	.255
2.5 Customer complaint information is communicated to staff	9 (14.3)	8 (12.7)	18 (28.8)	25 (39.7)	3 4.8	63	3.08 (1.140)	.552	62	.583
2.6 Data on product quality is regularly collected and analyzed	-	9 (14.3)	-	31 (49.2)	5 (7.9)	63	3.51 (.840)	4.800	62	<.001*
2.7 Organizational performance review findings are used to develop priorities for	-	9 (14.3)	20 (31.7)	25 (39.7)	9 (14.3)	63	3.54 (.913)	4.693	62	<.001*

continuous improvement										
2.8 Information and data is readily available to employees who need it.	-	17 (27.0)	26 (41.3)	16 (25.4)	4 (6.3)	63	3.11 (.882)	1.000	62	.321

Table 4.8 and Figure 4.5 above indicate the analysis that determines a composite variable to measure this construct. Factor analysis with ProMax rotation was applied to these 8 items. The extraction process yielded two factors, explaining 65.21% of the variability observed in the data. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) obtained a value of .698, indicating that the data was suitable for successful and reliable extraction. Furthermore, the Bartlett's test showed significance, further supporting the adequacy of the data for the extraction process. The rotation process achieved convergence after three iterations.

Table 4. 9 Factor analysis - Information and analysis

	Factor	
	1	2
2.7 Organizational performance review findings are used to develop priorities for continuous improvement	.836	
2.4 Quality information is displayed at most of the workstations	.798	
2.8 Information and data is readily available to employees who need it.	.752	
2.6 Data on product quality is regularly collected and analyzed	.730	
2.5 Customer complaint information is communicated to staff	.690	
2.3 Information concerning the quality of our primary product is readily available.	.663	
2.2 Data and information for tracking daily operations and performance are collected and analyzed.		.934
2.1 Data is gathered and analyzed to improve quality in the company.		.813

The frequency of responses related to information and analysis displayed that organizational performance review findings are used to develop priorities for continuous

improvement. In addition, quality information is displayed at most of the workstations, and information and data are readily available to employees who need it. It is also indicated that data on product quality is regularly collected and analysed, customer complaint information is communicated to staff, information concerning the quality of the organizational primary product is readily available, data and information for tracking daily operations and performance are collected and analysed to improve quality in the company. Table 4.9 shows that these factors are tested for reliability using Cronbach's alpha. The factors and their assigned labels are summarized in Table 4.10 below.

Table 4. 10 Information and analysis

Factor	**Construct**	**Items included**	**Variance extracted**	**Cronbach's alpha**
1	Information (INFO)	3, 4, 5, 6, 7, 8	43.62	.873
2	Analytics (ANAL)	1, 2	21.59	.829

Analysis shows that both composite variables are reliable (alpha >.7). Composite variables are generated by computing the mean of the agreement scores across all the items incorporated within the variable. These composite variables are analyzed to determine if there is significant agreement or disagreement between them. Test used= one-sample t-test. Therefore, Table 4.11 and Table 4.12, describe respectively One-Sample statistics and One-sample Test.

Table 4. 11 One-Sample Statistics

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
INFO	63	3.3280	.73627	.09276
ANAL	63	3.8968	.87602	.11037

Table 4. 12 One-Sample Test

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
INFO	3.536	62	.001	.32804	.1426	.5135
ANAL	8.126	62	.000	.89683	.6762	1.1174

Analysis shows that these composite variables are reliable (alpha >.7). To create composite variables, the agreement scores of all the items within the variable are averaged together. These composite variables are analyzed to determine if there is significant agreement or disagreement between them. Test used= one-sample t-test. Therefore, except for q2.5 and q2.3, which are below (alpha >.7), meaning that there is neither sig agreement nor sig disagreement concerning customer complaint information communicated to staff, as well as information concerning the quality of the company's primary product readiness and availability.

However, Table 4.11 and Table 4.12 indicate that there is sig agreement on organizational performance review findings, which are used to develop priorities for continuous improvement. In addition, these tables show that quality information is

displayed at most of the workstations, and information and data are readily available to employees who need it. Data on product quality is regularly collected and analyzed, as well as data and information for tracking daily operations and performance are also collected and analyzed. Furthermore, Table 4.9 A and Table 4.9 B demonstrate that data is gathered and analyzed to improve quality in the company.

4.5.5 Management/Leadership Role

It was stated earlier that leadership aims to help people, machines, and gadgets to do a better job. According to (Salomon and Steyn, 2017:3), good leadership has serious implications for any change initiatives within the organization, the sector, and even outside the sector. To implement quality management initiatives, an organization should consider its quality culture, leadership, and staff. Lobo, et al. (2012:1006) opined that quality leadership; customer focus and satisfaction; quality information and analysis; human resource development were important constructs of quality management practices. Additionally, Aftab and Khan (2014:40) reiterated that management techniques that could be employed to enhance quality and productivity in organizations were based on a comprehensive management approach to engage employees from top to bottom as this provided a structure for implementing effective quality and productivity initiatives that could boost the profitability and competitiveness of an organization. Furthermore, Samson and Terziovski, (1999:393), Nair (2006:953), and Sahoo (2020:1424) postulated that management directs their efforts to customer satisfaction, and to implement appropriate staff training and quality readiness for continuous improvement. To this extent, Figure 4.5 exhibits the role of management/leadership in the chemical manufacturing organization.

Figure 4. 5 Management/leadership role

Figure 4.5 shows an Analysis to determine a composite variable to measure this construct. The set of 13 items underwent factor analysis with ProMax rotation. As a result, a single factor was extracted, explaining 80.55% of the variation in the data. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) yielded a value of .916, indicating that the data was suitable for reliable and successful extraction. Furthermore, the Bartlett's test showed significance, suggesting that the data was adequate for the extraction process and could be considered reliable. Table 4.10 below shows factors aligned to Management/leadership role.

Table 4. 13 Factors aligned to management/leadership role.

	Factor
	1
3.1 There is a transparent mission and vision about quality in the company.	.964
3.10 Top management actively participates in quality management and improvement process	.938
3.5 Management regularly monitors my role in meeting company quality targets.	.938
3.7 The commitment of management to quality and customer satisfaction is visible to staff.	.921
3.3 The company has a clear quality plan and policy.	.912
3.6 There is a company-wide culture committed to quality improvement.	.900
3.8 There is an emphasis on continuous improvement in the company.	.897
3.4 Management encourages staff to actively participate in quality initiatives	.897
3.9 My manager facilitates communication between me and top management	.896
3.11 Top management empowers employees to solve quality problems	.883
3.12 Top management makes adequate resources available for employee education and training	.866
3.2 Management actively promotes the manufacturing of good quality products.	.852
3.13 Top management focuses on product quality rather than yields	.790

Table 4.13 illustrates the frequency of responses aligned to management/leadership roles from the chemical organization. Most importantly, it shows that there is a transparent mission and vision for quality in the company. Top management actively participates in quality management and improvement process by regularly monitoring organizational roles in meeting quality targets. Results revealed that the company has a clear quality plan and policy and the commitment of management to quality and customer satisfaction is visible to staff. In addition, there is a company-wide culture commitment to quality improvement, and management encourages staff to actively participate in quality initiatives. Notably also, to ensure continuous quality improvement, managers are committed to facilitating communication between employees and top management. On

the other hand, Top management empowers employees to solve quality problems and intends to make adequate resources available for employee education and training to actively promote the manufacturing of good-quality products. This implies that Top management focuses on product quality rather than yields.

Table 4. 14 Management/leadership role

Factor	**Construct**	**Items included**	**Variance extracted**	**Cronbach's alpha**
1	Management (MAN)	1 - 13	80.55	.980

This analysis shows that the composite variable is reliable (alpha >.7). Composite variables are constructed by computing the mean of the agreement scores for all the items encompassed within the variable. These composite variables are analyzed to determine if there is significant agreement or disagreement between them. Test used= one-sample t-test. Table 4.15 and Table 4.16 describe respectively One-Sample statistics and One-sample Test.

Table 4. 15 One-Sample Statistics

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
MAN	63	3.0016	1.10243	.13889

Table 4. 16 One-Sample Test

One-Sample Test

	Test Value = 3					
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
MAN	.011	62	.991	.00155	-.2761	.2792

This analysis shows that there is neither sig agreement nor sig disagreement that management/leadership 'is completely on board' regarding product quality aspects. In addition, Table 4.15 and Table 4.16, which are linked to Table 4.11 and 4.12 indicate also that there is a transparent mission and vision for quality in the company. Top management actively supports and participates in quality management and improvement processes by regularly monitoring staff roles in meeting company quality targets. Thus, the sig agreement shows that the commitment of management to quality and customer satisfaction is visible to staff.

4.5.6 Staff Training and Education

Samson and Terziovski, (1999:393), Nair (2006:953), and Sahoo (2020:1424) postulated that management should direct their efforts on customer satisfaction through the implementation of appropriate staff training and to ensure quality readiness for continuous improvement. Figure 4.7 illustrates the factors related to staff training and education.

Figure 4. 6 Staff training and education.

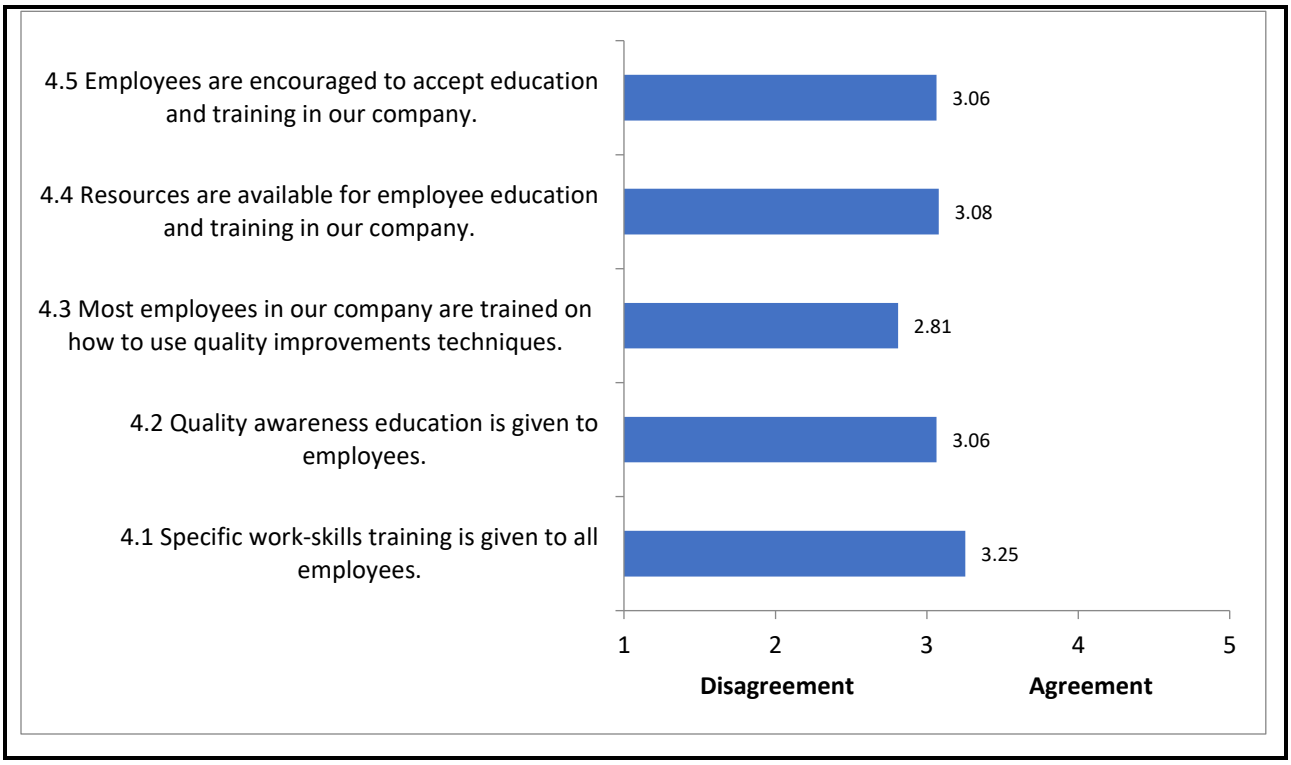


Figure 4.6 reflects the results of the analysis to determine a composite variable to measure this construct. Factor analysis was conducted on a set of 5 items using ProMax rotation. This analysis resulted in the extraction of a single factor that accounted for 69.92% of the variability observed in the data. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) yielded a value of .810, indicating that the data was suitable for successful and reliable extraction. Additionally, the Bartlett's test showed significance, further supporting the adequacy of the data for the extraction process. Table 4.17 represents the factors related to staff training and education.

Table 4. 17 Staff training and education.

	Factor
	1
4.3 Most employees in our company are trained in how to use quality improvement techniques.	.986
4.4 Resources are available for employee education and training in our company.	.910
4.5 Employees are encouraged to accept education and training in our company.	.865
4.2 Quality awareness education is given to employees.	.769
4.1 Specific work-skills training is given to all employees.	.597

Table 4.17 indicates the frequency of responses based on staff training and education. It shows that most employees in the manufacturing company are trained in how to use quality improvement techniques. Therefore, resources are available for employee education and training, while employees are encouraged to accept education and training within the company. In addition, results reveal that quality awareness education is given to all employees for specific work-skills training.

Table 4. 18 Factor analysis

Factor	**Construct**	**Items included**	**Variance extracted**	**Cronbach's alpha**
1	Training and education (TED)	1 – 5	69.92	.915

This analysis shows that the composite variable is reliable (alpha >.7). Composite variables are formed by calculating the average of the agreement scores for all items

included in the variable. These composite variables are analyzed to determine if there is no significant agreement or disagreement with them. Test used= one-sample t-test. Therefore, Table 4.19 and Table 4.20 describe respectively One-Sample statistics and One-sample Test.

Table 4. 19 One-Sample Statistics

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
TED	63	3.0540	1.07416	.13533

Table 4. 20 One-Sample Test

One-Sample Test

	Test Value = 3					
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
TED	.399	62	.691	.05397	-.2166	.3245

This analysis shows that there is neither sig agreement nor sig disagreement that training and education are offered/given. In other words, Table 4.19 and Table 4.20, which are linked to Table 4.18 describe that there is no specific work-skills training that is given to all employees. However, significant agreement shows that most employees in the chemical manufacturing company are trained in how to use quality improvement techniques. Resources are available for employee education and training in the company. Therefore, employees are encouraged to accept education and training offered to them via quality awareness campaigns on education, which is given to employees.

4.5.7 Responsiveness to Customers

According to Goetsch and Devis (2010:39), a manufacturer must consistently provide superior value to customers in terms of cost, quality, and service. The expectation of success of quality initiatives is the result of gaining an understanding of customers and their requirements (Nel, 2017:163). Thawesaengskultha (2010:156) postulated that staff training on customer responsiveness and responsiveness to the customer are amongst the factors of quality management initiatives that can be identified as a trigger of organizational improvement and performance. Thus, to implement a quality programme, the organization is likely to focus on training employees in customer responsiveness, and this responsiveness should be continuously improved through the channel of communication (Taifa and Vhora, 2019:148). Figure 4.8 demonstrates factors that are linked to responsiveness to customers in the chemical manufacturing company.

Figure 4. 7 Responsiveness to customers

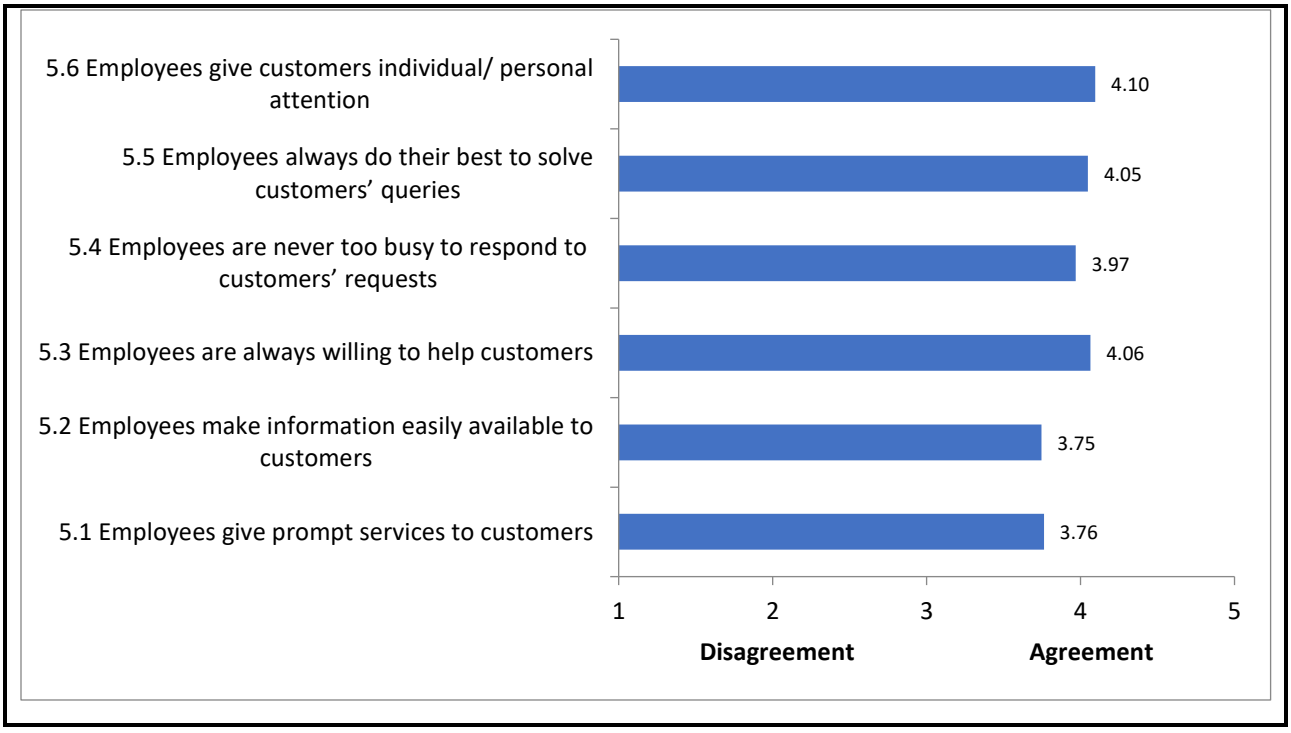


Figure 4.7 displays a Sig agreement to all factors related to responsiveness to customers. This analysis determines a composite variable to measure construct in which factor analysis with ProMax rotation was applied to these 5 items. Two factors were identified, explaining 75.82% of the variation present in the data. The Kaiser-Meyer-Olkin Measure

of Sampling Adequacy (KMO) yielded a value of .750, indicating that the data was suitable for reliable and successful extraction. Furthermore, the Bartlett's test showed significance, providing additional support for the adequacy of the data for the extraction process. The rotation process reached convergence after three iterations. Table 4.21 indicates Factors that are related to responsiveness to customers.

Table 4. 21 Factors related to responsiveness to customers.

	Factor	
	1	2
5.5 Employees always do their best to solve customers' queries	.913	
5.6 Employees give customers individual/ personal attention	.913	
5.3 Employees are always willing to help customers	.863	
5.4 Employees are never too busy to respond to customers' requests	.817	
5.2 Employees make information easily available to customers		.875
5.1 Employees give prompt services to customers		.816

Table 4.21 is linked to the factors related to responsiveness to customers. However, the frequency of responses indicates that employees always do their best to solve customers' queries by giving customers individual/ personal attention. Furthermore, employees are always willing to help customers by responding to customers' requests and making information easily available to customers.

5.1 Employees give prompt services to customers.

Table 4. 22 Responsiveness to customers

Factor	Construct	Items included	Variance extracted	Cronbach's alpha
1	Responsiveness to customers 1 (RES1)	3, 4, 5, 6	51.81	.927
2	Responsiveness to customers 2 (RES2)	1, 2	24.01	.833

This analysis shows that the composite variable is reliable (alpha >.7). Composite variables are created by averaging the agreement scores of all items contained within the variable. These composite variables are analyzed to determine if there is no significant agreement or disagreement with them. Test used= one-sample t-test. Therefore, Table 4.23 and Table 4.24 describe respectively One-Sample statistics and One-sample Test.

Table 4. 23 One-Sample Statistics

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
RES1	63	4.0437	.74127	.09339
RES2	63	3.7540	.55990	.07054

Table 4. 24 One-Sample Test

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
RES1	11.175	62	.000	1.04365	.8570	1.2303
RES2	10.688	62	.000	.75397	.6130	.8950

This analysis shows Sig agreement that both forms of responsiveness are present. In other words, Table 4.23 and Table 4.24, which are linked to Table 4.22 describe that employee always does their best to solve customers' queries by giving customers individual/personal attention. In addition, Sig agreement indicates that employees are always willing to help customers and are never too busy to respond to customers' requests by making information easily available to customers and giving prompt services to them.

4.6 SECTION C: STAFF PERFORMANCE

4.6.1 Introduction

Earlier in this study, it was stated that the persistent quality problem raised a question of production levels in the organization as well as quality and staff performance regarding the implementation of quality management initiatives. Consequently, this study envisaged determining the effectiveness of quality management initiatives that were implemented in addressing the production levels, customer satisfaction and staff performance within the organization. Notably, staff quality performance can be conceptualized as embedded in employee suggestion schemes to address customer complaints in terms of realization and feedback (Martinez-Lorente, Dewhurst and Gallego-Rodriguez 2010: 3229). Quality is primarily concerned with meeting customer specifications and productivity, and it is used as an approach to achieving the targets set by organizations through labour

productivity (Gidey, Beshah and Kitaw, 2014:49). Lobo, Matawie and Samaranayake (2012:106) emphasized that the performance output of an organization is a function of customer satisfaction.

Furthermore, Sony, Naik and Theresa (2019:420) observed that businesses should focus on improvements in every possible opportunity whether in the context of financial crises or quality costs. The business improvement initiatives should be implemented for the competitive and operational performance of the organization. Goetsch and Davis (2010:152) found that a positive staff attitude was likely to promote and improve customer relationships with the organization. In terms of the implementation of quality management initiatives, Kaizen refers to employees engaging in continual self-improvement activities and their ability to contribute to the team's improvement (Goetsch and Davis, 2010:495). Moreover, El-Garaihy (2020:12) indicated that performance measurement intends to encourage goals design, to identify future steps at tactical, operational and strategic levels, and performance assessment. Performance measurement plays an essential role in the organization as it improves the supply chain and product flow. Appropriate performance measurement systems are needed for managing integrated supply chains. Both the effectiveness and efficiency of staff members are monitored through performance measurement to achieve organizational goals. Figure 4.9 displays Team improvement/ Staff performance.

Figure 4. 8 Team improvement

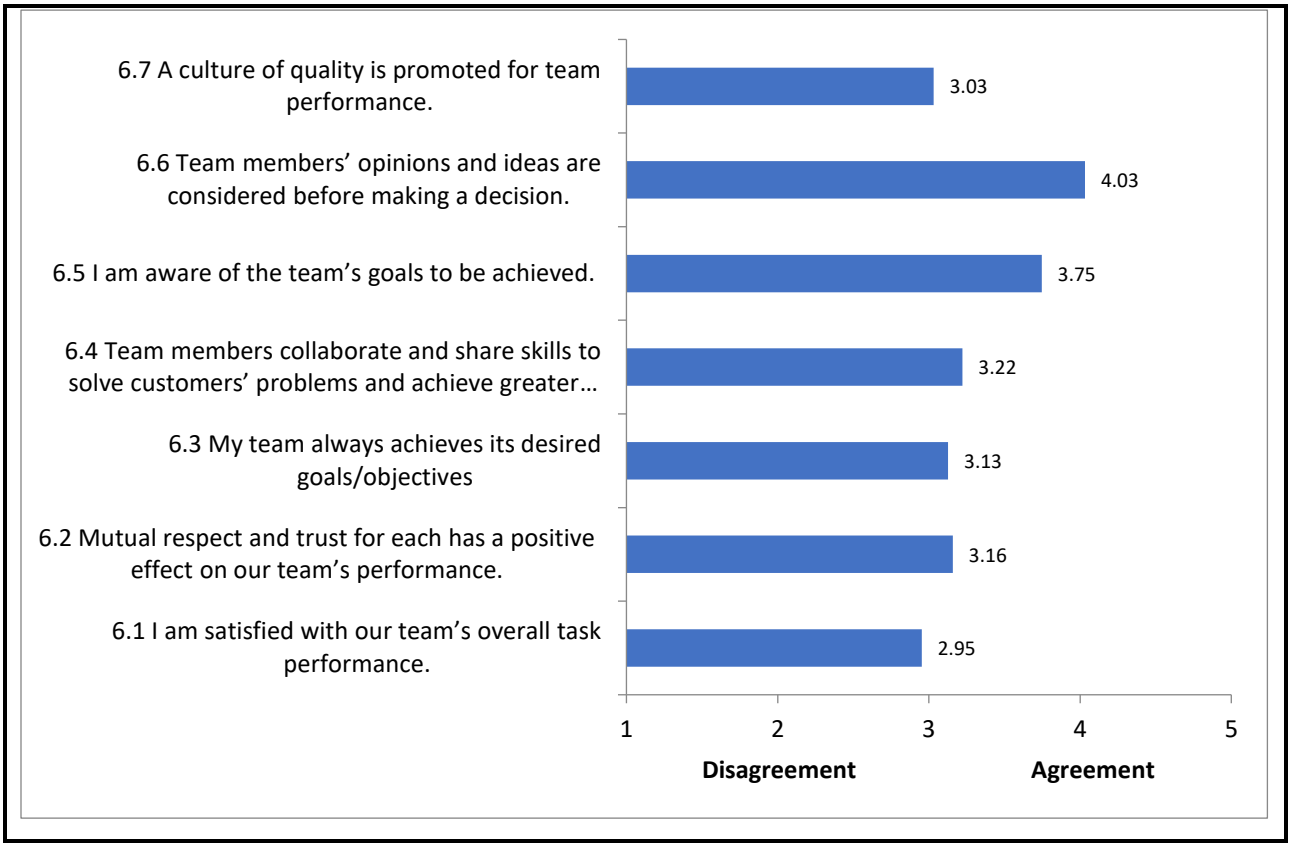


Figure 4.8 shows a Sig agreement to 5 and 6 only, which links to team improvement or staff performance.In this analysis, a composite variable was established to assess a construct by conducting factor analysis with ProMax rotation on a set of 7 items. The analysis resulted in the extraction of two factors, explaining 90.50% of the variability observed in the data. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) obtained a value of .830, indicating that the data was suitable for successful and reliable extraction. Additionally, the Bartlett's test showed significance, further supporting the adequacy of the data for the extraction process. The rotation process reached convergence after 3 iterations. Table 4.25 indicates Factors that are related to staff performance or team improvement.

Table 4. 25 staff performance or team improvement.

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
6.1 I am satisfied with our team's overall task performance.	-.269	62	.789	-.048	-.40	.31
6.2 Mutual respect and trust for each has a positive effect on our team's performance.	1.182	62	.242	.159	-.11	.43
6.3 My team always achieves its desired goals/objectives	.767	62	.446	.127	-.20	.46
6.4 Team members collaborate and share skills to solve customers' problems and achieve greater results.	1.411	62	.163	.222	-.09	.54
6.5 I am aware of the team's goals to be achieved.	7.378	62	.000	.746	.54	.95
6.6 Team members' opinions and ideas are considered before deciding.	8.193	62	.000	1.032	.78	1.28
6.7 A culture of quality is promoted for team performance.	.195	62	.846	.032	-.29	.36

Table 4.25 shows that there is Sig agreement to 5 and 6 only. The analysis determines a composite variable to measure this construct. Factor analysis was conducted on a set of 7 items using ProMax rotation. This analysis resulted in the extraction of two factors, which explained 90.50% of the variation in the data. The Kaiser-Meyer-Olkin Measure of

Sampling Adequacy (KMO) yielded a value of .830, indicating that the data was suitable for reliable and successful extraction. Additionally, the Bartlett's test showed significance, further supporting the adequacy of the data for the extraction process. The rotation process achieved convergence after 3 iterations. Table 4.26 illustrates the factors that correspond to staff performance or team improvement.

Table 4. 26 factors that correspond to staff performance or team improvement.

	Factor	
	1	2
6.4 Team members collaborate and share skills to solve customers' problems and achieve greater results.	1.009	
6.3 My team always achieves its desired goals/objectives	.977	
6.7 A culture of quality is promoted for team performance.	.931	
6.2 Mutual respect and trust for each has a positive effect on our team's performance.	.925	
6.1 I am satisfied with our team's overall task performance.	.895	
6.6 Team members' opinions and ideas are considered before deciding.		.949
6.5 I am aware of the team's goals to be achieved.		.838

Table 4.26 illustrates the factors that correspond to staff performance or team improvement. Results show that team members are mostly collaborative in sharing skills to solve customers' problems and achieve greater results (desired goals/objectives). Therefore, a culture of quality is promoted for team performance, and mutual respect and trust for each employee have a positive effect on the team's performance. However, managers are satisfied with the team's overall task performance and team members' opinions and ideas are considered before planning and deciding. Thus, managers acknowledged that they are aware of staff performance that contributes to the achievement of the team's goals.

Table 4. 27 Factor construct

Factor	Construct	Items included	Variance extracted	Cronbach's alpha
TEAM1	Team performance 1 (TEAM1)	1, 2, 3, 4, 7	67.83	.974
TEAM2	Team performance 2 (TEAM2)	5, 6	22.67	.848

This analysis shows that the composite variable is reliable (alpha >.7). Composite variables are created by taking the average of the agreement scores for each item that is part of the variable. These composite variables are analyzed to determine if there is no significant agreement or disagreement with them. Test used= one-sample t-test. Therefore, Table 4.28 and Table 4.29 describe respectively One-Sample statistics and One-sample Test.

Table 4. 28 One-Sample Statistics

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
TEAM1	63	3.0984	1.21010	.15246
TEAM2	63	3.8889	.84455	.10640

Table 4. 29 B One-Sample Test

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
TEAM1	.646	62	.521	.09841	-.2063	.4032
TEAM2	8.354	62	.000	.88889	.6762	1.1016

This analysis shows Sig agreement that both forms of responsiveness are present. In other words, Table 4.28 and Table 4.29, which are linked to Table 4.19 describe that TEAM2 shows sig agreement while TEAM1 displays a different aspect (is not sig.). This implies that TEAM2 is about working together, and that team members' opinions and ideas are considered before decisions are made. Hence, team members are aware of the team's goals to be achieved. TEAM1 shows performance because Team members collaborate and share skills to solve customers' problems and achieve greater results. Results indicate also that TEAM1 always achieves its desired goals/objectives. A culture of quality, mutual respect, and trust for each member of the team has a positive effect on promoting the team's performance. Management is satisfied with the team's overall task performance. Figure 4.9 shows the realization of the level of performance.

Figure 4. 9 Realization

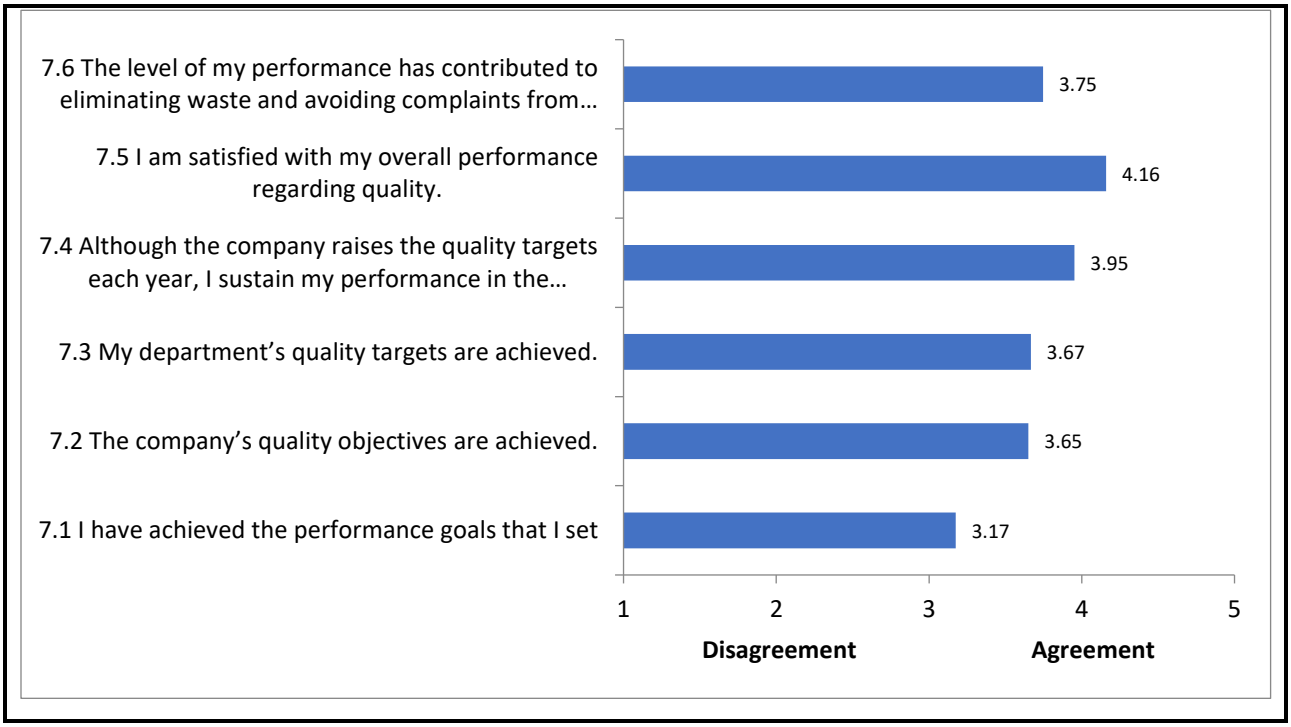


Figure 4.9 shows a Sig agreement to all, except 7.1 (not sig). In this analysis, a composite variable was established to assess a construct by conducting factor analysis with ProMax rotation on a set of 6 items. The analysis resulted in the extraction of two factors, which explained 66.37% of the variability observed in the data. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) obtained a value of .667, indicating that the data was suitable for successful and reliable extraction. Additionally, the Bartlett's test showed significance, further supporting the adequacy of the data for the extraction process. The rotation process reached convergence after 3 iterations.

Table 4.30 indicates Factors that are related to Realization.

Table 4. 30 Realization

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
7.1 I have achieved the performance goals that I set	1.277	62	.207	.175	-.10	.45
7.2 The company's quality objectives are achieved.	7.387	62	.000	.651	.47	.83
7.3 My department's quality targets are achieved.	8.171	62	.000	.667	.50	.83
7.4 Although the company raises the quality targets each year, I sustain my performance in the department.	14.497	62	.000	.952	.82	1.08
7.5 I am satisfied with my overall performance regarding quality.	12.001	62	.000	1.159	.97	1.35
7.6 The level of my performance has contributed to eliminating waste and avoiding complaints from customers.	7.570	62	.000	.746	.55	.94

Table 4.30 represents Sig agreement to all except 7.1 (not sig). The analysis to determine a composite variable to measure this construct. Such as indicated further above, Factor analysis was conducted on a set of 6 items using ProMax rotation. As a result, two factors

were extracted, explaining 66.37% of the variation in the data. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) obtained a value of .667, suggesting that the data was appropriate for successful and reliable extraction. Additionally, the Bartlett's test showed significance, further supporting the adequacy of the data for the extraction process. The rotation process achieved convergence after 3 iterations.

Table 4. 31 Factors linked to Realisation.

	Factor	
	1	2
7.1 I have achieved the performance goals that I set	.943	
7.3 My department's quality targets are achieved.	.884	
7.2 The company's quality objectives are achieved.	.817	
7.5 I am satisfied with my overall performance regarding quality.		.824
7.4 Although the company raises the quality targets each year, I sustain my performance in the department.		.607
7.6 The level of my performance has contributed to eliminating waste and avoiding complaints from customers.		.595

Table 4.31 discusses factors that are linked to the realization. The frequency of opinions affirmed that the performance goal was settled, and the department's quality targets were achieved. In addition, the company's quality objectives were also achieved. However, managers are satisfied with the overall performance regarding quality, although the company raises the quality targets each year. It is surmised that the level of managers' performance has contributed to eliminating waste and avoiding complaints from customers.

Table 4. 32 Table 4.24 construct Realization

Factor	Construct	Items included	Variance extracted	Cronbach's alpha
1	Realization of goals and targets (GOAL)	1, 2, 3	46.20	.881
2	Realization of personal performance (PP)	4, 5, 6	20.17	.694

This analysis shows that the composite variable is reliable (alpha >.7). Composite variables are created by taking the average of the agreement scores for each item that is part of the variable. These composite variables are analyzed to determine if there is no significant agreement or disagreement with them. Test used= one-sample t-test. Therefore, Table 4.33 and Table 4.34 describe respectively One-Sample statistics and One-sample Test.

Table 4. 33 A One-Sample Statistics

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
GOAL	63	3.4974	.74985	.09447
PP	63	3.9524	.55150	.06948

Table 4. 34 One-Sample Test

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
GOAL	5.265	62	.000	.49735	.3085	.6862
PP	13.707	62	.000	.95238	.8135	1.0913

This analysis shows Sig agreement that both forms of responsiveness are present. In other words, Table 4.33 and Table 4.34, which are linked to Table 4.23 describe that Sig agreement for both realizations exist. This implies that Factor 1 (GOAL) shows a Sig agreement on the achievement of the performance goals that were set. The company, as well as the department, have reached or achieved respectively the quality targets and achieved the quality objectives. Concerning Factor 2 (PP), Sig agreement displays that There is satisfaction with the overall performance regarding quality. The level of performance in the department or the entire organization has contributed to eliminating waste and avoiding complaints from customers.

4.6.2 Feedback

4.6.2.1 Introduction

According to Martinez-Lorente, Dewhurst and Gallego-Rodriguez (2010: 3229), staff quality performance is conceptualized in employees' suggestions regarding strategies to address customer complaints in terms of realization and feedback. Feedback is most often needed when a company expresses a need for change and when evaluation is required to determine whether a decision resulted in improvements. An evaluation conducted by management to identify the causes of the non-conforming products

indicated that a change in the management approach had to be made to ensure that the organization improves the quality of its products to be sustainable. Feedback from such evaluation will lead to an alternative decision for change and improvement. Furthermore, according to Gidey, Beshah and Kitaw (2014:48), any variation in production should necessitate evaluation and feedback on the effectiveness of the quality programme. Figure 4.11 discusses the feedback.

Figure 4. 10 Feedback

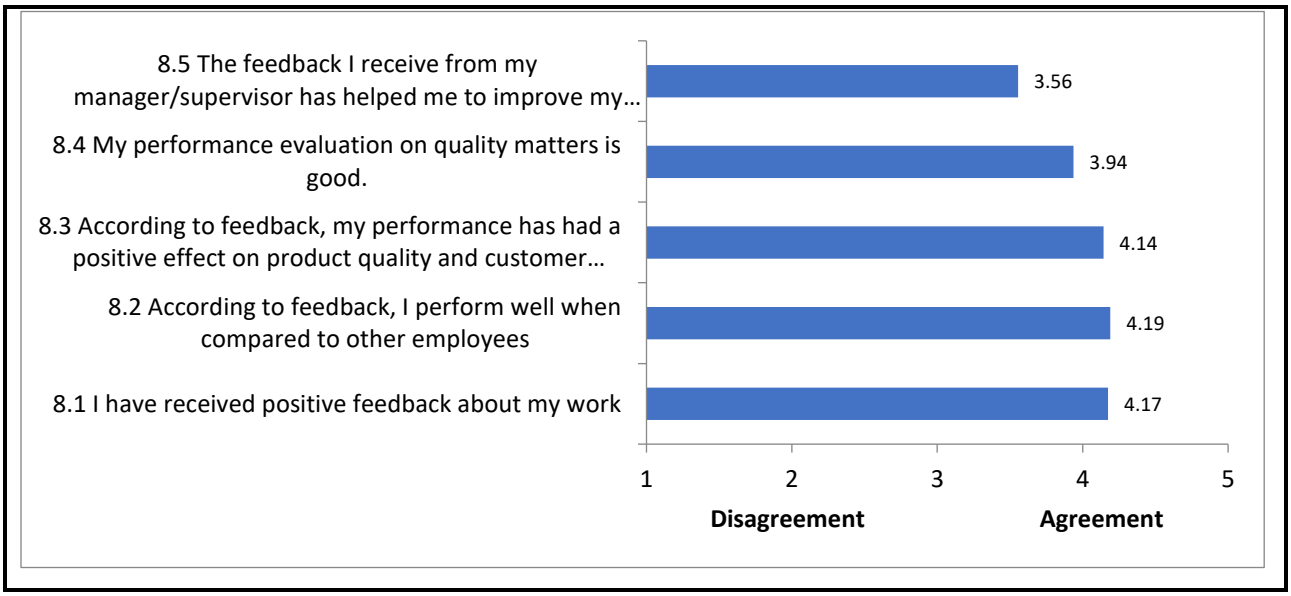


Figure 4.10 illustrates a Sig agreement to 5 items related to feedback. In this analysis, a composite variable was established to assess a construct by conducting factor analysis with ProMax rotation on a set of 6 items. The analysis resulted in the extraction of two factors, explaining 71.80% of the variability observed in the data. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) yielded a value of .740, indicating that the data was suitable for successful and reliable extraction. Additionally, the Bartlett's test showed significance, further supporting the adequacy of the data for the extraction process. The rotation process reached convergence after 3 iterations.Table 4.26 indicates Factors that are related to factors that are related to feedback.

Table 4. 35 One-Sample Test

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
8.1 I have received positive feedback about my work	9.393	62	.000	1.175	.92	1.42
8.2 According to feedback, I perform well when compared to other employees	12.814	62	.000	1.190	1.00	1.38
8.3 According to feedback, my performance has had a positive effect on product quality and customer service	11.631	62	.000	1.143	.95	1.34
8.4 My performance evaluation on quality matters is good.	13.894	62	.000	.937	.80	1.07
8.5 The feedback I receive from my manager/supervisor has helped me to improve my performance	5.035	62	.000	.556	.33	.78

Table 4.35 demonstrates Sig agreement with all. The analysis to determine a composite variable to measure this construct. Hence, factor analysis with ProMax rotation was utilized to examine these 5 items. Two factors were identified, explaining 71.80% of the variability in the data. A Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) of .740 and a significant Bartlett's test both suggest that the data was suitable for reliable and successful extraction. The rotation process reached convergence after 3 iterations.Table 4.36 indicated feedback. factors.

Table 4. 36Table 4.27 Feedback Factors

	Factor	
	1	2
8.2 According to feedback, I perform well when compared to other employees	.935	
8.3 According to feedback, my performance has had a positive effect on product quality and customer service	.927	
8.1 I have received positive feedback about my work	.706	
8.5 The feedback I receive from my manager/supervisor has helped me to improve my performance		.843
8.4 My performance evaluation on quality matters is good.		.686

Table 4.36 explains the feedback factors. Results indicate that feedback shows the level of performance of certain employees who perform well compared to other staff. It also displays that individual performance has had a positive effect on product quality and customer service. In some other cases, the feedback from managers helped staff to improve their performance and to keep a positive and quality behavior/attitude for better services.

Table 4. 37Construct factors

Factor	**Construct**	**Items included**	**Variance extracted**	**Cronbach's alpha**
FEED1	Feedback 1 (FEED1)	1, 2, 3	56.56	.886
FEED2	Feedback 2 (FEED2)	4, 5	15.24	.664

This analysis shows that the composite variable is reliable (alpha >.7). Composite variables are created by taking the average of the agreement scores for each item that is part of the variable. These composite variables are analyzed to determine if

there is no significant agreement or disagreement with them. Test used= one-sample t-test. Therefore, Table 4.38 and Table 4.39 describe respectively One-Sample statistics and One-sample Test.

Table 4. 38 One-Sample Statistics

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
FEED1	63	4.1693	.76170	.09597
FEED2	63	3.7460	.62780	.07910

Table 4. 39 One-Sample Test

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
FEED1	12.185	62	.000	1.16931	.9775	1.3611
FEED2	9.432	62	.000	.74603	.5879	.9041

This analysis shows Sig agreement that both forms of responsiveness are present. In other words, Table 4.38 and Table 4.39, which are linked to Table 4.36 describe Sig agreement that both types of feedback are present. FEED1 indicates that the outcome of feedback shows employees' performance and that employees have received positive feedback from the work done. Thus, positive feedback on work performance has had a positive effect on product quality and customer service. The analysis above addressed the first objective – evaluating the implementation of Quality Management initiatives (QMI) that were specifically introduced to reduce quality complaints against prescribed

implementation protocols available using historical data obtained from the Company by evaluating staff performance. Now, an analysis will be done to evaluate the effect that QMI has on Staff performance. Regression analysis will be applied to determine these effects. The DVs will be the factors found in questions 6, 7, and 8. These are TEAM1, TEAM2, GOAL, PP, FEED1 and FEED2. They are used in individual analyses. The IVs are all factors found under the analysis of QMI. These are used together in each analysis so that they can identify which of the IVs stands out as influencing each performance DV when all IVs act together. For all regression analyses, standard checks are made on conditions. Table 4.40 illustrates DV = TEAM1 (Team performance).

Table 4. 40 DV = TEAM1 (Team performance)

IV	**R^2**	**F**	**df1; df2**	**p-value**	**B (regression coefficient)**	**T**	**p-value**
FEED	.950	126.957	8; 54	<.001	.108	.806	.424
FOC					.193	1.042	.302
INFO					.383	1.758	.084
ANAL					.207	1.813	.075
MAN					.391	3.230	.002*
TED					.118	.921	.361
RES1					-.350	-2.571	.013*
RES2					.270	2.374	.021*

Table 4.40 shows that the eight independent variables account for 95% (R^2= .950) of the variance of TEAM1, F (8; 54) = 126.957, p<.001. Three of the independent variables are significant predictors of team performance: MAN (management support), β=.391, p=.002; RES1 (responsiveness to customers 1), β= -.350, p=.013; and RES2 (responsiveness to customers 2), β=.270, p=.021. The coefficient for RES1 is negative which means that higher RES1 leads to lower TEAM1, while higher RES2 leads to higher TEAM1. Table 4.30 translates that management support and responsiveness to customers have a positive impact on the team's performance or team improvement.

Table 4. 41 DV =TEAM2 (Teamwork)

IV	R^2	F	df1; df2	p-value	B (regression coefficient)	t	p-value
FEED	.846	37.172	8; 54	<.001	-.089	-.543	.589
FOC					.083	.369	.714
INFO					.347	1.309	.196
ANAL					.527	3.793	<.001*
MAN					-.070	-.474	.637
TED					.095	.606	.547
RES1					.427	2.579	.013*
RES2					-.043	-.313	.755

Table 4.41 illustrates that the eight independent variables account for 84.6% (R^2= .846) of the variance of TEAM2, F (8; 54) = 37.172, p<.001. Two of the independent variables are significant predictors of teamwork: ANAL (analysis), β=.527, p=.001, and RES1 (responsiveness to customers 1), β= .427, p=.013. The coefficient for RES2 is negative which means that higher RES2 leads to lower TEAM2, while higher RES1 leads to higher TEAM2.

Table 4.41 translates good teamwork, meaning that ANAL and RES1 both have a positive effect on TEAM2 (working together).

Table 4. 42 DV = GOAL

IV	R^2	F	df1; df2	p-value	B (regression coefficient)	t	p-value
FEED	.900	61.006	8; 54	<.001	-.030	-.259	.796
FOC					-.080	-.497	.621
INFO					.497	2.624	.011*
ANAL					.323	3.249	.002*
MAN					.230	2.181	.034*

TED					.038	.338	.736
RES1					-.186	-1.567	.123
RES2					.028	.280	.780

Table 4.42 shows that the eight independent variables account for 90% (R^2= .900) of the variance of GOAL, F (8.54) = 61.006, p<.001. Three of the independent variables are significant predictors of goal achievement: INFO (information), β=.497, p=.011; ANAL (analysis), β= .323, p=.002; and MAN (management support), β=.230, p=.034. The coefficient for RES1 is negative which means that higher RES1 leads to lower TEAM1, while higher RES2 leads to higher TEAM1. Table 4.42 discloses that information (INFO), analysis (ANAL), and management support (MAN), all have positively affected GOAL achievement (realization of goals and targets).

Table 4. 43 DV= PP

IV	**R^2**	**F**	**df1; df2**	**p-value**	**B (regression coefficient)**	**t**	**p-value**
FEED	.662	13.215	8; 54	<.001	-.258	-1.637	.108
FOC					.104	.477	.635
INFO					.397	1.547	.128
ANAL					.347	2.576	.013*
MAN					.015	.106	.916
TED					-.122	-.808	.423
RES1					.068	.421	.676
RES2					.071	.530	.598

Table 4.43 demonstrates that the eight independent variables account for 66.2% (R^2= .662) of the variance of PP, F (8.54) = 13.215, p<.001. Only one independent variable is a significant predictor of PP realization or achievement: ANAL (analysis), β= .347, p=.013. This means that information analysis has positively affected or contributed to the realization of personal performance (PP). The coefficient for TED is negative which

means that efforts will be required to encourage staff to accept training and education within the company. Most employees in the company should be trained in how to use quality improvement techniques and provide available resources for employee education and training in the company. Also, awareness of quality education and specific work-skills training should be addressed to all employees.

Table 4. 44 DV- FEED1

IV	**R^2**	**F**	**df1; df2**	**p-value**	**B (regression coefficient)**	**t**	**p-value**
FEED	.908	66.730	8; 54	<.001	-.274	-2.412	.019*
FOC					-.176	-1.115	.270
INFO					-.014	-.078	.938
ANAL					.449	4.631	<.001*
MAN					.051	.493	.624
TED					.095	.869	.389
RES1					.554	4.796	<.001*
RES2					.262	2.707	.009*

Table 4.44 shows that the eight independent variables account for 90.8% (R^2= .908) of the variance of FEED1, F (8; 54) = 66.730, p<.001. Four of the independent variables are significant predictors of feedback to improve products/services: FEED (feedback to improve products/services), β= -274, p=.019; ANAL (analysis), β= .449, p=.001; RES1 (responsiveness to customers 1), β= .554, p=.001; and RES2 (responsiveness to customers 2), β= .262, p=.009. The coefficient for FEED, FOC, and INFO are negative, which means that ANAL and RES1 have a positive effect on FEED1, while FEED has a negative effect on FEED1.

Table 4. 45 DV- FEED2

IV	**R^2**	**F**	**df1; df2**	**p-value**	**B (regression coefficient)**	**t**	**p-value**
FEED	.880	49.289	8; 54	<.001	-.543	-5.064	<.001*
FOC					.282	1.901	.063
INFO					1.107	6.343	<.001*
ANAL					.179	1.962	.055
MAN					.251	2.583	.013*
TED					-.245	-2.388	.020*
RES1					-.008	-.073	.942
RES2					-.007	-.075	.940

Table 4.45 displays that the eight independent variables account for 88% (R^2= .880) of the variance of FEED2, F (8; 54) = 49.289 p<.001. Four of the independent variables are significant predictors of feedback to improve products/services: FEED (feedback to improve products/services), β= -543, p=.001; INFO (information), β= 1.107, p=.001; MAN (management support), β= .251, p=.013; and TED (training and education), β= -2.238, p=.020. The coefficients for FEED, TED, RES1, and RES2 are negative, which means that ANAL and RES1 have a positive effect on FEED1, while FEED has a negative effect on FEED1.

4.7 SUMMARY

This study focused on a chemical manufacturing organization located in KwaZulu-Natal to examine the quality management initiatives on production levels, quality, and staff performance of the company. This chapter evaluated the implementation of QMI against some prescribed protocols, the effect of the implementation of QMI on quality performance, the effect of the implementation of QMI on staff performance, and the effect of the implementation of QMI on production levels. The general conclusion will provide useful strategies and recommendations for the improvement of quality performance in the company, as well as for the improvement of quality management initiatives on staff quality performance in the company. In addition, useful strategies and recommendations will also be provided for the improvement of quality management initiatives at production levels.

The findings in this chapter reveal that most respondents (54%) who participated in this study were of the age category falling between 31 to 40 years old, and that males (87.3%) participated massively in this study more than females (12.7%). In addition, results show that 55.6% of respondents that participated in this study were from the production department and that 57.1% of respondents have had work experience between 5 to less than 10 years. Concerning the effect of the implementation of QMI on production levels, results revealed that there is a significantly greater effect of QMI on production than the average production rate pre-implementation. Furthermore, the effect of the implementation of QMI on staff performance demonstrates that there is performance because Team members collaborate and share skills to solve customers' problems and achieve greater results or desired goals/objectives.

A culture of quality, mutual respect, and trust for each member of the team has revealed a positive effect on promoting the team's performance. Results also show that management is satisfied with the team's overall task performance. Moreover, the analysis based on the effect of the implementation of QMI on quality performance showed that customer feedback is always taken into consideration for improvement. There is also evidence from the findings that all employees behave in ways that show the importance of customers for the organization, given that, customer strategy has been designed to focus on customer needs to deliver quality products/services beyond customer

expectations. This significant agreement also indicates that satisfying customers' needs and expectations are important to the chemical manufacturing company. The next and last chapter presents the general conclusion of this study.

CHAPTER 5: GENERAL CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The preceding chapter presented statistical evidence and findings in this study through the use of the Statistical Package for Social Sciences (SPSS version 22.0) for the quantitative aspect, and the Nvivo software package and thematic data analysis for the qualitative aspect. The results obtained in this study were compared to that obtained via the literature review. This was done to assess the effect of quality management initiatives on production, quality, and personnel performance. This chapter focuses on the attainment of the study objectives and examines the key findings and their importance. It also addresses the limitations, gaps, and potential areas for future research. In summary, the chapter presents the research conclusions and illustrates how the recommendations align with the research objectives and questions.

5.2 GENERAL CONCLUSIONS

This study assessed the influence of quality management initiatives on production, quality, and personnel performance. This aim was achieved through the investigation of the following objectives:

- The evaluation of the implementation of quality management initiatives against some prescribed protocols;
- The evaluation of the effect of the implementation of quality management initiatives on quality performance;
- The assessment of the impact of the implementation of quality management initiatives on production levels in the company selected for this study;
- The evaluation of the effect of the implementation of quality management initiatives on staff performance; and
- The continuation of the improvement strategy based on information obtained from the objectives above.

Additionally, research questions were formulated to assess the achievement of defined objectives in light of views and the relevant theories gleaned from the literature review. An analysis of the collected data was performed and compared with data from reviewed

existing literature. The section that follows examines and concludes the evaluation of the implementation of quality management initiatives against some prescribed protocols.

5.2.1 Objective 1: Evaluation of the Implementation of Quality Management Initiatives Against Some Prescribed Protocols

This objective evaluated the implementation of quality management initiatives against some prescribed protocols. In the review of literature, it was indicated by Njuguna and Bett (2018:84) that the quality of management initiatives has different aspects of quality initiatives undertaken by an organization to satisfy their customers in terms of quality of goods, delivery, price, or services. In addition, it was also stated that empirically, quality management is observed through practices enforced by management decisions about organizational improvements (Valmohammadi and Roshanzamir, 2015:168). Furthermore, Samson and Terziovski, (1999:393), Nair (2006:953), and Sahoo (2020:1424) indicated that a manufacturing organization is required to focus on identifying gaps in quality management strategies through information and analysis. Results related to the evaluation of the implementation of quality management initiatives against some prescribed protocols display the following:

- The independent samples t-test aligned to this objective indicates that the average production rate post-implementation (162.5 kg/hr) is significantly greater than the average production rate pre-implementation (127.5 kg/hr), t (4) = -4.733, =0.009). In addition, results demonstrate that an independent samples t-test indicates that the average production rate post-implementation (168 kg/hr), is significantly greater than the average production rate pre-implementation (133.5 kg/hr), t (4) = -3.312, =.030);

- Results from the evaluation of the implementation of quality management initiatives based on customer focus revealed that respondents have approved that customer feedback is always taken into consideration by the organization. In addition, customer strategy has been designed to focus on customer needs and delivery of products/services beyond customer expectations. Therefore, results

indicated that there is consistent communication between the company and customers, and all employees behave in ways that show the importance of customers to satisfy customers' needs and expectations, which is important to the company. Furthermore, results demonstrated that the company has a deep understanding of customer needs, and reviews the means/approaches or methods they might use to develop over the years.

Given the foregoing, the frequency of responses attests to the organization's comprehensive awareness of client needs. Therefore, it is crucial for the business that meets the demands and expectations of its clients. Furthermore, the frequency of responses shows that there is regular communication between the business and its consumers and that all staff are dedicated to acting in ways that emphasize the value of customers. Moreover, a customer strategy has been developed to concentrate on customer needs and provides goods and services above and beyond what the client had anticipated. To improve products and services, client feedback must always be considered.

5.2.2 Objective 2: Evaluation of the Effect of the Implementation of Quality Management Initiatives on Quality Performance

The second objective intended to evaluate the effect of the implementation of quality management initiatives on quality performance. Notably, it was stated in the review of literature that the organization's quality performance can be used to determine whether a quality management initiative is being implemented successfully. Customer satisfaction and quality compliance are at the centre of Forza and Flippini's (1998:4) definition of quality performance. The quality management initiatives in this context are likely to deal with problems including flaws, customer complaints, costs associated with poor quality, and the effect on the organization's competitiveness (Nel, 2012:178). The performance of a company and its quality practices were found to be significantly correlated (Ali, Holiman, and Gorondutse, 2020:15-18). To reduce wasteful time as much as possible and increase productivity, Taifa and Vhora (2019:147) emphasized that the process of product development should consider several different variables. In light of this, results relating to the impact/effect of quality management initiatives on quality performance

showed that team members work well together to share expertise and find solutions to customers' problems to achieve better results (desired goals/objectives). As an effect, fostering a culture of excellence helps teams perform better because it fosters mutual respect and trust between team members. However, it is apparent from the findings that team members and their ideas are considered before making plans and decisions, and managers are happy with the team's overall task performance. Also, results indicate that managers are aware of the contributions of staff members to the team's success.

Additionally, it is clear from the analysis of this objective that both types of responsiveness exist. Table 4.26 and Table 4.28 and 4.29, which are related, state that TEAM 2 exhibits significant agreement, whereas TEAM1 exhibits a different feature. This suggests that TEAM 2 is about cooperating and that decisions are made after considering the opinions and ideas of all team members. As a result, everyone on the team is aware of what needs to be accomplished. TEAM1 demonstrates performance because Team members work together and share resources to address customer issues and provide better outcomes. Results also show that TEAM1 consistently meets its desired goals and objectives. Consequently, a culture of excellence, respect for one another, and confidence in each team member benefit the output of the team. It is noted that the performance of the team as a whole on the task has pleased management. According to the frequency of opinions, the performance goal was satisfied, and the department's quality goals were met. Additionally, the company's quality goals were met as well. Although the corporation raises the quality targets every year, management was nevertheless happy with the overall performance in terms of quality. As a result, the effectiveness of managers has helped cut down on waste and stop customers from complaining. Thus, regarding quality, the entire performance has been met with satisfaction. Eliminating waste and preventing customer complaints have both been made possible by the department's or the overall organization's performance levels.

5.2.3 Objectives 3: Assessment of the Impact of the Implementation of Quality Management Initiatives on Production Levels in the Case Study Company

This third objective assessed the impact of the implementation of quality management initiatives on production levels in the company involved in this study. The literature review indicated that any change in production should need an evaluation of the effectiveness of the quality program being used (Gidey, Beshah, and Kitaw, 2014:48). It might be argued that the cost element may also impact a company's ability to create the volume of outputs that are required. According to Rothman, Tillmann, and Toniati (2016:279), due to the fixed costs associated with operating a shift, the manufacturing and assembly of items in shifts may be modified according to the number of units produced by adding or eliminating shifts. As a result, altering the number of shifts could create distinct changes in the number of units produced; for client satisfaction, the nature and method of production of goods and services were probably essential.

Before beginning manufacturing, Juran suggested that a company should identify "who the customers are" and ascertain their product specifications (Juran 1986:6; Goetsch and Davis, 2010:15-18). As production levels may have an impact on the organization's customer base, they should be taken into consideration when choosing the best strategies to apply and when using lean manufacturing technologies. On this, the results of this study indicated that due to COVID-19, the total production or the production levels (kg) between 2016 and 2021 would have been impacted. Consequently, shutdown-related production data were scaled up to determine the number of production hours in these years. Production from 2016 to 2021 is shown in chapter 4 of this study (Table 4.1 and Figure 4.3). Figure 4.3 depicts the production results for the years 2016 to 2021, and Table 4.1 shows a pattern of early and late adoption in 2019. The average production rate following implementation (162.5 kg/hr) shows the results to be considerably higher than the average production rate before implementation (127.5 kg/hr), according to an independent samples t-test ($t(4) = -4.733$, $=0.009$). Additionally, findings show an independent samples t-test that displays that the average production rate following implementation was 168 kg/hr, which is significantly higher than the average production

rate before the implementation (133.5 kg/hr), according to the formula t(4) = -3.312, =.030.

5.2.4 Objectives 4: Evaluation of the Effect of the Implementation of Quality Management Initiatives on Staff Performance

The fourth objective evaluated the effect of the implementation of quality management initiatives on staff performance. According to Goetsch and Davis (2010:152), positive staff attitudes are more likely to advance and enhance client connections with the company. Employees who engage in ongoing self-improvement activities and can enhance the team when quality management initiatives are being implemented (Goetsch and Davis, 2010:495). The employee's suggestions as plans to handle customer complaints in terms of realization and feedback can be conceptualized as staff quality performance (Martinez-Lorente, Dewhurst and Gallego-Rodriguez 2010: 3229). To achieve the goals, set by organizations through labour productivity, quality was largely understood as matching client criteria and productivity (Gidey, et al., 2014:47). According to Ifrim, et al. (2020), employees should be held accountable inside an organization to enhance the quality of the products with services.

This study's findings, however, showed that staff generally work together to solve problems for consumers and produce better outcomes (desired goals/objectives). Consequently, encouraging a culture of quality helps staff work better because it fosters mutual respect for all staff members and their contributions. This implies that managers were satisfied with the overall performance of staff on assignment, and they always consider the staff members' input and suggestions when making plans and decisions. Because of this, managers asserted that they are aware of how well their staff performs regarding the team's objectives. Furthermore, this study’s findings disclosed that the department's quality goals were met, and the performance goal was achieved. Furthermore, the company's quality goals were also met. Even though the company raises the quality targets every year, managers are happy with the overall performance in terms of quality. As a result, the effectiveness of managers has contributed to decreasing waste and reducing consumer complaints.

Furthermore, the items of a variable are deemed reliable as alpha coefficient of >.7. Any agreement or disagreement with these composite variables is evaluated for significance: a t-test on a single sample was used. As a result, One-Sample Statistics and One-Sample Test are described in Tables 4.28 and 4.29 respectively. According to Aftab and Khan (2014:40), management techniques that could be used to boost quality and productivity in organizations were built on a comprehensive management approach to engage staff from top to bottom as this provided a framework for implementing successful quality and productivity initiatives that could raise an organization's profitability and competitiveness. Thus, staff quality performance might be compared to employee suggestion programmes that address customer problems.

5.2.5 Objective 5: Continuation of the Improvement Strategy Based on Information Obtained from the Objectives Above.

The study's final objective included an analysis of the improvement plan based on the data (feedback) from the objectives that came before it. It was indicated in the review of literature that every fluctuation in the output should, in the opinion of Gidey, Beshah, and Kitaw (2014:48) call for an evaluation of the available program's effectiveness. The feedback, therefore, was discussed in Figure 4.9 from chapter 4 of this study. The findings suggest that feedback reveals the level of performance of particular employees who outperform other staff. Additionally, it shows how individual performance has a favourable impact on the standard of the offered goods and services. In other instances, staff members were able to enhance their performance and maintain a positive and quality mindset to provide better services. The outcome of feedback demonstrates how well employees performed and that they earned compliments on their work. Thus, constructive criticism of employees' work performance has improved the calibre of products and the level of customer service. However, the analysis above focused on the first objective, which was introduced specifically to decrease quality complaints against the available implementation protocols by using historical data obtained from the Company and by evaluating staff performance (evaluating the implementation of quality management initiatives).

Information (INFO), analysis (ANAL) and management support (MAN) have all favourably impacted GOAL attainment, according to Table 4.42 in chapter four of this study (realization of goals and targets). Finally, results from this study demonstrate that information analysis has benefited from or helped realize personal performance (PP). However, the organization should make available resources for employee education and training. It should train the majority of its employees on how to implement quality improvement strategies. All employees should be made aware of the need of receiving a high-quality education and specialized work-skills training.

5.3 RECOMMENDATIONS ALIGNED WITH THE STUDY'S OBJECTIVES

Recommendations are aligned with the objectives defined for this study. These are the following:

- To focus on customer needs and deliver goods and services that go above and beyond client expectations, a customer-satisfaction strategy must be devised. Customer feedback must constantly be considered when making improvements to goods and services. Empirically, quality management is observed through principles and practices. The commitment of organizations to quality principles stem from the purpose of operations to ensure product or service produced and delivered should continually meet customers' requirements and satisfies their needs.

- Importantly, the implementation of quality initiatives is likely to elevate quality, improve customer satisfaction and business performance. Therefore, the effectiveness of managerial decisions with regard to the selection and implementation of quality management initiatives must continually preoccupy managers and staff at different levels within the organization.

- The performance must be satisfied throughout in terms of quality. The department's or the organization's overall performance levels must always be improved to make waste elimination and complaint prevention achievable.

- Due to the fixed costs involved in running a shift, the manufacture and assembly of goods must be altered according to the number of units produced by adding or removing shifts. Determinable changes in the number of units produced should also result from changing the number of shifts. The type of a product or service and the process use to create it are crucial for customer satisfaction.

- Employee suggestion programs that handle client issues by offering realization and feedback should continue to be used as a comparison point for staff quality performance; and

- The company should continue to make resources for employee education and training available and train the majority of its staff on how to apply quality improvement techniques. It is important to make all employees aware of the value of getting a top-notch education and specialized work-skills training.

5.4 RECOMMENDATIONS FOR FURTHER RESEARCH

This study sought to determine how quality management strategies affected output, product quality, and employee performance. To do this, the study assessed the application of quality management initiatives against some established protocols, as well as the impact of those initiatives on quality performance; the effects of the organization subject to this study's quality management efforts being implemented on production levels; the impact of implementing quality management efforts on employee performance; and the continuous improvement plan based on data gathered from the aforementioned objectives. Against the backdrop of the findings, analysis, and conclusions in this study, additional research or studies must be carried out on the following emerging themes: quality management on production, quality, and personnel performance, as well as on the implementation of quality management initiatives on staff performance; and on the continuous improvement strategy based on the feedback obtained from clients.

5.5 CONCLUSION OF THE STUDY

This study investigated a chemical manufacturing organization that had experienced an increased number of complaints regarding the quality of products manufactured and delivered to customers. The chemical manufacturing company under this study produces

different grades of metal powders. These grades of metal powders are produced depending on customers' specifications and requirements. It was specified that these metal powders have ranges with respect to particle size, oxygen content, carbon content, binder content, and impurities (inorganic elements). This study assessed the influence of the implementation of quality management initiatives on production levels, customer satisfaction, and staff performance. This is because an improved operational process was required as a contemporary business strategy to boost productivity and sustain organizational competitiveness through customer satisfaction. As the organization has been facing challenges aligned with customer complaints and low productivity, managerial interventions became necessary to oversee all activities and tasks that were likely to be accomplished and sustained at a desired level of excellence.

The persistent complaints from customers and the inability of the organization to effectively respond to quality issues required a re-evaluation and reinforcement of management's commitment to continuous improvement. Based on the above perspective, this study envisaged or intended to evaluate the implementation of quality management initiatives against some prescribed protocols; evaluate the effect of the implementation of quality management initiatives on quality performance; assess the impact of the implementation of quality management initiatives on production levels in the chemical manufacturing company under this study; evaluate the effect of the implementation of quality management initiatives on staff performance; and put forward a continuous improvement strategy based on information obtained from the above-defined objectives. The results of this study revealed that respondents have approved that customer feedback is always taken into consideration by the organization and that the customer-satisfaction strategy has been designed to focus on customer needs and deliver products/services beyond the expectation of customers. Consistent communication between the company and customers and all employees was encouraged in a way to show the importance of customers and to satisfy their needs and expectations. Furthermore, results demonstrated that the company developed a deep understanding of customers' needs and considered the means/approaches or methods to be used and

improved to respond to the complaints regarding the quality of products manufactured and delivered to customers.

Moreover, results relating to the impact/effect of quality management initiatives on quality performance showed that team members are increasing efforts to work together to find solutions to customers' problems and to achieve better results (desired goals/objectives). Also, results indicate that managers became aware of the staff members' contributions toward the team's success. Notably, also, the study's findings showed that encouraging a culture of quality helps staff work better because it fosters mutual respect for all staff members and their contributions to improving the quality and delivery of products to customers. This finding indicates that managers are in gesticulation agreement on the way to improve the overall performance of staff on assignment when making plans and decisions. Also, the study’s findings disclosed that the department's quality goals were met, and the performance goal was realized. Consequently, even though the company is endeavouring to raise the quality target every year, managers are putting efforts to improve the overall performance in terms of meeting the goals of quality. As a result, the effectiveness of managers has contributed to decreasing waste and reducing consumers’ complaints.

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APPENDIX A: LETTER OF INFORMATION AND CONSENT

LETTER OF INFORMATION

Title of the Research Study: Quality Management Initiatives on Production Levels, Quality and Staff Performance at a selected chemical manufacturing company

Principal Investigator/s/researcher: Derosha Moodlier

Co-Investigator/s/supervisor/s: Professor KG Moodley (PhD)
Rajesh Haripersad (PhD)

Dear Potential Participant, I hope you are well.

I am a student at DUT doing research for my master's in quality (MPhil Quality)

I would like to invite you to participate in the research study described below.

Research is a systematic investigation to generate new concepts and understanding of problems and challenges that are being faced.

The problem under investigation focuses on the case of a chemical manufacturing organisation based in KwaZulu-Natal that has recently recorded a number of complaints from customers and a drop in the production levels within the organisation despite the implementation of quality management initiatives. The persistent complaints of customers and the inability for the organisation to effectively respond and address customer complaints necessitated a proper examination of the implementation of quality management initiatives. This study aims to assess the influence of the implementation of quality management initiatives on production levels, customer satisfaction and personnel performance.
A quantitative approach and a survey design will be adopted. The study will use a purposive sampling, and a questionnaire to collect data from the selected participants. To achieve the objectives of the study, the variables will be subjected to statistical analysis such as ANOVA, regression, etc.

The aim of the study is to assess the influence of quality management initiatives on production, quality and personnel performance. This aim will be achieved through the following objectives:

- To evaluate the implementation of Quality Management initiatives that were specifically

introduced to reduce quality complaints against prescribed implementation protocols available using historical data obtained from the company.

- Assess the impact of quality management initiatives on the reduction of quality complaints implemented by the company using historical data obtained from the company.
- To conduct a survey of staff to determine their perception of the quality management initiatives implemented by the company.
- To propose a continuous improvement strategy based on information obtained from the objectives above.

The research questions are:

- What is the effectiveness of the implementation of the quality management initiatives with regard to customer satisfaction and production levels in the organisation?
- What perceptions do employees have regarding the implementation of quality management initiatives and how it affects their performance?
- What can be recommended to improve the current quality state of the organisation with regard to customer complaints?

The MD of the organisation has granted written permission for the survey to be conducted at its premises. It will take approximately 30 minutes to complete the survey. The population for the study are the personnel including managers and non-managers within the organisation who are directly affected in their day-to-day operations with the change management process that resulted in the implementation of quality management initiatives. The population consists of 63 employees in total.

Your confidentiality as a participant will be protected as no names will be documented on the questionnaire you will be required to answer. The questionnaire and all information will be stored securely by me. Data will be obtained and kept electronically for a period of 5 years afterwards records will be deleted. Data will be retained for 5 years in a secure environment with restricted access to the completed questionnaires. This period will be used to verify findings from the completed questionnaires.

As a participant of this study, it is your responsibility to provide information that is objective and truthful. It must be noted that no financial reward will be given under any circumstances to you as a participant for partaking in the research study.

There are no risks or discomforts associated with the survey.

There will be no adverse consequences for the participant should you choose to withdraw from the study at any point. In the event of the study being terminated at any point, you will be informed via written communication as soon as such a decision is taken. You will be also informed if under any special circumstances, it is decided to withdraw you from the study. A document with detailed reasons for withdrawing participants from the study has been drawn up.

The research will assist the company in terms of Quality Initiatives and hence drive continuous improvement within the organization. This will bring about positive change for the all the participants, ie satisfied employees and a healthy workplace where there is a good quality culture that exists.

You will not receive any monetary or other types of remuneration.

You will not be expected to cover any costs towards the study.

You will remain anonymous and information will not be shared. You will not be asked to document your names on the questionnaire. The researched will ensure that all information is stored securely.

Regular town hall meetings are held within the organisation which will serve as a platform to distribute the findings of the study and discuss. Any new findings will also be communicated at the town hall meetings.

Research-related Injury: N/A

Data will be obtained and kept electronically for a period of 5 years afterwards records will be deleted. The researcher as well as the supervisor of the research project will have access to the data.

Persons to contact in the Event of Any Problems or Queries:(Supervisor and details) Please contact the researcher (tel no.), my supervisor (tel no.) or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Director: Research and Postgraduate Support Dr L Linganiso on 031 373 2577 or researchdirector@dut.ac.za.

APPENDIX B – LANGUAGE EDITORS REPORT

EDITOR'S LETTER

Researchers Beyond-Borders (PTY) LTD
Umhlanga, Durban
South Africa
April 21, 2023

To whom it may concern

Editing of Masters Dissertation: Derosha Moodlier

Title: Quality Management Initiatives on Production Levels, Quality and Staff Performance of a Manufacturing Company.

This letter serves as confirmation that the aforementioned dissertation has been language edited. Any queries may be directed to the author of this letter.

Regards

Maleni Pillay
Researchers Beyond-Borders
consult@researchersbeyondborders.com
www.researchersbeyondborders.com

APPENDIX C – STATISTICIANS LETTER

Gill Hendry B.Sc. (Hons), M.Sc. (Wits), PhD (UKZN)

Mathematical and Statistical Services

Cell: 083 300 9896
Email: gillhendrystats@gmail.com

14 April 2023

Re: Assistance - statistical aspects of the study

Please be advised that I have assisted Derosha Moodlier (Student number 20405970), who is currently studying for M.Phil: Quality at DUT, with the alignment of the questionnaire and the statistical analysis of her data.

Yours sincerely

Dr Gill Hendry
Private Consulting Statistician

APPENDIX D – IREC APPROVAL

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Gate 1, Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2375
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

30 November 2021

Ms D Moodlier
175 Firwood Road
Redhill
Durban

Dear Ms Moodlier

Quality Management Initiatives on Production Levels, Quality and Staff Performance at a selected chemical manufacturing company
Ethical Clearance number IREC 204/21

The Institutional Research Ethics Committee acknowledges receipt of your notification regarding the piloting of your data collection tool.

Kindly ensure that participants used for the pilot study are not part of the main study.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely

Prof J K Adam
Chairperson: IREC

APPENDIX E – SURVEY CONSENT

CONSENT

Quality management initiatives on production levels, quality and staff performance at a chemical manufacturing company

Names of Researcher: Derosha Moodlier

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Derosha Moodlier, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, _____ herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

SHU POWDERS T: +27 31 782 1061 F: +27 31 782 1160 W: www.shupowders.com

Shu Powders Africa PTY. LTD
Logra Industrial Park, No.40 Track 94040, Harrison Flats
Old Main Road, Cato Ridge, KwaZulu Natal 3680 South Africa
Postnet Suite 10015, Private Bag X7005, Hillcrest, 3650

Vat No: 4150236521 CK No: 2007/000865/07

APPENDIX F – GATEKEEPERS LETTER

15th April 2021

Durban University of Technology

Dear Sir/Madam,

PERMISSION TO CONDUCT RESEARCH AT SHU POWDERS AFRICA

I, Dr Michael Oehlers, Managing Director of Shu Powders Africa, do hereby consent to allow the student Derosha Moodlier (student number 20405970) permission to carry out her investigation at the organisation. The investigation/research will be carried out in accordance with the qualification (M.Phil: Quality).The research to be carried out will evaluate the quality management initiatives at our organization (Shu Powders Africa) on production levels, quality and staff performance.

For any enquires please don't hesitate to contact me on:

Yours faithfully

_____

DR MICHAEL OEHLERS

Managing Director

Email: moehlers@shusa.co.za

Cell: 0032 477 0732

APPENDIX G: QUESTIONNAIRE

Please use a cross (x) to mark the answer that best applies to you.

Section A: Biographical information

1. What is your age?

18-20	
21 – 30	
31- 40	
41- 50	
51- 60	
Above 60	

2. What is your gender?

Male	
Female	

3. In which department are you employed?

_____

4. How long have you worked for this organisation?

Less than 5 years	
05 – <10 years	
10 – <15 years	
15 – <20 years	
20 – 25 years	
Over 25 years	

Section B: Implementation of Quality Management Initiatives

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Customer focus					
1.1 I have a deep understanding of our customer needs and how they might develop over the years					
1.2 Satisfying our customers' needs and expectations is important to us					
1.3 All employees behave in ways that show the importance of customers.					
1.4 There is consistent communication between the company and customers.					
1.5 We regularly solicit customer feedback to improve products/services					
1.6 Our customer strategy has been designed to focus on customer needs and deliver product/service beyond customer expectations					
1.7 Customer feedback is always taken into consideration.					
Management/leader role					
2.1 There is a transparent mission and vision about quality in the company.					
2.2 Management actively promotes the manufacturing of good quality products.					
2.3 The company has a clear quality plan and policy.					
2.4 Management encourages staff to actively participate in quality initiatives					
2.5 Management regularly monitors my role in meeting company quality targets.					
2.6 There is a company-wide culture committed to quality improvement.					
2.7 The commitment of management to quality and customer satisfaction is visible to staff.					
2.8 There is an emphasis on continuous improvement in the company.					
2.9 My manager facilitates communication between me and top management					
2.10 Top management actively participates in quality management and improvement process					
2.11 Top management empowers employees to solve quality problems					
2.12 Top management makes adequate resources available for employee education and training					
2.13 Top management focuses on product quality rather than yields					
Information and analysis					
3.1 Data is gathered and analyzed for the purpose of improving quality in the company.					

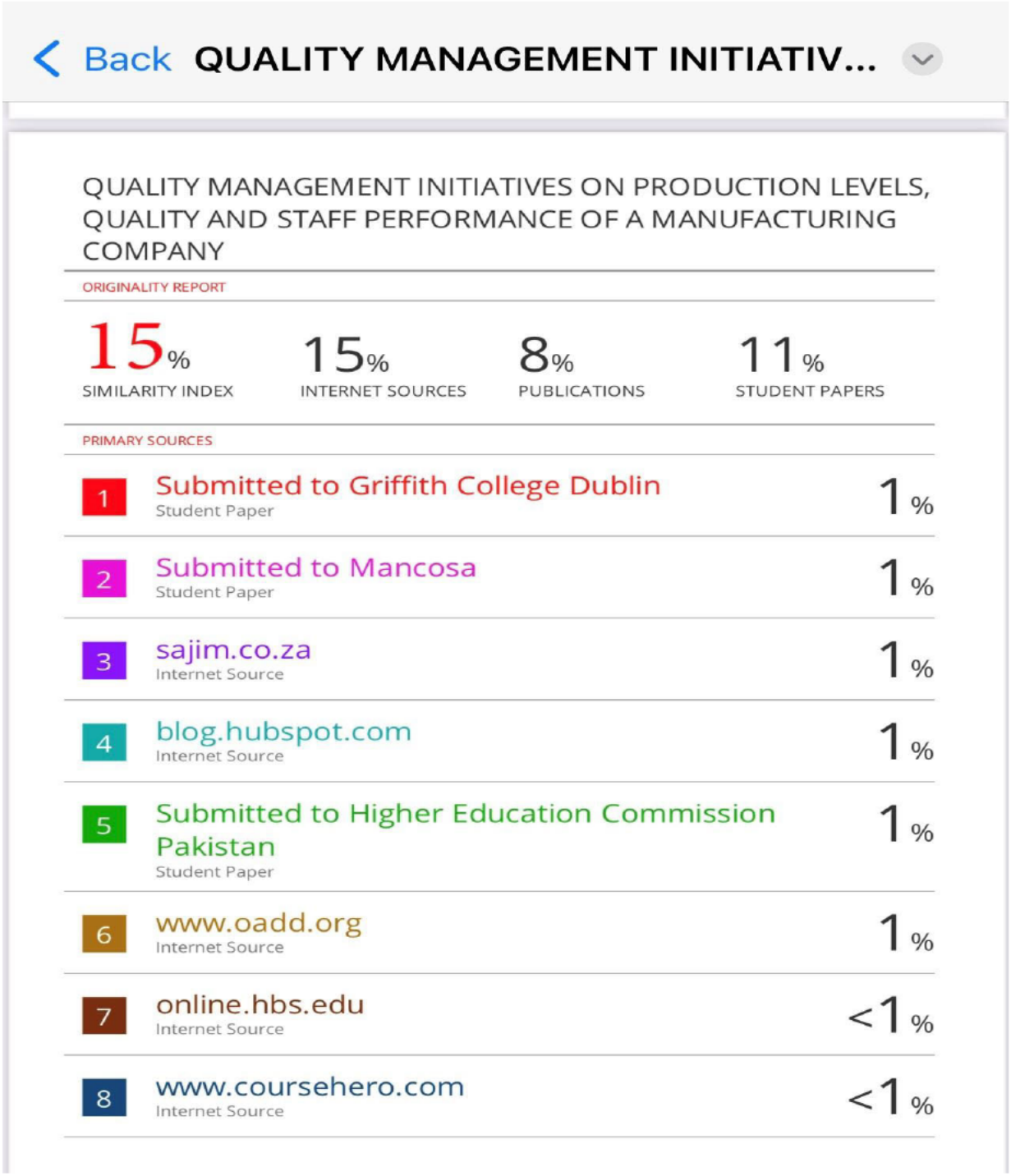
3.2 Data and information for tracking daily operations and performance is collected and analysed.					
3.3 Information concerning the quality of our primary product is readily available.					
3.4 Quality information is displayed at most of the workstations					
3.5 Customer complaint information is communicated to staff					
3.6 Data on product quality is regularly collected and analysed					
3.7 Organisational performance review findings are used to develop priorities for continuous improvement					
3.8 Information and data is readily available to employees who need it.					
Staff training and Education					
4.1 Specific work-skills training is given to all employees.					
4.2 Quality awareness education is given to employees.					
4.3 Most employees in our company are trained on how to use quality improvements techniques.					
4.4 Resources are available for employee education and training in our company.					
4.5 Employees are encouraged to accept education and training in our company.					
Responsiveness to customers					
5.1 Employees give prompt services to customers					
5.2 Employees make information easily available to customers					
5.3 Employees are always willing to help customers					
5.4 Employees are never too busy to respond to customers' requests					
5.5 Employees always do their best to solve customers' queries					
5.6 Employees give customers individual/ personal attention					

Staff Performance

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Team improvement					
6.1 I am satisfied with our team's overall task performance.					
6.2 Mutual respect and trust for each has a positive effect on our team's performance.					
6.3 My team always achieves its desired goals/objectives					
6.4 Team members collaborate and share skills to solve customers' problems and achieve greater results.					
6.5 I am aware of the team's goals to be achieved.					
6.6 Team members' opinions and ideas are considered before making a decision.					
6.7 A culture of quality is promoted for team performance.					
Realisation					
7.1 I have achieved the performance goals that I set					
7.2 The company's quality objectives are achieved.					
7.3 My department's quality targets are achieved.					
7.4 Although the company raises the quality targets each year, I sustain my performance in the department.					
7.5 I am satisfied with my overall performance regarding quality.					
7.6 My achievement contributes to eliminating waste and avoid customer's complaints.					
Feedback					
8.1 I am always informed whether I do my work well in the company.					
8.2 It is difficult for my supervisor/manager to assess the quality of my performance objectively.					
8.3 I am always informed about how my work is related to that of other staff members.					
8.4 I am informed about how my work is related to quality product or service we offer to customers					
8.5 I am always satisfied with my performance evaluation on quality matters.					
8.6 The feedback I receive from my manager/supervisor has helped me to improve my performance					

Thank you for your time.

APPENDIX H- TURN IT IN REPORT



Back QUALITY MANAGEMENT INITIATIV...

QUALITY MANAGEMENT INITIATIVES ON PRODUCTION LEVELS, QUALITY AND STAFF PERFORMANCE OF A MANUFACTURING COMPANY

ORIGINALITY REPORT

15%	15%	8%	11%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

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8	www.coursehero.com Internet Source	<1%

Supervisor Signature: **(Professor KG Moodley)**