

DURBAN UNIVERSITY OF TECHNOLOGY

ASSESSMENT OF SUPPLIER AND PROCESS QUALITY DURING THE COVID-19
PANDEMIC: A CASE STUDY IN ONE OF SOUTH AFRICAN MANUFACTURING
COMPANIES

BHEKISISA NKULULEKO NDLOVU

MAY 2024



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COMPANIES

Submitted in Fulfilment of the Requirements of the Degree of
Master of Philosophy in Quality Management
In the Faculty of Management Sciences at the
Durban University of Technology

BHEKISISA NKULULEKO NDLOVU

MAY 2024

APPROVED FOR EXAMINATION

Supervisor (Affiliation): _____ Date: __30.05.2024

Co-Supervisor (Affiliation): ____ (signature) _____ Date: _____

ABSTRACT

This study focused on assessing the impact of the COVID-19 pandemic on supplier and process quality and how the company responded to the crisis to ensure the seamless continuity of daily operations. The research evaluated the impact of the pandemic on the supplier and process quality departments statistically. The researcher also used statistics to determine whether supplier and process quality departments should implement new processes to mitigate and prevent future disruptions. The study examined employees' general perceptions of the pandemic, the strengths, and weaknesses of the company, and how the pandemic affected its business, as well as the trends that were happening. The total sample size, as well as sample size for questionnaire and interviews was 27 but only 20 participants manage to participate on interviews and only 25 participants manage to participate on survey questionnaire. The questionnaire was designed and tested using pilot study. A total of 6 employees were interviewed as part of pilot study process. A mixed method research was used, this allowed the researcher to display findings statistically and theoretical. NVivo software was used to analyse qualitative data and SPSS software was used to analyse quantitative data.

The findings of the study indicated that the pandemic had a significant impact on both supplier and process quality, with the entire company experiencing disruptions in its supply chain. The company employed various actions, including remote work, a reduced workforce, and virtual meetings to ensure daily operations were carried out. These actions helped the company maintain business continuity and minimise the impact of the pandemic on its operations. The study identified some of the strengths and weaknesses, as well as visible trends within the company, which included its ability to adapt quickly to changes and its adoption of remote working. The study recommends that companies should focus on improving supplier and process quality, enhancing communication with suppliers, and establishing contingency plans to ensure business continuity. Companies should also adopt strategies to avoid inconvenience, such as conducting supply audits, hiring skilled individuals, and ensuring regular training. This research will assist the organisation in realigning its commitment to providing quality products and services.

The researcher worked hand in hand with supplier and process quality management to find optimum solutions to COVID-19 challenges such as parts shortages, delays between departments, and absenteeism, as these are the most important factors that affected its business. It was also noted that since the COVID-19 pandemic started, customers' expectations for better-quality products increased. Total quality management (TQM) should be used as a tool to eliminate COVID-19 pandemic related issues in the supplier and process quality department.

DECLARATION

I, the undersigned, hereby declare, unless otherwise stated that the work presented in this thesis is my own. I also declare that this dissertation has not been submitted simultaneously, or at any other time, for a degree at any other university or higher learning institution.

Bhekisisa Nkululeko Ndlovu

Date: 2023/11/06

DEDICATION

I dedicate this dissertation to my late father, Vusumuzi Ngqwambi Ndlovu, my mother Muntuza Ndlovu, my daughter Khethelo Ndlovu, my son Yongama Ndlovu, and my fiancé Thembelihle Ngema. For your love, care, prayers, motivation, and moral support, thank you.

ACKNOWLEDGEMENTS

I wish to express my gratitude to the following people who made this dream come through:

My supervisor, Dr R. Naidoo, for his guidance and support during the writing of the proposal and dissertation. I also acknowledge the contribution of Professor S. Singh, who was involved in this project at the early stage. I am grateful to the Bell Equipment team for supporting this study.

Appreciation and thanks to Mr. Z Adam (Process Quality Engineer, Assembly Process Quality), for unwavering support and cooperation during the period of the study. Mr. N Andhee (General Manager, SA Manufacturing and Material Planning), for giving me permission to conduct the study. The supplier and process quality teams for agreeing to complete the survey questionnaires and for participating in this study. I express my sincere appreciation to Mrs. C Morkel (Material Planning Manager) for her support and encouragement. My sincere appreciation also goes to Mr. A Webster (Quality Supervisor, Final Assembly), for providing support, thank you. Mr. F Opperman (General Manager, Global Sourcing), for taking his time and participate in the study. Mr. S Richards (Quality Manager, Supplier Quality), thank you for the opportunity. Mr. N Grobbelaar (Group Safety and Risk Manager), thank you very much. Mrs. L Bornman (Pay Roll Manager), for her assistance. To all respondents, for their support, time, and interest in the study.

Department of operations and quality and postgraduate librarians for their support and administrative work.

The Lord Almighty.

APPROVAL FOR SUBMISSION

I certify that this project report entitled 'Assessment of supplier and process quality during the COVID-19 pandemic: A case study in one of South African manufacturing companies' was prepared by Bhekisisa Nkululeko Ndlovu and has met the required standard for submission in fulfilment of the requirements for the award of Master of Philosophy (M. Phil) Quality Management at the Durban University of Technology.

Approved by:

Supervisor:

Date: 9.11.2023

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LIST OF ABBREVIATIONS

TQM:	Total quality management
NCR:	Non-conformance reporting
TA:	Thematic analysis
PDCA:	Plan-do-check-act
WHO:	World health organisation
QMS:	Quality management system
ADT:	Articulated dump truck
PC:	Personal computer
PPE:	Personal protective equipment
SPSS:	Statistical package for the social sciences
SC:	Supply chain
ISO:	International organization for standardization
HR:	Human resource
PQM:	Process quality management
IT:	Information technology

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CHAPTER ONE: BACKGROUND

1.1 Introduction

The purpose of this study is to investigate the impact of the COVID-19 pandemic on supplier and process quality at one of the South African manufacturing companies located in Richards Bay, kwaZulu-Natal. This chapter briefly explains the background of the study and identifies the problem statement and the methodology that was followed.

1.2 Background of the study

The COVID-19 pandemic has negatively affected the supplier and process quality departments at Bell Equipment. The departments are faced with absenteeism and parts shortages from internal and external suppliers. As a result of the impact of the COVID-19 pandemic, employees are fearful for their lives and the lives of their loved ones. This further impacts the daily operations and functioning of the departments. As this is primarily a health crisis, it has become necessary to assess both supplier quality and process quality and to develop mitigation plans to remedy the situation. Bell Equipment is a supplier of heavy equipment in the mining sector.

The purpose of the study is to evaluate the impact of the COVID-19 pandemic on the respective departments during 2020 and 2021 and to investigate whether the mitigation plans normalised production quality and productivity and if there were any other actions that could have assisted in limiting the impact of COVID-19. Supplier and process quality are critical as they provide sustainability for businesses. The COVID-19 pandemic has disrupted all business operations worldwide, this global challenge requires a thorough search and mitigation strategies to keep the production running as cited by (Sharma et al. 2020).

The research methodology adopted in this study used both qualitative and quantitative data. The quantitative data collected was analysed using SPSS software as a tool. Survey questionnaires were administered to 27 participants, comprising quality assurance inspectors, pre-delivery inspection technicians, quality engineers, and supervisors and managers. Additionally, focus group discussions were conducted with

the same 27 participants, and the qualitative data collected was analysed using Nvivo software as a statistical tool. The use of questionnaires and focus group discussions allowed the findings to be triangulated. A case study approach was used to get all the information needed on the supplier and process quality departments at Bell Equipment. This is a sequential study; the activities were conducted in a logical order. All 27 employees from the supplier and process quality departments formed the population for this study.

1.3 Problem statement

2020 was the most challenging year due to COVID-19-related restrictions at Bell Equipment. It severely impacted operations and financial results. The pandemic also caused a lot of anxiety and uncertainty. Generally, the employees were fearful of their lives and the lives of their loved ones, which in turn disrupted the daily operations of the business. The departments of process and supplier quality were the most affected departments in the company. The challenges below were identified by the researcher, and managers from the process and supplier quality departments:

- Absenteeism increased dramatically due to COVID-19 infections, which disrupted the daily planning of the supplier and process quality departments.
- Parts shortages from internal and external suppliers increased, raw materials were not sufficient to fabricate products because of COVID-19 restrictions, and this challenge limited the supplier and process quality department from providing adequate support to production.
- COVID-19 restrictions forced the company to buy steel from Europe, this affected supplier quality, as the department had to put plans in place to ensure that the steel met quality standards.
- Customers' expectations for better-quality products increased during the pandemic due to raw material issues being raised.
- The delays between the departments due to COVID-19-related issues increased work and affected quality.

- The competition increased in the market, sales were low, and costs were high, which put pressure on the process and supplier quality departments as they support production processes.

Clearly, the above challenges therefore called for the investigation to assess whether the mitigation plans did normalise quality and productivity in the process and supplier quality departments at Bell Equipment.

1.4 Aim of the study

The aim of the study is to understand the impact of the COVID-19 pandemic on process and supplier quality in the organisation.

1.5 Research objectives

The specific objectives of the study are:

- To understand the impact of disrupting factors on all aspects of product and service at the supplier and process quality departments.
- To quality assure all products supported by supplier and process quality departments by using total quality management (TQM) concepts such as brainstorming.
- To enhance existing or current mitigation strategies to improve productivity and quality.
- To propose a framework to improve productivity and quality during a pandemic.
- To develop a guideline through a framework to mitigate the impact of COVID-19.

1.6 Research question

Are the Bell Equipment mitigation strategies sufficient to deal with disrupting factors to provide production continuity?

1.7 Scope of the study

Title of the study: Assessment of supplier and process quality during the COVID-19 pandemic: A case study of South African manufacturing company.

This study focused on the challenges created by COVID-19 pandemic at Bell Equipment. The study mainly covered the supplier and process quality departments. The study included the population of 27 participants, and timeline of the study was two months.

1.8 Significance of the study

This study contributed to the Bell Equipment community in many aspects mainly because the participants were able to share their opinions about work and personal challenges related to the COVID-19 pandemic which is something that has never happened in the company. The company benefited from the study as the framework to improve productivity and recommendations for future studies were included. The study also focused on supply chain challenges that were experienced in the supplier and process quality at Bell Equipment. This study bridges gaps that have existed for a very time as this was the first study to have been conducted by a student which is something that will encourage future generations to conduct more studies in their fields of work or study.

1.9 Research methodology

The study intended to investigate the impact of supplier and process quality during the COVID-19 pandemic at a South African manufacturing company. The research methodology employed in this study is a mixed method, and the research was conducted using a case study approach with employees involved in the supplier and process quality departments. Mixed-methods research is the type of research in which a researcher combines elements of qualitative and quantitative research approaches for the broad purpose of breadth and depth of understanding and corroboration (Schoonenboom & Johnson 2017).

This is a sequential study; the activities were conducted in a logical order. All 27 employees participated in both the quantitative and qualitative sampling. The reason behind this is that the researcher intended to get comprehensive and consistent data from participants and the participants had an opportunity to participate in qualitative sampling should they have missed the quantitative session. The survey questionnaire was administered to employees from the supplier and process quality departments (quality assurance inspectors, pre-delivery inspection technicians, quality engineers, supervisors, and managers). The quantitative data collected was analysed using SPSS software. The focus group discussion was conducted with the same employees from the supplier and process quality departments. The qualitative data obtained was analysed using NVIVO software. The use of both questionnaires and focus group discussion allowed the results to be triangulated.

1.10 Population and sample

The population and sample size were 27; and therefore, this was a census sample. The study population is a subset of the target population available for the study (Banerjee and Chaudhury 2010).

1.11 Quantitative sampling

The sample was selected at a 99.5% confidence level. All 27 employees from the supplier and process quality departments formed the population of the study. The researcher concurred with the preference of Fassinger and Morrow (2013) for a “quantitative approach that can help summarise numerical data in ways that are clear and persuasive”. The survey questionnaire was emailed to all 27 employees to complete, and after completing the survey questionnaire, the employees then emailed them back to the researcher to avoid close contact between employees. In line with COVID-19 protocols, gatherings were avoided, and the employees were asked to complete the survey questionnaire in their own offices. The participants were given 1 hour 30 minutes to complete and return questionnaire via email. The population size for the quantitative study was 27. The survey questionnaire, designed for both employees and managers, used a Likert scale.

1.11.1 Qualitative sampling

The qualitative aspect of the study consisted of interviews with all employees from the supplier and process quality departments (quality assurance inspectors, pre-delivery inspection technicians, quality engineers, supervisors, and managers). Data obtained from the focus group interviews was triangulated. The focus group interviews were conducted via Microsoft Teams. A meeting was set up, and the invitation was emailed to all participants. The purpose of the focus group interviews was to determine the perceptions of managers and employees and get information on the impact and challenges experienced during the COVID-19 pandemic. The focus group interviews allowed the researcher to follow up on responses obtained from questionnaire interviews and facilitate a discussion on the challenges surrounding the COVID-19 pandemic in the supplier and process quality departments.

Qualitative approaches seek to explore different aspects to quantitative approach, focusing on the individual experience, rather than conclusions that can be drawn from large groups (Nicholls 2017). The number of participants was limited to 27. Nyumba et al. (2018) affirm that a “focus group discussion is frequently used as a qualitative approach to gain an in-depth understanding of social issues”.

Confidentiality and anonymity were maintained during the focus group interviews by not identifying the names and responses of the participants, and the discussion was hosted over the Microsoft Teams channel. The duration of the single focus group discussion was two hours.

1.11.2 Measuring instrument

The questionnaire and focus group interviews scheduled for this study were developed by the researcher. The quantitative aspect of the study incorporated one survey questionnaire, which was administered to 27 participants and the qualitative aspect of the study incorporates the focus group interviews, which was conducted with 27 participants.

1.12 Summary of chapters

1.12.1 Chapter One: Background

This chapter is made up of introduction and background of the study. The problem statement, aim and objectives of the study are also part of this chapter. The structure of the research methodology concludes this chapter.

1.12.2 Chapter Two: Literature Review

A range of literature about quality and COVID-19 pandemic was gathered from different authors. The figures and diagrams which highlight the impact of COVID-19 pandemic in the supplier and process quality are included in this chapter. Different perspectives of quality were also provided in the chapter.

1.12.3 Chapter Three: Research Methodology

The methodology chapter describes the data collection process, and the data collection tools that were used during the interviews of the study. The sample and populations of the study and the pilot study process are included in this chapter. The recruitment process, inclusion and exclusion were outlined.

1.12.4 Chapter Four: Results and Findings

This chapter presents the findings of the study, the findings were obtained from interviews and survey. The findings were presented statistically and theoretically.

1.12.5 Chapter Five: Conclusion and Recommendations

In this chapter the objectives were discussed and the framework as well as the guidelines for framework were outlined. Total quality management tools such as pareto chart and fish born diagram which were part of the objectives were also discussed.

1.13 Conclusion

This section concludes and discusses the overall impact of COVID-19 in the supplier and process quality. The challenges such as materials shortages and absenteeism were outlined as disrupting factors in the supplier and process quality departments.

The background of the study, problem statement, aim of the study, research objectives, and research methodology were covered in this chapter. The following chapter is proving the literature review.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In this chapter, authors offered different views about the topic, aim, objectives, and the problem statement of the study. This chapter reflected on main findings, such as airfreight costs, absenteeism and other disrupting factors in the supplier and process quality during the COVID-19 pandemic at Bell Equipment.

2.2 Recognising different perspectives of quality

Georgiev and Georgiev (2017) describe quality as one of the few scientific terms that triggered a misunderstanding in the operational field. It is not surprising that there are nearly as many definitions as there are experts, researchers, and books. Nevertheless, among the numerous definitions for the term quality, some of the well-known ones include something with the positive attribute of conformance to specified standards and a predictable degree of uniformity and dependability at a low cost with a quality suited to the market.

Foster (2015) highlights different flows of quality management with process flows, information flows, material flows, and flows of funds being on the lists. The author states that each one of these operate effectively, efficiently and with outstanding quality. Ahammad (2021) weighs in, stating that quality relates to different product's functionality but also to different products and sectors. Oakland (2014) further affirms that quality is often used to signify excellence of production in the manufacturing industry.

In times of crisis and disruptions such as COVID-19, which severely impacted businesses and economies throughout the world, the researcher borrows words from Mullins (2007), where they state that in an increasingly global, competitive, and challenging business environment, particular attention must be given to organisational effectiveness, and it is important to recognise the main influences on behaviour in work organisations, the effective management of human resources, and the nature of the people-organisation relationship.

These words emphasise the importance of managing the work of the organisation and the people who are at the frontline, even during difficult times, and quality is always considered a top priority in all processes of the organisation, whether it is a manufacturing or service organisation. The quality of products and services plays an important and noticeable role in the survival and success of the organisation. Heizer, Render, and Munson (2016) state that improvement in quality helps firms increase sales and reduce costs, both of which can increase profitability. An increase in sales often occurs as firms speed response, increase, or lower selling prices, and improve their reputation for quality products.

Bowersox et al. (2020) state that total quality management is a philosophy supported by a managerial system focused on meeting customer expectations with respect to all needs, from all departments or functions of an organisation whether the customer is internal or external. One of the elements of the philosophy of TQM are that every employee must be imbued with an attitude of continuously striving for improvement that leads to higher quality and improved customer service across all activities of the organisation. Ghunaim and Jaaron (2022) agree that the total quality management philosophy that managers seek to create in the business environment enables companies to produce flawless products and services based on continuous improvement coupled with a performance measurement system.

TQM is without doubt an efficient management approach for improving customer service and customer satisfaction, but at the same time it is an evolving system, continuously improving processes, products, and services to increase customer satisfaction. Souza et al. (2021) point out that the concept of TQM presents a management approach that aims to achieve excellence in business through quality; it focuses on increasing customer satisfaction through quality. Consumer expectations of quality have grown in recent years, forcing organisations, both service and manufacturing, to adopt total quality management (TQM) principles to satisfy customer demands efficiently (Acquah, Quaicoe & Arhin 2023). Schiavone et al. (2022) affirm that TQM is a strategy to continuously improving the quality of the companies that involves management, employees, and the business process. The TQM approach has focused primarily on manufacturing firms.

Sedevich-Fons (2022) states that in basic terms, this principle may be defined as an organisational culture promoting specific quality procedure and practices that help organisations succeed and thrive, including, among the most important ones, focus on work processes, analysis of variability, management by fact, learning and continuous improvement, supplier partnership, and use of scientific methods to monitor the progress. Ahmad et al. (2023) agrees, stating that the critical parameters determine that product's quality are conformance to specification, and reliability, and efficiency.

The profit of an organisation relies on its product quality; according to Louw and Venter (2010), profitability is the ability of an organisation to generate net income on a consistent basis, often measured by the price-to-earnings ratio. Over the last few decades, many organisations have adopted continuous improvement strategies such as lean, agile, Six Sigma, or total quality management (TQM). To sustain such improvements, many organisations now aim to become full-learning organisations, in which it is the norm to pool knowledge to solve persistent problems effectively (Franken, van Dun, & Wilderom 2021). These pressures, among others, force organisations, both service and manufacturing firms, to use total quality management (TQM) principles to efficiently and effectively meet the market demand. Clancy and colleagues (2021) assert that inadequate data visibility amplifies supply chain quality challenges. Enhanced visibility of quality costs, particularly to company management, significantly boosts the effectiveness and efficiency of their oversight.

Sahoo (2021) asserts that the concept of process quality management has undergone various theoretical interpretations over time. In particular, Total Quality Management (TQM) is described as a systematic method aimed at enhancing business performance, encompassing various technological and socio-cultural elements. Echoing the significance of ongoing quality enhancement, Clancy (2022) emphasize that continual improvement of processes constitutes a vital aspect of operations management. This approach targets waste reduction and quality enhancement.

2.3 Bell Equipment supplier quality

Uluskan, Joines and Godfrey (2016) state that suppliers are under pressure to ensure that their products and services continue to meet or exceed acceptable thresholds set by their customers; therefore, it is imperative for suppliers to implement some form of

quality management system and practices within their facilities to meet the changing needs of today's market conditions.

COVID-19 was a notifiable disaster that had severe negative impacts on the global economy (Sharma, and Sha 2020). The COVID-19 restrictions that were imposed by the government prevented the supplier quality department from undertaking some of the important quality processes, such as supplier visits at Bell Equipment. The supplier visits enable interaction between the company and the suppliers to ensure that the raw material is produced according to standard operating procedures. The COVID-19 pandemic also affected quality feedback communicated from the company to the supplier at Bell Equipment. These dual disruptions make the production planning complex, and without proper action, the business could be unable to ramp up production and could lose demand (Paul & Chowdhury 2020). Organisations might need to rethink their processes and routines for the post-pandemic period based on the lessons learned from COVID-19's work implications (Narayanamurthy & Tortorella 2021).

The slow response from the suppliers on parts rejected as suppliers were missing work completely due to illness, and some unfortunately passed away, was among the factors that affected supplier quality. This led to longer lead times in terms of getting feedback and reports on quality issues communicated from the suppliers. Even if the health dimension is controlled, it is expected that the impact of COVID-19 will be long-lasting in the manufacturing industry (Ceylan, Ozkan, & Mulazimogullari 2020). Kumar (2020) presents a contrasting perspective, asserting that the emergence of COVID-19 has notably enhanced organizational environmental sustainability. Nonetheless, they concur that the pandemic has downsized the consumer economy, posing challenges for industrial workforce management. Supply disruptions are linked to production interruptions among direct suppliers and global transportation issues stemming from health risks and quarantine measures (Li et al. 2021). It is evident that the disruptions caused by COVID-19 also call for a relook at the way the manufacturing sector has set its priorities and the way we measure performance (Deshmukh & Haleem 2020).

2.3.1 Working from home

Supplier quality engineers and inspectors found it very difficult to work from home as their work requires them to be physically in the offices and factories to perform quality duties during the COVID-19 pandemic, and sometimes the urgency of the replacement parts does not permit them to work remotely (Pantano et al. 2020). However, some departments in the company worked remotely from March 2020 to July 2022, at which point Bell Equipment made a call that all employees had to return to the office. Some suppliers working from home were unable to go into the offices and factories to investigate the quality issues raised by Bell due to the limited staff number allowed on the premises (Bolisani et al 2020). The availability of the staff was a problem, and those who were available to assist worked remotely, which affected the response time as they were not directly at the factories to resolve the issues raised pertaining to non-conforming parts (Aczel et al. 2021). At their peak, supplier quality inspectors were unable to visit suppliers for quality inspection but conducted meetings on Microsoft Teams to communicate quality issues, which compromised both supplier and product quality. The supplier quality department held meetings on teams, and this was done in a fight for survival during the COVID-19 pandemic. All team members are now working on teams more than before and are required to have all technologies necessary for productivity. It has been proven that this pandemic has presented an opportunity to adapt to new technologies quicker than expected (Irawan 2020).

The fundamental role of information and communication technologies is to facilitate business transactions and communicate relevant information to decision-makers (Lau 2020). The COVID-19 pandemic has caused more businesses to turn to digital applications to enable a work-anywhere economy and mitigate the risk in daily operations.

The pandemic has not only raised opportunities to advance technology-based solutions but also provided a rare opportunity to study the research and practice of technology (He et al. 2020). Vaishya et al. (2021) weigh in that modern technologies are made to provide appropriate information and improved services in healthcare sector.

Internally, deviations were signed in person, but due to team members working from home, they had to be scanned and sent to relevant people. Working from home has traditionally been considered a means of increasing an individual's work-life balance because telework provides an opportunity to take care of family members (Nakrošienė, Bučiūnienė & Goštautaitė 2019).

During the COVID-19 pandemic, many workers were advised to work from home full time, which redefined the conventional concept of working from home that was typical only for certain types of work, on an occasional basis, or given unique employee circumstances. Now, many companies believe that working from home can become more common after the COVID-19 pandemic incidence (Xiao et al. 2021). To lower the risk of spreading the virus, national governments across the world required people to work from home unless they were key workers (Ipsen et al. 2021). Lockdowns resulted in a considerable impact on global as well as local economies, which will take a long time to perform in the business-as-usual scenario (Jain, Sharma, and Shrivastava, 2021).

Moreover, being away from the office may also create a lack of visibility and increase teleworkers fear that being out of sight limits opportunities for physical quality inspections (Aczel et al. 2021). Some suppliers did not survive the lockdown, and parts supplied by these suppliers had to be sourced from other suppliers. The number of logistics companies that outsource their functions increased rapidly, positively affecting the quality of services and efficiency as well as complying with consumer demands (Tsai et al. 2021).

Supply chain organisations worldwide were facing a crisis in tackling the COVID-19 pandemic-related challenges, as they have never experienced such an event in the near past. In terms of supplier quality, working remotely was a big adjustment for employees. Getting used to and being able to participate in online meetings required some investments in technology from individuals and the organisation. However, a significant number of challenges were experienced during the work-from-home period (Utomo 2021). To continue operating during the challenges posed by the COVID-19 pandemic, many firms became increasingly dependent on digitised operations, often using cloud-based technologies and virtual meetings (Castka et al. 2022).

The "new normal" signifies a state in which individuals need to adapt their lifestyle due to the COVID-19 pandemic. There were more distractions at home that interfered with the ability to work effectively (Irawan 2020). Moreover, many of the employees also had additional duties at home, such as taking care of their children, given that schools were online and childcare services were not operational. Every economy was introducing practices such as social distancing and aggressively embracing work-from-home or remote working practices instead of working in offices (Rehman et al. 2022).

2.3.2 Part shortages

The COVID-19 pandemic came with a few factors that contributed to a loss in the company's annual income. The shortage of raw materials is a fundamental factor that has a long-lasting impact on finances, stakeholders, customers, and production, which is the main goal of the company (Paul & Chowdhury 2020). The companies suffered in many ways due to raw material shortages, insufficient supply to fabricate products, the inability to supply on time, and others that could not operate due to a lack of financial assistance, which was essential during the COVID-19 pandemic (Salmi et al. 2020). Many customer orders were cancelled due to raw material shortages from both internal and external suppliers, and some orders had to be diverted in the hope that the raw materials would be eventually delivered. The increased shortage of materials resulted in increased airfreight costs and the increased airfreight costs resulted in increased production costs (Martin & Bergmann 2021). The customers had to wait for their products because the parts were not available, which was not a good experience for the company. The challenges were not only financial; the company lost a lot of time too, and the management had to go back to the drawing board, restructure, and reschedule its plan to ensure that the products were being manufactured expeditiously to satisfy the customers.

The COVID-19 challenges limited the supplier quality department from providing adequate support to production, and the department had to put measures in place to ensure that the raw materials bought from overseas suppliers meet quality standards (Gui et al. 2022). Services were affected due to the availability of technicians to fulfil service requirements. The supply chain capacity constraints also exposed a lack of resilience, which changed the strategy of companies to focus more on spreading risk

by setting up multiple supply lines where possible. This was a change from the previous strategy to consolidate to maximise volume and cost benefits. The company found it difficult to recover from the devastating COVID-19 pandemic. The supplier quality department reported an increase in deviation requests due to shortages resulting from COVID-19 challenges. The deviation process was used to reach out to alternative suppliers, which was a cause for an increase in deviation requests during the COVID-19 pandemic. Xu et al. (2020) affirms that the lockdown measures implemented in numerous cities led to limited access to raw materials, causing shutdowns or capacity suspensions across nearly all sectors. Kumar et al (2020) present an alternative perspective, suggesting that the COVID-19 situation has provided an opportunity to cultivate a flexible and resilient manufacturing system. This is aimed at sustaining the economic and social aspects of production processes. Paul and Chowdhury (2020) agreed that manufacturers faced a significant decrease in their raw material supply, which created this highly tense supply-demand problem. The effect of the coronavirus outbreak on global supply chains has emerged on three different fronts: the supply side, the demand side, and the logistical side (Raj et al. 2022). Bolisani et al. (2020) share a different view, stating that other businesses were able to place material orders and requested delivery prior to when deliveries became more challenging, and shortages of supplies were experienced in the market.

Elsafty and Osman (2021) state that in every challenging circumstance, flexibility is the only ways to survive. Paul and Chowdhury (2020) affirm that such disruptions can abruptly affect the production process, potentially leading to its collapse without prompt and essential interventions. There are many COVID-19-related challenges that were experienced in the supplier quality department. Many shortages were reported, and there was a spike in deviation requests from the suppliers requesting the use of different or available materials to keep production going. The COVID-19 pandemic generated interruptions in supply chains, being considered an extraordinary risk for companies in various sectors that have experienced different types of challenges. For some, the demands are increasing, and on the other hand, the supply of raw materials to produce these articles has been reduced due to the lack of supply (Paul & Chowdhury 2020). However, manufacturers are refining production schedules to meet the production challenges (Butt 2021).

Given the substantial adverse effects of the COVID-19 pandemic on global supply chain management, it is imperative for companies to reinforce their supply chains in a way that enhances flexibility. The COVID-19 pandemic has revealed the fragility of global supply chains arising from raw material scarcity, production and transportation disruption, and social distancing (Paul et al. 2021). Paul et al (2021) propose that companies should meticulously anticipate challenges during the recovery phase and devise suitable strategies to guarantee the survival of their businesses and supply chains. Production in all industries has been affected in some way compared to pre-COVID-19 levels, and these disruptions ripple back through their supply chains, partially impacting manufacturing (Stannard, Steven, & McDonald 2020).

The impact of COVID-19 led to stringent measures such as the imposition of trade barriers and export restrictions that have affected global trade and negatively impacted the credit market (Sharma et al. 2020). The supplier quality department engaged in several mitigation strategies to keep the production going and to help the suppliers find a way to deal with COVID-19-related challenges. One of these mitigation strategies was to send letters to the suppliers to reflect on the production status and reiterate the company's quality requirements, this was done on a regular basis. Pandemics like COVID-19 have created a proliferating and ever-higher health threat to humans in the manufacturing sector, which incurs severe disruptions and complex issues for industrial networks (Li et al. 2021). The supply chain disruption caused by the COVID-19 pandemic has forced many manufacturers to look for alternative suppliers (Chen et al. 2021).

Many factors are essential for choosing the right supplier, such as product quality, price, delivery speed, company reputation and supplier relationship (Chen et al. 2021). Flexibility risk was among the other critical enablers that has a high driving power (Sreenivasan & Suresh 2022). The authors further stated that supplier risk, quality risk and demand risk were found to have highly dependent other enablers for implementation. The COVID-19 pandemic has increased the pressure on manufacturers to make their designs freely available, particularly in cases where spares may not be readily accessible due to disruptions in production plants, logistics, and supply chains (Salmi et al. 2020). The COVID-19 pandemic has changed the demand and supply of products and services in the organisation, and this has

increased lead times in terms of getting feedback and reports on quality issues communicated to production and internal customers. Competitive markets around the world found it necessary to give their customers better responses by making their activities more customer focused.

2.3.3 Shipment delays

Goods shipments took longer than anticipated, which caused more delays in the production processes, and this was due to COVID-19 restrictions. The company ended up incurring additional airfreight costs as shown in figure number 2.1 below. In October 2022, Bell Equipment spent R3.7 million on airfreight, which was the highest amount between 2021 and 2022. Kusrini et al (2020) suggests that challenges stemming from raw material delivery and product distribution can present risks and threats to companies. Cariou and Notteboom (2022) express concerns about shipment delays, noting that shortages in certain goods and substantial increases in lead times result from low schedule integrity among container liner services, port congestion at major ports, and significant shortages of equipment, dockworkers, and truckers. Pantano et al. (2020) assert that the world has not encountered such severe restrictions previously. Alsharef et al (2021) affirm that delays in material delivery were also anticipated to prolong overall production processes and lead to significant disruptions in schedules. The pandemic diminished the resilience of supply chains, rendering firms more susceptible to disruptions due to halts in production and logistical operations (Sudan & Taggar, 2021). The rapid and widespread transmission of the SARS-CoV-2 virus posed a severe stress test for existing economic models and global chains of interaction (Medyakova et al., 2020). Shipping played a critical role during the epidemic, ensuring the continuous functioning of global logistics. However, COVID-19 affected various industries worldwide, including shipping (Sun & Zhang, 2022). Gruenwald (2020) confirms that as flights were cancelled due to closed borders and lockdowns, other air cargo faced delays or cancellations, attributed to factors like staffing shortages, layoffs, and part-time work due to COVID-19. Delayed return of workforces, lack of personnel mobility, and traffic restrictions were the factors that were visible and experienced in the supplier quality department. Various protocols have been implemented across individual institutions to both minimise the spread of the virus and protect the workforce (Stinner et al. 2020). The main factors responsible for

delays due to the COVID-19 pandemic were the fear of an outbreak, the imposition of a nationwide lockdown, the late return of workers, resource shortages and changes in operating procedures (Abubakar, Hasan & Jha 2022). Rueda-Garrido et al. (2020) suggest that each organisation should find it way to gradually bring employees back according to each worker's need to physically attend work, the strategic interests of the employer, and the individual vulnerabilities of each worker.

Infectious disease outbreaks and human mobility are intrinsically linked, yet those links are complex. Chan et al. (2020) state that there was a sharp decline in mobility after the World Health Organization (WHO) (2020) declared COVID-19 to be a pandemic. On the one hand, the movement of people can contribute to the spread of diseases, creating pandemics in the worst case (Martin & Bergmann 2021). With pandemics, challenges arise from a lack of knowledge, experience, and readiness (Kim et al. 2020). The COVID-19 pandemic was rapidly spreading, forcing governments to implement historic lockdowns, shutdowns, and closures of schools and businesses (Kim et al. 2020).

Figure 2.1 gives an overview of airfreight costs between 2021 and 2022 at Bell Equipment. The company used airfreight to mitigate the impact of material shortages and to ensure that there was continuity in the production during the COVID-19 pandemic. The delays in goods delivery were also, in turn, expected to increase airfreight costs (Alsharef et al (2021)).

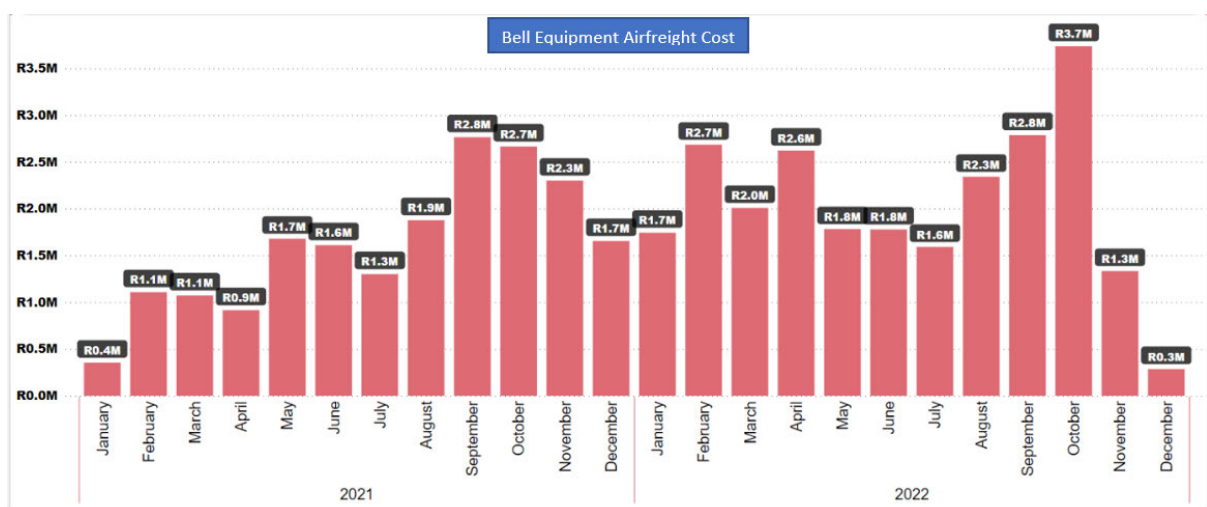


Figure 2.1 Airfreight cost

2.3.4 Absenteeism

The COVID-19 pandemic was a devastating challenge for the Bell Equipment. It severely impacted operations and financial results. The pandemic also caused a lot of anxiety and uncertainty. Generally, the employees were fearful of their lives and the lives of their loved ones, which in turn disrupted the daily operations of the business. As Song (2021) outlined the impact of the pandemic in the manufacturing sector and the evaluation of the impact of COVID-19 was vitally important as the pandemic was disrupting daily operations. The pandemic continuously impacted companies' revenue, and suppliers did not have enough manpower due to the COVID-19 pandemic, which resulted in quality issues not being attended to immediately. Absenteeism increased dramatically due to COVID-19 infections, which caused disruptions in the daily planning of operations (Namin & Ketron 2023). The company had to replace the employees who were unable to come to work with employees who were neither trained nor familiar with work, which in turn resulted in material damages, delays, and loss of time. These issues had a very negative impact on the financial side of the businesses, as the companies had to pay extra costs for new employees who were replacing ill employees and the ones that were isolating due to being in contact with either members of their families or other employees at work (Özgüner, Özgüner & Durmaz 2022).

The company also had to replace the materials damaged by new employees who were untrained and unproductive. The company ended up struggling to maintain its business expenses during these COVID-19 pandemic challenges and this undoubtedly compromised the quality of end products and production processes, as there were numerous quality processes that took place during the production process. At some stage, companies could not operate due to lockdown, which forced the employees to stay indoors and not travel to any place of work, gym, or where there would be some form of gathering (Masoudi & Shahin 2021). This was done for the protection of the employees. COVID-19 also changed the personal lives of the employees; they felt anxious and dissatisfied. The employees were unsure about their future as COVID-19 continued to impact the economies negatively (Neill & Bowen 2021). The level of anxiety and uncertainty was very high. The employees were unable to go to work due to numerous reasons related to COVID-19, such as isolation, illness, travel regulations,

and sometimes the filling stations were out of fuel, which forced the employees to take unplanned leave. The argument was that workers were anxious that they may have been exposed to the virus in the workplace and that many of the safety measures are not realistic to adopt or are not sufficiently enforced in manufacturing workplaces.

The lasting effects of COVID-19 will persist for a considerable duration. Therefore, it is crucial to instil habits such as adhering to social distancing, practicing good hygiene, and remaining aware of the situation among workers (Jain, Sharma, and Shrivastava, 2021). The authors additionally highlight that this situation has generated a substantial impact on both the global and local economies, requiring ample time for a return to business-as-usual conditions. The companies that survived are those that have understood this and have been able to best adapt to unforeseen threats (Baryshnikova, Kiriliuk, & Klimecka-Ta 2021). Some workers were working from home, and they were unable to respond promptly to quality issues raised from the factory.

Figure 2.2 presents Bell Equipment COVID-19 related absenteeism for permanent employees in 2020. There are several factors contributed to absenteeism. Illness, fear, and government restrictions had a huge impact on employee's attendance during the COVID-19 pandemic at Bell Equipment.

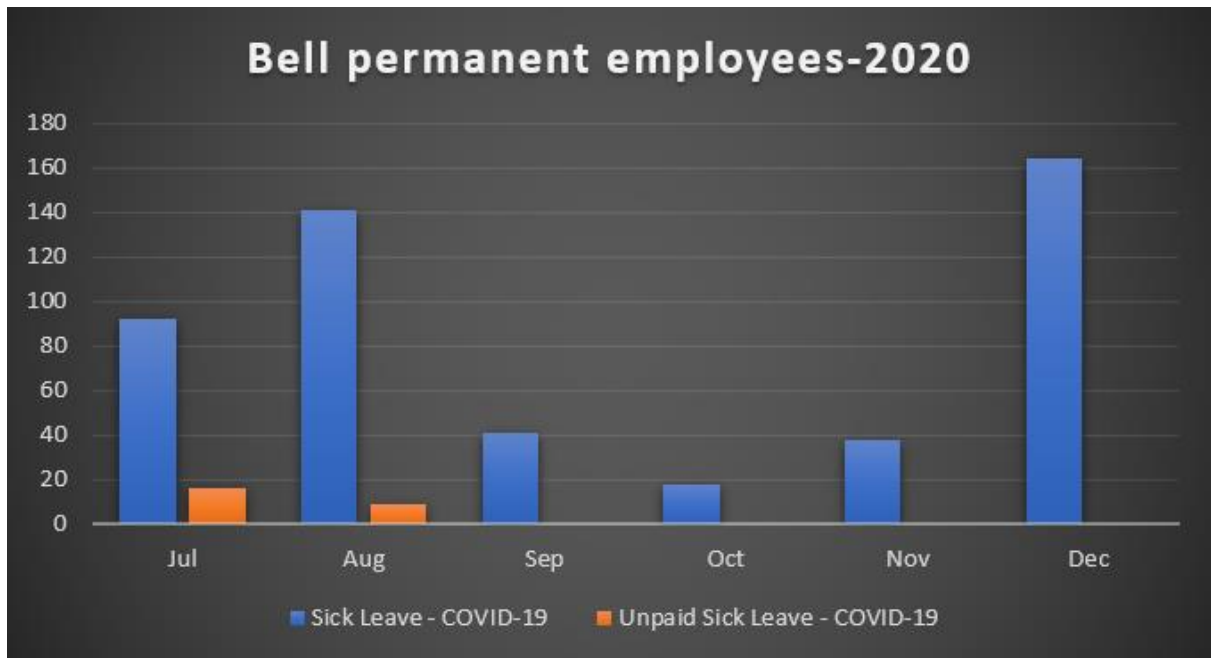


Figure 2.2 presents Bell Equipment COVID-19 related absenteeism

Figure 2.3 presents Bell Equipment COVID-19 related absenteeism for permanent employees in 2021.

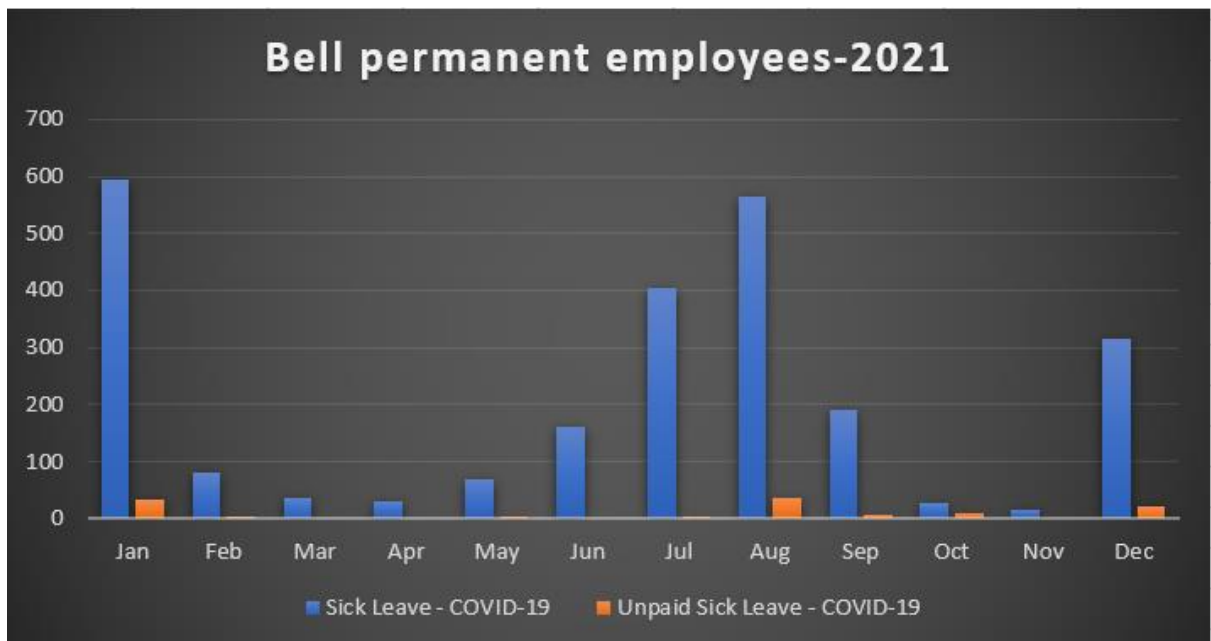


Figure 2.3 presents Bell Equipment COVID-19 related absenteeism

Figure 2.4 presents Bell Equipment COVID-19 related absenteeism for permanent employees in 2022.

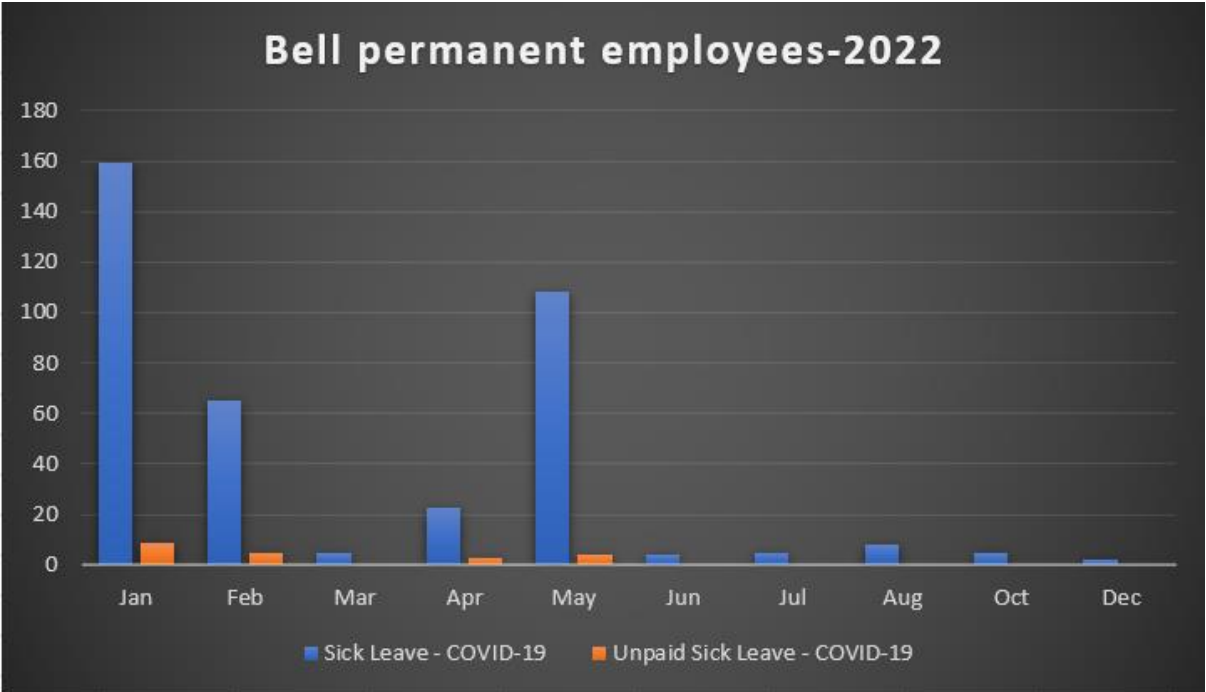


Figure 2.4 presents Bell Equipment COVID-19 related absenteeism

Figure 2.5 presents Bell Equipment COVID-19 related absenteeism for apprentice employees in 2020.

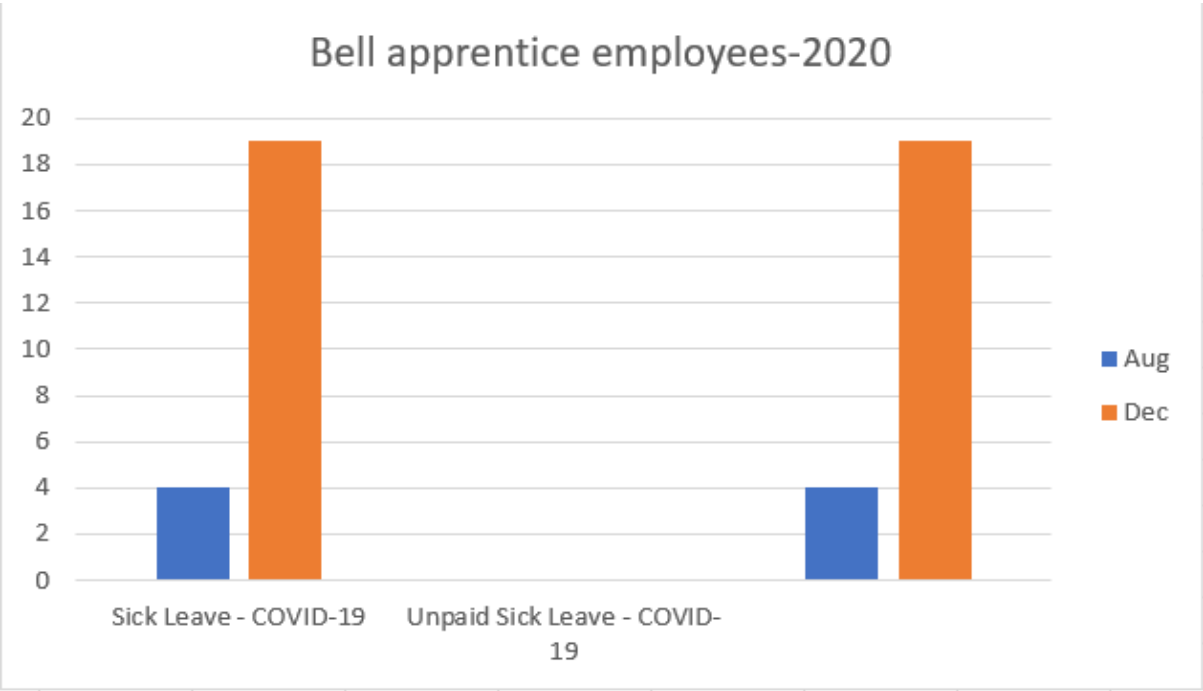


Figure 2.5 presents Bell Equipment COVID-19 related absenteeism

Figure 2.6 presents Bell Equipment COVID-19 related absenteeism for apprentice employees in 2021.

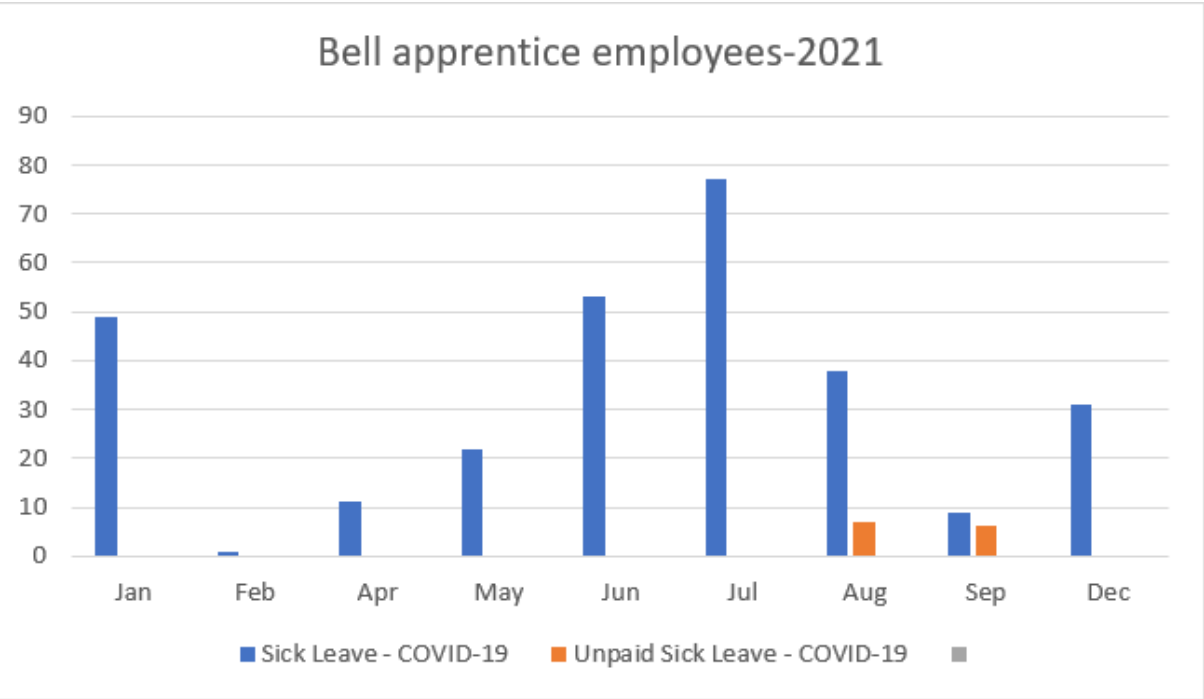


Figure 2.6 presents Bell Equipment COVID-19 related absenteeism

Figure 2.7 presents Bell Equipment COVID-19 related absenteeism for apprentice employees in 2022.

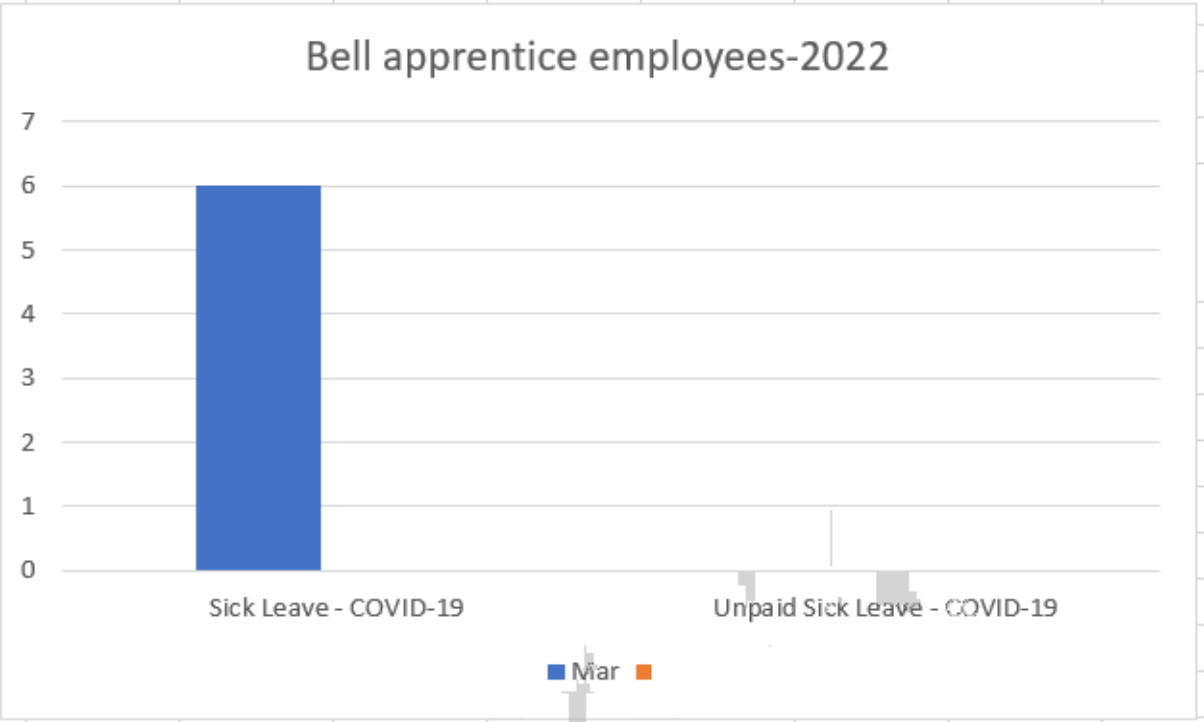


Figure 2.7 presents Bell Equipment COVID-19 related absenteeism

Figure 2.8 presents Bell Equipment COVID-19 related absenteeism for temporary employees in 2021.

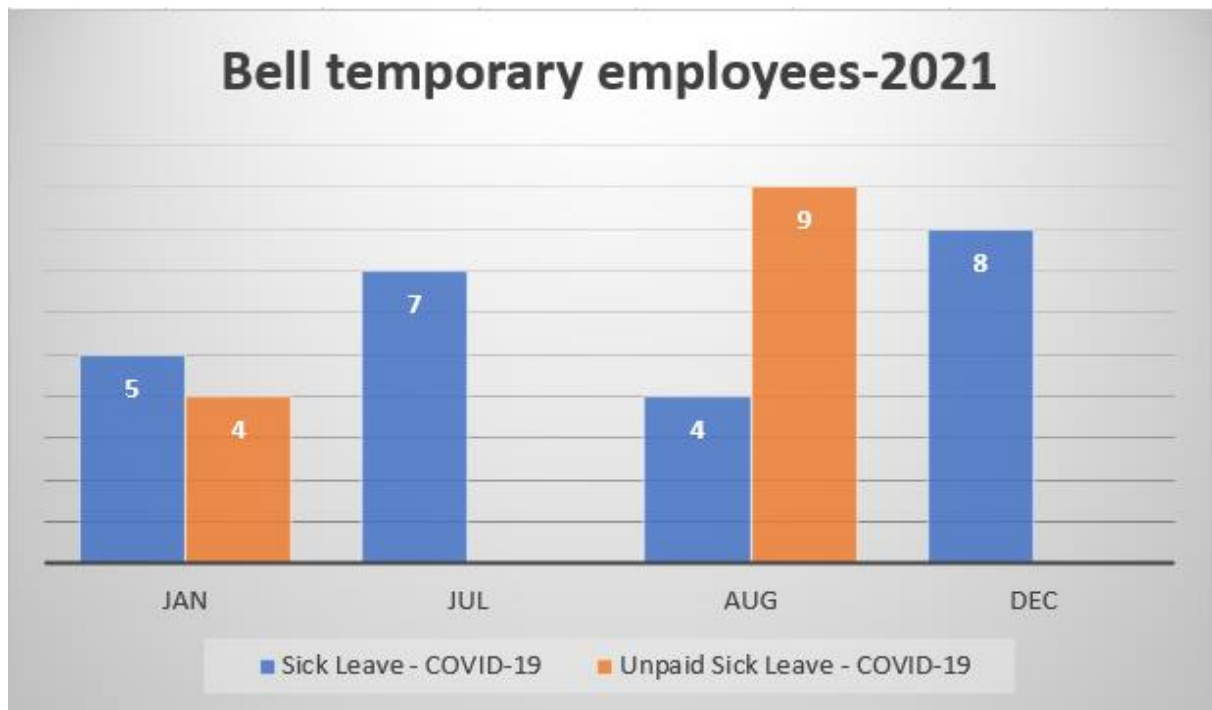


Figure 2.8 presents Bell Equipment COVID-19 related absenteeism

2.3.5 Increase in the number of deviations request due to shortages

The impact of COVID-19 led to drastic measures such as export restrictions that have affected the global supply chain and negatively impacted the credit market. In terms of supplier quality, the availability of goods was due to employee absenteeism, limited capacity from the suppliers, limited logistics, congestion at ports, and the availability of containers. Absenteeism among workers in several sectors was significantly higher than expected in April 2020 (Groenewold et al. 2020).

The impact of the pandemic across sectors and in different scenarios of complete, extended, and partial lockdown and at different levels of capacity utilisation is massive on the economy (Sahoo & Ashwani 2020). As the COVID-19 outbreak hitting the world, the frequency and severity of port congestion caused by various factors were increasing, challenging the stability of international supply chains (Gui et al. 2022). Any

sudden change in consumer demand has an immediate impact on shipping and port operations activity levels and may alter corporate strategies or even market structures (Notteboom et al. 2021).

2.3.6 Automotive industry

The automotive industry makes up most of the manufacturing sector in a country's economy (Kropatschek et. 2022). Importantly, the pandemic affected consumers' perceptions and responses to foreign brands, with some consumers avoiding purchasing foreign brands during the pandemic due to perceived risks of illness (Namin & Ketron 2023). In this process, consumer and producer confidence indices fell sharply, the government's budget revenues decreased, their expenditures increased, and unemployment rates increased. In this context, the worldwide spread of the COVID-19 pandemic affected production, supply chain, and consumption, while sharply narrowing the economic activities in the world and bringing some sectors to a standstill (Özgüner, Özgüner & Durmaz 2022).

2.3.7 Quality before quantity

Quality assurance procedures at Bell Equipment involve suppliers of raw materials. Supplier quality inspectors work with suppliers to ensure that the raw materials are produced based on the company specification and standard operating procedures (Sarkis 2020). The supplier quality department is responsible for the quality of products in the production lines. Each production line has its own quality team, including the final assembly, and raw materials or products that do not meet the Bell quality specification get rejected and follow the rework procedures. As part of quality assurance procedures, management provides training such as material handling, assembly training, and internal short courses to all employees (Aladejebi 2020). Masoudi and Shahin (2021) state that companies have taken steps to implement continuous improvement processes to boost their quality management systems and to avoid future challenges. In terms of supplier quality, building a strong relationship with key suppliers and ensuring that quality issues are handled as soon as they arise is one of the top priorities, and it is treated as a culture of the organisation and part of quality assurance at Bell Equipment.

If the quality of service received or felt is as expected, then consumers will feel satisfied; conversely, if the quality of service received is lower than expected, the consumer will be dissatisfied (Syafarudin & Buana 2021). Therefore, with high-quality products to ensure punctuality, consumers will buy more frequently, even for some inexpensive daily goods (Zhu & Tian 2022). Weak internal quality control can reduce the earnings quality of a company, while high internal quality control can help improve both product and service quality (Li et al. 2021).

The better the internal quality control, the better the results in the marketplace. The manufacturing industry needs to focus more on improving quality processes and functions, such as supplier and process quality, to achieve quality and reliable end products. Li et al. (2021) reflected that high quality in the manufacturing industry is to continuously meet customers' demand for product quality and improve production efficiency and processing for producers. Thus, the plan is the most crucial part of the implementation of quality-oriented management. Satisfying customers is the main goal of any manufacturing company, and intensifying quality processes in production can channel it in the right direction in the marketplace, improve its competitiveness, and achieve its goals successfully.

So there needs to be a redesign of quality assurance activities at the institution. Some rethinking and strategies are needed in carrying out quality assurance activities to survive, maintain stable organisational performance, and maintain the quality of production (Baharun et al. 2021). The authors further point out that having a focus on quality and quality improvement should be a part of every business organisation, whether the organisation's business is making cars or providing financial services. Kropatschek et al. (2022) weigh in, stating that meeting the required high product quality consistently in the context of increasingly complex products comes with many challenges. He further affirms that detecting quality issues in increasingly complex production processes efficiently is necessary to producing high-quality products.

2.3.8 New approaches in the event of other pandemics (mitigation strategies)

A crisis tends to unmask weaknesses within the process and the entire department; as such, the organisation needs to have stringent measures in place to handle such a crisis by ensuring that all the necessary preventative measures are in place, including

the implementation of new approaches to handle these situations. During the COVID-19 pandemic, companies invested in hardware and especially software that allowed for automation on cloud-based solutions that assist in reporting and dashboards that highlight areas that require attention (Parker 2020). Lean manufacturing system can be used to eliminate waste and non-value-adding tasks, which will impact the organisation even more negatively during a crisis. Lean has proven to be a good and valuable system to eliminate waste and reduce the costs of making a product (Kabir et al. 2020). Just in time can be used to eliminate overproduction by only producing what is needed at that time to avoid overspending, which can be a contributing factor in times of crisis; and low inventory is cost-effective, high inventory means large amounts of working capital are tied up (Aladejebi 2020). The company needs to develop and implement supply chain risk management. This can be done by ensuring the supply chain has backup suppliers that can deliver the required products and be used on deviation.

Response strategies and prioritisation had to occur at the cross-functional team level, from security through material planning and receiving of goods to the production floor. Cross-functional teams, consisting of stakeholders from all affected areas, had to design and prioritise protocols to ensure effective responses to keep the business flowing. Abideen, Mohamad, and Hassan (2020) Agree that the strategic approaches are urgently needed to mitigate the impact of the COVID-19 pandemic, and we must learn from different approaches used in the past pandemics to gain insights into curbing and containing the present COVID-19 crisis. The authors further point out that manufacturing industry should introduce daily self-reporting with all key suppliers to ensure that the production process is not greatly affected. However, the COVID-19 pandemic cruelly highlights the failure of predictions of emergence and preparedness strategies, and the experience of this pandemic urges the need to understand the processes that led from the onset of emergence to the global health crisis for pandemics (Morand & Lajaunie 2021).

Organisations are adapting by using more frequent pulse surveys, video conferencing technology, and mobile applications (Neill & Bowen 2021). Elcheroth and Drury (2020) affirm that it is fundamental to develop skills to adapt actions to the course of events. A crisis tends to reveal weaknesses within the department; as such, the organisation

needs to have stringent measures in place to handle such a crisis by ensuring the workforce is skilled to handle these situations.

2.3.9 Lessons learned from COVID-19 pandemic

Pandemics are difficult to predict, and the design and implementation of countermeasures to prevent disruptions were also a huge challenge in the supplier quality department. More robust, resilient, and smarter functions were required, with a higher level of automation, as individuals that were responsible for making functions work were not always available to fulfil this role. The department can only learn from this round of circumstances and do its best to be better prepared for what the future holds. Sarkis (2020) states that while the pandemic provides new opportunities it could also result in disappointment. From this crisis, we can presage a transition to further production sustainability. While mitigation of the current raw material shortages is an immediate concern that should be accomplished as soon as possible, it is also important to prepare for a post-pandemic landscape that may continue to feel the effects of this crisis for many years to come (Zhu, Chou, & Tsai 2020). During the pandemic, such as COVID-19, diverse manufacturing companies should adopt manufacturing repurposing, which is a temporary strategy that envisages the production of items not related to the core business (Ardolino, Bacchetti, & Ivanov 2022).

Viability is the ability of a supply chain to maintain itself and survive in a changing environment through a redesign of structures and a reconfiguration of performance with long-term impacts (Ivanov, 2022). Most of the producers were not able to fulfil the extra demand because of capacity problems and supply difficulties (Monostori & Váncza 2020). The COVID-19 pandemic also provided sufficient time to devise an appropriate strategy for handling the burgeoning environmental impact of the industrial sector (Marimuthu et al. 2022).

Drive continuous improvement and always question the “status quo” to always improve and do things better or more efficiently have always been among the strategies that were put in place to mitigate and ensure that the company continued to make profit even during the disruptive COVID-19 pandemic. Continuous improvement consists of processes such as Six Sigma. The main objectives of Six Sigma are to make

improvements, standardisation, and proposals for business process improvements so that companies can increase profit and sustainability and provide satisfaction or added value to customers (Praharsi et al. 2021). The COVID-19 pandemic provides unique circumstances surrounding the implementation of new management guidelines and methods for production (Munzer et al. 2020). There is a need for upgrading technology to facilitate unforeseen challenges, such as the COVID-19 pandemic, which came unexpectedly and had a devastating impact on all sectors of the world. Upgraded technology can eliminate face-to-face meetings, ideally through IT systems, so that people could conduct meetings and discussions remotely without having to be in one place of work.

2.3.10 Cost of operations during the COVID-19 pandemic

The departments incurred additional costs to supply employees who worked on-site with masks and sanitisers (Hoek 2020). Suppliers increased their material prices in response to the rebound in economic activities following the COVID-19 pandemic (Mota et al. 2022). Moreover, the increased cost of doing business and the need for suppliers to be geographically closer to the manufacturing facilities became apparent. These challenges were not isolated to supplier quality alone, other departments were also going through the same (Yassine 2023). The company was expected to respond better than its competitors in the market despite the COVID-19 crisis. However, the company experienced a substantial increase in material prices during the COVID-19 pandemic, which made it even more difficult to maintain the daily running of operations and added to financial challenges (Ali 2020). This obviously increased the cost of building the machines. Air freight was used to catch up on lost time because suppliers did not meet the due date of orders (Cirlan & Loukkola 2021). Although air freight is costly, it was still beneficial to do so compared to the cost of tied-up capital and building up working capital due to unavailable components. This increased cost eroded profit margins, and it was not possible to pass all of it on to customers. In general, the organisations also implemented upgraded cleaning and sanitising protocols in workstations and meeting rooms. While these COVID-19 prevention strategies are crucial for minimising virus transmission risk, they led to significant increases in office operating costs (Parker 2020). Furthermore, capital is one of the factors that is vital for the running of the business; it also has the function of being the main source of financial

activities, in addition to safeguarding the business against potential losses in the future (Ichsan et al. 2021).

Undoubtedly, COVID-19 caused the most severe economic crisis since the Great Depression of the 1930s. The COVID-19 pandemic caused the most severe losses to companies in many countries. According to Yamin (2020) the world's working class, estimated to be more than three and a quarter billion strong, was severely impacted by the sudden and unimaginable slowdown in the world economy, causing unprecedented losses in employment in all countries. The current outbreak of COVID-19 was estimated to have cost \$2 trillion to the world 's economy between the 2020 and 2022, and this impact is even worse than the Great Financial Crisis that the world faced in 2007–2008 (Kabir et al. 2020).

The measures enacted to stop the spread of this pandemic, such as large-scale quarantines, travel restrictions, and social distancing measures was predicted to result in a sharp decrease in consumer and business spending at the end of 2020 and ultimately lead to a global recession (Ferneini 2020). The COVID-19 pandemic hurt the production, operations, and sales of the industry. Company managers were expected to pay attention to environmental changes outside, adjust the business, establish strategies to make production, and carry out operational activities that met consumption trends during the COVID-19 pandemic to assist business recovery (Devi et al. 2020). The COVID-19 pandemic had a significant impact on all aspects of life, and on the financial reporting of companies (Crucean, Habil & Hațegan 2021). Belitski et al. (2022) offer a different view, stating that “the COVID-19 pandemic is an unprecedented challenge for businesses that also brings new market opportunities”. Le Breton and Mille (2022) weigh in, stating that firms with a long-term orientation finds ways that enables them to survive during times of crisis, and as a result, they develop an ability to withstand declines in revenue via adequate financial reserves. Aladejebi (2020) states that it was not easy to estimate the COVID-19 long-term economic, behavioural, or societal consequences, as the aspect has not been done with past pandemics. Ecklebe and Lofler (2021) point out that a crisis can be defined as the perception of an unpredictable event that threatens important expectancies of stakeholders related to health and safety and can seriously impact an organisation's performance and finances. Balouchi and Gholhaki (2019) weigh in, stating that the

objective of continuous improvement programmes is not only to meet customer requirements but also to practice it effectively and with intention to reduce costs. Ko et al. (2022) affirm that poor quality leads to increases in the cost of operations within the warranty period. To prevent defective products from being sold to customers, the customer inspects the products after receiving them at a fixed rate. High rejection rates were experienced, aggravating the lack of components in the company. Due to high demand for components and a lack of capacity, as well as replacement for employees standing in for their colleagues that were not available, assets were stretched to the limit and were not always operated by operators that were familiar with the processes.

Poor quality of materials affects product delivery dates and overall operations. The supplier quality department is responsible for ensuring that both the supplied and in-house goods are in good condition and meet the company's quality standard. Poor quality results in a production stoppage and not achieving the target. And it affects supplier quality as it increases the required inspections of stock and the request for replacement stock if no stock is available after inspection. Before the COVID-19 pandemic, the supplier quality department ensured that measures were in place, all parts were assigned for inspection on arrival, customer due dates were met, and any other quality issues that arose were dealt with quickly before they escalated, but COVID-19 restrictions prevented the department from undertaking these vital responsibilities. Poor quality of materials affects the overall operations and the supplier quality department and could cause delays in the production lines and severe issues that could have the potential to create an inconvenience. Multiple previous studies have shown that the decrease in demand for a particular product or service might be due to poor quality.

Each quality characteristic needs to meet the required quality level so that the quality of the final product can be guaranteed (Chen et al. 2020). Tambunan (2022) shares his view about poor quality, affirming that indeed poor quality is huge concern for any business. Decreased activity intensity will lower costs but not always enhance profitability, especially in the long run. The COVID-19 pandemic led to many disruptions that disrupted the functioning of the supplier quality department and its quality process, which are vital to the company's end products and customer certification, which is the main goal. Paul and Chowdhury (2020) state that these dual

disruptions impact the production process suddenly, and the company can close down if the necessary actions are not taken.

The consequences of a poor-quality product can largely depend on how the firm reacts to different situations, including pandemics, which are very challenging to any company's reputation. Chen et al. (2021) state that poor quality can lead to external failure costs, which could negatively impact financial performance and further threaten the survival of the organisation. Quality is the lifeline of the company, and quality management is an important part of company management, which is of great significance to the survival and development of the company. Chen et al. (2021) state that the rise in supply chain challenges, tougher regulation, and penalties related to product quality are posing a serious risk to product quality. Broday (2022) states that poor quality is costly, and some companies are dealing with problems of the past, from serious quality management problems that lead to substantial profit losses due to rising costs of poor quality and consumer dissatisfaction.

With the continuous development of quality management, quality management has changed from focusing on results to focusing on prevention, from checking after the event to prevention before the event, and from managing the results to managing factors (Yingying et al. 2019). Ammar et al. (2022) weighs in, stating that quality has always been an important part of manufacturing industry, and quality management systems (QMS) are a collection of processes and procedures used by firms to assure quality in the production processes. The authors further point out that QMS is needed in the continuing manufacturing of high-quality goods and the continual reduction of quality expenses. Product quality is important for firms because, on the one hand, higher product quality promotes consumer demand, increasing the firm's revenue and profit (Sun and Anwar, 2022). By understanding and applying the quality costs, companies can identify operational weaknesses and provide an opportunity to assess the efficiency and effectiveness of the implemented processes, programmes, and activities for quality (Velkoska and Tomov 2023). At Bell Equipment, the internal failure cost is associated with the issue of product damages, rework, and scrapping, and the external failure cost is the cost related to warranty claims, product recalls, and liability claims. Because the quality costs express the money spent on repairing poor quality,

quality-related activities, and quality management-related activities, they are especially important for the strategic, tactical, and operational management of the companies.

2.3.11 Inventory management

COVID-19 restrictions resulted in reduced capacity at suppliers, which resulted in supply chain shortages, from raw materials to processed components. Kumar et al. (2022) state that during a pandemic, it is very difficult to keep stock at the required level to meet the business promise. Lead times from the suppliers increased significantly, and to stay flexible with variable demand, safety stock was implemented. When parts availability resulted in the rescheduling of production lines, inventory with long lead times was already shipped and could not be stopped. The resultant effect was a buildup of inventory, which in turn put a strain on cash flow. That made inventory management challenging, as the company requires inventory when the delayed parts arrive. Inventory management—to find a balance with parts available, without putting strain on cash flow—was challenging during COVID-19, and it is going to be a challenge. Due to parts shortages, delivery delays, and market demand, supply chain departments were forced to over-stock steel products Patrinely et al. (2021). For products with less risk of supply, inventory levels were maintained to meet production levels (Koren & Pető 2020). For high-risk supply parts, the company was unable to keep the inventory at the expected level to ensure that it did not have a negative impact on the organisation's finances and to keep production running. This was difficult to achieve, and the company had to revert to other means as well, by approaching suppliers with extended payment terms.

There have been shortages, which obviously reduces the amount of stock coming in, and then to wait for a rainy day (Dilawo & Salimi (2019). This is one of the most disruptive factors in inventory management during the COVID-19 crisis in the supplier quality department, and it has a negative impact on the company's end products. Another significant role that inventory plays is to reduce cost by exploiting economies of scale that may exist during production and distribution. Hoek (2020) states that the implication of this is that without changes to the supply chain design, the supply disruptions from COVID-19 will have extended effects past the closures and quarantining. Cesarelli et al. (2021) state that "supply chain management is an

innovative approach that deals with the planning and control of materials and the information from the suppliers to final consumers; a fundamental aspect of this approach is the cooperation between all parties to optimise system-level performance". Furthermore, organisational resilience in overcoming turbulent times of change, such as the COVID-19 crisis, can be viewed as a dynamic capability (Mota et al. 2022).

Manufacturing organisations in South Africa are perceived to be underperforming due to ineffective inventory management practices and have recognised the importance of inventory management and the role it plays in competitive advantage (Lessing 2021). However, they are working with secondary suppliers to meet the inventory shortage (Butt, 2015). Chopra and Meindl (2001) state that a "high level of responsiveness in an apparel supply chain leaves the supply chain vulnerable to the need for markdown, lowering profit margins". The authors further affirm that a good inventory management can improve inventory turnover but may result in lost sales if customers are unable to find products, they are ready to buy.

Komorowski et al. (2021) offer a different view, stating that there is always a room for change, so change management is becoming a dynamically developing area. Manufacturing companies need to coordinate quickly to be able to adjust to the disruption (Sari et al. 2021). Inventory control is the activity of managing inventory to suit production needs and remain stable. Meanwhile, if there is excess stock, it can cause problems, such as material damage due to storage that is too long, and the amount of storage costs will also increase.

Management of stocks ensures availability and minimises investment as required in materials and takes inventory decisions that include funding, promotion, sourcing, and procurement management, which present high risks and have a direct financial effect on the organisation (Basha et al. 2020). Li et al. (2021) weighs in, affirming that appropriate implementation and organisation of logistics activities greatly contribute to the creation of a better business environment in companies. The authors further point out that this reflects improved business efficiency, cost reduction, increased productivity, and improved quality, and in order for a company to achieve the sustainability of its business and its competitiveness, the communication between the marketing logistics system and other logistics subsystems is particularly evident.

Tannady et al. (2021) affirm that failure to initiate good inventory management is likely to result in production failure. Patrinley et al. (2021) suggest that in the near future, manufacturing firms will need to relook at their inventory management strategies, which are geared towards cost efficiency, to avoid shortages of critical and essential. Supply chains often comprise partners from different manufacturing companies, including ones where governments have imposed lockdowns due to the spread of COVID-19 (Paul & Chowdhury 2023).

The optimal level of inventory should be determined by taking into consideration different costs, such as order, shipping and holding costs, as well a shortage costs. Supply chain members are facing various types of uncertainties related to order quantities, lead times, and demand fluctuations. To make effective decisions aimed at addressing challenges faced during the COVID-19 pandemic and possibly in future trade, Yassine, (2023) suggest that supply chain managers should thoroughly adjust their supply chain design and align it to modern production challenges.

2.3.12 Quality assurance

Quality departments at suppliers were required to be on-site after the hard lock-down periods (Dias 2022). High absenteeism affected quality controls. The challenging factor was following the quality process, while absenteeism was high during hard lockdown (Kumar et al. 2022). However, resources were shared between different processes to make sure the quality inspections still occurred (Agarwal et 2022). With internal quality, the supplier quality department had to absorb the costs of rejected parts during the COVID-19 pandemic. This was due to the absenteeism of experienced employees who were unable to work due to illness or being in contact with others, which forced them to isolate and avoid spreading the virus to other employees (Pacheco & Librelato 2023). And for external rejects, the company claimed the costs from the suppliers. The company lost a lot of time trying to find alternatives for these rejects, which was not an easy task with government regulations being tough and disruptive. One of the negative impacts the department experienced was that it could not use multiple quality inspectors on the same shift during COVID-19. This resulted in some inspection delays as small parts had high volumes and some parts were large and required multiple quality inspectors.

There was an increase in reworks on internal quality due to illness and people working on new stations due to COVID-19 regulations (Milne & Xie (2020)). Some external suppliers were unable to pay the warranty claims in full due to their cash flow problems resulting from COVID-19 challenges. COVID-19 was the most devastating factor for the company's finances and quality department. This could only serve as a lesson and prompt the supplier quality department and the company to stay prepared for any situation that the company could find itself in. Cirlan and Loukkola (2021) affirm that the sudden shift in the mode of operations caused by the pandemic raised questions around the effectiveness, relevance, and flexibility of internal quality assurance arrangements. The authors further stated that the typical internal quality assurance enhancement cycle proved to be slow to react in times of crisis. Supplier quality maintained the coherence and consistency of quality assurance actions during the COVID-19 pandemic by ensuring that all processes were followed and audited. The risks were identified and verified, especially the critical product. Internal audits of procedures were also done by internal auditors to meet quality and ISO requirements.

2.4 Bell Equipment process quality

Liu et al. (2023) state that in order for any organisation to succeed, responding quickly to the needs of its customers and providing quality products and services is fundamental. Little has been analysed regarding how external factors can influence the quality of products. The influence of an external factor such as a pandemic on the quality of products can take place in several ways, which may make it difficult for manufacturing companies to manage production in the same way as they did before the pandemic (Díaz-Santamaría, Bulchand-Gidumal, & Melián-González 2022). Ensuring superior product quality within the products that companies sell in the marketplace is particularly imperative, considering mass customisation and price competition among companies. Process quality serves as support in the production processes. According to Goswami and Daultani (2022), product quality at its fundamental level essentially implies that a product is supposed to work properly and flawlessly, and any variability in the product's functions would be detrimental to meeting broad customer requirements. But the COVID-19 pandemic caused significant

changes to the way the process quality department conducted its day-to-day operations to ensure that quality standards were maintained during the machine final assembly (Ajmal & Khan 2021). The workforce was divided into three shifts, and the number of employees in the production lines was reduced due to COVID-19 restrictions.

With social distancing, the management had to limit their interaction with employees, and the on-the-job training approach because corrective action was not as effective as during the pre-pandemic period (Laorden et al. (2022). An example of this is that management had to generate and distribute more written instructions with limited practical demonstrations to a particular item assembly. Not all the employees have an exceptional grasp of the English language or can read assembly drawings competently. Manufacturing a product is a standing work that sometimes involves physical interaction in different conditions, and at the same time, it is often performed by consulting with different people, which makes it difficult for people to keep the distance between each other while performing their duties (Kumar et al 2022). Cai et al. (2022) state that WHO advised governments to prevent the spread of COVID-19 by introducing stringent social distancing measures at five levels, ranging from pandemic surveillance, stay-at-home recommendations, workplace closures, and national and international travel restrictions. The authors further point out that these measures inevitably disrupted the global business worldwide.

Kim 2020 agrees that the outbreak of COVID-19 hit the economy severely by not only causing higher unemployment rates but also forcing people to practice social distancing, which requires them to avoid close contact with other people, which may have far-ranging implications for various aspects of the manufacturing industry. Gunay and Kurtulmus (2020) offer another view: the lessons taken from COVID-19 pandemic experience will become crucial in terms of risk management and policy implications. The authors further point out that it is important to prevent and restrict the transmission of COVID-19 because of its highly contagious nature. Ali (2020) affirms that the entire industry was directly affected by social distancing measures decided by governments, while others had to grapple to with supply chain challenges which eventually forced some organisations to suspend their operations.

Zivaljevic, Zakic, and Bevanda (2022) share their view about the processes that are supported by process quality, affirming that core processes serve as tools to deliver products or services to the company's customers, supportive processes are enabling the quality, while managerial processes are setting directions for core and supportive processes. All processes use energy, material, and information to run, while QMS implementation is conducted by employees and equipment. These processes are intricately tied to process quality, which, in turn, affects or is affected by the company's image, profits, costs, and waste. In essence, these outcomes, such as image, profit, costs, and waste, are a result of how processes are carried out and how they interact with the company's suppliers and customers.

Koren and Pető (2020) state that social distancing interventions can be effective against epidemics but can cause serious damages to organisations that rely heavily on face-to-face communication when producing a product or providing a service. Kim (2020) affirms that workplaces were identified as high risks during the COVID-19 pandemic. Milne and Xie (2020) affirm that measures such as the application of workplace non-attendance and community contact reduction is highly effective in reducing the maximum daily case numbers. Hou et al. (2020) offer a different view although this is viewed as a disruption to production but it is advised that people should avoid any person-to-person contact, such as shaking hands, and they should maintain a distance of at least 1 metre from each other to reduce the possibility of infection. Koren and Pető (2020) offer a different view, stating that frequent interaction increases productivity irrespective of whether it is happening between workers and customers, or between workers and equipment. Due to the COVID-19 crisis, workplaces have had to make significant alterations in the way they conduct business and this, in addition to the current financial instability, may put workers at risk of experiencing job insecurity and, in turn, lower wellbeing (Pacheco & Librelato 2023).

Jones, and and Roy (2021) affirm that the response to the COVID-19 crisis highlights the concerns between health care systems and economic outcomes. This entails not only cost reduction and profit enhancement but also an emphasis on improving product quality. Willar et al. (2023) state that if the quality of a product does not meet the standards, the need for rework increases, which delays the production flow, leading to increased losses in sales. Dilawo and Salimi (2019) point out that “quality leadership

involvement in all stages of production is crucial for the success of the project and the achievement of quality goals.

Silva, Borges, and Magano, (2022) suggest that prioritising the quality problems supported by the fundamental knowledge and tools of traditional quality management, is fundamental to the production processes. When quality is linked to management, it emphasises several important aspects of the digital transformation, with a focus on management systems (Dias et al. 2022).

2.4.1 Raw material shortages due to COVID-19 pandemic

During the COVID-19 pandemic, shortages of raw materials had a significant negative impact on the organisation, they had a direct impact on the assembly processes and on a financial perspective (Anh and Gan 2021). The Pareto chart can be used as a tool to investigate the cause of material shortages and to provide visibility and solutions to any future challenges. The company still finds it difficult to get electrical components as some suppliers have ended their operations due to COVID-19 issues. Shortages are not good for any assembly process (Albitar et al. 2020). In the process quality department process, which is a flow line with 10 assembly bays and a move time of three hours, parts are expected to be available at the point of use when required. If they are not there, there are various types of adverse effects it could have on the product's quality (Hoque 2022). Parts may not be fitted as per the drawing specification, as they will need to be fitted when the machine is off the assembly line. During the COVID-19 pandemic, it was necessary to fit parts when the machines were offline due to parts shortages resulting.

Given the prolonged pandemic, it was inevitable that economic damages would escalate significantly on national, regional, and global scales. Bastas and Garza-Reyes (2022) state that manufacturing companies were struggling to adapt to the unprecedented challenges posed by the COVID-19 pandemic.

Butt (2021) states that the impact of COVID-19 has created a lasting effect in supply chains, which was spread across different industries in the world. It has also triggered both supply and demand variations that are most detrimental at the same time, and on

the other hand, the influence of COVID-19 produced a cascade effect that extends through various sectors (buyers, distributors, and suppliers) in the supply chain.

Kumar et al. (2022) affirm that production management ensure that the preventative measure are in place should another pandemic happen. The lockdown circumstances also led to the closure of various business ventures, establishments, and commercial marketplaces, throwing the economy out of gear (Agarwal, Tyagi, and Garg 2022). Dohale et al. (2021) state that “unprecedented havoc due to the catastrophe owing to COVID-19 epidemic conditions has disrupted livelihoods, economies, businesses, enterprises and supply chains globally”. The authors further state that “the pandemic destroyed the lives and careers of millions, and it caused the discontinuation of the supply from the sources, leading to the closure of the manufacturing facilities”. Borojo, Yushi, and Miao (2022) concur that the economic effects of COVID-19, particularly in terms of production, can be broadly classified into demand and supply sides. Handfield, Apte, and Finkenstadt (2022) state that during a pandemic such as COVID-19, the distribution of critical supplies and services to the affected population proved a major concern.

The authors further state that the “lockdown of factories and offices, export restrictions, and rapid spread of the disease among workers in congregate settings created multiple shortages of raw materials, particularly in areas where manufacturing assets did not exist for these supplies”. Ikram et al. (2022) weigh in, affirming “that considering the global supply chain operation, both supply and demand sides were affected, and an unprecedented imbalance was caused in the trading of goods and services”. Minondo (2021) states that the “nature of the collapse suggests that trade in goods could recover swiftly when the health crisis ends; however, COVID-19 may have a long-term negative impact on the trade of services that rely on the movement of people”. Jaffu et al. (2022) discussed the challenges created by COVID-19 on the supply of goods, stating that “although worldwide trade has depicted signs of bouncing back from the deep downturn lately caused by the COVID-19 pandemic in 2020 as consumption and production have been scaled back across the globe, the trends in global trade in the coming years were unclear since the health crisis was going on.

Ajmal and Khan (2021) point out that “the pandemic impacted the global economy significantly due to workplace absenteeism, low production, a sharp drop in travel, a decline in demand and supply, and closures of factories”. Kunovjanek and Wankmuller (2021) affirm that “established and proven corridors for the transport of goods also collapsed under the pressure of COVID-19 containment measures”. The authors further affirm “that internationally operating manufacturers had to shut down their plants as the risk of an unintentional spread of the virus was simply too high, resulting in critical supply shortages all over the globe”. Kumar et al. (2022) state that “the nations are still experiencing a variety of obstacles and challenges resulting from COVID-19, such as inventory, availability of raw materials from the supplier side, human resources (HR) and customer management concerns such as out of stock, supply to match demand, inventory holding costs, and credit management”.

Transportation facilities were severely impacted and manufacturing companies ran out of stock during COVID-19 due to a constrained supply system for raw materials and manufacturing (Kumar et al. 2022). Nair (2022) weighs in, affirming that many countries responded to the pandemic by imposing lockdowns intending to achieve social isolation through confining millions of people to their homes, limiting work, shutting down businesses, and stopping almost all economic activities. As a result of the COVID-19 pandemic, businesses, workers, and business owners experienced an immediate economic shock all over the world. Entire industries have built their value creation and value distribution activities for serving customers and society on extensive supplier networks. The pandemic crisis has put these networks, for various reasons, under scrutiny. Suppliers can suffer operational and financial consequences from the COVID-19 crisis and might ultimately experience financial distress or even bankruptcy (Wagner, Bode, & Peter 2022).

2.4.2 Scraps, rejects and returns

The allocation number of findings per machine serves as a gauge for the process (Puram et al., 2022). The company averaged 15 points pre-pandemic, but because of the pandemic and shortages, the company ended up averaging 110 points per machine; for example, a hose routed from one end of the front chassis to the other end will be routed as per drawing in Bay 1, as there were no other components fitted, and

if it is not available when required, it may not be routed as per drawing because of all the other components already fitted to the chassis. Defects and scraps are not good for any production activity; they are causing delays, and there are financial consequences involved (Bozola et al. 2022). They should be detected as soon as possible to prevent delays and wasted money. One of the most delaying factors in production is waiting for the replacement of the part that was damaged or rejected for non-conformance on the production line because some parts have a long lead time and others are outsourced, which makes it even more difficult for a production process to be undertaken smoothly and to be completed in time (Ogunnusi et al. 2021). The rejects and scraps were caused by insufficient manpower; for example, if an experienced operator was off sick, the management would be forced to have someone stand in for the operator who is off sick, even if he or she is not clued up about work (Shaheen et al. 2022).

These issues were affecting the signing-off of the machine, which was always a top priority as customers expect their machines to be delivered on time. If the company fails to meet the delivery due date of the machine to the customer, there are severe and impactful consequences that can be experienced because customers are the main goal of the organisation (Spieske et al. 2022). The defects must be eliminated at all costs to run production successfully, meet customer requirements, and prevent unnecessary costs and delays from occurring. This can be done by utilising total quality management tools such as fishbone diagrams, pareto charts, and control charts, which can enable the identification of the cause of scraping the raw materials. Stevenson (2014) affirms that “control charts should be used to analyse process output, along with a plot of data” and the training of the employees can help in eliminating defects and scrapping the raw materials should any unforeseen circumstances arise.

The COVID-19 pandemic was a learning experience; it came unexpected, had a very negative impact on businesses and stakeholders, and should be something that reminded the world that anything can happen at any time, and we should stay prepared. The defective products identified at a certain stage of the production process can be reworked or discarded (Soares, Sousa, & Tereso 2020). The discarded products can represent a credit to the company, and replacement of the defective products may occur during disposal and rework. These inspection points aim to identify

any issues that may result in a product not meeting the customer's needs. If the product is not delivered with quality to the customer, it will immediately erode the trust of the customer; therefore, the inspection point must be planned and designed for maximum efficiency.

To remain competitive, production must be optimised to identify defects as early as possible, as well as their dependencies and variation patterns. Defects mainly occur in the form of dimensional and shape deviations due to, for example, tool wear, frequent re-clamping, and vibrations on the workpiece caused by the high machining forces. The production process includes defect detection stages involving different costs and deadlines.

2.4.3 COVID-19 challenges in the process quality

To build a complete machine that meets all customer requirements and the design intent, it is critical that all parts meet the drawing specifications and are available when required in the assembly bays. Too much time was wasted on testing alternate parts that needed to be used, as the usual supplier could not supply them. More time was lost by employees adhering to the excessive number of deviations that needed to be initiated. Employees that were not familiar with a particular task were asked to stand in for a team member who was either off sick or restricted from going to work because he or she was in contact with someone who tested positive for COVID-19, which caused delays because they needed to refer to the assembly drawing more often. This also caused an increase in the number of coaching sessions that needed to be done. Laorden et al. (2022) offer a different view about the COVID-19 pandemic, affirming that, on the other hand, it presents a transformational opportunity because it engenders efforts to reduce risks and respond to crises, bringing forth sustainable measures geared towards building resiliency.

Agarwal, Tyagi, and Garg (2022) states that the dire situation stemming from the COVID-19 pandemic has halted operations worldwide, significantly impacting the socio-economic landscape and placing immense pressure on governmental bodies to safeguard lives. The authors further note that the pandemic has necessitated the adoption of new operational approaches due to its numerous unprecedented effects. They emphasize that within an agile supply chain, qualities such as quality, speed,

adaptability, and responsiveness across the supply chain are crucial capabilities for meeting customer demand and market requirements. Obayelu, Edewor, and Ogbe (2022) state that “the pandemic has simultaneously triggered a supply-side shock propagated along value chains because of the disruption of business activities and rising frictions in international trade, as well as a demand shock, whereby growing unemployment and heightened uncertainty reduce consumption and investment expenditure”. Salunkhe, Rajan, and Kumar (2021) affirm that “global crises create a discernible worldwide impact on countries, companies, and citizens; crises have been conceptualised as situations that are unwanted, unexpected, unprecedented, and almost unmanageable, causing widespread disbelief and uncertainty”. Lamba and Jain (2022) state that “due to the retrenchment of employees from the companies, the hardship of people was increased, and they were short of funds for livelihood and investment purposes, which also negatively affected the stock market”. Arianpoor and Tajdar (2022) affirm “that many businesses were at risk of bankruptcy and, as a result, were seeking financing to get out of the crisis, continue operations, and reduce risk; however, companies face financial distress due to over-indebtedness, which acts as a deterrent to corporate investment and can slow down economic growth in crises”. The COVID-19 pandemic made people refrain from close physical contact, disrupting normal day-to-day activities.

Pandemics result in one or more impacts, such as human, material, economic, or environmental losses, and can be defined as disruptions in the functioning of a society or community arising from calamitous events related to conditions of exposure, vulnerability, and capacity (Resende et al. 2022). Sa’ad et al. (2022) weigh in, stating that within less than five months of its discovery and the acknowledgment of its spread, worldwide economies and financial activities come to a standstill, and the world witnessed a situation it never ever witnessed before. Anh and Gan (2021) agree that the deadly infectious virus COVID-19 resulted in a global social and economic crisis. The pandemic caused a labour shortage, an increase in unemployment, and material and equipment supply problems, but the pandemic also increased new technology adoption, the cleanliness of workplaces and job sites, and the diversification of suppliers in the global construction industry (Kim et al. 2022).

2.4.4 Non-conformance due to the COVID-19 pandemic

Non-conformance within the process can be a result of many different attributes. To solve this problem, many customers implement an inspection process at the beginning of the replenishment cycle that aims to prevent defective products from being sold to consumers. Abdolazimi et al. (2021) state that “with the expansion of competitive management, supply chains (SC) have become a critical issue facing businesses; these chains can affect all the activities of firms and organisations, ranging from product quality improvement to cost reduction to customer service provision”.

The process quality department experienced an increase in non-conformance within the process because parts were not at the point of use and competent employees were not available to complete a specific task. The pandemic was the main contributing factor to these results. The process quality department tightened its inspection frequency and increased hours of drive testing to prevent any major assembly-related non-conformances from reaching our end users. Olanrewaju and Lee (2022) mention that terms such as defects, rework, poor quality, snagging, non-quality, deviation, and non-compliance have been employed interchangeably to indicate substandard quality. They suggest that COVID-19 restrictions may compromise quality (Gong et al. 2022). Importantly, these economic instabilities, combined with market unpredictability, can impact investors' trust in companies' financial outcomes and potentially result in various financial difficulties (Albitar et al. 2020). The automotive industry, in general, is investing in innovative processes that improve the quality of its products, its capacity to conserve the environment, and its ethical commitment to its stakeholders and future generations (Bozola et al. 2022). Nonconformity can be defined as the non-fulfilment of a requirement, need, or implicit or obligatory expectation (ISO 9000 2015). Ji et al. (2021) state that non-conformances are the major sources of waste in the manufacturing process.

Ji et al. (2021) further affirms that one way to adapt to the inevitability of nonconforming products is to produce surplus products that can replace the discarded ones although this may result in overproduction. Under certain circumstances, underproduction costs can be higher than overproduction costs, therefore, manufacturers often prefer to produce more than the actual amounts required by the work orders. Siwiec and Pacana

(2022) share their view about the quality of products, stating that “the right analysis of the quality of products and the implementation of supporting actions to reduce incompatibilities also contribute to stabilising the production process”.

Hoque (2022) states that “quality defects are responsible for customer dissatisfaction, poor market reputation, weak competitive position, sluggish business growth of buyers, rejection, rework cost, production bottleneck, and material wastage of suppliers”. Improved product quality guarantees a competitive advantage in the apparel market. Hoque and Maalouf (2022) affirm that it is understandable for lead buyers to be concerned about the prevalence of quality defects within supplier factories and supplier initiatives for quick remedies of the quality defects and response time in reducing quality defect and rework initiatives. The authors further affirm that unnecessary costs are some of the common problems in the production.

Figure 2.9 shows final assemble process quality non-conformance resulting from the COVID-19 pandemic. This can be done to keep track of non-conforming material and rejects during the COVID-19 pandemic (Khan et al. 2022).



Figure 2.9 Process quality non-conformance

2.4.5 Export restriction during the COVID-19 pandemic

The process quality department needed to investigate proper and adequate preservation methods within the build process as machines did not have some parts fitted. This also resulted in the department having to implement a new process called “machine condition assessment” which involved an inspection of the machine in the yard before it could be shipped off to the customer. The COVID-19 pandemic also brought severe supply chain disruptions to the world, and it is also deemed to be devastating for global supply chains (Choudhury, Kim, & Ramkumar 2022). Such a situation led to a halt in production and other upstream supply chain activities, which subsequently disrupted downstream activities such as manufacturing and distribution (Puram et al., 2022). The pandemic has significantly changed work, communication and socialisation patterns associated with daily living (Ogunnusi et al. 2021).

The scale of the disruption was unimaginable, and thus existing supply chain management (SCM) techniques have failed to mitigate the pandemic’s adverse impact on the supply chain and logistics (Mariappan et al. 2022). Unprecedented challenges such as large-scale border crossing restrictions and government-imposed manufacturing shut-downs resulted in simultaneous supplier failures, production capacity restrictions, and demand uncertainties for companies worldwide (Spieske et al. 2022). The coronavirus pandemic could be the straw that breaks the camel’s back of economic globalisation, forcing governments, companies, and societies to strengthen their capacity to cope with extended periods of economic isolation (Free & Hecimovic 2021). The outbreak of the novel coronavirus disease (COVID-19) has created enormous social and economic challenges. Border closures and mobility restrictions have been widely credited with restricting the spread of the virus. Lee (2021) affirms that if a traveller is confirmed COVID-19 positive within the hours after entering the country and being tested, he or she is required to be transported to a designated treatment facility (in most cases, a hospital). Those whose financial status is severely affected by business disruptions or job losses because of the long and strict lockdowns suffered socioeconomic shocks despite financial aid, which is often considered insufficient (Anh et al. 2022).

Ozbiltekin-Pala et al. (2022) state that due to COVID-19 pandemic, the world was facing a challenge of border closures, and the closure of enterprises producing raw materials. Borders were closed, paralysing global trade and migration. Billions of people were socially isolated, leading to changing patterns of work, production, and consumption. Hundreds of millions of people were furloughed or made redundant, eroding prosperity, and necessitating economic stimulus at historically unseen levels (Branicki, Sullivan-Taylor, & Brammer 2021). The COVID-19 crisis has had a far-reaching impact, affecting nearly all sectors, levels of society and countries worldwide. The macroeconomic consequences of this crisis include its unprecedented impact on production (Anggraini, Utami, & Wulandari. 2022).

2.4.6 Impact of the COVID-19 on employees

He et al. (2021) affirms that “employee fears of external threats represent negative psychological emotions involving uncertainty or danger resulting from undesirable events or harm from outside of the organisation and hundreds of thousands of employees in manufacturing companies faced threats to their health and job security because of the uncertainty and threat of loss brought by COVID-19”. The authors further point out that fear of external threats leads to employee silence in organisations, reduces morals, and damages employee wellbeing, and can cause organisational underperformance. Employees were forced to take early retirements, undergo significant benefit decreases, be laid off, and alter their work shifts (Khan et al. 2022). The manufacturing industry’s actions have triggered enormous fears in employees’ minds, with the most common fear being job insecurity (Khan et al., 2022). The COVID-19 pandemic has overthrown the world as we know it, with subsequent shifts in the way individuals and society proceed with everyday life (Glasdam & Stjernswärd 2021).

The impact of this pandemic has been quite asymmetric, as the workforce segment has suffered the most in almost all the countries (Kundu et al. 2022). Some policy measures introduced by governments, such as self-isolation and quarantine, had negative and indirect effects on people. These measures affected the daily routine activities of individuals and, in the long run, may lead to depression, anxiety, insomnia or suicidal behaviour (Kundu et al. 2022). These measures not only affected the populations’ daily lives but also have caused significant economic consequences in

economies around the world (Rozman & Tominc 2021). Harun (2022) affirms that due to the pandemic, economic activities were interrupted throughout the world. Fear of COVID-19 is a new workplace hazard that has caused drastic changes at workplaces (Shaheen et al. 2022). Stress generally describes any form of unpleasant emotional reaction that human beings may develop in or outside of the work environment, arising when they feel that they are facing a threat of any nature to which they have no adequate response, leading to anxiety and frustration (Oruh et al. 2021). Disasters and natural pandemics test institutional preparedness, risk assessment, threat recognition, hazard identification, lifelines, vulnerability, recovery measures, and rapid response to restore the normal function of society. Momentous events can encourage employees to change, and COVID-19 arguably should be one of those moments.

Since the onset of the COVID-19 pandemic, the workplaces and working practices of many sharing economy workers have been fundamentally transformed, with significant implications for their physical and mental well-being (Li et al. 2022). Workers have succumbed to suffering from anxiety, stress, depression, and mental health issues because of being infected or affected by the COVID-19 situation (Matli 2020). The COVID-19 pandemic-affected communities need immediate support and relief during and after the occurrence of disaster, which can be successfully handled by an effective disaster management system (Tasnim et al. 2022). Jafari, Özduran, and Saydam (2021) weigh in, affirming that as the COVID-19 pandemic was continuing to affect the manufacturing companies, pressure was mounting to halt tourism in the businesses, and measures and limitations such as social distancing, community lockdowns, self-quarantine, crowd control, and so on were being implemented.

Employee psychological needs and emotions are acute during workplace changes; these needs are influenced by the perceptions of job security, autonomy of voice, and fairness that are linked to organisational decisions (Lee 2021). In turn, organisational decisions and managerial actions shaped the state of psychological safety (Lee 2021). Employees experience of high or low psychological safety refers to freedom of expression, a feeling of safe interpersonal risk-taking, and shared belief and support. When employees feel higher levels of connectedness and belonging, they are more likely to show higher achievement and engage their whole selves in organisational activities (Anzengruber 2022). Achieving positive outcomes in times of crisis largely

depends on the commitment of employees (Anzengruber 2022). Employees who were at risk of contracting COVID-19 had a higher rate of mental health issues; these employees, in turn, demonstrated non-attendance behaviour as well as low levels of life satisfaction.

This turbulent situation has required a rapid reorganisation of work that likely had repercussions on workers' well-being and performance. The happy and productive worker thesis assumes that happy workers perform better (Boulet & Parent-Lamarche, 2023). As an unprecedented outbreak in recent years, COVID-19 has brought many physical activities to a halt, creating disruptions never seen before in recent history. The uniqueness of the coronavirus was in its severity and the ever-increasing cases of infections and thousands of deaths daily that beat previous health crises such as the 2009 Influenza (Akomea-Frimpong et al. 2022). The COVID-19 pandemic has impacted not only businesses but also the lives of everyone on this planet (Alam et al. 2022). To adhere to state and national guidelines regarding safe working conditions to limit the spread of COVID-19, organisations have made significant changes to their standard operating procedures and employee expectations (Shipman, Burrell, & Huff 2023). Amoah and Simpeh (2021) agree that countries, including South Africa, implemented these guidelines, which were imposed on all operations during the period of the COVID-19 pandemic. The shortage of resources, daily news updates about death and lockdown, lack of personal freedom, cancellation of flights, and above all, fear of death—all negatively affected people emotionally, mentally, and economically around the world (Khozaei et al. 2021). Seabra et al. (2021) suggest that considering the nature of the COVID-19 pandemic, the health risks should be addressed by improving the safety measures and the health-care infrastructure of destination communities.

The crisis of the COVID-19 pandemic must be perceived as an opportunity and a motivation for assessment, reflection, and a holistic understanding of how the built environment is shaped in contemporary times. Owing to the COVID-19 outbreak and the extreme global responses (shutting down communities and social isolation), most people have experienced life differently, living in altered realities. Consequently, people's experiences have led to new stories; at least in the short term, our lives and behaviours have changed (Wright 2023). The current COVID-19 pandemic has offered

us an opportunity to rethink and re-examine self-tracking applications (Lee, 2021). Leiva and Clark (2020) weigh in, affirming that “regulated entities faced many challenges in trying to maintain their ongoing business operations and infrastructure due to severe financial pressures, the threat of infection to employees and customers, and, within the context of cybersecurity, unique risks posed by remote operations from hackers and fraudsters”. Rai and Verma (2022) state that the COVID-19 pandemic “fuelled stressors, namely physiological safety, the social stigma of exclusion, economic losses, depression, and job insecurity”.

2.4.7 Working remotely in the process quality department

The process quality department could not work remotely due to the nature of the manufacturing process, as during the process components might not match up, and if there is non-conformance, the team needs to be hands-on and be present at the non-conformance to decide on a solution and oversee the entire manufacturing process because the COVID-19 pandemic created a lot of challenges that impacted the department negatively. While some departments were working from home, except for the period where the government required all citizens to quarantine at the beginning of lockdown to prevent the virus from spreading, the process quality department was required to be on site to conduct audits, inspections, and facilitations. The COVID-19 isolation and quarantine increased the momentum drastically for technology services where they were already used, and they presented opportunities to other manufacturing companies to explore how technology can provide services to organisations without physical contact (Maleka and Matli 2022).

There were several concerns about the quality of materials received from external suppliers since COVID-19 affected most businesses, and the external suppliers were included in a way that the respective people who would normally perform tasks were also affected by COVID-19, and parts were not received in time and some parts did not meet the specification that was set. These issues delayed the entire production process, and the company ended up not meeting the customers’ requirements, which created a lot of financial constraints within the business.

2.4.8 Effect of inadequate quality of materials in the process quality department

The components that were not conforming prevented the machines from being signed off, and that resulted in delays and possible extensive rework, and in some cases, to such an extent that the delivery dates of the machine were missed and resulted in dissatisfied customers and possible cancellation of orders. The quality of a product has a profound impact on the company's performance; it is determined by a variety of factors, including procurement method, materials, design, production team competencies, and climatic factors. With strict travel restrictions in place, it became difficult, if not impossible, for quality auditors to complete audit engagements, using their customary procedures for evidence collection. Yarnold et al. (2021) state that poor quality can cause decline on sales.

In some cases, there were machines that were delivered to the dealer without specific parts being fitted to the machine or a task that was not completed due to hasty inspection, which resulted from COVID-19 challenges such as delayed deliveries. The lack of access to first-hand audit evidence may contribute to difficulties in risk assessment and to the auditor's ability to challenge managers' decisions surrounding discretionary accounts.

2.4.9 Poor inspection

If the supplier audit does not take place, it may result in some materials going to the production line with non-conformances. This was experienced and a non-conformance report was yielded: the root cause was identified as an inadequately trained individual who had stepped in for someone affected by COVID-19. The exiting firms were of relatively low quality in terms of the total number and severity of defects detected in inspections during the COVID-19 pandemic (Löhlein 2016). The issue of quality defects is a growing concern that affects all major productions and stakeholders because of the costs and time implications of reworks (Sandanayake et al. 2022). Mahmood and Khan (2021) state that because of the lack of systematic approaches for decision-making, it sometimes becomes difficult for the authorities to classify the product condition on the basis of the inspection. The process of conducting product

inspections is important to enable decision-makers not only to evaluate the quality of products but also to identify their strengths and weaknesses (Badri et al. 2016).

Amani (2022) weighs in, stating that the quality inspections should be designed and classified by inspectors and engineers. The author further affirms that “reviews and inspections must be objective and based on reliable information, evaluation, and justification”. The fundamental purpose of regulatory inspections is to enhance product quality and increase its transparency (Cho, Kim & Kim 2020). Johnson et al. (2018) suggests that the quality inspection process must produce the kind of results that it should for people who are using the results and trying to understand what this means. Mohamed and Tran (2022) state that quality inspection of products is a tool or means by which the company ensure that the product is produced in accordance with approved specifications in the most economical, and efficient method.

2.4.10 Customers complains for batter quality

If the customers raise concerns about the quality of the product, the process quality team comes together and determines the containment action that needs to happen to perform a 100% inspection on the products at the factory, dealers, and all other branches, and if there are non-conformances, the correction plan must be determined to ensure that it does not happen again. The organisations need to follow the zero-defect philosophy to create and retain customers because there was tremendous pressure from customers and competitors to offer higher value in their products or services in terms of quality, cost, and delivery. Lin and Chou (2022) offer a different view about customer complaints, affirming that even the experienced service provider cannot prevent service errors from occurring because characteristics such as variability and heterogeneity are inherent to services.

John (2021) states that performance not satisfying the client is a key issue in the business operations. The author further points out that “there are cases when the client fails to achieve the expected competitive advantage due to the low levels of product quality”. The customer complaint should be considered the voice of the customer; what they want and why they have complained should be verified by re-engineering the product or service that was supplied to the customer, lot-wise. Moreover, customer complaints provide a chance for organisations to take out useful information that can

be applied to avoid future complaints. Customer complaint management should be done in a way that can guarantee customer satisfaction and retention. John (2021) points out that the way customer complaints are managed by a firm is an indicator of its customer centricity and overall service quality; the continuous monitoring of the changes in the customer complaints and ensuring that it is not going out of control is essential for the growth of firms in the modern era of technology and competition. Aragão et al. (2021) weigh in, affirming that “consumer habits are also undergoing extensive reformulation, mainly because of the recent social confinement imposed by the COVID-19 pandemic”. The authors state further that “instead of investing time in a more thorough understanding of the customer journey, companies are dedicated to improving the efficiency of services in the business’s scope, reducing expenses, routines, bureaucracies, and administrative time, among other aspects”. Patyal, Modgil, and Koilakuntla (2021) state that quality plays a key role in meeting customer needs and expectations, which influence customers decisions to buy a particular product or service. It also focuses on customer-centric measures like availability, reliability, delivery performance, and after-market service to provide higher value at a low cost”.

The success of goods or services is reliant on customers’ satisfaction; therefore, one of the principal missions of every company is to respond to its customers’ needs. Chang et al. (2022) weighs in, affirming that “customer complaint resolution and cost reduction are now at the centre of attention”. The authors suggest that evolutionary approaches such as lean principles, total quality management (TQM) and Six Sigma concentrate on incremental improvements to existing business processes because those strategies are aimed at a more customer-centric approach and continual improvements and thus must be seen as long-term initiatives. Lopez-Lopez et al. (2021) offer a different view about customer complaints, stating that “even the most customer-oriented company can make a mistake that elicits a negative reaction from a consumer and leads to complaining behaviour”. The authors further points out that “complaints involve an expression of dissatisfaction with the dual purpose of drawing attention to perceived misconduct by an organisation and achieving personal or collective goals”. Oliveira et al. (2022) state that “another relevant aspect is that

nowadays, consumers are more conscious of their rights; they want to access various products and services, looking for value propositions that exceed their expectations”.

2.4.11 Quality requirements

During the COVID-19 pandemic, the process quality department used assembly quality gates to undertake quality functions, starting from gate 1, which is the pre-assembly gate where alignments are measured and checked; gate 2, which is the end of the assembly line and a static check where most of the attribute variables of the machine are done; gate 3, which is the dynamic check where the functions of the machine and some of the variable checks like pressure checks are done; and gate 4, which is the final check before the machine goes to the customer as Chang et al. 2022 pointed out. Based on any quality policy and procedure, the process quality department is responsible for ensuring that the quality of products that are being produced is not compromised, that they are fit for purpose, and that they meet the necessary quality requirements and customers' expectations (Rai & Verma 2022).

2.4.12 New opportunities due to the COV-19 pandemic

There is always room for improvement and new opportunities. In the quality department, what was realised is that it is not always easy for assemblers to adhere to procedures and policies that were put in place without proper training and face- to-face conversations, primarily due to the social distancing measures that was put into effect. This served as a lesson to the department, reinforcing the idea that it should never keep employees away or limit the interaction with them. As this nature of business requires quality, people need to interact with employees on the shopfloor frequently and perform audits and reviews and the budget and staff must be increased to make the organisational changes that were required during the COVID-19 pandemic much easier to handle. Alraouf (2021) states that “pandemics such as COVID-19 have caused a critical reassessment of manufacturing processes and created an era of unprecedented change and uncertainty. With the manufacturing environment under the spotlight, the pandemic provides an opportunity to re-examine the manufacturing planning priorities in the post-COVID-19 world”. The authors further points out that the crisis of the COVID-19 pandemic must be perceived a motivation for assessment, reflection, and a holistic understanding of how the built environment is shaped in

contemporary times. Ratten (2020) states that “this changed with the advent of the crisis that required a fast migration of most manufacturing environments to online or virtual platforms; this made the current COVID-19 crisis complex due to the way it has changed how individuals conduct their daily lives”. The author further states that “this will provide practical guidance to manufacturing and policymakers about building a quick response to a crisis; moreover, it will stimulate the formation of education-based learning efforts that harness the innovation opportunities derived from a crisis”. COVID-19 is considered the “black swan event of the century.” Given its significant macroeconomic impact on all industries globally, the pandemic has negated the growth, possibly leading to sharp shocks worldwide to nations and industries (Rai & Verma 2022).

2.4.13 Impact of COVID-19 on inventory at Bell Equipment

COVID-19 had a significant impact on the inventory management system. To cope with all the restrictions at Bell Equipment, a lot of insourcing from various departments became necessary due to the lack of supply from external suppliers. A higher frequency of inspection needed to be done to ensure that the parts that were coming from alternate suppliers were within specification. In a pandemic context, optimised lean inventory systems are counterintuitive as manufacturing companies and relief organisations individually grapple with clogged inventory processes; businesses, logistics organisations and manufacturing companies cannot function under an inventory-stressed global network (Friday et al. 2021). It was projected that the impact of COVID-19 on supply chains was going to be greater than that of prior epidemics, as the pandemic affected almost all countries and manufacturing companies in the world (Paul et al. 2021).

These challenges were in urgent need of comprehensive documentation to ensure that firms were aware of them and can formulate appropriate response strategies for a fast recovery (Paul et al. 2021). A high volume of inventory reveals the fact that a large part of the capital that can be allocated to productive resources was frozen throughout the supply chain; on the other hand, inventory stock-out intensifies the risk of non-production and disrupts the production processes (Mohebban-Azad, Abtahi & Yousefi-Zenouz 2022). Inventory selection is essential since it assists in manufacturing and

prevents financial losses on storage and handling and/or customer dissatisfaction (Panigrahi et al., 2022). Inventory can affect firm performance through multiple channels, such as the cash flow, the cost of capital to order and hold inventory, and the obsolescence cost (Wang, Lin, & Shi 2021).

2.4.14 Internal quality assurance

The COVID-19 had an impact on internal quality assurance as well because parts were occasionally late, and the staff had to work quickly to inspect the parts that did not meet the delivery date (Irawan et al. (2023). The frequency of inspection had to be increased, and additional hours had to be put into some of the inspection tasks, such as the shakedown, where the functionality of the machine was verified and all non-conformances were identified because of poor workmanship or poor quality of a component, such as light leaks and parts not being routed properly are identified (Okpukpara et al. 2023). The shakedown hours had to be increased. Shakedown is basically driving the machine, simulating what an operator does in the field, and the costs of doing that were extensive, with fuel and diesel being the most expensive resources. The shakedown costs themselves were very high, and the department incurred these costs just to ensure that a good-quality product leaves the factory for the customers. During the COVID-19 pandemic, all the materials that were brought in because of shortages or because they were sourced from external suppliers were inspected to ensure that they met the minimum requirements for design, materials, and quality standards (Roy & Prabhakaran 2022).

2.4.15 COVID-19 cases at Bell Equipment

The process quality department had a few individuals who felt ill due to COVID-19 and had a negative effect on the day-to-day running of the operations. The department had to regroup, reorganise, and restructure itself to continue to support the production processes and adequately furnish the services that it provides to the organisation. A certain number of inspections could not be conducted due to a few team members being ill due to COVID-19. Strategic decisions had to be made to ensure that even during difficult times, process quality was in line with the organisation's goal. From a quality perspective, the demand does not change whether the company was facing

difficulties or not; process quality was always expected to meet the right quality at the right time.

Figure 2.10 gives an overview of how many people were affected in August 2021 at Bell Equipment. This graph includes all Bell Equipment employees (permanent, contractors, and apprentice employees). The graph shows that three employees died in August 2021, and four hundred and sixty-three employees tested positive for COVID-19. These highlights major disruptions in the production processes and the entire organisation.

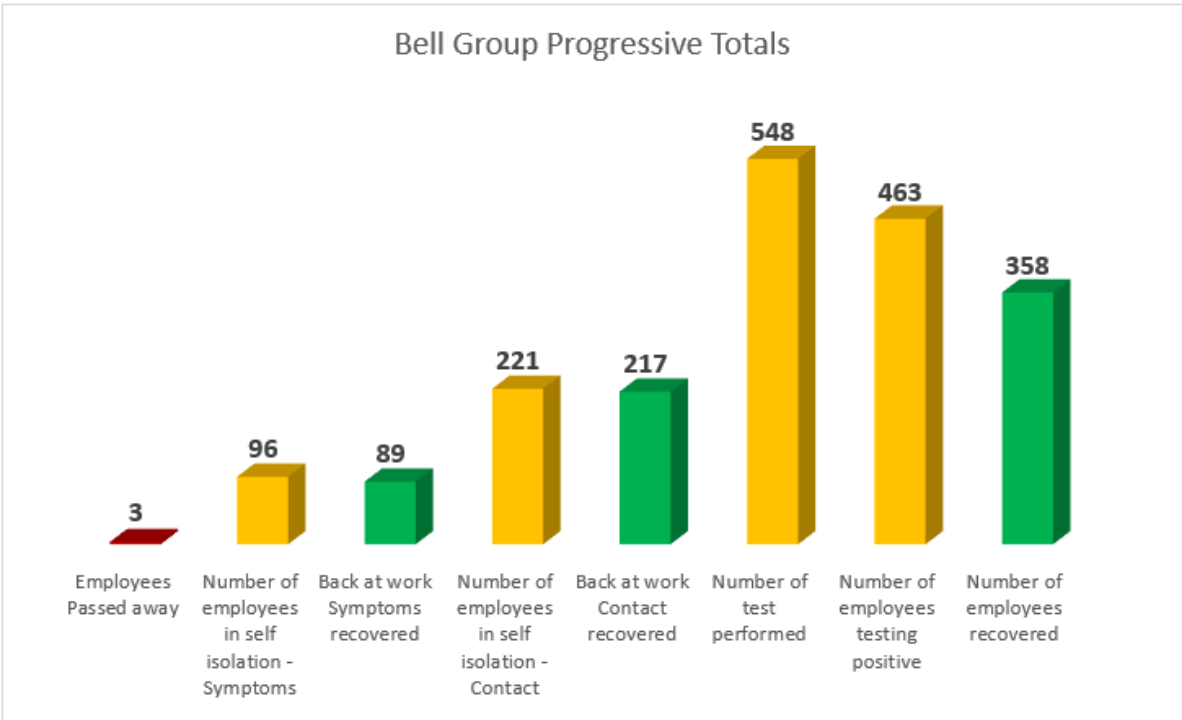


Figure 2.10 Overview of people affected by COVID-19 at Bell Equipment

Figure 2. 11 gives an overview of how many COVID-19 cases were reported at Bell Equipment in both years, 2021 and 2022. These figures were recorded weekly by the department of health and safety, starting from week one to week fifty-two.

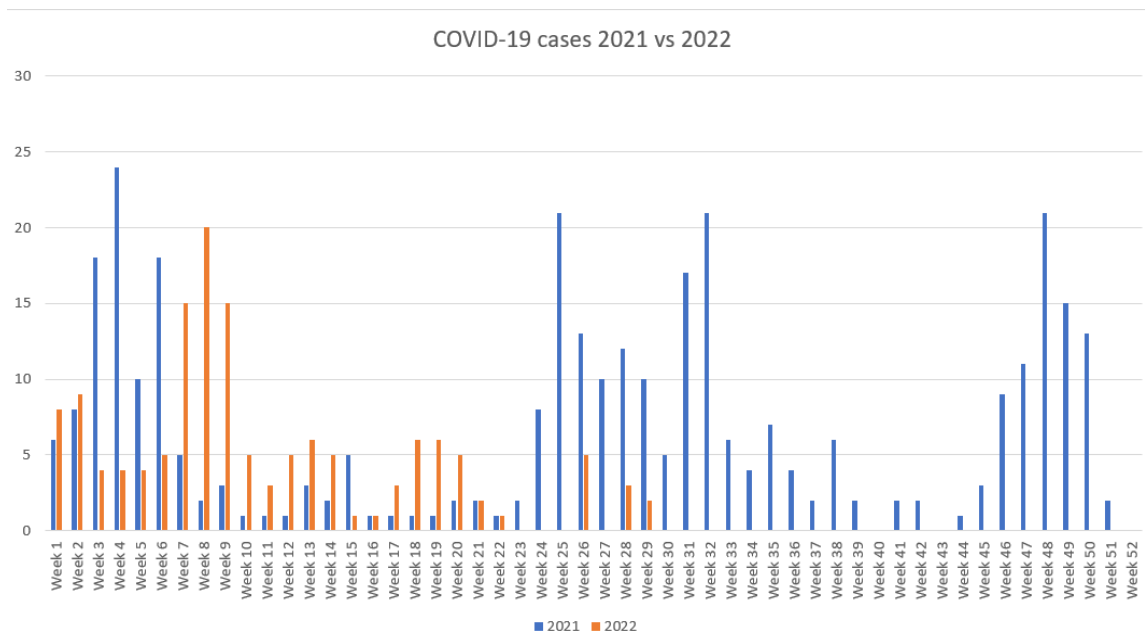


Figure 2.11 Bell Equipment positive COVID-19 case 2021 vs 2022

2.4.16 Compliance to COVID-19 regulations

Management provided leadership by ensuring that everybody is sanitised, the use of face masks is at the expected level, meetings and discussion groups are limited, and the health of all employees and other stakeholders is a priority. Close contact was limited on the production lines; this was done to protect the employees from the deadly COVID-19 virus. The employees that were affected by the COVID-19 pandemic were supported through company safety structures and government relief. The varied aspects of the pandemic, such as uncertainty about the infection, loss of life, evolution, concerns about immunity, and lack of proper vaccination or cure, induced fear in the population (Rai & Verma 2022).

2.5 Disrupting factors at Bell Equipment

2.5.1 Mental health

The emotions were high, and the number of psychological and social well-being issues was overwhelming. Vessal et al. (2022) agree that the COVID-19 outbreak has undoubtedly affected overall mental health and most people were living in fear and uncertainty. The employees at Bell Equipment were uncertain about their future as the COVID-19 pandemic was changing their day-to-day lives. Ajmal et al. (2023) state that

people's mental health was suffering, work and family routines were disrupted, and triggered by economic instability. As shown in figure 2.11, the impact of COVID-19 on the business was severe and disruptive. This is related to the cases that were being reported; the Bell community was fearful of undertaking their daily tasks. The most disturbing factor was to experience or learn about the loss of lives due to the COVID-19 pandemic. While the initial crises were very much focused on our physical health and the practical challenges, as the crisis continued and lockdowns were reintroduced, it became much more about how we would protect our mental health and engage our struggling teams (Walker 2021). However, despite existing concerns about survivors of chronic disease, evidence shows that people with combat-related experiences have developed resilience skills that have helped them cope with trauma (Vessal et al. 2022).

2.5.2 Decrease in demand orders

Under normal circumstances, the Bell Equipment final assembly produces 15 machines per week, but during the COVID-19 pandemic, the assembly produced 10 machines per week. This adjustment can have severe impact from a financial perspective. The adjustment was driven by several logistics, production, and human resource factors (Ajmal, Khan, and Shad 2021). Irawan et al. (2023) affirms that the pandemic also causes a supply shock and supply shock is anything that causes a significant decrease in the production of goods and services. The authors further states that "COVID-19 represented an extraordinary disruption to the global economy as production was substantially affected across the globe." The production slowdown impacts were evident from supply adjustments in the manufacturing industry (Verma & Singla 2023).

2.5.3 Financial challenges

The employees had to incur additional costs due to the shutdown, which lasted for almost three months. The shutdown was implemented by the South African government to protect its people and economy from the devastating virus. As shown above, some employees ended up taking unpaid leave because of the insufficient number of leave days. People, except for essential workers, such as the police, health care workers and retail workers were not allowed to leave from their homes. People's

credit records were at risk during the COVID-19 pandemic (Okpukpara et al. 2023). Salaries alone proved insufficient, as families found themselves confined to their homes without any additional sources of income beyond their regular pay checks.

2.5.4 Bell Equipment mitigation strategies

Bell Equipment collaborated with the South African government to ensure that the employees received their salaries during the COVID-19 pandemic shutdown. The preventative measures were put in place to ensure that there is continuity and safety in the company. One of these measures was to work hand in hand with suppliers to provide support about the challenges related to the COVID-19 pandemic, such as shortages of raw materials. Supplier quality inspectors were sent to suppliers to ensure that their raw materials meet Bell Equipment quality standards and policies. The company initiated this exercise in consideration of COVID-19 cases and the rising death toll, which was impacting their daily operational functions. Bell Equipment also assisted suppliers with raw materials where suppliers reported major delays and shortages. Rayawan, Tipnis, and Pedraza-Martinez (2021) states that “mitigation refers to measures taken to prepare for and reduce the effects of disasters”. There is a need for a solution that is agile, proactive, quick, relevant, practical, and caters to all stakeholders. It cannot be overstated how important it is to prevent and mitigate disasters (Roy & Prabhakaran 2022).

2.6 Conclusion

In this chapter the challenges such materials shortages, decrease in demand orders, disrupting factors, and mitigation strategies were discussed. The literature highlights the significant impact of COVID-19 pandemic in both the supplier and process quality departments. Authors agree that the most disturbing factor was to experience or learn about the loss of lives due to the COVID-19 pandemic which affected the daily operations. It is evident that the research of this nature has never been conducted at Bell Equipment. The idea of the research implementation will assist the company in tackling future challenges based on a researched context.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter served as a guide throughout the study. All activities were conducted based on the research methodology (mixed method). The population and sample are detailed in this chapter. The pilot study and recruitment processes that were followed during the study are explained.

3.2 Methodology

Chan et al. (2022) offers the explanation that “the methodological approach is the type of data, its source, language of analysed documents, size of the data set, levels of analysis, aspect identification and evaluation, polarity identification and evaluation, and further analysis”. The study was intended to investigate the impact of supplier and process quality during the COVID-19 pandemic at a South African manufacturing company. The research methodology employed in this study was a mixed method, and the research was conducted using a case study approach with employees involved in the supplier and process quality departments. Shum et al. (2021) offer an explanation that “mixed methods study is a type of study in which a researcher combines elements of qualitative and quantitative research approaches for the broad purpose of breadth and depth of understanding and corroboration”. Authors further explain that “the development of the mixed method research approach began in the 1980s, when scholars began expressing concerns about the mixing of quantitative and qualitative data without articulating defensible reasons for doing so; subsequently, scholars began identifying a number of rationales for combining data collection methods with research questions aimed at different mixed method research designs”.

This is a sequential mixed method study; the activities were conducted in a logical order. Mixed-methods research is the type of research in which a researcher combines elements of qualitative and quantitative research approaches for the broad purpose of breadth and depth of understanding and corroboration (Schoonenboom & Johnson 2017). All 27 employees from both suppliers and process quality formed the population and sample size of the study. The reason behind this is that the researcher intended to get comprehensive and consistent data from the participants. Due to work-related

commitments, only 25 participants were able to participate in quantitative sampling, and only 20 participants were able to participate in qualitative studies. The participants who missed the qualitative session had an opportunity to participate in quantitative sampling. The survey questionnaire was administered to all participants from the supplier and process quality departments (quality assurance inspectors, pre-delivery inspection technicians, quality engineers, supervisors, and managers). The quantitative data collected was analysed using SPSS software. The interviews were conducted with nine participants from supplier quality and eleven participants from process quality departments (quality assurance inspectors, pre-delivery inspection technicians, quality engineers, supervisors, and managers). The qualitative data obtained was analysed using NVIVO software. The use of both questionnaires and interviews allowed the results to be triangulated. The study was able to determine whether the mitigation strategies developed to address the challenges were functioning.

3.3 Population and sample

The population and sample size were 27; therefore, this was a census sample. Kindig (2007) states that “population refers to a group of individuals themselves, organised into many different units of analysis, depending on the research or policy purpose”. Chatha et al. (2015) affirms that “the sample size reflects the robustness of results and also represents a characteristic of empirical research whereby it is easier to generalise results”.

3.4 Quantitative sampling

The sample was selected at a 99.5% confidence level. All 27 employees from the supplier and process quality departments formed the population of the study. The researcher concurs with the preference of Fassinger and Morrow (2013) that “quantitative approaches can help summarise numerical data in ways that are clear and persuasive”. Amos (2022) states that “quantitative study can also lead to an over-reliance on statistical data, which limits the understanding of the fundamentals of the study and participants’ behaviours and perceptions”. The survey questionnaire was emailed to all 27 participants to complete, and after completing the survey questionnaire, the participants emailed it back to the researcher to avoid close contact

between employees. The gatherings were avoided as the participants were asked to complete the survey questionnaire in their own offices in line with COVID-19 protocols. The participants were given one hour and thirty minutes to complete the survey questionnaire. The population size for the quantitative study was 27, but 25 employees were able to participate. The survey questionnaire, designed for both employees and managers, was based on a 5-point Likert scale. Chan et al. (2022) affirms that “a quantitative review in its turn categorises reviewed studies according to a pre-determined framework”.

3.5 Qualitative sampling

The qualitative aspect of the study consisted of interviews with participants from the supplier and process quality departments (quality assurance inspectors, pre-delivery inspection technicians, quality engineers, supervisors, and managers). The data obtained from interviews was triangulated. Face-to-face interviews were conducted. All COVID-19 protocols were adhered to, the participants were informed to wear masks, wash hands with sanitizers and ensure the distance is kept during and after the interviews. A meeting was set up, and the invitation was emailed to all participants. The purpose of the interviews was to determine the perceptions of managers and employees and get information on the impact and challenges experienced during the COVID-19 pandemic. The interviews allowed the researcher to follow up on responses obtained from questionnaire interviews and facilitated a discussion on the challenges surrounding the COVID-19 pandemic in the supplier and process quality departments. Qualitative approaches are suitable for conducting inquiries, such as interviews and focus groups (International Journal of Therapy and Rehabilitation, 2017). The number of participants was limited to 27 but only 20 participants managed to participate. Nyumba et al. (2018) affirm that “interviews are frequently used as a qualitative approach to gain an in-depth understanding of social issues”. Qualitative techniques employed by Chan et al. (2022) not only help to reveal the commonalities but also to map relationships between the identified constructs”.

Confidentiality and anonymity were maintained during the interviews by not identifying the names and responses of the participants, and the discussion was hosted in the

boardroom for safety and security reasons. The duration of the single interview was 50 minutes.

3.6 Measuring instrument

The questionnaire and interviews scheduled for this study were developed by the researcher. The quantitative aspect of the study incorporated one survey questionnaire, which was administered to 27 participants and the qualitative aspect of the study incorporated the focus group interviews, which were conducted with 20 participants. Kleinhans and Schumann (2015) state that measurement instrument is a central function of the study. The more precise the competencies measured before the main study are, the more accurate and reliable the results will be.

Kleinhans and Schumann (2015) assert that the measurement of instruments plays a pivotal role in their study. They emphasise that the more precise the competencies assessed prior to the primary investigation are, the greater the level of accuracy and reliability will be achieved in the results.

3.7 Pre-testing / Pilot study

The testing of the questionnaire and interviews allowed the detection of errors, misleading or unclear questions, and uncomfortable issues. The instruments were tested with a small number of participants to identify and resolve issues with the type and style of questions used, as Lindholm, Backholm, and Högväg (2018) affirm that “a complex or poorly designed instrument can occupy the user’s cognitive abilities to an unnecessary degree and cause added inaccuracy in the study”. The authors further affirm that “to determine if instrument usability goals are achieved, its performance can be measured through predefined tasks, and such tests can be conducted where the study is being conducted”. The survey questionnaire was piloted with six participants; these participants did not form part of the main study. This was conducted in the boardroom, and all ethical principles and confidentiality were maintained.

3.8 Data analyses

Bradley et al. (2007) affirms that “data analysis is an ongoing process that begins in the early stages of data collection and continues throughout the study. Brynard et al.

(2014) agree that “the analysis of collected data is undertaken to determine what data can be discarded and what ought to be saved for the actual research”. De Medeiros and Maçada (2022) state that the analysis of data reflects behavioural aspects of the use and interpretation of data and analyses to obtain actionable insights.

3.8.1 Qualitative data

Qualitative data was analysed using Nvivo software as a tool. The data obtained from 20 participants was analysed and coded. Bradley et al. (2007) Offer an explanation that “coding provides the analyst with a formal system to organise the data”. The researcher also used colours to categorise the data. The data was collected from interviews; as Silverman (2020) states “the interview methodology is a way of collecting qualitative data, typically engaging with participants in a formal discussion”. Ghosh and Baloglu (2021) affirm that “qualitative studies are commonly touted for providing rich data with a high level of realism at the cost of measurement precision and generalisability”. Chan et al. (2022) state that “qualitative review techniques integrate and compare findings in the literature, thereby revealing the common themes and constructs”.

3.8.2 Quantitative data

Quantitative data was analysed using SPSS software as a tool. The data obtained from 25 participants will be presented statistically in this study. Quantitative methods separate the social world into empirical components called variables, which can be represented numerically as frequencies or rates (Rahman 2020). The researcher also interpreted the data obtained from participants.

3.9 Non-responsiveness of participants

Different reasons contributed to the participant’s non-responsiveness:

- Unplanned meetings taking place during the research interview or sessions.
- Being absent during the research interview or sessions.
- Overwhelming workload.

3.10 Validity and reliability/trustworthiness (qualitative research)

Rose and Johnson (2020) state that “researchers should attend to the overall trustworthiness of qualitative research by more directly addressing issues associated with reliability and/or validity”. Surucu and Maslakci (2020) affirm that “validity refers to whether the measuring instrument measures the behaviour or quality it is intended to measure and is a measure of how well the measuring instrument performs its function”.

Trustworthiness in qualitative research refers to the systematic rigour of the research design, the credibility of the research, the believability of the findings and the applicability of the research methods, as cited by Rose and Johnson (2020). The importance of credibility will also be maintained and demonstrated throughout this study. The researcher also focused on issues like internal validity (whether the analyses represent reality), external validity (whether the analyses compare to other populations or settings), reliability (whether the study is replicable), and objectivity (whether the analyses depend upon the researcher) the previous dissertations were visited to ensure that all is in line with requirements as cited by Rose and Johnson (2020). Surucu and Maslakci (2020) state that “the concepts of validity and reliability are closely related; they express different properties of the measuring instrument”. In quantitative research, the data collection, analyses, and interpretation processes were followed to ensure the validity and reliability of the study. The pilot study was conducted to ensure measurement validity. The pilot study was also conducted to test questionnaires and interviews to avoid any misleading or uncomfortable issues.

3.11 Anonymity and confidentiality

The researcher realised that the participants would be hesitant to participate in the study if they were going to be identified. It was important to maintain the anonymity of the respondent so that he or she could participate without fear or favour. The researcher did not include information that could make participants vulnerable; the names and surnames were not mentioned. Instead, the researcher used numbers to identify participants (e.g., participant 1, participant 2, and participant 3). Confidentiality was also maintained, as participants could have been hesitant to share internal information since sharing such information could put their employment at risk. Ardalan et al. (2019) offer the explanation that “anonymity is the degree to which the identity of

a message source is unknown and unspecified; thus, the less knowledge one has about the source and the harder it is to specify who the source is among possible options, the more anonymity exists". Taylor and Land (2014) affirm that "organisational anonymity and individual confidentiality are usually framed as ethical issues in which the responsibility to protect individuals lies with the researcher". The authors further affirm that "respondents can feel a loss of control over their stories if they are cloaked with pseudonyms, and that data providers sometimes desire recognition of their contribution to the research".

3.12 Recruitment process

The below list represents the process that was followed during the recruitment process.

- The researcher approached the heads of departments directly to inform them about the commencement of the study.
- The researcher then emailed the letters of information to all participants who were involved in the study.
- The participants were required to avail themselves should they be interested in participating in the study.

3.13 Inclusion and exclusion

The researcher included experienced workers who have served the company for a very long time, ranging from 4–35 years. The reason behind this was to obtain relevant, reliable, and accurate information about the assessment of process and supplier quality during the COVID-19 pandemic. New employees were not included in the study as they would not be familiar with some of the things that could have been asked by the researcher. 25 out of 27 participated in survey, 2 participants did not participate due work commitment.

3.14 Study setting

The study is intended to identify and resolve issues created by the COVID-19 pandemic in the process and supplier quality departments. The study also identified

and developed quality protocols in the event of any new disruptions, which will result in the organisation becoming more agile and resilient in its supply chain.

3.15 Conclusion

This chapter provided a clear picture of how the research was conducted and how the research activities were scheduled. The methodology, population and sample size outlined and followed. The literature was included in support of the sections.

CHAPTER FOUR: RESULTS AND FINDINGS

4.1 Introduction

This chapter consist of discussion, findings, and the results of the study. The thematic analysis was explained using the current literature. The demographic profile is shown in table 4.2. The qualitative and quantitative data was collected, analysed, and presented systematically and logically.

4.2 Thematic analysis process

Thematic analysis (TA) is a technique for locating, examining, and deciphering meaningful patterns (or “themes”) within qualitative data. Thematic analysis is distinct from other qualitative analytic methods since it provides a technique, a tool, or technique unrestricted by theoretical commitments, as opposed to a methodology (a research framework that is theoretically informed and constrained). This does not imply that thematic analysis is atheoretical, realist, or essentialist, as is frequently thought. Instead, TA can be used with a variety of theoretical frameworks and research approaches. Given the emphasis on positivism in positive psychology (Friedman, 2008) and the versions of TA developed for use within post-positivist frameworks that emphasise the importance of coding reliability (Guest et al. 2012), it is not surprising that these approaches are frequently preferred by qualitative researchers in this field (Selvam & Collicut 2012). However, there are other TA versions that were created (mainly) for use with a qualitative paradigm, like the present work (Braun & Clarke, 2013). Some positive psychologists are embracing the greater freedom that these versions offer the qualitative researcher since they emphasise an organic approach to coding and theme development as well as the active engagement of the research in these processes (Holmqvist & Frisé 2012).

4.3 Nvivo

Nvivo is computer-assisted qualitative analysis software. Nvivo (QSR International, n.d.a.) is a software developed by QSR International for qualitative data analysis, such as content analysis and narrative analysis. The software provides a workspace for researchers to store, manage, query, and analyse unstructured data, including text,

images, audio, video, and other data types. Nvivo has been used in many library and information science studies, including the analysis of interview data (Wiley & Mischo 2016), student assignments (Insua et al., 2018; Phillips & Zwicky 2017), and survey data (Gibbs et al. 2012). Nvivo allows users to complete multiple qualitative analysis functions on the platform, including sorting and filtering raw data, discovering, and building relationships among data, assigning, and defining themes and categories for data, visualising data analysis results, and creating reports.

4.4 Coding process

According to Linneberg and Korsgaard (2019), coding is an important part of the process of turning raw qualitative data into a “story” that is clear and reliable. The core of coding is looking at a coherent piece of empirical data, like a word, a paragraph, or a page, and labelling it with a word or short phrase that sums up what it is about. Coding is an important part of qualitative analysis because it cuts down on the amount of data and makes it easy to analyse. It also improves the quality of the analysis and results. The coding process is illustrated in Figure 4.1 below.

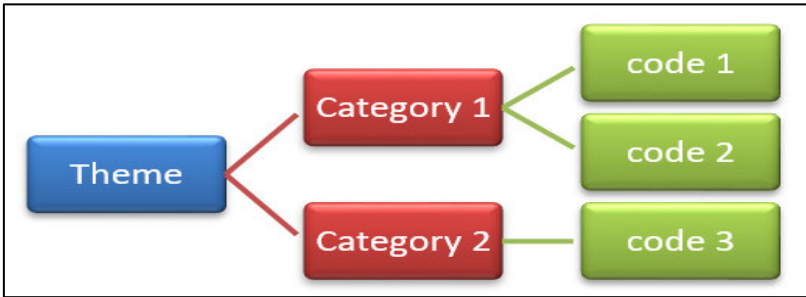


Figure 4.1 Coding process Source

Table 4.1 below demonstrates an example of the coding process—how themes and codes are created. The code equipped employees with resources to work from home was used to give meaning to the data provided by the participants. Therefore, the theme actions employed ensuring daily operations were carried was generated through the code grouping.

Table 4.1 Example of the coding process

Theme	Code	Information from transcript
Actions employed ensuring daily operations were carried	Equipped employees with resources to work from home	They supplied us with data; they supplied us with everything that we needed because we took our pcs home. We took everything we required to connect to the Internet and continued working and connecting to Zoom on our phones; they supplied us with all the equipment from day one. We did not need much. We only needed data, which they supplied us with; we had no issues. The only issue we had was network, which is something beyond what the company can do. S9

4.5 Demographic Profile

Table 4.2 shows demographic profile, the sample consisted of twenty-seven respondents from both departments (supplier and process quality), but only nine respondents from supplier quality and eleven respondents from process quality managed to participate. A total of twenty participants were interviewed. Most of the interviewed participants were males (16), and females were four.

Table 4.2 Demographic profile

Name of the Participant	Gender
Participant P1	M
Participant P2	M
Participant P3	M
Participant P4	M
Participant P5	M
Participant P6	M
Participant P7	M
Participant P8	M
Participant P9	M
Participant P10	M
Participant P11	M
Participant S1	F
Participant S2	M
Participant S3	M
Participant S4	F
Participant S5	F
Participant S6	M
Participant S7	M
Participant S8	F
Participant S9	M

P: represents process quality

S: represents supplier quality

Figure 4.2 below illustrate the number of quotations for each of the data analysis 's primary themes. "Impact of COVID-19 on businesses" was the most discussed topic, with 116 references. Followed by "visible trends within the company" (113) and a general perception of COVID-19 pandemic with 107 references. The least discussed theme was "recommendation to alleviate process quality", with only 32 references.

4.6 Themes

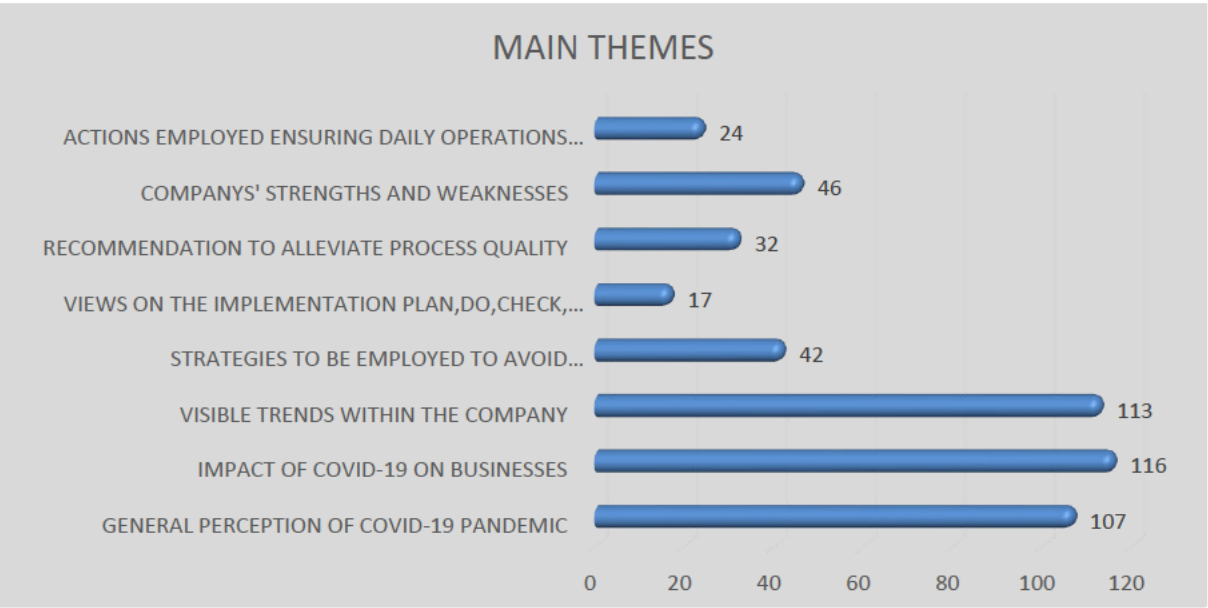


Figure 4.2 Main themes

4.6.1 General perception of covid-19 pandemic

This section explores participants general perceptions of COVID-19. Furthermore, this section details participants' initial knowledge of COVID-19 and the lessons they learned from the pandemic. Figure 4.3 is a schematic representation of the results of the data analysis.

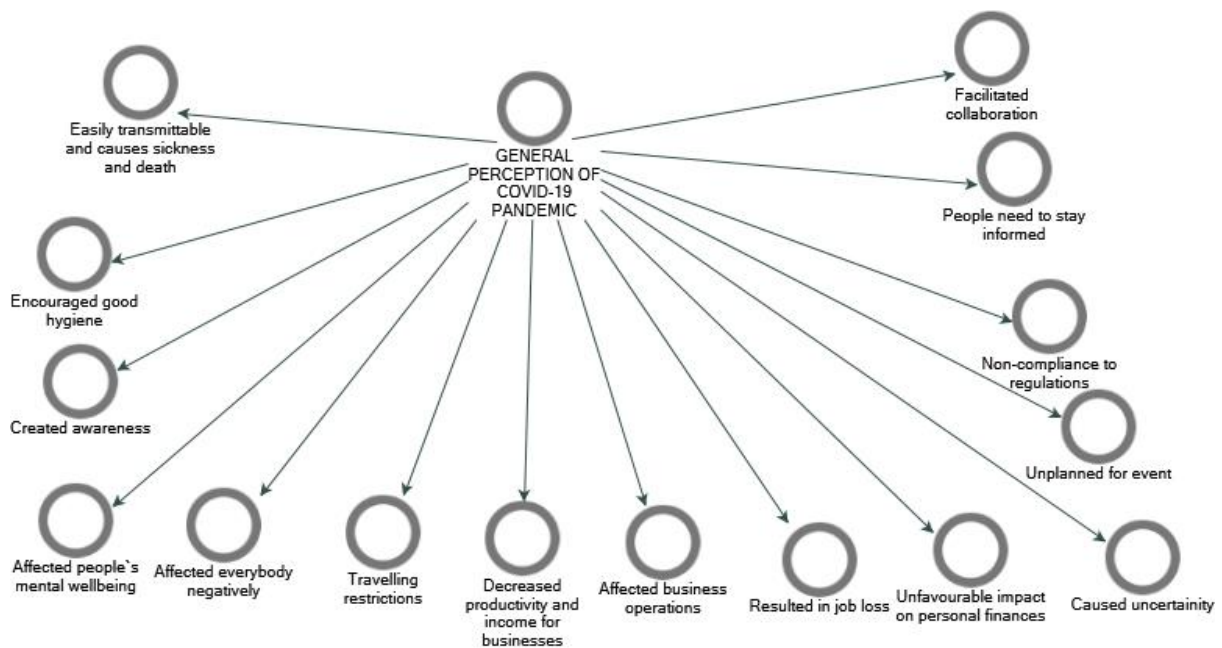


Figure 4.3 General perception

The data displays the different opinions shared in response to the question concerning participants' general feelings about the COVID-19 pandemic and the responses are interpreted below.

4.6.1.1 Easily transmittable and causes sickness and death

Participant 2 from supplier quality lamented that COVID-19 was easily transmittable, that people did not have to be in direct contact with one another to transmit it.

"The problem is that you can get it through people breathing, it's not a contact thing where at least you know you are safer when you don't encounter a certain person. It is something that you breathe around so that makes people nervous. As much as you want to control it, you can't have 100% control over it." (S2)

Moreover, this easily transmittable virus caused grave sickness in families and communities which impacted their ability to work.

"I had stuff man apart from me getting it for over a month. I remember my team also got it and all got it around about the same time one person even got it twice. So, no matter how much care they took, they got infected, so their concern was that they're going to go home and pick their family as well because I've been to the doctor as well, so I understood what they feared. Most of them when they message me, they were most scared about themselves and were more scared about the older people at home of getting it because they could lose their life because of them carrying a virus back home." (P8)

The virus also caused the loss of many lives in communities.

"COVID-19 has been devastating both personally and business wise people have lost live, people lost their loved ones." (S4)

4.6.1.2 Encouraged good hygiene

COVID-19 also encouraged good hygiene practices as people were required to constantly wash their hands and use sanitisers to kill off germs that could transmit the virus.

"What motivates me is that COVID taught us a lot of things. For example, it was not a norm to constantly wash our hands, and wear masks and all those things, but COVID came in and taught us how to change our lifestyle." (P10)

4.6.1.3 Created awareness

P8 suggested that humans saw itself as untouchable and human ingenuity as having a solution for all the problems of the world. The participant states that the COVID-19 pandemic came to create awareness and alert us that living is about more than making money and that we live side-by-side with both nature and other humans.

"I think that's it created awareness like I said previously people used to think they are untouchable, we thought we have solution for every single thing in the world now the human nature or human race understands that we don't, we are not untouchable so we need to work harder, we need to understand you know it's not about making money so much about helping the next person and that's what happened COVID-19 made sure that we help the next person."

4.6.1.4 Affected people's mental wellbeing

The stress that came with the deaths and uncertainties of this virus affected people's mental wellbeing by causing depression. This was mentioned by participant S2 during the interview, and the absenteeism statistics confirm this, as there were unpaid leaves that were taken during the pandemic.

"Generally, and not related to work, it affected a lot of families. It created a lot of stress on people. Some people ended up experiencing depression because a lot of their family members died. So those were just general issues that affected people when they came back to work, we can never know." (S2)

S7 also explained that this was a stressful period of people's lives because of the impact of COVID-19 on people's income and the restriction of movement.

"Well, it's been more stressful, at a personal level, I would say it has impacted us, it impacted us on our income and impacted us on the restrictions to the movements that impacted my son at university because he couldn't do classes. They had to come home so and for a long time they had to work online. So, it's had a personal impact as well."

4.6.1.5 Affected everybody negatively

Participants were of the perception that the pandemic affected everybody negatively.

“COVID is something that just affected everybody negatively. Whether it’s business wise, personally, it just affected the whole world negatively.” (P4)

4.6.1.6 Travelling restrictions

Travelling was restricted for everyone; a valid permit was required to travel between provinces and cities.

“Yeah, it restricted travel and stuff like personally, I couldn’t see some distant family members. My mom doesn’t live close by so the restrictions on the travel did not allow me to see some family members for a while. And, I had to incur additional costs in terms of technology so that we didn’t have to not see them at all we could use technology to see them in terms of Skype and stuff, or zoom, that’s about it on a personal level.” (P11)

4.6.1.7 Decreased productivity and income for businesses

The lockdown imposed due to the pandemic put strain on businesses because workers could not be at the workplace to conduct their duties and ensure continuity of business operations. This resulted in decreased productivity and a loss of income for many businesses. P5 states that business operations and quality were disrupted, as well as income generation for the firm.

“There was a lot of disruption in the normal day-to-day life, it was a bit bitter even if you look at the quality of our machines it had to go down because of the lack and lateness of delivery of machines, we had to make plans which is out of our quality portfolio and also if we look at

the income it does not end here at Bell alone we looking at our pensions as well they had a bad knock on the pensions it was a very bad pandemic which we hope is not going to come back again. It touched on all our areas of life in a negative way.”

S7 shares similar sentiments as the previous speaker.

“The problem was it was impacting production and impacting our daily lives and there was nothing we could do about it. It was impacting everything in our daily life, how we were normally conducting business and waking up every morning and go to work.”

4.6.1.8 Affected business operations

The way businesses are normally run was affected by COVID-19. Bell Equipment could not meet the orders they had from the suppliers.

“We also had a lot of orders from the suppliers, but we couldn’t meet the due date because of COVID. What COVID did to us as South Africans, was something we had never experienced before.” (P10)

S2 articulates that Bell Equipment could not communicate effectively with their international suppliers. Due to the different lockdown restrictions imposed by the different governments.

“The concerns within Bell, because we are dealing with international companies, we could not contact the people on the other side because most of them were on lockdown. We had to wait a certain period to get a response so production was at a standstill which wasn’t cost-effective for us and was time-consuming to meet targets. The other concern, as I mentioned previously, was the issue of going to the lines to meet people and resolve issues that are related to production. The

concern was contracting the disease. But in general, we could not perform 100% of our work due to the delays caused by COVID-19.”

S7 observed a concern regarding supply shortages during the pandemic that negatively affected business operations.

‘Shortages of supply was a big problem. And that was due to capacity constraints with suppliers, and raw material constraints from suppliers. Availability of labour at suppliers, all that impacted shortages of raw materials, we also had to do a lot of redesigns because of shortages in the supply chain. And we had to also do a lot of deviations for the full material that was available in the system. So, what would happen is you would have something that was specified, and then suddenly, because of unavailability of raw material, you would have to look at something different. And we would get an alternative and we would a deviation, that caused constraints within our production and within our quality department because of that, it was not business as usual, it was business unusual.’

S4 enlightened the study by highlighting that as much as people were working from home during this period, there were those who were expected to still come to the workplace even though their operation could be conducted in their homes.

“There are people that had to come to work and that is because of the nature of their job they can’t work from home when they are required to be at work and that is understandable. But there are those people that were not working from home but the nature of their job or work did not require them to be in the office so that was a concern for me, but it felt like those lives were not considered over other people. There were some people who were forced to come to work whereas there was no need for them to be there, they could do whatever needed to be done working from home. So, that was the concern for me you have

other people forced to work in the office whereas most of the people are working from home being safe from contracting the virus so that was the main concern for me.”

4.6.1.9 Resulted in job loss

The adverse effects of the COVID-19 pandemic, along with the imposed lockdowns and restrictions, resulted in significant job losses nationwide, causing considerable hardship for numerous families.

“There are companies that went down that were closed because of COVID-19, employees were sick, and production was affected. Supply chain was affected so all that inclusive affected the suppliers and led to closure of businesses.” (S4)

4.6.1.10 Unfavourable impact on personal finances

COVID-19 came with movement restrictions and lockdowns that had unfavourable impacts on the personal finances of many people. Participants articulated how their finances were affected by COVID-19 to the researcher. P5 expressed:

“Covid-19 for some of us who are approaching the pensions, it has big knock on our pensions they already said when the production is low it means your incomes are also low it will knock down on the quality of daily life.”

P8 conveyed that the unfavourable impact on people’s financial situations necessitated the need for people to extend a hand of assistance where and how they could.

‘Some people had no food and no income at home because their companies were closed. So, a lot of us had to go in and helped with a little bit offering money or be it buying groceries whatever so the only positiveness is to bring humans together as the situation required.’

P9 lamented that during the pandemic breadwinners were lost through death or unemployment, which had adverse effects on families and some of these families are still dealing with this ordeal.

“No, well, it’s a pandemic that was new to everyone and people did lose their lives and loved one’s families, breadwinners and homes were affected, and some people are still overcoming that pandemic era businesses, financial situations of some homes are still in disarray. And people are still working to come out of it. So, it wasn’t a good thing for the whole world. Economically, financially, socially it negatively affected in all areas”

4.6.1.11 Caused uncertainty

COVID-19 being a novel virus caused many uncertainties. People questioned the virus’ authenticity and how it was handled by the various governments and health systems.

“Well I had no hyperbole media but what COVID-19 was and how it was handled how long how genuine it was like I said people took vaccines some people didn’t take vaccines there’s so much uncertainty still up in this day but it really is a way really started what is actually cure it was actual vaccine to stop it like I said people still took vaccine and still that some wouldn’t take vaccine and nothing happened to them.” (P6)

Similarly, P8 states that the fake news relayed in relation to the virus left people uncertain.

“Fake news is a concern, uneducated people as a topic are also a concern.”

S4 expresses that people were not sure how to protect themselves from contracting this virus.

“The problem was that there was no way of containing it except if you stay at home but even if you stay home, you still got sick because you don’t know how you contracted it because the symptoms are not instant you would stay thinking that you are fine whereas you already contracted the virus.”

People were uncertain of the origin of the virus, with some people claiming that it was “man-made” and some pinpointing it to China.

“My general feelings about COVID-19, the first one is that. Me since I’m affiliated with people in politics that are close to politics, I personally believe that it was a man-made virus. That was created. For some personal gain, intentions for some politicians and the world leaders. I believe that it was intentionally done maybe to reduce the population. Since the plans they had about the world are not working out according to what they planned would happen.” (P7)

“You know it. We were discussing that yesterday and we said that you know when COVID first started. I can recall this clearly that it was In January, where we started to hear the January 2020, yeah where we just started to hear this virus that’s affecting the guys in China.” (P4)

4.6.1.12 Unplanned event

The pandemic took the globe by surprise and no nation and government was able to adequately plan for it because it happened in a short space of time and was highly communicable, leaving governments underprepared with each mutation.

“It impacted everyone because it happened in a very short space of time, we were not prepared we were not even aware that this is coming to South Africa. Initially it started in other countries and while

we were busy trying to get information from our suppliers especially internationally it affected us. I'll say it everyone was affected business wise even personal life wise we were all affected work wise even in personal lives we were all affected by COVID-19.” (S7)

It was hard to find solutions to it, as expressed by P8.

“What ‘s concerning well, it’s a pandemic we can’t plan for it, it took a human race which we thought we knew we had a solution for everything, and we found that we do not have a solution for everything. The concern is with pandemic you can’t plan for it, so the concern is that we think we are untouchable we are not.”

4.6.1.13 Non-compliance to regulations

P8 concern was that there was non-compliance with regulations because people did not take the virus seriously and were of the impression that the government had staged this virus.

“I can say from a government point of view I don’t have concern they tried their best and they did everything possible to try to minimise it as much as people feel otherwise my opinion is they did everything possible, and it was up to us to behave and follow the rules. So, the concern is that some people don’t take these things seriously, people think it’s some gimmick it’s a flaw some government plan to trick them.”

4.6.1.14 Facilitated collaboration

The pandemic also had positive impacts; it encouraged and facilitated collaborations from different stakeholders to give them platforms to look for solutions to their new problems.

“The positive thing is how people come together and quickly brainstorm stuff, brainstorm situation to come up with the acceptable way forward that everybody is safe, and business can continue. So that’s one positive thing I can take out of the pandemic is that people can come together as a team and fast enough to react to the problem and come up with solutions to reduce the risk and continue working.”
(P9)

4.6.1.15 People need to stay informed

S4 highlighted that people need to stay informed about what was happening with regards to this virus, and the government needed to equip citizens with the knowledge to protect themselves from the virus.

“Generally, I would like to say people need to be aware of what is happening, and the government needs to give us means of knowing or knowledge on how to deal with such issues. Now people are not wearing masks, we are not doing social distancing anymore and that does not mean COVID is not here anymore people need to be aware and be careful as well. If you are careless about such things, you will not only endanger yourself but other people as well who are around you, so you need to think about yourself and people around you. Do you know COVID-19 is still alive in other countries overseas like in China they are still in lockdown. So people must not think that COVID is over they must just protect themselves and when they are sick they should put the mask on, last week I was sick and I did not know if it was just flue and I decided to put the mask on so that if it’s not flu, then everyone around me is safe so we just need to be vigilant, we don’t take symptoms lightly because they might be serious.”

4.6.1.16 Initial knowledge of COVID-19

Participants were asked where they heard about the COVID-19 pandemic, and the data extracted from the transcripts shows that there were four mediums of communication that people acknowledged learning about COVID-19 through. These are: the news, the internet, newspapers, and the radio.

Radio

P10 reported that they initially heard about COVID-19 on the radio.

“Firstly, I heard from the radio. It was said that one guy from South Africa was visiting overseas, contracted the COVID, and brought it to South Africa, which started the spread.”

Newspaper

S7 stated ...the newspapers and internet.

Internet

P6, P8, and S7 explained that they heard about COVID-19 on the internet.

“We heard about it in the media, I got two kids studying in China where COVID-19 originated. When it broke out, I brought my kids back immediately when it started spreading and when they came to South Africa nobody knew that they were coming from China and they did not declare which country they were coming from and nobody knew what was the procedure around COVID and I think they gave them Ebola forms to fill out for declaration at the time COVID-19 was already a big thing China and even the South African government wasn’t well prepared. You could just walk through the airport where they should have stopped you and start quarantine process. Believe it or not this was just before the 1st COVID-19 case here in South Africa, so we did the whole quarantine at home with kids for 10 days or so.”

News

P5, P8, P9, S2, and S4 said that they heard about the virus on the news.

“Covid-19 came through the news, and we first thought COVID-19 was the Chinese thing and then when we came back from the shutdown it was another story and then we had to go to short time.”

4.6.1.17 Lessons learned

Encouraged teamwork

P10, P9 and S2 concurred that COVID-19 encouraged teamwork.

“COVID-19 taught us that we need to work as a team so that we can save our jobs and even though COVID-19 is over now, we must operate as if it is still here.”(P10, P9 and S2)

Maintain good hygiene

The COVID-19 pandemic also taught people to maintain good hygiene. This was acknowledged by P10, P9 and S2.

“Well as the pandemic was the airborne thing and virus... So, it is something that took us all by surprise for a lesson learned is we can't take anyone's health for granted and sometimes basic health that we should be adhering to health regulations and stuff we sometimes take for granted and ignored. With that said, we didn't need to be having all these rules of sanitising. If we followed our basic health”. (P9)

Have a contingency plan

P6 and S4 emphasised that the pandemic taught them about the importance of having a contingency plan. P6 states that there is a need for a production plan as a contingency plan seeing that Bell Equipment deal with imports and exports with international companies.

"I don't know whether production plan or production fictional company pandemic or any unnatural causes and our work implication could be in terms of downtime in terms of supply I don't know if you have a contingency plan in place for better equipment and there should be some contingency plan in place for something as big as a pandemic like this, especially since we deal with imports and exports. I don't know how quick we were to change supplier because you know we couldn't get back from certain countries we couldn't get items from certain countries I wonder how quickly we responded to getting alternative suppliers locally." (P6)

This will allow them to prepare for eventualities resulting from climate change.

"I think we should be ready for any eventualities, I mentioned that before we were ready for things like floods environmental earthquakes, and this was on a different scale." (S4)

Proper work plan is needed

S4 also said that there is a need for proper work plan.

"People are still able to work like in our case we were able to work from home but for those people who are in the office or at the factory I think going forward is to ensure there is proper planning in terms of the shift that they work. They split the shifts so that only specific numbers are available obviously that would take key consideration of what each person does."

Communication

S2 and S9 spoke about how the pandemic taught them the importance of communication.

‘So, if things are communicated internally and employees are assured of their safety, I think it’s different when you act with knowledge and when you’re panicking without knowledge that obviously affect everything even how you do your work. Maybe also providing counselling to those people who need counselling but most importantly availability of knowledge and I will say finding ways to keep healthy.’ (S9)

Need for internal training

P8 stated that the pandemic highlighted the need for internal training at Bell Equipment.

“Well, we need to provide more training for individuals especially for young people, we should always have like workforce out there to train the people of Zulu land as much as possible. It will benefit many other companies as well, but a good training program is required it will benefit Bell in the long term.”

Suppliers need to be held accountable

P8 indicated that the pandemic highlighted that suppliers need to be held accountable.

‘Suppliers must be held accountable, not just for creating shortages but also for poor-quality components.’

Learn from what worked

S9 states that the pandemic taught them to learn from what worked by going back and analysing the trends of the pandemic.

“I think what we need to do is that we need to look back and maybe have a session where we consider the good and the bad of this pandemic and then the good and the bad of our interventions and then to build on the good of that for any future crisis” like this. And then to have the lessons learned from the bad side of what happened in this pandemic and how we handled it. I think that would be a good exercise to look back and reconsider what we did good and what we did bad and where we excelled and to build on that.”

4.6.2 Impact of covid-19 on businesses

Figure 4.4 shows the impact of COVID-19 on business.

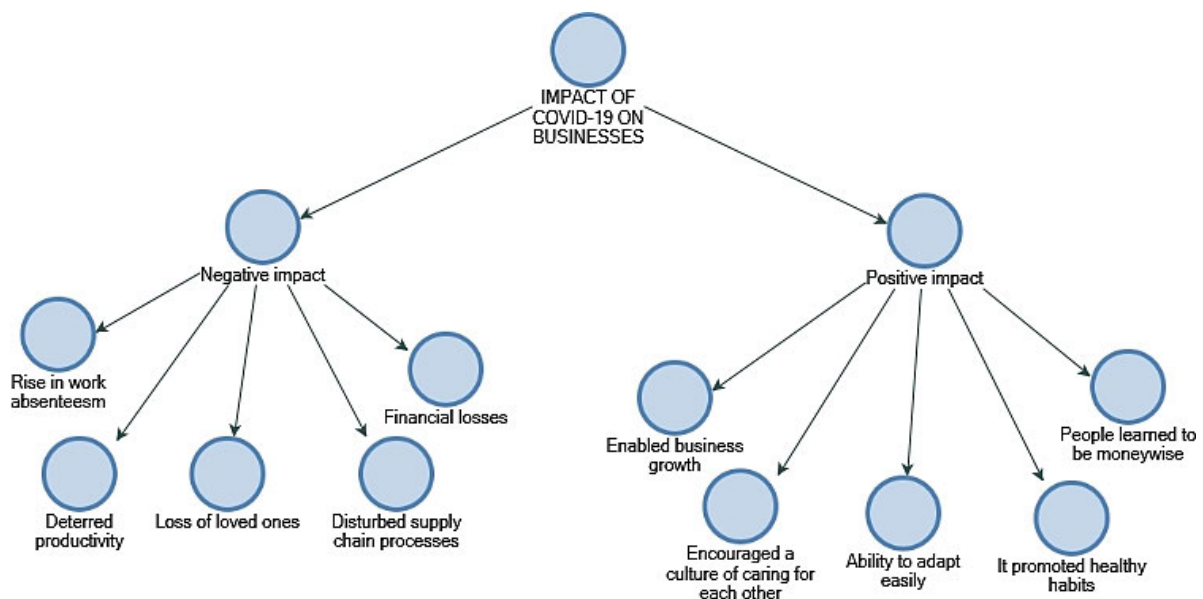


Figure 4.4 Impact of COVID-19 tree diagram.

This part of the thesis addressed the question of what you already know about the COVID-19 pandemic and its impact on the business at Bell Equipment. In addition, the codes that were prevalent were both of a negative and positive nature, hence the identified two subthemes or subcategories (negative and positive impact).

4.6.2.1 Negative impact

Participants in the study highlighted the negative impact of COVID-19. They mentioned that COVID-19 (1) deterred productivity at Bell Equipment; (2) disturbed supply chain processes; (3) subjected them to financial losses; (4) caused the loss of loved ones; and (5) increased work absenteeism.

Deterred productivity

Participants highlighted how the pandemic had negatively affected production levels at Bell Equipment. They mentioned issues including reduced production rates, delays in fulfilling customer orders, shortages of parts and components, changes in work hours and shifts, and constraints on the number of people allowed on site due to social distancing requirements. For instance, some mentioned that they were struggling to meet deadlines and targets due to COVID-19 restrictions that hindered the transportation of equipment supplies.

It did affect it a lot because in ADT I know used to build forty machines a week and we ended up building ten and we were not able to satisfy our customers because of COVID. Our parts were mostly coming from overseas. The ships were not allowed to enter the country, as I previously mentioned, so we missed due dates and then we ended up losing a lot of customer orders for our business. (P10)

It affected it negatively because we couldn't maintain the number of machines that we should have manufactured. So, our rates of manufacturing went down. (P7)

Some of the participants mentioned that due to COVID-19, there were changes in duties and hours worked to accommodate pandemic protocols. COVID-19 also necessitated changes in supply-side protocols as well.

Yeah, what I know about COVID-19 is that there were so many restrictions that were implemented by the government. That negatively

impacted the company. The hours were shortened. Staff had to be shortened. That caused the Bell not to produce the required quantity that they normally produce per annum for the customers. In short, they couldn't fulfil the customer's orders Because of the virus. (P7)

You know, I think that essentially, the fact you must go to different shifts with Limited numbers at any given Time on site in terms of social distancing. So yeah, definitely, I think the production volumes were down. Because you couldn't have a lot of assemblers in the factory to assemble trucks. So, yeah, there was a lot of changes required And I think it significantly affected the production flow. (S8)

Disturbed supply chain processes

The participant complained that COVID-19 affected the supply chain processes, which caused so many delays in terms of production at Bell Equipment. They mentioned that they could not get the parts that they had ordered on time.

So, I'm on the production side here at Bell Equipment. We had a lot of orders for customers that were supposed to meet the due date, but we could not because of COVID. We did not get parts on time; suppliers could not supply them because of the Pandemic. Shipment dates would get moved because no parts were allowed to enter the country due to COVID restrictions. (P10)

Yes, they were. From the supply's perspective, they couldn't travel like they normally travelled because of the restrictions. They couldn't supply us with the material on time...There were serious challenges with the suppliers. Some suppliers get their raw material from overseas, so when the borders were locked, they couldn't get the material affecting Bell in the process. (P7)

Other participants also indicated that part of the supply process is for them to go and inspect the quality of the material used by the suppliers, but due to COVID-19

restrictions, they were unable to do so. They highlighted that, even though this fortunately did not affect the quality of the products, but it was nevertheless risky.

I think the most concern was over the supplier quality. We were supposed to visit suppliers all over the country and we couldn't do that obviously and normally when we go to suppliers, we evaluate their processes just to make sure that whatever parts the suppliers are supposed to make. So, I think being unable to visit them, that might not necessarily have affected the quality, but it posed the risk to some degree. Cause else you just rely on what the suppliers are saying, and we couldn't see. (S1)

Look, we struggled a lot with shortages and getting reaction from suppliers especially from suppliers that used to come on site to do investigations or to come and collect parts that were found to be defective couldn't come on site anymore. Due to the supplier restrictions on the movement of their employees. We were also not able to conduct supply audits as much as we wanted to due to mostly restrictions on movement. As well some of the suppliers not allowing anyone from outside on to the premises. So yeah, it was a difficult time. (S8)

Financial losses

Participants in the study indicated that they suffered a lot during COVID-19, including financial losses. They mentioned that the company was losing money because it was not performing normally due to COVID restrictions that interfered with its processes. Most companies were implementing severe strategies to cut losses. One of the things the participants from Bell Equipment mentioned was the cut in salaries.

So, for me personally. It messed up my life. It messed up my life to a point that now I'm still trying to recover from the losses that Hit me during the COVID-19 period. Besides the people that passed away in

front of my eyes. My personal financial status was knocked heavily by COVID-19. Our salary was reduced by 20%. Also, having a negative impact on our livelihoods and our families. (P7)

Right. Ok, for starters. Obviously, we had to go into lockdown for like a month. So obviously that massively affected the business somehow and then our salaries were also cut then by two percent. Really remember what the percentage was, And I suppose most countries were affected by the pandemic, and that will contain affect Bell Business outlook. (S1)

One participant added that many companies were not able to keep up in terms of their finances, and as a result, they closed.

They face any challenges. I think a few companies were closed. Because they just couldn't survive the pandemic. About two companies in Joburg and another one in Durban had to close and because of that we had to find new suppliers quickly. I think mostly the smaller companies like our smaller suppliers are the ones that did not survive the pandemic. Maybe due to lack of resources I don't know. (S1)

Loss of loved ones

The loss of loved ones, friends, family members, and colleagues was mentioned as a major effect of COVID-19 and was seen as a source of negativity and stress. The pandemic also had a significant impact on businesses, with some losing good employees. Some of the participants mentioned had personal experiences with the pandemic, with some family members getting ill and recovering while others passed away. Overall, the pandemic had a testing and stressful effect on individuals and communities.

So, yeah. So, COVID has had negative impacts on All of us. However, we are human beings. I think we look at the fact that we have lost loved ones, friends, family members, colleagues and we say that ok, we are hurt by that and that's the negativity that we feel. (P4)

Firstly, it was a testing time. I mean I had some family members affected and even one or two of them have passed away due to the pandemic. So, on a personal level it was a stressful time. (S8)

Rise in work absenteeism

The pandemic also caused absenteeism and quality issues with Bell Equipment, with alternative workers having to cover for those who were sick. Some participants also mentioned emotional and psychological challenges, with some workers being afraid to come to work due to the pandemic.

We didn't get, a lot of people were sick. I think people were sick like me. We were sick, like during the holidays so we didn't necessarily need it to take time off work, but another department people were sick, and people had to be moved around to cover to those who felt. (S1)

It affected Bell in terms of absenteeism. We had to deal with quality issues related to absenteeism because we had to find alternative people working on the line. (S2)

I think there was also, a lot of guys that were afraid to come to work because of the pandemic. So, I mean, I know emotional or psychological from that point of view. Huge challenges in some areas. (S8)

4.6.2.2 Positive impact

Even though COVID-19 had a negative impact on most businesses and the economy, study participants highlighted its advantages. These include (1) the ability of the

companies to adapt easily; (2) people learned to be moneywise; (3) COVID encouraged people to take care of each other; (4) it promoted healthy habits; and (5) other companies were able to grow.

Ability to adapt easily

Other companies were not really affected by the virus. They were able to withstand the challenges brought about by the virus. For instance, one participant in the study alluded to the fact that the Bell Equipment Company was able to pull through the trying times by being compliant with the COVID-19 regulations, ensuring that everyone in the company is abiding by the rules.

I suppose our ability to adapt quickly. That's a positive...And then also to see that we as Bell were able to Come through the pandemic relatively unscathed. There were a few guys here and there, but there was not a lot. So, I. Think that the people really can react quickly to measures being put in place, and to understand and, you know, embrace the measures that management put in place in terms of social distancing and sanitising and those kinds of things to make Sure that the disease didn't spread. And then also, yeah, just to able to communicate well, with our suppliers. And having the supply relationship in place. You know, for them to also adapt quickly and understand our predicament and for the Bell supply relationship to grow. And strengthen through. Through the whole process. (S8)

Because Bell Equipment was able to react quickly to the pandemic situation, as the participant mentioned above, the quality of their work was not affected. The participant below explains.

Correct. Yeah, safety wise. It Would have affected us but let 's say on the work side of things. I think no matter what the things that we would expect, the standards of the quality remain the same. You know what I mean? It shouldn't be changing. So, the safety aspect of it is what

affected us. You know at that time When you, if you were infected at the very beginning, it was what Like a two week (P4)

People learned to be moneywise

Many people lost their jobs during the COVID-19 pandemic and were left unsure of where their next meal would come from. Some of the participants in the study mentioned that COVID-19 has taught them to be smarter when it comes to money. They learned to save money for unforeseen circumstances.

And another thing that I was taught by the pandemic is that you must always have savings, always save. Never use every cent that you have, always save. Because there comes a time, like when the pandemic came, you're not going to work your salary is cut you don't have any savings. Then problems start. (P7)

Encouraged a culture of caring for each other

The pandemic has humbled humanity and made people think more realistically, leading to an increased focus on looking after one another and treating each other with respect.

It has humbled the world in a way that it has made us to Think more realistically and look after one another. So, we think about each other more. We think how are we going to look after each other? What can we do to make each other 's life easier? How can we be beneficial to each other? So, it has its pros and its cons basically. It's how we check it. (P4)

I think on the positivity side of things, as I said earlier, I think that COVID-19 has Humbled us as human beings. And we now look at each other as equal individuals and it's brought us to the point where

we tend to care for another and look after another and we treat each other much better as human beings. So that's the positivity that I think I can take out from it is that we care for each Other. It humbled as human beings; we've learned to respect each other much better. (P4)

Participant P7 added that spending time with family is important, especially during the pandemic. He mentioned that it reminds them that life is short, and they should cherish the time they have with their loved ones.

Besides the hygiene spend time with your family, that's the most important thing one can do, Spending time with your family. We were forced to learn to spend time with our family during the pandemic because we couldn't move anywhere. Spend time with your family. If you want to have fun, have fun with your family. Because it also taught us that life is very short one minute you were the person the next minute the person is gone. (P7)

It promoted healthy habits

P7 talks about how the pandemic has led to improved hygiene levels in society and increased family time. He further highlights the importance of maintaining good hygiene habits beyond the pandemic.

OK, maybe and generally everyone's hygiene was improved. Yeah. Generally, societies hygiene was improved. People started taking good care of themselves after the pandemic, because it was emphasised by the government that we must clean up, clean ourselves, look after ourselves. So, besides the few people that made it in business because of the pandemic, the hygiene levels of the society were also improved. So those are the two that I can just think of. Ok. And another one that's coming to my head. We were taught to spend more time with our families. Before the pandemic will all be doing our own things and not spending enough time with our families.

But the pandemic forced us to stay home and spend time with your family, which is a positive. (P7)

What lessons from this experience of the COVID-19? One of the first most important lesson is that your hygiene must always be on point. Always take care of yourself, with or without the pandemic. Wash your hands on a regular basis. Sanitise your hands and your area that you're working on because we always touch things with a lot of gems (P7)

For participant S1, there were not many positive experiences during the pandemic but notes that it has taught people to be more content, resilient, grateful, and to appreciate the important things in life.

I don't know if there's a positive experience per se because people were sick and people were dying, and everybody was scared. So, it's like when you ask people, what did you achieve during the pandemic, it's like achieve not dying, for example, but I don't know. I think situations like this, like those as they teach you to be more Content more resilient, more grateful, and Sort of like to pay attention to what 's important in your life and not take things for granted. So, yeah, I don't think. I don't know if I can categorise that as a positive experience, but there's more for learning experience than anything else. (S1)

Enabled business growth

Few of the participants in the study alluded to the fact that, even though the pandemic has had a negative impact on businesses, it has created opportunities for some. For instance, P7 explained how his brother got the opportunity to supply PPE, which increased his profit margins in his business.

Positive experience? The only positive experience that I can think of from my head right now is that one cousin of mine that's in business got a tender to supply PPE and he made big bucks. That's the only positive I can think of caused by the pandemic. Nothing else. (P7)

4.6.3 Actions employed to ensure daily operations were carried

The emergence of COVID-19 forced all people, companies, and the government to act rapidly to address the challenges that came with this pandemic. Bell Equipment was no exception. Participants alluded to the actions that were taken by this company to ensure that it withstood these challenges. The tree diagram below presents the actions that were taken by Bell Equipment Company.

Figure 4.5 shows actions employed to ensure daily operations were carried.

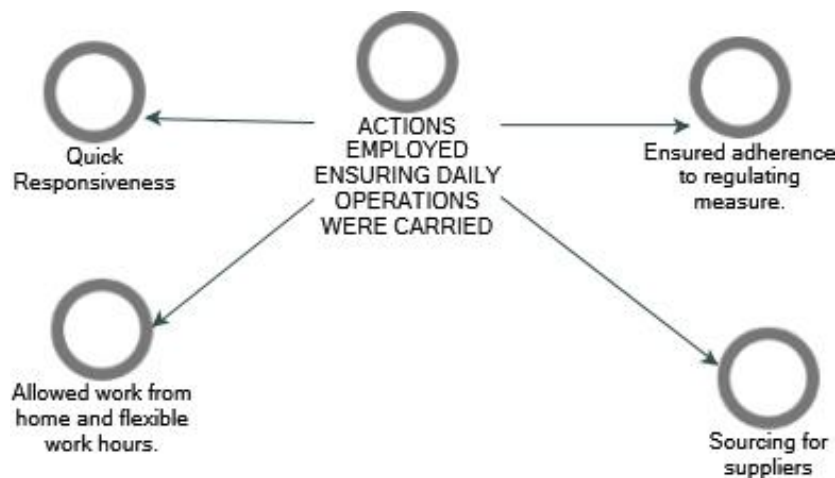


Figure 4.5 Actions employed tree diagram

4.6.3.1 Ensured adherence to regulating measure

Some of the participants in the study stated that their company ensured that they were compliant with COVID-19 regulations. They ensured that they maintained social

distance and wore all the necessary protective gear always, including masks, as well as sanitising.

We can always mitigate the risk by following all these things that they are telling us to do, like wearing masks, sanitising. And just maintaining your health. (P7)

Ok, I don't know how to put this one, Mr Ndlovu. But I know that management did do something. That is why we carry on working. But in terms of what they did besides enforcing the restrictions, enforcing the rules and restrictions. That we must make sure that we wear all the required PPE So we don't spread the virus and so we can protect ourselves. And then they also separated our slots for tea breaks. The normally the entire company tea break is at half past 9 to 10. So, at that time they changed the dates. So, a certain batch would go on a certain time. Another batch would go on a certain time Just to make sure that we don't spread it and then we protect ourselves so we can carry on working efficiently. (P7)

To ensure that the workers maintained a social distance, the company changed their working schedule to manage the number of employees working on site in a day.

Supplier quality, I know that we came to work but we changed our shifts we did not all come at once we were alternating to give each other space. I think that's what happened in this department, not everyone had to be in the office at the same time so that was the way to maintain the distance, we were alternating days on which we would come to the office. Also, if there were issues then we would come and if there aren't any, we wouldn't so we didn't have to be here all the time, (S4)

OK, the first thing we did was we changed our shifts. I'm not sure how much we were affected, but those shifts will change. (S1)

Some of the participants mentioned that the company provided them with PPE including, sanitisers and masks.

The company took a the initiative to provide the masks free of charge right, so they provided the PPE, they give us the information on a daily basis and they were so quick in responding to the attack on the department's trying to normalise it back and those were the initiative that the company did to enforce quarantine because if a person is not going to quarantine it would have ripple effect so it was a very good idea and to make sure that if you person is affected must be quarantined back home. (P5)

We provided the safety equipment in terms of masks and sanitisers. (P6)

OK, the first thing they did was they changed our shifts. I'm not sure how much they're affected everything, but those shifts will change and they're also supportive with PPE things like masks when we were still wearing masks. They also provided us with sanitisers. (S1)

4.6.3.2 Quick Responsiveness

The Bell Equipment Company was acknowledged by some of the employees for their rapid responses to the pandemic. They mentioned how supportive the company was during that time. They also mentioned that the company went as far as ensuring that the employees had access to information pertaining to the virus. They created awareness and updated the workers about the virus daily.

I think they have done enough; they've done everything possible, and I don't think there's a better way of doing it, there's a daily communication, they created awareness. (P8)

The company was very flexible we are very kind colleagues, we always got notices about COVID they sent out regular updates from management about COVID stats there was a lot of support from the company itself. (P8)

For communication, there was daily communication every day they explain to us the seriousness of this issue for them to take the rest of the company to allow people to work from home for me that was a major stepping stone for the company but it had to be done and they said they wanted to minimise the risk I mean our infection rate in the company was not high as every other company so whatever you have planned worked. (P8)

Yes, they did respond correctly, yes. (P4)

No, we basically continued as normal there is not nothing additional that they put in place. You know, just because of the pandemic they provided us with latest you know in terms of moving around driving. To say that we are part of essential Services after that first. Other than that, if there was any questions or queries, we could always approach management. I cannot think of anything specifically that they have implemented. You know, as a contingency during the pandemic. (S8)

4.6.3.3 Sourcing of suppliers

The company experienced a challenge in terms of meeting deadlines because suppliers were struggling to ship material due to COVID-19 restrictions. However, to ensure the company did not fail, Bell Equipment Company searched for new suppliers. However, this was also a challenge for the company because they had to bypass some of their processes, like assessing the quality of the products.

Yeah. So that's where we must look at alternative suppliers. And so, we were looking at unapproved alternative suppliers and trying to get

them on board and get those products approved so that we can use it. I think you in the material planning side of things, so. (P4)

The idea was the same there. If there was a point, I recall clearly is that we couldn't get steel from our normal supplier and steel was available from specific other suppliers only. There's a Lot of things that come with the strength of the composition of the steel and especially with the equipment that we build, you need proper good steel and stuff. Otherwise, you're going to see failures in the field and other things in that side, so things like that will have to deal with. (P4)

Yeah, there were new issues for us address with regards to quality on our side, like the composition of the products we use changed, a bit due to the raw materials we have used right? So, let 's say we had to get a whole lot of testing done to ensure that product can be used and so basically, alternate approvals on suppliers and stuff. (P4)

4.6.3.4 Allowed work from home and flexible work hours

During the outbreak of the virus, many companies were forced to adopt a culture of working remotely. Some of the participants also mentioned that this was also a reality for Bell Equipment. They were allowed to work flexible hours and work from home. The management was supportive in terms of ensuring that they were provided with all the possible support they needed to work effectively at home. For instance, they were provided with data for connectivity purposes.

Allowed people to work from home and they even allowed flexible hours when they need to have flexible hours, they've done everything possible to minimise it. It was up to the people to behave and follow these rules. (P8)

I would say management did very well, like providing those options to work from home because it limited the number of people who are available in the office and spreading of infection I would say the other

thing that they can do is provide something like the boosters just for employees to take and have that strong immune system and I think also they did through safety training where they will teach people how to prevent spreading infections and everything . I think management did well because when other people were infected, they had options to work from home. So, I think they've done very well considering the situation that this was new to everyone I would say they did well yeah cut the shifts for people to be limited in that working areas it was something good they provided exit and entrances they did well I'm positive about judging based on the situation and how things happened everyone was scared it was new thing going on. Under the circumstances they did well and because of that we had couple of employees who died you know it wasn't as scary as like what was happening in other countries, they've managed to control the infection spread. (S7)

They supplied us with data, they supplied us with everything that we needed because we took our PC's home we took everything we required to connect to internet and continue working and connecting to zoom, our phones everything they supplied us all the equipment from day one. We didn't need much we only needed data which they supplied us with, we had no issues the only issue we had was network which is something beyond what the company can do. (S9)

4.6.4 Company's strengths and weaknesses

Due to the disruption the pandemic brought about in people's personal and professional lives; participants were then asked what their department's key weaknesses were when it came to dealing with the pandemic. Therefore, the subsequent section examines the department's strengths in dealing with the pandemic and their key weaknesses. The diagram below is a visual representation of the results of the data analysis. Also, the information provided in this section was similar to what was asked here, so the data was merged due to the same information provided under this question and the following quoted question: "What positive experiences have you

had since the COVID-19 pandemic started?” “What influences and motivates you about the COVID-19 pandemic?”

Figure 4.6 shows the company’s strength and weaknesses during the COVID-19 pandemic.

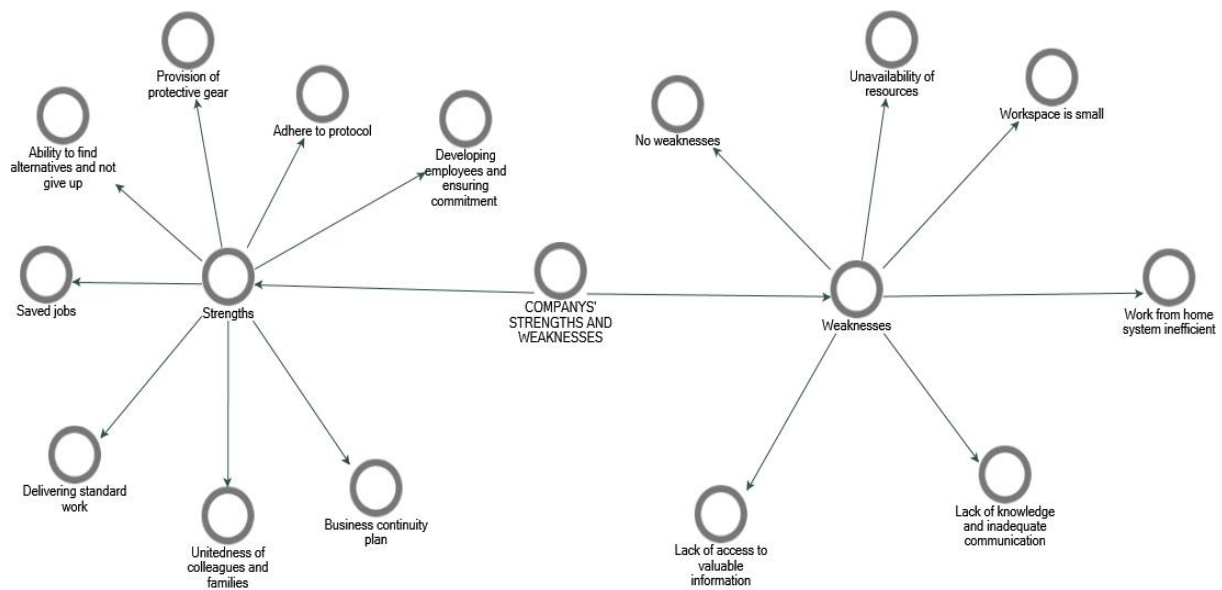


Figure 4.6 Company’s strength and weaknesses

4.6.4.1 Strengths

Delivering standard work

P4 stated that their strength as a department has been their ability to deliver standard work during the pandemic.

“Yeah, I think we did excellent in making sure that we maintained our standards during these periods especially during the times of infection. So, you know, during the times of infection, we generate and fill spaces with people that’s got some experience, but not too familiar. You know, they’ve got some experience, but they’re not 100% on it.”

Unitedness of colleagues and families

S7 and S8 noted that the strength of their department in dealing with the pandemic was in the unitedness of colleagues at work and their families. S7 highlighted the importance of the two structures—work and families—in dealing with the pandemic.

“I think we all realised that family was important. And that help was important. And I think we all realised that the businesses that we work for are important because those were all things that you could easily lose during that time. So those are things that motivate me. And, realised some of my strengths and weaknesses during that period. So that was also something that motivated me.”

S8 highlighted how teamwork and support from their line manager made things much easier for colleagues.

“Yeah, I think as a supply quality department we were able to support each other and come together. We’ve got an open-door policy with our manager. So, if there are any issues, we can speak to him directly without any hindrance.”

Similarly, S9 noted that their managers were available to guide and assist them at Bell Equipment, which made dealing with the pandemic easy.

“Also, our managers are always available to assist and to give guidance and the fact that Bell is such a big company so we have other branches so it is easier to get material when we can’t get it from suppliers, we cannot get it from other suppliers, so we have couple of options available.”

P7 highlighted how their manager actively participated in their safety meetings during this period, which showed the support of the employees.

‘So, my department was trying. And often he would come to safety meetings. Safety meetings are normally held by the supervisors, but at times he would invite himself and come over and talk about the importance of our hygiene and wearing the masks and sanitising, so he was going out of his way to make sure that he spreads the word to the employees. So that was the strength that was created by the manager. And if you felt sick, he wasn’t fussy If you stayed at home. If you felt sick, if you had the flu You’d stay at home. Until you get checked up, so he wasn’t fussy about that People are abusing that and stuff like that.’

Saved jobs

P10 acknowledged that their strength as a department was in their ability to save jobs.

“In my department what we did was, we managed to save people ‘s jobs by not retrenching anyone because we did not have that much work to do for our customers. So, what we did was separate people into groups so that we can work in different shifts that we can be able to continue with production and we are following the COVID-19 protocol.”

Provision of protective gear

S2 stated that the department provided them with protective gear and information about COVID-19.

“I think the first they did correctly was information about COVID by providing regular updates. They provided masks to assist, and everyone got their bottle of sanitiser which would get refilled when required. I think having all those in place as per health requirements, helps ease some of us in our work.”

Adhere to protocol

P6 and P9 said that the strength of their department in dealing with the pandemic was adhering to protocol. P6 states that their strength was adhering to the production plan without any hesitation.

“We just follow the production plan, we just go with what their plan was telling us, like I said shifts have changed to suit the working hours. I think from strength point of view we just complied without any hesitation”.

P9 reported that their strength was in adhering to protocols such as social distancing and sanitising to protect them from contracting the virus.

“We’ll be with the pandemic for a while as the rules were set in terms of social distancing and sanitising. The sharing of tools came to a minimum, the number of employees working in a bank was reduced, the times that were allocated for teatime was kind of staggered. So, that not all assemblies working went to the home zone or the wash area at the same time, so, this was to ensure that some sort of acceptable social distancing was adhered to the media coverage, the posters put up the educational stuff, that literature that was that was quickly available and displayed in on key areas of the department also assisted with ensuring our employees, team members adhere to these rules.”

P5 highlighted that the protocols and policies were communicated well, which was a strength for the department. They would discuss and debrief about the pandemic to ensure everyone’s safety.

“Because the company has good policies that also cascaded to us as well at the departmental level, we had committees right for safety

where we would have a brief in the morning about what is happening, and the jobs will be given what one will be working on. That was the strength, and, in the morning, people would talk about how pandemic is so people getting debriefing, and we would start working knowing how far we are. For example, if a person is informed and the company is looking after him then he has confidence in whatever he does so the dissemination of information and implementation of that gives us confidence as the department.”

Ability to find alternatives and not give up

S7 explained that their strength as a department was their ability to find alternatives and look outside the box for the issues they faced during this period.

“I think the part of our strengths was we were able to look at alternatives, we were able to look outside the box and to think up alternative plans for issues and constraints in the system. I think the fact that we thought out of the box and that we looked at alternatives was a key strength. Because I know that a lot of the other companies that was in the same position was quite impacted. What we also did is we would assist suppliers when they had constraints.”

Moreover, they did not give up and ensured that they managed their suppliers well.

‘So, our dealings with the suppliers were very good. Managing the suppliers during that time was very good. I think we managed the suppliers through difficult times we build relationships through difficult times. I think a key strength is the fact that we didn’t give up. We kept on planning or thinking of alternatives. There were very little times that we stood back and said we can’t do anything more.” (S7)

Business continuity plan

The department had a business continuity plan, which aided them in dealing with the pandemic.

“We normally have something called business continuity plan, so in the business continuity plan its where we identify alternative suppliers. Maybe let’s say our supplier was affected severely by COVID-19 whereby they did not have enough capacity in terms of people production then would go to an alternative supplier. So, we have contingencies in terms of suppliers, we also have contingencies in terms of buffer stock inventories, so we have other plants which belong to Bell Equipment that carry enough stock across the globe. If we have issues of stock, we will go to Bell Equipment subsidiaries that can assist with stock, so the back up of continuity plan is there to help us with such. We don’t rely on only one supplier, so the only issue is critical components like engines those ones are a problem, but I don’t have first-hand information because that’s not my supplier, it’s not my commodity but I think there were some contingencies that were in place to prevent any negative impact on our production.” (S7)

Developing employees and ensuring commitment

P8 stated that the department’s strength was in developing employees and ensuring their commitment.

“The strength is grooming individuals and coming to work sacrificing the time because they have to deal with people.”

Furthermore, the speaker explained that committed employees ensured that dealing with the pandemic was easy for the department. Employees committed their time to the work that they do, and morale was high.

“The employees were very committed because they could have said, I’m scared I want to work from home, but the employees came to work they knew the risk involved so they were being brave by coming to office we told them we must be at work, but they could have come back and said no I’m scared. Guys came in and they gave 110% like every other time they come they do not show to next team that they scared. For the department we kept the morale very high, and we had an open-door policy, where we said come in whenever you scared off or whenever you feel uncomfortable, we would sit down just talk about it lets see what we going to do let’s plan to eliminate that concern. So, communication was key.” (S8)

4.6.4.2 Weaknesses

Lack of access to valuable information

P7 stated that their weakness was the lack of access to valuable information, specifically for people who had no access to emails or computers.

“The spreading of the word was a very key weakness. They were not spreading the word sufficiently. If you don’t have an e-mail, as I said, the message would get to you very late. Because the company just sends emails to those who uses computer. If you don’t use a computer and you are an assembler or a packer, the message would get to you very late. That was the biggest key weakness.”

Unavailability of resources

P5 and S7 said that the unavailability of resources during the COVID-19 pandemic was a weakness for their department. They had to share resources, which compromised their safety.

“What I’ve seen is that in my department we share a lot of tools so they are changing hands frequently in the case of the pandemic the transmission of course will be high so if the company can buy a lot of tools that are specific to a person, I know it’s very expensive to do that. But if each person their own specific tools that they do not share it would help.” (P5)

S7 stated that the unavailability of resources slowed down the work that they were doing during this period.

“Would say the availability of resources was a problem, because suddenly the workload increased considerably. And there was special intervention required from the team. But we did not have enough tools, and we did what we needed to do. But some of our work fell behind.”

Workspace is small

P8 and S2 lamented their concern that their workspace was limited, which made it challenging to maintain social distance to prevent the spread of COVID-19 from one person to the next...

“We were in contact with everyone working at the department, let’s say the task is to identify problems or get called in because there are problems and the expectancies from production is for them to resolve problems, to identify or get called for a problem is called by the individual and they have to physically show you what is wrong and it’s difficult to maintain 1 meter so it is pretty difficult to maintain the meter or half a meter to look at a problem with individual so I have to say the weakness is contact with people.” (P8)

S2 echoed similar sentiments and said they had to work in a small container.

“For us, I don’t think that there were things that we didn’t do right because we are a small team so in terms of sitting arrangements, we were able to keep the distance that was allowed. The only fear that we had at that time is that we are all in a small space. That wasn’t a good thing because we think the disease was rotating all around us. But in a nutshell, there is not much to say that our department didn’t do, everyone followed the rules except certain people that didn’t want to vaccinate. Certain people in the department were uneasy around colleagues that didn’t vaccinate, especially at a time when the vaccine was available. I think we did well.”

P10 stated that the restrictions on the number of people that should be in a space left them short of people to conduct the work.

“In ADT lines, we work with [inaudible:00:09:35] and each has five or six people. Due to COVID, we were not allowed to have that number of people close together, it killed the product. In ADT we work with tech-time and have 4 to 6 people working the machines at the same time, but if you remove two people to account for social distancing, what will usually take us three days to build, now took five to eight days because of less manpower and this killed our output.”

Lack of knowledge

P9 stated that the lack of knowledge about the novel virus was the department's weakness and trying to keep people updated about it was very challenging.

“The lack of knowledge, I assume because it’s something new to everyone and kind of not having the heads up on exactly what this COVID-19 is all about. Getting the people educated fast enough, was

a bit of a challenge and then having people adhere to the rules that were set was also challenging. This is a big change for people to suddenly go from being buddy-buddy close-close and without sanitising suddenly was sanitised. Every time social distancing in place and to get people to adhere to those rules in the beginning was a challenge.”

P6 also stated that “communication” was their weakness.

Work from home system inefficient

P6 noted that the work from home system’s inefficiency was their weakness.

“My people are working from home and there are some challenges there are facing”

No weaknesses

S1, S4 and S9 explained that their departments had no weaknesses.

“I don’t think we had key weaknesses or what I can call weaknesses because like everybody, like when you went into shut down, everybody ‘s off like going to shut down and then when we came back all of us came back so with everything that was happening, we were still able to work, come to work every day. You know, so I don’t necessarily think that our department had witnesses.” (S1)

4.6.5 Trends within the company

Figure 4.7 shows visible trends during the COVID-19 pandemic at Bell Equipment

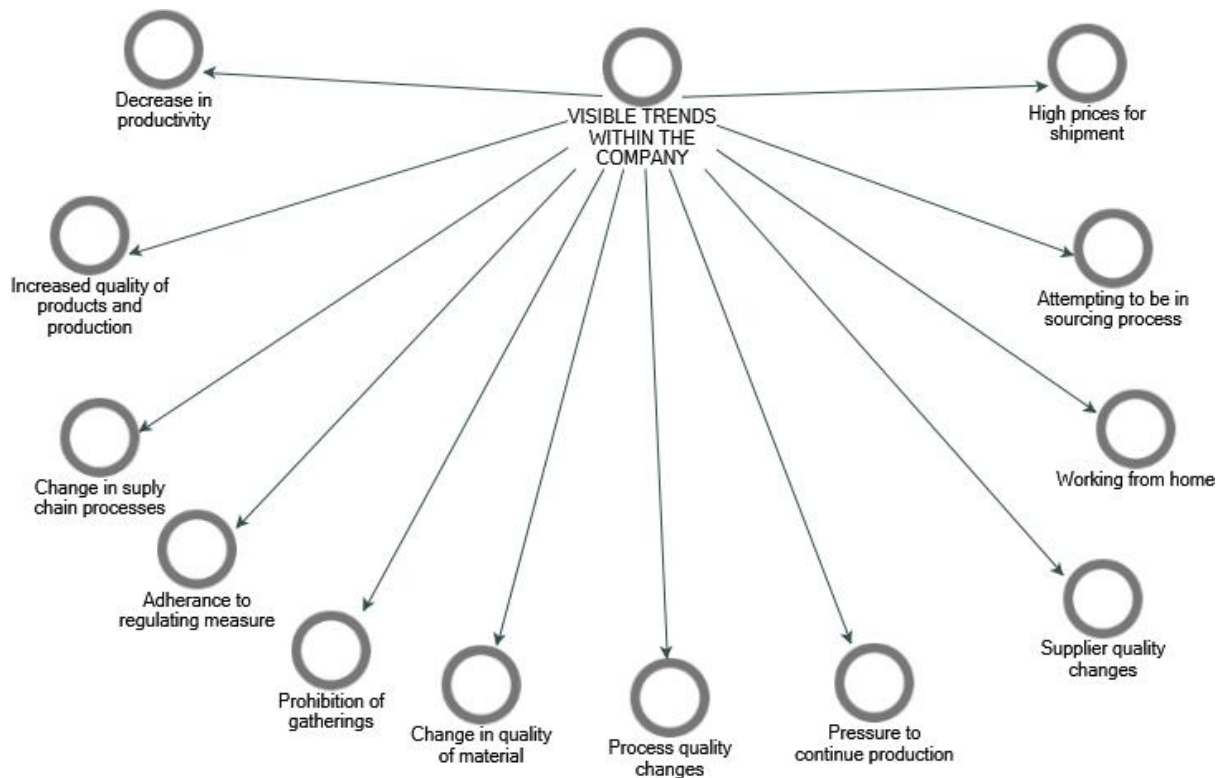


Figure 4.7 Visible trends

The data shows the different trends experienced by employees at Bell Equipment. The COVID-19 pandemic has had a significant impact on businesses worldwide. The trends in different business companies have varied depending on their industry, size, location, and the measures they have taken to adapt to the changing circumstances. In trying to gauge what trends were apparent in the business, participants were asked to provide views on the trends that were seen at Bell Equipment.

4.6.5.1 Adherence to regulatory measures

One of the trends experienced at Bell Equipment was adherence to regulatory measures. It was very important for all people to be compliant with the preventive measures implemented to curb the spread of COVID-19. For instance, P8 stated that people started being conscious and kept social distance.

As I said face mask, keeping the distance to each other that's the new trend. Minimum contact, minimum physical discussions, seeing people being very scared so that became the new trend and being scared that you're going to get the virus.

Participants P9 and P10 agreed with the above participant. The participant stated that they adhered to preventative measures such as social distancing, hand sanitising, and wearing face masks. The following excerpts validate this statement.

"Well, basically, when it comes to the workforce, the adjustments as I said earlier, the adjustments had to be made and social distancing and sanitising and people 's mindsets and culture changing. And this fear that this pandemic brought upon everybody even the transport lift clubs coming to work, people had to adjust accordingly, team members the work that they carried out, the daily tasks with sanitising of the tools so in some cases in the beginning, it was the fearful thing so people kind of drifted from the normal day to day practices before or pre COVID And they've made more errors during assembly as a result and which also increased the n-conformances that we saw as a trend and we had to make adjustments to the process to counteract that increase in non-conformances." P9

"The good thing was that everyone was complying with COVID-19 regulations". P10

4.6.5.2 Adoption of remote working

Working from home was another trend that was practised by Bell Equipment staff. Participants stated that they were told to work from home to minimise physical contact and to maintain social distance. Though participant S4 said it was not much of a trend. Working remotely has become the norm as they have been working from home since the introduction of lockdown.

“We started working from home as soon as the lockdown was announced, so we started working from home for the past two years so there is no trend there, except we were being conscious staying away from the public.”

Participants S5 and S9 agreed with participant S4 and said:

“I think because we worked from home, we worked more hours than at the workplace. So, it did not affect us at all.”

“They supplied us with data, they supplied us with everything that we needed because we took our PC`s home we took everything we required to connect to internet and continue working and connecting to zoom, our phones everything they supplied us all the equipment from day one. We didn’t need much we only needed data which they supplied us with, we had no issues the only issue we had was network which is something beyond what the company can do.” S9

4.6.5.3 Price Hike/increase

A trend in increased spending attributed to rising prices was also noticed, as explained in the following excerpt.

“No, just a frequency the additional costs incurred because of Shakedown fuel costs are quite high. So, if any increase in the shakedown hours would result in more money being spent by Bell.”
P9

4.6.5.4 Increased quality of products and production

Some participants stated they did not witness any trends, but there was growth in the business; they started seeing a rise in the number of orders. For instance, participant P7 contended that:

"I don't think much has changed in the process quality. I don't think much has changed besides the quantities of the orders. Probably manufacturing went up because it went down during the COVID-19 pandemic and now it's gone up. Those are the only changes. But besides that, the process quality at Bell is on point. And now the suppliers are supplying us on time unlike before during the pandemic. They wouldn't supply us on time. Because of the restrictions."

4.6.5.5 Change in quality of material

Due to the many disruptions brought by COVID-19, the quality of the material was due to be affected. Illness was affecting individuals, and others would complete the manufacturing tasks initiated by someone else, so somehow specificities were missed because different people were involved. Participant P10 stated:

"Yes, the quality of the material was not as good as before COVID. So, it means that they did not have time to prepare our products and supply them to Bell Equipment in good standing in terms of quality. Machines were failing now and then because of bad material."

4.6.5.6 Prohibition of gatherings

The COVID-19 pandemic significantly impacted social interactions and gatherings. Hence, governments all over the world introduced a set of restrictions on public gatherings, ranging from attendance to stopping the virus from spreading. Large-scale events, including concerts, sporting events, marriages, and religious rituals, were all cancelled or delayed as a result. The ban on gatherings had an influence on not only the leisure and hospitality industry but also on everyday life, making it harder for people to spend time with friends and family. Although many people have found these limits to be challenging, they were vital to prevent the virus from spreading and to safeguard the public 's health.

In addition, everyone was in panic mode during COVID, and that did not help because people were guarded and were trying to maintain social distancing, and others were preoccupied because their loved ones were sick and were probably living in fear. These fears showed in the work they produced. Participant P10 is explained:

“The sad thing about COVID was that we didn’t get to spend time with our loved ones, friends, and families because we were not allowed to be at gatherings.” (P10)

4.5.5.7 Change in supply chain processes

COVID-19 had a significant impact on various aspects of our lives, including supply chain processes. Transportation disruptions were observed, factories and warehouses were shut down, and there was a global economic slowdown. The pandemic left no aspect of the supply chain untouched. The virus not only affected the physical movement of goods but also disrupted the workforce; employees were working shifts, but that did not help because it led not only to labour shortages but to reduced productivity as well. The pandemic forced businesses to rethink their supply chain strategies, highlighting the importance of resilience and agility. Participant S1 eloquently expressed that:

“I think the two major changes, like I said, our shifts were changed. We used to work 7 to 4. They will move from 6 to 2 because they are supposed to be this bigger shift where not everybody needed to be at work at the same time. So, we sort of are trying to displace people. And then the second is our inspection team, they usually went to Durban to do inspections but because of COVID, I think that that there was changed. So now instead they do inspections here instead of driving down Durban every week. Yeah, I think that’s it.”

“I think the way change is in that case, the suppliers had to use different materials to manufacture the pot. For example, if they were supposed to use, say a certain material they couldn’t source that material, then they had to use another one.”

Participant S8 also mentioned that the supplier response rate was unsatisfactory, resulting in consumer dissatisfaction with the delayed delivery of machines and parts that they had expected, which hindered their productivity.

“I won’t say quality deteriorated. I would say It was the same. It’s just the reaction time for feedback from the suppliers, which was possibly affected. And, after the first five weeks of lockdown, there was not much happening on site, production was down quite a lot. So, we didn’t see many issues coming through to us because of the lower production volumes. The trend in terms of NCR that was raised slowed down, but that was purely because of production probably being down. But yeah, as soon as the production volume started to pick up again, the train started to pick up in terms of defects.”

Moreover, participant P4 also shared that suppliers could not keep up with everything that was happening.

‘So yeah, that’s one side of it. That is something that we’ve seen about the supply. That was the first time and I think we haven’t it seen in years. It’s like we had excellent suppliers that couldn’t keep up.’

4.6.5.7 Decreased productivity

The coding process revealed that COVID-19 was not the only disruption that negatively contributed to companies’ inefficiency, but there were other external factors such as suppliers not keeping their end of the bargain. For instance, P7 maintained that there were a lot of issues regarding the delivery of material.

“Yes, there was quite a bit of supplier problems, and what comes to mind is one of the suppliers that supply electrical components. They had a lot of issues with their raw material and with their production and with faceting and that required a lot of intervention and from our side and a lot of people from Bell got involved in that, there were also quality issues because of that.”

Participant S2 indicated that it was not a trend that was perceived in their department, but rather issues that they had encountered but were able to resolve before. However, when COVID-19 hit, those issues resurfaced due to employee rotation.

“I wouldn’t say that most of the issues were new but increase in the number of the issues that were being identified. I would think that it’s because of this influence of the movement of people. So, the rate of reported issues was increasing. Not as such that these are new issues, probably they have always been there and resolved, but because of the rotation of people then we start to pick up those issues again and increasingly.” S2

Participant P10 echoed the same sentiments as P7, where he stated that there was a backlog.

“Yes, issues like satisfying us with our backlog of parts so that we can carry on with our production and giving us parts in good condition with good quality.”

Moreover, S8 reiterated the above statements and alluded that:

“Yeah, I won’t say quality deteriorated. I would say It was the same. It’s just the reaction time for feedback from the suppliers, which was possibly affected. Yeah. And, after the first five weeks of lockdown,

there was not much happening on site, production was down quite a lot. So, we didn't see many issues coming through to us because of the lower production volumes. The trend in terms of NCR that was raised slowed down, but that was purely because of production probably being down. But yeah, as soon as the production volume started to pick up again, the train started to pick up in terms of defects."

4.6.5.8 Pressure to continue production

Even though COVID-19 had a detrimental influence on both small and large enterprises, some of them experienced company development and found that it was necessary for their staff to put in more effort to show up for their clients and provide them with the service they needed.

"People were under a lot of pressure, production continued as normal. And there was a lot of strain on the people and there were resources in our department to make sure that the lines keep running, and that production remain stable. So, we had to make a lot of plans, and do a lot of different things to keep the production lines going." S7

4.6.5.9 Attempting to be in sourcing process

Lessons learned in some departments included exploring other avenues to sustain the company and finding better ways of tackling internal problems. S2 participants elaborated:

"I think in general, currently we are working as firefighters. We are in the process of trying to improve how we conduct our work. Instead of being firefighters, we want to be in the beginning process of the sourcing because currently, we are in a situation where the sourcing team will source, request samples, and get whatever defects get rejected. We are not aware of all those issues. Only once everything on their side is confirmed, they will handover to us for production,

without knowing that there were issues previously identified during the sample stage, issues that may end up being our problem when we are in production. We are trying to highlight those issues updated on the drawings. For example, we had a problem with a supplier, and we went to another supplier, but the information on the issue identified was not updated. So, somebody in the sourcing team doesn't know that there was an issue until they started sending production parts. When we raised the problem, looking back they realised that the issue started from that supplier and wasn't incorporated in the information that was supposed to go to the new supplier."

4.6.5.10 Encouraged spending money wisely

The pandemic had a significant impact on most businesses, forcing them to retrench staff and in some cases even close their doors. So, the interviewed participants highlighted that going forward, they have learned to spend money wisely, as no one knows what tomorrow holds, and when something of this nature happens again, they want to be ready and safe financially.

"Another good thing about COVID was that it teaches you a lot in terms of being responsible and saving money. When situations like this arise, you know you've got something. Some people were crying for basics like food because they had no money." P10

4.6.6 Strategies to be employed to avoid inconvenience

Figure 4.8 shows strategies to avoid inconvenience.

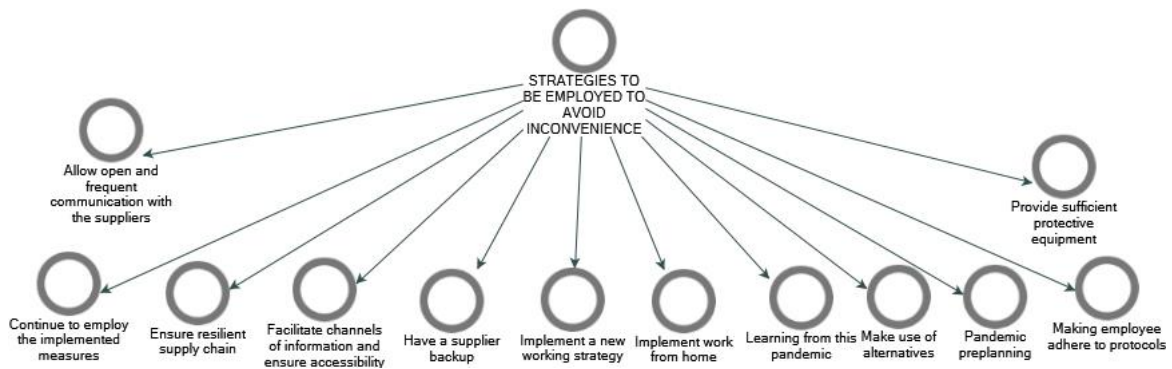


Figure 4.8 Strategies to avoid inconvenience

The question under this section was: How would you expect your department to respond to the COVID-19 pandemic to avoid issues and inconvenience? Hence, this section discusses the importance of open and frequent communication with suppliers to ensure a resilient supply chain, especially during a pandemic. It is suggested that companies should have various channels of communication with suppliers to avoid a situation where the communication channel is broken and there is no communication between the company and the supplier. Clear instructions and important information should also be communicated beforehand to reduce complications and ensure that the desired standards are met. It is also important to have alternate suppliers readily available to ensure a steady supply of equipment and raw materials. Finally, having contingency plans in place, maintaining open communication channels with suppliers, and ensuring a resilient supply chain are some of the lesson's companies can learn from the pandemic.

4.6.6.1 Allow open and frequent communication with the suppliers

Relying solely on one method of communication with the supplier could be to the detriment of the company. If this communication channel breaks down, preventing any further interaction between the company and the supplier, the company may find itself without the necessary supplies. Therefore, it is advisable to establish multiple alternative communication channels with the supplier:

“In our department for example, we need to be able to find more ways to remain in contact with suppliers. So, that when you can’t visit the supplier, then the supplier still manages to reach us.” S1

Furthermore, even upon opening these channels, ensuring that important information and clear instructions have been communicated with the supplier reduces complications and mistakes that could arise but also ensures that standards of what is required are always met.

“Yeah, I think we can probably Improve in terms of making sure that the correct information from Bell instructions is communicated beforehand and then making sure that suppliers have got the systems and the processes set up to meet the desired standard. And then also if they do encounter some issues on their side from unavailability of raw materials or expertise levels.” S8

Participant S8, also indicated the importance of maintaining a certain level of communication to support the current relationship:

“We need to make sure that we’ve got good relationship with our suppliers. And that we speak to the correct people in the correct positions. At the suppliers. To ensure that we get the correct feedback from them.”

4.6.6.2 Continue to employ the implemented measures

Participant P4 indicated that their work was not severely affected by the pandemic and therefore alluded to the idea that even though there have not been any infections in the department, work must continue and the regulatory measures that were made by the government must continue to be followed:

"I don't think it affects our department. Like it affects the work directly because as I said, we still manage to do our day-to-day duties to the best of our ability and we still well, we haven't changed the way we work like with our day-to-day duties, but that's safety and stuff, yes, but I don't think it's going to have a direct impact on departments, not like from our side. Unless we were infected."

'So, if we were infected. Yes. It affected the process and the departments because then you need additional safety cleaning precautions to be taken. So that's the only way I think it would have been.'

4.6.6.3 Ensure resilient supply chain

Participant P4 mentioned that their ability to function without disruption is a strategy that they need to employ to avoid inconvenience by ensuring that there is an alternative supply of equipment. This strategy enables the companies to function during a pandemic.

"Yeah, I'd say the weakness was the supply chain. So, it puts pressure on us to look at alternatives. Because if we were getting a sample A for example from John and John was the only supplier. And now we tried and tested sample A, but the fact that Joe now has sample B available, it's not tried and tested, so that's where the pressure came on to us. We had to see, like trial and test it and make sure that it can be used. You know what I mean we Like to get it to meet the standard requirements and stuff. It was a bit of a thing on our side. The supply chain was the biggest Hassle where with regards to raw materials and stuff where we had to look at the changing composition of certain products and stuff."

"Is to have alternates available. Alternate suppliers approved and available."

“Yeah, I think basically as I said that, but that’s true. What we can learn is that we need to have alternate suppliers readily available that we can always go to and lean back on should we require it. I think that’s going to help us a lot pretty much in the long run. Supply was the biggest issue that affected us. And when I say supply, I mean supply across the board. So, these are the raw materials. Basically, everything affected us, so that’s what happens today. It was teal, tomorrow it’s engines. The next day it would have been something else, you know. So, you just need alternative supplies available that can be used.”

In a similar vein, S8 reiterated the point of having alternative suppliers and pre-planning for a possible pandemic.

“Look, it’s not something you could have really predicted. So, it’s difficult to plan for something that you don’t know of. But I’m sure in terms of making sure you’ve got a resilient supply chain and open communication channels with your suppliers.”

“I believe the Microsoft Teams based on doing business helped us a Lot due to the fact meetings can be conduct on teams instead of having them in a boardroom. Obviously face to face contact was limited. Yeah, just have contingencies in place, I think you can learn from this pandemic. Just ensure that you are resilient, you have a supplier base that the communication channels are open. As well as If some suppliers struggle to supply you correct parcel or to the desired quality, making sure you’ve got a second or a third suppliers set that can step in. If the first suppliers were to supply or if their systems fail so that you know the desired quality is not met anymore.”

“And people being Affected by the illness being booked off sick or even passing away. To have the processes resilient and robust enough set up at the supplier to make sure that if that does happen, that the

process can continue. And that you can then bring on someone on board and turn them up relatively quickly to continue with the processes involved.”

4.6.6.4 Facilitate channels of information and ensure accessibility

Participant P7 reported that there should be a mandatory workshop or a similar means of providing employees with comprehensive information regarding the pandemic. This would ensure that all members have access to the necessary information about the pandemic.

“Maybe have Workshops like we normally have for safety Like once a week or something like that, that every employee must go and attend. If you put a paper on the notice board, half of us don’t even go to a notice board. I don’t know when the last time I’ve Seen a notice board. But if we are all forced to attend a session at the shack room Then that’s better because each employee must go, and we sign that we attended.”

4.6.6.5 Have a supplier backup

It is imperative to have a backup supplier, as depending solely on one supplier can lead to supply backlogs during a pandemic. Therefore, it is advisable to have other options to ensure a steady and reliable source of supplies.

“I also think might be a long shot that maybe we need to have like lined up suppliers. In case some suppliers go under due to the pandemic. That would be helpful. I don’t know how Possible, but I think that would be helpful.” S1

S8 reiterated the need to have multiple suppliers:

“Also, just to make sure that you’ve got an alternative, especially for items can hurt you in the process that have a second or a third supplier set up. Should your first supply not be able to supply, should your first supplier encounter big issues so that the quality is not compromised.”

4.6.6.6 Implement a new working strategy

Being receptive to employing new ways of working is important, considering the pandemic came and methods had to change. Therefore, it is important to ensure that work is completed efficiently, even if you must adapt to unconventional ways of working.

“It did a good thing by following COVID-19 protocols. Normally we work 2 shifts, so what they did was that instead of telling people to stay home, we worked 3 shifts so that we could continue building our products. The shifts were 06:00-14:00, 14:00-22:00, and 22:00-06:00 so that people wouldn’t lose their jobs, at least they had something to keep them busy.” P10

“We’re working on shifts sometimes, but only eight hours, and then we had to change to work 12 hours four days a week because some guys were not at work.” P3

4.6.6.7 Implement work from home

Both S4 and S9 emphasised the continued implementation of the work-from-home strategy because they felt that it is the only way they can ensure their safety. Participant S9 further mentions the importance of a reliable internet connection during these circumstances.

“Would say working from home is the only preventative option for me because like I said you cannot tell once a person has contracted the virus until it very late and by the time a person has contracted the virus

would have passed it on to the colleagues. So, continuing working from home for me is the best solution until we have the cure fortunately our bodies have adapted to the virus it is not as severe, they have learnt to fight the virus but there are those who are unfortunate who can contract the virus and get sick and die. So, prevention is stay home and try to be safe and make sure other people are safe as well.”

S4

“I would say the same thing they’ve done like working from home because we were able to be as productive as we would be in the office, working from home but we need to kind of have some stable internet connection because that was an issue like and data and everything was done properly without being physically in the office. So, I would say our department did very well when it comes to that.” S7

4.6.6.8 Learning from this pandemic

Participant P9 suggested that while the pandemic necessitated a shift in our approach, it remains vital for the company to thoroughly assess what has been effective and what has not in the event of another pandemic.

“This is a pandemic tip which for the first time that we experienced those, it is a learning curve for everyone and what came out of it quite significant in terms of adjustments you had to make the additional tooling and equipment and technology. So, we’ve got enough data from this first experience of a pandemic to kind of benchmark off and only improve on going forward if there isn’t ever another pandemic.”

4.6.6.9 Make use of alternatives

Unfortunately, during pandemics, materials that used to be readily accessible to effectively do a job might not be so accessible anymore; therefore, being receptive to using alternatives is important, as suggested by participant S7:

"I think what we did during the COVID-19 pandemic is what would be expected of our department to make plans to look at alternatives to ensure that there's alternative suppliers available for suppliers that cannot perform, to look for alternative raw materials, if that is required, to look at redesigning items, re-engineering items when it's required when they have shortages of raw material. So, I think we covered most of those areas during that time and even now."

4.6.6.10 Pandemic preplanning

While preplanning might be difficult considering one never knows what might happen in the future, participant P6 suggested that there must be some sort of preplanning.

"Little bit of preplanning, more sense of communication and consultation, like I said the big issue I had was the shifts and good-looking irregular shift."

4.6.6.11 Making employee adhere to protocols

Both P10 and S2 repeated the importance of ensuring that your employees adhere to the safety protocols that were put in place by the government:

"COVID protocols of washing hands and social distancing were always adhered to. They were not allowing anyone to sit in groups as we did before." P10

"The expectation for everyone was to follow the COVID-19 regulations. We must make sure we have masks, and sanitisers, keep the allowed distance and avoid being in congested areas so that we can manage the contraction of this disease." S2

4.6.6.12 Provide sufficient protective equipment

Continued provision of personal protective equipment ensures that work can be done effectively without the constant anxiety of the possibility of contracting COVID. This ensured that employees constantly took care of their hygiene, as suggested by participant P7:

“In the future we should all have a certain number of protective equipment that we are given by the company. For example, instead of two masks or three masks that we normally had, maybe have a mask for each day for the whole week. Have sanitisers. Every employee must have a sanitiser. Yeah, just taking care of our hygiene.”

“The company must make sure that we don’t have issues with taking care of ourselves. When it comes to personal protective equipment for the pandemic. And spreading the word as well, because people that don’t use computers, they only get the message late. Because in this company messages are sent via e-mail, so if you don’t have an e-mail, you get a message very late, so the spreading of the word down on the ground must.”

Furthermore, actively going out and teaching or providing employees with information about the virus is also important.

“So, they must try to reach out to each employee somehow. Just to pass the message. About the COVID-19 virus.” P7

4.6.7 Views on the implementation of plan, do, check, and act system

Figure 4.9 shows the views on the implementation of plan do check and act system.

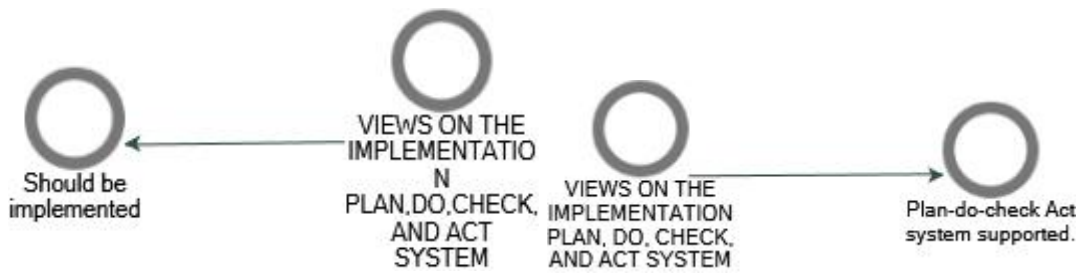


Figure 4.9 Views on Plan-do-Check

Participants were asked if they supported the implementation of strategies such as the plan-do-check-act, which forms the basis for many internal quality assurance systems. This section discusses the views on Bell Equipment Company 's implementation of the plan-do-check-act system. Most companies employ management evaluation tools to plan projects, report data and address organisational issues. To ascertain views on this type of project management tool, participants were asked if they would support a tool of this type that would be utilised for continuous improvement in a variety of departments. The tool is useful since it aids in the identification and resolution of difficulties as well as the enhancement of opportunities.

4.6.7.1 Plan-do-check-act system supported

Most participants suggested that they would support the system, for instance, one participant indicated that the tool is crucial at identifying possible problems and thereby circumventing any challenges. Participant S1 shared how they have already started implementing the system in her department:

“Yeah, I do. We, at Bell has already implemented the plan in some areas. For example, in our department, we implemented that I think last year in our inspection area where we do inspections and stores. The plan-do-check-act is looking at the process and then finding problems in implementing and things like that.”

In a collaborative view, participant S2 said he supported the system as it would assist with the proper planning and recording of information within the department.

“Yes. Everything that we do from our side is about planning, doing, and checking. That is our daily function. For instance, even for whatever parts we receive, we do planning based on the history of the deliveries, we confirm if they are correct or not and we verify with relevant drawings that are there. So that whole cycle is the daily routine we do.”

S4 and P8 further confirmed that they would support the system.

“I would support it.” S4

“Yes, we do, spiral for daily work check act an example would be on the inside system we use it frequently our daily so plan-do check that is part of plan.” P8

Moreover, the information showed that P7 agreed with S1 and S2, who supported the plan-do-check-act method. This participant believes that these tools help the organisation because they enable them to anticipate problems and take appropriate action before damage is done.

“Procedures like that are normally very good. In this case, I think a lot of things happened unplanned and quickly. So, decisions had to be made very quickly and off your feet basically. So, it might not be possible in future crises have a strategy that covers everything that happens and that is required. It will be good for a risk from a risk-free basis preview to do it and to have it in place, but they might be some aspects of it that will be unplanned that you cannot foresee.”

4.6.8 Recommendation to alleviate process quality

Figure 4.10 shows recommendations to alleviate process quality at Bell Equipment.

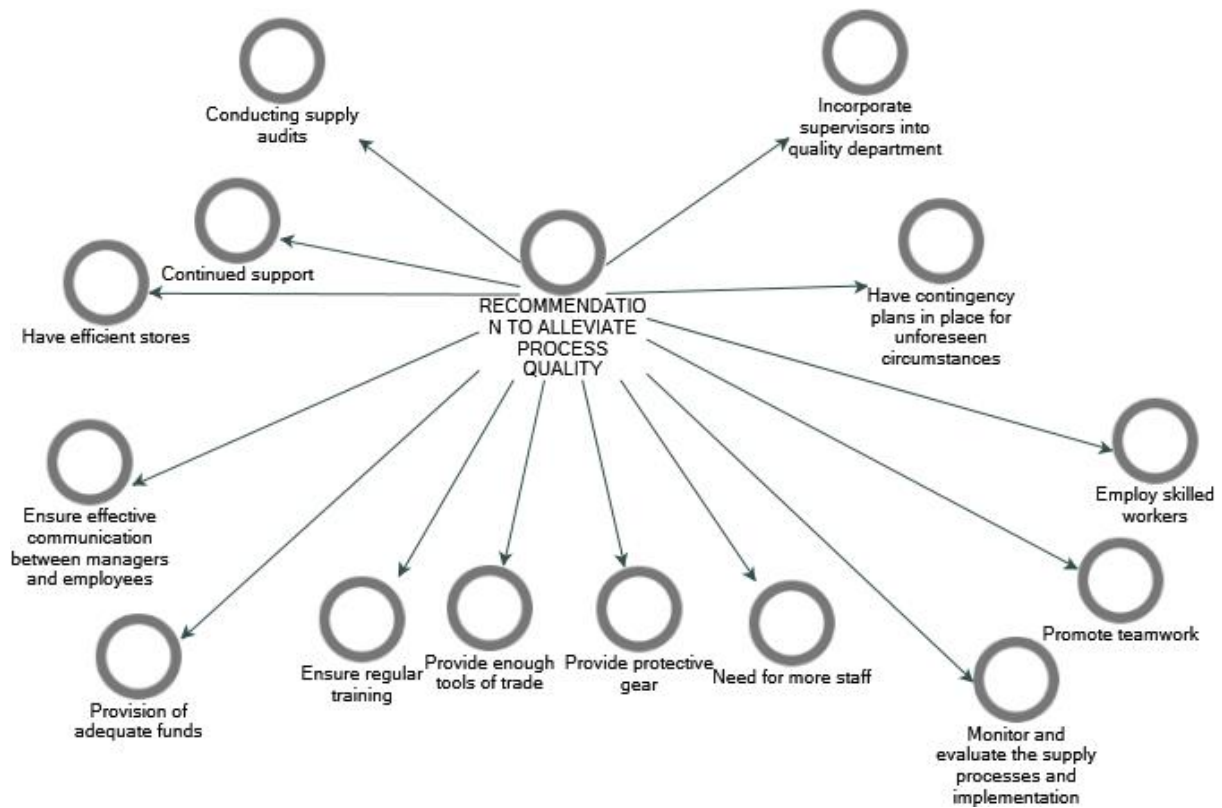


Figure 4.10 Recommendations to alleviate process quality

The question addressed what, in the opinion of the interviewees, can be done to improve process quality.

This section discusses various recommendations made by different participants to improve the quality processes at Bell. The first suggestion is to conduct more supplier audits to ensure that suppliers are aware of the specific equipment needed and to develop their capabilities. The next suggestion is to continue providing support to employees, such as working from home, as it has been effective. Another participant recommended that Bell employ more skilled workers and provide training for current employees. Effective communication between managers and employees is also highlighted as a key recommendation, with some participants suggesting that more upfront and transparent communication is needed, especially during a crisis like the

COVID-19 pandemic. Overall, the participants stressed the importance of continuous improvement and effective communication to enhance the quality of processes at Bell.

4.6.8.1 Conducting supply audits

One of the recommendations that have been made to alleviate process quality is the need to do more supplier audits. Explaining to the suppliers in depth the type of equipment you need from them is important.

“Doing a lot more supply audits.” S8

‘Spending time with the suppliers, developing them. Assisting them with Especially things are not always on a drawing, you know a painting specification or a certain area on a bus that should remain unpainted because of an interface of that part with another part. You know things that’s not always on a drawing, stuff that you know at Bell will affect the quality of that product, but which is not necessarily assisting the supply of that kind of knowledge.’ S8

Participant S8 elaborated on different suppliers and their ability to produce equipment, essentially focusing on each supplier’s strengths and capabilities to produce over another:

“Industry. So, I think what we’ve learned was that some suppliers are more proactive, more resilient in terms of how they deal with these kinds of Things. I think you could see which suppliers has got the most appropriate or the best systems and processes in place to deal with these kinds of things. So going forward, I suppose those kinds of suppliers would get preference in terms of getting work or getting Bars being set up from Bell. And not to say that we will disregard the other suppliers. I think that you know the opportunities are there for us to try and develop those suppliers. You know to be become more resilient and to become more robust in how they deal with these. Kind of things.

And I think that's way. The supplier audits and this and spending time with the suppliers at their facilities to understand the weaknesses and to try and develop them so that they can become better suppliers. Or more resilient."

4.6.8.2 Continued support

Participant S7 reported that they were working from home during the lockdown; but they acknowledge that management provided them with support. This is imperative because you can do work effectively when you know you have support from your manager, and it has been recommended that the measures that are in place be continued.

"Mostly in lockdown we worked from home, which was a very good intervention. A lot of people still worked onsite because they could not work from home. I think the measures on site was very adequate, the infection rate was not high from what I could see. So, I think the interventions at work was very adequate, people worked from home was a very good drive and that continued for quite some time. I think management support in as far as resource availability is concerned and with them being there and being available if there is a crisis to support the people."

4.6.8.3 Employ skilled workers

Another participant suggested that the company must employ more skilled workers on the basis that a lot of the workers have experience but not necessarily qualifications.

"Bell should employ more people who are qualified for the job and provide skills for the current people who are already working here. The experience is there, but some of us did not go to school to study the quality process. So, we need skills." P10

4.6.8.4 Ensure effective communication between managers and employee

Given the circumstances of the pandemic, many essential measures were required, like promptly communicating cases of COVID-19. In the event of close contact with an infected individual, it was crucial to follow the appropriate protocols. It seemed, however, that there were some inconsistencies in terms of their communication because certain things were communicated over others. Therefore, it is recommended that there be effective communication:

"I think communication is key here. Yeah, there was communication during the pandemic stage. But I think the communication they I don't know if it was weekly or monthly, but I'm sure that can improve. So that could have improved. Because there was a time when somebody tested positive, but nobody knew. It wasn't communicated to everyone and. Yet we all used the facilities that were available in that area, you know in the working space like from the kitchen to the printers and everything." P4

"What can they do differently? Yeah, I think more upfront communication I suppose. And being more open and being more transparent in terms of sharing the statistics. You know, giving more regular updates instead of doing it once a month maybe do it once a week and disclosing the areas that were affected by pandemic. The stats came out in terms of how many cases of COVID we had, but we didn't know cases were recorded. I'm not sure if there was a reason for not disclosing it. Maybe they were, but just so that you know where? Where the hotspots are so you can Try and avoid." S8

Furthermore, because employees were not always at work, it was imperative that precautionary measures be communicated effectively:

"But I think the precautions that we did take at that time were sufficient enough." P4

Participant S2 mentioned the inherent effectiveness of the communication and suggested that a high level of communication be sustained in the future.

“I think currently they are doing it well. It was managed well for me because it was all about communication and enforcing the rules. That was the one key thing from the management side that they had to do for us to make sure that there is always communication, and information available for people because you can’t enforce any rules without any communication and information available to people. That is key to anything. If you want to do any improvement you must provide information and communicate.”

4.6.8.5 Ensure regular training

Participant P7 suggested regular training associated with COVID-19 and the provision of personal protective gear:

“Regular training sessions to spread the word and to teach us more about COVID-19 and to give us more PPE.”

Participant P7 suggested the need to reskill and upskill workers in the workplace to make sure that they are up to date with the current way of doing business. While the company may have many old people, it is imperative to constantly reskill employees.

“In my opinion, what can be done to improve process quality is that training is the most important thing. We must have regular training sessions. Because what happens is, in big companies like this one, we have very old employees that are so used to doing the same thing repeatedly. They end up not knowing that this thing can be done differently and doing it differently can result in positive results. So regular training sessions, Be it you’re an engineer, you’re a packer. You’re an expeditor they must have regular training sessions, which

now we don't have in this company. And you just do your job for 15 years, do the same thing repeatedly without any regular training sessions, just to refresh your memory and to show you innovative things, new things of doing what you're doing. People are so used to doing the old way of doing things. So, I would stick to regular training sessions."

4.6.8.6 Have efficient stores

The importance of producing quality stock is imperative for every business out there; hence, the need to ensure that stores give out the right order and do not mix anything up. This minimises wastage in the company.

"There are a lot of things that can be done to improve the process quality, I'll talk about my department we have got a lot of waste when stores mix-up but if the store can sort out their things in time correctly and not mix things, then we end up rejecting parts going back into stores and stores refusing that they didn't send them like that. If we have efficient stores first in that way, we will improve the process quality and then reduce waste in the line, to make sure that everything is done on the first go correctly." P5

4.6.8.7 Incorporate supervisors into quality department

Participant P5 suggested that having production supervisors and managers on the floor will be very beneficial simply because they will aid in ensuring the production of quality equipment to reduce the expense of going back and forth attempting to reach targets but producing quantity instead of quality.

'Supervisors are also part of the production they would want production to go at the expense of quality because they are given targets to push these machines as far as that, so they focus on the target. What I would want to do is incorporate the supervisors into the

quality department because that is where the big problem is. Production managers and production supervisors if they are incorporated into quality, we will produce quality material because there won't be any antagonism between the two."

4.6.8.8 Have contingency plans in place for unforeseen circumstances

Although management could not have known what to expect or what to do, it was suggested that they always have a plan in place to protect the workers from, for example, salary cuts, as indicated by S1 below.

"I don't think the management can stop people from getting COVID. I think they can try sort of mitigation, for example, when we went into lockdown Instead of cutting our salaries, they tried to find ways to adjust instead of not getting paid at all, so they cut our salaries and then they also took our leg. So, in that sense, where able to get paid."

"That was a terrible time. I don't know if there's anything you can necessarily add to. I think the best you could do is just learn from it and Prepare for the future. But I feel like the people who can make the most changes in such situations are the management. Because most people lost their Jobs and things like that. So, maybe if management could have a plan in place Bell would have taken care of such situations."

4.6.8.9 Monitor and evaluate the supply processes and implementation

Participant S8 suggested that the implementation of supply processes must be monitored during the process and not only at the end because, if you wait till the end, you are putting yourself at risk of producing a product that is not of good quality.

"And then also just making sure that the suppliers are manufacturing and employing systems and processes that result in a good quality

product because obviously quality is built into your processes. You can't inspect quality into a product because it's made already. You can't expect quality at the end, you must do it the source of manufacturing, use the correct inputs and controls so that you can ensure good quality of Product. So yeah, supply audits are one thing that we can really improve."

4.6.8.10 Need for more staff

Another suggestion is the need for an increased workforce. This suggestion is a general one and does not stem from COVID:

"Well, currently. I don't believe we have enough employees. I think we need more heads, like more people." P1

4.6.8.11 Promote teamwork

Promoting teamwork is imperative because during a time like COVID, where not much can be done in terms of going to the office. The team needs to work together to make sure that work is done effectively and efficiently.

"I think if you are working as a team, by following the rules, everything is possible to overcome." S2

"I think every team member worked together. So, there was a good team spirit, I think people realised that everyone 's feedback and input is required to make it work. Bell management supported us, and they were quick to make decisions. As for instance, if there were raw material shortages, it was easy to get management input, and to get them to approve buying out of that resource, that specific raw material that was in short supply in our team as well, we had great support from our manager. And he was involved daily in the shortages and involved daily in what we needed to do. Yes, he really gave very good input

and assistance when needed. So, we had a very good support from our manager.” S7

4.6.8.12 Provide enough tools of trade

It has been recommended that there is a need to provide sufficient tools for employees to work with and therefore allow them to work efficiently considering they do not have to wait for the next person to finish with the tool, as explained by participant P5 below:

“To make sure that people are given correct tools they don’t have to wait for another person, like I have already said above one have to wait for someone to finish in order to use the tool that will also minimise the movement because if a person goes to another person that is a waste of time, they will rush and that will impact the quality.”

4.6.8.13 Provide protective gear

Participant P10 suggested that Bell Equipment continue to provide them with PPE, and employees must wear masks if it is required of them to do so:

“They must carry on providing COVID-19 hygiene like they used to do before; sanitise, social distance, and wear masks if necessary.”

4.6.8.14 Provision of adequate funds

Allocating a budget to work on things that are related to the company to avoid a situation where the company does not have sufficient money to carry out day-to-day tasks that require a budget.

“And then I think we need more budget because sometimes you want to visit suppliers and there’s not enough money to do that, and so we need funds. Yeah, I think those are the two main things.” S1

4.7 Descriptive statistics

This section presents the profiles of the respondents who participated in the process quality investigation. Frequency tables are essentially used to describe the demographic profiles of the respondents and illustrate the distribution percentage of the responses. The sample consisted of twenty-seven respondents from both departments, but only ten respondents from supplier quality and fifteen respondents (a total of twenty-five respondents) from process quality participated. The questionnaire presented a series of numbered questions in sentence format, and participants were instructed to indicate their answers with a tick. The demographic results are presented below.

4.7.1 Process quality quantitative questions

The shortages of raw materials affected the functions of process quality and the entire company.

Table 4.3 indicated that the majority of participants (100% agreed, with 66.7% agree and 33.3% strongly) agree that there was a shortage of material during the COVID-19 pandemic.

Table 4.3 Raw material Shortage

	N	%
Agree	10	66,7
Strongly Agree	5	33,3
Total	15	100

The suppliers could not deliver due to insufficient manpower during the COVID-19 pandemic.

The results in Table 4.4 indicate that 66.7% of the respondents agreed that workforce during the COVID-19 pandemic was insufficient, while 33.3% strongly agreed.

Table 4.4 Insufficient manpower

	N	%
Agree	10	66,7
Strongly Agree	5	33,3
Total	15	100

There were shortages in demand orders due to the COVID-19 pandemic.

The results shown in table 4.5 indicate that 60% of the respondents agreed that there was a shortage in demand orders, while 26.7% strongly agreed. Only 6.7% of respondents disagreed.

Table 4.5 Shortages in demand orders

	N	%
Disagree	1	6,7
No opinion	1	6,7
Agree	9	60
Strongly Agree	4	26,7
Total	15	100

There was insufficient production to fulfil demand due to the COVID-19 pandemic.

Table 4.6 shows that more than half (53.3%) of the respondents agreed that there was production insufficiency.

Table 4.6 Production insufficiency

	N	%
Disagree	2	13,3
Agree	8	53,3
Strongly Agree	5	33,3
Total	15	100

The restrictions imposed by the government impacted operations negatively during the COVID-19 pandemic.

The results below (see Table 4.7) reveal that 53.3% of respondents are of the opinion that restrictions have impact, whereas 46.7% strongly agree.

Table 4.7 Impact of restrictions

	N	%
Agree	8	53,3
Strongly Agree	7	46,7
Total	15	100,0

The COVID-19 threatened our lives as workers and the lives of our loved ones.

The results presented in Table 4.8 shows that 46.7% of the respondents agreed and strongly agreed, whilst 6,7% disagreed that COVID-19 threatens their lives, respectively.

Table 4.8 COVID-19 Impact

	N	%
Disagree	1	6,7
Agree	7	46,7
Strongly Agree	7	46,7
Total	15	100

Effective communication about the COVID-19 pandemic is required to perform daily operational duties.

As shown in Table 4.9 below, the majority (53.3%) of the respondents strongly agreed that effective communication is required within the organisation.

Table 4.9 Effective Communication

	N	%
Agree	7	46,7
Strongly Agree	8	53,3
Total	15	100

Responding to COVID-19 requires critical production preparedness with effective communication as an essential strategy.

Table 4.10 shows that 46.7% of the respondents agreed and strongly agreed that there is a need for critical production preparedness, respectively, whereas 6.7% of the respondents had no opinion on the matter.

Table 4.10 Production preparedness

	N	%
No opinion	1	6,7
Agree	7	46,7
Strongly Agree	7	46,7
Total	15	100

Quality protocols such as QTM and Quality 4.0 must be developed to prevent any future disruptions or pandemics from discontinuing business functions.

The above results presented in Table 4.11 show that 53.3% of the respondents agreed that quality protocols must be developed. About 13.3% of respondents disagreed or had no opinion regarding the development of quality protocols.

Table 4.11 Quality Protocols

	N	%
Disagree	2	13,3
No opinion	2	13,3
Agree	8	53,3
Strongly Agree	3	20
Total	15	100

Total quality management tools must be used to identify COVID-19 related issues.

Table 4.12 indicates that 46.7% of the respondents agreed that there is a need for quality management tools to be used. Only about 6.7% of the respondents disagreed and 20% had no opinion.

Table 4.12 Quality management tools

	N	%
Disagree	1	6,7
No opinion	3	20
Agree	7	46,7
Strongly Agree	4	26,7
Total	15	100

Existing or current mitigation strategies must be intensified to improve productivity and quality.

The results below (see Table 4.13) indicate that 60% of participants agreed that there is a need for mitigation strategies in the event of any future disruptions. Only 13.3% of the respondents had no opinion on mitigation strategies.

Table 4.13 Mitigation strategies

	N	%
No opinion	2	13,3
Agree	9	60
Strongly Agree	4	26,7
Total	15	100

There was adequate documentation during the pandemic.

As shown in the table below (see Table 4.14), about 73.3% of the respondents agreed that adequate documentation needs to be presented. 13.3% of the respondents either strongly agreed or had no opinion on the provision of adequate documentation.

Table 4.14 Adequate documentation

	N	%
No opinion	2	13,3
Agree	11	73,3
Strongly Agree	2	13,3
Total	15	100

Measurements and analysis are required to undertake quality functions in response to the COVID-19 pandemic.

Table 4.15 Measurements and analysis

	N	%
Disagree	3	20,0
No opinion	1	6,7
Agree	9	60
Strongly Agree	2	13,3
Total	15	100

The results in Table 4.15 show that 60% of the respondents agreed with the measurement and analysis. Process quality was compromised during the COVID-19 pandemic.

The below results shown in Table 4.16 indicate that most of the respondents agreed (66.7%) that process quality was compromised during the COVID-19 pandemic. Only 13.3% of the respondents disagreed with that statement.

Table 4.16 Process Quality

	N	%
Disagree	2	13,3
Agree	10	66,7
Strongly Agree	3	20
Total	15	100

COVID-19 affected the production negatively

Table 4.17 shows that more than half (53.3%) of the respondents agreed that COVID-19 affected production negatively.

Table 4.17 COVID-19 Effects

	N	%
Disagree	1	6,7
Agree	8	53,3
Strongly Agree	6	40
Total	15	100

There were gaps between the departments due to the COVID-19 pandemic.

The results presented in Table 4.18 indicate that 60% of the respondents agreed that there were gaps between departments because of COVID-19.

Table 4.18 Departmental Gaps due to COVID-19

	N	%
Disagree	3	20
Agree	9	60
Strongly Agree	3	20
Total	15	100

The gaps created by COVID-19 related restrictions may have far reaching effects on the process quality departments at Bell Equipment.

Table 4.19 indicates that 80% of the respondents agreed that the gaps created by COVID-19- related restrictions may have far reaching effect on the supplier quality department at Bell Equipment.

Table 4.19 Effect of gaps created by COVID-19

	N	%
Disagree	1	6,7
No opinion	1	6,7
Agree	12	80
Strongly Agree	1	6,7
Total	15	100

I would recommend bridging the gaps created by COVID-19 in the event of other pandemics.

The below results presented in Table 4.20 show that 66.7% of the respondents agreed that they would recommend bridging the gaps created by COVID-19 in the event of other pandemics.

Table 4.20 Recommendation of bridging of gaps created by COVID-19

	N	%
Disagree	1	6,7
Agree	10	66,7
Strongly Agree	4	26,7
Total	15	100,0

4.7.2 Process quality qualitative questionnaire

The qualitative questionnaire was designed, and the numbered questions were presented in a question form, and participants were asked to tick on the answer. The demographic results are presented below.

Do you think process quality had the capacity to be mitigated during the COVID-19 pandemic to save production?

Figure 4.11 shows that 60% of the participants believed that process quality did not have the capacity to mitigate the impact of the COVID-19 pandemic to save production.

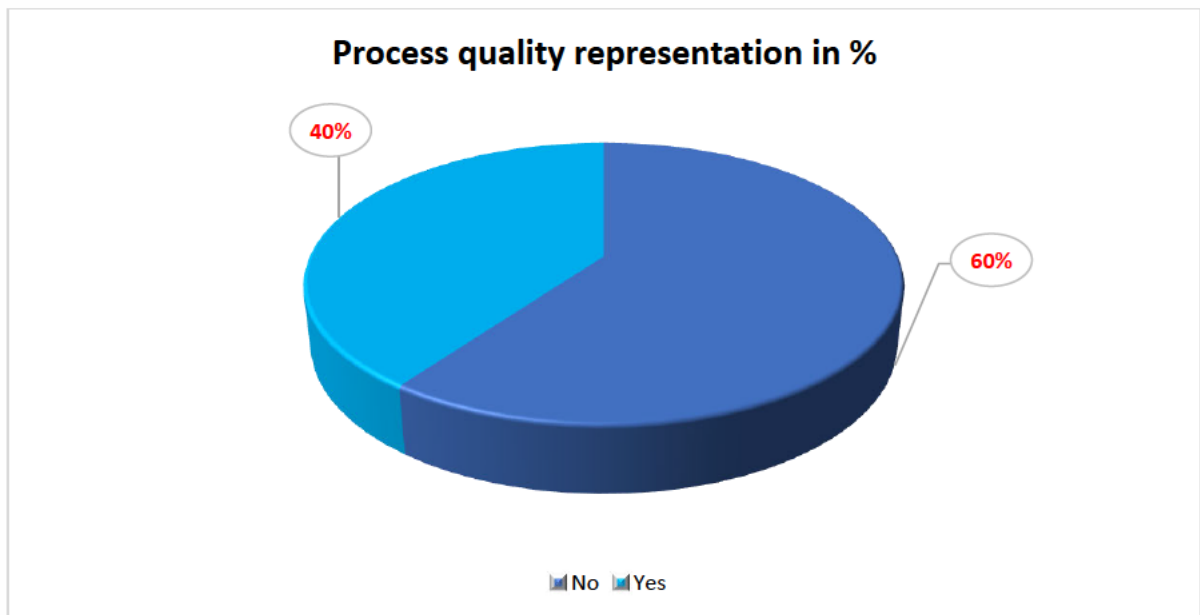


Figure 4.11 Process quality capacity

Do you think process quality has the capabilities to mitigate during the COVID-19 pandemic and save production?

Figure 4.12 indicate that 60% of the respondents responded that there was no process quality mitigation during the COVID-19 pandemic.

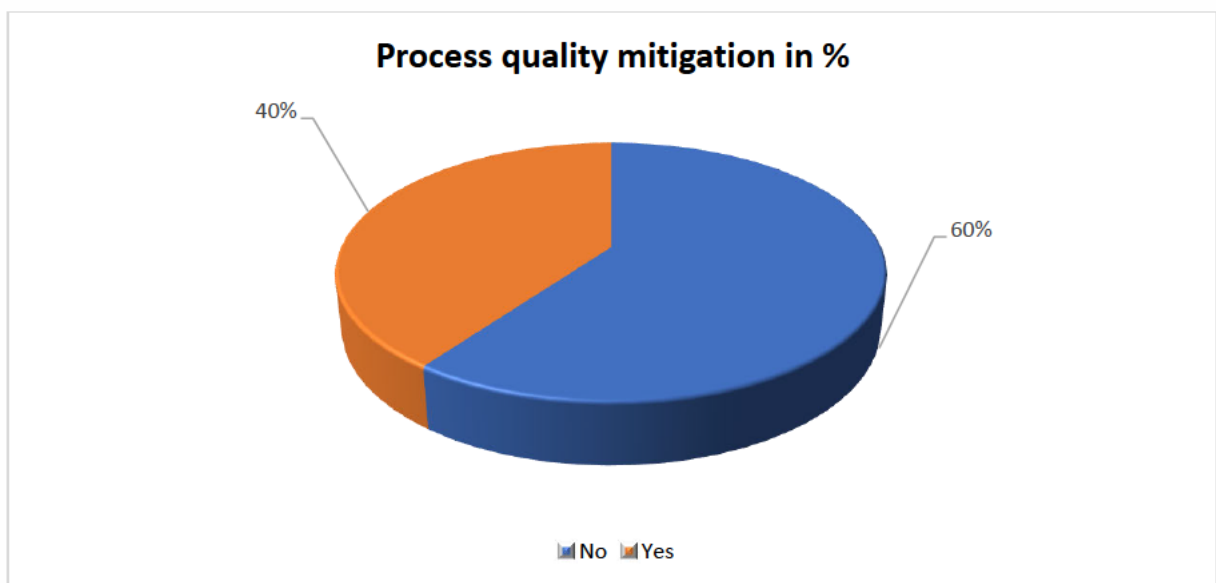


Figure 4.12 Process quality mitigation capabilities

What type or kinds of information should be communicated during COVID?

Figure 4.13 indicate that 53.3% of the type of information classification is of factual nature, while 33.3% of the information is of analytical nature. Only 13.3% of the information was of an objective nature.

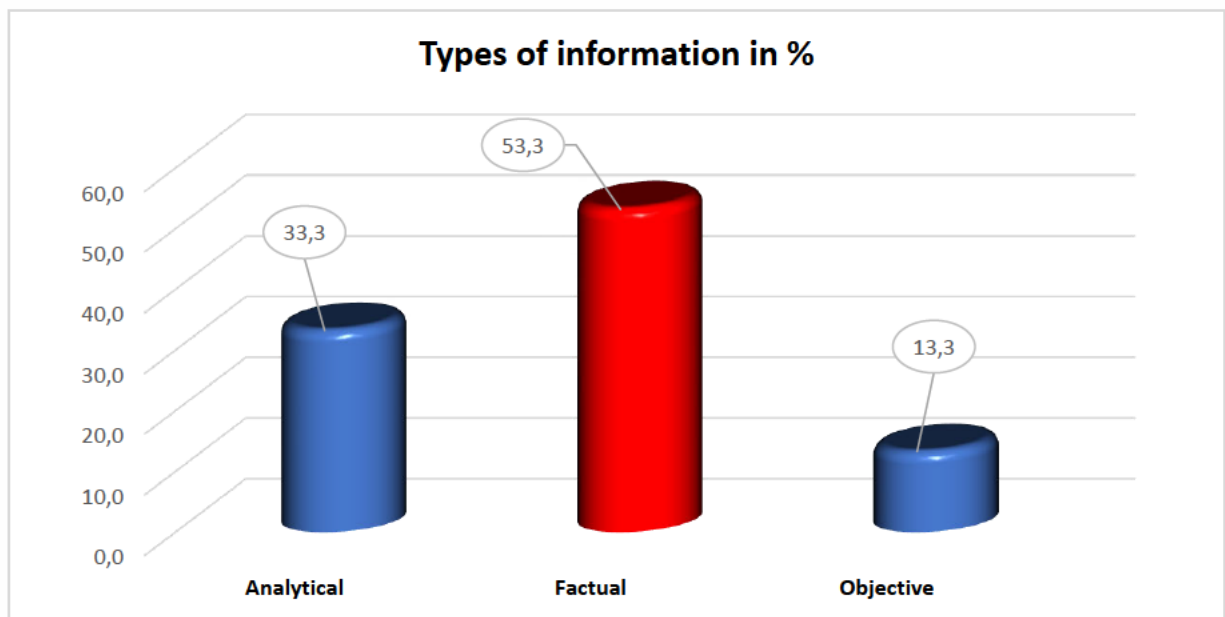


Figure 4.14 Types of information required in event of other pandemics

How often should COVID-19 information be displayed?

Figure 4.15 shows that the majority (73.3%) of respondents believe that COVID-19 information should be displayed daily.

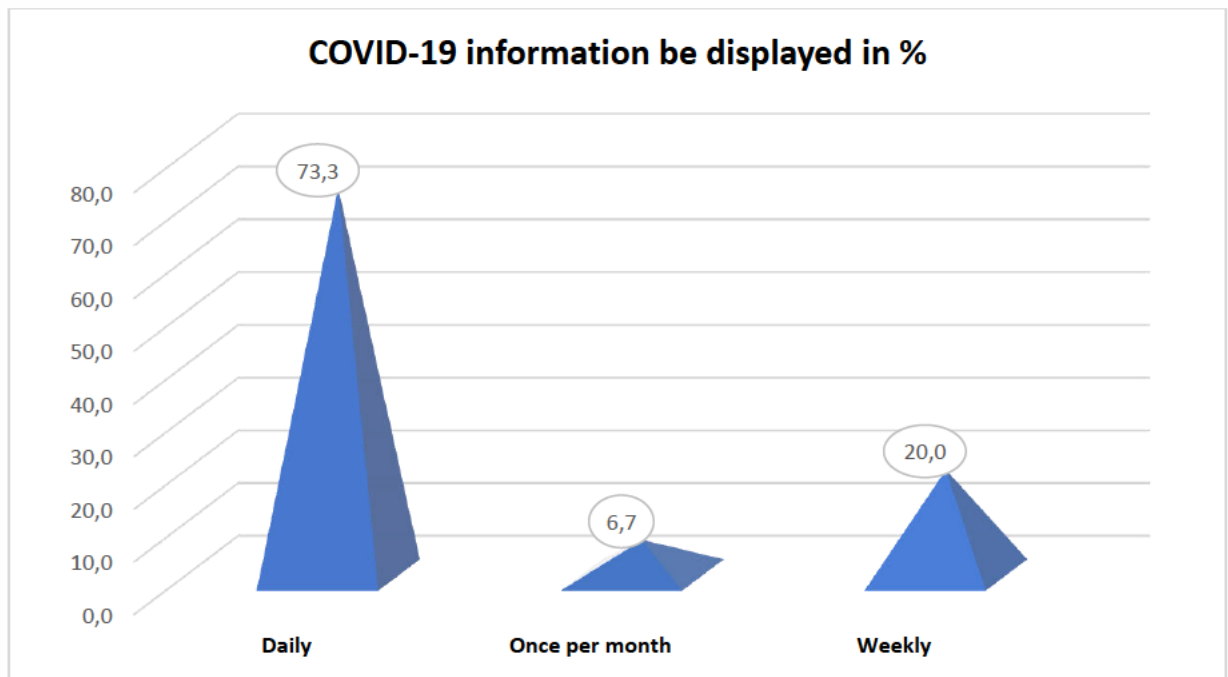


Figure 4.16 Displaying COVID-19 information

Is the information provided by the safety department about COVID-19 helpful and valuable to you as an employee?

Figure 4.17 shows that 93.3% of the respondents affirmed that the information provided by the safety department about COVID-19 is helpful and valuable for them as employees.

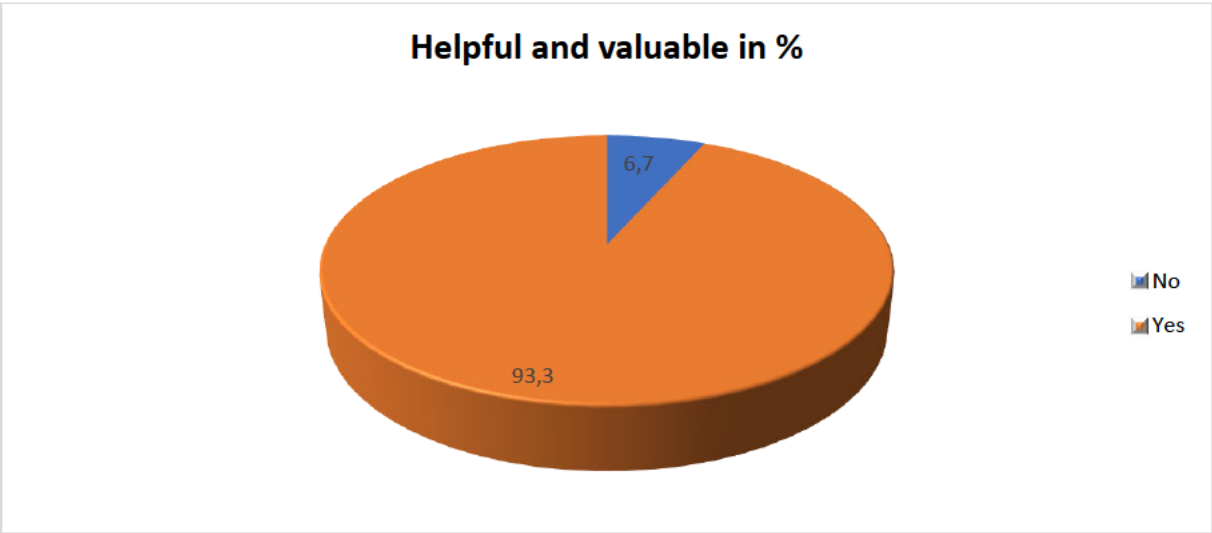


Figure 4.18 Helpful information

Have you and your loved ones been negatively affected by COVID-19?

Figure 4.19 indicate that more than half (53.3%) of the respondents, as well as their loved ones, have been negatively affected by COVID-19, while less than half (46.7%) of the respondents and their loved ones have.

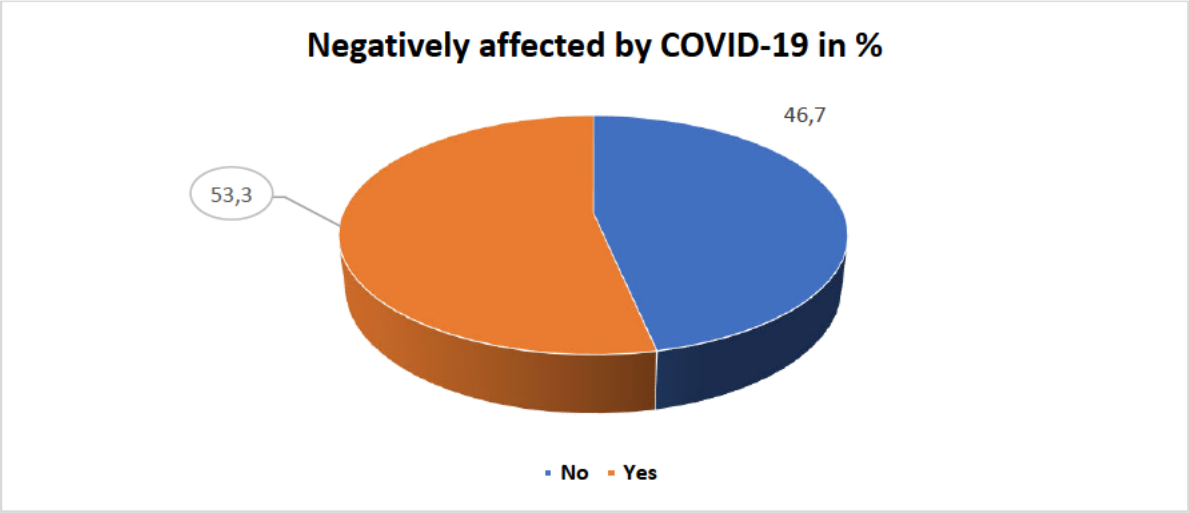


Figure 4.20 COVID-19 effects

What planning strategies would you recommend for the company in the event of another pandemic?

Figure 4.21 indicate that 80% of the respondents would recommend objectives, strategies, and tactics for the company in the event of another pandemic.



Figure 4.22 Planning Strategies

What documentation is necessary for the company to prepare itself for a pandemic?

The results in figure 4.23 indicate that the majority (86.7%) of the respondents believed that system documentation is necessary for Bell Equipment to prepare for a pandemic.

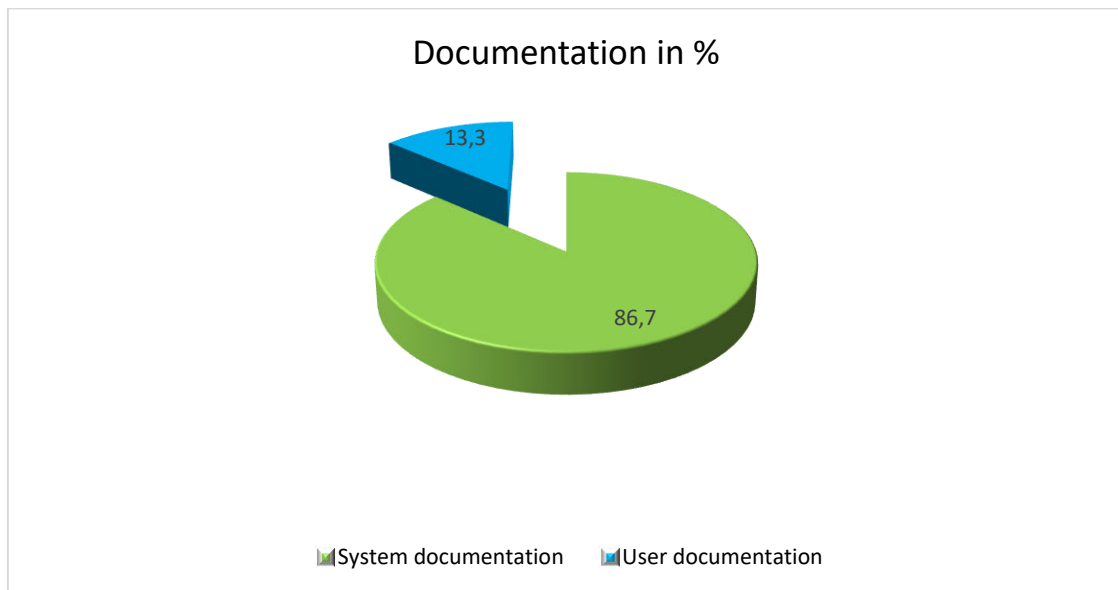


Figure 4.24 Documentation in preparation for a pandemic

What measurements and analyses should be considered in a pandemic situation?

As shown below in (figure 4.25) 73.3% of the respondents indicated that measurements and analysis should be considered in a pandemic situation.

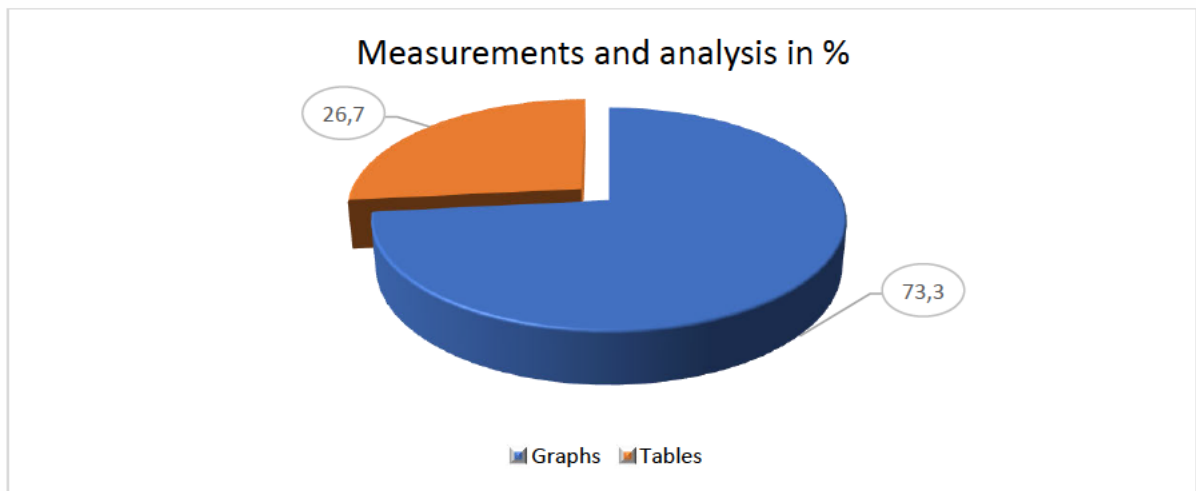


Figure 4.26 Measurements and analysis

Have you experienced any personal or work-related disruptions since the pandemic started?

Figure 4.27 shows that 66.7% of the respondents have experienced personal or work-related disruptions since the pandemic started, while 33.3% have not.

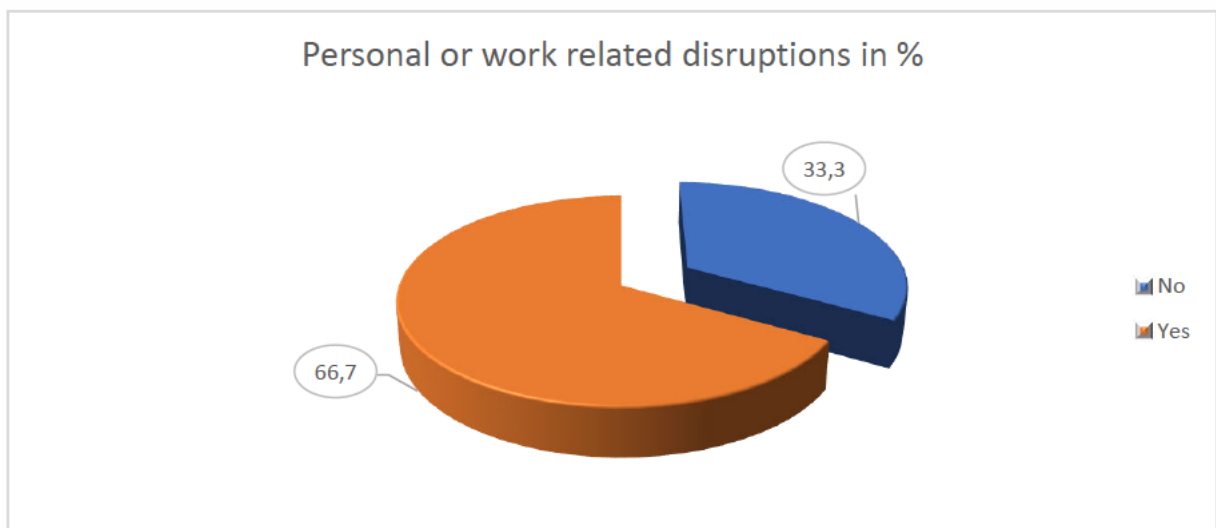


Figure 4.28 Personal or work-related disruption

Are there any issues created by COVID-19 in the quality of the process?

As indicated in figure 4.29 below, more than half (53.3%) of the respondents outlined that no issues were created by COVID-19 in the process quality, while 46.7% outlined that there were issues.

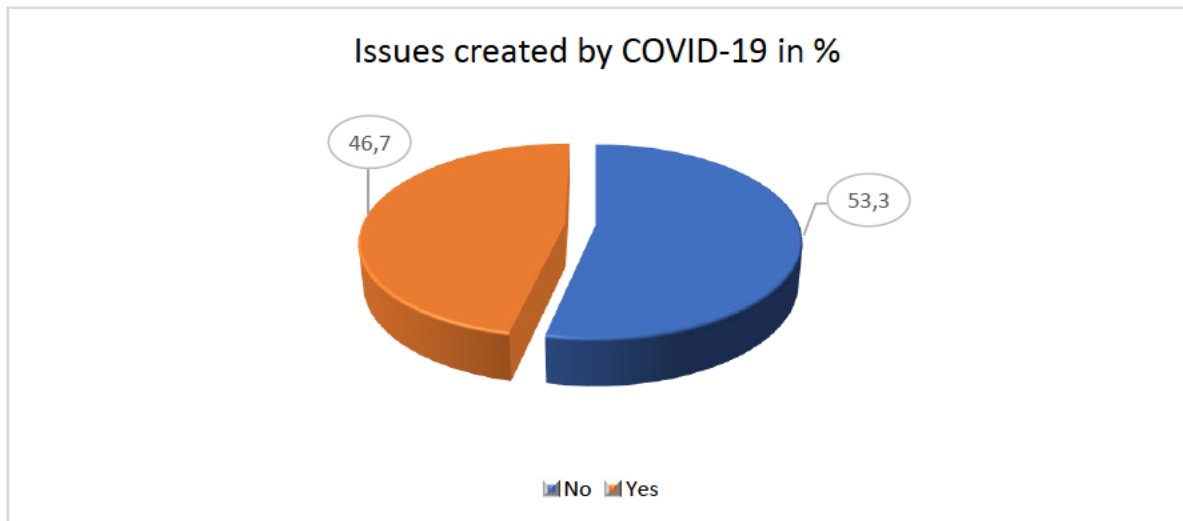


Figure 4.30 Issues created by COVID-19

What action should be taken to resolve these issues?

The results shown in figure 4.31 indicate that 73.3% of the respondents believed that strategic action should be taken to resolve these issues related to any future disruptions.



Figure 4.32 Action to be taken to resolve issues

Where do you think the study should focus on terms of improving process quality?

As shown below (see figure 4.33), 60% of the respondents thought that the study should focus on training and development in terms of improving process quality functions.



Figure 4.34 Focus of the study

Is there anything else that the company can do that will make them better prepared for another pandemic?

The results presented in figure 4.35 indicate that 53% of the respondents believed that there is nothing that the company can do to make them better prepared for another pandemic, while 47% think otherwise.



Figure 4.36 Better preparations

4.8 Supplier quality

This section presents the profiles of the respondents to the investigation on supplier quality. Frequency tables are used to describe the demographic profile of the respondents and the percentage of the distribution of the responses. The sample consisted of twenty-seven respondents from both departments, but only ten respondents from supplier quality and fifteen respondents from process quality managed to participate (a total of twenty-five respondents). The questionnaire was designed and presented in a sentence format, and participants were asked to indicate their answers with a tick. The demographic results are presented below.

4.8.1 Supplier quality quantitative questions

The shortages of raw materials affected the functions of supplier quality and the entire company.

The below tabular representation (Table 4.21) shows the responses to the question of raw material shortage. The majority (70%) of the respondents agreed that there was a shortage of material during the COVID-19 pandemic. The remainder of the respondents (30%) lean towards strongly agreeing with the matter.

Table 4.21 Raw material shortage

	N	%
Agree	3	30
Strongly Agree	7	70
Total	10	100

The suppliers could not deliver due to insufficient manpower during the COVID-19 pandemic.

The results in Table 4.37 shows that 50% of the respondents agreed that there is insufficient workforce during the COVID-19 pandemic, while the other 50% strongly agreed with the statement.

Table 4.22 Workforce during the COVID-19 pandemic

	N	%
Agree	5	50
Strongly Agree	5	50
Total	10	100

There were shortages in demand orders due to the COVID-19 pandemic.

Table 4.23 showcases that the majority (70%) of the respondents agreed there is a shortage in demand orders. Furthermore, 20% of the respondents strongly agreed there is a shortage in demand orders. Only about 10% of respondents indicated that they disagreed with or had no opinion on the shortages in demand orders.

Table 4.23 Shortage in demand orders

	N	%
Disagree	1	10
Agree	2	20
Strongly Agree	7	70
Total	10	100

There was insufficient production to fulfil demand orders due to the COVID-19 pandemic.

The information presented in Table 4.24 shows that 50% of the respondents agreed that there was production insufficiency. The other 50% of the respondents disagreed that there was insufficient production.

Table 4.24 Production sufficiency

	N	%
Agree	5	50
Strongly Agree	5	50
Total	10	100

The restrictions imposed by the government impacted operations negatively during the COVID-19 pandemic.

The information in Table 4.25 indicates the responses to the impact of restrictions. About 60% of the respondents agreed that restrictions impacted production and only 40% strongly agreed that restrictions impacted production.

Table 4.25 Impact of restrictions

	N	%
Agree	4	40
Strongly Agree	6	60
Total	10	100

COVID-19 threatened our lives as workers and the lives of our loved ones.

The results presented in Table 4.26 shows the response to the impact of COVID-19. About 70% of the respondents agreed that COVID-19 threatened their lives. While only 30% of respondents strongly agreed that COVID-19 threatened their lives.

Table 4.26 The impact of COVID-19

	N	%
Agree	3	30
Strongly Agree	7	70
Total	10	100

Effective communication about the COVID-19 pandemic is required to perform daily operational duties.

The results presented in Table 4.27 shows the responses to the need for effective communication. Most of the respondents (60%) strongly agreed that effective communication is required within the organisation; 30% of the respondents agreed that there is a need for effective communication within the organisation; and only about 10% of the respondents disagreed that there is a need for effective communication.

Table 4.27 Communication effectiveness

	N	%
Disagree	1	10
Agree	3	30
Strongly Agree	6	60
Total	10	100

Responding to COVID-19 requires critical production preparedness with effective communication as an essential.

Table 4.43 presents the results of production preparedness. About 70% of the respondents strongly agreed that there is a need for critical production preparedness. About 20% of the respondents agreed that there is a need for critical production

preparedness. A representation of 10% of the respondents had no opinion on the matter.

Table 4.28 Production preparedness

	N	%
No opinion	1	10,0
Agree	2	20,0
Strongly Agree	7	70,0
Total	10	100,0

Quality protocols such as TQM and Quality 4.0 must be developed to prevent any future disruptions or pandemics from discontinuing business functions.

The information presented in Table 4.29 showcases the responses to the need for quality protocols to be developed. The results show that 50% of the respondents strongly agreed that quality protocols must be developed. About 30% of respondents agreed regarding the development of quality protocols. About 10% of the respondents either disagreed or strongly disagree that quality protocols must be developed.

Table 4.29 Quality protocols

	N	%
Strongly Disagree	1	10,0
Disagree	1	10,0
Agree	3	30,0
Strongly Agree	5	50,0
Total	10	100,0

Total quality management tools such as pareto charts and fishbone diagrams must be used to identify COVID-19 related issues.

The below table (Table 4.30) presents results on the use of quality management tools. The responses indicate that 40% of the respondents strongly agreed and agreed that there is a need for quality management tools to be used. Only about 20% of the respondents strongly disagreed that quality management tools must be used.

Table 4.30 Quality management tools

	N	%
Strongly Disagree	2	20,0
Agree	4	40,0
Strongly Agree	4	40,0
Total	10	100,0

Existing or current mitigation strategies must be intensified to improve productivity and quality.

Table 4.31 presents the responses to mitigation strategies. The results indicate that 50% of participants strongly agreed that there is a need for mitigation strategies. About 30% of the respondents indicated that they agreed that there is a need for mitigation strategies, and 20% of the respondents had no opinion on mitigation strategies.

Table 4.31 Mitigation strategies

	N	%
No opinion	2	20,0
Agree	3	30,0
Strongly Agree	5	50,0
Total	10	100,0

There was adequate documentation during the pandemic.

The information in the below table (Table 4.32) indicates the results of the responses on adequate documentation. About 60% of the respondents agreed that adequate documentation needs to be presented, while 20% of the respondents are shown to have no opinion on the provision of adequate documentation. About 10% of the respondents either strongly agreed or disagreed with the provision of adequate documentation.

Table 4.32 Documentation

	N	%
Disagree	1	10,0
No opinion	2	20,0
Agree	6	60,0
Strongly Agree	1	10,0
Total	10	100,0

Measurements and analysis are required to undertake quality functions in response to the COVID-19 pandemic.

Table 4.33 presents the respondents' results on measurement and analysis. The results show that 50% of the respondents agreed with the measurement and analysis, 20% either strongly agreed or had no opinion on measurement and analysis, and 10% strongly disagreed with the measurement and analysis.

Table 4.33 Measurement and analysis

	N	%
Strongly Disagree	1	10,0
No opinion	2	20,0
Agree	5	50,0
Strongly Agree	2	20,0
Total	10	100,0

Supplier quality was compromised during the COVID-19 pandemic.

The below information presented in Table 4.34 showcases the responses regarding supplier quality being compromised. About 30% of the respondents agreed and disagreed that supplier quality was compromised, while 20% of the respondents strongly agreed that supplier quality was compromised. Only 10% of the respondents either had no opinion or strongly disagreed that supplier quality was compromised.

Table 4.34 supplier quality

	N	%
Strongly Disagree	1	10,0
Disagree	3	30,0
No opinion	1	10,0
Agree	3	30,0
Strongly Agree	2	20,0
Total	10	100,0

COVID-19 affected production negatively.

Table 4.35 presents responses on how COVID-19 negatively affected production. The results show that 60% of the respondents agreed that COVID-19 affected production negatively. The remainder of 40% of the respondents strongly agreed that COVID-19 affected production negatively.

Table 4.35 Production effect

	N	%
Agree	6	60,0
Strongly Agree	4	40,0
Total	10	100,0

There were COVID-19 related gaps between the departments at Bell Equipment.

The results presented in Table 4.36 shows the responses to departmental gaps due to COVID-19. Most of the respondents (70%) agreed that there were gaps between departments because of COVID-19. While about 20% of the respondents disagreed that there were gaps between departments due to COVID-19.

Table 4.36 Departmental gaps

	N	%
Disagree	2	20,0
No opinion	1	10,0
Agree	7	70,0
Total	10	100,0

The gaps created by COVID-19 related restrictions may have far reaching effects on the supplier quality departments at Bell Equipment.

The below information presented in Table 4.37 presents results on the effects of gaps created by COVID-19. Most respondents (about 60%) of the respondents agreed that there were effects gaps created by COVID-19. About 20% of the respondents disagreed that there were effects gaps created by COVID-19. The remainder of the respondents within the distribution of 20% either strongly agreed or had no opinion on the effect of the gaps created by COVID-19.

Table 4.37 Effects of gaps

	N	%
Disagree	2	20,0
No opinion	1	10,0
Agree	6	60,0
Strongly Agree	1	10,0
Total	10	100,0

I would recommend bridging the gaps created by COVID-19 in the event of other pandemics.

The information presented in Table 4.38 shows the results of responses to the recommendation of gaps created by COVID-19. About 60% of the respondents agreed with the recommendation for gaps created by COVID-19. The results indicate that 30% of the respondents had no opinion on the recommendation of gaps created by COVID-19.

Table 4.38 Recommendation of gaps

	N	%
No opinion	3	30,0
Agree	6	60,0
Strongly Agree	1	10,0
Total	10	100,0

4.8.2 Supplier quality qualitative questions

The questionnaire was created, and the questions listed below were presented in a question format, with participants being instructed to mark their responses with a tick. The demographic results are presented below.

Do you think supplier quality has the capacity to mitigate during the COVID-19 pandemic and save production?

The information below in Table 4.39 represents the results of whether the required capacity of supplier quality had the capacity that was required. The results indicate that 50% of the participants responded that the supplier quality did not have the capacity that was required to prevent COVID-19 from affecting the production.

Table 4.39 Required capacity

	N	%
No	5	50,0
Yes	5	50,0
Total	10	100,0

Do you think supplier quality had the capabilities to mitigate during the COVID-19 pandemic and save production?

The below representation of Table 4.40 presents results in supplier quality mitigation. The results indicate that 50% of the respondents, gave the response that there was no supplier quality mitigation.

Table 4.40 Mitigation capabilities

	N	%
No	5	50,0
Yes	5	50,0
Total	10	100,0

What type or kinds of information should be communicated during COVID?

Figure 4.37 present the results of the different types of information classifications. The results outline that 70% of the type of information classification is of a factual nature, while 20% of the information is of an analytical nature. Only about 10% of the information was of an objective nature.

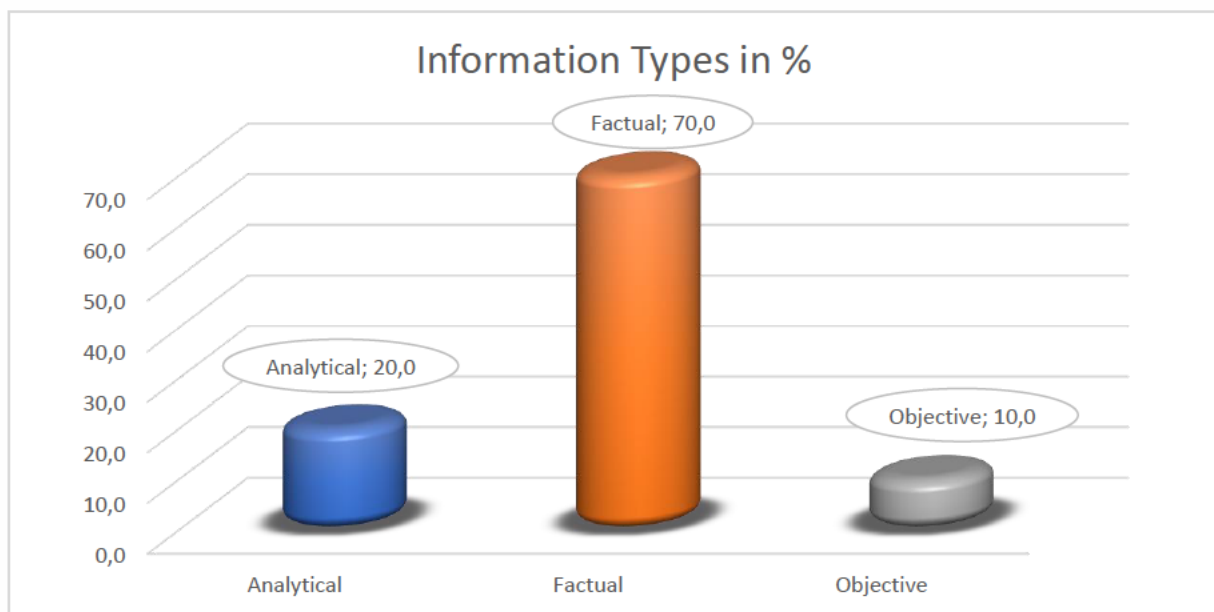


Figure 4.38 Information Types

How often should COVID-19 information be displayed?

The results presented in figure 4.39 showcase the frequency of displaying COVID-19 information. The data shows that most of the time (50%), COVID-19 information was displayed weekly. About 40% of the responses indicated that the information was displayed daily, and only about 10% indicated that the information was displayed once per month.

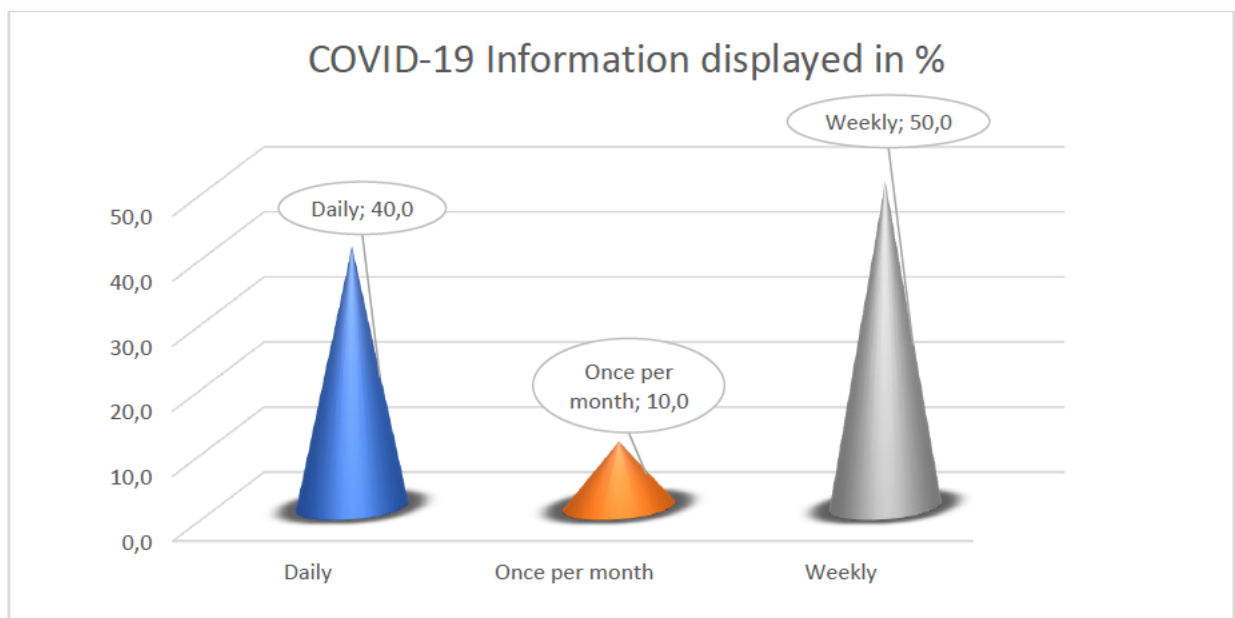


Figure 4.40 Displaying COVID-19 Information

Is the information provided by the safety department about COVID-19 helpful and valuable to you as an employee?

Table 4.41 Helpful information

	N	%
Yes	10	100,0

The results presented in Table 4.58 show the responses to the helpfulness and valuableness of the COVID-19 information. The results indicate that all the responses (100%) agree that the information was helpful and valuable.

Have you and your loved ones been negatively affected by COVID-19?

Figure 4.41 present the results on whether respondents were negatively affected by COVID-19. The results indicate that 70% of the respondents outlined that they were negatively affected by COVID-19. Only about 30% of the respondents indicated that they were not affected by COVID-19 negatively.

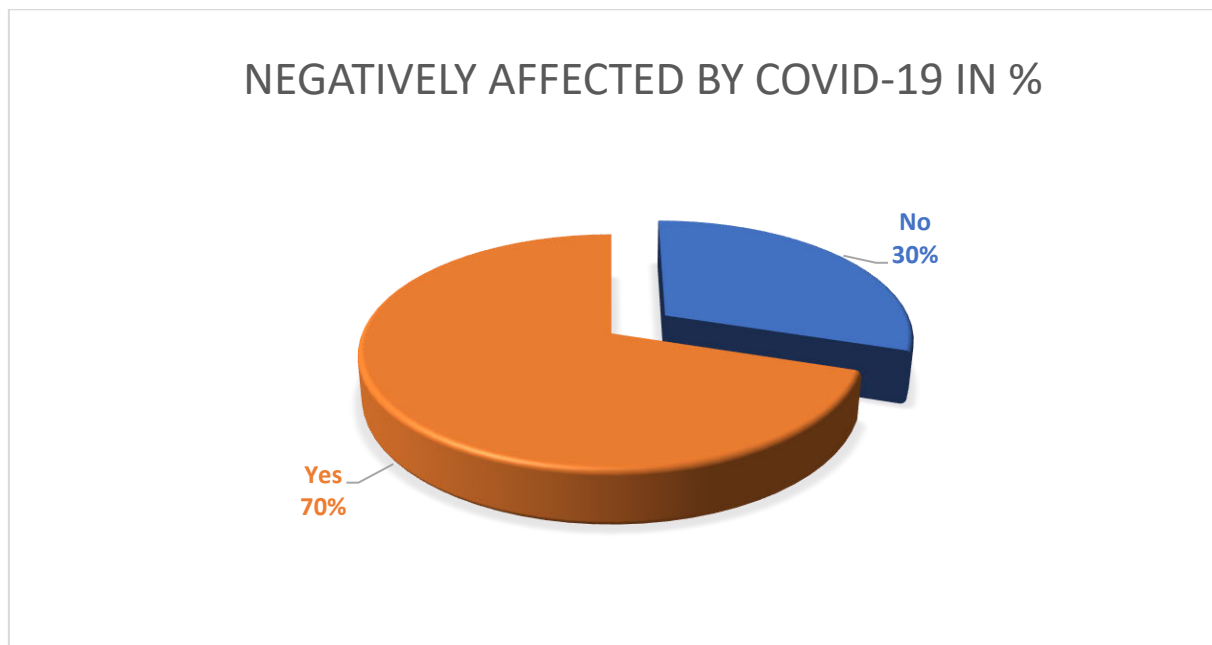


Figure 4.42 COVID-19 Effects

What planning strategies would you recommend for the company in the event of another pandemic?

The below information presented in figure 4.43 showcases the different types of planning strategies. About 90% of the planning strategies were objectives, strategies, and tactics, and 10% of the planning strategies were strategic themes and goals.

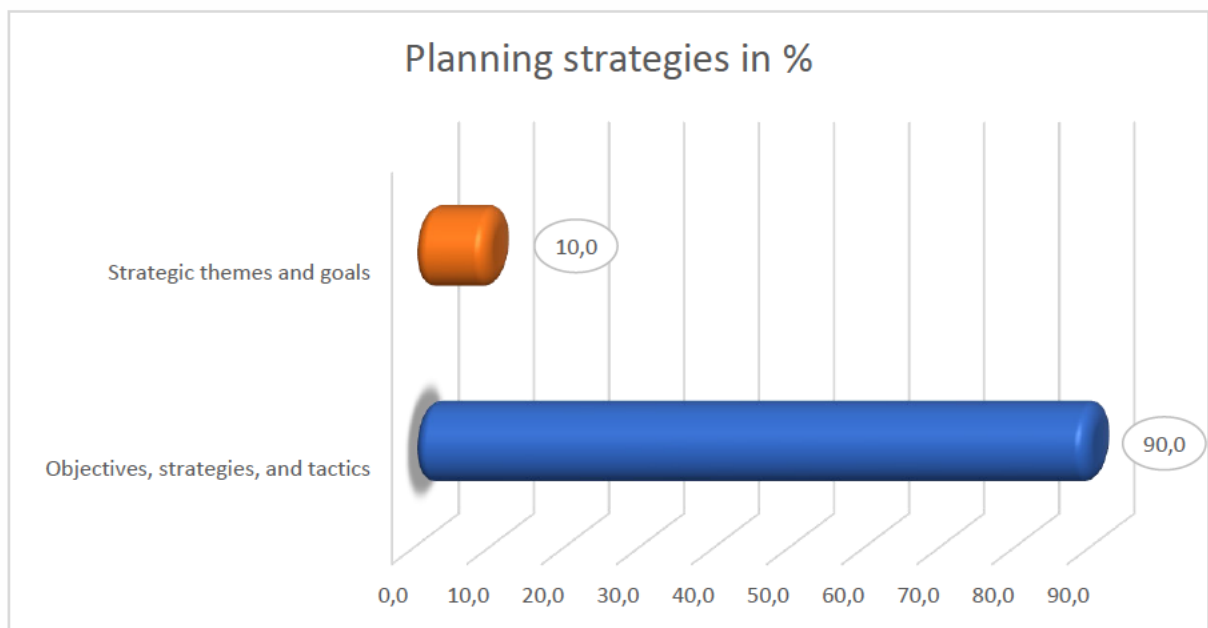


Figure 4.44 Planning Strategies

What documentation is necessary for the company to prepare itself for a pandemic?

The information in figure 4.45 presents the results for the type of documentation. About 60% of the documentation was system documentation, and the remaining 40% was user documentation.

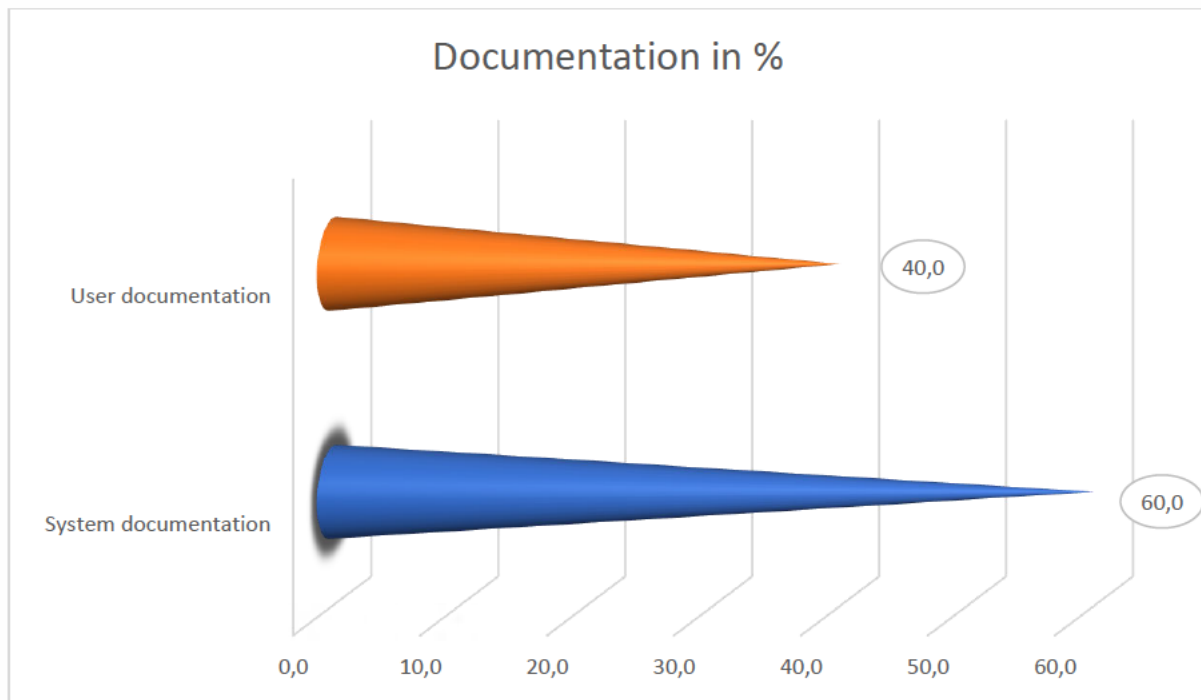


Figure 4.46 Documentation in preparation for a pandemic

What measurements and analyses should be considered in a pandemic situation?

Figure 4.47 present the results of the types of measurement and analysis formats that were used. Many of the measurements and analysis at 90% show that they used graphs, and 10% of the measurements were done using tables.

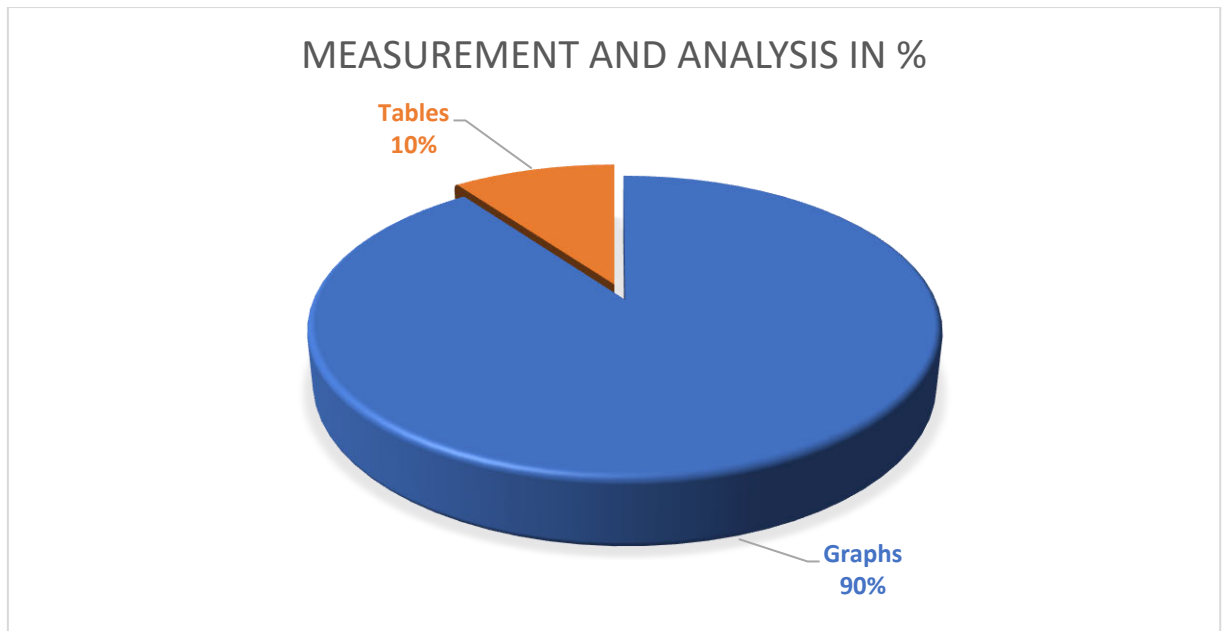


Figure 4.48 Measurement and Analysis

Have you experienced any personal or work-related disruptions since the pandemic started?

The results presented in figure 4.49 showcase the results on whether there were any disruptions caused by personal or work-related reasons. Most responses (about 80%) indicate that there were disruptions caused by either personal or work-related reasons.

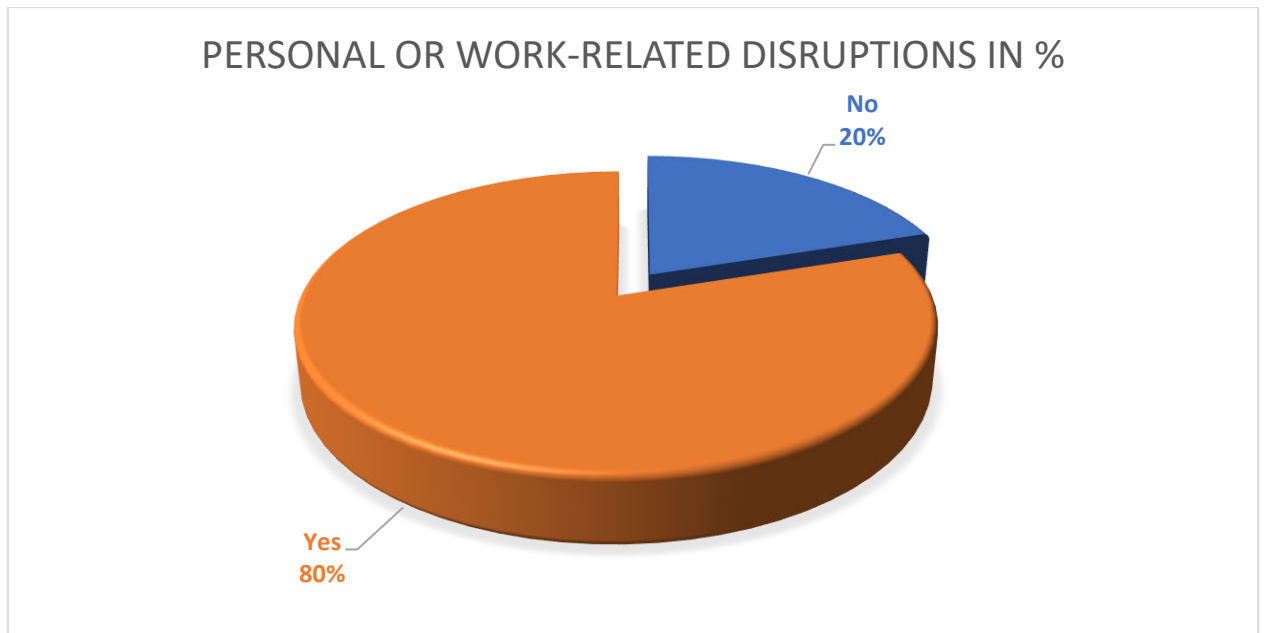


Figure 4.50 Personal or work-related disruptions

Are there any issues created by COVID-19 in supplier quality?

The information in figure 4.51 presents the responses on whether there were issues that were created by COVID-19. The results indicated that about 70% of the responses outlined that there were issues created by COVID-19 while 30% outlined that there were no issues created by COVID-19.

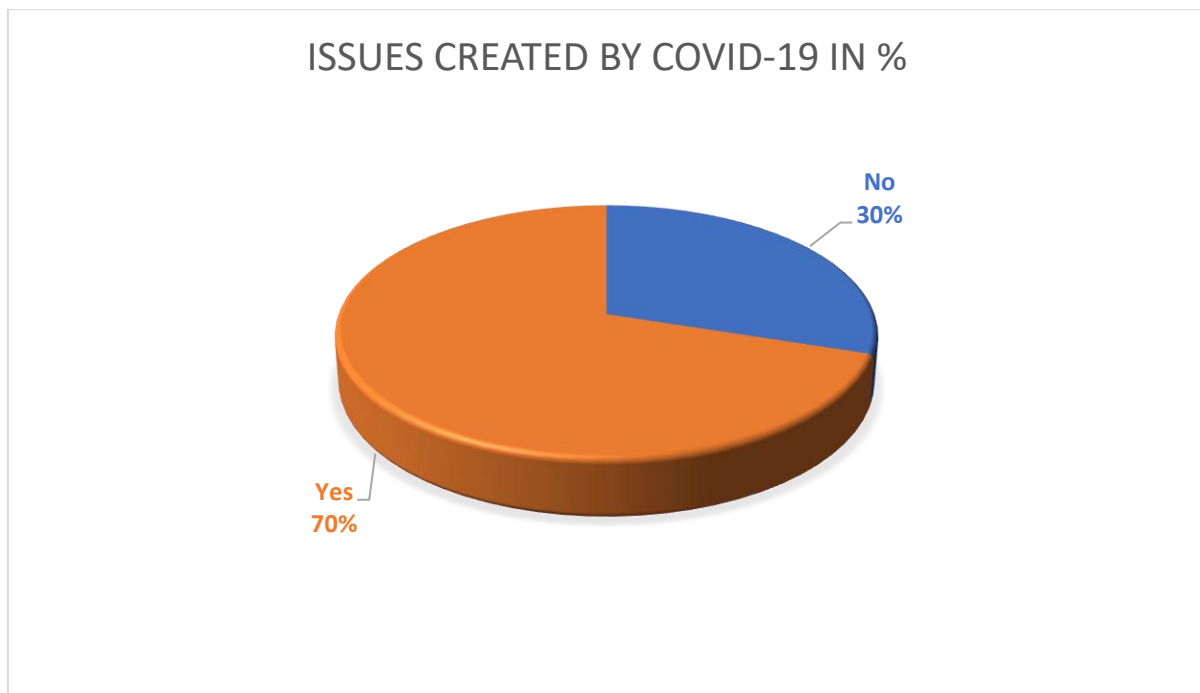


Figure 4.52 Issues created by COVID19

What action should be taken to resolve these issues?

The information in table 4.42 presents the results of the actions that need to be taken. The results indicate that most of the respondents (90%) agreed that the action to be taken is strategic.

Table 4.42 Action to be taken

	N	%
Corrective action	1	10.0
Strategic action	9	90.0
Total	10	100.0

Where do you think the study should focus on terms of improving supplier quality ~~from~~?

Figure 4.53 present the results of the study. The results indicate that 60% of the respondents noted that the study's focus is on training and development, and 40% of the respondents indicated that the study's focus is on the supply chain.

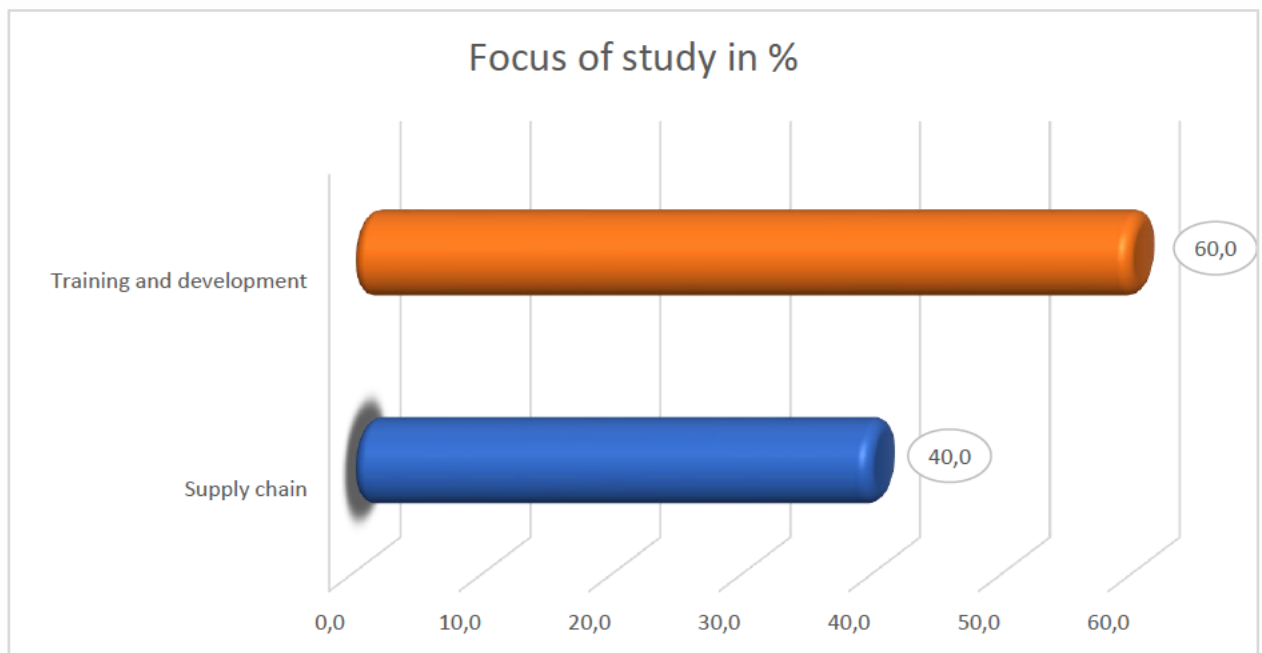


Figure 4.54 Focus of study

Is there anything else that company can do that will make them better prepared for another pandemic?

The below information presented in figure 4.55 showcases the responses to being better prepared. The results indicate that 70% of the respondents were better prepared and 30% were not.

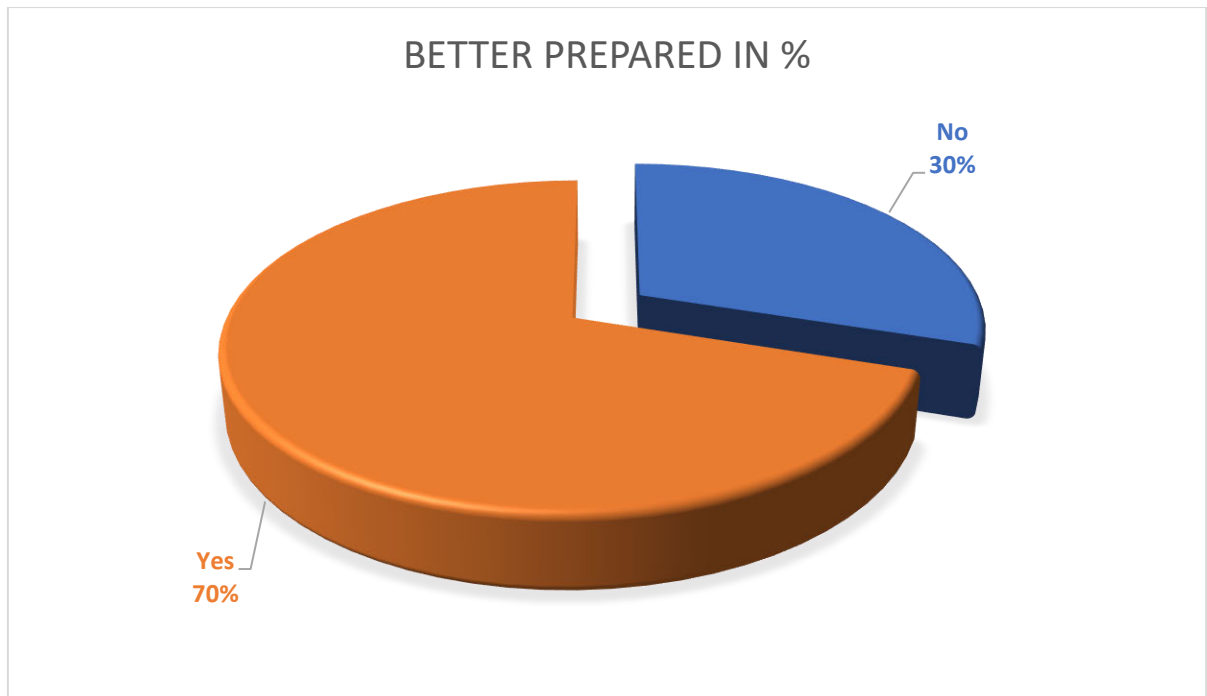


Figure 4.56 Better preparations

4.9 Conclusion

This chapter provided the justification of the study, most of the participants agreed that the COVID-19 pandemic had a severe impact on the production and their personal lives. The results shows that pandemic had negative impact on the company in different ways, with material shortages being the main factor.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the recap of each objective is provided. The framework to improve productivity is detailed and the recommendations are listed followed by references. Total quality management tools that were used are explained.

The COVID-19 pandemic presented an opportunity to utilise total quality management (TQM) tools on the production lines and to troubleshoot challenges related to any issues on the production lines.

Recap of objectives

The first objective of the study was to understand the impact of COVID-19 on all aspects of product and service at the supplier and process quality departments. Almost every participant did mention the effect of COVID-19 on the production and the entire company and its finances. The study then reflected these facts through the findings and analyses with materials shortages and increase on demand orders being the main factors. These findings justify the decision to conduct the research and the need for future studies to prevent possible future disruptions. The second objective was to quality assure all products supported by supplier and process quality departments by using total quality management (TQM) concepts such as brainstorming. The study included TQM in the literature review section and questionnaire. Brainstorming was used to investigate the cause of absenteeism among the departments. Poor inspection and quality requirements were discussed in the study. The third objective was to enhance existing or current mitigation strategies to improve productivity and quality. The plan, do, check, and act was parts of the discussions, and the results shows that the company is interested in the adoption of this initiative. The fourth objective was to propose a framework to improve productivity and quality during a pandemic. Efficiency, planning strategy, information, and action to be taken were included in the results and findings section. The participants were given the opportunity to get their opinions heard through the study regarding the framework. The fifth objective was to develop a guideline through a framework to mitigate the impact of COVID-19. The mitigation

strategies were discussed throughout the study, authors had different views and suggestions that supported this objective and the resolutions for future challenges.

5.2 Total quality management

5.2.1 TQM tools

Maganga and Taifa (2022) suggest that total quality management be adopted in all manufacturing companies because it entails the integration of the entire organisation through the application of principles such as leadership, continuous improvement programmes, top-level commitment, customer emphasis, supplier management, employee participation, and process approach. One of the approaches used to achieve growth in companies is total quality management. TQM is used as an organisational performance enhancement strategy (Karamouz et al. 2020). Brainstorming, fishbone diagrams and pareto charts have been introduced in both supplier and process quality departments as means to investigate and reduce the effects of challenges such as production shutdowns, machine shutdowns, injuries on the lines, raw material shortages, and employee efficiency.

5.2.2 Pareto analysis

A pareto chart was used to investigate and identify internal raw material shortages that were causing delays and frustration for both the company and its customers, resulting in a loss of time and sales. The raw materials that were described as the most critical and problematic were identified using a check sheet, which was then converted into pareto charts. The problematic raw material was then reported to the relevant department for action and future reference.

5.2.3 Brainstorming

Brainstorming is a visualisation tool that was used to investigate the root causes of non-conformance, supply of wrong orders to the customers, short supply of orders to the customers, and absenteeism among the departments. This is a helpful and reliable total quality management tool.

5.2.4 Fishbone diagrams

TQM promotes analytical skills to investigate the hidden root causes of problems and an effective way to check progress. The task of eliminating problems in processes encompasses three basic elements: process selection, identification of process issues, and implementation and monitoring of improvement activities (Oliver, Oliver & Chen 2019).

5.3 Strategies

Plan-do-check-act is one of the effective strategies for problem solving and process improvement that has been warmly welcomed by the participants from both supplier and process quality departments. This strategy is applicable to any manufacturing and operational function. The company adopted it, and it is being used as part of improvement strategies and to maintain quality and efficiency in all operations, especially in the supplier and process quality departments, where quality assurance and inspection are vital and key in terms of the manufacturing process. The plan-do-check-act is part of supplier and process quality inspection that takes place daily. These departments are involved in every production process, including the receiving of raw materials, dispatch, and material preparation. Most participants strongly agreed to participate and support this continuous improvement strategy.

Framework to improve productivity

The study can address the gaps by developing a comprehensive framework and proposing feasible and effective strategies that enable efficiency and improvement in production (Kim et al. 2020). Figure 5.1 present the framework to improve productivity.

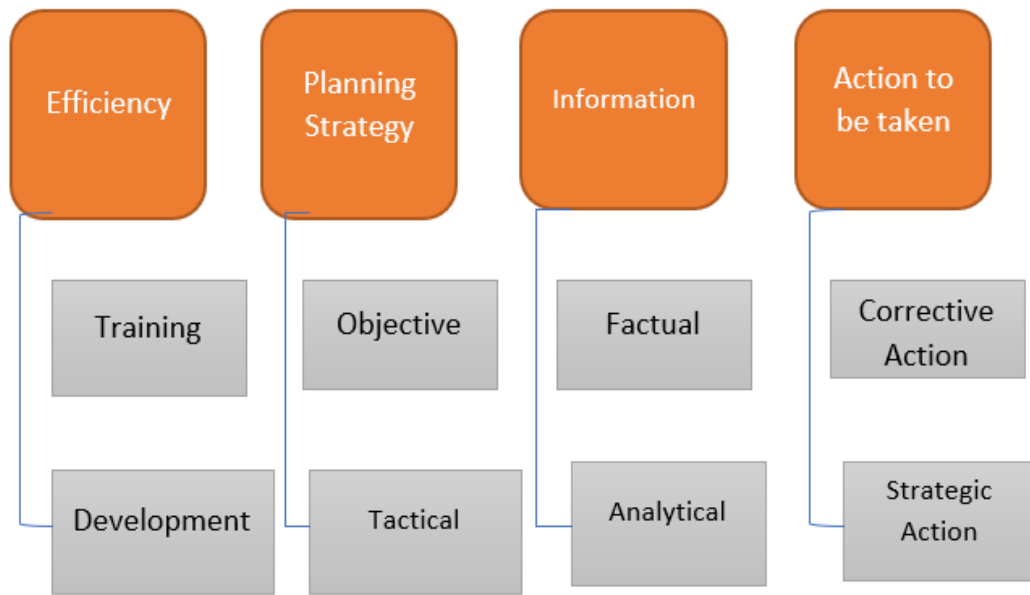


Figure 5.1 Framework to improve productivity

This framework works in relation to Bell Equipment supplier and process quality, as efficiency, planning, information, and action are the keys to producing quality products, with training and development being part of quality assurance measures. Now, the international business marketplace has turned out to be extremely aggressive, and due to this, organisations are facing different challenges in improving productivity, making operations faster, increasing operations and reducing costs (Berhe 2021). Productivity addresses the question of how efficiently resources are used to achieve organisational goals (Manoharan et al. 2022). Training and development in supplier and process quality are essential to improving productivity. 60% of the participants from supplier quality and 60% of the participants from process quality agree that training, and development should be intensified. 80% of the participants from process quality and 80% of the participants from supplier quality agree with the concept of objectives, strategies, and tactics for planning strategies as part of productivity improvement. The safety department's type of information should be factual, according to 70% of the participants from supplier quality and 53% of the participants from process quality. This framework was introduced and discussed with employees, supervisors, and senior team leaders, and it is among the future developments and productivity improvements.

This framework will also be used to mitigate the impact of COVID-19 and any future pandemics to avoid disruptions and production discontinuities that can cause uncertainty and put the company's future at risk.

5.4 Guidelines for framework

- Training: to promote efficiency and productivity, training must be prioritised in all quality departments that are supportive of production processes.
- Recruitment criteria: the recruitment criteria should be designed in a way that supports quality protocols and procedures. This is important because everyone in the organisation should understand that quality comes before quantity.
- Communication: the company must use communication devices as a means of communication to factualise and analyse information about disruptive developments such as the COVID-19 pandemic, which could shut down production. This will minimise the uncertainty in the organisation and help the employees stay informed about the situations that affect their personal lives.
- Development: quality must be added as a module in the development stages of the company. Adding quality as a module will align the company with its quality standard operating procedures. Which will eventually improve quality processes, attract the customers, and improve sales.
- Strategic action: management should be strategic in decision-making to improve productivity and achieve long-term results. A supplier visit must be done to ensure that suppliers are producing according to Bell Equipment quality operating procedures and to help, especially during outbreaks, to avoid production stoppages and raw material shortages.

5.5 Recommendation

The researcher makes the following recommendations for supplier and process quality departments.

- As these two departments (supplier and process quality) appeared to be among the most affected in the company, comprehensive and adequate action needs to be taken to ensure that these departments have a mitigation strategy in place in the event of any pandemics or unforeseen circumstances.

- The study recommends that suppliers elevate process quality by implementing quality control measures, enhancing communication with suppliers, and establishing contingency plans to mitigate future disruptions.
- The implementing of strategies to avoid inconvenience, including improving supply chain visibility and succession planning, are recommended.
- There should be a research office that will work in the interest of the business and advise when there are possible pandemics, circumstances, or any disruptions that might materialise.
- Both supplier and process quality departments should prioritise the training of all employees for the sake of flexibility and continuity should another pandemic emanate.
- The company should engage in health awareness to educate the employees about the pandemics and the impact that they can have on their lives and the lives of their loved ones, and for employees to avoid possible anxiety.
- The company should intensify health and safety functions throughout its departments and branches.
- The company should enhance its supply chain channels to reduce the impact of parts shortages, especially during difficult times such as pandemics.
- The company should increase the number of supplier quality inspectors to ensure that every part that enters the premises is inspected.
- Quality 4.0 and TQM should be adopted and implemented in both supplier and process quality departments to quality-assure all products and services.
- The quality survey should be conducted to get the opinion of customers and build as per the customer's requirements.
- The mitigation plans must be intensified to normalise quality and productivity in the supplier and process quality departments.
- The impact of disrupting factors must be investigated and understood.
- Effective communication about transmissible diseases should be provided to avoid possible disruptions.
- Critical production preparedness is required as an essential strategy to respond to future pandemics.

- Measurements and analysis are required to undertake quality functions in response to future disruptions.
- Objective, strategic, and tactical planning strategies should be used in the event of another pandemic.
- Strategic action should be taken to resolve pandemic-related issues.

5.6 Conclusion

The study assessed supplier and process quality during the COVID-19 pandemic. The case study was conducted at one of the manufacturing companies in northern kwazulu-Natal (South Africa). As shown in Chapter 4, the study highlighted the significant impact of COVID-19 on supplier and process quality, as well as the employees and their loved ones. The study also highlighted the need for the company to implement measures to mitigate future disruptions. The implementation of strategies such as the plan-do-check-act (PDCA) system was perceived positively by the interviewees, with many seeing it as an effective tool for continuous improvement. The COVID-19 pandemic had a severe impact on both departments and production. Until today, the company is still recovering from the disruptive and impactful disease. The study further highlighted the gaps where some participants did not agree with certain questions pertaining to production and the personal lives of employees and their loved ones that were compromised, yet the company and society are still mitigating the impact of the pandemic. The shortage of raw materials is one of the main factors that negatively affected production; and demand orders were not fulfilled due to shortages and delays between the departments. Training and development appeared to be one of the most important elements in terms of mitigation strategies; this element was supported by participants during the study. COVID-19 fundamentally uprooted assumptions about worker safety, health, and well-being. The pandemic also highlighted classic social issues that workers (Abas, et al 2021) face. These issues, together with existing health and safety requirements, could impact the focus, concentration, and reaction time of the workers, which could lead to an increase in work-related accidents.

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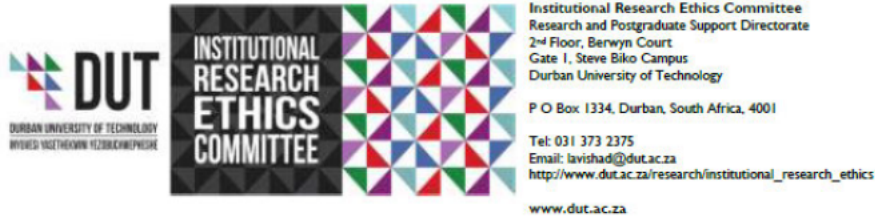
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APPENDICES

Appendix A research approval



1 August 2022

Mr B N Ndlovu
Unit 5 La Mer
12 Kitefish Meerensee
Richards Bay
3900

Dear Mr Ndlovu

Assessment of process and supplier quality during the COVID-19 pandemic: A case study at a South African Manufacturing company.
Ethical Clearance number IREC 105/22

The Institutional Research Ethics Committee acknowledges receipt of your final data collection tool for review.

We are pleased to inform you that the data collection tool has been approved. 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 Standard Operating Procedures (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: DUT-IREC

Appendix B Gatekeepers letter



BELL EQUIPMENT COMPANY S A (PTY) LTD.
Reg No. 1966/004606/07
A member of the worldwide Bell Equipment Group
13-19 Carbonode Cell Road, Alton
Richards Bay, 3900, South Africa

P/Bag X20046, Empangeni, 3880, South Africa
E: @bellequipment.com
T: +27(0)35
W: www.bellequipment.com

16 May 2022

Dear Mr Bhekisisa Nkululeko Ndlovu

PERMISSION TO CONDUCT RESEARCH AT BELL EQUIPMENT – Updated Gatekeeper Letter

Your email correspondence in respect of the above refers. I am pleased to inform you that Bell Equipment Co SA (Pty) Ltd has granted **Gatekeeper Permission** for you to conduct your research “Assessment of Supplier and Process quality during the COVID-19 pandemic: A case study at a South African manufacturing company” at Bell Equipment Co SA (Pty) Ltd.

Kindly note that this letter must be issued to Bell Equipment Co SA (Pty) Ltd for approval before you commence data collection.

Bell Equipment Co SA (Pty) Ltd may impose any other condition it deems appropriate in the circumstances having regard to nature and extent of access to and use of information requested.

We would be grateful if a summary of your key research findings would be submitted to Bell Equipment Co SA (Pty) Ltd on completion of your studies.

Yours sincerely

Johan Van Wyngaardt Digitally signed by Johan Van Wyngaardt
Date: 2022.05.17 07:12:08 +02'00'

Johan van Wyngaardt
Global Human Resources Director

BROAD-BASED BEE STATUS: LEVEL 2 CONTRIBUTOR

Directors: R Naidu** (Chairman), N Andhee, C Brown, D Chinnappen, A Goordeen*, B Harie*
Company Secretary: D McIlrath
(**Independent Non-Executive, *Non-Executive)

Appendix C Interview schedule for process quality

Interview questions

The researcher employed some of these questions from wonderflow 2018. Available: <https://www.wonderflow.ai>. (Accessed 19 August 2021). Connaway et al. (2017: p 249) states that 'the focus group interview is designed to explore in depth the feelings and beliefs people hold and to learn how these feelings shape overt behaviour'.

Introductory questions

1. What are your general feelings about covid-19 pandemic?
2. What do you already know about COVID-19 pandemic and its impact on the business at Bell Equipment?
3. How did you first hear about COVID-19 pandemic?
4. What are your problems or concerns about COVID-19 pandemic?
5. What trends did you see happening in your departments?

Transition questions

1. What are specific issues, concerns, or problems you have faced regarding COVID-19 pandemic? How significant is the problem or concern you had with COVID-19?
2. How would you expect your department to respond to COVID-19 pandemic to avoid issues and inconvenience?
3. What are your department's key weaknesses when it comes to dealing with the pandemic?

4. What did Bell Equipment management do to provide continuity in the process quality department during COVID-19 pandemic?
5. Would you support the implementation of strategies such as Plan–Do–Check–Act cycle, which forms the basis for many internal quality assurance systems?
6. What in your opinion can be done to improve process quality?

Key questions

1. What are your department's strengths in dealing with the pandemic? How has COVID-19 impacted your department?
2. What positive experience have you had since the COVID-19 pandemic started? What influences and motivates you about COVID-19 pandemic?
3. Has the situation required changes in the process quality during the COVID-19 pandemic?

If so, what were these?

4. Have there been new issues for process quality to address?

If so, how have these been tackled?

5. How did COVID-19 affect the production at Bell?

6. Were there any challenges experienced from the supplier perspective?

Internal quality assurance stays relevant and demonstrate its value-added in promoting the continued innovation of production.

7. Has the situation required changes in internal quality assurance since the pandemic started?

If so, what were these?

8. Have there been new issues for internal quality assurance to address?

If so, how have these been tackled?

9. Have there been new issues for external quality assurance to address?

If so, how have these been tackled?

4. What lessons learnt from this experience should be considered while moving forward?

5. What would you like management to do differently to provide continuity in your department and to protect employees from getting infected by COVID-19?

Ending questions

1. Is there anything else you want to add to the conversation about COVID-19 pandemic?
2. Do you feel that any topic or issue about the impact of COVID-19 has not been addressed?

Appendix D Process quality questionnaire



Quantitative questionnaire

Please mark an X in the parentheses that indicates your answer:

The shortages of raw materials affected the functions of process quality and the entire company.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

The suppliers could not deliver due to insufficient manpower during the COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

There were shortages in demand orders due to COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

There was insufficient production to fulfil demand due to COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

The restrictions imposed by government impacted operations negatively during COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

COVID-19 threatened our lives as workers and lives of our loved ones.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Effective communication about the COVID-19 pandemic is required in order perform

daily operational

Duties.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Responding to COVID-19 requires critical production preparedness with effective communication as an essential strategy.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Quality protocols must be developed to resolve COVID-19 related issues.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Total quality management tools must be used to identify COVID-19 related issues.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Existing / current mitigation strategies must be intensified to improve productivity and quality.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

There was adequate documentation during the pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Measurements and analysis are required to undertake quality functions in response to COVID-19

Pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Process quality was compromised during the COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

COVID-19 affected the production negatively.

1 Strongly	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

disagree				

There were gaps between the departments due to COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

The gaps created by COVID-19 related restrictions may have far reaching effect in the process quality departments at Bell Equipment.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

I would recommend the bridging of gaps created by COVID-19 in the event of other pandemics.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Qualitative questionnaire

Please mark an X in the parentheses that indicates your answer:

Do you think process quality had the capacity required to mitigate during covid-19 pandemic to save production?

Yes	
No	

If yes, please identify the

capacity _____

Do you think process quality had capabilities to mitigate during covid-19 pandemic to

save production?

Yes	
No	

If yes, please identify some capabilities_____

What type/ kinds of information should be communicated during COVID?

Factual	
Analytical	
Subjective	
Objective	

How often should COVID-19 information be displayed?

Daily	
Weekly	
Once per month	
Twice per month	
Three times per month	
Four times per month	

Is the information provided by safety department about COVID-19 helpful and valuable to you as an employee?

Yes	
No	

Have you and your loved ones been negatively affected by COVID-19?

Yes		
No		

If yes, please explain how you survived_____

What planning strategies would you recommend for Bell equipment in the event of another pandemic?

Objectives, strategies, and tactics	
Strategic themes and goals	

What documentation is necessary for Bell Equipment to prepare it for a pandemic?

System documentation	
User documentation	

What measurements and analysis should be considered in a pandemic situation?

Graphs	
Tables	

Have you experienced any personal or work-related disruptions since the pandemic started?

Yes	
No	

If yes, please identify the disruptions experienced.

Are there any issues created by COVID-19 in the process quality?

Yes	
No	

If yes, please explain the nature of issues.

What action should be taken to resolve these issues?

Strategic action	
Corrective action	

Where do you think the study should focus on terms of improving the process quality

functions?

Training and development	
Supply chain	

Is there anything else that Bell equipment can do that will make them better prepared for another pandemic?

Yes	
No	

If yes, please
elaborate

End

Thank you

Appendix E Interview schedule for supplier quality

Interview questions

The researcher employed some of these questions from wonderflow 2018. Available: <https://www.wonderflow.ai>. (Accessed 19 August 2021). Connaway et al. (2017: p 249) states that 'the focus group interview is designed to explore in depth the feelings and beliefs people hold and to learn how these feelings shape overt behaviour'.

Introductory questions

6. What are your general feelings about covid-19 pandemic?
7. What do you already know about COVID-19 pandemic and its impact on the business at Bell Equipment?
8. How did you first hear about COVID-19 pandemic?
9. What are your problems or concerns about COVID-19 pandemic?
10. What trends did you see happening in your departments?

Transition questions

7. What are specific issues, concerns, or problems you have faced regarding COVID-19 pandemic? How significant is the problem or concern you had with COVID-19?
8. How would you expect your department to respond to COVID-19 pandemic to avoid issues and inconvenience?
9. What are your department's key weaknesses when it comes to dealing with

the pandemic?

10. What did Bell Equipment management do to provide continuity in the supplier quality department during COVID-19 pandemic?
11. Would you support the implementation of strategies such as Plan–Do–Check–Act cycle, which forms the basis for many internal quality assurance systems?
12. What in your opinion can be done to improve supplier quality?

Key questions

10. What are your department's strengths in dealing with the pandemic? How has COVID-19 impacted your department?
11. What positive experience have you had since the COVID-19 pandemic started? What influences and motivates you about COVID-19 pandemic?
12. Has the situation required changes in the supplier quality during the COVID-19 pandemic?

If so, what were these?
13. Have there been new issues for supplier quality to address?

If so, how have these been tackled?
14. How did COVID-19 affect the production at Bell?

15. Were there any challenges experienced from the supplier perspective?

Internal quality assurance stays relevant and demonstrate its value-added in promoting the continued innovation of production.

16. Has the situation required changes in internal quality assurance since the pandemic started?

If so, what were these?

17. Have there been new issues for internal quality assurance to address?

If so, how have these been tackled?

18. Have there been new issues for external quality assurance to address?

If so, how have these been tackled?

6. What lessons learnt from this experience should be considered while moving forward?

7. What would you like management to do differently to provide continuity in your department and to protect employees from getting infected by COVID-19?

Ending questions

3. Is there anything else you want to add to the conversation about COVID-19 pandemic?
4. Do you feel that any topic or issue about the impact of COVID-19 has not been addressed?

Appendix F Supplier quality questionnaire



Quantitative questionnaire

Please mark an X in the parentheses that indicates your answer:

The shortages of raw materials affected the functions of supplier quality and the entire company.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

The suppliers could not deliver due to insufficient manpower during the COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

There were shortages in demand orders due to COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

There was insufficient production to fulfil demand due to COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

The restrictions imposed by government impacted operations negatively during COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

COVID-19 threatened our lives as workers and lives of our loved ones.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Effective communication about the COVID-19 pandemic is required in order perform daily operational

Duties.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Responding to COVID-19 requires critical production preparedness with effective

communication as an essential strategy.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Quality protocols must be developed to resolve COVID-19 related issues.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Total quality management tools must be used to identify COVID-19 related issues.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Existing / current mitigation strategies must be intensified to improve productivity and

quality.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

There was adequate documentation during the pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Measurements and analysis are required to undertake quality functions in response to COVID-19

Pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Supplier quality was compromised during the COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

COVID-19 affected the production negatively.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

There were gaps between the departments due to COVID-19 pandemic.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

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The gaps created by COVID-19 related restrictions may have far reaching effect in the supplier quality departments at Bell Equipment.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

I would recommend the bridging of gaps created by COVID-19 in the event of other pandemics.

1 Strongly disagree	2 Disagree	3 No opinion	4 Agree	5 Strongly agree

Qualitative questionnaire

Please mark an X in the parentheses that indicates your answer:

Do you think supplier quality had the capacity required to mitigate during covid-19 pandemic to save production?

Yes	
No	

If yes, please identify the capacity_____

Do you think supplier quality had capabilities to mitigate during covid-19 pandemic to save production?

Yes	
No	

If yes, please identify some capabilities_____

What type/ kinds of information should be communicated during COVID?

Factual	
Analytical	
Subjective	
Objective	

How often should COVID-19 information be displayed?

Daily	
Weekly	
Once per month	
Twice per month	

Three times per month	
Four times per month	

Is the information provided by safety department about COVID-19 helpful and valuable to you as an employee?

Yes	
No	

Have you and your loved ones been negatively affected by COVID-19?

Yes		
No		

If yes, please explain how you survived_____

What planning strategies would you recommend for Bell equipment in the event of another pandemic?

Objectives, strategies, and tactics	
Strategic themes and goals	

What documentation is necessary for Bell Equipment to prepare it for a pandemic?

System documentation	
User documentation	

What measurements and analysis should be considered in a pandemic situation?

Graphs	
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Tables	
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Have you experienced any personal or work-related disruptions since the pandemic started?

Yes	
No	

If yes, please identify the disruptions experienced.

Are there any issues created by COVID-19 in the supplier quality?

Yes	
No	

If yes, please explain the nature of issues.

What action should be taken to resolve these issues?

Strategic action	
Corrective action	

Where do you think the study should focus on terms of improving the supplier quality functions?

Training and development	
Supply chain	

Is there anything else that Bell equipment can do that will make them better prepared for another pandemic?

Yes	
No	

If yes, please

elaborate_____

End

Thank you

Appendix G Editing certificate

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The pen is mightier than the sword

To whom it may concern

I edited a master's titled: Assessment of supplier and process quality during the COVID-19 pandemic: A case study in one of SOUTH AFRICAN manufacturing companies by Bhekisisa Nkululeko Ndlovu, student number (21444941), submitted in fulfilment of the requirements for the degree of Master of Philosophy in Quality Management in the Faculty of Management Sciences at the Durban University of Technology

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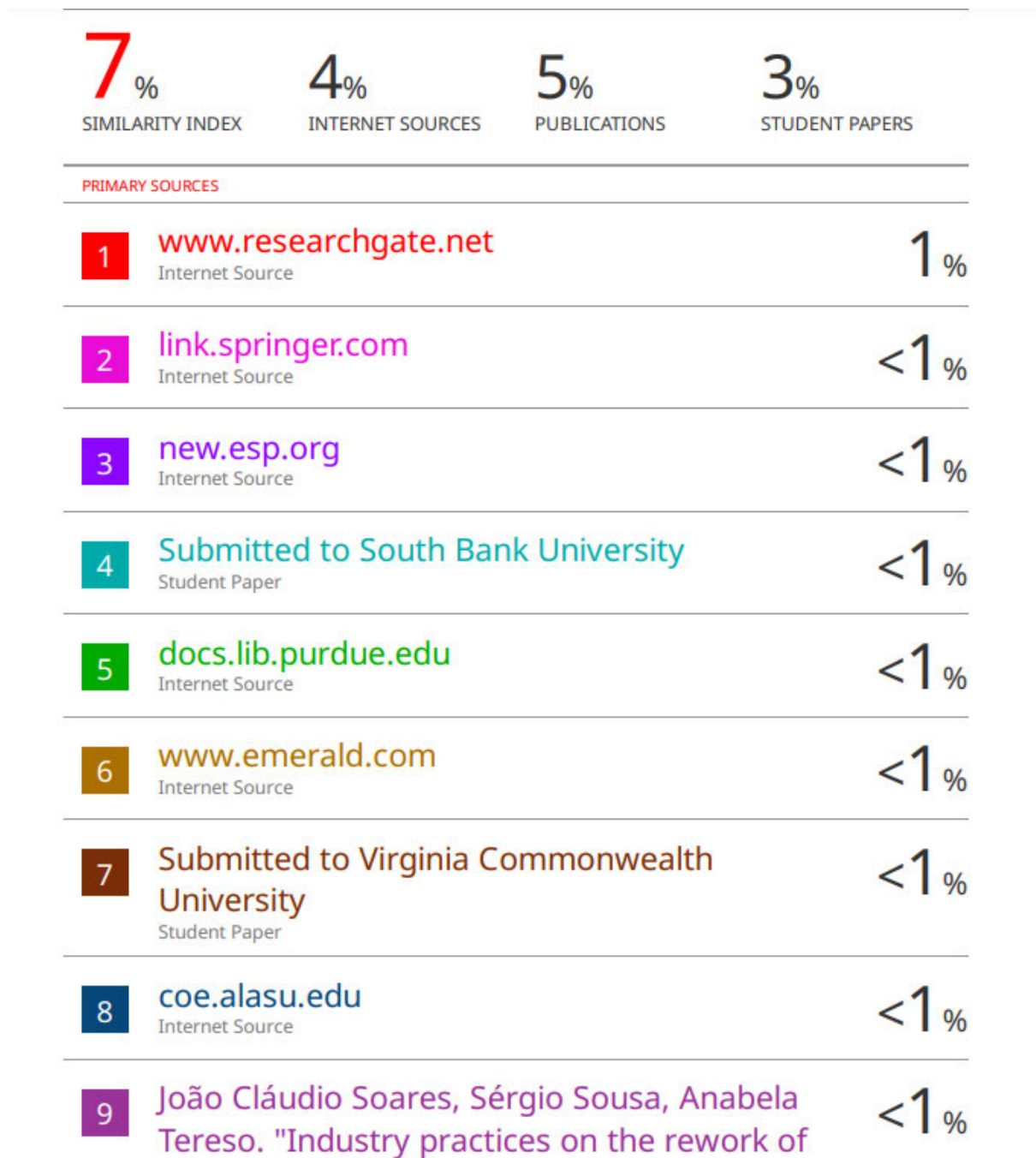
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