



**Information sharing to manage bullwhip effect on the stream sites: A case of Khathino
supermarket**

By

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Declaration

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Acknowledgment

My work is dedicated to my sister

Mbali Pearl Makhathini

First and foremost, I would like to begin by thanking God for providing me with the ability and determination to endure and finish my dissertation. I would also like to convey my heartfelt thanks to the following people:

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Abstract

Information sharing between supply chain partners can result in improved business processes. Information sharing in the Khathino supply chain lacks consistency. This lack of consistency may be due to misalignment in supply chain operations and internal communication systems. Despite the systems used by the organisation and the regional distribution center in place managing the bullwhip effect remains a significant challenge. The study aims to entrench the magnitude of communication between Khathino warehouse and supermarket through supply chain technological systems and collaboration between supply chain partners. Research objective aim: firstly, to examine the extent of information sharing to optimize management of bullwhip effect; secondly, to examine how information is shared from retail warehouse to the supermarket to ensure stock management and order fulfilment; thirdly, to assess the impacts of supply chain technology as an enabling tool of information sharing; and finally, to establish the extent of collaborative planning to entrench the magnitude of communication amongst warehouse and supermarket to ensure better information sharing. This study used both questionnaires and interviews to collect data from the sample size of 150 respondents and 2 participants. The quantitative approach used descriptive statistics and frequency distribution to analyse individual variables. Pearson correlation, cross-tabulation, and chi-square were chosen for bivariate analysis. The qualitative approach utilised thematic analysis to analyse data collected from 2 participants.

The majority of respondents (98%) agree that information is shared from the warehouse to the supermarket and from the supermarket to the warehouse to make strategic decisions. This study found empirical evidence that supply chain technology plays an important role to the organisations performance. The study further discovered that ninety-six percent of the respondents from this study agreed that electronically enabled information sharing technologies improve integration, coordination, and cooperation in supply chain networks. This indicates that's supply chain technology remains the central hypothesis on the company's performance. The findings of this study show that good supply chain technology is necessary for a significant magnitude of information sharing between warehouses and individual stores. As a result of this finding, the information technologies implemented should include the collaboration of supply chain partners. These management implications show that collaboration is the responsibility of all supply chain partners.

Keywords: Supply chain technology, collaboration, supply chain partners, Information sharing, and the bullwhip effect.

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Abbreviation

BWE	Bullwhip effect
CPFR	Collaborative planning, forecasting and replenishment
CRM	Consumer relationship management
DCM	Demand chain management
DP	Demand planning
DV	Dependent variables
IT	Information technology
IV	Independent variables
KZN	KwaZulu-Natal
OOS	Out of stock
RDC	Regional distribution centre
SC	Supply chain
SCM	Supply chain management
SPSS	Statistical package for social science
SRM	Supplier relationship management

Chapter One

Introduction to the Study

1.1 Introduction

The exchange of information between two or more parties is known as information sharing. A successful company aims at reducing the bullwhip effect by optimising or enhancing the flow of information using technology. Optimising can be defined as an approach that makes business processes and supplies chain responsive and effective for businesses to gain a competitive advantage. The bullwhip effect on the other hand can be described as the distribution system trend under which supply chain inefficiencies are predicted. The case of the supermarket under investigation has numerous stores across the globe. However, one supermarket will be used in this study. The pseudo name of the supermarket Khathino Supermarket will be used in this study. It is essential to protect the integrity and confidentiality of the real supermarket. The flow of information sharing within the stream sites of the supermarket (between the upstream warehouse) and the downstream (the individual stores) is key to the successful movement of products needed by the consumers. Effective use of information has the propensity to result in efficiencies in the sharing of the right information between supply chain partners. Thus, technology is a key factor that aims at improving information sharing in a collaborative approach. The theme of this study is to entrench the magnitude of communication through better information sharing amongst the retail-based warehouses and individual Khathino supermarkets while considering the influence of the fourth industrial revolution to mitigating the effect of a bullwhip on the information.

The dissertation consists of six chapters, the first chapter focuses on the study introduction, which includes information about the research framework to be used. The second chapter examines the literature on information sharing as well as the study's major constructs. Following the literature review, the research methodology chapter details the methodologies used. In Chapter four, the researcher will discuss analysis of the data. There is a discussion of the outcomes after the data analysis and interpretation so that the data can be aligned to the study objectives. The dissertation's last chapter explains the literature and research findings-based suggestions and conclusions.

1.2 Background of the Study

In South Africa four major retailers are using distribution centres, Shoprite has two distribution centre which is dried and frozen warehouse. Furthermore, Massmart has two logistics distribution center. Khathino warehouse is a distribution centre that facilitates in providing the products to the supermarket required by consumers. In this study, the researcher aims to entrench the magnitude of communication through better information sharing amongst Khathino retail-based warehouses and supermarkets. Information sharing is vital for the Khathino warehouse to have accurate orders of products required by the supermarket. Information should be shared from the warehouse to the supermarket to track orders and deliver the right amount of goods ordered. Hence, it is very much imperative for the study to be conducted to entrench communication between Khathino retail warehouse and supermarket. This study should be conducted to assist the company with recommendations on how to try and implement supply chain technology to improve information sharing. As the company has challenges in adopting effective supply chain technology to improve information flow.

The factor behind Khathino's growth is the collaboration of individual retailers and wholesalers at the local level in satisfying the needs of their consumers through proper sharing of information (Kim, 2017:5). Khathino is powered by dedicated local retailers that have earned the confidence and friendship of their communities. By supporting emerging farmers by purchasing their products, Khathino does not only receive its products from the warehouse, but the supermarket also purchases goods from local farmers, who sell fresh products. The research is based on Khathino warehouse and supermarket, on how information is shared from retail warehouse to the supermarket (stream sites) to ensure management of stock, product to minimize bullwhip effect. According to Wins (2018:1-2), the bullwhip effect can be demarcated “as the variation of information from the downstream to amplified upstream sites”.

1.3 Problem Statement

Supply chain efficiency and effectiveness include a clear exchange of information within the supermarket business model. Information sharing is a vital component to ensure the fast movement of goods for enough stock in supermarkets. Extreme cycles in customer demand tend to represent larger movements upstream in the supply chain. The study's theoretical framework is based on CPFRR model, which emphasises the importance of Information sharing, collaborative partnership

and supply chain collaboration in organisations. The main aim of this study is to entrench the magnitude of communication through better information sharing amongst the Khathino retail warehouse and supermarket. Supply chain partners often experience a lack of information sharing moving from the warehouse to the supermarket. Information sharing can facilitate a collaborative approach to mitigate the bullwhip effect on both information and product flow. Information can be shared at Khathino warehouse and supermarket, through proper adoption of technology that aims at transmitting information faster to reduce lead times is emphasized in this study. The effect of the fourth industrial revolution system remains a vital component in enhancing the efficiency of information sharing.

1.4 Research Questions

This study aims to answer the following research questions:

- 1-To what extent can information sharing optimize the management of the bullwhip effect?
- 2- How is information shared from the retail warehouse to the supermarket to ensure order management of stock, product, and order fulfilment?
- 3-What are the impacts of supply chain technology on information sharing?
- 4- To what extent does collaborative planning entrench the magnitude of communication amongst warehouses and supermarkets to ensure better information sharing?

1.5 Research Objectives

1.5.1 Primary objectives

The purpose of this study aims:

- 1-To examine the extent of information sharing to optimise management of bullwhip effect.
- 2- To establish the extent of collaborative planning to entrench the magnitude of communication amongst warehouses and supermarkets to ensure better information sharing.

1.5.2 Secondary objectives

- 3 -To assess the impacts of supply chain technology as an enabling tool of information sharing.
- 4-To examine how information is shared from the retail warehouse to the supermarket to ensure stock management and order fulfilment.

1.6 Literature Review

When conducting the literature review for this study, it became evident that little research has been conducted on how to entrench the magnitude of communication through better information sharing amongst retail warehouses and supermarkets. This section will discuss the literature of this study.

1.6.1 Information Sharing

According to Hollin (2018:5-7), exchange of information is essential for ensuring the growth of businesses to enhance profits. For both public and private companies, sharing information has been regarded as a barrier because it often requires collaboration between organisations (Abdullah, 2017:175). According to Seifbarghy, Darvish and Akbari (2017:291), information sharing can assist in minimising the bullwhip effect. Sharing of information has quickly gained much importance in the supply chain, placing emphasis on both profit and productivity. It also increases the productivity and growth prospects of a company (Seifbarghy, Darvish and Akbari, 2017:291). Information sharing can be defined as real-time data collection through a conveniently accessible online database. Information sharing should be achieved through the intelligent use of technologies to reduce lead times and mitigate the bullwhip effect (Seifbarghy, Darvish and Akbari, 2017:291).

The main challenge in supply chain management is the implementation of processes that can combine priorities and organise operations to maximise information sharing at Khathino retail and supermarket. A thorough examination of Khathino warehouse and supermarket is carried out in the literature review, on how information flow can be maximised, to ensure management of stock, order fulfilment. Moreover, to ensure products required by consumers are acquired. Quality and accuracy of information provided across the supply chain will result in excellent decision-making, as per the literature. Information involving slow transmission and incorrect data results in poor financial results and bad decision-making. Literature suggests evidence that technology is a crucial factor in achieving optimal or successful information sharing.

1.6.2 Bullwhip Effect

According to Michna and Neilson (2013:10), the “term bullwhip effect can be described as a “distribution channel phenomenon in which forecasts yield supply chain inefficiencies”. In this study, delayed deliveries of consumer orders and minimal stock causes supply chain inefficiencies for the company. Improper sharing of information can cause inefficiencies in the supply chain. Delivery of goods should be communicated from the warehouse, manufacturers, logistics to the

supermarkets and consumers. Information on how many trucks deliver, at what time should also be communicated by the Khathino warehouse to the supermarket to minimize the bullwhip effect. Lastly, information should be shared amongst supply chain partners to increase efficiency, effectiveness, and competitive advantage in Khathino warehouse and supermarket (Wu and Katok, 2006:839-850).

1.6.3 Stock Management and Order Fulfilment

According to Kim (2021:47-67), inventory management is a “function of comprehending the stock mix of a company and the different demands on that inventory”. Inventory management can also be described as the activity of processing, ordering, monitoring, and managing inventory (Berman, 2011:57-71). In this study, information sharing is vital for the Khathino warehouse to have accurate orders of products required by the supermarket. Information should be shared from the warehouse to the supermarket to track orders and deliver the right amount of goods ordered. Information sharing is required in stock management to ensure Khathino supermarket receives accurate orders to shortened lead times, to improve performance, and to avoid unsatisfied consumers (Berman, 2011:57-71). According to Forslund (2011:515-524), fulfilment is defined as the "steps involved in receiving, processing and delivering orders to end customers. A fulfilment service is defined as a third-party company that provides order fulfilment on behalf of another party, such as an online seller". Hence, information should be share on whether the order is received by the supermarkets and the type of shipping method preferred by the supermarket. Throughout the fulfilment process, the companies rely on information from the suppliers and consumers. From the supplier's perspective, information on terms of payment, price, condition of payment should be share during the fulfilment process (Forslund, 2011:515-524).

1.6.4 Supply Chain Technology

Ward and Given (2019:338-350) define information, sharing and technology is “the proliferation of Internet-based IT and has laid a foundation for firms to electronically share rich information with partners in their supply chain". Information sharing with the use of technology may result in reduced lead times in the day-to-day operations of a business. However, Khaddam, Irtaimah and Bader (2020:547-562) has identified challenges in adopting supply chain technology. Adopting or implementing supply chain technology is expensive, that is why many organisations are hesitant to adopt this technology (Mohammed, Maroof, Thamer and Huda, 2015:49-58). Supply chain

technologies will automate and maximize business operations. As a result, it is imperative for businesses to continually develop supply chain technology. The correct supply chain technology allows the organisation to create visibility in its supply chain and proper flow of information. Supply chain technology drastically reduces shipping errors, tracks orders, and computerises shipping. Hence, supply chain technology will substantially reduce Khathino warehouse time spent tracking, receiving, and collecting order details. Thus, this can save business resources and time. Creating effective supply chain technology at Khathino retail warehouse and supermarket enables the company to access all the actionable and real-time information and transfer information quickly (Mohammed, Maroof, Thamer and Huda, 2015:49-58).

1.6.5 Collaborative Planning

Healey (2003:101-123) is of the view that collaborative supply chain, refers to two different businesses carefully planning and implementing supply chain activities with more effectiveness than when acting individually. Kumar, Singh and Shankar (2016:455) further alluded those collaborative efforts are based on maximizing the overall performance of the system by employing sophisticated technologies and procedures to coordinate the actions of members in sourcing, storage, manufacturing, and delivery in limited information sharing environment. In this study, collaboration is defined as the process of unifying Khathino warehouses and supermarkets. Through collaborative planning, Khathino warehouse will together improve information flow from Khathino warehouse and supermarket.

1.7 The Theoretical Framework for the Study

The theoretical framework is "a structure that supports a theory of a research study" (Zuber, 2013:18). The theoretical framework for this analysis is used to establish the interpretation of the theory that is related to the phenomena. On the contrary, a conceptual framework can be defined as "the researcher's synthesis of the literature on how to explain a phenomenon. It maps out the actions required in the course of the study given previous knowledge of other researchers' point of view and observations on the subject of research" (Ravitch and Riggan, 2016:20-21).

Walmart and Procter and Gamble (P&G) are using the CPRF model to maximise the supply chain and flow of goods and information. The CPFR model has helped the two companies share information effectively and make a profit. There are challenges involved in adopting this theory such as selecting the right partner, as the model integrates partners. Organisations also share

different goals, hence deciding on one goal can be difficult. Collaborative planning, Forecasting, and Replenishment (CPFR) “model is a tool to describe how a researcher determines how variables interlink” (Saptaria, 2017:130). The CPFR model is the model to be utilised in this study. CPFR was developed by Wal-Mart president of the supply chain in 1995. According to Burns (2016:10-11), the model sets out the basic structure of information flow. In the retail market, the supplier typically fulfils the buyer's position, the manufacturer fulfils the seller's position, and the client is the end customer (Burns 2016:10-11). Rogers (2016:20-21) indicated that the CPFR model can be applied in this study to entrench the magnitude of communication through better information sharing amongst retail-based warehouses and Khathino supermarkets. The application of the CPRF Model in this study can enhance overall information sharing from retail industries.

1.8 Justification of the Study

The purpose of this study is to entrench the magnitude of communication through better information sharing amongst the Khathino retail warehouse and supermarket. The study also aims to enlighten other companies on how the flow of information sharing can play a vital role in the growth of a business. It also aids in assisting businesses on how to cut costs, enables faster decision-making, and enhances the delivery of products and services to consumers by sharing effective information. If the study is not conducted business will not be able to make sound and effective decisions, it will also result in a lack of consumer satisfaction. Thus, this study can have a positive impact internationally on how to entrench communication to improve the organisation's supply chain.

1.9 The Significance for the Study

The goal of the research is to help entrench communication between retail warehouses and supermarkets to ensure the management of stock and consumer satisfaction. This research is likely to motivate other retail companies on how information can be shared across supply chain partners to reduce lead times and maximize profits. This study is important as it aims to stress the digitization of the retails supermarket on how technology can be used to effectively share information with the influence of the Fourth-Industrial Revolution (4IR).

1.10 Research Methodology

Research Methodology refers to the approach the researcher should adopt (Kumar,2011:1-10). In this study, mixed method will be used in a form of interviews and questionnaires to collect data. The researcher used both the interviews and questionnaires because it provides strong evidence. Mixed method gives a voice to study participants and ensure that study findings are grounded in participants' experiences. It is vital to the researcher as it provides useful information in understanding contradictions between quantitative results and qualitative findings. Hence, the central premise is that the use of mixed method provides a better understanding of research problems than either approach alone.

1.10.1 Research Design

According to Bhat (2018:1-2), research design is defined as a set of methods and procedures selected by a researcher to incorporate various study components. It can also be considered a master plan to provide an idea of how research is to be carried out. Team (2017:12) argues that the research design involves three forms of research analysis: descriptive, case study, experimental and sequential design. A case study design is an in-depth analysis of a research problem rather than a detailed systematic survey, it is a broad field of study. An explorative study seeks to learn about a phenomenon and find innovative ideas for enhancing phenomenon knowledge. Experimental research is any study done using a quantitative approach where a collection of variables is kept constant while the other collection of variables is evaluated as the focus of the experiment. Lastly, sequential design is an approach that incorporates both cross-section and longitude design. This helps to tackle some of the issues found with cross-section and longitude design (Kennedy-Clark, 2013:62). In this study case study analysis and primary data was utilised to gain in-depth information on the research problem. The research design also has three dimensions, which are strategy, philosophy, and sampling. Nickols (2017:3) defines strategy as a strategic plan to accomplish a long-term or general goal. The research strategy is an overarching attempt to carry out the research study, it gives out the direction to the researcher on the research study (Pedersen, 2017:233-240). The sample design lays out the basic strategy and methods for the preparation of the study (Curedale, 2013:2).

1.10.2 Research Approach

Morgan (2013:45) defines the “research approach as a strategy or process composed of specific principles about a comprehensive system of data collection, interpretation and analysis and is therefore focused on the complexity of the problem being addressed”. The research approach can be different for qualitative and quantitative studies. According to Gower (2016:82-90), the qualitative approach attempts in its language to tell the story of the perspectives of a group. According to Phillips (2015:197-210), quantitative approaches are used to collect information to explain a phenomenon among a larger number of respondents, thus providing the ability to quantify characteristics between groups or relationships. Mixed method analysis is the style of study in which a researcher incorporates elements of qualitative and quantitative methods. The study will use mixed-method approach. Compared to one approach alone, the mixed-method approach gives a greater knowledge of study objectives. This study employs explorative design under mixed methodology. The mixed-method approach is the use of in-depth interviews and questionnaires to acquire information for the study. The mixed approach assists to better comprehend the problem at hand by gathering at Khathino retail-based warehouse and supermarket (Kaur, 2016:93).

1.11 Study Site

According to Patter (2015:2), a study site can be defined as the place where the research is carried out. The research environment can be considered as the physical, social, and cultural site where the study is carried out. The study will be conducted at Khathino warehouse and Khathino supermarket in South Africa, in KwaZulu-Natal province, the warehouse and the supermarket to be used in this study will be in Durban.

1.12 Target Population

Ngwenya and Ramukumba (2017:6) state that population “refers to the group of individuals or elements who are the focus of the study”. Individuals who meet the sampling criteria can be characterized as the target population. The population is made up of individuals with identified characteristics. The target population for this study is the role players who work at the Khathino warehouse and supermarket. Two managers from the retail warehouse will be interviewed, and 150 employees will be given questionnaires to complete. The two managers will be interviewed

because they form part of the core valuable of the study given their experience on entrenching information sharing from the Khathino warehouse and supermarket.

1.13 Sampling Strategies

According to Lavrakas (2011:1), sampling strategy is a structure that is the basis of a survey sample collection and affects some other important aspects of a survey. There are two types of sampling strategy, probability, and non-probability (Santoro, 2016:100-102). According to Etikan (2017:5-6) probability sampling is an experiment that uses a method based on probability theory for selecting the sample from a larger population. On the other hand, non-probability can be defined as a method by which the probability of selection on each sample from the total population is not known, as the process does not provide the chance of selection for individuals in the population (Santoro, 2016:100-102). In this study, probability sampling will be used because the research will select a sample from a larger population, hence the study will focus on employees and the managers of the Khathino warehouse and supermarket. Under probability sampling, simple random sampling was used.

1.14 Sample Size

The sample size can be defined as the set of individuals that meet the sampling criteria (Mohapatra, 2020:17-21). The role players for this study are the employees and managers of Khathino retail-based warehouse and supermarket. The target population are 150 employees at the Khathino store for a quantitative approach. The 150 employees are chosen as a larger sample size to produce an accurate and reliable outcome. On the other hand, 2 managers at the warehouse will be interviewed because getting the correct sample size is important for obtaining a statistically meaningful outcome. The two managers will provide insight on how information is shared from Khathino retail warehouse to the supermarket. The two managers will be interviewed because they are in a position to provide pertinent information for the purpose of the study. The researcher is not an employee at the organisation, hence it is extremely difficult to get people to participate. Hence, that is why two managers were interviewed and not all the levels of management got the chance to be part of the study.

1.15 Data Collection Method

According to Bryman and Bell (2011:73-83), the research method can be defined “as the technique that is used by researchers to structure a study and to collect and analyse information that is

relevant to the research problem". The data collection method consists of five instruments, which are questionnaires, interviews, observation, document analysis, and the unobtrusive method. According to Ndokwe (2019:5) questionnaires can be defined as an approach with a series of questions used to collect data or information. Interviews can also be defined as an instrument, a face-to-face meeting used to gather information on the research issue (Dainejanzen, 2014:12). Observation can be defined as a method of collecting data through spotting. Document analysis can be defined as a qualitative research approach for analysing interview focus groups. Lastly, the unobtrusive method seeks unusual data such as published statistics (Harvey, 2012:1-3). In this study questionnaires and interviews will be conducted to acquire in-depth information on the research problem. Both the questionnaires and the interviews provide in-depth information about the research objectives of the study. This study used questionnaires to assess the behaviour, preference, knowledge and attitudes from a larger sample. Interviews are also vital in this study to allow the researcher to collect non-verbal data. Both the questionnaires and interviews were drafted by the researcher to collect information relating to the study objectives.

1.16 Data Quality Control

Cai and Zhu (2015:2) alluded that data quality control "is the analysis and documenting the process of the findings made in the context of the research effort". There are two qualitative and quantitative types of analyses (Cai and Zhu, 2015:2) Quantitative analyses provide measurements for an analysis to be discussed below. Quantitative consist of reliability and validity and qualitative measure trustworthiness. According to Morake (2013:30) measure of trustworthiness can be defined as the analysis stipulated as a method of demonstrating the true value of the research. It is also necessary to determine the quality of the study after the data have been gathered and evaluated. The researcher will concentrate not only on the outcome of the research but also on the quality of the study. According to Bashir and Afzal (2008:35), validity can be defined as an analysis that ensures that the results accurately reflect the phenomena that the researcher seeks to measure. Validity dictates whether the researcher measures what the researcher wanted to measure. Reliability is described as the degree to which the findings are constant over time and the correct representation of the total population under the research (Bashir and Afzal, 2008:35). In this study, the research will be conducted with trustworthiness, true value, reliability, and validity.

1.17 Data Analysis

According to Benozzo (2020:167-170), data analysis is a method of analysing data using analytical and statistical tools to seek useful information and assistance in decision making. According to Galetto (2016:1-2), quantitative methods are in a form of questionnaires, and qualitative data are in a form of interviews. On the other hand, qualitative analysis is simply the process by which quality data are examined to clarify a specific phenomenon (Galetto, 2016:1-2). Qualitative data analysis enables a researcher to understand the research goal by showing patterns and topics of the data. Quantitative research can be defined as an analysis of the data gathered by using surveys and questionnaires, utilizing computational methods, through analytical, mathematical, and numerical analysis of the data gathered, statistical charts, diagrams, and other presentation of facts in this approach. According to McCombes (2019:1), descriptive analysis can be defined "as the quantitative research method that attempts to collect quantifiable information to be used for statistical analysis of the population sample".

Hence, using the descriptive analysis will be an attempt to identify the nature of the problem influenced by a few responses contingent on the drive to eliminate the bullwhip effect. This study involved mixed-method analysis. Qualitative analysis will aid in quantitative analysis to help understand the depth of the problem and meet the research objectives, then using one analysis (Luo, 2019:1-4). Inferential and descriptive statistics used to analyse data in this study. According to Bhandari (2021,1-5) descriptive statistics are a series of short descriptive coefficients that summarize a data set, which might be a representation of the full population or a subset of a population. Inferential statistics can be described as a method of inferring attributes of an underlying probability distribution through data analysis (Bhandari, 2021:1-5).

1.18 Measures to ensure Trustworthiness

Measures to ensure Trustworthiness of the study is stipulated as a process of showing the “truth value” of the study (Morake, 2013:30). It is very important to evaluate the quality of the research after the data has been collected and analysed. The researcher’s focus must not only be on the results of the study but also on the rigour of the research. By rigour is meant the extent to which the researcher worked to enhance the quality of the studies (Heale and Twycross, 2015:66). Credibility was achieved in this study through engagement with the participants and respondents.

1.19 Ethical Consideration

Respondents should be protected, and the research should be guarded against any misconduct. Information confidentiality and anonymous should be given to respondents. This study will require an approval letter, with a business stamp written by the Khathino warehouse authorizing the researcher to conduct the study. To obtain a Gatekeeper's letter a researcher should approach the business and obtain the letter of support from the owner before submitting the research proposal. In this study, the Gatekeeper's letter should be obtained at the Khathino warehouse and supermarket. Ethical clearance will be conducted by the UKZN Research Ethics Committees. If ethical approval has not been obtained, the researcher will bear personal responsibility for any claims. Permission will also be received by the letter of permission attached to each survey tool utilized in the study. The University of KwaZulu-Natal needs all personal data gathered to stay private and to be preserved in the university records.

1.20 Limitation of the Study

Limitations are defined as occurrences the researcher has no control over (Simons, 2011:1-2). There are circumstances under which the researcher cannot control the research. The drawback of this experiment might be that employees are busy with crucial things in their lives and have little time to complete the questionnaires provided. Managers are also busy, and the researcher will have limited time to conduct an interview. The research will have to limit questions on the interview because of time constraints. The researcher will also have to travel to acquire information.

1.21 Conclusion

This paper has critically discussed the background, the research problem which is to entrench the magnitude of communication through better information sharing amongst the retail-based warehouses and individual Khathino supermarkets. Additionally, this paper has also stated the objective and the research questions of the study. It has also discussed the literature review and the types of framework to be used in the study. The study has also stated the justification, contribution, research methodology, limitation, delimitation, and measures of the study.

1.22 Chapter layout

Chapter 1: Introduction

This is the first section of the study. The research's background is described, followed by a brief description of the issue statement and the justifications for doing the investigation. In this chapter, the research's goals are also explained, the importance and limitations of the research.

Chapter 2: Literature Review

In this chapter, a summary of the specified or relevant literature is addressed. As a result of this, a literature review of the identified or relevant literature is addressed. Information and findings derived from earlier studies are presented in this chapter on how technology may be used to exchange information between retail warehouses and supermarkets. The theoretical framework used in this study is also discussed.

Chapter 3: Research Methodology

With the study methods, this chapter provides a comprehensive review. A description of the precise procedures utilised in literature evaluation and data gathering will be presented. The explanation of the population study as well as the sampling technique used in this document will be discussed. In addition, the sample size and frame will be included. The document will include a thorough description of the data collecting techniques, data analyses and questionnaire and interview question creation. Validity, reliability, and dependability will also be discussed in this chapter.

Chapter 4: Data Analysis

This segment summarises the study's discoveries and the results of data analysis. Tables, graphs, and reports using the data obtained from the respondents will be used to show the findings of the study.

Chapter 5 and 6: Results, Conclusions, and Recommendations

The research concludes with these last chapters. There is a quick overview of all of the findings in Chapter 5 provides a brief summary of the complete study. The outcomes of the research will be examined and evaluated in light of the literature that was explored in the study. The study's suggestions are outlined in the study's sixth chapter. In light of the findings and literature evaluation, conclusions will be formulated.

Chapter Two

Literature review

2.1 Introduction

The key variables that make up the literature framework for this study were mentioned in the preceding chapter. The literature on information sharing among Khathino retail-based warehouses and individual supermarkets is reviewed in this chapter. The review of existing literature is to learn more about the major determinants and obstacles of information sharing. The bullwhip effect, as well as the business process, are investigated, followed by a thorough explanation of the study's major factors and their impact on supply chain information sharing. The term bullwhip effect can be described as a “distribution channel phenomenon in which forecasts yield supply chain inefficiencies”. The study will thereafter review the importance of effective supply chain technology to optimise information sharing. This research study examines ways in which the Khathino retail-based warehouse can share information with Khathino supermarket. The study sought to investigate whether sharing information between Khathino warehouse and individual supermarkets is important for an efficient supply chain and satisfied consumers. Information sharing should result in advantages such as correct stock, increased sales, and better customer relationship. It should also help control the bullwhip effect as it advances upstream in the supply chain network.

The study's starting point is a review of related literature on the theory behind the investigation's concepts and assumptions, which are the foundation for the research questions. This section is about the theories and assumptions that underlie the study topics in the first chapter. Summary of past research and studies on information sharing's significance in businesses in warehouses and supermarkets. The literature research also investigates coordination techniques on sharing demand forecast and inventory data between Khathino warehouses and the supermarket (s). This review has two purposes: first, it establishes a context for the research problem by examining relevant theories, concepts, frameworks, and models. The second step is to lay out the research questions and place this research study within the context of existing knowledge. Furthermore, a literature review enables researchers to assess various techniques or study approaches, as well as to comprehend how such methods have been applied. As a result, this chapter reviews prior research to refocus the research methodology and clarify the research objectives. The following is the

structure of this chapter: It begins by outlining the context of this study, underlying, reviewing, and explaining the underlying theory, as well as relevant constructs in terms of the research problem, so that the reader is familiar with the complex topic and terminologies such as supply chain technology, information sharing, and the bullwhip effect. The chapter reviews the concept of information sharing in light of demand management and flow management. The discussion progresses to review the implications and benefits of sharing information, business process integration elements, and CPFR Model. The chapter ends with elaborating on agility, flexibility, and responsiveness on information sharing to enhance supply chain performance as an interlink between warehouse and supermarket.

2.2 Background of the Study

According to Hollin (2018:5-7), information sharing has an impact on supply chain costs and achieving competitive advantage, hence it has become an increasingly essential issue for the company's supply chain. Notably, the study was motivated by the desire on the part of the researcher to entrench the magnitude of communication through better information sharing amongst Khathino retail-based warehouses and individual supermarkets. Information sharing is viewed to have been a useful tactic for integrating activities, increasing profitability, and boosting corporate growth chances (Kim, 2020:1-3). Khathino is a significant multinational food retail company that sells food both in South Africa and around the world. As a result, the company's mission is to support communities with food. This struck a chord with the researcher, who grew up in rural areas and understood the significance of food insecurity. As a result, sharing of information is critical since it helps to improve supply chain efficiency by smoothing production and ensuring that consumers have access to the products they demand. In addition, better information sharing is required at the Khathino warehouse and supermarket to give opportunities for collaboration with other businesses and remove supply chain inefficiencies. Shared data from the Khathino warehouse and supermarket can help to improve current operations and plan. The most effective method is to leverage supply chain technologies. Unexpected incidents occur in supply chain stream sites with strict delivery schedules due to a lack of appropriate planning, resulting in the bullwhip effect. The upstream portion of the supply chain, according to Vaillancourt (2020:3), consists of the organisation's suppliers and the methods for managing their interactions. The organisations. and processes responsible for distributing and delivering items to end customers are found in the downstream section. According to (Singh, 2018:1-3) the "bullwhip

effect refers to a scenario where a retailer's orders to their suppliers tend to have a larger variance than the consumer demand that triggered the orders". The retailer's order information and volume requirements may be inaccurate and out of sync with true customer demand. As a result, information exchange is an effective strategy for lowering late orders and surplus stock levels at supply chain stream points. To decrease the bullwhip effect, Khathino warehouse and supermarket should implement effective information sharing systems.

2.3 The Theoretical Framework for the Study

Demiray, Akay, Tekin, and Boran (2017:1567-1586) define Collaborative Planning, Forecasting, and Replenishment (CPFR) "as a business practice that combines the intelligence of multiple trading partners in the planning and fulfillment of customer demand". According to Belvi (2019:60-69), the CPFR method was established in 1995 by Wal-president Mart's supply chain. CPFR enhances product availability while lowering inventory, shipping, and logistics costs (Laporte, 2020:1). In this study CPFR approach is to be used. Mazikana (2019:2015) avers that CPFR is a platform that incorporates the information systems of internal and external business partners. In Fu (2016:931-946) view, CPFR systems "are information systems that enable partnering firms to integrate their inventory planning, forecasting and replenishment processes by sharing information, developing joint forecasts and jointly creating replenishment plans". The complexity develops when these companies must integrate conflicting business processes across CPFR partners, as argued by Burns (2016:1-2). These findings are pertinent to the current study. Walmart and Procter and Gamble (P&G) employed the CPRF model to improve supply chain efficiency and information flow (Yousefli, 2018:181-194). Yousefli (2018:181-194) goes on to say that the two companies used the CPFR model to efficiently share knowledge and make a profit. To evaluate and comprehend the concept of information sharing in supply chains, various theoretical perspectives have been applied. Rizov (2018:43-59) conducted a thorough literature analysis of published research in peer-reviewed international journals on prevalent theories and techniques that may be used to examine different elements of information sharing in his recently released work. CPFR arises from the analysis of many theoretical views on information sharing. Because the primary goal of this study is to look at the function of information exchange from upstream to downstream. CPFR addresses why information is shared across the business, the model also improves operational performances.

2.4 Elements of CPFR

The CPFR approach is made up of three parts, according to Ranjan (2020:17-44): collaborative planning, forecasting, and replenishment. In this study, the CPFR model may be used to establish the volume of communication through improving information exchange between retail-based warehouses and Khathino Supermarket. The first element is collaborative planning. According to O'Rourke (2016:58-82). Berezinets and Zenkevich (2020:38-53) suggest that collaborative planning required significant investment in information technologies and change management across businesses. The second element is forecasting. Tayur and Ganeshan (2019:73) emphasise that forecasting is “a method whereby the organisation looks at data about its suppliers, whether they provide complete products or part that are assembled further down the supply chain and used to project how much products will be available and when”.

Khathino's forecasting practices are the centerpiece of its competitive strategy. It is argued by Tayur and Ganeshan (2019:73) that the firm has built a successful collaborative partnership with both customers and suppliers. As a result, the company has increased its bargaining power, reduced inventory levels, and operational costs, and realized better economies of scale across its distribution network. The visibility of current demand and inventory levels enables Khathino to better forecast and schedule their production inventory activities and improve customer service. Kembro, Naslund, and Olhager (2017:77-86) argued that sharing information across stream sites also poses significant challenges. Yao and Cederlund (2013:285-297) alluded that the last element is replenishment. In Li and Tiwari (2016:78-87) findings replenishment is used to keep inventory moving through the supply chain by ensuring that order and line-item fill rates are as high as possible.

2.5 Business processes in supply chain

Present supply chain businesses aim to use systems that share information quickly and accurately. As process flows are connected among trading partners, business processes will become more complicated (Denner, Puschel, and Roglinger, 2018:331-349). To create an intra- and inter-organisational aligned supply chain network, the process mechanisms in a supply chain must be synchronized. Szymczak (2013:16-18) defines supply chain as “the network of organisations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the eyes of the ultimate

consumer”.Kembro, Naslund and Olhager (2017:77-86) a re-engineered supply chain process in organisations from the manufacturing phase to the ultimate consumer is required for effective information flow. Hoogeboom and Wilderom (2020:3-42) identified the need for reliable systems engineering to effectively share information.

2.6 Literature Review

According to Singh and Thurman (2019:289-306), a literature review acknowledges the work of various authors and therefore assures the reader that the study has been meticulously designed. It is considered by acknowledging prior work in the topic of study, that the author has read, assessed, and incorporated that work into the current work. On Morcov, Pintelon, and Kusters (2020:1-2) view, a literature review is academic research that reviews current knowledge on a given issue, including substantive findings as well as theoretical and methodological contributions.

2.7 Information Sharing

Dwaikat and Money (2018:289-300) define information sharing as the process through which people or other entities exchange data. This might be accomplished electronically or via the use of specific systems. Veselovska, Kožárova, and Zavadsky (2018:381-393) define “information sharing as the voluntary act of making information possessed by one entity available to another entity”. Darvish (2017:291) reports findings that improving information exchange can help to reduce the bullwhip effect. Hollin (2018:5-7) insisted that information sharing has quickly become a critical problem in the supply chain since it impacts the value of the supply chain, as well as the acquisition of competitive advantages and income. Davish (2017:291) showed at Khathino the major challenge in supply chain management is the adoption of procedures that can combine priorities and arrange activities to maximize information sharing.

The literature review investigates how information flow might be improved in the Khathino ware house and supermarket to enable stock management, order fulfilment, and the acquisition of consumer-requested products. Literature shows that good decision-making is aided by the quality and accuracy of data shared across the supply chain. Research suggests that technology is a crucial driver for successful information exchange (Abdullah, 2017:175). Meisinger (2020:4) highlights the necessity of information sharing across supply chain partners from upstream to downstream, such as exchanging information on transported entities, items required by customers, containers, packages, and products. Nakusumi (2017:140-149) states that are information sharing is seen as

an effective coordination tool that combines operations and enhances a company's profitability and development potential. Poor information sharing has been shown in the literature to have a detrimental influence on the whole retail industry. Literature validates that information sharing between the Khathino warehouse and the Khathino supermarket is critical for providing better and more responsive service to customers. To make this possible, the company should ensure proper supply chain technology implementation to ensure the fast information flow from the downstream to the upstream supply chain network.

2.8 Bullwhip Effect

According to Michna and Neilson (2013:10), the term bullwhip effect can be described as a “distribution channel phenomenon in which forecasts yield supply chain inefficiencies”. It refers to inventory fluctuation in reaction to changes in market demand as it moves further along the supply chain. However, Schmidt (2018:839-843) defines the bullwhip effect as "the observation that the variability of orders in supply chains increases as one moves closer to the source of production". In the opinion of Warburton (2004:1), the bullwhip effect refers to a scenario “where a retailer’s orders to their suppliers tend to have a larger variance than the consumer demand that triggered the orders. Hu (2019:36-40) argued that delivery of goods should be communicated from the warehouse, manufacturers, logistics to the supermarkets and consumers (Hu, 2019:36-40). In this study, delayed deliveries of consumer orders and minimal stock causes supply chain inefficiencies for the company.

Hu (2019:36-40) is of the view that information on how many trucks deliver, at what time should also be communicated by the Khathino warehouse to the supermarket to minimize the bullwhip effect. Michna and Neilson highlighted in their study that the flow of information sharing results in the smooth running of business operations which in turn minimises the bullwhip effect. In Nagaraja and McElroy (2016: 10-15) findings exchanging decision rights is considered to elevate the bullwhip effect. Thomas and Mahanty (2019) developed optimum ordering strategies that decrease the bullwhip effect and enhance inventory management, in general, using a new solution to supply chain equations. Jeong and Hong (2019:1739-1751) described published all of the reasons for the bullwhip effect that may be eliminated by reengineering the supply chain. Smooth material flow, smooth and transparent information flow, and time compression of all operations are all required to re-engineer the supply chain to systematically remove all avoidable reasons of

uncertainty. Dolgu, Ivanov and Rozhkov, (2020:1285-1301) insisted that the bullwhip effect can be mitigated by companies who employ information sharing policies throughout the supply chain. Actual customer demand information can be shared with suppliers and manufacturers, which will help enhance supply chain demand forecasting (Dornfield and Linke, 2012:580-600). Forecasting methods that have shown to be accurate and reliable in the past Industries can predict demand using historical sales data and point-of-sale data. As a result, the bullwhip effect is reduced by the amount of effective information sharing implemented by supply chain trading partners. (Ojha, Sahin, Shockley, and Sridharan (2019: 529-543). Hence, the literature indicates that information sharing is an effective approach that can be used by companies to mitigate the bullwhip effect. (Skaksen, 2013:2-3).

2.9 Inventory Management and Order Fulfilment

According to Ramos (2020:113-131), inventory management entails keeping track of stock from sourcing to order fulfillment throughout the supply chain. The process of controlling goods once it arrives at a warehouse, store, or other storage site is called inventory control. According to Agrawal and Jia (20119:743-744), inventory management entails having the correct stock at the right levels, in the right location, at the right time, and the right cost. In this study, information sharing is vital for the Khathino warehouse to have accurate orders of products required by the supermarket. Thus, the literature indicates that information should be shared from the warehouse to the supermarket to track orders and deliver the right amount of goods ordered (Berman, 2018:57-71). Wang and Disney (2016:691-701) explain how the ability to share order status from upward to downward members can aid in the resolution of first-call issues. The authors went on to say that efficient inventory management necessitates a dependable technological platform as well as communication among all parties involved.

Without inventory management in place businesses would encounter excessive inventory levels and high storage costs. (Leung and Chen, 2016:30) are of the view that when precise and up-to-date information is missing, communicating with customers about product availability and estimated shipment times becomes impossible. The customer's and supplier's inventory information can be shared if they are both involved in the negotiation. According to Dias and Silver (2019:1031-1038), Order fulfilment can be defined complete process from point of sales inquiry to delivery of a product to the customer. According to Camiller (2021:1-2), order fulfilment is

defined as the "steps involved in receiving, processing and delivering orders to end customers. A fulfilment service is defined as a third-party company that provides order fulfilment on behalf of another party, such as an online seller". Literature states that information should be shared on whether the order is received by the supermarkets to the warehouse and the type of shipping method preferred by the supermarket. Companies rely on information from suppliers and customers throughout the fulfilment process. During the fulfilment process, information on terms of payment, pricing, and payment conditions should be shared from the supplier's standpoint.

2.10 Supply Chain Technology

Technology is used in today's supply chains in almost every aspect, from transaction processing and tracking to planning, scheduling, and management. It makes it possible to have a completely connected, visible, and efficient supply chain that benefits from collaboration. According to Bai and Sarkis (2020: 2142-2162), supply chain management software is a system that is designed to manage and improve information sharing between various key supply chain partners to achieve goals like just-in-time procurement, inventory reduction, increased manufacturing efficiency, and meeting customer needs promptly. In Sovolainen (2017:10) view, information sharing, and technology is "the proliferation of Internet-based IT and has laid a foundation for firms to electronically share rich information with partners in their supply chain". Patterson (2003:95-121) states that business processes will be automated and improved thanks to supply chain technologies. As a result, organisations must invest in supply chain technology regularly. Nakusumi (2017:140-149) suggests that correct supply chain technology allows the organisation to create visibility in its supply chain and proper flow of information.

Supply chain technology drastically reduces shipping errors, tracks orders, and computerizes shipping. Hence, the literature indicates that supply chain technology will substantially reduce Khathino warehouse time spent tracking, receiving, and collecting order details. Thus, this can save business resources and time, creating effective supply chain technology at Khathino retail warehouse and supermarket enables the company to access all the actionable and real-time information and transfer information quickly (Nakusumi, 2017:140-149). Moharana, Murty, Senapati and Khuntia (2011:747-751) indicated that with effective supply chain technology, products are tracked down and can be easily traced once they leave the warehouse. Ali and Haseeb (2019:215-226) indicated that Supply chain technology efficiently improves information in

businesses, allowing the supply chain to reduce costs and improve supply chain efficiency to compete on a global scale. Supply chain technology must be used to promote collaboration, flexibility, speed, and accuracy. By reducing order cycle time and cost, supply chain technology helps to improve overall competitiveness, supply chain performance, operational efficiency, and financial performance.

2.11 Collaborative Planning

Faehnle and Tyrvaenen (2013:332-341) defines collaborative planning as a method of urban planning that brings together stakeholders and engages them in a process that allows them to make decisions together while respecting the perspectives of all parties involved. Roy (2015:59-68) is of the view that when two or more independent companies work together to design and execute supply chain operations, they have a better chance of succeeding than if they worked alone. Literature indicates that collaboration is defined as the process of unifying Khathino warehouses and supermarkets. Through collaborative planning, Khathino warehouse will together improve information flow from Khathino warehouse and supermarket. Wu (2013:1) advocates that to determine the transparency of information between trading partners, information technology should be harnessed to assist supply chain members to establish partnerships for better supply chain performance. Kim and Shin (2019:6181) is of the view that supply chain partnerships tend to mitigate the deficiencies associated with decentralised control by reducing the “bullwhip effect” through working with supply chain members before implementing supply chain collaboration with trading partners.

2.12 Business processes integration elements

Information sharing requires collaboration between functions such as customer relationship management, supplier relationship management, demand management, manufacturing flow management, and procurement.

2.12.1 Consumer-Supplier relationship management

Botea and Marinescu (2017:48-53) states that “supplier relationship management (SRM) is the supply chain management process that provides the structure for how relationships with suppliers are developed and maintained”. Wieteska and Grażyna (2016) stated that businesses should form relationships with suppliers in light of growing market instability. Flexible and adaptable are the characteristics of SRM. Botea and Marinescu, (2017:48-53) alluded that "supplier relationship

management has a significant impact on financial performance and business decision systems of a company”. Kosgei and Gitau (2016:134-148) highlighted that having SRM helps organisations to access data from across their supply chain, allowing them to collaborate on functions such as sales, production, and logistical planning. A company's performance can be improved if it prioritizes customer and supplier partnerships. Homburg, Stierl and Bornemann (2017:54-72) demonstrated that Relationships between consumers and suppliers decrease uncertainty in business processes, enhance demand forecasting, and increase delivery performance. Suppliers and customers benefit from information sharing in businesses because it saves costs, increases supply chain efficiency, and facilitates smart decision-making. Khathino's warehouse and supermarket should be able to supply consumers with the exact quantities of stock they require. Strong customer relationships with the business offer consumers the goods and services they desire.

2.12.2 Demand management

According to Rexhausen, Pibernik and Kaiser (2012:269-281), demand management is a supply chain management technique that balances the customer's needs with the supply chain's capabilities. Customers' needs are considered while analysing the supply chain, and all procedures are geared towards meeting those expectations. Stock, Tsai, Jiang and Klein (2021:59-70) highlighted in his study that effective information sharing is required to ensure no excessive stock or less stock is produced in the company. Improved information sharing allows companies to be more responsive to consumer demands. Before goods are manufactured, companies should be informed on how much stock is required by the consumer, to avoid the bullwhip effect. Information sharing is vital in every aspect of an organisation, from the manufacturing to the logistics phase. Lotfi, Mukhtar, Sahrah and Zadeh (2013:298-304) alludes to the fact that “information sharing in demand management ensures that there is no excess stock”. Ryu, Tsukishima and Onari (2009:162-175) suggested that a business must be able to balance orders (demand) for its products and services with its ability to produce them in terms of resource and scheduling restrictions to effectively manage the planning, production, and delivery (supply).

2.12.3 Manufacturing and flow management

According to Khorram and Nonino (2017:1419-1439), manufacturing can be described as the manufacture of products for use or sale utilising labour, machinery, tools, chemical or biological procedures, it is a process of manufacturing raw material into a finished product. Bodek (2017:1)

highlighted that Manufacturing is often carried out on a large-scale production line using heavy machinery and specialised labour. Management of technologies and procedures utilized in the manufacturing process is also included in manufacturing. Information sharing in the manufacturing phase is imperative to ensure accurate the products required by consumers are being manufactured. In this study, Khathino supermarket should provide Khathino retail-based warehouse on what products are services are required by consumers. Multiple phases or tasks within a business process are managed using flow management techniques. To enhance operations, flow management examines how workflows move from task to task within a given business process. Consumer satisfaction and bullwhip effect are enhanced by controlling information flow in a supply chain (Scheer and Hoffmann, 2015:351-380). Literature suggests that information flow should be managed from manufacturing, logistics in Khathino warehouse to ensure Khathino supermarket receives goods and services required by consumers.

2.13 Procurement

Edler and Yeow (2015:1) defines procurement as the ultimate act of purchase, but procurement may also refer to the entire procurement process, which is crucial for organisations before they make their final buying decision. Lysons (2020:1-3) is of the view that an organisations procurement policy dictates the suppliers, products, and communication technique it will employ with its suppliers. Procurement information sharing is necessary to gather data on raw materials, and other products from companies and to get better outcomes in the procurement process. Purchasing procedures are more reliable, stable, and profitable when information is shared (Yoon and Rosales, 2020:1362-1383). Yoon and Rosales (2020:1362-1383) points out, the sharing of procurement information also helps firms increase delivery reliability, shorten delivery times, and enhance service quality. Several studies have emphasized the importance of information quality in the procurement phase. Organisations would be able to reduce uncertainty and improve planning with the correct information. Lysons (2020:1-3) further indicated that with the proper information at their fingertips, businesses can react faster and more effectively as the marketplace changes. They can then better serve their customers. Lysons (2020:1-3) findings indicated that organisation's need for raw materials and how much stock to keep on hand for day-to-day operations are determined by information gathered during the procurement phase, which is vital to this research.

2.14 Collaboration Planning, Forecasting and Replenishment (CPFR) Model

Ravitch and Riggan (2016:20-21). states that the Collaboration Planning, Forecasting, and Replenishment (CPFR) plan is the latest method in the evolution of supply chain collaboration. The author further indicates that CPFR can be defined "as an alternate technique to facilitating communication". Fourteen years ago, CPFR was first proposed as a concept that allowed manufacturers and retailers to work together to plan the replenishment of the retailer's inventory (Rogers, 2016:10-11). According to Mazikana (2019:2015) CPFR is a strategy that attempts to increase integration by supporting and aiding collaborative activities. CPFR is an acronym for Collaborative Planning, Forecasting, and Replenishment. CPFR attempts to achieve inventory management cooperation through shared visibility and replenishment of items across the supply chain. Benchmarking Partners began creating a CPFR operating model for cross-enterprise use in late 1997 (Belvi, 2019:60-69). After its first adoption, the Voluntary Interindustry Commerce Standards (VICS) Association improved the CPFR to increase the overall efficiency of the supply chain by creating cooperative relationships between buyers and sellers through co-managed procedures and shared information (Cagley, 2016:30). Mazikana (2019:2015) further alluded that supplier's benefit from CPFR collaboration because they have a better knowledge of demand fluctuation and are better able to deal with it. For this reason, collaboration is one of the most crucial aspects of supply chain management. For a seamless flow of information and procedures, hospitals take the initiative to work with their pharmaceutical suppliers. CPFR might be used by a hospital's information system and its suppliers, allowing the institution to maximize the benefits of its electronic procurement system (Yousefli, 2018:181-194). The method offers supplies and consumers to participate in demand forecasting and inventory replenishment planning operations.

2.15 Logistics

Christopher (2016) states that "logistics is crucial to the supply chain of any business, it involves the timely delivery of freight and goods from one place to another, as well as the unloading and unpacking of this cargo". According to the results of Beiki (2013:17-20) research, information sharing using intelligent transportation systems improves traceability of products in fresh food supply chains, increases the safety of freights, and transportation of harmful goods. In this study, the Khathino warehouse should ensure that the supermarket has access to information about the movement of goods, and share data through intelligent transportation systems, which would

improve product traceability and promote the safety of trains delivering hazardous items. Beiki (2013:17-20) argues that during logistic phase the flow of shared information is crucial, as it helps organisations determine how many orders or stock must be shipped. Actors in supply chains can collaborate on tracking and tracing activities when they communicate tracking and tracing information about entities at different levels in the chain. Christopher (2016) emphasized that supply chain technology, which facilitates communication in supply chain stream sites, can facilitate information sharing

2.16 Flexibility

Dwaikat (2018:289-300) alluded that information sharing, and flexibility go hand-in-hand since the information supplied should be easily modified so that it can reach the manufacturing phase promptly and then reach the logistics phase to reach the final consumer. For an organisation to be successful, the information it shares should be flexible and also function in an agile environment to handle demand unpredictability. Doetzer and Pflaum (2021) view flexibility in information sharing provides the accurate delivery date and enhances satisfaction in consumers. In this study, Khathino warehouse can share flexible information with Khathino supermarket to control the delivery quantity and to satisfy consumer needs. Hence, flexibility is vital in information sharing. Flexibility has been proven to increase performance and information sharing, according to research. Companies with a lack of information sharing should prioritize flexibility to remain competitive, according to research findings as well (Hu, Haq and Gu, 2021:1411-1434). As argued by Hu, Haq and Gu (2021:1411-1434) For efficient information sharing and supply chain responsiveness, flexibility is a crucial enabler. In this study, the flexibility of information sharing can enhance Khathino warehouse and supermarket's smooth flow of information and improve performance. The authors findings indicate that information sharing should be flexible for smooth operations in businesses. Thus, flexibility is an important concept in information sharing.

2.17 Agility

Information sharing should move quickly and easily to all supply chain phases of the organisation to ensure consumers get what they require. Literature suggests that Khathino warehouse and supermarket should have agile information sharing. Suifan and Alhyari (2020:1-13) defines agility as the firm's ability to adapt to changes in the market and consumer demand that are unpredictable. To know which orders to send and where to distribute them, and agile information sharing process is also essential in the logistic phase. An organisation's ability to learn and function effectively

might be hampered by a lack of Agile information exchange practices. This includes ensuring that information reaches all stages of production from manufacturing through logistics to the ultimate consumer. Literature indicates that Khathino warehouse and supermarket be able to respond to rapid and unpredictable changes for information to flow smoothly and to improve performance. Thus, agility information sharing should be implemented.

2.18 Responsiveness

According to Hum and Zhou (2018:106-118) responsiveness can be defined as the ability of the firm to respond promptly to the needs and wants of its customers. Song and Liao (2019) demonstrates that information shared in businesses should be responsive to attend to daily consumer needs. In this study, Khathino warehouse and supermarket require information shared amongst each other to be responsive, for smooth flow of business processes. Information sharing was positively related to customers' responsiveness. Thus, the literature concludes that information sharing needs to be responsive to travel fast across supply chain phases. Information sharing is regarded as crucial when it comes to responding to changes in market demands. Hasibuan and Maharani (2020:731-738) claims that reduced production costs, shorter lead times, and faster product delivery are all possible with responsive information sharing in the supply chain network. For Khathino's warehouse manufacturing approach to be successful, demand must be stabilized, reliable information must be shared, and supply chain unpredictability must be reduced. As a result, businesses must ensure that information is shared efficiently between warehouses and supermarkets. Companies that are responsive in their information exchange can produce less or more in response to customer orders.

2.18 The Implications of information sharing

Sahin and Topal (2019:815-828) surveyed to determine the influence of information sharing on the performance of businesses. He observed that companies with the best profit margins don't just exchange information, but also work closely together. As Nativi and Lee (2012:366-377) shown, companies can reap the benefits of information sharing by changing their operating policies. To reap the full benefits of information sharing, the organisation must undergo some important changes. Collaboration between organisations is essential to accomplish common supply chain efficiency goals, which are built on mutual trust (Nativi and Lee, 2012:366-377). Zibak and Simpson (2019:1-9) underline the importance of sharing decision rights, effort, and resources for

collaboration and coordination. If individuals in an organisation continue to think in functional silos, then information sharing will not have much of an impact.

2.19 Type of Information

How information is distributed can be viewed from a variety of viewpoints. A supply chain's upstream and downstream parties should share information to what extent? What partners should be involved at each stage? These considerations have to do with the supply chain structure. Van (2007:239-256) argues that organisations must carefully consider which supply chain partners they should be closely connected with before planning. Sauli (2021:1-22) argues that a company should only exchange information with certain partners in a supply chain. To protect the security of the company's information, Khathino warehouse should choose with which supply chain partners it should share information. The author further alluded that product attributes influence how many retailers should be involved in information sharing. Companies should assess how far in the supply chain should information be exchanged. Enhanced information sharing will result in changed business operations (Sauli, 2021:1-22).

2.20 Conclusion

Supply chain technology is an essential tool for effective information sharing in businesses. Poor decision-making is an outcome of a lack of information sharing. This chapter indicate that CPFR is an effective approach to sharing information with upstream and downstream supply chain partners. The literature further indicates that for Khathino warehouse to effectively share information and make profits the company must have a strong relationship with its consumers and suppliers. Having a strong consumer relationship enhances the chances of businesses delivering products according to consumer needs thus minimizing the bullwhip effect. Information exchange is an important aspect in businesses, literature stipulates that information should be shared across all business supply chains from the manufacturing phase to the logistic phase. Moreover, supply chain partners should also have access to current information being shared in Khathino for smooth business operations. As a result of transparent information sharing, all parties are kept informed of possible issues with the business. Hence, a product or service that may be handled in a coordinated manner. The study's background, the theoretical framework, and its relevance were critically addressed in this chapter. A discussion of different authors' theories followed. Furthermore, several previous researches on information sharing in supply networks is also discussed in this study. There have been several studies conducted on the impact of information sharing under different

circumstances and assumptions. The study objectives were discussed, as well as aspects and ways to achieving them. The research technique used in the study, as well as the methods and techniques used in its implementation, will be discussed in the next chapter.

Chapter Three

Research methodology

3.1 Introduction

A review of the literature on information sharing to manage the bullwhip effect on the stream sites on Khathino supermarket was discussed in the previous chapter. The study's governing CPFR framework, was presented. This chapter defines and presents the research design used in this research project. The chapter describes the researcher's sample strategy and data gathering procedures. The study used mixed method to analyse data. The questionnaire and interview design are discussed in depth, as the methods used to analyse the data. This chapter focuses on all the methods used to analyse data.

3.2 Research Questions

This study aims to answer the following research questions:

- 1-To what extent can information sharing optimize the management of the bullwhip effect?
- How is information shared from the retail warehouse to the supermarket to ensure order management of stock, product, and order fulfilment?
- 3-What are the impacts of supply chain technology on information sharing?
- 4- To what extent does collaborative planning entrench the magnitude of communication amongst warehouses and supermarkets to ensure better information sharing?

3.3 Research Objectives:

The purpose of this study aims:

3.3.1 Primary objectives

The purpose of this study aims:

- 1-To examine the extent of information sharing to optimise management of bullwhip effect.
- 2- To establish the extent of collaborative planning to entrench the magnitude of communication amongst warehouses and supermarkets to ensure better information sharing.

3.3.2 Secondary objectives

- 3 -To assess the impacts of supply chain technology as an enabling tool of information sharing.

4-To examine how information is shared from the retail warehouse to the supermarket to ensure stock management and order fulfilment.

3.4 Hypotheses

H₀₁: Supply chain technology is not effective tool to enhance information sharing

H_{A1}: Supply chain technology is an effective tool to enhance information sharing

H₀₂: Order and product fulfilment are not significant through sharing information

H_{A2}: Order and product fulfilment is significant through sharing information

3.5 Research methodology

Moffitt (2013:1) defines the term research methodology as the technique and system for gathering information and data for decision-making purposes. This approach of obtaining knowledge and data may also be used to make efficient business decisions.

3.5.1 Research Design

According to Abbott and McKinney (2013), research design can be defined as a method to incorporate diverse study components through a system of techniques and processes. It is a plan on how the research will be conducted. Furthermore, Panke (2018: 4) defined research design as the plan to connect theoretical problems with the applicable empirical research. The study analysis not only explores the whole nature of the situation but also its related factors. Case study design was adopted for this study. Tetnowski (2015:39-45) described case study design as a method that is “based on an in-depth investigation of a single individual, group, or event. Case studies may be descriptive or explanatory”. The case study method is particularly effective when it is necessary to gain a thorough understanding of a topic, event, or phenomenon in its natural environment. The first part of the study provides a thorough literature review which is crucial for the development of the data collection guide. Data will be collected from the retail and manufacturing managers. The managers will be interviewed because they are in a position to provide pertinent information for the purpose of the study. The researcher is not an employee at the organisation, hence it is extremely difficult to get people to participate. Covid-19 restrictions have made it extremely difficult to get people to participate. The respondents represent top, lower and middle management, individuals who are well-versed in supply chain and business principles.

3.6 Research Approach

The study utilised mixed method approach under case study design. The approach is called the mixed method. Mixed methods is a study design that incorporates philosophical assumptions as well as methodologies of analysis. The approach provides in-depth findings in the researcher's study. When testing hypotheses in a more rigorous way, mixed method measurements are necessary in order to collect data for this study, which is cross-sectional in nature. In the Durban area of KwaZulu-Natal in South Africa, data is gathered at a certain point in time. The researcher used both the interviews and questionnaires because it provides strong evidence to the primary research goals. Mixed method gives a voice to study participants and ensure that study findings are grounded in participants' experiences. It is vital to the researcher as it provides useful information in understanding contradictions between quantitative results and qualitative findings. Hence, the central premise is that the use of mixed method provides a better understanding of research problems than either approach alone.

3.7 Measurement Scales

Measurement scales are used to describe and classify variables/numbers. Statistics can be used to determine the acceptability of certain scales of measurement based on their distinctive properties. There is a four-measurement scale which is nominal, ordinal, interval, and ratio Dalati (2017:79-96). Using a measurement scale, data variables are validated or quantified in statistics, it also establishes approaches to be used. The category data utilised in this analysis are mutually exclusive. and collectively exhaustive. Responses can be classified into different groups based on level of employment and the number of years they have worked for Khathino using nominal data. Using these results, individuals were asked to rank a series of criteria from most liked to least preferred, allowing them to communicate their opinions and experiences concerning information sharing.

3.8 Sampling Technique

Khathino warehouse and supermarket employees, managers, supplies, and supervisors were considered for this study. Individuals with a higher rating are more likely to have correct data than participants with a lower ranking (Mbhele, 2014:206). As a result of their comprehensive knowledge of information sharing from the warehouse to the supermarket, managers have been included in this study. Managers were the perfect candidates for this study's qualitative approach.

In meeting the research study's requirements, all individuals were considered in the study. Participant knowledge on the phenomena is likewise in-depth and comprehensive. The two managers will be interviewed because they are in a position to provide pertinent information for the purpose of the study. Because the researcher is not an employee of the company, getting individuals to participate is incredibly tough. As a result, only two managers were questioned, and not all levels of management were given the opportunity to participate in the study.

3.9 Sampling types and sizes

The sampling technique can be classified into probability and non-probability sampling. Non-probability sampling and probability sampling are two approaches that can be employed in quantitative research when distributing questionnaires to study participants (Uprichard, 2013:1-11). Probability sampling is an experiment that uses a method based on probability theory for selecting the sample from a larger population (Acharya and Nigam, 2016:330-333). Vehoyar and Steinmetz (2016:329-345) defines non-probability can be defined as a method by which the probability of selection of each sample from the total population is not known, as the process does not provide the chance of selection for individuals in the population. Probability sampling will be used in this study. Under probability sampling, simple random sampling will be used. Individuals who can provide imperative information for this study were part of the sampling criteria. To acquire as much information from managers and suppliers as possible about the flow of information from Khathino warehouse to the supermarket. The probability sampling was implemented (Ngwenya and Ramukumba, 2017:6). The sample size can be defined as the number of people who meet the sampling requirements. There are 150 people in the Khathino retail industry who were selected as a sample for this research. As a result of their positions, employees, managers, and supervisors can give relevant information to the research. For this study, the sample size is within Durban and the eThekweni municipality in Kwazulu-Natal province, South Africa. The researcher is not an employee at the Khathino, hence it is extremely difficult to get people to participate. Covid-19 restrictions has also made it extremely difficult to get people to participate. Hence, that is why two managers were interviewed and not all the levels off management got the chance to be part of the study.

3.10 Study Site

According to Patter (2015:2), a study site can be defined as the place where the research is carried out. The research environment can be considered as the physical, social, and cultural site where the study is carried out. The study will be conducted at Khathino warehouse and Khathino supermarket in South Africa, in KwaZulu-Natal province, the warehouse and the supermarket to be used in this study will be in Durban.

3.11 Paradigms in Research philosophy

3.11.1 Ontology

When people assume that something makes sense or is genuine, the researcher makes ontological assumptions about the fundamental nature of the social phenomena being studied (Lukyanenko and Mueller, 2019:133-137). The researcher's belief system regarding the nature of being and existence is examined as a result of this study. Some assumptions must be made to believe that anything makes sense or is true. Using ontology, a researcher can explore the key religious ideology and philosophies about what it is to be human or to exist. Understanding how to make sense of the facts obtained requires philosophical beliefs about reality. These assumptions, notions, or propositions guide the researcher's thinking about the study topic, its relevance, and how the researcher can approach it to answer the research question, comprehend the problem studied, and contribute to its resolution.

3.11.2 Axiology

In research proposals, axiology refers to the ethical considerations that must be made when planning for research. Creating judgments of significance or correct decisions takes a philosophical perspective. Research-related ideas of good and bad behaviour must be defined, evaluated, and understood. As part of the research process, the researcher should adhere to the highest ethical standards by knowing what constitutes acceptable and unacceptable behaviour. Researchers must respect the dignity of all individuals and their fundamental human right to make decisions. Participants and data must be treated with respect for privacy, security, accessibility, and property (Biedenbach and Jacobsson, 2016:139-155).

3.11.3 Epistemology

The epistemology concept describes how a researcher gains knowledge. The researchers might utilise it to gain a deeper understanding of research by examining the nature of human knowledge

and understanding. The case when the researcher depends on data collected from people in books or who are in positions of authority in organisations. For the researcher, epistemology is crucial since it helps establish trust in the study's findings and conclusions. As a result, the researcher's findings will be influenced by this factor Alababneh (2020:75-91).

3.12 Data collection

3.12.1 Survey Instrument

The researcher used self-administered questionnaires and interviews to obtain data for this study. The researcher used self-administered questionnaires and interviews to obtain data for this study. As part of the data collection process, questionnaires were administered to employees and supervisors. The interviews were conducted with managers. The two managers will be interviewed because they are in a position to provide pertinent information for the purpose of the study. Interviews are also vital in this study to allow the researcher to collect non-verbal data. This study used questionnaires to assess the behaviour, preference, knowledge and attitudes from a larger sample. Respondents were asked to return completed questionnaires on paper or via email. The researcher also collected the questionnaires for employees who could hand out the questionnaires. Covid-19 precautions were considered, such as wearing a mask and sanitizing hands before collecting the questionnaires. Both the questionnaires and the interviews were drafted by the researcher to collect information related to the study objectives. To fulfill the study's goals, both primary and secondary data were employed. Books, journals, papers, and the internet were used to access secondary data. The design of the research questionnaire was compromised in this research. Krosnick (2018:439-455) describes questionnaire design as a set of printed or written questions with a selection of answers created for survey or quantitative research objectives. There are three sections to the questionnaire. As part of Section A, respondents are asked questions on their details at Khathino Warehouse and the supermarket.

Section B is questions with the option "Yes" or "No" answer, this section aims at acquiring information with regards to the bullwhip effect on Khathino stream sites. Finally, Section C contains of questions based on scale ranging from 1 = “strongly disagree” to 2= “disagree” 3 = “neutral” 4 = “agree” and 5 = “strongly agree” using the objectives. The questionnaire design is a quantitative method that was used in this study to obtain information to answer the study objectives. Questionnaire's strategic design, data could be collected for each independent variable

separately. It is assumed that an independent variable is accountable for the change that occurs in phenomena or circumstances. Order fulfillment, supplier relationship management, and the CPFR are independent variables in this research. To guarantee that the right data was gathered, qualitative interviews were carefully prepared and organized for use in this study. To conduct semi-structured and in-depth interviews, an interview guide was required. Thematic analysis was utilised as a method to accomplish the study objectives. Many scholars have recognized thematic analysis as a basic tool of qualitative analysis (Kiger and Varpio, 2020:846-854). Using thematic analysis, the researcher will find common threads that run throughout an interview, and you'll be able to get a good handle on complex and delicate issues. Analysis of data to find and report patterns (themes) can alternatively be defined as a thematic analysis (Kiger and Varpio, 2020:846-854). These implicit and explicit concepts are identified and then grouped into themes.

3.13 Methods

3.13.1 Univariate Analysis

To code and input data for data analysis, univariate analysis is utilised. It involves analysing one variable at a time (Bertani and Tuzzolino, 2018:1133). Descriptive analysis in a univariate approach serves to offer basic insights into the nature of the responses obtained. The researcher analyzed the mean values obtained from the data. In addition, each variable's median was calculated, and outliers were compared. Also, the researcher will determine the variability of a collection of observations, which is why the variance was determined.

3.13.2 Bivariate Analysis

The use of interval and ratio scales in bivariate analysis ensures that many variables are measured (Peng and Huang, 2016:624-639). As part of the bivariate analysis chi-square and cross-tabulation was used. In a bivariate method, Pearson correlation is used to examine the relationship between two variables. The significance level was used to establish whether there was a significant correlation between the two variables. Example: 5 percent significance level would indicate that there is 95 percent chance of a meaningful correlation between two variables, and only 5 percent chance that there is no relationship. -1.0 and +1.0 are the ranges of the correlation between the two variables. For this study, it is crucial to determine the degree and direction of the relationship between two variables. For example, Pearson (r) supports this type of understanding (Peng and Huang, 2016:624-639).

3.13.2.1 Cross tabulation and Chi-Square

According to Knapp and Knapp (2018:253-275) cross-tabulation can be “defined as an approach that determines the relationship between two variables”. Cross-tabulation allows researchers to investigate the link between two separate variables (Schumacker and Tomek, 2013:169-175). Cross-tabulation was used to determine the relationship between two variables in this study. To demonstrate data grouping, a cell is formulated using this strategy, which assures that the variables are computed at the same time. This method is used to determine whether there is a substantial discrepancy between observed and expected frequencies in one or more categories (Shih, 2017:322-326). It was decided to compare the two variables by using the chi-square method.

3.14 Methods of Assessment

It is vital to verify that the study tools used to assess the variables can provide relevant and reliable information. The reliability and validity of the measurements were established by the researcher.

3.14.1 Reliability

LoBoindo-wood and Haber (2014:289-309) conceives that reliability is “the extent to which repeated testing results from an experiment, test or any measuring method” As argued by LoBoindo-wood and Haber (2014:289-309) when it comes to reliability, the Cronbach alpha coefficient is often used as a standard measurement instrument. For quantitative data analysis, reliability is a key factor. The researcher used Cronbach's alpha. Reliability coefficient measures how effectively elements in a set are positively linked.

3.14.2 Validity

Mohajan (2017:59-82) validity can be defined as a strategy for determining if a finding represents the facts claimed by the researcher. Measuring data flows from warehouses to supermarkets is part of this study's methodology. Analysing and reading the information provided by the respondents was done with caution. This means that validity should consist of proof determining how information was attained (Mohajan, 2017:59-82). Internal and external validity are the two methods of validity. Tests of validity determine whether or whether the produced research instrument measures the idea that it was meant to assess, or whether it does not. Validity tests include content validity (important for judgment techniques), criterion-related validity (important for correlation), and construct validity.

3.15 Data Analysis

McCombes (2019:1) alluded that “data analysis is the process where collected data is reduced to a more convenient size and where the researcher identifies patterns, applies statistical techniques and summarises the data”. The researcher may utilise frequency distribution to gather enough information that can be easily read. Descriptive statistics are used to simplify data without compromising its meaning. (Galletto, 2016:1-2). As part of this study, questionnaires were verified to make sure that all questions had been answered. Each question was then assigned a numerical value. The replies submitted by the target population were given numerical values. Data was analysed using SPSS (Statistical Package for the Social Sciences) system. A statistical package called SPSS was utilized to help with data analysis. SPSS 20.0 was used to analyze the obtained data. Quantitative data is often shown using bar charts and histograms, as well as other ways. When presented in a diagram, information is easier to interpret and understand. This study will further use inferential statistics to analyse data. Inferential statistics allow the researcher to create a hypothesis or analyse whether the data is generalizable to a larger population. (Calderwood, 2012:133-147). There are two ways that two variables might be related, positively or negatively. To begin with, the variable's strength or magnitude might range from negative 1 to positive 1. The stronger the association, the closer the correlation coefficient is to -1.00 or +1.00.

3.16 Measures to ensure Trustworthiness

Measures to ensure Trustworthiness of the study is stipulated as a process of showing the “truth value” of the study (Morake, 2013:30). It is very important to evaluate the quality of the research after the data has been collected and analysed. The researcher’s focus must not only be on the results of the study but also on the rigour of the research. By rigour is meant the extent to which the researcher worked to enhance the quality of the studies (Heale and Twycross, 2015:66). Credibility was achieved in this study through engagement with the participants and respondents.

3.17 Data Saturation

In the research process, data saturation occurs when no new knowledge can be gleaned from data analysis. Because the individuals were remaining in the same location and experiencing identical challenges, adding more participants was a waste of effort. Individuals in the study had the same concerns, such as a lack of effective technological innovations and the costs the business would undergo if it were to deploy new technology, at that saturation was reached. In this study there is

adequate information and understanding that Khathino warehouse and supermarket do share information across supply chain partners to the consumer to meet consumer needs.

3.18 Ethical Consideration

Respondents should be protected, and the research should be guarded against any misconduct. Information confidentiality and anonymous should be given to respondents. This study will require an approval letter, with a business stamp written by the Khathino warehouse authorizing the researcher to conduct the study. To obtain a Gatekeeper's letter a researcher should approach the business and obtain the letter of support from the owner before submitting the research proposal. In this study, the Gatekeeper's letter should be obtained at the Khathino warehouse and supermarket. Ethical clearance will be conducted by the UKZN Research Ethics Committees. If ethical approval has not been obtained, the researcher will bear personal responsibility for any claims. Permission will also be received by the letter of permission attached to each survey tool utilised in the study. The University of KwaZulu-Natal needs all personal data gathered to stay private and to be preserved in the university records.

3.19 The Limitations

As defined by academic researchers, limitations are events over which the researcher has no control. Due to research restrictions, limitations in research structure or technique may emerge, and these variables might affect study outcomes (Simons, 2011). In such situations, the researcher has no control over the research. Below are the limitations the researcher can encounter while conducting the research study:

1. Limitations of this study might be that employees and managers of Khathino warehouse and supermarket are busy with important things in their lives and have little time to complete the questionnaire provided.
2. Time is another limitation. In a study carried out over a certain period the researcher cannot carry the study to the best of his abilities.
3. The pandemic has hurt the progress of the study due to the national lockdown enforced by the president of South Africa, the researcher was having a hard time collecting data.
4. Other employee managers of Khathino warehouse and supermarket may not want to be part of the study due to Covid-19. Not all supermarkets were included due to the pandemic.

5. The limitation is that the researcher is not employed within the Khathino warehouse and supermarket. This influenced the research study since some managers and staff refused to take part in the research study.

3.20 Conclusion

For this study, the research methodology served as an overview and analysis of the research design used. As part of the study, Khathino's warehouse and supermarket were approached to collect data. There is a mix of quantitative and qualitative research in this project. To evaluate the research objectives, nominal and interval scale data has been applied. It was thus essential to assess the data using SPSS, which is a statistical package. Additionally, the research requirements include a detailed review of the correlation between variables. The next chapter will evaluate and interpret the data obtained from the respondents in order to achieve the study objectives.

Chapter Four

Data analysis and Presentation

4.1 Introduction

This chapter followed the same research technique that was mentioned in the previous chapter. This chapter, therefore, presents the quantitative and qualitative research findings. As part of the research, 150 respondents took part of the study for quantitative approach and two participants were interviewed as part of the qualitative approach. SPSS was employed to analyse mean values, standard deviations, and correlation coefficients. Measuring central tendency was used to examine the relationship between information sharing, the dependent variable in the study. Research objectives for this study were specified as follows:

Primary objectives

The purpose of this study aims:

- 1-To examine the extent of information sharing to optimise management of bullwhip effect.
- 2- To establish the extent of collaborative planning to entrench the magnitude of communication amongst warehouses and supermarkets to ensure better information sharing.

Secondary objectives

- 3 -To assess the impacts of supply chain technology as an enabling tool of information sharing.
- 4-To examine how information is shared from the retail warehouse to the supermarket to ensure stock management and order fulfilment.

Regarding each research objective, the study produced compelling evidence. The questionnaires were administered to the 150-target population. The sample in the study was drawn from the logistics and supply chain management departments, as well as from warehouse and supermarket dispatch managers.

4.2 Data Preparation and Coding

It was determined that all questionnaires were correctly completed and error-free before analysis could begin. Due to the pandemic, interviews were performed electronically using zoom. The email was used to disseminate the questionnaires to participants due to the pandemic. No errors were found on any of the questionnaires, and missing data were represented with 0. Since data had

to be coded both for transfer and for editing in SPSS, each question and possible answer required a code.

4.3 Qualitative Research

For this study, the qualitative technique was considered effective due to the nature of the data. It was considered that this study would be best served by using a qualitative method. Multiple perspectives on how information is shared may be gained by studying the perceptions of individuals with extensive experience with information sharing between the Khathino warehouse and the supermarket. The responder permitted the interview to be recorded, and the material was transcribed verbatim. The researcher took notes to ensure that the information obtained, and its transcription was as accurate as possible. To fulfill the research aims, the study employed thematic analysis to analyse the participants' replies.

Theme 1 to 6:

It is essential to have a proactive program that facilitates for the exchange of information in order to continue progressing. This may be seen as one of the primary themes that are prominent in the data sets. Khathino's warehouse and supermarket staff, supervisors, suppliers, and managers are all working hard to ensure that information flows effectively. Two managers were interviewed. Because the researcher is not an employee of the company, getting individuals to participate is incredibly challenging. The managers will be presented as participants 1 and participant 2. Below are the themes for the data analysis.

Theme 1: Exchange of information

Theme 2: Effective and efficient

Theme 3: Optimised information sharing

Theme 4: Supply chain technology

Theme 5: Central distribution model

Theme 6: The bullwhip effect

Table 4.1: Major themes and sub-themes

Exchange of Information	1-Communication between warehouse and supermarket 2-System
Effective and efficient	1-Clear information sharing 2-Consumer needs
Optimised information sharing	1-Flow of operations 2-Information technology
Supply chain technology	1-Opportunities
Central distribution model	
Bullwhip effect	1-Forecast accuracy

Source: Compiled by a researcher from NVivo results

4.1 Theme 1: Exchange of information

Any organisation's day-to-day activities cannot run properly without information sharing. To be successful, a company must share information to improve decision-making capacities, create learning organisations (through regular training programs), and encourage cultural change as well as creativity. Even so, when employees do things differently, the overall performance of the firm improves. The participants brought up a variety of information-sharing issues. Below are the sub-themes of the research study.

4.1.1 Communication between warehouse and supermarket

In the response to question 1 of the interview question: How often does your organisation share information, and which information is exchanged within the organisation?

The need to share information gradually is vital for the smooth operation of a business. Both the managers agreed that continuous sharing of information enhances business decision-making. Participant (1) indicated that *“Information is exchanged hourly from the warehouse to the supermarket, on what consumer requires and what product is supposed to be delivered. To voiding redundant effort managing information properly, saves a lot of time and budget. The Khathino supermarket needs to be updated by the Khathino warehouse on what products need to be dispatched.”* Information sharing between the warehouse and the supermarket is crucial so that staff is aware of possible issues that may develop in the business and can handle them

collaboratively. Participant (2) further explained that *the “Khathino warehouse team is also a communication link between the Khathino warehouse and the distribution centre in reviewing programs and services. Information needs to be shared in a form report, updates on how the company is currently doing and if it is making a profit, and how many losses have been incurred by the company. The company also shares information of how many trucks went out with how much stock is required by the retail store”*. The discussion outlines the extent to which the sharing of information from the warehouse to the supermarket is effective when all employees understand what is required of them. The discussion also indicated how information is shared from the Khathino warehouse to the supermarket.

4.1.2 Systems

Employers and employees communicate more efficiently by using business information systems. Systems make it easy for companies to store data, documents, and recording communications. The respondents emphasized the importance of an effective system in the Khathino warehouse and supermarket. According to the participant (1) and participant (2), *“the company uses AS400 system for reliability in manufacturing, and to also exchange information. Khathino has a huge range of consumer goods, hence the performance of the system is reliable. The system is used to ensure a smooth flow of business operations to meet consumer needs. The systems transfer information from different departments, to keep track of the day-to-day operation of the business. Furthermore, to check how much profit and loss the company is making”*. Business systems facilitate decision-making and simplify the delivery of essential information, allowing for better decisions to be made more quickly in Khathino warehouse and supermarket. As a result, the flow of information between management and lower-level staff is closely monitored. When front-line employees are involved in the decision-making process, they feel more motivated and committed to completing tasks.

4.2 Theme 2: Effective and efficient

In response to question 2 of the interview questions: Do you think the way information is exchanged from the warehouse to the supermarket is effective and efficient

The respondents indicated that the way information is exchanged from the warehouse to the supermarket is effective and efficient, and also emphasized that there is always room for improvement.

4.2.1 Clear communication

Clear information sharing in business ensures that all staff are in the loop and also enhances effective and efficient information sharing. Thus, boosting every function in an organisation. *Both participants agreed that “the information shared from the warehouse to the supermarket is indeed effective and efficient. Consumers get good they require the business is doing good and making a profit. Effective information sharing is critical to business success. Clear information sharing ensures that every employee of Khathino understands their role and objectives in a business for smooth day-to-day operations. Continuous exchange of information keeps all employees in every department aware of the progress made and highlights any issues that might affect progress. Failure to exchange information in every department in Khathino warehouse and supermarket can lead to costly delays and impact the success of the business.”* Clear communication’s primary goal is to enhance Khathinos operations, inform people, eliminate silos and decrease mistakes. It was emphasized by the respondents that the success and growth of Khathino warehouse and supermarket depend on effective business communication.

4.2.2 Consumer needs

Sharing of effective and efficient information can enhance business processes and consumer needs, through accurate delivery of products. According to participant 2 *“Information sharing is an exchange in Khathino warehouse and supermarket in different departments in various stages to ensure the right material is purchased to manufacture goods required by consumers, and that the right products reach the consumer. Khathino also ensures that to gather information on what goods are required by consumers and manufacture goods according to consumer’s needs.”* Having a positive relationship with consumers and sharing effective information about consumer requirements from the warehouse to the supermarket helps satisfy consumer needs.

Both participants stated that “Khathino takes data and turns it into useful information. The organisation uses this information to do a variety of things such as to push advertising to consumers, on what products are required by consumers. The members of Khathino warehouse and supermarket improve their relationship significantly by sharing and managing information properly, even in the same or different departments. Information sharing helps Khathino warehouse and supermarket to analyse new trends, deal with unsatisfied consumers and to also

build new strategies, and also keep track of the day-to-day operations of the business.” Sharing information is therefore important to ensure consumer needs are met. The respondents indicated that Khathino has clear communication to effectively share information between the warehouse and the supermarket. The shared information may assist employees to broaden and maximize their skills to better serve consumers' needs and wants.

4.3 Theme 3: Optimised information sharing

In response to question 3 of the interview questions: do you think there is a need for your organisation to optimize how information is shared?

4.3.1 Flow of operations

Introducing innovative processes, processes, and systems that improve turnaround time is one way to optimize business activities. Participant (2) indicated that *“yes, information needs to be optimised in some departments for information to flow smoothly. Sharing information increases the productivity of the company. Khathino warehouse and supermarket employees can work faster and smarter, as they get easier access to the internal resources and expertise within your organisation.”* The respondents agreed that improved information enhances the flow of business processes. Optimisation of information enhances new approaches that make firms effective and efficient. According to the participant (1) *“if the information is optimised projects don't get delayed, People swimmingly get the information they need to do their jobs, and consumers get goods they require. Information needs to be optimised; technological change is growing rapidly. Hence, for Khathino to keep up how information is shared sharing of information needs to be optimised through effective supply chain technology.”* Continuous evaluation of business processes is a primary emphasis of optimisation techniques such as continuous improvement and lean management.

4.3.2 Information technology

People's communication methods and business practices have been transformed by the use of information technology. If correctly implemented information technology can help Khathino transfer information much quickly and decrease costs. According to the participant (1) and (2) *“Information, technology is changing the way companies operate and how information is shared. It is affecting the entire process by which companies create their products. Furthermore, it is reshaping the product*

itself, the entire package of physical goods, services, and information companies provide to create value for their buyers. Information technology is advancing faster than technologies for physical processing. The costs of information storage, manipulation, and transmittal are falling rapidly and the boundaries of what is feasible in information processing are at the same time expanding. Information technology is generating more data as a company performs its activities and is permitting it to collect or capture information that was not available before. Such technology also makes room for a more comprehensive analysis and use of the expanded data. As a result, information should always be optimised to keep up with today's rapidly changing environment.” Khathino must guarantee the efficiency and security of business information. Information technology professionals construct communications networks for a firm. They also secure data, create databases, and assist employees in troubleshooting issues with their computers and mobile devices.

4.4 Theme 4: Supply chain technology

In response to question 4 of the interview questions: Which systems are used to exchange information to ensure consumers access the goods they require?

Respondents expressed their views on the

4.4.1 Opportunities

Today, supply chain technology improves opportunities for collaboration across business supply chain partners. Participant (1) indicated that *“supply chain technology not only affects how individual activities are performed but, through new information flows, it is also greatly enhancing a company’s ability to exploit linkages between activities, both within and outside the company. The technology is creating new linkages between activities, and companies can now coordinate their actions more closely with those of their buyers and suppliers.”* Customer service can also be improved by using supply chain technology. It has become increasingly necessary to have a supply chain that is integrated due to the rising emphasis on technology developments and the changing consumer expectations. According to participant (2) *“Khathino provides a wide range of products, the company makes it so easy for clients to order, receive, and prepare invoices that the customers, in return, are willing to place larger orders. AS 400 is the system used by Khathino to share information. The AS400 plays a huge role in exchanging information between the warehouse and the supermarket. Furthermore, AS 400 has a powerful effect on the competitive scope it allows Khathino to coordinate value activities, it also expanding the scope of industries in which a Khathino must compete to achieve*

competitive advantage. This system helps the organisations reduce inventory, improve fulfillment rates and product availability at point of purchase and ensure a lean supply chain improving margins and profitability.” Thanks to technological advancements, Khathino may now be able to build end-to-end supply chain solutions that speed up operations and alleviate bottlenecks in the supply chain. Supply chain management relies on exchange of information.

4.5 Theme 5: Central distribution Model

In response to question 5 of the interview questions: Is the central distribution model effective for Khathino?

Deciding on the distribution model to utilise is difficult for any business since it implicates a company’s supply chain. Both respondents alluded that *“yes, the central distribution model is indeed effective for Khathino because products are distributed to the retail stores and consumers acquire goods they require. The company operates warehouses facilities here in South Africa which supplies goods and services to retailers. Khathino has on distributional centre here in KwaZulu-Natal which feeds all the regions. Centralised distribution is effective as fewer locations make the standardization of systems and processes through the business easier. The company culture is easier to foster and maintain in a single location. Furthermore, management can have eyes on a product within moments if there is a concern since everything is often located in the same building. Having a centralized distribution is to have better control. Thus, it can be concluded that the central distribution model is indeed effective for Khathino.”* Using a central distribution center is one of the greatest methods to reduce the logistical issues of managing many distribution centers. All items may be accessed and shipped from a single distribution center, allowing firms to send products more quickly.

4.6 Theme 6: The bullwhip effect

In response to question 6 of the interview questions: Does your organisation share information with upstream supply chain partners to avoid the bullwhip effect?

4.6.1 Forecast accuracy

As a result of forecasting, firms can identify potential problems in their production and supply chains and take action before they occur. Participants (1) and (2) indicated that *“Yes, information is shared to all supply chain partners under Khathino warehouse to ensure smooth flow of business operations. The company collaborates with suppliers and consumers to minimize the bullwhip*

effect. To improve forecast accuracy, the company encourages orders to consumers' needs. Khathino works with customers to understand their plans and forecasts, to build promotions and seasonality into the forecast, and then provide more insight to suppliers to help prevent the buildup of unnecessary inventory due to the bullwhip effect." The participants of Khathino indicted that operations management relies heavily on demand forecasting to improve supply chain efficiency. Manufacturing, shipping, and storage schedules are more efficient if companies forecast.

4.7 Quantitative Research

Data is analysed using charts and tables to answer questions about the relationships between variables that are examined in the quantitative aspect of the study (Thelwall, 2020:1-9). As a result, the other source of data in this study was the questionnaires provided to staff of Khathino warehouse and supermarket.

4.8 Demographic Data

One hundred and fifty respondents participated in this study, as mentioned previously. In the next subsections, a breakdown of the demographics of the 150 respondents in terms of age, number of years and gender is presented.

Figure 4.1: Gender

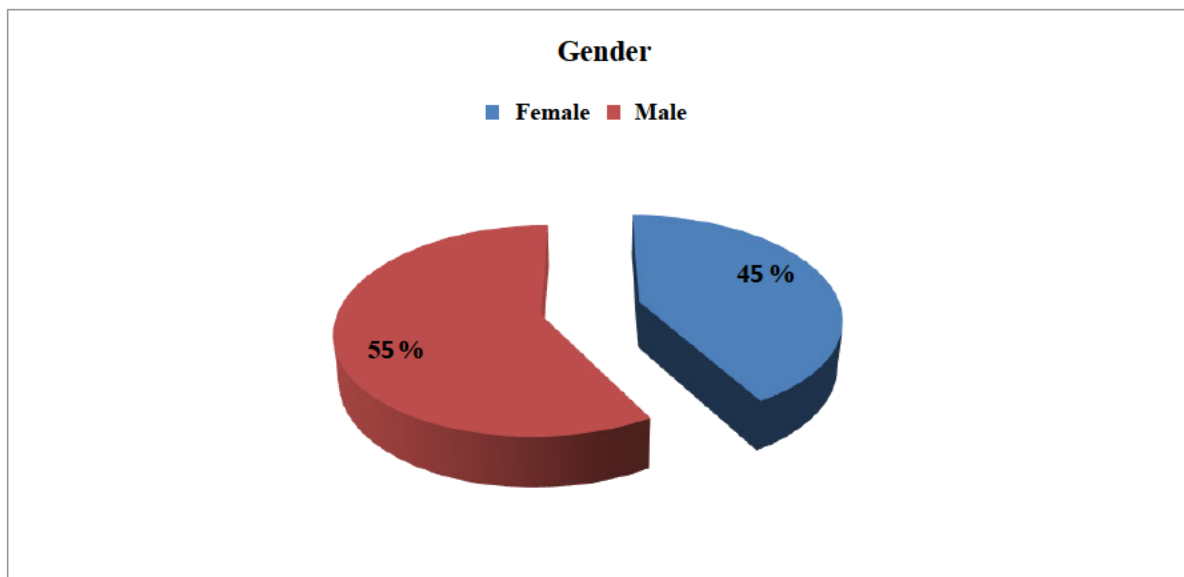


Figure 4.1 Indicates that 55% of respondents are male, whereas the remaining 45% of respondents are female. The results show that the there is a pretty equal representation of men and women in

this research from the Khathino warehouse and supermarket. The reason why gender was explored in this study is to gather the unique experiences of both men and woman and also to promote gender equality. The above pie chart indicates the data was collected and more data was accumulated from males more than females regarding the research study.

Figure 4.2: Number of years

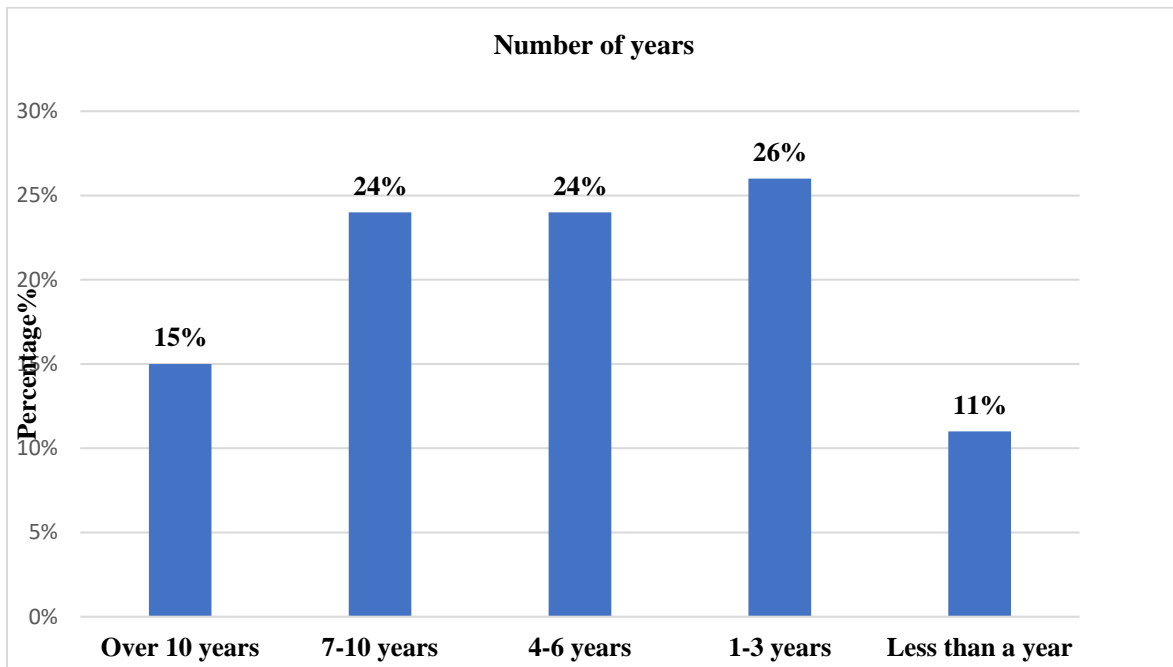


Figure 4.2 shows how long respondents have worked for the company. According to the study, 15% of the respondents had worked at Khathino for more than 10 years, 24% of employees have been employed in Khathino for 7-10 years. Furthermore, 24% of employees have been employed for 4-6 years, and 26 individuals have been with the company for 1 to 3 years. Only 11% of the respondents have been working for Khathino for less than a year. Employees participated equally in the study conducted by the researcher as evident in the bar graph presented above. This implies that the respondents have sufficient experience and a thorough comprehension of the topics in order to provide correct responses to the questionnaire instruments.

Figure 4.3 Job-status

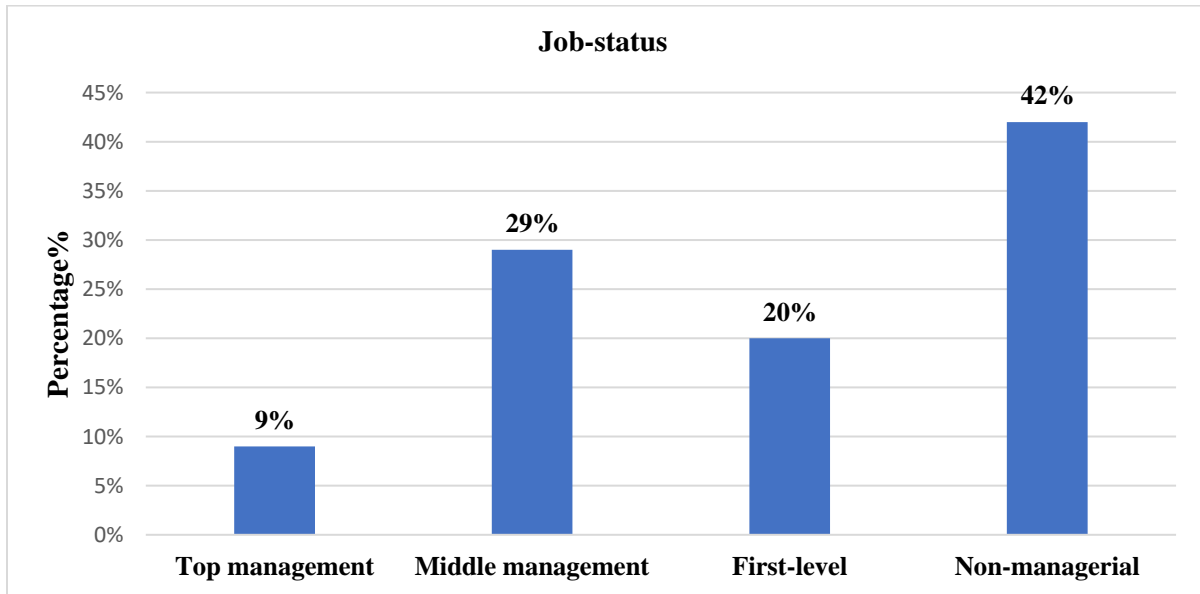
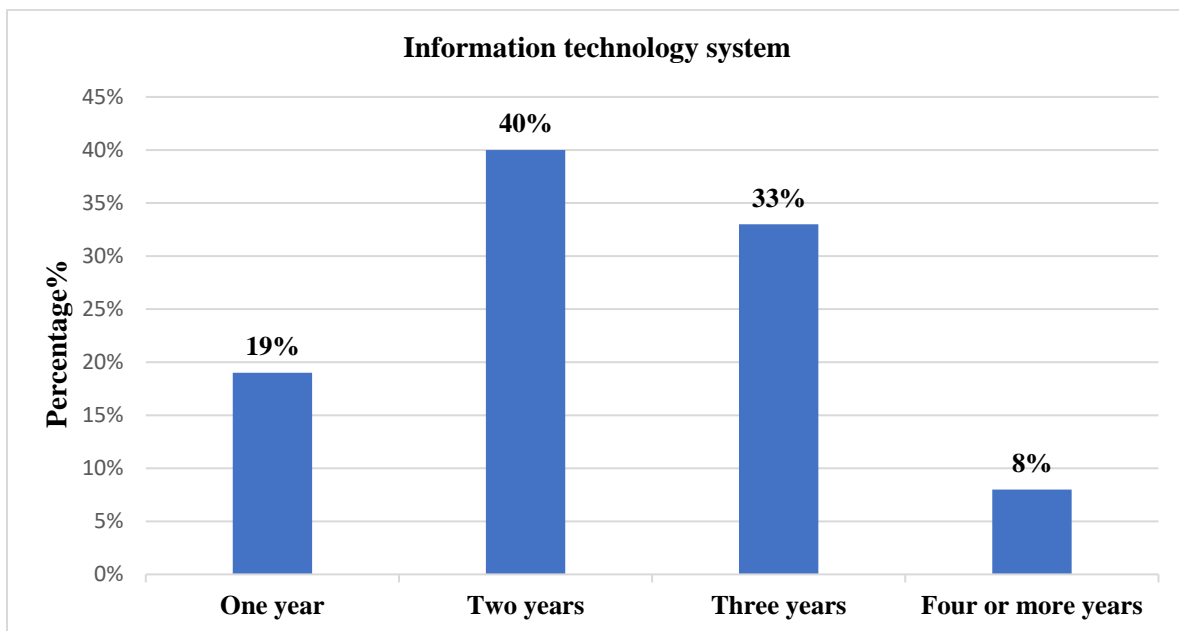


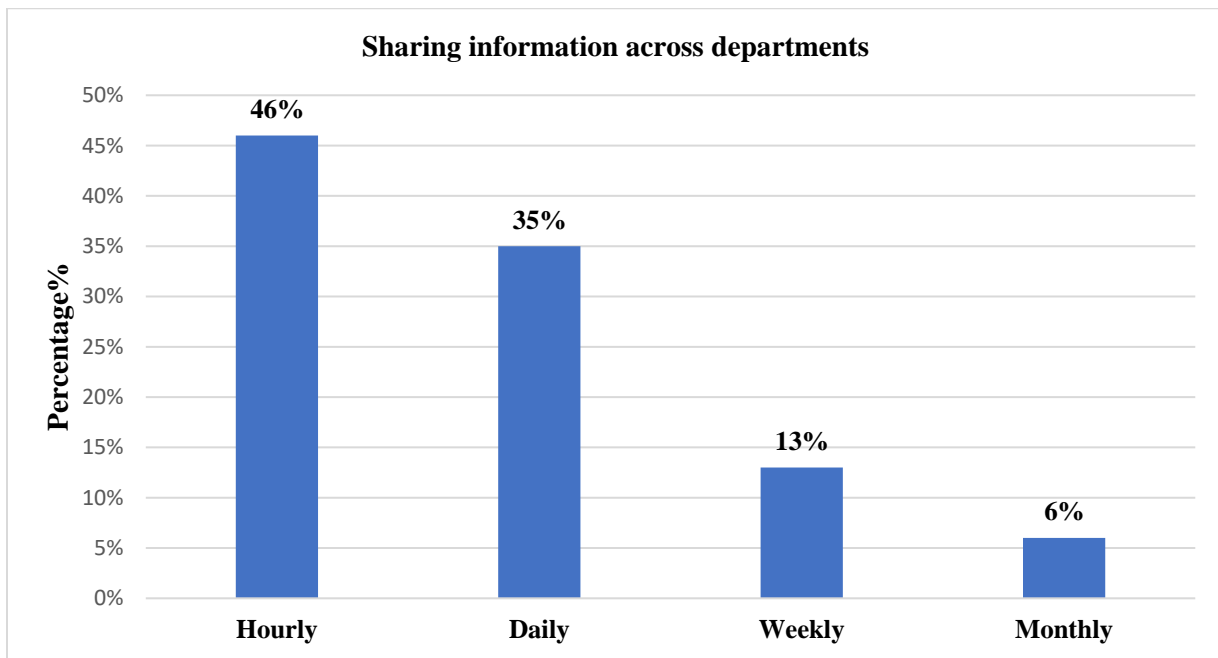
Figure 4.3 shows that 9% of the sample composition is employed at top management, 29 % of the respondents are middle management employees. Moreover, 20% of first-level employees are working for Khathino in this study. Lastly, 42% of the sample comprises non-managerial employees within Khathino. This indicates the respondents' job statuses of the study.

Figure 4.4: Information technology system



During the last five years, the organisation has adopted a few business information technology systems. Figure 4.4 indicates that 19% of the respondents in Khathino shows that only one information technology system had been introduced within the past year, while 40% of the respondents affirm information technology systems have been implemented within two years. Furthermore, 33% of the respondents stated that information systems had been implemented in the three years. Eight percent (8%) of the respondents reported that four or more information systems have been introduced within the organisation over the last four or more years.

Figure 4.5: Sharing of information Across departments.



To determine how often information is transferred between departments, the researcher requested respondents to answer question 5 of the survey instrument. As shown in Figure 4.5, 46 % of respondents agreed that information is exchanged across departments on an hourly basis, whereas 35 % of respondents said it is shared daily. Information is exchanged between departments on a weekly basis, according to 13 % of respondents. While 13 % of respondents indicated that information is provided on a monthly. No respondents indicated that information is shared across departments less than ten times a year.

Figure 4.6: Sharing information across business

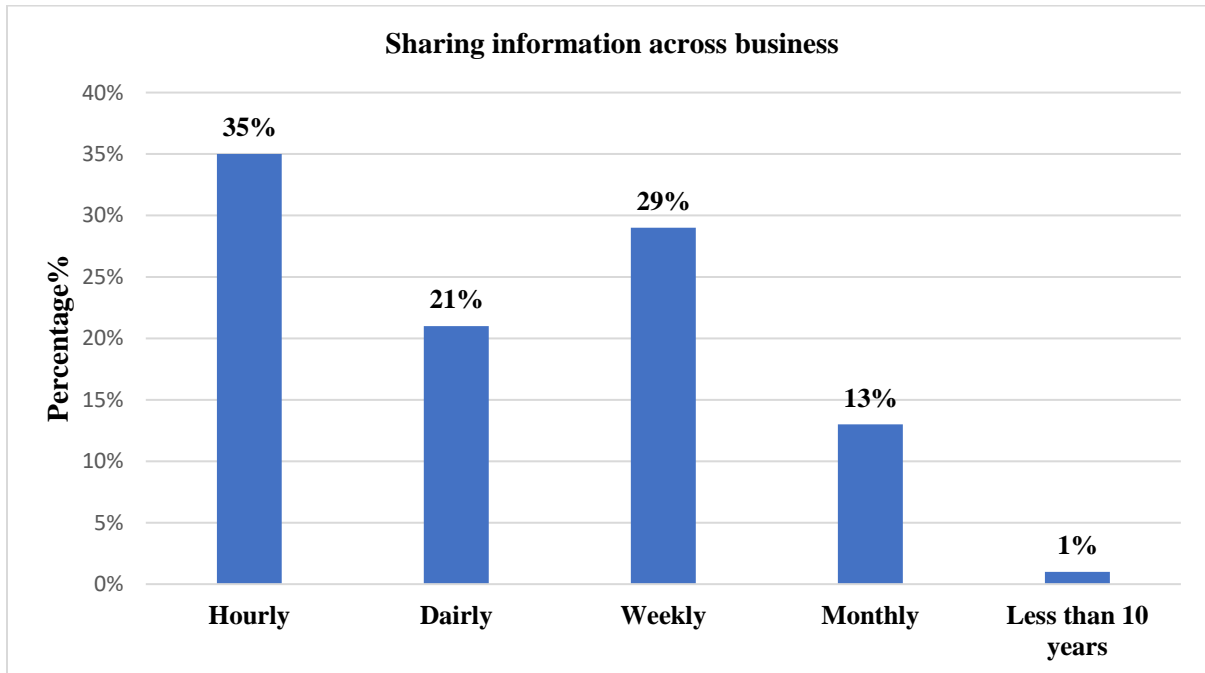
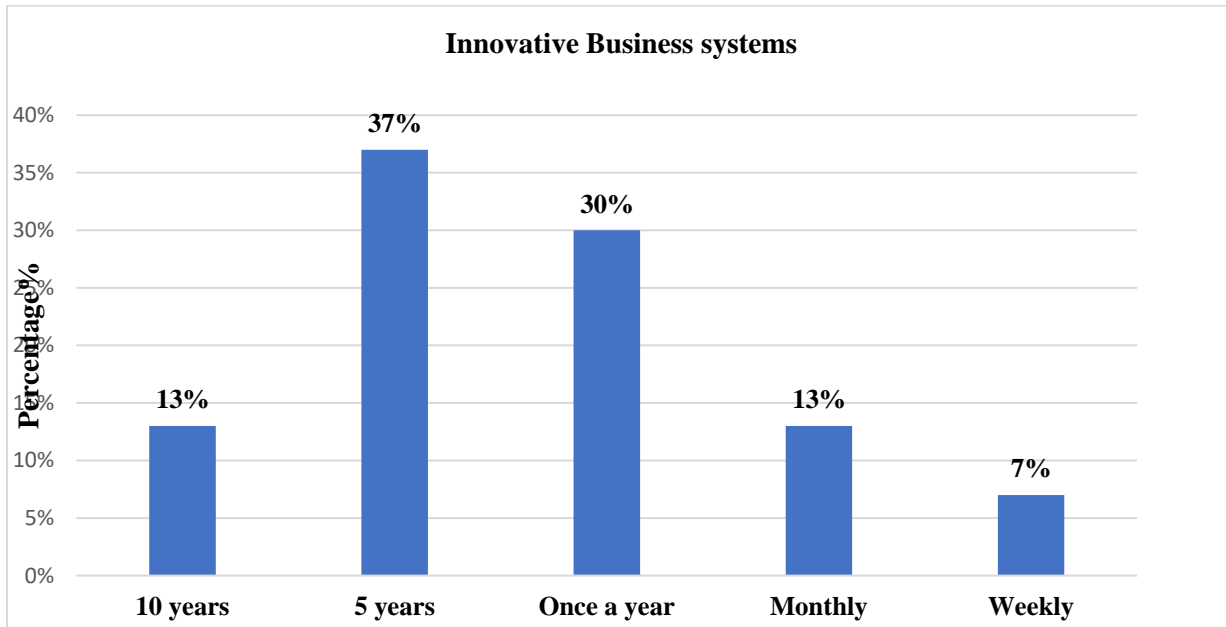


Figure 4.6 illustrates how often information is shared across the business. Khathino warehouse exchanges information with supermarket hourly, according to 35% of respondents. 21 % of respondents specified that Khathino warehouse exchanges information with the supermarket daily, and 29 % of respondents confirmed that information is exchanged on a weekly basis. Among the respondents, 13% said that information is shared across the company on a monthly basis. Only 1% of respondents said that information is shared less than 10 year from the Khathino warehouse to the supermarket. This indicates that information is shared effectively across the business to ensure the smooth flow of business operations.

Figure 4.7: Innovative Business systems



The aim of this survey was to determine how often Khathino invents, adopts and improves innovative business systems. The respondents of Khathino warehouse and supermarket were given an option on how business systems are innovated either once in 10 years, once in five years, once a year, monthly and weekly. Figure 4.7 illustrates that Khathino installs innovative business systems once every ten years, according to 13% participants, whereas 37 % of respondents stated they do so once every five years. Moreover, 30% of those who answered to the survey said Khathino develops new business systems once a year. In the survey, just 13% of the employees said that Khathino installs electronic business systems every month, according to the results. The remaining 7 % of respondents indicated that the organisation implements new business systems on a weekly basis.

4.10 Dichotomous questions

Yang (2016:527-532) alluded that “dichotomous questions have only two response alternatives usually presenting the two extremes of yes or no”. Respondent results to dichotomous variables are presented in Figure 4.8. The questions seek to gather information from Khathino staff about their thoughts on information sharing and systems in the organisation.

Figure 4.8: Dichotomous questions

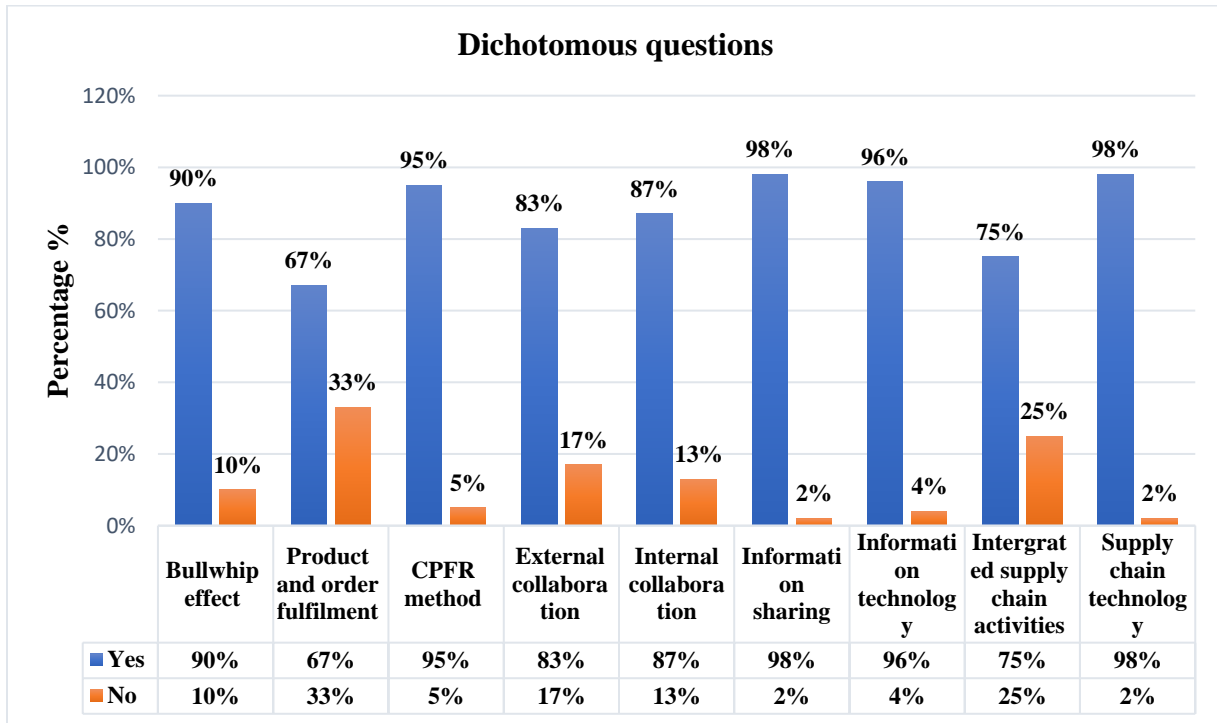


Figure 4.8 under the bullwhip effect illustrates that 90% of respondents stated that Khathino shares information from upstream to downstream to minimize the bullwhip effect. For product and order fulfillment 67 % of respondents indicated that information is shared from upstream (warehouse) to downstream (supermarket) to ensure order management of stock, product, and order fulfilment. The graph continues to illustrate under the CPFR method theme 95% of the respondent indicated that the Khathino warehouse and supermarket does make use of the CPFR method to enhance information sharing. Eight three percent of respondents for this study agreed that Khathino collaboration adds efficiency. Under the internal collaboration theme, 87% of the respondent’s state that Khathino internal collaboration adds value by cutting costs and boosting productivity, according to respondents.

Moreover, information states that 98 % of the respondents agree that information is shared from the warehouse to the supermarket and from the supermarket to the warehouse to make strategic decisions. Ninety-six percent of the respondents from this study agreed that electronically enabled information sharing technologies improve integration, coordination, and cooperation in supply chain networks. Figure 4.8 under the integrated supply chain activity theme illustrates that 75% of the respondents from this study indicated that optimise exchange of information improves

coordinated supply chain operations. The graphs also stated that 98% of participants indicated that supply chain technology is an effective tool to share information.

Figure 4.9: Bullwhip effect (four factors)

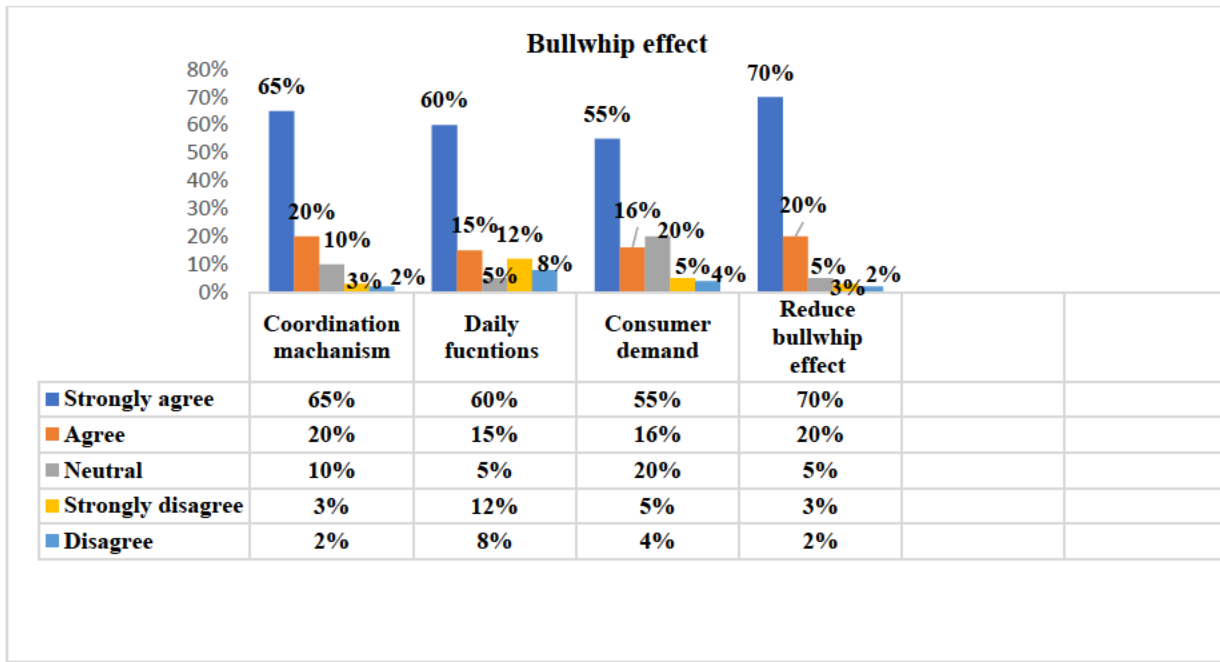


Figure 4.9 demonstrates the immense agreement of the respondents regarding regards to reducing the bullwhip effect. Eighty-five percent of the respondents indicated that information sharing is the coordination mechanism for reducing the bullwhip effect in the communication phenomenon. Interestingly, 75% indicated that the bullwhip effect affects the daily functions of the business. Thus, 90% of the respondents indicated that the bullwhip effect must be reduced for the flow of information from the warehouse to the supermarket, so the consumer demands can be met which is indicated by the phenomenon of consumer demand of 71%.

Figure 4.10: Information sharing

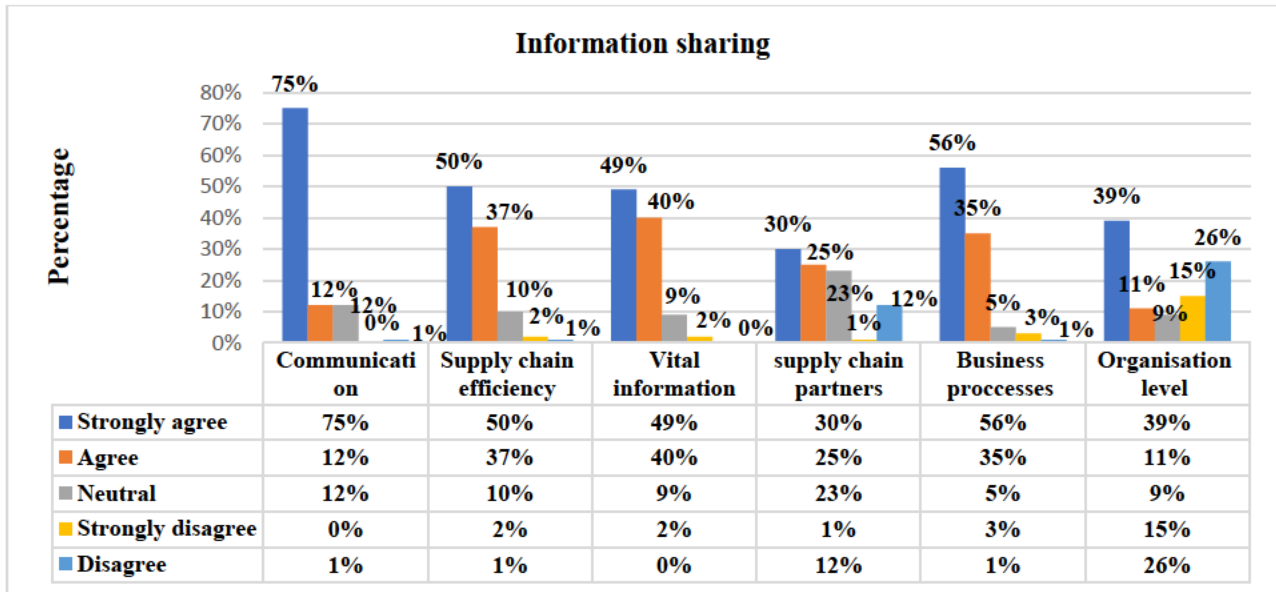


Figure 4.10 indicated that 75% of participants indicated that communication from the warehouse to the supermarket is important. Under the phenomenon of supply chain efficiency, 87% of the respondents indicated that information sharing can enhance supply chain and production. Thus, 89% of respondents indicated that information sharing is vital to smoothen business processes illustrated by 91% of respondents under the business process factor. Lastly, under the organisation level phenomenon, 50% of respondents agreed that information should be made available to all levels of the organisation.

Figure 4.11: CPFR Method

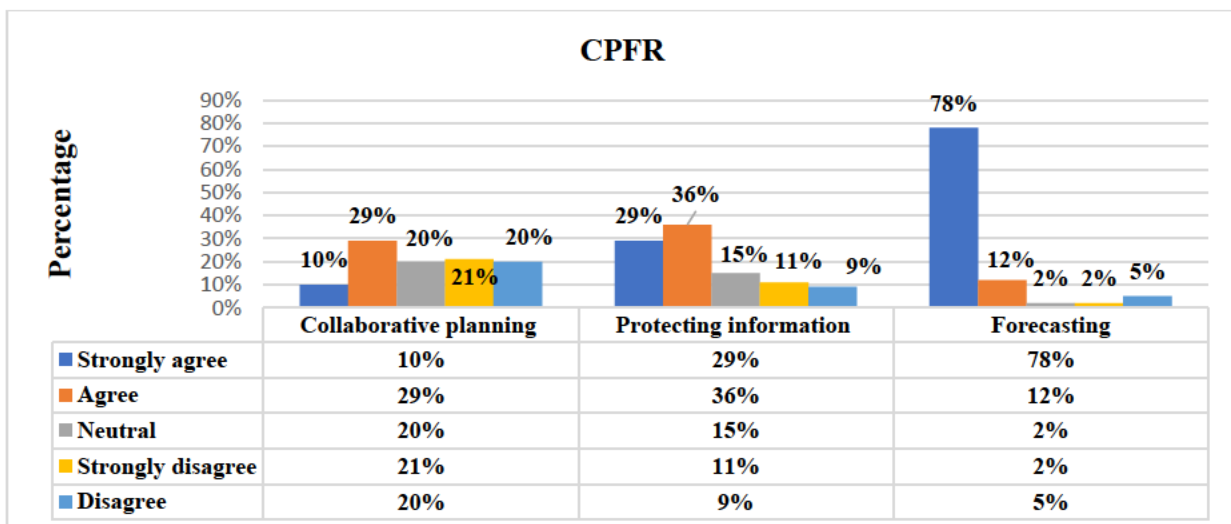


Figure 4.11 thirty-nine percent of the respondents indicated collaborative planning entrenches the magnitude of communication from the Khathino warehouse to the supermarket, 20% of the respondents remained neutral. Furthermore, 41% of the respondents disagreed that collaborative planning entrenches the magnitude of communication between the warehouse and the supermarket. A high number of 65% of participants agreed that both the Khathino warehouse and the supermarket has a high degree of information protection. While 15% of individuals remained neutral, 11% strongly disagreed and 9% of the participants disagree under the protection of information phenomenon. Ninety-one percent of participants indicated that the warehouse and the supermarket can forecast and plan using integrated information systems.

Figure 4.12: Supply chain technology

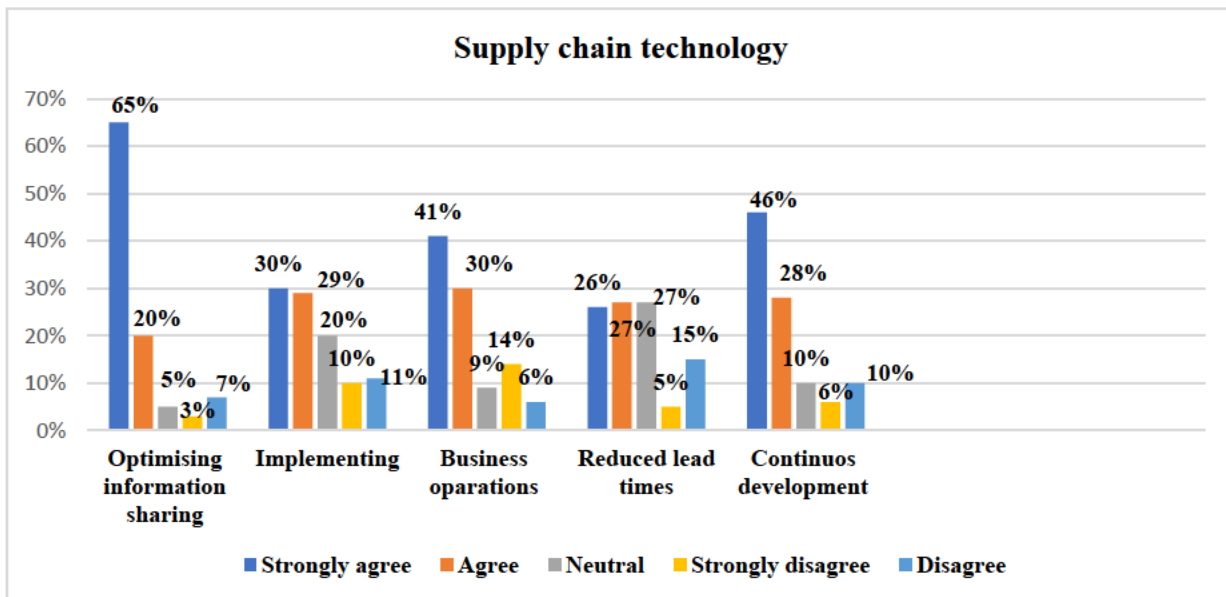


Figure 4.12 shows important variables (optimising information sharing, implementing, business operations, reduced lead times, and continuous development) on the perception and experience of participants. Eighty-five percent of the respondents indicate that when it comes to optimising information sharing, supply chain technology is crucial. With regards to implementing new supply chain technology, 59% of the respondents agreed that implementing new supply chain technology, while 20% remained neutral, 10% and 11% disagreed. Fifty-three percent of the participants illustrated that technological systems used by Khathino reduce lead time. Furthermore, 27% remained neutral while 15% disagreed and 5% strongly disagree. A high number of respondents

indicates that 74% of the respondents agreed that continuous development in supply technology is vital.

Figure 4.13: Inventory management and order fulfilment

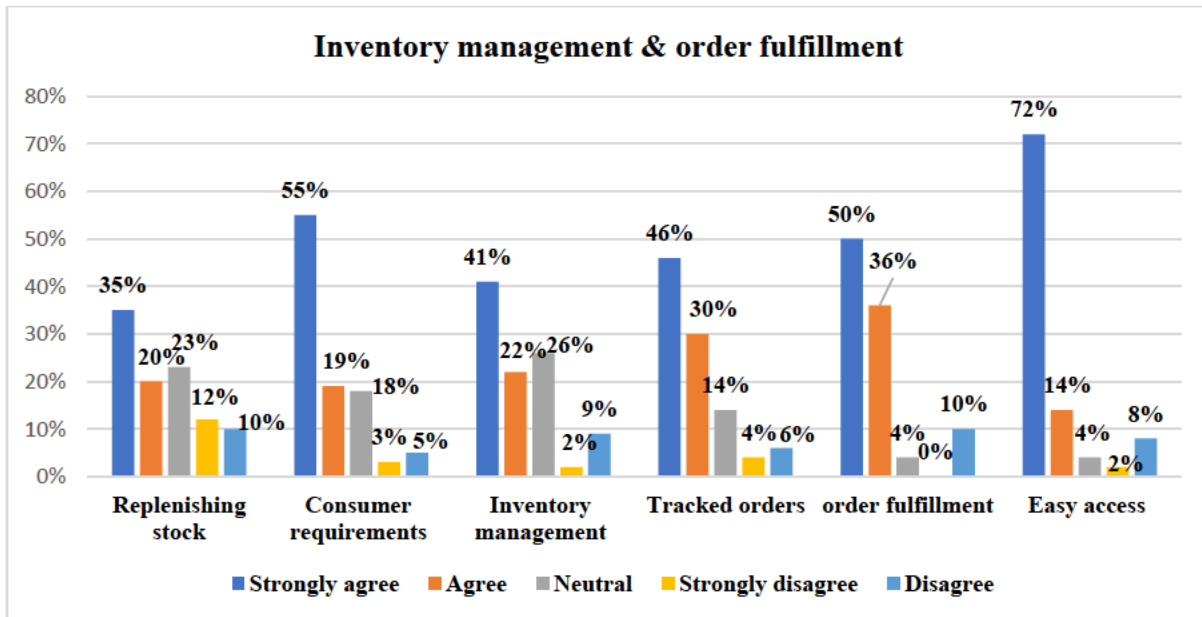


Figure 4.13 demonstrates the important variables (replenishing stock, consumer requirements, inventory management, tracked orders, order fulfillment, and easy access) on the perceptions of Khathino participants. Fifty-five percent of the participants indicated that the organisation replenishes stock from regional distribution centers to stores. Seventy four percent (74%) of respondents believe that regional distribution centers should always have the correct amount of product on hand to meet consumer needs. While 63% of respondents said that information exchange ensures order fulfilment. A high degree of participants illustrates that 76% of the participants state that information sharing from the warehouse to the supermarket ensures orders a tracked and the right amount of goods are ordered. Furthermore, a huge number of participants 86% in the order fulfilment phenomenon states that order fulfilment relies on information from both the supplier and the consumer. Lastly, under the variable of easy access 86% of participants demonstrated that consumers can easily access the product they are looking to purchase at the retail store.

4.8 Measures of central tendency

According to Mutairi (2018:775-785), the two most “common numerical descriptive measures are measures of central tendency and measures of variability. Among the measures of central tendency are mode (the measurement that occurs most frequently); median (the middle value when data is arranged from lowest to highest) and the mean (average value within the dataset)”.

4.8.1 Descriptive statistics

Table 4.2 indicates the descriptive statistics for the research instrument's independent variables. As a result, all variables have the same minimum value ("1") and maximum number ("5").

Theme: The bullwhip effect	N	Minimum	Maximum	Mean	Std.Deviation
Coordination mechanism	150	1.00	5.00	3.9467	1.26802
Daily functions	150	1.00	5.00	4.2133	1.04648
Consumer demand	150	1.00	5.00	3.8200	1.28005
Bullwhip effect	150	1.00	5.00	4.0400	1.08609
Theme: Information sharing					
Meet consumer demand	150	2.00	5.00	4.2267	.89102
Supply chain efficiency	150	1.00	5.00	4.2200	.85820
Information sharing is Vital	150	3.00	5.00	4.5600	.56140
Supply chain partners	150	1.00	5.00	4.4867	.76620
Business processes	150	1.00	5.00	4.5133	.84135
Level of organisation	150	1.00	5.00	3.9200	1.13232
Inventory Management and Order fulfillment					
Regional distribution center	150	2.00	5.00	4.5067	.56140
Requirements of consumers	150	1.00	5.00	4.0400	1.29987
Inventory management	150	1.00	5.00	4.4600	.79114
Tracked orders	150	1.00	5.00	4.3933	.97552
Order fulfillment	150	1.00	5.00	3.9000	1.13368
Easy access	150	3.00	5.00	4.7200	.47937
Supply chain technology					
Optimising information (ST)	150	1.00	5.00	4.5800	.53433
Implementing new technology	150	3.00	5.00	3.8933	1.24322
Business operations	150	3.00	5.00	4.4600	.66181
Reduce lead times	150	3.00	5.00	4.5333	.57541
Continuous improvement	150	1.00	5.00	4.2867	1.08273
CPFR method					
Forecasting and planning	150	1.00	5.00	4.3867	1.00860
Protecting information	150	1.00	5.00	4.5333	.94597
Collaborative planning	150	1.00	5.00	4.5267	.88003

Source: SPSS statistical findings were used by the researcher to compile this report

Table 4.2 illustrate the descriptive statistic for information sharing, bullwhip effect, consumer demand, sharing of consumer information, meet consumer demands, supply chain efficiency,

warehouse to the supermarket, etc. The categorization of variables remains within the standard mean deviation. Therefore, the mean sample represents the true mean population. The mean or mode of agreement between these variables exists in the same manner. These have a mean ranging from 1.5 to 4.25. The standard deviation in all is less than the mean which shows the variance in the data's importance. There is also a more frequent core value of 1 (median) which is the sample's most occurring value. The median and mean are measures of central tendency which approximately indicate the location of the center of the distribution. Standard deviation is a measure of dispersion, a measure of dispersion indicates how widely spread out the distribution is. Standard deviation is the mean score of the sample.

Table 4.2 under the bullwhip effect theme the respondents shows a high understanding of information sharing as a coordination mechanism to share information from the warehouse to the supermarket which is shown by the mean value of 3.9467. Furthermore, under the daily function variable shown by the mean value of 4.2133 respondents indicated a high value of understanding that bullwhip effects impact the daily function of the organisation. Thus, the score value of 3.8200 indicates that sharing information on consumer demand from upstream to downstream can be an effective tool for managing the bullwhip effect. The respondents indicated that another effective tool of managing the bullwhip effect is communication from supply chain members under the bullwhip effect theme indicated by the mean value of 4.0400.

The respondents agreed that consumer demands are met which is evident to the mean value of 4.2267 under the information sharing theme in table 4.3. The respondents indicated that information sharing can maximise supply chain efficiency show under the supply chain efficiency phenomenon ($m=4.2200$ and standard deviation= 0.85). To mitigate the bullwhip effect, information exchange is crucial indicated by the mean score of 4.5600. Thus, all supply chain partners in an organisation must share information, to ensure goods are delivered to the supermarket on time ($m=4.4867$ and standard deviation= 0.76). The smooth flow of the businesses process is enhanced through effective information shown by the participants ($m=4.5133$). The respondents for this study indicated that information sharing is made available at all levels of the organisation ($m=3.9200$ and standard deviation= 1.13). The second highest mean value ($m=4.5600$ and standard deviation= 0.461) indicates that is why sharing information from the warehouse to the supermarket is important. The mean value of 4.5067 states that Using the central supply chain

distribution model, activities are easily coordinated under inventory management and order fulfillment theme.

To meet the needs of customers, Khathinos regional distribution center always has enough stock supported by the mean value of ($m=4.0400$ and stranded deviation= 1.29) that in turn in maximise efficiency by minimising inventory and smoothing production. There is overwhelming evidence provided by the respondents that Khathino information sharing between the warehouse and the supermarket ensures inventory management ($m=4.4600$ and standard deviation= 0.79). The respondents affirm that information sharing from the warehouse to the supermarket ensures orders a tracked and the right amount of goods are ordered, as indicated by the man value of 4.3933 . There is no overwhelming evidence that the mean value of 3.9000 indicates that there is a disagreement that information is shared from upstream (warehouse) to downstream to ensure order management of stock, forecasting product, and order fulfilment. Table 4.3 respondents indicate that customers have easy access to products they want to buy at retail stores, according to a significant majority of respondents ($m=4.7200$ and standard deviation= 0.47).

The participants agreed that supply chain technology plays a huge role in optimising and transferring information from the warehouse to the supermarket and from the supermarket to the warehouse as per the mean value of 4.5800 . The mean value of 3.8933 denotes that respondents remained neutral on whether or not, implementing new supply chain technology to enhance information sharing is expensive. The respondents affirm that supply chain technology maximise business operations, as indicated by the mean value of 4.4600 . Furthermore, the mean value of 4.5333 states that technological systems used Khathino organisation reduces lead times and maximise the flow of information. Furthermore, the respondents indicated that continuous development of supply chain technology in Khathino is vital ($m=4.2867$ standard deviation= 1.08).

Under the CPFR theme, the variable "forecast, and planning" has a minimum value of 1 and a maximum value of 5. This suggests that there were respondents who were both strongly in favor of and very opposed to the idea of warehouses and supermarkets forecasting and planning cooperatively using integrated information systems. Furthermore, respondents highly agreed that both the warehouse and the supermarket have a high degree of understanding about protecting the exchange of information ($m=4.5333$ and standard deviation= 0.57). Lastly, the mean value of 4.5267 shows that collaborative planning entrenches the magnitude of communication amongst

warehouse and supermarket to ensure better information sharing, which mean a lot of respondents agrees that collaborative planning does entrench magnitude of communication from the warehouse to the supermarket.

4.9 Inferential Statistic

Table 4.3: Pearson correlation coefficient analysis

Correlations					
Pearson Correlation	Information sharing	Bullwhip effect	Central Distribution Model	Inventory Management	Supply chain technology
Information sharing	1.000	0.510	-0.631	0	0.781
Bullwhip effect	0.510	1.000	0.381	0.251	0.432
Central Distribution	-0.631	0.381	1.000	0.521	0.631
Inventory Management	0	0.251	0.523	1.000	0.502
Supply chain technology	0.781	0.432	0.631	0.502	1.000
Sig. (2-tailed)	Information sharing	Bullwhip effect	Central Distribution Model	Inventory Management	Supply chain technology
Information sharing	0	0.054	0.000	0.000	0.16
Bullwhip effect	0.000	0	0.000	0.000	0.057
Central Distribution	-0.050	0.000	0	0.000	0.000
Inventory Management	0.000	0.000	0.000	0	0.000

Supply chain technology	0.000	0.000	0.000	0.000	0
N=150					

Source: Compiled by searcher from SPSS results

Table 4.3 determines the association between the dependent variable and those variables classified in the bullwhip effect part of the questionnaire. The bullwhip effect and information sharing indicate fairly strong results of 0.51 which indicates that information sharing can indeed minimise the bullwhip effect, which leads the researcher to a conclusion that bullwhip effect can be mitigated by effective information exchange. The relationship of -0.63 implies that information sharing and the centralised distribution model are interdependent. In accordance with the theory, centralised distribution models are remarkably efficient. The link between information sharing and supply chain technology is strong, with a correlation value of 0.78, which indicates a strong relationship.

These results are supported in the findings of the literature that for information sharing to flow effective supply chain technology is utilized. Table 4.3 further indicates that the centralised distribution model and bullwhip effect indicate a relationship of 0.38. The correlation coefficient of 0.52 indicates a fairly strong relationship between inventory management and the central distribution model. The correlation coefficient of 0.43 depicts an average relationship between supply chain technology and the bullwhip effect. This correlation is interesting, it indicates that the company is indeed trying to use supply chain technology to minimise the bullwhip effect. Lastly, supply chain technology and inventory management depict a strong relationship of 0.50, which shows that supply chain technology utilized by the company is indeed strong to the management level of inventory.

4.10 Cross tabulation

Cross tabulation is a technique used to quantitatively analyse the determine the relationship between two variables. A contingency table is a table used for constructing statistical testing (Knapp and Knapp, 2018:253-275). The Cross-tabulation purpose is simply information sheets showing the results of the entire class of participants as well as the results of the subgroups of study participants. Cross-tabulations allow you to analyse relationships with data that may not be easily apparent when examining complete answers to the analysis. Cross tabulation is therefore

used to check the relationship between the two of the selected variables (Knapp and Knapp, 2018:253-275).

Table 4.4: Information sharing and Information technology systems cross-tabulation

Information technology system *				
		Information sharing		Total
		Yes	No	
Information technology systems	One	29	0	29
	Two	58	2	60
	Three	48	1	49
	Four And more	12	0	12
Total		147	3	150

Table 4.5: Chi-Square test

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.653 ^a	3	0.043
Likelihood Ratio	7.654	3	0.044
N of Valid Cases	150		

H₀₁: Information systems implemented are not effective in sharing information.

H_{A1}: Information systems implemented are effective in sharing information.

Table 4.4 indicates that 19% (29) of the respondents indicated that information systems implemented within one year have indeed proven to be effective in sharing information, 40 % (58) show that information systems implemented in two years have indeed shared information effectively. Information system implemented within the last four years has the lowest count of 8% (12). Information system implemented in the last three years has 33% (48) respondents who indicated the system is effective in transferring information. As a result, it is hypothesised that there is a statistically significant connection between information sharing and the systems use to

share information. Table 4.5 shows that the significance ranges to 0.043, which indicates that the variables are significantly related.

Table 4.6: Product and Order fulfillment cross-tabulation

Sharing information across business *		Product and order fulfillment		Total
		Yes	No	
Sharing information across business	Hourly	37	15	52
	Daily	17	15	32
	weekly	31	12	43
	Monthly	14	6	20
	Less than ten years	1	2	3
Total		100	50	150

Table 4.7: Chi-square test

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.233 ^a	2	0.013
Likelihood Ratio	5.234	2	0.014
N of Valid Cases	150		

H₀₂: Order and product fulfillment are not enhanced through information sharing

H_{A2}: Order and product fulfillment are enhanced through information sharing

Table 4.6 provides insight into the frequency of information sharing across the business and how it is significant to product and order fulfillment. Thirty-five percent (35%) of the respondents indicated that information is shared with the supermarket hourly. Furthermore, 21% of the respondents specified that Khathino warehouse shares information with the supermarket daily, and 29% of the respondents validated that information is shared weekly. While 13% of the respondents indicated that information is shared across the business monthly. The remaining 2% stated that information is shared less than ten years from the Khathino warehouse to the supermarket. Table

4.7 shows that there is a p value= of 0.013, this implies that the variables are significantly related. This indicates that the flow of information across the business is required for the order and product fulfillment to ensure high satisfactory consumer levels.

Table 4.8: Bullwhip effect cross-tabulation

Collaborative planning*				
		Bullwhip effect		Total
		Yes	No	
Collaborative planning*	Agree	15	0	15
	Strongly agree	44	0	44
	Neutral	20	10	30
	Disagree	25	5	30
	Strongly disagree	31	0	31
Total		135	15	150

Table 4.9: Chi-square test

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.437 ^a	1	0.035
Likelihood Ratio	4.455	1	0.035
N of Valid Cases	150		

H₀₃: Bullwhip effect is not mitigated through collaborative planning

H_{A3}: Bullwhip effect is not mitigated through collaborative planning

Table 4.8 provides insight into the frequency of collaborative planning and how it is significant to bullwhip effect. Ten percent (10%) of the respondents agree that collaborative planning is an effective tool to mitigate bullwhip effect. Furthermore, 29% of the respondents strongly agree that Khathino collaborates to mitigate bullwhip effect, and 20% of the respondents are neutral. Twenty percent (20%) of the respondents indicated that information is shared across the business monthly.

The remaining 21% stated that bullwhip effect is mitigated by bullwhip effect. Table 4.9 shows that there is a p value= of 0.035, this implies that the variables are significantly related. This implies that collaborative planning does decrease the bullwhip effect.

4.11 Cronbach alpha & Reliability and Validity

Heo, Faith and Kim (2015:1-9) states that If the items on a scale connect well with each other, Cronbach's alpha is the statistical tool used see how strongly they correlate. An alpha value higher than 0.07 is indicates that the scale being utilised is trustworthy.

Table 4.10

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.593	.544	27

Table 4.10 shows the reliability scale used in this study. According to the real Cronbach's alpha value of 0.59, the scale used in the research is definitely accurate and credible. Construct validity was used to assess if the research instrument measures the aspects as intended by the study. Analyses and interpretations based on a multivariate analysis demonstrate that the measurements employed in this study are valid.

4.12 Histogram and scatter plot

Table 4.11

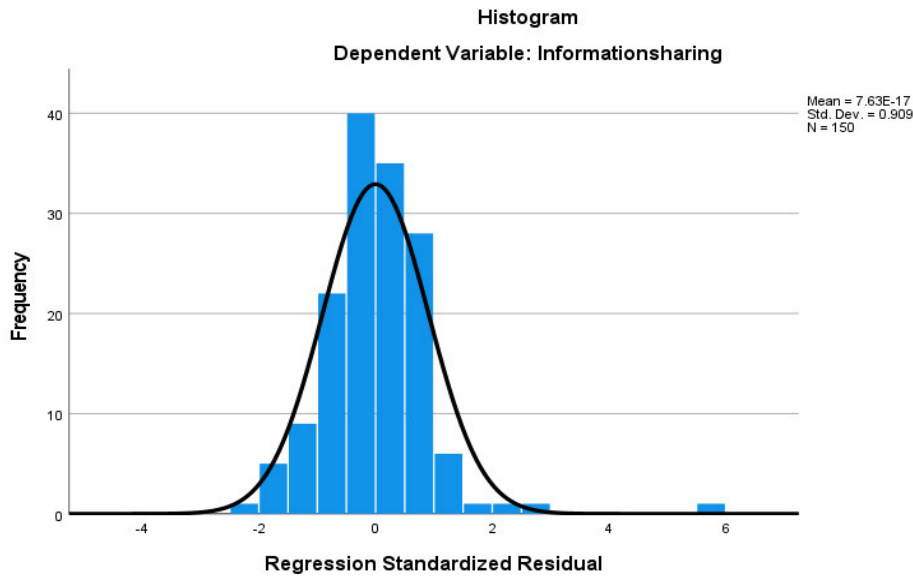


Table 4.12

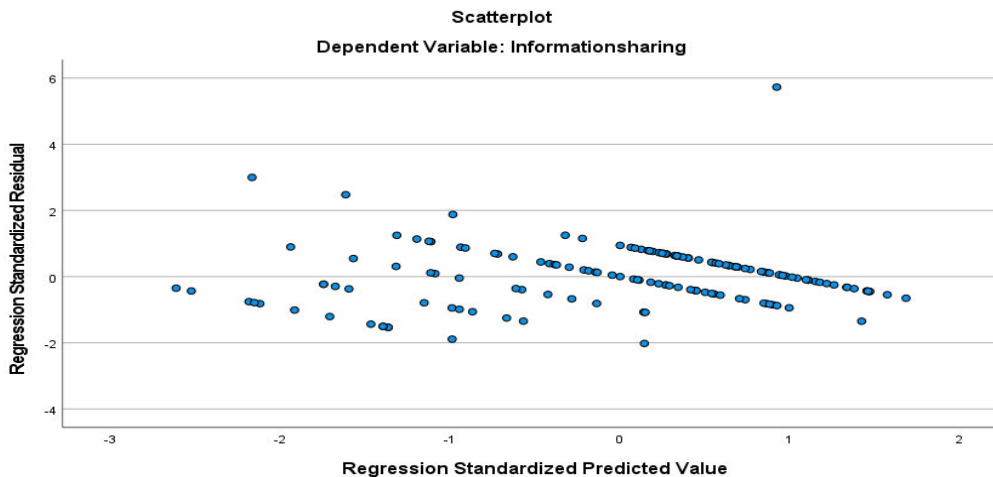


Table 4.11 illustrates the histogram and scatterplot for information sharing. The histogram shows that information sharing is shared effectively from the Khathino warehouse to the supermarket as evident as per the histogram. The histogram is normally distributed but slightly distributed to the right, it represents the association of information sharing. In the middle section of the histogram, there are many respondents, who agree that information sharing is shared effectively. The histogram is a normal distribution, which implies that the study was conducted effectively. Table

4.12 shows the scatterplot for the study, the scatter plot shows that as information sharing increases bullwhip effect decreases. This means there is a significant relationship between information sharing and the bullwhip effect.

4.12 Conclusion

In conclusion, the research study's objectives were:

- 1-To examine the extent of information sharing to optimize management of bullwhip effect.
- 2 -To examine how information is shared from the retail warehouse to the supermarket to ensure stock management and order fulfilment.
- 3 -To assess the impacts of supply chain technology as an enabling tool of information sharing.
- 4- To establish the extent of collaborative planning to entrench the magnitude of communication amongst warehouses and supermarkets to ensure better information sharing.

Information sharing is an effective approach in reducing the bullwhip effect. This chapter makes conclusions based on the data analysis. It also evaluates whether the analysis meet the research objectives and answered the research questions. The data analysis brought several concerns to light. The findings of this chapter's display will be discussed in the following chapter. Qualitative and quantitative findings of the study are included in the results. This comprises thematic analysis and content analysis as strategies for analysing and exposing the outcomes of the research project.

Chapter Five

Discussion of Results

5.1 Introduction

The problem statement for this study focuses on entrenching the magnitude of information sharing within the Khathino warehouse and supermarket. Business divisions typically operate independently towards separate objectives. The study aimed to entrench supply chain integrated information sharing through planning, forecast-based performance, collaboration, outcomes, and supply chain technologies. The data obtained from respondents were analysed in the previous chapter. This chapter synthesis data analysis with a literature review.

5.2 Themes from the literature review

There were various common themes highlighted in the literature review. It confirmed that today's retail industry is a part of modern supply chain networks. Khathino Warehouse and Supermarket specializes in general goods and nonperishable foods for work, home, and leisure usage. The literature revealed that CPFR is a key driver of supply chain integration, allowing for alignment and information sharing among Khathino warehouse and supermarket. It was determined that information sharing, and system integration were key success elements for the CPFR approach. Data analysis indicates that Khathino warehouse and supermarket believes in the value of information sharing. Information sharing has grown more complicated and harder for employees to utilise. To successfully exchange information, Khathino warehouse and supermarket have a strong working relationship with suppliers and consumers and understand each other's goals. Effective exchange of information requires well-defined communication methods. Khathino should recognize the value of transparency to improve the seamless flow of information. Transparency is improved vis supply chain integrated systems (Burns,2016:10-11). Once relationships are established and transparency is improved via the use of integrated technologies, all stakeholders in the supply chain profit by guaranteeing that consumers' needs are met. This can be done by effective means of information exchange. To guarantee that consumers are serviced according to actual demand, successful information sharing relies significantly on internal and external collaboration.

5.3 Research objective one

To examine the extent of information sharing to optimize management of bullwhip effect.

The first objective of the research study was to examine the extent of information sharing to optimize the management of the bullwhip effect. A transparent business environment is required for all stakeholders participating in the Khathino supply chain and information sharing process. The company must establish a good relationship with employees, consumers, and suppliers. Thus, the purpose of this statement was to determine whether or not efficient and effective information sharing had a substantial impact on managing the bullwhip effect.

The survey instrument gathered data from respondents about the frequency of information sharing across enterprises. Forty-six percent (46%) of the respondents indicated that warehouses and supermarkets share information with other departments hourly, thirty-five (35%) stated that it shares information with other departments daily, thirteen (13%) of participants validated that information is shared across departments weekly, only six (6%) of the participants indicated that Khathino shares information across departments monthly. And the remaining zero (0%) indicated no response selected this section, on how Khathino shares information less than 10 times a year.

The fact that 46% of the study population illustrates that information is shared across departments weekly and less frequently is cause for concern. A conclusion that was drawn was that Khathino warehouse exchanges information with the supermarket and suppliers regularly. The retail practice relies heavily on real-time information and communication to be effective. The data analysis confirmed that there is an overwhelming agreement (90% of the respondents) that sharing information from upstream to downstream minimises the bullwhip effect.

The literature strongly agrees that technological advancements and enhancements in the Khathino supply chain facilitate effective information exchange. Therefore, it is concluded that effective information sharing minimizes the bullwhip effect and also smooth day to day operations of the business. However, this finding does not indicate that the Khathino have the tools necessary to engage in this degree of collaboration. Perhaps Khathino's lack of system tools is to blame for the infrequent sharing of information between departments and businesses (Darvish, 2017:291).

This is confirmed by Figure 4.8 in the previous chapter, which shows 96% of the respondents from this study said yes to the statement that electronically enabled information sharing tools enhance

integration, coordination, and collaboration in supply chain networks. However, 4% said no to the statement that electronically enabled information sharing tools enhance integration, coordination, and collaboration in supply chain networks. Improved visibility and accountability are a result of the use of an effective information system in Khathino. Product movement and information across the supply chain may be better controlled by manufacturers' exchange of information. According to the respondents of this study information technology systems is important as it provides information to ensure smooth process flow of day-to-day operations in Khathino (Mirchna and Neilson). However, this does not imply that Khathino now has the system tools and resources necessary to execute the CPFR and to share information. The information provided does not indicate whether the organisation has effective technological tools for sharing information. Khathino has one main distribution center located in KwaZulu-Natal that distributes to other regions.

Khathino found that distribution centers had high inventories and slow sales, resulting in the "bullwhip effect." The warehouse's capacity was limited due to a lack of space. This implies that, while the logistics division had invested in distribution centers, forecasting and inventory management systems had not yet been deployed. A centralized distribution model was adopted by Khathino. Even though the organisation invested in a centralized distribution center, there are still problems in implementing it. For this business model to function properly, and information sharing system is necessary. Since information must be exchanged internally and externally within the Khathino organisation, efficient collaboration is required. While respondents' perceptions about external cooperation are highly positive, this research study's findings show that the organisation lacks the system tools and resources essential for a comprehensive collaborative process. According to the study's literature, the usage of electronic technology within an organisation is essential to a successful exchange of information. Effective information sharing, according to the literature, enhances strategic supply chain processes. On the other hand, Khathino lacks the resources to catch future value-added.

5.4 Research objective two

To examine how information is shared from the retail warehouse to the supermarket to ensure stock management and order fulfilment.

Research objective two sought to establish how information is shared from the retail warehouse to the supermarket to ensure stock management and order fulfilment. There is overwhelming agreement amongst respondents that information is indeed shared from the warehouse to the supermarket. Figure 4.8 states that an overwhelming number of respondents for this study indicated that 67 % of respondents indicated that information is shared from upstream (warehouse) to downstream (supermarket) to ensure order management of stock, product, and order fulfilment. However, 33 % of the employees of Khathino illustrated that information is not shared from the warehouse to the supermarket to ensure order fulfillment, management of stock, and product fulfillment. The majority of the respondents states that the Khathino warehouse communicates with retailers to ensure the right quantity of stock is distributed by the supplier to the retail supermarket. Having a well outlined and smooth order fulfillment process helps Khathino continue to draw customers and satisfy them with their products.

Figure 4.8 provided a summary of the respondent's perception, 98 % of the respondents agree that Information is shared from the warehouse to the supermarket and from the supermarket to the warehouse to make strategic decisions. Only 2% of the respondents indicated that information is not shared from the warehouse to the supermarket, and from the supermarket to the warehouse to make strategic decisions, the respondents disagreed with this statement. It can be concluded that the Khathino warehouse does provide information to the supermarket to ensure products reach the final end-user. This is irresistible evidence from the respondents of Khathino that the company does share information from the warehouse to the supermarket.

Table 4.3 presents strong evidence that information sharing is conducted through the warehouse to the supermarket because consumers have easy access to the goods they require. The mean from easy access is 4.7200 which is highly great and thus shows that a lot of respondents agree with the fact that consumers can easily access the product they are looking to purchase at the retail store. Hence, information is shared effectively from the warehouse to the retail store. Table 4.3 provides a summary of respondents that Khathino's distribution centers always hold the acceptable amount of the right product, to satisfy the requirements of your customers supported by the mean value of

($m=4.0400$ and standard deviation= 1.29). This implies that information is shared effectively to ensure consumer demands are met which is supported by the mean of 3.8200 .

5.5 Research objective three

To assess the impacts of supply chain technology as an enabling tool of information sharing.

The focus of this research objective is to establish whether supply chain technology can be used to facilitate information sharing. Most respondents feel that supply chain technology makes it easier to share information. The purpose of the research objective was to establish which information technology systems had been implemented in the organisation to help minimise the bullwhip effect. Figure 4.4 provided startling evidence that shows that 19% of the respondents indicated that only one information technology system had been implemented within Khathino within one year, while 40% of the respondents affirm that information technology systems have been implemented within two years. Furthermore, 33% of the respondents stated that information systems had been implemented in the three years. Within four or more years 8% of the respondents indicated that four or more information systems had been implemented within the organisation. This information between respondents means that Khathino lacks the necessary system tools to effectively share information. Respondents indicated that implementation of supply chain technology can effectively enhance how information is shared that is provided in Table 4.2 with the mean of 3.8933 , implementing new supply chain technology can indeed enhance information sharing even though it is expensive. This implies that Khathino is unable to take advantage of the benefits of efficient information exchange due to a lack of resources and system capacity (Ali and Haseeb, 2019:215-226).

5.6 Research objective four

To establish the extent of collaboration planning to entrench magnitude of communication amongst Khathino warehouse and supermarket to ensure better information sharing

This research objective sought to establish whether or not the CPFR model entrenches the magnitude of communication amongst Khathino warehouse and supermarket to ensure better information sharing. There was overwhelming agreement amongst the respondents that Figure 4.8 states that 95% of the respondent indicated that the Khathino warehouse and supermarket does make use of the Collaboration, Planning Forecasting and Replenishment (CPFR) method to

enhance information sharing. Only 5% disagreed that the organisation does make use of the CPFR method to effectively share information. The CPFR model is used as an approach to share information across trading partners and improve operational efficiency. Hence, it can be concluded based on the data analysis that CPFR does improve information sharing. The models help Khathino warehouse and the supermarket to exchange information smoothly and build a relationship with suppliers and consumers. Table 4.2 provided a significant amount of evidence that the CPFR method has indeed entrenched magnitude of communication amongst Khathino warehouse and supermarket, which can be identified by the mean of 4.5267 from collaborative planning. The mean shows that strong evidence showed that a lot of respondents for the study agreed that collaborative planning entrenches the magnitude of communication amongst warehouses and supermarkets to ensure better information sharing. Furthermore, Table 4.2 shows a summary of how respondents think CPFR affects the volume of communication from the warehouse to the retail shop (Darvish, 2017:291). CPFR is crucial for lowering inventory levels, minimizing out-of-stocks, boosting sales, enhancing forecast accuracy, and strengthening relationships and internal communication.

5.7 Conclusion

The chapter began by clarifying the study's goals. Afterwards, the empirical data were examined to determine whether there were any connections or differences with the study's goals. Technology must be accepted as a vital engine in today's businesses. Managers are compelled to make judgments based on manual data and assumptions when they don't have real-time access to precise information. A lack of effective tools to exchange information inside Khathino's organisation is a major problem. Khathino is currently using manual solutions to solve obsolete inventory, slow response to consumers. The following chapter will provide conclusions and recommendations for further research arising out of this study. The limitations and ethical issues also form part of the discussions in the following chapter.

Chapter Six

Conclusions and Recommendations

6.1 Introduction

The empirical findings of the research were described in the preceding chapter. These findings are discussed and summarised about the literature on information sharing from upstream to downstream in the Khathino warehouse and supermarket. Additionally, the implications of the study, limitations, and delimitations are discussed after which recommendations for further research on the sharing of information from upstream to downstream in Khathino warehouse and supermarket.

6.2 The Main Purpose of the Study

The purpose of this study was to establish how information is shared from the warehouse to the supermarket to ensure the bullwhip effect is minimised and that consumers acquire the information they require. The bullwhip effect is minimised by focusing on the smooth flow of information amongst supply chain partners. Moreover, the main purpose of this research study is to indicate the importance of information sharing in the retail industry in South Africa. Information exchange is the backbone of a business, without it, businesses would be unable to produce goods required by consumers. Hence, information needs to be transmitted from the manufacturing phase to the logistics phase in the retail sector, that is why the study needs to be conducted as it is of great paramount.

6.3 Overview of the research study

This section presents an overview of the different chapters of the study. The study mainly comprises an extensive discussion on how information is entrenched from the Khathino warehouse to the supermarket to ensure the bullwhip effect is minimised.

Chapter 1: gave a brief overview of the research study and elaborated on the numerous study criteria offered in the form of research objectives and questions. The chapter also included a more in-depth analysis of the research topic and the issues that motivated the research study. The chapter paved a way for the chapter that followed.

Chapter 2: This Chapter addressed a wide variety of concerns with information sharing from stream sites at the Khathino warehouse and individual supermarkets. It described the many components and themes related to information sharing from stream sites in other retail establishments, as well as how it relates to the Khathino organisation. This chapter discussed the views of other authors relating to information sharing. The challenges and definitions are supplemented by the theoretical framework.

Chapter 3: This chapter discussed the research design, methodologies, and techniques used to collect to acquire the necessary data for this research project. The research methodologies employed were mostly directed by the study's aims and have been thoroughly detailed in chapter one. This study has been defined as a mixed-method study, employing a qualitative approach and quantitative approach with the use of managers, suppliers, and employees of Khathino warehouse and supermarket. As a result, this research study relied on primary data sources such as in-depth interviews conducted utilizing a semi-structured interview guide. The chapter also included thematic data analysis, which was employed. The chapter concludes with the supply of a process and instruments to be used to achieve the study objectives.

Chapter 4: The key focus was to present both qualitative and quantitative data and analyses the data using multiple data gathering methods to achieve the study's objectives properly. The presentation adhered to the scope of the thematic analysis approach and made use of statistical tools to show the data. The study was interested in presenting how information is shared from the Khathino warehouse to the supermarket and what supply chain technologies are used to transfer information between the warehouse and the supermarket and also get a management perspective on how information is shared from the warehouse to the supermarket to ensure smooth flow business processes. The presentation and analysis were carried out in line with the study objectives, and the direction was improved by reviewing the research questions that needed to be addressed.

Chapter 5: The presentation and analysis were carried out by the study objectives, and the direction was improved by examining the research questions that needed to be answered. The chapter centered on a discussion of the study's findings and results this includes an examination of each research objective using available data to back up the findings. The chapter went over each research objective and offered comprehensive data to back up the fact that the objective was met.

The literature from Chapter two also served as a foundation for reviewing and unpacking the objectives, with findings serving as visual supporting mechanisms.

Chapter 6: The examples are proposed and provided, with conclusions made from the primary study objectives and recommendations for further studies.

6.7 Conclusion Based on the Reviewed Literature

Based on the literature examined on the issue of the bullwhip effect, all organisations affected by their supply chain have a significant risk of having the bullwhip effect. As a result, for firms to meet their goals, their supply chain stream sites must be able to efficiently share information for operations to move smoothly toward reaching the company's set of objectives. The literature indicated that CPFR is a critical driver of supply chain integration, allowing for alignment and information exchange across Khathino warehouse and supermarket. Information exchange and system integration were highlighted as CPFR success factors. The data analysis revealed that Khathino warehouse and supermarket believes in the value of information sharing. However, due to the lack of system integration information sharing has become more complex for employees to manage. The Khathino must guarantee appropriate and solid planning for it to be a success and to ensure the smooth flow of business activities.

Collaboration and integration should be encouraged among supply chain partners in the Khathino warehouse and supermarket. To this end, the inclusion of the CPFR model to the study as part of the tool and a mechanism to manage the bullwhip effect from the Khathino warehouse to the supermarket. All the stakeholders concerned from downstream to upstream in Khathino warehouse and supermarket must play a role in the planning and collaboration. Information sharing is thus imperative to ensure the management of the bullwhip effect from the Khathino warehouse to the supermarket. The study provided insight regarding information sharing from the Khathino warehouse to the supermarket to manage the bullwhip effect. The bullwhip effect is caused by poor information sharing, lead times, lack of collaboration, and poor planning in organisations. The literature indicated that supply chain technology plays a huge role in the effective sharing of information within the companies supply chain process to smooth the flow of production.

6.8 Recommendations

In this study it was recommended that For Khathino warehouse and individual supermarkets to effectively share information to reduce the bullwhip effect, it must:

- 1- To improve technology to help support the companies supply chain.
- 2- Khathino must ensure that all information systems adopted must facilitate supply chain collaboration
- 3- Improve communication mechanism to all employees to enhance information sharing
- 4- The business structure has a direct influence on supply chain hence it should be adjusted
- 5- It is recommended that the organisation's strategy be updated such that each internal department fully understand their function
- 6- The organisation's significant development in its systems should be a primary strategy

6.9 Opportunities for further research

Suggestions for future studies are provided in this section. As a result of this research, several new research possibilities have been identified. A future study might assess supply chain performance and information sharing. Furthermore, a system reliability study may be carried out for future research. Given the complexities of the Khathino business divisions, a study of information flow might give further research opportunities. It is suggested that this study be repeated with bigger sample size. Moreover, more qualitative approaches such as focus groups may be utilised to investigate the research topic of this study, allowing respondents to express their thoughts entirely. Research on all Khathino operating formats may be done, it is a good concept for future studies to extend the sample geographical reach.

6.10 Conclusion

The final chapter summarized the purpose of the research study, its contribution, and chapter summaries. Following that, the study's limitations and delimitations were explored, as well as recommendations for further research. This research study has indicated that the exchange of information to minimize the bullwhip effect depends on information systems and technological tools. The logistics and forecasting technologies are in place. Recognizing and evaluating problem areas so that corrective action can be taken is a challenge for the business. In Khathino, the supply

chain is encouraging. According to the findings of the study, the smooth flow of business processes in a business is the responsibility of each individual employed in the business.

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Appendix A: Timeline, Budget

Timeline Schedule

According to Pickton (2013:8) timeline schedule essentially displays the sequential sequence of things the researcher should do with the study.

Research Proposal	April 2020
Literature Review	May 2020
Application for ethical clearance	May 2020
Research Methodology	June 2020
Data collection and analysis	July- August 2020
Final corrections and binding	September 2020

Budget

The budget can be defined as the cost that will be incurred during the research. According to Donnell (2019:1-6) budget can be defined “as the justification that contains more in-depth detail of the costs behind the line items and sometimes explains the use of the funds were not evident”

Masters Research Programme

Program	Research work
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Project Information

Institution	University of KwaZulu-Natal
Research title	Information Sharing to Manage Bullwhip Effect on the Stream sites on Supply Chain Management: A Case of Khathino
Start year	2020
End year	2020
Budget start year	2020
Required funding period	1-2 years

Operating Costs

Activities	Visitation to the Khathino warehouse and Store
Category	Study visit

Item	Transport fee
Year	2020
Amount	12 000
Motivation	The research will travel to Khathino warehouse and store for 12 weeks to gather information with regards to the study.

Appendix B: Questionnaires



UNIVERSITY OF KWAZULU-NATAL

School of Management, IT and Governance

Master's Research

Project Researcher: Smangele Makhathini (0655469264)

Supervisor: Mr T.P Mbhele (031-2607524)

Title: Information Sharing to Manage Bullwhip Effect on the Stream Sites: A Case of

Khathino Supermarket

The purpose of this questionnaire is to generate information from employees of the organisation regarding the supply chain information sharing initiatives and structures of the Massmart group. The information that is provided by your company is strictly private and confidential to the researcher. The questionnaire will take approximately 10-15 minutes to complete.

Thank you for participating!!!

CONSENT

I (**Optional**) _____ (full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

Date

Signature of Participant

Section A

The following questions relate to personal details. Please tick the appropriate answer.

1. Your Gender

Female		Male	
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2. Indicate the number of years working in this organisation:

Less than 1	1-3	4-6	7-10	Over 10

3. What is your job status/level:

Top management	Middle management	First-level	Non-managerial

4. How many business-to-business information technology systems have been implemented in your organisation for last 5 years? One Two Three Four or more Namely:

One	Two	Three	Four	Namely

5. How often does your organisation share information across departments?

Hourly	Daily	Weekly	Monthly	Less than 10 times a year

6. How often does your organisation share information across enterprises? Hourly Daily Weekly
Monthly Less than 10 times a year

Hourly	Daily	Weekly	Monthly	Less than 10 years

7. How often does your organisation introduce and implement innovative electronic systems?
Weekly Monthly Once a year Once in 3 years Once in 9 years

Weeekly	Monthly	Once a year	Once in 3 years	Once in 9 years

Section B

This section aims to obtain information on dichotomous questions (Yes or No) with regard to general perceptions, information sharing and the impact of information technology systems. Please tick the appropriate box below.

8	The organisation does share information from upstream to downstream to minimize bullwhip effect	Yes	No
9	Information is shared from upstream (warehouse) to downstream to ensure order management of stock, product and order fulfilment	Yes	No
10	Supply chain technology is utilized to optimise information sharing from upstream to downstream sites	Yes	No
11	The organisation does make use of CPFR method to enhance information sharing	Yes	No
12	The organisation does believe that external collaboration has value-adding outcomes to mitigate bullwhip effect	Yes	No

13	The organisation does believe that internal collaboration has value- adding outcomes by reducing cost and improving efficiency	Yes	No
14	Information is shared from the warehouse to the supermarket and from the supermarket to the warehouse to make strategic decisions	Yes	No
15	Electronically enabled information sharing tools enhance integration, coordination and collaboration in supply chain networks	Yes	No
16	Optimised information sharing enhances integrated supply chain activities	Yes	No

Section C

The following questions are based on a Likert scale ranging from ‘Strongly agree’ (5) to ‘Strongly disagree’ (1). Please tick the most appropriate answer.

Bullwhip effect

17 Information sharing is a coordination mechanism for reducing bullwhip effect	5	4	3	2	1
18 Bullwhip effects impacts daily function of the organisation from the warehouse to the supermarket	5	4	3	2	1
19 Sharing consumer demand from upstream (warehouse) to downstream (supermarket) can manage bullwhip effect	5	4	3	2	1
20 Communication from members of supply chain and sharing of consumer information can reduce bullwhip effect	5	4	3	2	1

Information sharing

21 Is information shared from the warehouse to the supermarket and from the supermarket to the warehouse to ensure consumer demands are meet	5	4	3	2	1
22 information sharing can maximise supply chain efficiency by reducing inventory and smoothing production	5	4	3	2	1

23 Sharing information from the warehouse to the supermarket is important	5	4	3	2	1
24 Information sharing is crucial to all supply chain partners in an organisation	5	4	3	2	1
25 Information sharing from the warehouse to the supermarket enhances smooth flow of business processes	5	4	3	2	1
26 Information sharing should be made available at all levels of the organisation	5	4	3	2	1

Inventory management and order fulfilment

27 Your organisation replenishes stock from regional distribution centre to store	5	4	3	2	1
28 Your regional distribution centres always hold the acceptable amount of the right product, to satisfy the requirements of your customers	5	4	3	2	1
29 Information sharing ensures inventory management	5	4	3	2	1
30 Information sharing from the warehouse to the supermarket ensure orders a tracked and the right amount of goods are ordered	5	4	3	2	1
31 Order fulfilment rely on information from both the supplier and the consumer	5	4	3	2	1
32 Consumers are able to easily access to the product they are looking to purchase at the retail store	5	4	3	2	1

Supply chain technology

33 Supply chain technology plays a huge role in optimising and transferring information from the warehouse to the supermarket and from the supermarket to the warehouse	5	4	3	2	1
34 Implementing new supply chain technology to enhance information sharing is expensive	5	4	3	2	1
35 Supply chain technology maximise business operations	5	4	3	2	1

36 Technology systems used in your organisation reduces lead times and maximise flow of information	5	4	3	2	1
37 Continues development of supply chain technology in your organisation is vital	5	4	3	2	1

Collaborative Planning, Forecasting and Replenishment (CPFR)

38 Warehouse and supermarket are able to forecast and plan collaboratively through integrated Information systems	5	4	3	2	1
39 Both the warehouse and the supermarket has high degree of understanding about protecting exchange of information	5	4	3	2	1
40 Collaborative planning entrench the magnitude of communication amongst warehouse and supermarket to ensure better information sharing	5	4	3	2	1

End of questionnaire

Thank you for participating.

Appendix C: Interview questions



UNIVERSITY OF KWAZULU-NATAL

College of Management, Information technology and Governance

School of Management, IT and Governance

Voluntary Interview

Dear Respondent

Masters Research Project Researcher: Smangele Samantha Makhathini

Supervisor: Dr T.P Mbhele (0312607524)

Research Office: Ms Snyman (0312608350)

Title: Effects of Bottleneck on graduation ceremony: Case of University of KwaZulu-Natal

Date of interview:

Time of interview:

Name of Participant:

Pseudonym assigned to participant:

The purpose of the interview is to solicit information from the Khathino warehouse and supermarket staff. The truthful manner in which the interview questions are asked will aid in identifying information system used to eliminate bullwhip effect faced by the Khathino warehouse and supermarket. Once information sharing is optimized, it can result in smooth flow of business operations. The interview can take around 10-15 minutes to complete per each interviewee. In this interview, you are requested to indicate what is true for you, therefore no answer can be classified as “right” or “wrong”. Participants are humbly requested to ensure that whenever they need clarity

they must say so, in order to provide the 150 needed insight and are urged to answer all questions as honestly as possible. Feedback of findings will be provided to the participants if requested.

Thank you for participating!

Interview Questions

1. How often does your organisation share information, and which information is exchanged within the organisation
2. Do you think the way information is exchanged from the warehouse to the supermarket is effective and efficient
3. Do you think there is a need for your organisation to optimise the manner in which information is shared
5. Which systems are used to exchange information to ensure consumers access good they require
6. Do you think your organisation should make use of a centralised distribution model in its supply chain
7. Does your organisation share information with upstream supply chain partners in order to avoid bullwhip effect

End of the Questionnaire

Thank you for taking the time to complete the interview session.

Appendix D: English editor specialist



EDITORIAL CERTIFICATE

AUTHOR: SMANGELE MAKHATHINI

Documents Title: Information sharing to manage bullwhip effect on the stream sites: A case of Khathino supermarket

Date issued 17/09/2021

BEIN GLOBAL DESK

This document certifies that the above manuscript was proofread and edited by

Dr. Nkeleme Emmanuel I

The document was edited for proper English language, grammar, punctuation, spelling, and overall style. The editor endeavored to ensure that the author's intended meaning was not altered during the review. All amendments were tracked with the Microsoft word 'track changes' features. Therefore the authors had the option to reject or accept each change individually

Kind regards



Dr. N Emmanuel Cell: 0736262206

Editor

Appendix E: Ethical Clearance



01 October 2020

Miss Smangele Samantha Makhathini (216039666)
School Of Man Info Tech & Gov
Westville Campus

Dear Miss Makhathini,

Protocol reference number: HSSREC/00001835/2020

Project title: Information sharing to manage bullwhip effect on the stream sites: A case of khathino supermarket
Degree: Masters

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 18 August 2020 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL** on the following condition:

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

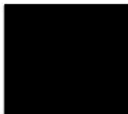
This approval is valid until 01 October 2021.

To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

All research conducted during the COVID-19 period must adhere to the national and UKZN guidelines.

HSSREC is registered with the South African National Research Ethics Council (REC-040414-040).

Yours sincerely,



Professor Urmilla Bob
(University Dean of Research)

/dd

Humanities and Social Sciences Research Ethics Committee

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