An assessment of the management of information sharing in the order processing system at Diplomat South Africa

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Declaration

I, Nokukhanya Khayelihle Dlamini, declare that:

(i) The research reported in this dissertation/thesis, except where otherwise indicated, is my original research.

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First and foremost, I would like to thank the Lord the Almighty, the author and the finisher of my life, as the word says in Philippians 4:13 “I Can Do All Things Through Jesus Christ Who Gives Me Strength”. I would not have done it without God.

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Dedication

This dissertation is dedicated to my late father Mr. N D Dlamini for planting a seed and shining the light. In the place where I come from in Msinga (Tugela Ferry), my father was an advocate for children whose parents had decided to take them out of school as soon as they can write a letter. Girl children were taken out of school because if they continued, they would become lose cannons, according to their parents. My father was a chairperson of the school governing body in our local village schools; he was involved in both Primary and High school and used to headhunt great mathematics and science teachers.

He took it up himself to school the children whose parents could not afford to put their children through school. He is the reason why I keep studying until I fulfil his dream. I also would like to pass on his lessons to the next generations. Rest well Dad, Sibal'khulu Nomagaga ka Nsele. I am because you were. If I could become half the person you were, I would have achieved much in life. You were such a figure with a strong presence and a great sense of purpose. You lived your life purposefully and accomplished the mission you came for on planet earth. Rest assured, a book is coming, and I will share your life and lessons with the rest of the world; the title of the book is "My Father's love, a daughter's perspective." You are forever in our hearts.

Abstract

Supply chain management is essential in steering an enterprise to success through coordinated activities of the value chain partners. The achievement of fast-moving consumer goods business organisations (FMCGs) has a direct relationship with the overall performance of supply chains, which are their principal distribution channel. Although it is known that sharing information improves the overall performance of a supply chain, information such as pricing or promotional strategy is often kept proprietary for competitive reasons. The supply chain of Diplomat South Africa (DSA), a Sales and Distribution company, and the corresponding supply chains were studied to establish whether the internal relationships enhanced the response to the customers' requirements. The study was grounded in collaboration and integration theory, and a qualitative research methodology was used. Non-probability sampling was used, and five senior managers from the Sales Department, Demand Planning, Operations, Masta Data, and Credit control/Finance Department were selected from the firm and were interviewed. The data collected were transcribed, coded, and thematically interpreted using content analysis. The aim of the study was to assess the management of information sharing in the order processing systems at DSA. Further, to determine whether they can appropriately use the information sharing tool and the level of transparency of information sharing amongst the departments involved in the order processing. The outcome of the study indicated that supply chain problems were department-specific, and it is recommended that information sharing and supply chain management be cohesive throughout each department at Diplomat South Africa. Employees' collaboration in the information sharing of the FMCGs at Diplomat South Africa would enhance the response to the client's requirements.

Keywords: FMCG; supply chain; value chain; supply chain relationship; performance.

Table of Contents

List of Tables

List of Figures

Glossary of Acronyms and Abbreviations

FMCG	Fast-moving consumer goods
DSA	Diplomat South Africa
SCM	Supply Chain Management
SOH	Stock On Hand
SOP	Standard Operating Procedure
PIP	Performance Improvement Plan
PWP	Poor Work Performance
MI	Management Information
OFP	Order Fulfilment Performance
MAS	Multi-Agent System
GT	Grounded Theory
Ops	Operations
Rep	Representative

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1 Introduction

Effective supply chain management (SCM) has become a valuable way of safeguarding competitive advantage and improving organisational performance since competition is no longer between organisations but among supply chains (Li, Ragu-Nathan, Ragu-Nathan and Rao, 2006; Madhani, 2021). Supply chain management has been identified to explicitly recognise the strategic nature of coordination between trading partners and to explain the purpose of supply chain management, which is to improve the performance of the whole supply chain (Li *et al*., 2006; Madhani, 2021). Supply chain dynamism, on the other hand, is defined as the volatile variations in products, technologies, and demand for products in the market (Miller and Friesen, 1983; Dess and Davis, 1984; Tahoon, Bahi, Elsehily and Nasreldeen, 2017).

Du, Lai, Cheung and Cui (2012) stressed that a business needs to share information to achieve an efficient and effective supply chain. Taking the data available and sharing it with other parties within the supply chain, an organisation can speed up the information flow in the supply chain, improve its efficiency and effectiveness of it and respond quickly to the changing needs of the customer (Li and Lin, 2006; Tahoon *et al*., 2017). While information sharing is essential, its impact on the performance of a supply chain rests on what information is shared, when and how it is shared, and with whom (Holmberg, 2000; Jafarnejad, Arbatani and Samadi, 2015). Inter-organisational relationship refers to the degree of trust, commitment, and shared vision between supplier partners (Li and Lin, 2006; Tahoon *et al*., 2017). This study considers internal organisational relationships as including one sub-dimension: trust in a collaborative culture, which is about information practices, attitudes to information, communication flows, trust, and collaboration. Information culture is the overall context of how the internal environment supports information sharing and management. Every company has a unique information culture. Several factors affect the information culture, and there are several layers of information behaviour to consider (Monczka, Petersen, Handfield and Ragatz, 1998; Jafarnejad *et al*., 2015).

In today's hyper-competitive global environment, organisations have begun to recognise that delivering the best customer value at the lowest cost is not only related to the activities, functions, and processes within the organisation itself, but also to the entire supply chain (Koçoglu, Imamoglu, Ince and Keskin, 2011; Jafarnejad *et al*., 2015). The decreased inconsistency in the information sharing of all types of supply chain activities relieves firms from corrective (rush orders and overtime) and preventive (safety stocks and extra capacity) actions, which serve to reimburse poor information exchange between the partners (Koçoglu *et al*., 2011; Jafarnejad *et al*., 2015). This study aims to investigate the management of information sharing at Diplomat South Africa (DSA).

1.2 Background and Motivation of the Study

Diplomat Global has been in operation for more than 50 years globally but only started operating in South Africa in 2011 (Ndwandwe, 2019). Diplomat South Africa operates in nine provinces around the country, with its head office in Johannesburg. This company is focused on sales and distribution in the FMCG sector. It caters to international and local brands. It has business units in five territories: South Africa, Israel, Cyprus, New Zealand, and Georgia (Diplomat Global, 2019). Diplomat South Africa is divided into two sales divisions: Tier 2 (T2) and Tier 3 (T3). Tier 2 is at a larger or bigger scale, servicing big customer buying groups and chain stores such as Boxer and Cambridge. Tier 3, on the other hand, focuses on independent wholesalers, mini-market stores, and sub-distributors, and contributes 13% to the total sales business at DSA. Tier 3 is the focus of this study.

The company in South Africa has been experiencing problems in the order processing system in the Tier 3 division (Sewpersad, 2019). All orders are captured and sent for processing via Appsterix, a world-class technology because it is a live system. It can show the order captured the stock on hand (SOH) at that particular time; it also generates an order number after capturing to confirm that the order has been captured successfully and to track it, and then the Pro-forma invoice is generated (Sewpersad, 2019). It also has all other valuable functions which are crucial for quick turn-around time for order processing. However, the sales representatives (referred to as sales reps) have been experiencing a situation that any salesperson would not wish to go

through. The process becomes frustrating: orders may be dropped off the system without any notification; stock may be lost in the system after the order has been captured; and the order may be cancelled even after generating the Pro-forma invoice to confirm the order (Sewpersad, 2019).

In some instances, the order goes through to the release stage, where the order is released and is ready for delivery. At this point the order capturer communicates and confirms the order delivery to the customer for the customer's nominated delivery day. In some instances, the customer pays for the order up-front, only to find that the sales rep receives a call from the customer that the order had not been delivered at all (Sewpersad, 2019). When the sales rep goes back to the call center to query, s/he finds out that the order was not delivered, while the order was released and ready for planning for delivery, somehow it was tampered with while still in the system. The stock disappeared and the order status went back to "block". This happens without the sales rep being informed or notified and the rep needs to start the releasing process again.

The customers get deliveries once a week per area, so if the order misses a delivery, they have to wait the entire week to get the stock (Sewpersad, 2019). There are also cases where the order survives the crucial stages in the processing system and gets to the operations department for picking and delivery, which is the last step before delivery. The sales rep may find out from the customer that the order was not delivered, despite it being the customer's nominated delivery day, as stated by the operations department. When the sales rep goes back to query with operations, they may find out that the order was ready for delivery; however, no communication transpired with the sales rep. This results in no confirmation between the sales rep and the customer, and delivery delays (Ndwandwe, 2019).

The issue of stock-outs from the supplier is also costly and detrimental to the company's reputation. The sales rep captures and confirms the order with all its content per the customer's request, but to the sales rep's surprise, the customer tells them they have received half or quarter of the stock they ordered. The other possible scenario is where the sales rep realises that there is no stock on the system as per the device's live system. The sales rep then contacts the supply chain coordinator to arrange for stock to be sent from Johannesburg to Durban. Once this is done, the order batch number and the day of delivery to the Durban depot are communicated. On

the expected day of delivery to the Durban depot, the sales rep tries to capture the stock received. However, the stock may not have reached the Durban depot. This is followed by no proper explanation as to what might have happened to cause no delivery on the expected day (Ndwandwe, 2019). All of these challenges do not come cheap: the sales rep misses the sales target, s/he also misses monthly/quarterly incentives, s/he loses customers and all other key performance indicators are affected as well. The rep's reputation or the company becomes tarnished and the company gains a bad perception among the customers because of poor service. The sales rep might end up under a performance improvement plan (PIP) or receive a poor work performance (PWP) status (Ndwandwe, 2019).

1.3 Problem Statement

The key element for any supply chain management structure is information sharing (Moberg, Cutler, Ross and Speh, 2002; Hassan and Nasereddin, 2018). According to Xie and Zhang (2002), the total cost and service level in the performance of supply chain is impacted by the sharing of information. If the level of information sharing is high, the total cost will be reduced, if the order contentment rate is higher, the turnaround time will be shorter (Lin, Huang and Lin, 2002; Hassan and Nasereddin, 2018). Zhou and Benton (2007) also affirmed an effective internal information sharing and information sharing with customers are positively influenced by a significant supply chain dynamism.

From an active supply chain perspective, continuously enhancing performance has fast become an important matter for many suppliers, manufacturers, and retailers to acquire and maintain charisma. The observing and enhancement of a supply chain have a growing tough job (Cai, Liu, Xiao and Liu, 2009; Hassan and Nasereddin, 2018), hence the need to investigate the study to unpack the frustration experienced in the process, and to find solutions to those frustrations. The inefficient management of information sharing makes this study imperative (Diplomat South Africa Annual Report, 2017). Diplomat South Africa's technology in the order processing system has evolved quite drastically. When the company started in South Africa in 2010, orders were captured manually and Sales Reps would call the call centre to process the orders. They

then moved to an electronic template where Reps would input the order on the template and send the template through to the call centre for processing.

The company then introduced a multi-modal verification tool called Ivy, a software that the Reps used to process the orders. They have now migrated to a system called Appsterix, this is a mobile application management platform for enterprises, which is built on a virtual Android-Cloud infrastructure. This system has the latest software technology, which is supposed to enable the Sales Reps to work very effectively and efficiently in processing the orders and carrying out their duties, while they are out in the trade. Once they synchronize the system after capturing orders, it is supposed to reflect to all other parties involved in the order processing system. This is so that they can each perform their relative functions on the order while it moves in the system, until it reaches the operation department and ultimately be delivered to the customer (Diplomat South Africa Annual Report, 2017).

The digital supply chain integration is currently underdeveloped from a social capital orientation; it can embrace relational integration and structural integration. The former concept pertains to behavioural and operational integration and incorporates activity evolution, cooperative work procedures, and interconnected decision selection between supply chain accomplices founded on mutual objectives, reliance, and reciprocity (Lee, 2021). The latter construct is indicative of the coordination of information conveyance and connectedness among accomplices founded on enablers of digital technologies, incorporating conventional Electronic Data Interchange (EDI) and rising artificial intelligence (AI), big data analytics, cyber-physical frameworks, and the Internet of Things (IoT) (Lee, 2021). Digital based supply chain integration intensifies clarity in the supply chain and brings down doubt originating from modifications in orders and demand unpredictability. Digital technologies can envision real – time information sharing among worldwide supply chain accomplices (Lee, 2021).

The sharing of information at Diplomat South Africa advanced due to the ability of the new ways to increase performance and synergy within and among the different departments in the organization. The order processing system, although digitally integrated, lacks structured internal processes, logic and order in terms of supply chain relationship management and customer

relationship management, which creates bottlenecks, resulting in internal disputes among the departments involved, frustrations and lack of accountability. The glitches in the system might seem insignificant but they have a huge impact on the outcome on key performance measurements set by the organisation for all departments involved, particularly the sales force.

Diplomat global started operating in Israel in 1968 as a sales and Distribution Company in the FMCG industry. In South Africa, DSA started operating in 2010 as the first company of its kind pioneering the model of sales and distribution that it uses. Diplomat Global and DSA do not own the brands that they carry, they specialise in sales and distribution for other companies such as Proctor & Gamble, Mondelez and they call them principals. DSA has partnerships with multiple companies as their principals, which exposes them to a lot of information that is sensitive and confidential and cannot be shared among the various partners. This then requires DSA to handle the information with utmost care, therefore adequate information sharing tools that are advanced and continue to evolve as the technology advances. It then poses a threat to DSA which is still a very young company and the only one in SA using this kind of model. Teething have emerged since the model was adopted from Israel which is a foreign country with different dynamics from South Africa. Some of the technical issues regarding the model are escalated to Diplomat global Israel, due to their skill and expertise in the model (Diplomat South Africa Annual Report, 2017).

The problem this study addresses is the lack of knowledge on supply chain management related to information sharing faced by Diplomat South Africa. This lack of knowledge results in the lack of implementation which causes a lack of systems integration and results in muddled scheduling of orders, delays on delivery, and difficulty in tracking orders. This costs the company its reputation and profits since the orders are not processed efficiently enough along the supply chain. The bullwhip effect (BWE) becomes apparent from the distortion in information sharing, that is the poor communication between supplier, DSA and DSA customers.

1.4 Research Aim and Objectives

a) Aim: The aim of the study is to assess the management of information sharing in the order processing systems at DSA, in order to determine whether they have the ability to appropriately use the information sharing tool and the level of transparency of information sharing amongst the departments involved in the order processing.

a) Research objectives

The study objectives are:

- To investigate the state of digital integration in the supply chain management system at DSA, focusing on internal processes;
- To evaluate the state of the current supply chain management on customer relationship management at DSA;
- To determine the state of information sharing and cross-functional relationships among departments at DSA;
- To propose improvement strategies for the management of information sharing in the order processing system at DSA in order to create functional relationships among departments at DSA.

1.5 Research questions:

The research questions are:

- What is the state of digital integration in the supply chain management system at DSA regarding internal processes?
- What is the state of the current supply chain management on customer relationship management at DSA?
- What is the state of information sharing and cross-functional relationships among departments at DSA?

- What improvement strategies for the management of information sharing in the order processing system at DSA can be provided to create functional relationships among departments at DSA?

1.6 Preliminary literature review

This section presents the preliminary literature review and theoretical framework that underpins the study. The core constructs of the literature review centres on supply chain management, the bullwhip effect and information sharing. The theoretical framework used in this study is the social interdependence theory.

1.6.1 Supply Chain Management

The term supply chain refers to a cluster of independent associations linked by the items and offerings that they distinctively and/or collectively contribute value to convey this to its clients (Lu, 2011; Nazifa and Ramachandran, 2019). The term supply chain management was introduced to the public in the early 1980's, more precisely by Oliver and Webber in 1982, and is indicative of the extent of tasks executed by the enterprise in retrieving and managing stock (Lu, 2011; Nazifa and Ramachandran, 2019). Supply chain management deals with four major intrinsic flows of the supply chain which are the material flow, information flow, finance flow and commercial flow. The material flow refers to raw materials that are transformed into finished products, while the information flow refers to data that is sent either upstream, downstream or both ways through the supply chain and which is unique to the specific supply chain such as that which has been investigated in this study concerning Diplomat South Africa. The finance flow refers to the flow of money through the supply chain and is most often the end consumer, referred to as a single entity point of view. The commercial flow refers to material flow that has ownership changes through transactions procedures (Lu, 2011; Nazifa and Ramachandran, 2019).

1.6.2 The Bullwhip Effect

The bullwhip effect is descriptive of a supply chain occurrence where customer requests change negligibly; however, this is exaggerated on the upstream ends of the supply chain, which leads to varied requests in terms of orders placed (Lu, 2011; Parmar and Patel, 2016). This effect is caused by structured delays that can take place in both the order processing and transporting phases, whether it is over ordering or under ordering, lack of integration and coordination between departments, and lack of communication. One way to alleviate the bullwhip effect is by improving information sharing through digital integration, electronic data interchange (EDI), coordination between departments and cohesive communication (Lu, 2011; Parmar and Patel, 2016).

1.6.3 Information Sharing

Information sharing is an important tool to facilitate supply chain integration. Its adoption has significant effects on business activities and process changes, collaborative relationships in the organisation and among partners (Nazifa and Ramachandran, 2019). Business activities can include the flow of information and material and the internal and external flow of network relationships. Information is a key construct of supply chain management and represents one of the three flows that need to be integrated to achieve effective supply chain integration and to improve the performance of supply chains (Li and Lin 2006; Sahin and Robinson, 2002; Nazifa and Ramachandran, 2019). The assumption is that the activities of sharing information in the organisation are based on the communication process. The nature of communication relevant to sharing activities can be scrutinised further by drawing on the analytical distinction made by Carey (1989).

While information sharing is vital, the significance of its influence on the performance of a supply chain depends on what information is shared, when and how it is shared and with whom (Holmberg, 2000). The internal relationship refers to the level of trust, commitment, and shared vision between supplier partners (Li and Lin, 2006; Chiang, Lin and Suresh, 2016). This study considers the internal relationship as including one sub-dimension: trust in colleagues or co-workers, which is described as the willingness to depend on shared information in whom one has

confidence (Li and Lin, 2006). The internal relationship is inter-departmental, from the incoming material all the way to distribution. It includes integration throughout the departments and functions under the authority of the manufacturer to satisfy customers' needs. This indicates that the cantre of functional departments should be given more focus, for example, production, procurement, logistics, stock, marketing, sales and distribution (Boon-itt, 2011; Chiang *et al*., 2016). In this study, information sharing and order processing are considered from some research (Charmaz, 2006; Glaser, 1978; Nazifa and Ramachandran, 2019) as dimensions of SCM.

1.7 The Social Interdependence Theory

The social interdependence theory was initially introduced by Morton Deutsch in 1949 to describe the outcome of co-operation and rivalry within a diminutive operational cluster. The original name of this theory was "The theory of Co-operation and Competition" (Deutsch, 1949; Jongman, 2017). This theory acted in opposition to the theory of Social Darwinism, which stated that rivalry was essential to achieve elevated levels of productivity and accomplishment (Jongman, 2017). Instead, the social interdependence theory characterized cooperation as an objective that is distributed evenly among all associates as an endeavor to beat rivals for the purposes of reaching their objectives (Jongman, 2017). For cooperation to subsist, there has to be a lessening of ego-demands so that the mutual objective and the requirements of other team associates are fulfilled. This is contrary to rivalry where ego-demands are intensified (Deutsch, 1949). This fashions the groundwork for the assumption that in order for a cluster to collaborate effectively, each associate must value the cluster objectives more than their own individualised objectives (Jongman, 2017). Gheorghe *et al.*, (2022) discovered that there is a positive interdependence that has a positive influence on teamwork engagement, while negative interdependence as well as social independence have a negative effect on teamwork engagement.

1.8 Research Methodology

Sekaran and Bougie (2013) and Thakur (2021) define research design as a blueprint or an outline for collecting, measuring and analysing data based on the research questions. This is based on positivistic methodologies that are followed in seeking and arriving at knowledge. There are many types of approaches i.e. qualitative, quantitative and mixed (Powoh, 2016). This study pursued a qualitative research methodology to investigate the state of supply chain management related to information sharing at Diplomat South Africa. Semi-structured interviews were used to collect primary data which was analysed by thematic analysis deductively using NVIVO software. The data was presented in the form of discussions, graphs and tables. Diplomat South Africa employs approximately 800 employees nationally, and approximately 182 employees in the Durban Distribution centre. Out of 182 employees, a sample of 16 respondents was selected to participate in the study. These 16 participants were selected according to their job roles within the organisation in the T3 department.

1.9 Limitations of the study

This study is applicable to DSA and is indicative of information that is applicable to DSA only. Hence, generalizations cannot be made to similar organizations regarding the phenomenon under investigation. However, adequate information was obtained from this study to answer the research questions and form suggestions for improvement. The researcher dealt with the DSA internal information which was a factual information obtained from the respondents, therefore, the study generated the results based on how the participants responded.

1.10 Significance of the Study

The initial objective of this study is to examine the impact of inflated demand changeability as order quantity moves upstream (supplier) and surpasses the demand from downstream (retailer). The bullwhip-effect can be defined as the enormous ripple in demand forecast mistakes that move back through the supply chain created by minor errors between individual company demand forecasts and real demands, or the lack of demand information at every phase of the supply chain. The bullwhip-effect is as a result of the absence of real-time information sharing

and efficient flow of information throughout the whole supply chain (Simchi-Levi, Kaminsky and Simchi-Levi, 2008; Trkman and Groznik, 2006; Nazifa and Ramachandran, 2019).

It is essential to discover strategic ways of taming and controlling order variability and preventing excessive inventory through electronic supply chain systems. The variance amplification is pervasively influential without effective collaboration and integration systems to prohibit insufficient or excessive capacity, avoid product unavailability, eliminate high costs, shorten lead time and formulate effective collaborative and integrative systems. These technical SCM aspects are only effective through proper information sharing processes with personnel in the SCM division of a company. Hence, the study focuses on the personnel of DSA and their perceptions of internal information sharing relationships.

The significance of this study is to establish the relationship between the bullwhip effect and the constructs of information exchange, inventory flow and electronic supply chain management and its global optimisation strategies. The overall objective of the research is to develop dimensions that produce an architectural business convergence structure to simulate an echelon-based model of supply chain management performance. The study aims to assist businesses in comprehending the pernicious effect of demand order variability and the significance of sharing advanced economic information and applying electronically-enabled supply chain management tools to synchronise supply chain business processes (Chiang *et al.*, 2016).

Research related to information sharing management in private organisations has focused on various dimensions of information management (Alawamleh and Kloub, 2013; Nazifa and Ramachandran, 2019). However, a research gap remains to highlight information sharing management initiatives and implementation, especially in the private sector. This would enhance and broaden the understanding of the motivating and demotivating factors for information sharing management in the order processing system at Diplomat South Africa. Besides this, the study provides recommendations for future initiatives in managing information sharing in the private sector. The study highlights the significant pitfalls that could potentially confront organisations in their attempt to operate information sharing management initiatives. This

information will help guide the response or the approaches that will be adopted by organisations to help them succeed in their management of information sharing initiatives.

1.11 Justification of the Study

The study focuses on internal information sharing relationships that play a role in the fast-moving consumer goods industry and presents this as optimal SCM knowledge (e.g. the management of information sharing in the order processing system at DSA). In other words, SCM with information sharing projects will be used to enhance performance, competitiveness and profitability. The study presents an opportunity for DSA to improve SCM activities, and electronically integrate activities across supply chain networks. The value of the study is to produce an academically scientific thesis to contribute to a new body of knowledge, and subsequently, develop future research areas in business management and beyond. It produces publishable articles locally and internationally. It enhances strategic thinking and holistic approach throughout the context of the interdisciplinary approach.

1.12 Ethical considerations of the study

This study was approved by DSA and the University of KwaZulu-Natal. Ethical clearance was obtained from the University before data collection commenced. Confidentiality and anonymity were guaranteed and an informed letter of consent was signed by each participant at the onset of the interview.

1.13 Dissertation Structure

Chapter 1: Introduction

This chapter outlines the circumstances that prompted the study, together with the study objectives. The background to the study including the research problem, research objectives and research questions are presented in this chapter. The significance and contributions of the study are highlighted.

Chapter 2: Literature Review

This chapter reviews the relevant literature on the assessment of the management of information sharing in the order processing system at Diplomat South Africa. The aims of supply chain management are highlighted and the legislative framework governing it. The challenges facing supply chain management in information sharing are highlighted. The order processing is defined in this chapter and the key elements of the service delivery system are discussed.

Chapter 3: Research Methodology

This chapter discusses the research methodology and design used to conduct the study. The study presents the study site, target population, accessible population, sampling method and sampling size. Then data collection instruments and data analysis methods are discussed, and measures employed to ensure data quality control are elucidated. The ethical considerations addressed are also discussed.

Chapter 4: Data Analysis and Presentation of Results

This chapter presents the data set generated in this study. This chapter presents the data generated in conducting the study on the assessment of the management of information sharing in the order processing system at Diplomat South Africa.

Chapter 5: Discussion of Results

This chapter presents the discussion and the findings of the study. This chapter aims to establish the answers to the research questions presented in this study and suggests best practices that can assist in improving the management of information sharing in the order processing system at Diplomat South Africa.

Chapter 6: Conclusion and Recommendations

This chapter presents the summary, conclusion and recommendations based on findings, limitations and suggestions for future research.

1.14 Conclusion

This chapter presented the outline of the study and the aims and objectives. It gave the background, motivation and justification for the chosen topic and positioned it in a broader sense. This study adds to existing studies on information sharing (diffusion) among employees at the place of work in SCM sectors. This study also provides relevant information that can help managers deal with internal information sharing in the organisation. This acknowledges the benefits and disadvantages of an improved internal information sharing system. The structure of the dissertation was also presented. The next chapter provides literature related to the current study and the theoretical framework that underpins the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The previous chapter introduced the entire study, highlighted the objectives, articulated the problem statement, and outlined the research study. This chapter discusses the management of information sharing within Diplomat South Africa to identify connections between the activities of an organisation and between the partnering companies of the supply chain. This chapter presents various definitions of information sharing and supply chain management; this is to ensure that there is a proper understanding of the current concept. In addition, the supply chain management development is discussed as to how it has progressed over time. Information sharing in a supply chain structure reveals how the supply chain functions. The chapter also highlights three factors: individual, organisational and technological factors influencing the management of information sharing. It is vital to pay attention to these topics so that a clear understanding of their significance to the supply chain in its entirety can be accomplished.

2.2 Supply Chain Management

The system of organisations, people, technology, activities, information sharing and resources involved in the product or service movement along the supply chain from manufacturer to end-user customer is known to be the supply chain. Supply chain management includes the designing and managing all activities involved in sourcing and procurement, conversion, and the management of logistics (Mentzer, Stank and Esper, 2008; Papadopoulos, Gunasekaran, Dubey, and Balta, 2017). In simpler terms, the final product delivered to the end customer is transformed from natural resources, raw materials and other parts through supply chain activities (Agrell and Hatami-Marbini, 2013; Kleab, 2017). Supply chain management was initially presented as a regular scientific and managerial term in 1982 to illustrate a hierarchical system that controls material, information and flow of finances in a multi-directional network of independent organisations that are decision makers (Christopher and Holweg, 2011; Al-Odeh, 2016). The supply chain management term became widely used during the 1990s. Supply chain management has evolved in practice and theory (Houlihan, 1985). From a process-oriented or multi-functional

perspective, supply chain management consists of planning, sourcing, production, and distribution logistics; however, it is not solely centred on any of these areas (Mentzer *et al*., 2008).

Since the inception of the supply chain management concept, it has been used to define the planning and control of materials, the flow of information, and the activities around logistics within the organisation and among external organisations (Cooper, Lambert and Pagh, 1997; Papadopoulos *et al*., 2017). The research on supply chain management has continuously expanded in focus over the years (Burgess, Singh and Koroglu, 2006). In the initial stages of the supply chain management, the emphasis was mainly on the flow of material. However, current recent and current research delves deep into other elements of supply chain management such as risk (Colicchia and Strozzi, 2012), performance (Hassini, Surti and Searcy, 2012) and integration (Fabbe-Costes and Jahre, 2007). The focus on the flow of information, internal and external networks of relationships is also increasing (Stock, Boyer and Harmon, 2010; Papadopoulos *et al*., 2017), and control of supply networks (Pilbeam, Alvarez and Wilson, 2012; Kleab, 2017).

Companies are impacted by uncontrollable global competition, unpredictable customer demands and an alarming rate of technological advancement that requires companies to have the capacity to react to the market changes to establish their crucial key adequacy (Ganguly, Nilchiani and Farr, 2009; Chiang *et al*., 2016). The reconciling of supply and demand issues in the value chain is the responsibility of supply chain managers, this provides solutions to overcome these disruptive impacts (Rainbird, 2004; Kleab, 2017). These competencies are necessary for companies to pinpoint and communicate market changes and put together strategies to react to these changes throughout the joint supply chain (Christopher, 2000; Papadopoulos *et al*., 2017). It seems as if the combining of development, demand and supply chains through the sharing of information processes and electronically-based supply chain management on various echelon levels has the tendency to grow customer – centric business strategies and improve the pestilent issue of the bullwhip effect.

Schroeder (2008) and Chiang *et al.* (2016) State that supply chain management comprises of series of value-added processes that seek to go with supply and demand, demand chain on the other hand emphasises on producing and controlling the quantities of many products that can be

offered by a supply chain According to Coyle, Langley, Novack and Gibson (2013:16), SCM is viewed as "a pipeline or conduit for the efficient and effective flow of products/materials, services, information and financials from the supplier's suppliers through the various intermediate organisations out to the customer's customers or the system of connected networks between original vendors and the ultimate final consumer". The ultimate customer satisfaction with both the product and service at a low cost is enhanced by an effective supply chain management. Supply chain management takes the integrated system's approach on design, observe and control of the chain to mediate the possible dispute of individual agents in the chain to coordinate the product and service flow giving the best service to the end customer (Christopher, 2000; Papadopoulos *et al*., 2017).

2.2.1 Definition of Supply Chain

In general, a supply chain is also known as a system of organisations, people, technology, activities, information and tools involved in moving a product or service along the supply chain. According to a study by Agrell and Hatami-Marbini (2013), supply chain functions change natural resources, raw materials and other parts into a finished product that is delivered to the end customer. Supply chain management takes an integrated system's view on the design, monitoring and control of the chain. This approach serves to mediate the possible dispute of individual agents in the chain to coordinate the flow of products and services to best serve the end customer (Christopher, 2000; Gao and Li, 2018). Mentzer, Stank and Esper (2008) confirmed that supply chain management includes the planning and management of all functions involved in sourcing and procurement, conversion, and logistics management. Supply chain managers are responsible for coordinating supply and demand issues within value chains (Rainbird, 2004; Chiang *et al.*, 2016). The growing interest in SCM has led to the development of numerous definitions (Stock *et al.*, 2010; Gibson, Mentzer and Cook, 2005; Lambert, Cooper and Pagh, 1998).

There are specific goals to accomplish in supply chain management. Enhancing customer satisfaction and service and increasing competitiveness are two of these goals (Cao and Zhang, 2011; Delgado and Mills, 2017). Supply chain management also intends to reduce the costs and resources involved in the development of products as well as to enhance efficiency and effectiveness (Weber, Hiete, Lauer and Rentz, 2010; Delgado and Mills, 2017). Supply chain

management also puts emphasis on lowering stock levels and relative costs (Ding, Guo and Liu, 2011), growing profits and upgrading cooperation (Droge, Vickery and Jacobs, 2012; Delgado and Mills, 2017). In this respect, it is safe to say that SCM has inevitably grown since its inception.

Many things have been modified in the growth of this process, and many supply chain management terms have been formulated. Supply chain management is a comprehensive idea, which has attracted recognition in multiple segments in the global community, which is also covered in this study. This section has reflected on the well-known terms in the field of supply chain and its management in general. The next section discusses the understanding of management information sharing and also considers the information-sharing framework, which involves the supply chain business processes.

2.3 Managing Information in the Supply Chain

According to Hugos (2006) and Papadopoulos *et al*. (2017), Supply chain management needs a constant decisive measures in the following distinct areas: production, inventory, location, transportation and information – by each of the stakeholders as individual or as a collective. The effectiveness of the whole supply chain will be defined by the abilities and effectiveness of the sum of these decisions. Information is mostly needed to coordinate activities on a daily basis, relating to how the other four focal areas are planned and functioning. The flow of information collected at certain points in the supply chain needs to flow efficiently between the functions of an organisation and member stakeholders of the supply chain (Hugos, 2006; Kleab, 2017). The effective interoperability on various supply chain partners controlling and utilising this information are as a result of efficient information flow, validity, trustworthiness and conciseness (Tyrinopoulos, 2004; Papadopoulos *et al*., 2017). The failure to transfer and convey the information appropriately to where and when it is needed will impact the decision-making in the four focal areas and ultimately affect the whole supply chain performance.

The composite connections of information sharing important to the performing of the supply chain, would not be feasible without well managed flow of information. Information sharing needs to take place on a real-time basis, to reduce unpredictability between the supply chain

members and causing a smoother and more proper functioning and integration of the supply chain (Nazifa and Ramachandran, 2019). The information flow in business organisations and especially in supply chains impacts productivity and transformation because it regulates the rate by which individuals can react and future activities (Wu, Huberman, Adamic and Tyler, 2005; Papadopoulos *et al*., 2017). It is therefore evident that the flow of information requires to be controlled in supply chain management. The efficient information flow measurement should outline an essential segment of information flow efficiency in supply chain management literature.

The formal management attention is necessitated by the clear significance of the flow of information in the performance of the supply chain. Management information (MI) is a concept that has been understood and described in several ways (Wagner, Kawulich and Garner, 2012; Alonso-Almeida, Perramon and Bagur-Femenías, 2020). MI is described as a method which offers information support to make decisions within the organisation. Furthermore, MI is also perceived as a combined method of man and machine for rendering the information to strengthen the operations, the management and the decision-making process in the organisation. Wagner *et al*. (2012) defined MI as a system based on the organisation's database that is enhanced to give information to the people within the organisation.

Despite having various definitions, all of them connect on one single point, i.e. MI is a support system for decision-making processes within the organisation. The differentiation point is when defining the elements of the MI. However, MI is a business processing method that generates information for people in the organisation to encounter the information requirements and assist in decision making to accomplish the organisational goals (Alonso-Almeida *et al*., 2020).

MI provides information that organisations require to manage themselves efficiently and effectively. Tocan (2012) and Ballou (2004) noted that MI consisted of five primary components namely: hardware, software, data (i.e. information and knowledge flows for decision-making), procedures (i.e. design, development and documentation), and people (individuals, groups and work-related teams). MI is distinct from other information systems because it is used to analyse and facilitate strategic and operational activities. Academically, the term is commonly used to

refer to the study of how individuals, groups and organisations evaluate, design, implement, manage and utilise systems to generate information to improve the efficiency and effectiveness of decision-making. This includes systems termed decision support systems, expert systems, and executive information systems (Oye, Mazleena and Noorminshah, 2012).

Table 2.1: Management information sharing definitions

Source	**Level**	**Management of Information Sharing**
Johnson, Scholes and Whittingtton (2006)	Within teams	The level at which team members share information with one another.
Stasser and Titus (1987)	Within groups	How the information is disseminated among group members before it is discussed.
Calantone, Cavusgil and Zhao (2002)	Within an organisation	A collective belief or behavioural routines related to the spread of learning among different units within an organisation.
Wu (2008)	Between organisations	The mutual sharing of business and market information between exchange partners.
Dawes (2016)	Between organisations	The exchanging of information between and across government agencies or otherwise giving them access to information.

This study regards management information sharing as the application of dynamic capabilities. Teece, Pisano and Shuen (1997) defined dynamic capacities as the ability to sense and shape opportunities and threats and maintain competitiveness. This is done by enhancing, combining, protecting, and re-configuring the business enterprise's intangible and tangible assets, in which sensing and shaping new opportunities is very much a scanning, creating, learning, and interpreting activity. Information sharing, which has been widely accepted as a learning activity, offers some of the functions of a dynamic capability, such as sensing and learning external knowledge, providing a key micro-foundation of dynamic capabilities (Nazifa and Ramachandran, 2019). Eisenhardt and Martin (2000) also argued that acquisitions and alliances can be considered dynamic capabilities because they allow for the renewal and reconfiguration of

a firm's resources. In a study of alliance learning and alliance success, Kale and Singh (2007) used information sharing as a dimension of dynamic capabilities.

Information sharing in the supply chain context refers to the extent to which operational and strategic information is available to members of the supply chain. Mohr and Spekman (1994) defined information sharing as the degree of exchange of critical information between a buyer and a supplier. Lee and Chuah (2001) referred to information sharing as activities of transferring or disseminating information from one person, group, or organisation to another.

Organisational information sharing refers to the process through which organisational actors (teams, units, organisations) exchange, receive, and are influenced by the experience and information of others (Van Wijk and Finchilescu, 2008). Flynn, Huo and Zhao (2010) referred to information sharing as the degree to which key information content, such as inventory, planning, and capacity, is shared. Some studies have defined information transfer processes in alternative but related ways, such as information transfer (Mowery, Oxley and Silverman, 1996; Tsai, 2001), information flows (Gupta and Govindarajan, 2000), and information acquisition (Lyles and Salk, 1996).

Table 2.2: Main definitions of information sharing

Study	**Definition**
Mohr and Spekman (1994)	Information sharing is the degree of exchange of critical information between a buyer and a supplier.
Li and Lin (2006)	Information sharing is in terms of quality (i.e. timeliness, accuracy, completeness, adequateness and reliability) and contents,
Flynn *et al*. (2010)	Describe information sharing as the level of sharing of vital information content, such as stock, planning, and capacity.
Wu (2008)	Information sharing refers to the mutual sharing of business and market information between exchange partners.

2.4 Understanding Management Information Sharing in Supply Chain

The supply chain in the everyday world exists whether it is managed or not. If none of the organisations will actively implement any of supply chain management concepts explained further in this study, the supply chain as a phenomenon of business will exist, but will probably not act rationally. Supply chain management thus requires an active management effort by the organisations within the supply chain. Lipovec (1987) defines an organisation as the composition of relationships between people, who by relationships become members of a formed social unit. It ensures the existence and specific characteristics of the social unit and rational achievement of goals. According to Rozman (2002) and Kleab (2017), there are three processes in an organisation assuring rational achievement of goals: organisational process, coordination process, and decision-making process.

The organisation processes are defined as goal oriented processes of ensuring the rationality of people's actions and behaviour and the rational achievement of the social unit's goal (Rozman, 2002; Gao and Li, 2018). Rationality is achieved through coordination, and coordination is conducted by taking care of problems and by making appropriate decisions. Coordination in that context is the essence of achieving rational behaviour within the organisation. It encompasses the coordination of activities, goals, interest and relationships. At the company level, coordination of business functions, unit, and projects are the centre focus (Rozman, 2002; Gao and Li, 2018).

2.4.1 Management

Most studies define management as the coordination of divided activities (who does what) or managerial functions in the organisation (Rozman, 2002). Agrawal and Narain (2018) defined management as a match between organisational processes and managerial processes. Aishah *et al.* (2013) define management as the process undertaken by one or more people to coordinate the activities of others to achieve results not achievable by one individual acting alone, while Hellriegel and Slocum (1996) defined coordination as the integration of the activities performed by separate individuals, teams and departments. It is the coordination and administration of tasks to achieve a goal. Such administration activities include setting the organisation's strategy and

coordinating the efforts of staff to accomplish these objectives through the application of available resources (Yang, Pardo and Wu, 2014; Gao and Li, 2018).

Management can also refer to the seniority structure of staff members within an organisation. Moreover, Zhang and Dawes (2006) defined management as an organisational method that involves strategic planning, goal setting, resource management, human deployment and financial assets required to accomplish goals, and calculating outcomes. Management also includes keeping records, facts and information used by other people within the organisation at a later stage. Management processes in information sharing are not restricted to managers and supervisors. Every member in the organisation has in their job a part of management and reporting functions. (Gao and Li, 2018). However, these authors did not distinguish between organisational and business processes in the same way. Therefore, management is commonly defined as planning, organising, leading, staffing, coordination and control.

2.4.1.1 Characteristics of Management

The management of supply chains in a business environment has a major financial impact on all parties involved in the chain (Teece, 2019; Hanson, 2019). Due to that, research and implementation of supply chain management principles to improve the supply chain are of key importance to any global company today. According to Teece (2019), "management is the art of applying the economic principles that underlie the control of men and materials in the enterprise under consideration". The primary task for a manager is to secure productive performance through planning, direction and control. It is expected of the management to bring into being the desired results. Rational utilisation of available resources to maximise the profit is the economic function of a manager. A professional manager can prove his administrative talent only by economising the resources and enhancing profit.

2.4.1.2 Management as an Economic Resource

South Africa is one of the top-rated emerging economies in Africa (Lewis, 2017). This position is partially attributable to the contribution of various economic segments that perform an important role in satisfying the needs of consumers and contributing to the country's economy (Industrial Development Corporation (IDC), 2016). Among these key economic parts is the Fast Moving Consumer Goods (FMCG) industry, which is one of the major industries in South Africa (KPMG, 2016). An underperforming supply chain is said to be improved by precise demand planning accuracy (Basson, Kilbourn and Walters, 2019). In addition, inaccurate demand forecasting is regarded as the main cause of uncertainty for FMCG companies operating in South Africa (Sanchez, Rodrigues and Potter, 2013). Diplomat South Africa is an established FMCG distributor, with different business units servicing different FMCG market needs around the country. As industrialisation increases, the need for performance and managerial expectations also increases. Efficient management is the most critical input in the success of any organised group activity such as information sharing, as it is the force which assembles and integrates other factors of production (Jordan and Lowe, 2014; Nazifa and Ramachandran, 2019). Factors of production do not by themselves ensure production, they require the catalyst of management to produce the goods and services required by society. Thus, management is an essential ingredient of an organisation.

Management is goal-oriented. As mentioned above, management is a purposeful activity. It coordinates the efforts of workers to achieve the goals of the organisation (Boss, Kirsch, Angermeier, Shingler and Boss, 2009; Gao and Li, 2018). The success of management is measured by the extent to which the organisational goals are achieved. For example, it is imperative that information sharing organisational goals are well-defined and properly understood by the management at various levels (Boss *et al*., 2009; Nazifa and Ramachandran, 2019).

2.4.2 Customer Relationship Management

Identifying vital customers or customer groups is the first priority in integrating supply chain management, which the organisation takes as its serious business purpose. Product and service agreements detailing the performance levels are then established with these key customer groups. Customer service teams work with customers to further identify and eliminate sources of demand variability. Performance evaluations are undertaken to analyse the levels of service provided to customers as well as customer profitability (Chen and Popovich, 2003; Chiang *et al*., 2016).

2.4.3 Customer Service Management

One source of customer information is provided by customer service. It is a first point of encounter for administering the product or service level (Cheung, Lee, Wang, Chu and To, 2003). The real-time information provided to the customer by customer service on nominated delivery dates and the availability of the product through the organisation's production stages and distribution operations. Ultimately, the customer service group must have the capacity to assist the customer with product applications.

2.4.4 Demand Chain Management

Diplomat South Africa's encounter with supply chain management shows that stock is either crucial or changeability-driven. The relationship management between suppliers and customers must offer great value to the end customers, at the best cost to the entire demand chain. Demand-chain management is the same as supply-chain management but with a specific focus on the customers. The required stock involves work-in-process in production houses and products moving from one place to another. Stock changeability is there because of difference in process, supply and demand. Customer demand is the biggest cause of changeability and it arises from inconsistent order patterns (Lee, So and Tang, 2000; Chiang *et al*., 2016). Given the inconsistency of customer orders, demand management becomes vital to efficient supply chain management. The demand management functions have to align with the customer's needs with the company's capacity (Raghunathan, 2001).

Part of managing demand includes trying to estimate what and when customers will buy. An excellent demand management process uses a rate of sale and important customer data to decrease unpredictability and give efficient flows across the supply chain. The requirements of marketing and production plans should be combined on an enterprise-wide basis. Therefore, various sourcing and routing alternatives are regarded at the time of receiving an order, this allows market needs and production plans to be combined on an organization-wide basis. In very progressive applications, customer demand and production rates are aligned to manage stock worldwide.

2.4.5 Customer Order Fulfilment

Meeting the customer requirement dates is the most important part to effective supply chain management. It is vital to accomplish high order-fill standard whether on a line item or order basis. Carrying the order fulfilment process effectively needs the combination of the organisation's manufacturing, distribution, and transportation strategies (Hariharan and Zipkin, 1995). Associations should be established with key supply chain stakeholders and carriers to satisfy customer needs and to decrease total delivery cost to the customers (Gallego and Ozer, 2001; Kleab, 2017). The ultimate goal is to start an uninterrupted process from the supplier to the organisation and on to its different customer divisions.

2.4.6 Procurement

The development of new products and manufacturing flow management functions are supported by strategic plans developed with suppliers. Suppliers are classified according to certain measurements, such as whether or not their productivity is exponential to the organisation According to Lewis and Roehrich (2009), organisations where operations expand worldwide, sourcing must be managed on a worldwide basis. Lengthy strategic associations are formed with a group of suppliers. The pleasant results are a win-win relationship, where both parties gain. This has evolved from a traditional business practices to including vital suppliers in the initial stages of design cycle, which can result in a huge reduction in product development cycle times (Caldwell, Roehrich and Davies, 2009; Gao and Li, 2018). Getting input from suppliers at an

early stage reduces time having the needed cooperation between management, buying, and the supplier prior to design conclusion. The buying process starts with quick communication procedures, such as electronic data interchange and Internet connections to process needs faster. These high speed communications resources give a means to decrease the time and cost spent on the deal part of the buying (Weele and Raaij, 2014).

2.4.7 Management Functions

As mentioned above, there are six management functions: planning, organising, staffing, directing, coordinating and controlling.

2.4.7.1 Planning

The most underlying and prevalent of all management processes is planning. People working in teams should understand prior what it is to be carried out and when, in order to perform effectively (Alawamleh and Kloub, 2013). The most important part of planning are the three W's of performance: what, how and when. For instance, the future of information sharing objectives and courses of action to effect achievement are to be decided in the present. (Dawes, 2016).

2.4.7.2 Organising

Organising includes the establishment of processes needed for the accomplishment of the company's goals and the execution of strategies; a classification of processes into tasks; the allocation of those tasks and activities to departments and individuals; the assigning of responsibility and control for performance; and the encouragement coordination of functions both vertically and horizontally. Each manager in every section has to select which function to perform in order to accomplish their departmental objectives expected of them to achieve. Once these functions have been established, the manager has to classify the same or similar functions to make tasks to allow them to make decisions and start executing these functions, and provide for cooperation between managers and their staff, and among the staff. This is vital in information sharing (Dawes, 2016).

2.4.7.3 Staffing

Staffing is an ongoing and important function of management. After the objectives have been determined, strategies, policies, programs, procedures and rules formulated for their achievement, activities for the implementation of strategies, policies and programs, have to be identified and grouped into jobs (Dawes, 2016). The next logical step in the management process is to procure suitable personnel for managing the jobs. For example, a suitable person should be identified to manage information sharing. The organisation's productivity and profitability is largely dependent on the quality of its people, it is also one of the most fundamental functions of management to acquire highly trained and qualified people to occupy different positions, staffing has been acknowledged as a clear-cut function of management (Dawes, 2016).

2.4.7.4 Leading

Directive is the function of leading the employees to perform efficiently and to contribute their optimum to the achievement of organisational objectives (Dawes, Cresswell and Pardo, 2009). Information sharing jobs, for example assigned to subordinates, have to be explained and clarified, they have to be guided in job performance and they are to be motivated to contribute their optimum performance with zeal and enthusiasm. The function of directing thus involves the following sub-functions: communication, motivation, and leadership that are all-important in management information sharing (Dawes, Cresswell and Pardo, 2009).

2.4.7.5 Coordination

Collaboration is the function of identifying such relationships among different departments in the organisation that when put together form organisational goals (Willem and Buelens, 2017). Information sharing, organisational decisions, operations, activities put together form a unified action to achieve organisational goals.

2.4.7.6 Controlling

Controlling is the function of making sure that all performances across departments are in line with the pre-established goals and objectives (Suddaby, 2006). Diverging from the set objectives and plans have to be identified and looked into, and remedial action is taken.

Controlling in management of information sharing, therefore, suggests that the objectives, goals standard operating procedures are in place and employees and their managers are aware of them. It also suggests that flexible and potent organisation which will allow variation in information sharing objectives, strategies, procedures, policies, design, staffing policies and practices, management style, and communication systems. Willem and Buelens (2017) said that it is not uncommon in information sharing that employees' failure to achieve predetermined standards is due to defects or shortcomings in any one or more of the above dimensions of management.

2.4.8 Dimensions of Management Information Sharing

Studies in the past have classified information sharing into different forms. For instance, Ahmad and Zailani (2017) indicated that customer information sharing includes key competencies obtained from cooperating with key customers, whereas supplier information sharing includes key competencies related to cooperation with key suppliers. Narasimhan and Kim (2002) implied that information sharing involves sharing with suppliers and customers, in which the company builds strategic partnerships with suppliers and customers and jointly creates strategies to leverage on market opportunities. Swink, Narasimhan and Wang (2007) classified external information sharing into information sharing with suppliers (information sharing that happens between suppliers and manufacturers) and information sharing with key buyers (information sharing that happens between manufacturers and key buyers). Devaraj, Ow and Kohli (2007) distinguished demand-oriented information sharing of real-time rate-of-sales data, sales forecasts, customer profiling, and customer relationship management from supply-oriented sharing of stock ordering policies, stock levels and production plans.

2.4.9 Manufacturer-Key Suppliers Information Sharing

Manufacturer-key suppliers information sharing is described as the level to which information is shared between core suppliers and manufacturers, such as production plans, product quality, stock level, and the quality of raw material, which increases the transparency of the supply capacities (Swink *et al*., 2007; Narasimhan and Kim, 2002; Devaraj *et al*., 2007; Ahmad and Zailani, 2017). This approach tends to be encompassed into relevant areas of just-in-time management (Lee and Chuah, 2001; Choi and Krause, 2006) and mass customisation in the supply chain (Berman, 2002; Salvador, 2002; Kleab, 2017).

2.4.10 Manufacturer-Key Buyers Information Sharing

Manufacturer-key buyers' information sharing is described as the level to which main buyers and manufacturers share information relevant to real-time rate-of-sales data, variations in the end customers' needs and choices, production times, and product quality. In other words, it is the process of exchanging customer needs information and relevant information (Devaraj *et al*., 2007). Manufacturer-key buyers' information sharing allows organisations to react directly to customers' needs and can be coordinated through various organisations or networks.

Studies have delved into upstream information sharing and downstream information sharing (Swink *et al*., 2007; Devaraj *et al*., 2007). Their attention has been on the examination of the direct impacts of both kinds of information sharing on operations abilities or performance, rather than the indirect impacts on performance via normal abilities. Given the significance of this research gap in the current literature, this study suggests that normal abilities intercede the relationships between manufacturer-key suppliers' information sharing and performance, and between manufacturer-key buyers' information sharing and performance.

2.5 Information sharing in the supply chain

The value of information flow in a supply chain is key to preventing the bullwhip-effect that can happen in various supply chains. Supply chain-wide information sharing between all the parties of a supply chain is essential (Simchi-Levi *et al.*, 2008; Delgado and Mills, 2017). Supply chain information which has been obtained only from the supply chain entity instantly ahead of a supply chain member, may result in the bullwhip-effect. Busch and Abt (2012) attributes growing mistakes in forecasts to dwindling data quality in those instances where each supply chain partner plans individually without a supply chain-wide data exchange.

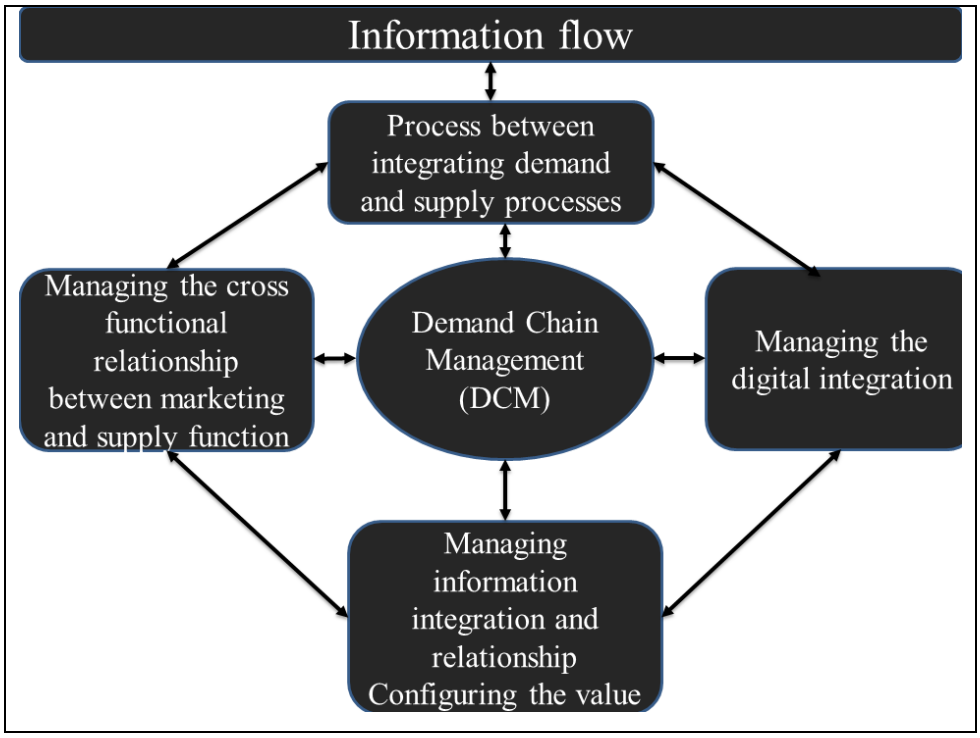

Figure 1: Supply chain business processes. Adopted from Lambert (2008)

Figure 1 shows the information flow including digital integration, supply processes (internal), cross functional relationship management and information integration and relationships with customers. These concepts are discussed below.

2.5.1 Digital integration in the supply chain management system

The current patterns regarding supply chain management are that it should react to the progressions and streamline activities while profiting from arising advanced innovations. In the existing contending climate, it is important for organizations to utilize current advancements to work on their efficiency and smooth out their SC. The consolidation of supply chain integration and digitisation gives rise to digital-based supply chain integration which can be characterized as a list of tasks preoccupied with coordinating merchandise and information movement along a supply chain by employing digital technologies. Numerous associations have progressively tended to supply chain integration, which intends to upgrade capability through the supply chain by integrating physical items, information, asset flows and synchronizing supply chain accomplices' procedures (Lee, 2021). In a world-wide value chain, geographical spatial arrangement has been detected as a momentous dispute for supply chain integration. Nevertheless, digital modification is distributed throughout commercial enterprises, sanctioning associations to accomplish enhanced perceptibility and better cooperation along a supply chain (Lee, 2021).

Advancements that are being utilized currently in supply chain management are "electronic data interchange (EDI), bar coding and scanning, enterprise resource planning systems (ERP), radio frequency and identification (RFID), social media and electronic commerce, computerized shipping and tracking" (Agrawal and Narain, 2018). Founded on the present technologies, associations progressively merge rising innovation, such as cloud computing, big data analytics, the IoT, and social media, into their world-wide supply chain management (Lee, 2021).

However, these advancements are immersed and are seemingly not adequate to stay ahead of the competition in today's worldwide market since the utilization of the internet has increased due to the pandemic and has changed the buyer purchasing conduct and their requests, which incites a vast amount of tension on SC administrators. Thus, there is a need to move to computerized advances to stay competitive in this worldwide commercial center. Digital SC has the capacity to deal with a broad measure of data and to engage SC accomplices to move collectively to team up and convey information digitally. Hoberg Krcmar, Oswald and Welz (2015) stated that computerized change is the course of hierarchical change wherein computerized innovations (for example, distributed computing, 3D printing, internet of things, large set information analysis)

are used to change how an organization incites value in its items, how it collaborates with its providers, accomplices and clients and how it contends in worldwide market. Consequently, computerised supply chain management can be characterised as strong inventive advances that is equipped for changing the customary approach to carrying different procedures of SC like arranging, task processes, communicating with every one of the members of the SC, accomplishing incorporation among the individuals of the SC and empowering new plan of action (Agrawal and Narain, 2018).

(i) Information sharing capabilities

Conventional supply chains have data storehouses (which alludes to business divisions that work autonomously and try not to share data) because of challenges with the interoperability of the IoT and enterprise resource planning (ERP) frameworks of the SC accomplices (Madhani, 2021). Blockchain stationing in the SC empowers data directness and subsequently assists in the end of data bottlenecks. Consistent data sharing and information security offered by blockchain empower connecting of the IoT and ERP arrangement of the SC accomplices (Madhani, 2021).

Data directness assists SC accomplices to be more receptive to client requests through simpler distinguishing of unusual circumstances. Information sharing in SC is the critical necessity for cooperative inter-organisational connections that creates rivalry in SCs (Chen Cai, He, Chen, Zhao, Zou and Guo, 2020). As a functional ability, data sharing capacities upgrade coordination abilities. Data sharing capacities empower an enterprise to share data and information in its units, as well as its SC accomplices genuinely and productively (Dolgui, Ivanov, Potryasaev, Sokolov, Ivanova and Werner, 2020). Blockchain arrangements in the SC creates data sharing abilities (Hughes *et al*., 2019).

Blockchain arrangement in the SC further develops straightforwardness and perceivability of tracking tasks in business activities (Nayak and Dhaigude, 2019). SC perceivability is the capacity to track items with next to no interruptions from suppliers to the client, including delegated exercises (Chen *et al*., 2020). Perceivability advances effectiveness, gives bits of knowledge into the information gained from confided in conditions (Dolgui *et al*., 2020), and makes it accessible for all partners. Blockchain arrangement in the SC actually settle the data disparity at the inter-firm SC organizations and, in this manner, creates data sharing capacities

(Hughes, Dwivedi, Misra, Rana and Raghavan, 2019). Blockchain arrangement successfully addresses the data security worries in the SC (Dolgui *et al*., 2020).

(ii) Collaboration Capabilities

Blockchain gives a commonsense method for teaming up and leading business among different individuals from a SC system (IBM, 2017). SC coordinated efforts are a complex idea that incorporates the components of data sharing objective compatibility, choice synchronization, motivating force arrangement, cooperative correspondence, and joint information creation (Cao and Zhang, 2011).

SC joint effort is vital to unrivaled SC execution (Ganesan, George, Jap, Palmatier and Weitz, 2009; Madhani, 2021). Yan and Dooley (2014) gave observational proof that SC cooperation assists organizations with performing better. Allred, Fawcett, Wallin and Magnan (2011) introduced proof that more noteworthy cooperation ability is connected to more noteworthy efficiency and consumer loyalty, all of which lead to higher benefit. Expanded degrees of cooperation in the SC brought about functional and social betterment, which impacted resource use, rivalry position, organizational execution and productivity (Madhani, 2021).

Compelling coordinated effort will lessen expenses and upgrade the effectiveness of the business (Dahlmann and Roehrich, 2019; Roggeveen and Sethuramann, 2020). Joint effort as far as vulnerability improves the performance of SC by diminishing a company's expenses, expanding income, and moderating the bullwhip impact in SCs (Bozic and Kuppelweiser, 2019). Blockchain innovation is an authoritative capacity that incorporates all the stock resources and assets (Teece *et al*., 1997).

(iii) Cultural/Organisational Transformation

As per Sathe and Davidson (2000), the coordination of mentalities in corporate culture is an essential for associations to develop to a value situated stage. This joining empowers constant, nonstop change, as well as the groundbreaking transformation of authoritative culture. Hierarchical culture, at this phase, is goaded by values. The higher the phase of development, the higher the consciousness of applying hierarchical qualities in the procedure towards a region of social change. Research outcomes of Gurlek and Tuna (2018), Kanten, Kanten and Gurlek

(2015), Leonidou, Leonidou, Fortiadis and Zeriti (2013), Asiedu (2015) show that with a decent hierarchical culture change, organizations will actually want to increment their upper hand in the market place. David and David (2013) contend that the industrial organisational way to gain an upper hand expresses that outside factors (industry) are a higher priority than interior elements in organizations that need to accomplish superiority.

2.5.2 Internal supply chain processes

Recognizing the inward supply chain management elements will help the organization achieve a superior execution. Information should be apparent since it is a significant variable which incites powerful and productive coordinated efforts among individuals. It is indicative of the achievement of each member in the SC both internally and outwardly. In addition to information being a component in the internal supply chain process, time, technology, leadership, communication, and commitment are also components of this (Aishah, Pyeman and Tajuddin, 2013; Delgado and Mills, 2017). In terms of being competitive in the marketplace, the internal supply chain processes are seen as the main portion contrasted with the outwardly factor. Stock, Noel and John (2000) and Bahinipati, Kanda and Deshmukh (2009) had concurred with the significance of the internal supply chain process which adds to the viability and productivity of SC execution. Many studies have indicated that the positive outcome of the SCM comes from the conduct inside the association where it mirrors the entire SC. Li and Lin (2006) put forward that strategies should have integration, adeptness, estimation, and situating to increment capability among industry individuals. Integration should be viewed as a procedure utilized for inner strategic operating success, and improvement of outside SC connections. A company can respond to marketplace changes in a fast way through an integration of every component in the internal supply chain process (Aishah *et al*., 2013; Delgado and Mills, 2017).

2.5.3 Information integration and relationships with customers

Lawrence and Lorsch (1967) took an inward point of view and characterized integration as the quality of the condition of cooperation that exists among departments that are expected to accomplish solidarity of exertion by the requests of the climate. An improved overseeing of the business processes through process integration in and across individuals from the SC can make exchanges and relationship structures more proficient and powerful (Lambert, 2004). Information integration alludes to connecting significant business information in and across departments of an organization that form part of the SC so that a durable and high-performing plan of action that incites a prosperous relationship with customers can be developed. Scholastic exploration has additionally found that accomplishing either inner or outward integration can be troublesome (Bowersox, Closs and Stank, 2000; Fawcett and Magnan 2002; Delgado and Mills, 2017). One of the significant sources to acquire quick business growth and development and to accomplish well on trade markets is the advancement of relationship and relationship building benefits of firms (Piercy, Kaleka and Katsikeas, 1998).

In many enterprises, relationships with customers predominantly affect their financial performance (Hakanson, Snehota, 1992). Relationships have long since been a significant portion of business procedures, particularly on business-to-business markets, yet today researchers and practitioners are more mindful of their impact on a company's performance and its role in gaining an upper hand on the market (Chen and Landry, 2009). The most common way of selling and purchasing in business is not just one activity or response as thought in transactional promoting, yet rather an active communicative relationship framed as a solitary collaboration among an arrangement of connections that a firm creates with one more actor or a greater amount of them (Ford, 1998). In any case, the kind of the actor is not important since the arrangement of intelligent connections among them present a dependable system for a functional enterprise.

Formal as well as in a greater part of cases, casual components of relationships incite a positive base for effective performance. Customer orientation essentially affects SC process coordination. Customer orientation has been characterized as a cluster of convictions that puts the customers' advantage first and an adequate comprehension of the enterprises target purchasers to make prevalent incentives for them ceaselessly (Deshpande, Farley, and Webster 1993; Gao and Li,

2018). Despite the fact that ‘customer’ frequently alludes to a company's immediate consumers, it is not enough to solely meet the necessities of direct clients as it were. An organization ought to consider all downstream SC accomplices, as all clients are essential to the SC (Lee, 2004).

2.5.4 Cross functional relationships in the supply chain

Overseeing long term associations with customers involving cross-functional groups is turning into a typical practice in supply chains. Collaboration was a basic part of numerous hierarchical change endeavors during the 1990’s. The expansiveness of corporate targets sought after through cooperation shows that it is key to many endeavors at colossal authoritative change (Drew and Coulson-Thomas, 1997; Delgado and Mills, 2017). Associations accomplishing change through expanded customer focus expect expansions in group based exertion. Enterprises changing their value chain and provider relations likewise expect significant commitments through collaboration. The most significant changes are those regions of the enterprise that cooperate with the outside world such as customers, providers and global accomplices (Handy, 1990; Davidow and Malone, 1992; Hastings, 1993). Cross-functional relationships have been distinguished as significant supporters of the success of such endeavours as deciding on providers determination and the design of the product (Burt, 1989), just-in-time fabricating, cost decrease, all out quality drives (Burt and Doyle, 1993; Ellram and Pearson, 1993) and, in particular, further developed correspondence. In light of the extensive variety of provider issues, possibly tended to by better purchaser-provider connections, expertise is expected from different capacities. Internal integration is the level at which enterprises can incorporate and team up across customary functional limits to give better customer support (Kingman-Brundage, George and Bowen, 1995; Cespedes, 1996; Kahn and Mentzer, 1996). Stolle (1967) asserted that overseeing SC actions includes different capacities inside the firm, to be specific advertising, funding, buying, and creation. Coordination is expected in the association's internal SC divisions to understand the ideal advantages for the firm (Ballou, Gilbert and Mukherjee, 2000; Gao and Li, 2018).

2.6 Structural Concepts of Information Sharing

2.6.1 Development Chain Management

Development chain management puts emphasis on new product introduction and is characterised by a set of stumbling blocks through technology clock speed and the short product life cycle of innovative products (Fisher, 1997), make or buy decisions regarding what to make internally and what to buy from outside suppliers (Ahmad and Zailani, 2017), and product structure on the level of modularity or integrity of the product (Simchi-Levi *et al*., 2008). The integrated philosophy assists to mitigate the phenomenon of the bullwhip effect through the framework for matching product design and optimum business performance targets along with the development chain clock speed and the supply chain (to prevent demand uncertainty).

2.6.2 Collaborative Information Management

Hertzum (2008) defined collaborative information retrieval as activities that a group or team of people undertake to identify and resolve a shared information need. Foster (2006: 330) defined collaborative information as "the study of the systems and practices that enable individuals to collaborate during the seeking, searching, and retrieval of information". Both seeking and retrieval activities are involved in the concept of seeking. Karunakaran, Spence and Reddy (2010) consider collaborative information seeking as also containing other micro-level activities such as retrieving and sharing. In the case of this study, it is a problem in data management systems to manage the information that is embodied in the data, in various inter-linked collaborative contexts. It is important to recognise a user's' context and to apply this individual context across all collaborative contexts to provide users with exactly the information they need.

Information is often relevant in more than one context; however, it is an issue that data management systems is unable control information existing in various contexts and use this contextual information in coordination with a user's current contextual situation to interpret what information is relevant to the user's current context. Furthermore, because information can exist in multiple contexts, in it is an issue that users are unable pivot between contexts to gain unique contextual perspectives of the same information (Karunakaran *et al*., 2010).

2.6.3 Bullwhip Effect

The bullwhip effect in the supply chain is the misinterpretation of demand perception along the chain in which supplier needs differ from sales (Lee, Padmanablan and Wang, 1997; Chiang *et al*., 2016). According to Svensson (2005) and Parmar and Patel (2016), the bullwhip effect suggests that the changing in the level of stocks tends to increase as they distance themselves from the point of consumption. The factors that cause this change along the chain can be the absence of information sharing, market data inadequacy and miscalculated estimations.

The bullwhip effect is one of the most common and widespread occurrence in the area of operations. The term "whip" is used to define the fact that a minor change in consumer demand can result in a huge variation in the suppliers' production at the other end of the supply chain (Silva, Ferreira, Silva, Magalhães and Neto, 2017). The bullwhip effect can also be defined as demand intensification, intensification of the Forrester impact or flexibility (Wang and Disney, 2016). Dai, Li, Yan and Zhou (2016) explain that the use of the latter term to reference the bullwhip effect is because the occurrence was documented and studied for the first time by Forrester (1958).

Ravichandran (2008) and Novitasari and Damayanti (2018) indicates that the bullwhip effect has implications on efficiency on various levels. At the macro level, the bullwhip effect causes poor service levels, ineffectiveness in production, scheduling (capacity utilisation), sourcing, distribution, revenue generation and its realisation. At the operational level, it generates more or additional stock and keeps it in the most unsuitable place to meet a specified service level. At a performance level, it can decrease the velocity of cash, knock down possible profit, and seriously diminish profit realisation through price discounts. It can possibly weaken competitive strategy and stance and therefore can be a 'strategy buster'.

The misrepresentation of demand information suggests that the manufacturers who only consider their instant order data will be misled by the inflated demand patterns. This has signicant cost ramifications. For example, manufacturers could suffer surplus raw materials cost as a result of unplanned purchases of supplies, additional manufacturing costs created by excess capacity, inefficient utilisation of raw materials and overtime, surplus warehouse costs and additional transportation costs due to inefficient scheduling and premium delivery rates (Lee *et al*., 1997;

Chiang *et al.*, 2016). In some supply chains, the bullwhip effect can drive 13% - 25% of operating costs (Fawcett *et al.*, 2007; Novitasari and Damayanti, 2018). The absence of real-time information can have a great effect on supply chain effectiveness and efficiency.

In this study, both the customer and supplier point of view are taken into consideration since DSA sends demand forecasting to the supplier to supply their customers. Thus, the outcome of inappropriate information sharing can be suffered across the supply chain. Once an organisation grips on the interdependence levels of each department on one another in the supply chain is determined, then only can the supply chain be enhanced.

2.7 Benefits of Information Sharing within a Supply Chain

Information sharing within a supply chain has many gains among supply chain members; it decreases various kinds of unpredictability related to the demand, product and technology that add costs to supply chain processes. Information-sharing speeds up efficiency and effectiveness of the supply chain as it has particular advantages. Several advantages are revealed by Khurana, Mishra and Singh (2011) as including better coordination between various departments and between supply chain members and enhanced control of the supply chain processes, and also that it may reduce product design time, make the production lead-time shorter and stabilise the outputs along with reliable quality. Sharing information is stated by Khurana *et al*. (2011) and Delgado and Mills (2017) as a core component for any prosperous supply chain management system when they discussed the need to execute a good framework of information sharing. It has been identified as being of paramount importance to the effective innovation and development of supply chain management at an industry and enterprise level.

Many papers have been focusing on the benefits of information sharing in supply chains; although many supply chains do not divulge much information because of some limitation due to information systems compatibility, information quality, trust, and confidentiality issues. But still, acquiring more information regarding the final customer of products and services is an essential means to reduce the unpredictability in future demand as the economic climate volatility is increasing at an alarming speed. Huge benefits are presented by sharing information according to Ali, Babai, Boylan and Syntetos (2017), for example businesses may utilise shared information

in their planning. Transparency within supply chain organisations provides opportunities for managers to plan efficiently, as well as responding appropriately to the proper information. Also, that would give the ability to manage properly the stock and transportation and to make informed pricing decisions based on the greater transparency of information. The process of information sharing has been confirmed to be the focal point for many coordination and logistics activities such as collaborative planning, forecasting and replenishment, forecast information sharing and efficient customer response; which may eventually result in a huge opportunity for performance enhancement (Felea, 2010; Gao and Li, 2018).

Information sharing impacts the supply chain performance in terms of total cost and service level as many scholars have agreed that shared information will result in remarkable cost reduction through reducing stock and batch size reductions, productivity gains, and other measurables. They conclude that manufacturers can achieve tremendous cost and inventory reductions with demand information sharing initiatives (Marshall, 2015). Information sharing has been estimated as one of the main methods to improve supply chain performance; it allows companies to improve managing activities with other supply chain partners which may result in a better performance. Supply chains achieve a list of benefits gained by information sharing. Some of them mentioned by Lotfi, Sahran, Mukhtar and Zadeh (2013) are the efficient stock management, cost reduction, significant reduction or complete removal of the bullwhip effect, optimising capacity utilisation, enhancing resource utilisation, better tracing and tracking for shipment, overall organisational efficiency, as well as improving services as a whole. From the researcher's point of view, the most important benefits extracted from the previous studies about the information sharing within a supply chain is that shared information increases the visibility between organisations which may result in earlier detection of errors, reduce the turnaround time from order to delivery, as well as building and strengthening the social connections particularly in the era social media. This would directly and positively impact the productivity, hastens the responsiveness to a new market and explore the chain networks.

2.8 Drawbacks of Information Sharing in Supply Chain

Many drawbacks of information sharing exist; one of them is the so-called leakage occurrence. Information sharing is a commitment to reduce the steps of accessing information between supply chain participating members through providing access to private information. Willingness to share information rests on trust and the sensitivity of information. (Simatupang and Sridharan, 2001). On the flip side, sharing information would result in unpleasant result of so-called information leakage. Information leakage refers to sharing an organisation's confidential information with external organisations. It means that confidential information is unintentionally disclosed to unaccredited parties. In supply chains, information leakage is a major threat. Companies have sufficient capabilities to collect, analyse, acquire, and utilise information on their competitors to obtain a competitive advantage, causing their competitor's business to be vulnerable (Tan *et al*., 2016).

Information leakage in supply chains is a major challenging issue for a number of reasons; the complexity of supply chains and the complicated process of sharing information within supply chains. Firstly, a supply chain is a complex network, because each partner plays one or different roles. While partners cooperate for some common interests, they have different business objectives and some of them are potential competitors. Moreover, partners may have different security policies and deploy security mechanisms corresponding to their security policies respectively. Therefore, when a supply chain partner shares information with another supply chain partner, the shared information may be leaked to third-party companies by the second supply chain partner either deliberately or unintentionally.

A manufacturer that supplies a number of retailers, may disclose the demand information with one retail personnel that can be leaked, either directly or indirectly, to other retailers (Kong, Rajagopalan and Zhang, 2017). However, it has been stated that information would not be voluntarily shared between retailers and the producers; the retailers would be willing to share information completely and get side payment for the information sharing when their information was statistically less accurate, or they benefited more from the effect of information leakage (Tan *et al*., 2016).

There are various types of information divulged between partners in supply chains. Information that could be divulged can be categorised into general information and confidential information. According to Lotfi *et al.* (2013), there are many different types of information that can be shared within a supply chain, including strategic, tactical, business, and logistics. Some other common types of shared information are related to stock, sales forecasting, order information, stock on hand information, exploitation of information of new products and other information. Lots of drivers recognised by Tan *et al*. (2016) are behind the leakage; as information leakage may occur when confidential information is a major part of shared information due to the inherent engineering relationships between different pieces of information.

Factors that cause leakage based on Tan *et al*. (2016) could be organisational stimulus, individual stimulus, leakage through outsourcing, joint-venture, subcontracting activities, or leakage arising from employee movement or people interaction. Making the information available to the different employees increases the probability of leakage risks, in case the security measures are inefficient within the databases to block out unauthorised access or systematic downloading of information (Gao and Li, 2018). Based on Inderfurth, Sadrieh and Voigt (2012), information sharing reduces the inadequacies caused by information shortage but that could occur only if there is a certain degree of trust and commitment between the supply chain members. Information leakage might impact the supply chain performance. The impact of information leakage in the supply chain has become more impactful with recent advances in Information Technology (Kim and Laskowski, 2016). The organisation must be conscious, put precautionary measures to their information, particularly the confidential information and try to alleviate such phenomena due to their negative influence. Tan *et al*. (2016) discussed that theoretically there are two major factors of leakage; natural factors and human factors. Natural factors are factors that cannot be controlled by any party in the supply chain such as communications or human movement. Human factors include the leaking of critical information to external parties for incentives, because of immoral behaviour or covert intentions by humans who have made deliberate decisions.

Latest studies reveal that companies which have leaked their patented and confidential information would experience a negative effect on their performances. A studies conducted by

Chen, Feng and Yang (2017) who investigated information value and found that the value of information works not only in a chain directly, but also in the competing chain indirectly. For instance, the outcome confirms that retailers sometimes refused to disclose to their partners their private information because of the information leakage risk. In the meantime, the quality of performance of the entire chain may be impacted and deteriorate if the information of disrupted demand is shared along the supply chain. In academic papers, information leakage has been argued as being a major issue for organisations.

Most organisations have formulated policies with regards to sharing of information. However, based on Hovav and Gnizy (2017), the tracking of these policies is a complicated task for two reasons. Firstly, once the information leaves the organisation, it is impractical to control that information using traditional security measurement such as access control systems; secondly, some information exists in peoples' mind and can be leaked verbally, consciously or unconsciously. For instance, an engineer might divulge the details of a new design for monetary gains intentionally or a group of collaborators from various firms might discuss the market potential of new technology and inadvertently disclose the starting of a new service based on that technology. While the last one is difficult to control using a technical measure, organisations often apply enterprise rights management (ERM) systems to give continuous controls for information assets. This system may increase confidentiality but reduce flexibility and information-sharing abilities. One of the solutions to the negative impacts of information leakage can be alleviated by using appropriate contracts between supply chain members. Another approach to alleviate the leakage is the better selection of supplier (Zhang, Cao, Wan and Zeng, 2012).

2.9 Managing Information

Soares, Soltani and Liao (2017) note that supply chain management practices limits perspectives and practices that effectively combine all suppliers, manufacturers, distributors and consumers to achieve all long-term performance objectives. According to Li and Lin (2006), information sharing serves as a key to supply chain integration. Most of the operational research scientists have agreed on some common goals of supply chain management. A previous study noted that the removal of communication barriers and elimination of redundancies as the ultimate goals of

supply chain management (Kaufman, 2002; Delgado and Mills, 2017). Choon (2002) described waste reduction, synchronised operations, delivery performance, quality management and flexibility in production, as supply chain management goals. Simchi-Levi *et al*. (2008) stated that customer satisfaction, time cost savings, and adequate warehousing and sound supplier relations are supply chain management goals. Furthermore, the supply chain involves other impactful activities such as auditing and leadership.

2.9.1 Levels of Information Sharing

As was shown above, there is a ranking in degrees of information sharing. These are interpersonal, intra-organisational and inter-organisational information sharing. The following sections pay attention to these degrees.

2.9.2 Inter-personal Information Sharing

Interpersonal relationships can result in a flow of information between individuals. These relationships happen in various contexts: between friends, neighbours or classmates. Socialisation is both a critical influential factor and a process to drive the sharing of both explicit and tacit knowledge on the level of interpersonal information sharing (Yang and Maxwell, 2011; Khan, Hussain and Saber, 2016). However, research has revealed that as a result of a lack of shared information between individuals within groups, decisions are often poor (Lee, 2010). To understand the management of information sharing in groups, the motivation sharing framework (Figure 2) was developed by Stasser and Titus in 1987 and revised by Wittenbaum and his colleagues (Wittenbaum, Hollingshead and Botero, 2004).

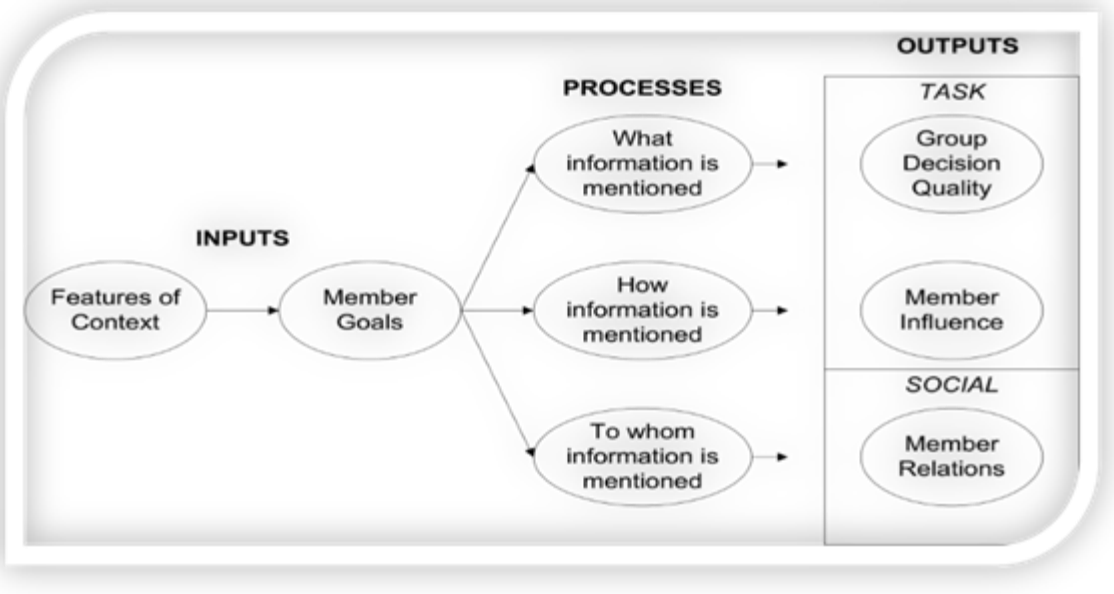

Figure 2: Motivation Sharing Framework (Stasser and Titus, 1987).

This framework reveals that the management of the sharing of information in groups that are key role players in decision making, is a intended process that could be driven by members' goal(s) accomplishment: group members to share information with are purposefully chosen as well as the decisions of what information to share and how. This corresponds with the work of Rioux (2005), who assumes that as a result of the cognitive state of an individual, information is only shared if that individual intends to.

This choice is further reliant on the objectives and the context. Reasonably, these management information-sharing strategies by group members then influence the task outcomes such as group decision quality and member influence. Regarding the context, a distinction can be based on the influences of a particular individual. This leads to a difference in the quantity and quality of information that is being shared when individuals are acting alone, or if these individuals are influenced by their social and organisational environment (Mentzer and Min, 2010; Khan *et al*., 2016).

In addition, in organisations, intricate decision-making tasks are carried out by groups of people, rather than individuals. This is in order to make adequate use of pooled information, potentially resulting in higher quality decisions (Mesmer-Magnus and DeChurch, 2009; Khan *et al*., 2016).

However, this results in further obstacles. Information can become a strategic and powerful asset to protect an individual's place and status within an organisation. This can, in both collaborative and competitive settings, limit the sharing of information between individuals in an organisational context.

2.9.3 Intra-Organisational Information Sharing

The internal sharing of information is a phenomenon that is necessary in the functioning of an organisation. Units or departments within organisations must be able to recycle knowledge and information from one another to improve the productivity of the organisation, but at the same time, these departments are often in competition with one another for resources. Information is shared based on formal hierarchical structures and informal lateral relations. However, research has revealed that as a result of these hierarchical structures, the degree of information sharing is being affected negatively (Tsai, 2001; Baba, Wang, Adzani and Abdul-Hamid, 2021). The same can be said for increasing horizontal structures, such as departmentalisation.

The enhancement in information technologies is increasing the probability for organisations to drive information sharing between their departments. Networks and applications focusing on groupware are increasingly being used by organisations to improve information exchange (Tsai, 2001; Baba *et al*., 2021).

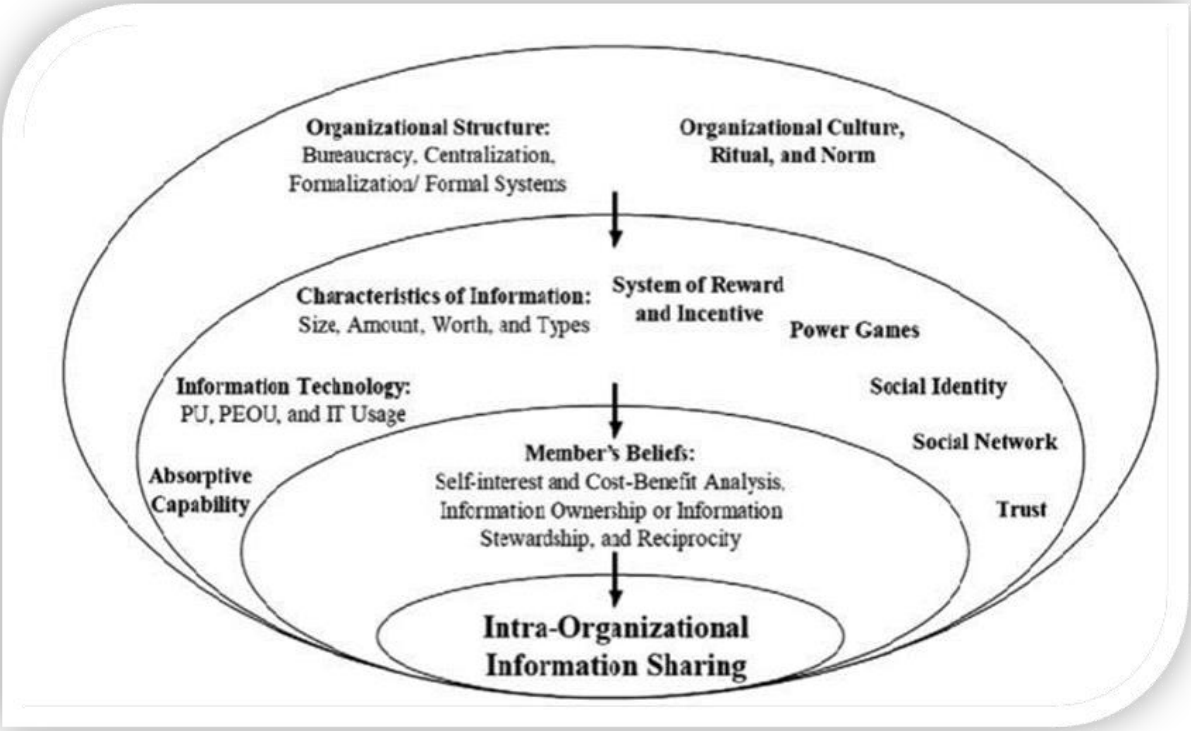

Figure 3: Intra-Organisational Information Sharing Framework (Yang and Maxwell, 2011).

However, as Barua, Rama and Sharma (2010) assert, technology cannot be singled out as the only enabler and/or disabler of information sharing within organisations. The organisations' culture, appropriate rewards systems and IT functions are all features that can help to accomplish inter-organisational information sharing (Baba *et al*., 2021). In Figure 3 the dominant factors for this level which are cited in the literature are categorised in layers, based on a literature study by Yang and Maxwell (2011).

2.9.4 Inter-Organisational Information Sharing

Inter-organisational information sharing that takes place across more than two independent organisation's boundaries, has been recognised by research as being one of the vital aspects that can result in increased efficiency and interoperability within governmental organisations (Pardo, Cresswell, Dawes and Burke, 2004; Baba *et al*., 2021). This inter-organisational information sharing thus takes place in networks. The role of information in networks is vital, as De Bruijn

and Heuvelhof (2008) argue. Accurate and prompt information is the main element resulting in appropriate decision making. To manage this issue of different objectives from different actors in such a network like an environment, these authors suggest that actors have to come up with the right information in interaction with each other. This is called negotiated knowledge (De Bruijn and Heuvelhof, 2008; Baba *et al*., 2021). This firstly requires that organisations share the right information. Due to this multi-actor environment, the factors that influence inter-organisational information sharing are believed to be not only more complex but can also be of a higher complex nature than in intra-organisational information sharing (Gil-Garcia, Schneider, Pardo and Cresswell, 2005; Khan *et al*., 2016).

There are numerous intricate interactions between these organisations in the context of information sharing, as the literature review by Yang and Maxwell identified (Gil-Garcia, Chun and Janssen, 2009; Gil-Garcia, Pardo and Burke, 2007; Klischewski and Scholl, 2008; Luna-Reyes, Gil-Garcia and Cruz, 2007; Pardo and Tayi, 2007; Ramon Gil-Garcia, Chengalur-Smith and Duchessi, 2007; Zhang and Dawes, 2006; Baba *et al*., 2021). Additionally, the level of information shared (no information sharing, partial information sharing and full information sharing), the scope of information shared (transactional, operational, strategic and competitive) and the level of intensity of the relationship between actors (cooperation to full collaboration) are also distinctions that different researchers have made in the context of inter-organisational information sharing (Gavirneni, Kapuscinski and Tayur, 1999; Seidmann and Sundararajan, 1998; Khan *et al*., 2016).

2.9.5 The Interrelation

Even though a distinction is made in the literature between different levels of information sharing (interpersonal, intra-organisational and inter-organisational), it is made explicitly clear that the different forms of information sharing levels are interrelated (Yang and Maxwell, 2011; Baba *et al*., 2021). Many researchers have further revealed that capabilities to share data, information and knowledge must not only be improved across departmental barriers but also organisational geographic and institutional ones (Schooley and Horan, 2007; Khan *et al*., 2016). Both interpersonal and intra-organisational information sharing are respectively embedded in each other. This is made clear when information shared between organisations has to reach different

departments and/or individuals within those departments. Yang and Maxwell (2011) argue that in a perfect situation, the three levels of information sharing should be linked to form an information-sharing environment as shown in Figure 4. It seems logical that there is an interrelation; however, the literature does not adequately deal with these interrelation interfaces.

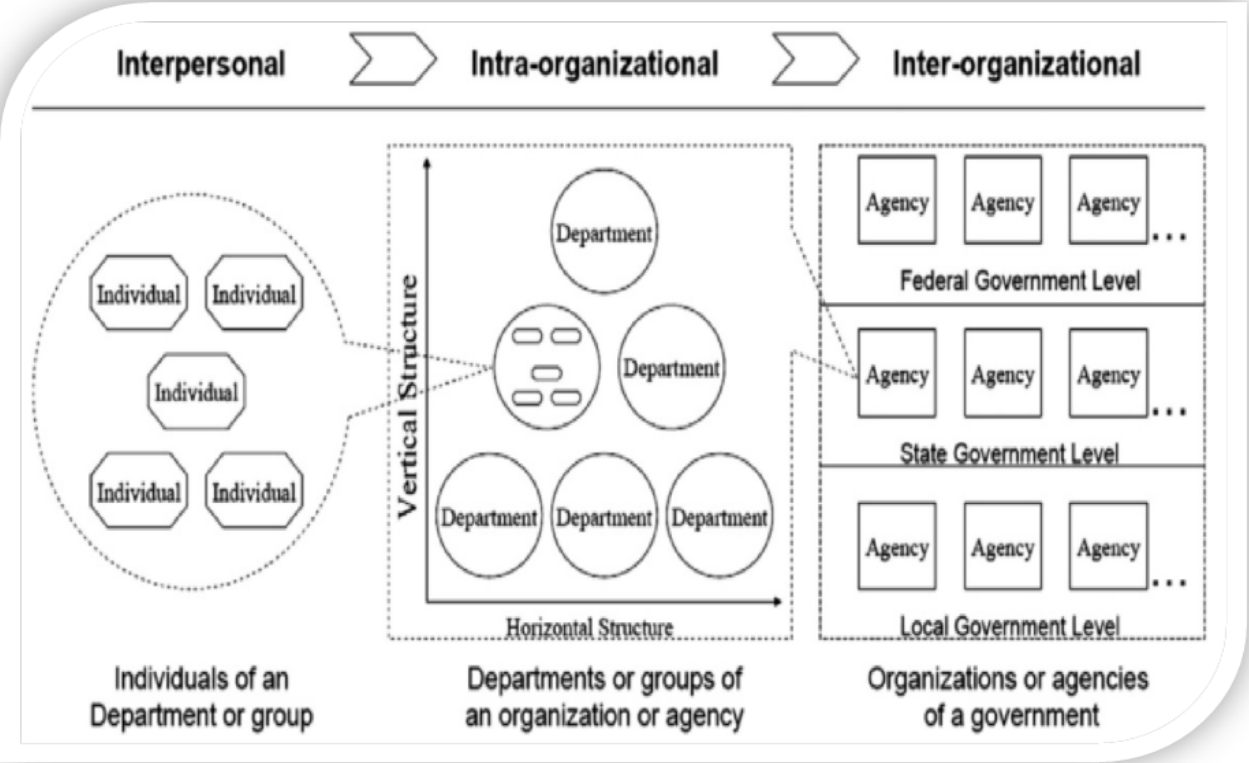

Figure 4: Interrelation between different levels of Information Sharing (Yang and Maxwell, 2011).

2.10 Resource-based View

The resource-based view concentrates on the internal strength of a firm by a consolidation of their seen and unseen resources and capabilities - which are rare, long lasting, and difficult to mimic (Amit and Schoemaker, 1993; Wernerfelt, 1984; Assensoh-Kodua, 2019). Resources and capabilities are seen as strategic assets (Amit and Schoemaker, 1993). The resource-based view emphasises gaining sustainable competitive advantage for a firm by creating heterogeneous and not mobile resources (Assensoh-Kodua, 2019). As a combined usage of the resource-based view

and transaction cost allows researchers to incorporate relationship-specific assets, both theories can be seen as complementary (Subramani, 2004).

As a result of the firms' internal emphasis on competitive advantage (derived from resources and capabilities), the resource-based view has been used to define and analyse the sources of competitive advantage (Halldorsson, 2007; Assensoh-Kodua, 2019). In addition, the resource-based view has been used to analyse complementary interactions between firms using inter-organisational information systems (Kim, 2006). Furthermore, the resource-based view can be applied to analyse influences on factors contributing to the competitive advantage of a firm by developing unique competencies or new heterogeneous resources such as technical competencies, reputation resources (such as a trust), and organisational resources (such as leadership or cultural resources) (Amit and Schoemaker, 1993; Assensoh-Kodua, 2019).

However, the big disadvantage of the resource-based view is that it only considers resources and capabilities from a firm´s perspective, not considering relationships in order to collaborate. Therefore, using a resource-based view would restrict the analysis of antecedents on information sharing to an egotistical perspective of a single supply chain member; without emphasising the creation of reciprocal gains for all supply chain partners.

2.11 Model Affecting Information Sharing

Bakhari and Zawiyah (2012) and Rohman, Eliyana, Purwana and Hamidah (2020) classify the factors influencing the management of information sharing into three categories. They are considered as factors that affect the management of information sharing in the organisation. These are individuals' factors, technological factors and organisational or work-related factors.

2.11.1 Individual Factors Influencing Information Sharing

Individuals are major role players and drivers of information sharing in every organisation, and there are a diversity of individual or personal factors that have been noted to affect information sharing in organisations. Bakhari and Zawiyah (2012) report that many research studies have put emphasis on the role of technology in driving information sharing, omitting the human factor

which is regarded to be the major role player in implementing information sharing in the organisation. Oye *et al.* (2012) report that tacit information is possessed by the individual, and therefore, it depends on his or her willingness to share that information to contribute towards the needs of the organisation or to help others who might need it. There is a number of factors that either encourage employees to share information or discourage them from sharing their expertise which they understand to belong to them (Rohman *et al.*, 2020).

It is important to note that individuals are the main drivers of information sharing in the organisation and that their frame of mind towards sharing information has an influence on their information sharing behaviour. According to Evans (2012), achievable sharing and conveyance of information throughout the organisation have an immediate positive effect on the feasibility and performance of organisations. Examining and comprehending workers' conduct regarding their eagerness to offer information can have noteworthy ramifications for organisations and their performance. Literature attests that organisations cannot efficiently utilise information without their workers having a proactive state of mind towards sharing information among themselves and others (Rohman *et al*., 2020).

The current literature presents a variety of theories and models that talk about the individual factors that influence information sharing. As per the research findings of Riege (2005), there are possible individual elements that influence employees' information sharing behaviour. These are the absence or availability of time for engagement and information sharing; the personal perception of risk involved in information sharing; awareness; dominance in sharing explicit information over tacit information; the employee's job satisfaction level; distribution of power and the individual's role; a collection of information; appraisal; criticism; personal engagement; the employee's job expertise; interpersonal relationships and communication skills; confidence in the individual's oral or transcribed communication; the individual's social skills; variance of age; gender; the availability of a social network; the individual's education levels; a sense of ownership by the company; the level of altruism; and the individual's culture and racial group, personal values and beliefs. The following passages looks at the most prominent individual factors that are believed to influence information sharing in organisations, as suggested by Bakhari and Zawiya (2012).

2.11.2 Technological Factors Influencing Information Sharing

Technological factors are perceived to have both positive and negative influence on information sharing behaviour. The definition of information sharing behaviour often focuses the importance of organisational strategies or tools that are used to share information (Bata, Norman and Allen, 2020; Rohman *et al*., 2020). The outdated methods used by organisations include direct interaction, training, and the unpacking of the organisational documents and policy handbooks. Furthermore, technological advancements have yielded several strategies and tools that are used in organisations to share information. These technological means have brought about impactful transformations in information sharing among employees in the organisation. Lee, So and Tang (2000) mention the internet, intranet, social media and computer equipment as some of the technological equipment and platforms that influence information sharing in the workplace. According to Camarinha-Matos (2004), technology is one of the crucial drivers of knowledge sharing.

Information and communication technology plays an important part in driving information sharing in organisations. Bakhari and Zawiyah (2012) attest that information and communication technology (ICT) is an important key player in information management, and categorises ICT tools into five subdivisions, namely office applications (e.g. emails, messaging, calendaring and scheduling); groupware (such as the discussion of databases, application sharing and electronic meeting systems); work process systems; analytical systems; and information systems such as portals, e-learning, and knowledge sharing. Thus, the successful use of these tools is likely to enable information sharing among employees in organisations.

Technical infrastructure and other resources are required by employees so they can utilise them to access latest information and share it whenever necessary. For this reason, information technology plays a critical role on information sharing behaviour. Bata et al. (2004) report that IT skills and technological infrastructure influence employees' tendency to share knowledge among themselves, while Ander, Spek and Spijkervet (1997 cited in Evans, 2012) articulate that information technology and communication technology are complex tasks with achievable skills and have marvellous outcomes in enhancing information sharing and the efficient performance of

knowledge exercises. In short, the availability of the necessary resources and organisational infrastructure encourages information sharing among employees in the workplace.

2.11.3 Organisational Factors Inducing Information Sharing

Supply chains management has turned into a broad-spectrum across industries since it focuses on seller-buyer partnerships, shared planning, continuing strategic partnership, control of stock, information sharing and logistics management (Banomyong and Supatn, 2011; Al-Odeh, 2016). Al-Odeh (2016) emphasise that effective supply chain management should provide high quality of customer service to a particular section by the reduction of the entire amount of resources and improving customer services through enhanced product availability and reduced turnaround time on order cycle. Supply chain management adopts a systems' perspective across firms and functions as an absolute system by processes of coordination. Companies may engage in information exchange and structural collaboration. Information exchange may include the inventory supervision, forecasting techniques and delivery. Meanwhile, the structural collaboration may include vendor-controlled inventory, outsourcing and collocating factories (Crainic and Laporte, 2016; Rohman *et al*., 2020).

The organisation plays a critical part in controlling information sharing among employees within the organisation. Several factors that are taken into consideration to effect information sharing is discussed in this section. Lin and Lee (2005) report that some studies have discovered that organisational innovation on information sharing is highly affected by the workers' capabilities, management approaches and management styles, organisational policies and employee attitudes. Bata *et al*. (2020) added that other factors affecting information sharing involves employee and management involvement, teamwork, and compensation, inclusion of high-ranking and new personnel and a dependable working environment.

The organisational factors involve the effect of the organisational culture, leadership technique, organisational structure, office design, integration between information management and tasks carried out, and the objectives of the organisation. According to Leopold *et al*. (2014), the centralisation of power and decision making is one of the factors that hinder information sharing among employees within the organisation. Senior management participation and support in

driving the sharing of information in the organisation has been finalised as one of the critical tools for the achievement of information sharing in the organisation (Holsapple and Joshi, 2000 cited in Easterby, Smith and Prieto (2008); whereas Bakhari and Zawiyah (2012) report that organisational structure and organisational culture has a great influence on information sharing in the organisation. According to Bata *et al*. (2014), the organisational culture is inclusive of factors like trust, leadership, communication, reward system, information system, and the organisation's structure, which collectively influence information sharing in organisations.

Various studies show several factors that affect organisational information sharing, but Leopold, Pittke and Ahrend (2014) assert that four factors affect information sharing in the organisation. These factors are trust, decision structures or senior management support, motivation, and organisational structures. These factors can hamper or encourage information sharing practices, depending on how it is handled by the organisation. Kim and Lee (2006) add that perfect managerial vision and objectives develop a productive influence on the employees' ability and willingness to share information. The following passages comprises a brief discussion on the findings of different scholars with regards to the above-mentioned organisational factors and how they influence information sharing behaviour in organisations.

2.11.3.1 Intra-organisational Factors Influencing Information Sharing

Intra-organisational exchange of data and information may occur according to several layers of responsibilities and territorial jurisdictions. There are significant challenges to encouraging enhanced communication and information sharing, especially given the fact that most communications interoperability issues are not technical. Organisational cultures, differences in terminologies, and incompatibility of standard operating procedures all create barriers for progress. These point towards the need to take an end-user-centric approach rather than a platform-centric approach in designing an information sharing framework. Inter- and intra-organisational issues in emergency response are concentrated into three main topics: organisational coordination, emergent technologies, and technique in information processing and evacuation planning (Dantas and Seville, 2006; Al-Odeh, 2016).

2.12 Information Sharing and Order Fulfilment Performance

According to Ojha, Struckell and Acharya (2018), information sharing and coordination reduce the bullwhip effect while improving the performance of the overall supply chain. These benefits can include advanced stock management capabilities that may enhance operational efficiency and reduce costs. The improved service level capabilities from effective inventory policy can also benefit the firm in generating higher revenues in many instances. Order fulfilment has strategic parts that play a vital role in the function of supply chain management, even if it is traditionally viewed as more of a logistics function. Order fulfilment performance (OFP) is a composite measure of the stock availability, timeliness of processing orders, stock acceptance, and the speed and accuracy of order delivery. They continue to argue that the order fulfilment is a multi-functional practice that requires some form of coordination and control. Acknowledging the crucial role that information sharing can have for enhanced order fulfilment performance, there have been calls for some more research to identify the type of information that should be shared between supply chain members. Different types of information sharing that include orders, market demand, stock/inventory and backlog on service levels, are yet to be investigated (Ojha *et al*., 2018).

Information sharing may reduce inventory levels; however, it also reduces service levels by increasing the processing requirement for order backlogs. A sufficient information infrastructure is imperative for order fulfilment process improvement as effective information management can substitute for stock requirements e.g. order fulfilment can be improved without increasing inventory cost. The impact of information sharing on both order processing and order execution performance dimensions are not generally examined in these studies. An empirical assessment of the value of information sharing focuses on inventory and cost reduction, it does not always consider the order fulfilment process itself. Order fulfilment failures in the form of order delays, lead-time variation, and delivery quantity in these cases can also have a negative effect on the supply chain performance outcomes, and that includes the loss of customers, order referrals, and future purchases (Ojha *et al*., 2018).

Edwards, Nimako, Owusu-Manu and Conway (2016) state that companies are expected to comply with customer order fulfilment even if it is hard to do so. They have to respond as quickly and as efficiently as possible in the shortest time available to satisfy the customer's needs. However, unexpected rush orders cause delays in delivery and decrease efficiency in all of the supporting members. To coordinate different supply chain activities and solve these problems, information sharing and negotiation decisions have been identified as vital for successful global manufacturing. Negotiation is the core of many agent interactions. It is unavoidable between different departments or projects participants with certain specific tasks and domain knowledge whilst they interact to achieve their departmental objectives as well as the inter-departmental group goals (Ojha *et al*., 2018).

2.13 Information Sharing and Inventory Management

Multi-Agent System (MAS) is a computer system that can function independently on behalf of its user or owner. It can figure out what needs to be done to achieve its objectives, rather than being responsive. In the agent-based simulation, the model consists of a set of agents that encapsulate the behaviours of the different individuals within the supply chain network. A four-level proposed model with unlimited entities in customer level and a single entity in other levels, each entity is simulated as one agent and their community results to a multi-agent system where information flow goes up and good flow comes down through the chain. Meanwhile, an analyst is brought into the simulated model to generate a demand analysis based on information received from final customers while the supplier is modelled as the special delivery agent with unlimited inventory (Edwards *et al*., 2016).

All entities keep record of their information in a joint database to be used by an analyst, these agents are capable of solving the problem of matching supply to demand and allocating resources dynamically in real-time, by identifying opportunities, trends and potentials, as well as carrying out negotiations and coordination. In any supply chain, the members should collaborate to reduce the total cost as the main objective, and therefore the entities should manage a MAS between themselves and pay for information sharing and maintenance. Lead-time between levels in the supply chain network and other variables such as stock holding and ordering cost is fixed and defined first. Unsatisfied customer orders change to a lost sale in retail, while an unsatisfied

order from a retailer in distributor changes to a back order. This order is satisfied as goods are received from a supplier (Edwards *et al.*, 2016). Retailer agent activity starts with receiving order requests from customers and checking stock level. It will then satisfy all orders received if there is enough stock at that time, otherwise, negotiations should ensue with customers who placed orders for new proposed prices. This is done while continuously checking the stock level. If inventory reaches replenishment point, a new order for the distributor is then made. After receiving goods from the distributor, the retailer updates the stock level. The retailer saves information in a database daily and receives new information about orders amount from the analyst agent. When there is not enough stock in the retailer for fulfilling all customers' demands, it gratifies some of the demands based on negotiation and the rest changes to a lost sale (Edwards *et al.*, 2016).

The distributor agent handles all behaviours in the distributor unit. It starts to receive orders from a retailer and, if there is enough inventory, orders are fulfilled, if there are out of stocks, orders change to a backlog. If faced with a backlog, the distribution agent orders from the supplier to fulfil retailers' requests as new stock is received from upstream. The distributor saves and keeps information in the database and receives updated information from the analyst agent for order quantity and replenishment time (Edwards *et al.*, 2016).

2.14 Information Sharing, Production Planning and Management System

According to Kumar, Singh, and Shankar (2016), it becomes crucial to eliminate activities that are a waste in the production and to meet the individual customer demands and the ever-changing market. Specifically, the variety of customer specifications in products and services must be satisfied without compromising the productive efficiency in mass customisation. The levelling of production load becomes difficult because manufacturers have to meet the orders of customers based on each specification. This is where the decrease in productivity takes place and finished goods stock increase, which makes it difficult to deal with the specifications of the customer. Under the precondition that the delivery lead time which is expected by a customer is longer than production lead time which is necessary for manufacturers, the Make-to-Order management system in which manufacturing starts after receiving an order, has been applied for a variety of customer specifications as a production planning and management system for mass

customisation (Kumar *et al*., 2016). However, it is often usual that delivery lead time becomes shorter than the production lead time. Therefore, manufacturers have to start manufacturing before they receive an order from customers.

2.15 Information Sharing on Businesses Performance in the Supply Chain Process

Sahin and Topal (2018) stated that supply chain management has currently become one of the focal points of the competition. The increase in information sharing in SCM is becoming more and more important in improving business performance. Businesses use the latest technologies and strategies to establish and maintain a competitive advantage in modern business environments which are influenced by the increasing competition and the globalising economy. The literature points out that the development of supply chain activities in many industries in the future will be based on competition. Therefore, there is currently a notable significant shift from businesses competing with each other to supply chains competing. It is also an organisational network that creates value in the form of a product or service in the hands of consumers and includes different processes and activities. Material flow, financial flow, and information flow form a structure that connects members from both sides in the supply chain system (Sahin and Topal, 2018).

The authors strongly emphasise that in today's businesses, information is the primary resource for individuals from an economic perspective. This has caused production factors, such as labour, capital, and raw materials to become secondary resources and are within reach. Effective information sharing has become an essential tool for supply chain management to succeed exponentially. Information sharing is a multi-directional process that organisations carry out both within themselves and between supply chain partners and customers who are considered to be members of the supply chain. This has resulted in the increasing of the level of information sharing among supply chain members becoming an obligation rather than a choice in order to increase supply chain efficiency (Sahin and Topal, 2018). Information sharing and information technologies are among the key components of coordination between parties in the supply chain. Information sharing can contribute to reducing inventories and balancing production in the supply chain. Businesses in the global economy strongly need appropriate information to stay afloat and to be competitive. The information flow has become the most important factor in

determining the difference between organisations in this business era and market conditions. Competition is not only between firms nowadays but has started to emerge in the networks in which companies are operating (Sahin and Topal, 2018). Therefore, information sharing has become even more crucial for firms to improve their performance.

2.16 Bull Whip Effect and its Causes

Inaccurate information from opposite ends of the supply chain can often result in immense incapability: overstock investment, poor customer service, low profits, inaccurate measurement plans, ineffective transportation, and miscalculated production schedules (Lee *et al*., 1997; Novitasari and Damayanti, 2018).

According to Lee *et al*. (1997) and Novitasari and Damayanti (2018), resolving the issue of inaccurate or misrepresented information, companies first need to determine the causes of the bullwhip effect to be able to counter it. Companies that are innovative in various industries have discovered that they can curb the bullwhip effect and enhance their supply chain performance by coordinating information and planning along the supply chain. The variabilities of an upstream site are always greater than those of the downstream site, and experiments indicated that human behaviour such as misconceptions about stock and demand information may cause the bullwhip effect. They have identified four major causes of the bullwhip effect within an organisation:

2.16.1 Demand forecast updating

Every company in a supply chain usually does product forecasting for its production scheduling, capacity planning and material requirements planning. Forecasting is usually based bench-marked on the order history from the company's immediate customers. The order sent to the supplier reflects the amount needed to replenish stock that will meet the requirements of future demands, as well as buffer stock. With long lead times, it is not unusual to have weeks of buffer stocks. The result is that variability in the order quantities over time can be much greater than those in-demand data.

2.16.2 Order Batching

In a supply chain, each company places orders with an upstream organisation using stock monitoring or control. When the demand comes in, the stock is depleted. However, the company might not immediately place an order with its supplier. It usually batches or accumulates demands before placing an order. There are two types of order batching: periodic ordering and push ordering. Periodic ordering amplifies variability and contributes to the bullwhip effect in that the demand spikes at one time during the month and is followed by no demand at all for the rest of the month. This variability is higher than the company itself is faced with. Push ordering is where a company experiences regular surges in demand. One common challenge for a company that wants to order regularly is the economies of transportation. There are notable variances between full truckload and less than truckload costs, so companies have a great incentive in filling truckloads when they order stock from a supplier: suppliers even offer discounts for full truck loads.

2.16.3 Price fluctuations

When a price is reduced through discounted deals and promotional activities, a customer purchases in large quantities and when the product price goes back to normal price, the customer stops purchasing until it sells out the discounted stock. This then messes up the customer's buying pattern and does not give a true reflection of its consumption pattern, and the variation of the buying quantities is higher than the variation of the consumption rate: the bullwhip effect.

2.16.4 Rationing and Shortage of Gaming

When the demand exceeds supply, a manufacturer often rations its product to customers. Most customers buy an excessive stock that is greater than their real needs if they know that the product is rationed by the manufacturer because of its short supply. Later when the demand decreases, orders disappear and get cancelled.

2.17 Counteracting the Bullwhip effect

Several authors have mentioned information sharing as an amendment to decrease the bullwhip effect. How the sharing of demand information by the retailer decreases the variance of the order quantity at the upstream level when demand at the retailer level is auto correlated over time, has been studied. Chen *et al*. (2000) and Chiang *et al*. (2016) stated that one of the most frequent suggestions to reduce the bullwhip effect is the centralisation of demand information that provides each stage of the supply chain with complete information on customer demand. Lee *et al*. (1997) argue that if all customers' order cycles were spread out evenly throughout the week, the bullwhip effect would be minimal. The periodic spikes in demand by some customers would be insignificant because not all of them would be ordering at the same time. However, this is just an ideal situation, and orders are more likely to be spread out randomly or even overlap. Understanding the causes of the bullwhip effect can help managers find strategies to mitigate it and many companies have started implementing innovative ways that partially address the effect. Various initiatives and other possible solutions based on the underlying coordination mechanism, such as information sharing, channel alignment, and operational efficiency are categorised. With information sharing, demand information at a downstream site is transmitted upstream in a timely fashion. Channel alignment is the coordination of pricing, transportation, inventory planning, and ownership between the upstream and downstream sites in a supply chain. Operational efficiency is the activity that improves performance such as cost reduction and lead time. They warn that companies should avoid multiple demand forecast updates, and should break order batching, stabilise prices and eliminate gaming in shortage situations (Lee *et al*., 1997; Novitasari and Damayanti, 2018).

2.18 Order Batching

Organisations have been consistently putting effort to lower their logistics costs in the current competitive markets (Cergibozan, Çağla and Tasan, 2019). With the efforts of cost reduction, management has is become very decisive, as storage and distribution of the ordered items to customers is a rigorous process in terms of cost for the organisations, and this process directly influences the customer service quality. The order batching challenge perturbs the decision of how to group orders and to assign them to order pickers. If the order picker begins a tour for

every order, the capacity might be insufficient to serve all orders. However, if the order picker waits to have a sufficient number of orders, the average time in the system of the orders might be longer than scheduled. The efficiency of the order picking process in such environments can be increased by serving a group of orders instead of individual orders. The crucial step to take is to determine the number of orders needed to be picked to reduce to reduce the amount of time of a random order (Le-Duc and de Koster, 2004). Overall, the effectiveness of the picking routes heavily relies on the batching decisions that are taken before the routing decisions (Pansart *et al*., 2018).

2.19 Theoretical Framework: Social Interdependence Theory

Social interdependence theory is based on the understanding that the composition of the cluster decides the collaborations in that cluster and thusly influences the result. The assumptions are that the errand must be sufficiently basic and the members smartly sufficient that there were no representative distinctions between the members. Participation and rivalry are depicted in it's unadulterated structure hence, the initial theory solely works with complete rivalry or complete agreeable circumstances. The supposition that is made is that all members exert effort on personal interest (Johnson and Johnson, 2005; Jongman, 2017). Asch (1952) as cited by Jongman (2017) states that there is a contrast between personal interest and selfishness. Personal interest can incorporate one's own objective and that of others while narrow-mindedness exclusively centers around self-benefit. The theory accepts that all members have equivalent power or, if nothing else, the view of equivalent power. The way that all members will not ever have completely equivalent power, in actuality, does not make any difference for social interdependence (Jongman, 2017). There needs to be the view of interdependence. As expressed by Morton Deutsch in his rough law of social relations, the trademark cycles and impacts evoked by a given kind of friendly interdependence likewise will generally inspire that sort of friendly relationship, and an ordinary impact will prompt the other normal impacts (Deutsch, 1973). Collaboration, in this way, prompts and is instigated by a direction towards upgrading shared power as opposed to an emphasis on power contrasts (Deutsch, 2011).

Morton Deutsch created two sorts of social interdependence and a sort that portrays itself by the shortfall of social association: positive reliance (cooperative) and negative association (competition). Both these kinds of social association are portrayed by one or the other positive or adverse objective reliance. At the point when there is a shortfall of objective reliance there is additionally a shortfall of social relationship (Jongman, 2017). This structure is called: no-relationship or no interdependence (individualistic endeavors). Positive reliance is the point at which the insight is that the ideal result can be accomplished if all individuals from the SC accomplish their objectives. Negative association is the point at which the insight is that on the off chance that one of the individuals from the SC arrives at its objective the others can no more, completely, achieve their objective (Jongman, 2017). Positive association brings about advancement of one another's prosperity which prompts higher efficiency and accomplishment, more convinced connections among people and more noteworthy mental well-being and prosperity. No-Association prompts little communication among people and brings down efficiency and accomplishment, more negative connections among people, and lower mental well-being and prosperity (Johnson and Johnson, 1989). Only positive and negative social association are applicable to the theory of social interdependence on the grounds that no-reliance does not prompt agreeable or competitive collaborations.

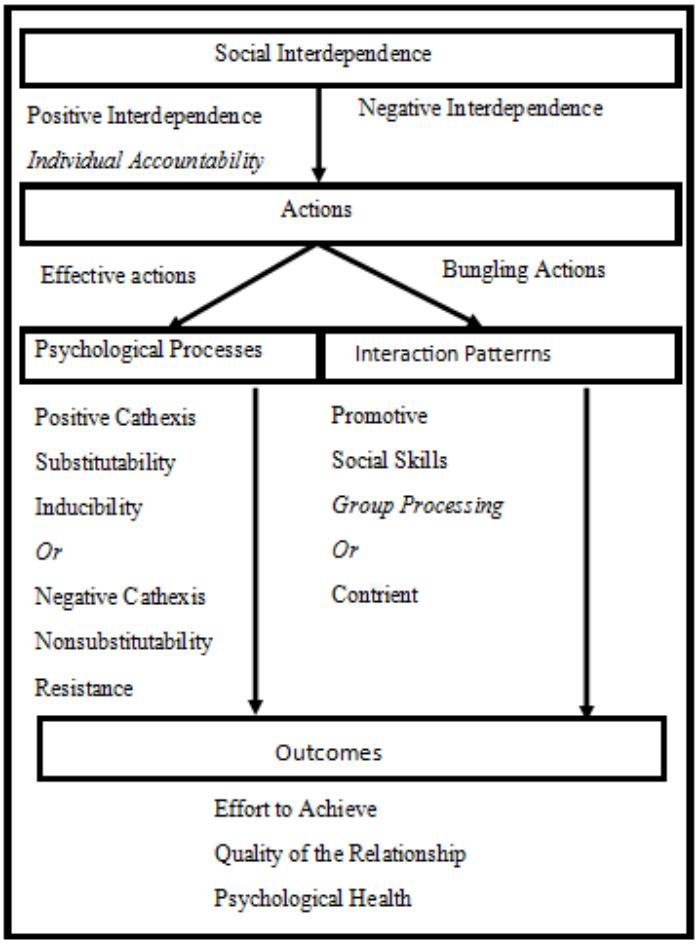

Figure 5: Overview of Social Interdependence Theory (Jongman, 2017).

The aftereffects of positive reliance or negative association are accomplished by actions and this is dictated by the connection patterns and mental procedures. These actions can be either effective or bungling, as depicted in Figure 5. Effective actions increment the individual's possibility of arriving at his/her objective. While bungling actions diminish the opportunity of the individual arriving at his/her objective (Jongman, 2017). At the point when there is negative association members will be helped by their own successful activities, impeded by different members' effective activities, helped by different members bungling activities and blocked by their own bungling activities. This is on the grounds that only one individual can completely accomplish their objective and any effective activity of one individual attempting to arrive at this objective will diminish the possibilities of the others attempting to arrive at this objective (Deutsch, 1949).

At the point when there is positive relationship members will be helped by their own effective activities and their colleagues' successful activities, and frustrated by their own and their members bungling activities. The group will possibly arrive at the objective when all work has been completed hence any activity that postpones this (bungling) will defer the entire group and any compelling activity from any of the colleagues will draw them all nearer to the objective (Jongman, 2017).

Interdependence has been portrayed in SCM to an extremely restricted degree and only in an intra-hierarchical scope, examining how departments inside a firm rely upon each other. Interdependence in the SC has somewhat been managed as far as how the firms are successively reliant and, in this manner, need to co-ordinate their tasks while relationship among chains has been marginally addressed in the SCM writing (Jongman, 2017). Endeavours to enhance individual SC's by disregarding the relationships and interdependence among chains, may hamper the proficiency somewhere else in the network, which might call for responses. Thus, interdependence among departments in an organization should be focused on as part of SCM so the SC can be fully optimized and well-functioning. This theoretical framework is used in this study to evaluate interdependence among different departments at DSA, and to provide suggestions for improving interdependence for the optimisation of the SC.

2.20 Conclusion

Supply chains comprise of sequence of links and shared processes existing between suppliers and customers, which includes all the activities from the procuring of raw materials to the delivery of the finished products to the end consumers. In this chapter, the importance of information sharing and supply chain in different sectors has been illustrated. Supply chain management has also been described from many perspectives. The chapter discussed the literature review on management information sharing in the supply chain management. It also dealt with the definition of management, information, sharing, and management information sharing. The chapter discusses the concept of management information sharing in the supply chain and presents descriptive information on theories on the management of information sharing in an organisation. The chapter also highlights information sharing and intra-organisational

relationships and supply chain performance and that there are three factors: individual, organisational and technological factors influencing management information sharing.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents a description of the research process. It provides information concerning the method that was used in undertaking this research as well as a justification for the use of this method. It gives an overview of the research process that was followed in developing the grounded theory of information sharing in supply chain management. It describes the various stages of the research, which include the selection of participants, the data collection, and the process of data analysis. The chapter also discusses the validity and reliability of qualitative research and discusses how these two necessities were met in the present study. The interview design is described and the methods used to analyse data are outlined in detail.

3.2 Grounded Theory

Grounded Theory (GT) was adopted and developed for this study. According to Glaser (1978), the analytical engine of GT is a process known as "constant comparison". Constant comparison seeks to identify theoretical similarities and dissimilarities between the perceptions of participating individuals. The key to constant comparison is theoretical sampling, which is a method for gaining multiple perspectives of phenomena. These contrasting perspectives allow the development of higher-order concepts that explain behaviour (Charmaz, 2006; Glaser, 1978). Grounded theorists select a sample that is rich in the phenomena under investigation (Charmaz, 2006). This sample provides data from which to reveal concepts (e.g. categories and their properties) in support of inductive theory development. This sampling approach contrasts with a quantitative methodology where the sampling goal is to support a statistical generalisation.

Grounded theorists such as Glaser (1978) and Charmaz (2006) validate emerging categories and relationships by comparing findings from one sample to a new sample selected specifically to confirm or disconfirm the previous propositions. Categories are abstract, higher-order concepts that represent groups of underlying codes sharing conceptual content. Theoretical sampling may involve, for instance, comparison of concepts articulated by study participants based on a single

interview. It may also be a comparison of interviews with multiple participants, comparison with organisational artefacts such as performance, awards, and appraisals or a comparison with relevant literature (Charmaz, 2006; Glaser, 1978). Good GT is, therefore, "a set of well-developed concepts related through statements of relationship, which together constitute an integrated framework that can be used to explain or predict phenomena" (Strauss and Corbin, 1998:22). This means collected data would create concepts to create sub-concepts and then links these sub-concepts to some properties. These properties can be conditions, context, consequences and strategies. This can be linked by relation, theses or theory. Below is the information-sharing framework which is aimed at giving a detailed structure of the entire supply chain process. Figure 3.1 illustrates a significant conceptual framework of information sharing and SCM proposed by Glaser (1978) discussed by Charmaz (2006).

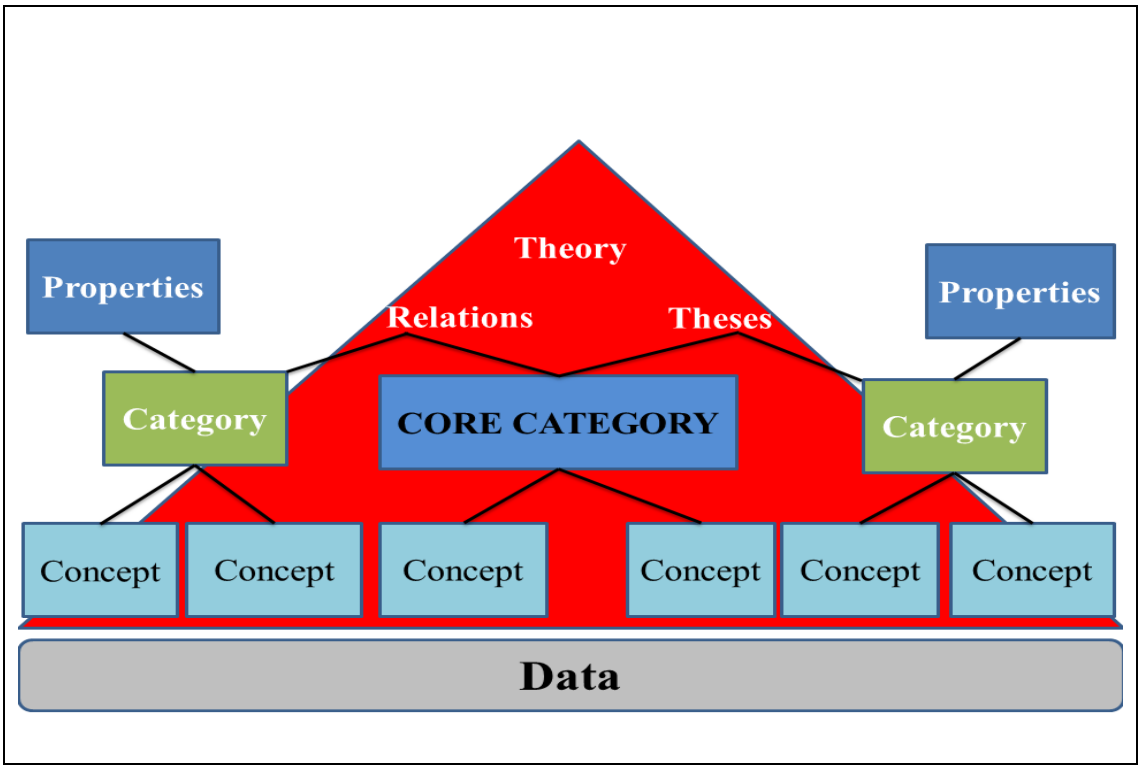

Figure 6: Ground theory process. Adopted from Charmaz (2006).

GT uncovers the behavioural dimensions in SCM research as it provides researchers with a method to collect and interpret data from personnel at various levels and functions within and across firms (see Figure 6). This direct contact gets at the core processes underlying SCM in practice. GT works because it uses a holistic and process-oriented method to determine the rules,

processes, and strategies upon which supply chains operate (Glaser, 1978; Randall and John, 2012; Al-Odeh, 2016). Therefore, this theory is relevant to the study as it has allowed us to constantly compare the level of transparency and information sharing amongst the DSA departments involved in the order processing. Furthermore, relevant concepts and sub-concept have emerged in the study during data analysis.

3.2.1 Types of Ground Theory

There are two paradigms of GT: firstly, there is a dimension of substantive theory versus formal theory and the dimension of micro-versus macro-theory (Figure 7). Usually, GT starts at the substantive theory, at the micro level. The goal of GT, in the long run, is to get to more formal levels of theories. It means that when research develops a theory more at substantive levels, this theory applies to a certain substantive field. However, when a researcher develops a theory, their theory would apply to different fields and then become more formal and macro, but it does not need to be.

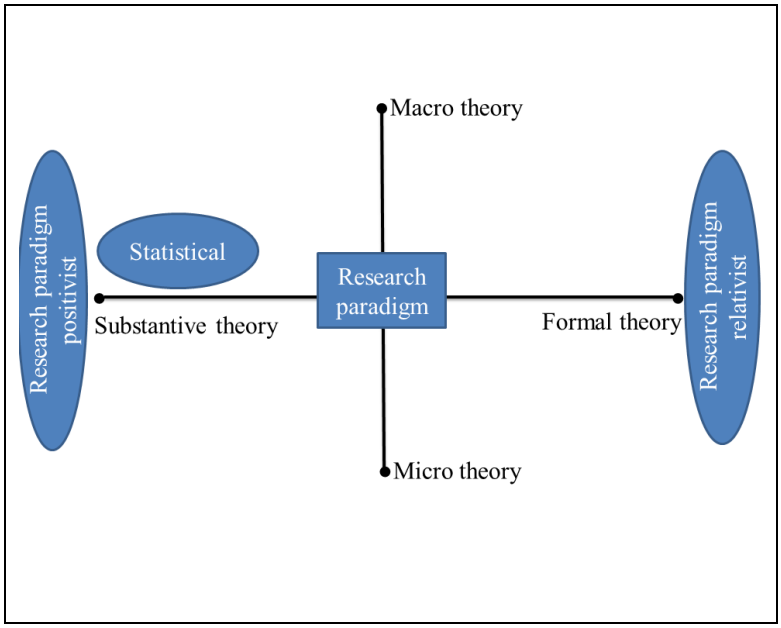

Figure 7: The GT types and range of research paradigms. Adapted from Randall and John (2012).

3.3 Research design

Research design is defined as a blueprint or an outline for collecting, measuring, and analysing data based on the research questions (Sekaran and Bougie, 2013; Thakur, 2021). According to Durrheim (2004) and Thakur (2021), a research design is a strategic framework for action that serves as a bridge between research questions and the execution or implementation of the research. Similarly, Denzin and Lincoln (2005) noted that a research design is determined by the nature of the research question and the subject being investigated. As a result, the research format used in an investigation should be seen as a tool to answer the research question. The research design that was, therefore, appropriate for this study was a qualitative grounded theory design. The principles of a grounded theory model of inquiry were followed.

Qualitative grounded theory design is a mode of scientific inquiry-oriented towards understanding human beings and the nature of their interactions in their natural setting (Brink and Wood, 1989; Thakur, 2021). The qualitative method of inquiry examines phenomena outside the context of the existing segmented views (Burns and Grove, 1987; Thakur, 2021). The purpose of the grounded theory method is to form a new gestalt to generate new theories. Burns and Grove (1987) argue that the researcher needs to step out of the segmented views and be open to the new gestalt that will emerge from the data and the researcher's abstract thinking.

The grounded theory method is appropriate when studying areas in which very little or no research has been done in the area and when new viewpoints or gestalt are needed to describe the familiar phenomena that are not clearly understood (Chenitz and Swanson, 1985; Tie, Birks and Francis, 2019). The phenomena of internal information sharing and customer satisfaction in the supply chain at DSA fit the criteria mentioned above. There are data on information sharing and technology but little research has been done on this topic and not at DSA. Therefore, this study aimed at exploring and understanding the factors that influence information sharing by the participants at DSA. The aim of the study was to investigate a particular way of looking at and deriving meaning on the phenomenon under investigation.

3.4 Research approach

A qualitative research approach was chosen as the methodology because this approach reinforces an understanding and interpretation of meaning as well as the intentions underlying human interaction. Data were collected using in-depth interviews. Denzin and Lincoln (2005) and Dawadi, Shrestha and Giri (2021) describe qualitative research as a multifaceted research method involving an interpretative, naturalistic approach to the subject matter. The multifaceted nature of qualitative research enables researchers to develop a holistic picture of the phenomenon in question. The authors provide the following principles that underlie qualitative research: holistic, looks at the relationships within a system; focuses on understanding a given social setting, not necessarily on making predictions about that setting; demands time-consuming analysis; it requires ongoing analysis of the data; requires the researcher to become the research instrument; incorporates informed consent decisions; and is responsive to ethical concerns.

In qualitative research, the objective is exploratory and descriptive rather than explanatory (Ferreirra, Mouton, Puth, Schurink and Schurink, 1998; Dawadi *et al*., 2021). The descriptive nature of qualitative research allows the researcher to describe the experiences of the participants, which will either sustain or confront the theoretical assumptions on which the study is based (Meyer, 2001; Dawadi *et al*., 2021). The descriptive nature of qualitative research enables readers to understand the meaning attached to the experience, the distinct nature of the problem and the impact of the problem (Meyer, 2001; Dawadi *et al*., 2021). Qualitative research was deemed suitable for this study as the purpose of this research was to explore the views of a group of workers on information sharing within the organisation.

The reasons for conducting qualitative research were twofold. First, the literature on the management of information sharing at DSA was limited. While existing Tier 3 employees faced business communication challenges, literature served as a valued catalyst for understanding factors affecting information-sharing in the organisation. The qualitative study helped to seek their relevance to the supply chain and provide an initial understanding of what factors have affected information sharing in the DSA context. The qualitative aspect serves to answer questions about the relationships among the variables studied and derives meaning from the data analysed through the use of statistics, diagrams and tables (Cooper and Schindler, 2011; Dawadi *et al*., 2021). A qualitative approach helped bridge the gap between theory and practice; and it

allowed the revelation of how different drivers or factors of information sharing operated in the DSA context. It also enabled the researcher to paint a more holistic picture of what drives differences in information sharing in the organisation and how this is linked to firm performance.

3.5 Target population

Atkinson and Flint (2001) describe the target population as having all the elements that meet the criteria for inclusion in a study. Research indicated that a population is the aggregate of all cases that conform to some designated set of specifications i.e. participants, from whom the researcher needs to draw outcomes and conclusions and to generalise the findings of the study (Patino and Ferreira, 2018). It is for the benefit of the population that research is done. However, due to the large sizes of populations, researchers often cannot test every individual in the population because it is too expensive and time-consuming. The chosen sample serves as a subset of the target population, on the assumption that the data collected are those that the researcher can draw conclusions from and make decisions about the bigger group and give a full reflection about the population (Braun and Clarke, 2006; Patino and Ferreira, 2018). This study aims at investigating the factors that influence the management of information sharing and intra-organisational relationships on supply chain performance in the FMCG industry at DSA. Therefore, this study's target population was 16 participants that were Tier 3 category workers and managers in the supply chain department of the organisation. The target population is based across South Africa. Planning sample design is a crucial step in the data collection of any research process and involved three dimensions: the target population, sampling methods and sampling size (Churchill and Lacobucci, 2005; Patino and Ferreira, 2018).

3.6 Sampling Design

Sampling design defines a set of elements from which a researcher can select a sample of the target population (Kemper, Stringfield and Teddlie, 2003; Shukla, 2020). Furthermore, a good sample frame includes all individuals in the target population, excludes all individuals not in the target population and includes accurate information that can be used to contact selected individuals. Jankowicz (2005) noted that a good sample design not only helps identify the kind

of data but also leads to efficient and accurate data collection. Due to the fact that a researcher rarely has direct access to the entire population of interest in social science research, a researcher must rely upon a sampling frame to represent all of the elements of the population of interest.

Sampling is the scientific procedure of selecting those units which would provide the required estimates with associated margins of uncertainty, arising from examining only a part and not the whole (Christensen, Johnson and Turner, 2011; Shukla, 2020). Sampling methods are used to select a sample from within a general population. Proper sampling methods are important for eliminating bias in the selection process. They can also allow for the reduction of cost or effort in gathering samples.

Jankowicz (2005) refers to two major categories of sampling, namely probability and non-probability sampling. In probability sampling, each member of the population has a known non-zero probability of being selected. Probability sampling is the most common technique when a survey needs to make inferences for the population. In non-probability sampling, it is impossible to provide a representation of the views of the total population because of the researchers' subjective judgments. Whilst Leedy and Ormrod (2005) emphasised that non-probability sampling is quite subjective, the surveys can produce acceptable results more quickly and at a lower cost than probability sampling. In non-probability sampling, members are selected from the population in a non-random manner. These include convenience sampling, judgment sampling, quota sampling, and snowball sampling. The advantage of probability sampling is that the sampling error can be calculated. Hence, this study employed a non-probability sampling method, since the researcher had no way of forecasting or guaranteeing that each element of the population could be identified in the sample.

This preference also means choosing a sample in such a way that some members of the population have little or no chance of being selected. In this case, DSA Durban and Johannesburg were selected as the sampling locations. Convenience sampling, as the cheapest and easiest way to conduct the sample, was used to select respondents. Cooper and Schindler (2011) suggest that this method is often used to test ideas or even to gain knowledge of the subjects of interest; hence, the choice of convenience sampling by the researcher. During the data collection period, 25 employees at the DSA were selected through the method of convenience sampling explained above. However, the researcher managed to interview only 16 employees.

This study's focus is mainly on the supply chain. A list of Tier 3 category employees in supply chain departments within a global sales and distribution company working in the FMCG sector of the DSA was obtained.

3.6.1 Study Site

The selected study area is Diplomat Global which is the leading sales and distribution company in the Fast Moving Consumer Goods (FMCG) sector. Diplomat Global operates in five countries across the world which are located in Israel, Georgia, South Africa, Cyprus and New Zealand. This study will specifically focus on the Diplomat in South Africa in Durban distribution center. Here in South Africa, Diplomat Global has five distribution centers that are located in five provinces which are Gauteng (Pretoria and Johannesburg), KwaZulu Natal (Durban), Free State (Bloemfontein), Eastern Cape (Port Elizabeth) and Western Cape (Cape Town). Diplomat entered the South African market in 2010 as a Proctor and Gamble (P&G) business partner. This study has only focused specifically in Durban distribution center. However, some departments that were part of the study such as Finance, Demand Planning and Masta Data were located in the head office in Gauteng, Johannesburg. The researcher was able to reach them through telephone for interviews. Diplomat South Africa is servicing the informal market nationwide and provides coverage for some 33,000 distribution points through 4 distribution centers with total coverage of 19,000 pallets (Diplomat Group, 2019).

3.7 Sample and sample size

When conducting research many types of sampling are possible, although researchers in qualitative research usually focus on relatively small samples (Dawadi *et al*., 2021). Research participants are generally selected because they can provide rich descriptions of their experiences and are willing to articulate their experiences, thereby providing information that is rich and which will be able to challenge and enrich the researcher's understanding (Crabtree and Miller, 1992; Dawadi *et al*., 2021). The sampling method was a combination of judgment and snowball techniques. The researcher specifically selected participants (e.g. managers, supervisors and finance department) who would be able to contribute to the research topic and who would be

willing to share their experiences across supply chain departments (Marshall, 1996; Dawadi *et al*., 2021).

In qualitative research, the exact number of participants cannot be specified before the study is conducted. Marshall (1996) and McLeod (2002) stated that in qualitative research the number of participants is informed by the extent to which the research question has been addressed. When data reach a point of saturation, i.e. when new themes stop emerging, the researcher can conclude that there is no need for more interviews (Dawadi *et al*., 2021). The sample size refers to the number of elements to be included in the study (Sandelowski, 1995). Important factors that are considered in determining the sample size include the importance of the decision; the nature of the research; the number of variables; the nature of the analysis; sample sizes used in similar studies; completion rates; and resource constraints (Collins, Onwuegbuzie and Jiao, 2007; Dawadi *et al*., 2021). In this study, a semi-structured interview guide was used to illustrate key areas of each interview discussion to focus upon specific issues of interest that would inform the research questions.

The number of participants interviewed in this study was therefore not predetermined but was determined by the information gained during the various interviews. Interviews were conducted until the data reached an acceptable saturation point and the researcher judged that the research question could be answered adequately. In total, 16 interviews were conducted and it was found that by the 13th interview little new information was being gained. However, more questions were added to some departments to probe further and delve deeper to get more insight; and additional interviews were conducted to ensure that the saturation point had indeed been reached. The last interviews confirmed the information gained in previous interviews and thus demonstrated that the information gathered had reached a point of saturation. It was at this stage that the researcher decided to conclude the interviewing process and proceed to analysis.

The number of respondents was composed of 16 participants recruited within the organisation. Of the total number of participants, 13% of them were from the administration, 6% telesales order clerk's office, 19% credit control/finance department, 25% operations department, 6% Masta Data, 6% demand planner, 6% divisional managers,13% sales reps and 6% supervisors. Figure 3.3 below indicates that the department of administration, telesales order clerk's office, credit control/finance department, Masta Data, demand planning, operations, divisional

managers, sales reps, and supervisors comprised the population size of the 16 participants. The basis for the selection of employees within the Tier 3 category of the organisation was that these individuals were well-placed to answer the questions correctly. This is attributed to their job roles being situated within the departments which play a key role in the supply chain at DSA. The participants represent a combination of the lower, middle, and top-level management as well as non-managerial personnel such as sales reps.

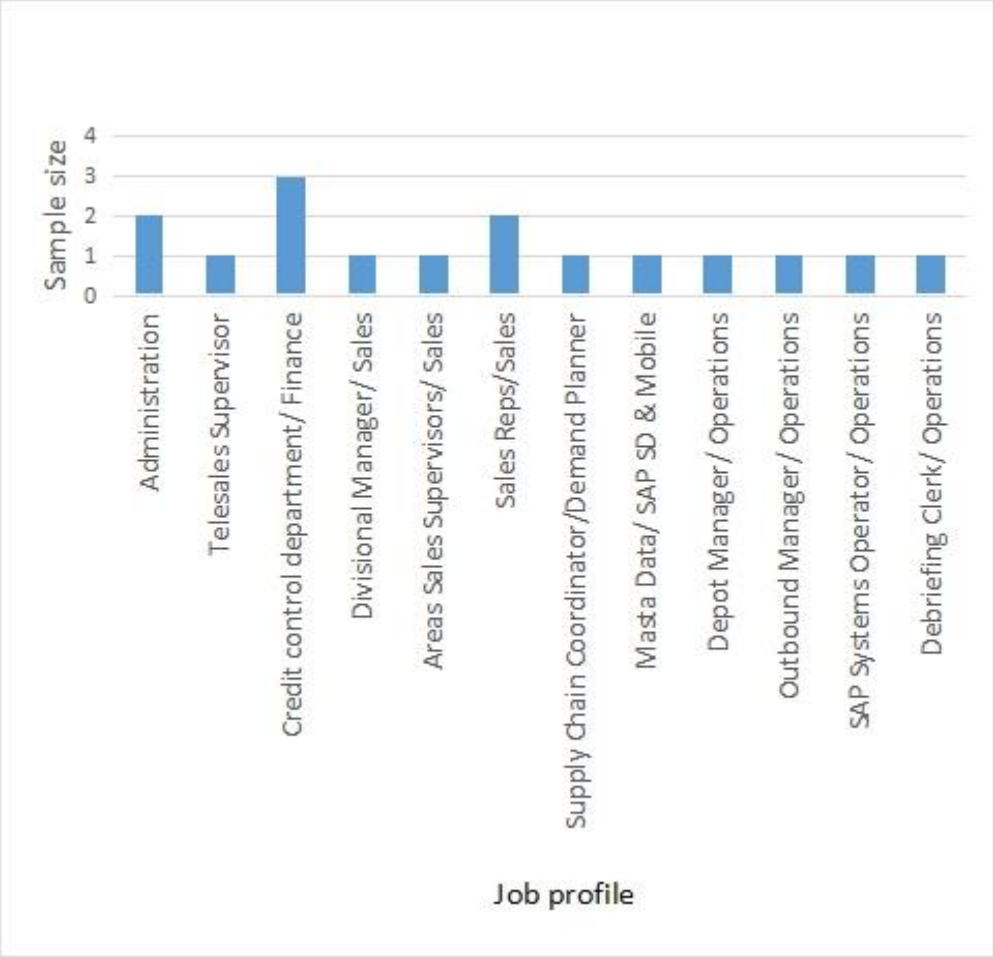

Figure 8: Population size by job profile.

3.8 Ethical considerations

Permission to conduct the study was obtained from all gatekeepers, including the DSA. Given the importance of ethics in conducting research and the challenges around conducting research, universities go to great lengths to protect the dignity and safety of research participants (Silverman, 2009; Parveen and Showkat, 2017). Permission was obtained through a letter of consent which was attached to each survey instrument. Furthermore, the University of KwaZulu-Natal requires that all personal data collected remain confidential and gathered data be submitted for storage in the university archives. A gatekeeper's letter was provided by the DSA director or executives who authorised access to information. The consent form that was used as a guideline for the research/consent process is attached in the Appendix section.

3.9 Data collection method

Qualitative research emphasises the importance of context in analysing data (Denzin and Lincoln, 2005; Dawadi *et al*., 2021). During the research process and especially during the data collection phase, the participants were able to decide on the venue for their interviews. Therefore, each participant was interviewed at a venue chosen by him/her and at the time that was convenient for them. The participants were interviewed at their place of work. Most of the participants indicated a preference for the interviews to take place at their place of work.

The interviews were conducted by the researcher and were all conducted in English, although there were times when participants would use their home language to express some idioms. However, these idioms did not have any impact on the data collected as this was carefully translated into context in accordance with the principle of grounded theory. Although most of the participants' home language was not English their command of the language was good due to their education and professional status. Conducting the interviews in English allowed the researcher to transcribe the interviews as presented by the participants without translating the interviews. This helped to identify areas of importance in the phenomena under investigation and it also acted as a means of developing rapport with the participants. The subsequent interviews with all participants focused on their personal experiences with the phenomena of managing and sharing information and also verified categories and concepts that emerged from the data. All interviews were conducted in the language the participants felt comfortable with. However, in

instances where the participants expressed themselves in a language other than English, this information was translated during the transcription stage.

During the interviews, the researcher treated all participants with respect. Given the researcher's background, it was easy for her to identify with the participants' responses although she guarded against imposing her view on the participants. The social location of the researcher and the participants in terms of their race, gender and social status played a pivotal role in shaping the research process (Parveen and Showkat, 2017). The researcher ensured that respondents express their views openly and willingly without any biased or pressure from the interviewer. Respondents were given opportunity to withdraw at any stage if they feel uncomfortable during the interview. Their freedom of expression in accordance with race, gender and social status were put into consideration during the interview to ensure that they were not made to feel uncomfortable or put in a compromised position. Their anonymity and confidentiality were guaranteed in the study.

Once the participants agreed to be interviewed, an appointment was made with each participant at a time convenient for the interviewer. The interviews took place at the participants' places of work. The background of the research was explained to the participants as well as the ethical considerations relating to participation. The researcher did not adopt an expert position and was transparent with the participants, which allowed them to talk easily about their experiences.

To collect data that was rich and diverse, the researcher utilised a semi-structured interview. Data was collected in two stages. In phase one, semi-structured, face-to-face in-depth interviews (Saunders, 2007; George, 2022) were conducted with all selected department's participants on a one to one basis (e.g. Administration, Telesales, Credit control/Finance, Masta Data, Divisional Manager, Areas Sales Supervisor, and Sales Reps). Considering the aims of this study, the different departments were chosen based on their experience in Tier 3, their ability to talk about information sharing in the organisation, and their availability and willingness to discuss these in an interview setting. These interviews were used to enrich the researcher's understanding of information sharing and its drivers (e.g. trust, commitment, cooperation, collaboration and communication) in the organisation.

A semi-structured interview guide was used to illustrate the key areas of each interview discussion to focus on specific issues of interest that would inform the research questions.

Informants were allowed to move freely between different topics without necessarily adhering to the order in which the topics appeared in the interview guide. The interviews were tape-recorded and transcribed verbatim immediately following each interview. The transcripts were shown to the interviewees to ensure their accuracy in terms of both content and language. An interview guide listed the major topic areas to be covered. Questions were open-ended to establish a conversation-like dialogue and enable the determination of what was most salient to the informant (Arnould and Wallendorf, 1994; George, 2022). Handwritten notes and memos were also utilised to provide backup information.

In phase two, a comparative case study approach was adopted, enabling the researcher to delve deeper into differences in factors affecting information sharing in the organisation-customers' relationships and to explore their link to company performance. Each selected focus group of employees (Administration, Telesales, Credit Control Department/Finance Department, Divisional Managers, Areas Sales Supervisor, and Sales Reps) was followed by focus group discussions which were scheduled at convenient times. The focus group discussions were conducted as follows:

i) Telesales Department - most orders are captured by them when an order is placed by the salespeople for capturing.

ii) Administrators – keeps customer documents such as new account applications and supporting documents and ensures they are captured correctly on the system.

iii) Credit Control Department – ensure customers are allocated credit limits accordingly, accounts are up to date, block outstanding ones and release orders on time for on time delivery, send order/account status report to all parties involved in the order processing.

iv) Demand Planner – Ensure they forecast stock accurately when they order from the supplier to avoid stock shortages.

v) Divisional Manager – Ensure all regions are meeting targets by ensuring that they get orders and getting them released on time so that they reach customers on their nominated delivery days.

vi) Areas Sales Supervisor – Liaise with various departments involved in the order processing to ensure orders are released on time, payments are made on time by customers, orders are processed and planned for delivery on time, and delivery schedule is sent by operations.

vii) Sales Reps; take orders from customers and capture them on the system for processing.

viii) Masta Data. Ensure account information is captured correctly and all products are properly listed and open for ordering, delivery addresses are accurate with geo-locations.

Each focus group lasted for approximately, 20-25 minutes.

The credit-control department was selected because it is responsible for releasing the orders once orders are captured, and deals loaded. The demand department was selected because they allocate the stock on the order on the system once the order is captured by the sales reps. The credit controller checks the status of the customer to see if there are no outstanding payments before releasing the goods. The finance department was selected because they are responsible for the authorisation of accounts for customers, whereas the operations department was included because it receives the final product of the order and plans for delivery. Masta Data was included because they sort out IT or mobile related issues that the reps might have with orders on the system while trying to capture the order e.g. an order number not generated or the device itself having issues.

3.9.1 Interviews

Due to the magnitude of the study, there was a need to collect as much significant data as possible from the selected sample of the company, to accomplish a deeper understanding of the internal factors hindering information sharing at DSA.

It had been decided to use semi-structured interviewing to collect primary data. Unlike an unstructured interview where the researcher might start the conversation with a question and then actively listen to the respondent who talks freely, a semi-structured interview follows a checklist of issues and questions that the researcher wishes to cover during the session (Bryman and Bell, 2007; George, 2022). Semi-structured interviews were chosen as the method in this study essentially due to the aim of encouraging the interviewees to discuss their own opinion freely on what was hampering the supply chain of their firms. This method with open-ended questions allows the adjustment of questions depending on the attributes of the specific department and the given type of problems that they face. According to George (2022), the semi-structured interview

is neither a free conversation nor a highly structured questionnaire. Semi-structured interviews provide the opportunity to regulate the order of the questions and the respondents can expand their ideas and speak in great detail about diverse subjects, rather than relying only on concepts and questions defined in advance of the interview. In other words, semi-structured interviews are more flexible than standardised methods such as a structured interviews.

Semi-structured interviews are rather organised in terms of what issues are discussed during the interview but the follow-up questions depend on the opinions of the interviewer. Another problem that can occur is misunderstandings and misinterpretations of words. This could be a problem within this research in particular, since interviews had been conducted in English which is not the mother tongue of either the respondents nor the interviewers. However, to increase the reliability of the answers, all interviews were recorded. Subsequently, transcribed material was sent to the respondents, statements were amended according to the respondents´ comments and finally, the material was approved by the interviewees.

3.9.2 Justification for using interviews

Interviews are valuable tools for collecting data in qualitative research (Potter, 1997; Dawadi *et al*., 2021). A one-on-one interview method allows the researcher to interact with the participants and to observe non-verbal cues during the interview process. In this study, a semi-structured interview method was used to allow for an open, in-depth discussion of the research topic. George (2022) argues that the semi-structured interview is neither a free conversation nor a highly structured questionnaire.

By choosing interviews as a method of data collection, the researcher hoped to gain a deeper understanding of the participants' constructions through dialogue and through the language they used in constructing the different discourses. The interview method allows the researcher to seek clarity and probe for deeper understanding. As a result, the reporting and analysis of data are reflective of the views of the participants.

3.10 Data Quality Control

3.10.1 Trustworthiness and credibility of data in qualitative research

The two concepts of trustworthiness and credibility of data are very important to take into consideration when carrying out qualitative research since they help to determine the objectivity of the research. Trustworthiness and credibility could be seen as two different measurement instruments that illustrate the level of trustworthiness and credibility of the research.

Qualitative research has been criticized for lacking the rigour and credibility associated with traditional quantitative research (Horsburgh, 2003; Dawadi *et al*., 2021). With quantitative research, the emphasis is on the accuracy of data and the extent to which data can be generalised. According to Denzin and Lincoln (2005), quantitative research concerns itself with the extent to which results are consistent over time (reliability) and whether the research truly measures that which it was intended to measure (validity). Qualitative research disputes the idea of the generalisability of results and argues that meaning is historically situated and therefore no two people can experience the same problem in the same way. With qualitative research there is a multiplicity of information and results can thus not be generalised across different contexts (Denzin and Lincoln, 2005; Dawadi *et al*., 2021).

3.10.2 Validity

Validity in qualitative research can also be seen in the extent to which the researcher provides sufficient detail to enable the reader to interpret the meaning and context of what is presented (Popay *et al*., 1998; Dawadi *et al*., 2021). Validation is thus dependent on the transparency with which the data collection and analysis procedures are presented. Similarly, Koch (1994) argues that the trustworthiness of the research process can be determined by the extent to which the research provides information and the process by which the end product has been reached. The discussion of data collection, research methodology and data analysis processes outlined in this chapter is in keeping with this hallmark of ensuring validity during the research process.

One of the hallmarks described by Horsburgh (2003) and Popay *et al*. (1998), validity is the interpretation of subjective meaning, which refers to the process of using the participants'

accounts to analyse and interpret data. These two authors further suggest that good qualitative research should include a description of context, which refers to the need to describe the social context within which the research was conducted to provide the reader with an understanding of the context in which the study was conducted. The next part outlines reliability in qualitative research, specifically concerning this research study.

Validity is a construct usually associated with quantitative research methods and measures the extent to which the theories or explanations derived from the research data are true and correctly capture the phenomenon under investigation (Gibbs, 2002; Dawadi *et al*., 2021). In qualitative research, validity is determined by the extent to which the data obtained from the participants have been consistently checked to a point where the data analysis process becomes self-correcting (Gibbs, 2002; Schurink, Schurink and Poggenpoel, 1998; Dawadi *et al*., 2021) and the researcher can "identify when to continue, stop or modify the research process" (Morse, Barret, Mayan, Olson and Spiers, 2002). In this research process, the researcher and the promoter of the researcher were on the lookout throughout the process for any evidence that the data obtained became repetitive or irrelevant relative to the research question. This process helped the researcher to determine when to stop or continue with the data collection, literature review and data analysis.

Qualitative research focuses on understanding the phenomenon under investigation and in doing so, the analysis aims at ensuring that the research findings capture what the participants say or what is happening. Validity in this regard is measured by the extent to which the analysis reflects what was said by the participants. This understanding of validity is in keeping with the theoretical framework for this study (social constructionism), which does not aim to seek an ultimate truth but rather focuses on identifying the constructions by the participants concerning the discourse under investigation.

Burns and Grove (2009) noted that in qualitative research, stability is also used as an indication of validity. Stability in qualitative research refers to the trustworthiness of data and is concerned

with whether the observations are repeatable during the data collection process (Gibbs, 2002; Dawadi *et al*., 2021). To ensure that data is stable, it is important to reflect continuously on the objectives of the study, and to ensure that the participants are guided to remain within the domain of the study. Also, during the analysis phase is it important to remain within the scope of the study. The stability of the findings is concerned with the degree to which the findings respond to the focus of the inquiry and not the biases of the scholar (Babbie and Mouton, 2001; Dawadi *et al*., 2021).

Consistency in the answers received from different participants enabled the researcher to compare the extent of stability in the findings. Stability is also measured by the extent of the researcher's level of empathy and the extent to which the researcher reflects on her/his understanding of the issues of the participants (Gibbs, 2002; Dawadi *et al*., 2021). The social constructionist paradigm maintains that the researcher is a key instrument in the construction of meaning. By reflecting on her understanding of what the participants said, the researcher was able to confirm or negate the meanings derived from the conversation.

In qualitative research, the context in which behaviour is understood and interpreted is crucial. The context includes the researcher's viewpoints on the subject matter and how the research procedure itself affected and was impacted on by the researcher. The next part outlines reliability in qualitative research, specifically concerning this research study.

In quantitative research, reliability measures the extent to which the research findings remains consistent across repeated investigations in different circumstances with different investigators and the extent to which such findings are generalisable (Gibbs, 2002; Dawadi *et al*., 2021). This study adopted a qualitative methodology with social constructionism as a theoretical framework. Social constructionism argues that there are multiple realities and that people construct discourses differently at different times. As a result, data cannot remain consistent across repeated investigations with different participants.

Confirmability refers to the degree of neutrality in the study's findings by addressing the researchers' influences and biasness on the study (Rule and John, 2011; Dawadi *et al*., 2021). This is achieved by confirming that the findings of the study are not just the researcher's figments of imagination. To achieve confirmability the researcher systematically demonstrated that the results gathered from this study were linked to the conclusions. Confirmability was achieved by keeping records of transcripts, consent forms and field notes that serve as evidence (Rule and John, 2011).

According to Rule and John (2011), dependability focuses on the methodological rigour and coherence towards generating findings that the research community can accept with confidence. Dependability is therefore the quality of the process of integration that takes place between the data generation methods, data analysis and the theory generated from the data (Plooy-Cilliers, Davis and Bezuidenhout, 2014). For this study to be dependable a detailed and accurate account of the research methodology was given, to allow the reader to assess the extent to which proper research practices have been followed.

3.11 Data analysis

Mouton and Marais (1988) describe data analysis as the process whereby a phenomenon is broken down into its constituent parts for it to be understood better. The software that was utilised is the NVIVO, a qualitative data analysis (QDA) computer software package produced by QSR International (Richardson, 1999). Richardson (1999) developed this software to assist researchers in handling and managing complex non-numerical data. To describe the sample composition, the researcher also utilised Microsoft Excel. This software was useful in handling quantitative data such as demographics.

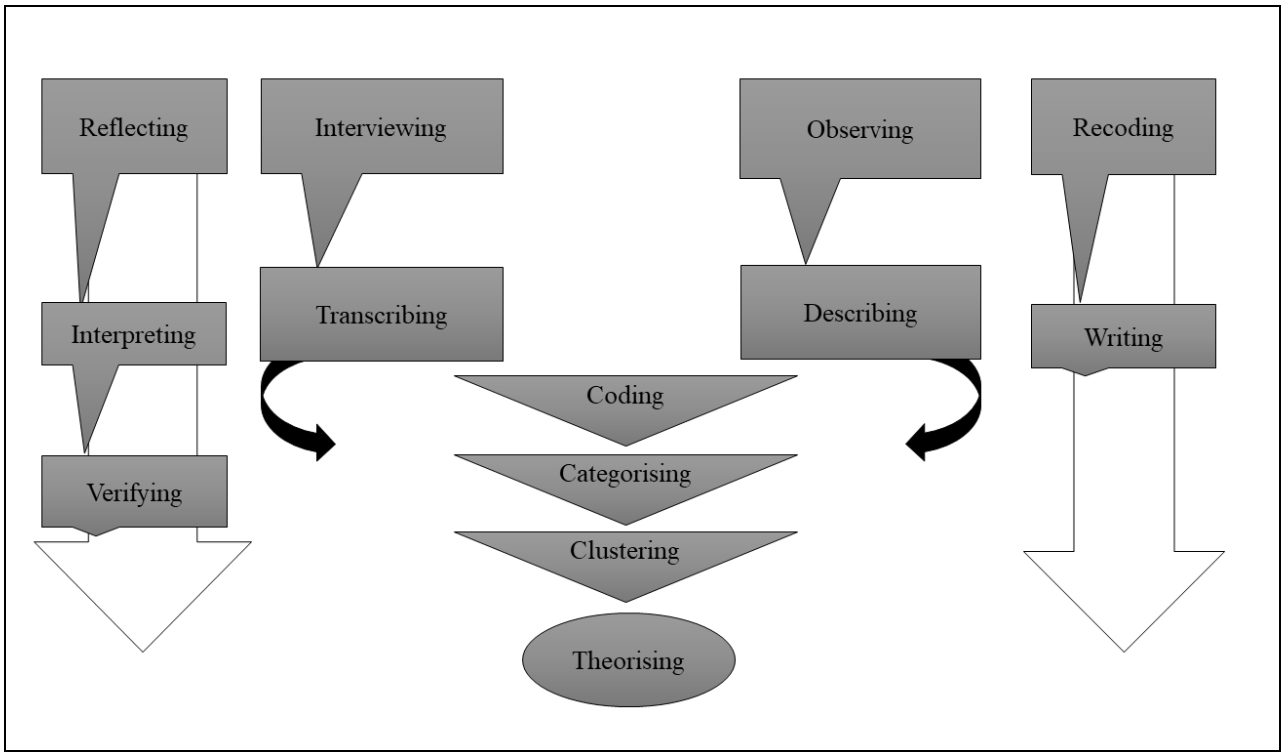

Figure 9: Flow model component of editing style. Author's compilation adopted from Pope and Mays (1995: 42-45).

The data were analysed using the editing style as shown in the flow model of the qualitative data analysis component in Figure 9. This means that analysis begins at the same time as data collection. According to Crabtree and Miller (1992), the editing style of data analysis is an appropriate approach when analysing data for developing grounded theory. The guidelines that were followed were extracted from Pope and Mays (1995), Tesch (1990) and Wilson and Hutchinson (1991).

3.11.1 Process of analysis

The recorded interviews were transcribed verbatim by the researcher and a written text was created for each interview. The identity of the participants was removed from the transcripts to maintain their confidentiality and pseudonyms were assigned to participants to protect their identity while providing information relating to their backgrounds. To allow the researcher to become familiar with the data as quickly as possible, the recorded interviews were transcribed within 72 hours of being conducted. In a case where there were idioms, the interviewer would

ask the respondents to elaborate further to ensure that the meaning is not lost during the transcription of data.

The analysis was a continuous process in which the protocols were read over time and a deeper level of analysis was reached each time. As a result, the data analysis and the literature review occurred in tandem. While the literature review guided the researcher in observing certain aspects of the topic under investigation during the analysis phase, the process of data analysis also informed the relevant literature that needed to be reviewed. The analysis was completed in two phases and each phase is outlined in the sections below, as in Miles and Huberman (1994).

In phase one, the researcher read through the collected data to get an overall sense of the data and to get a feel for the different participants' frameworks. While reading the individual protocols the researcher made note of how the participants constructed the meaning of the concepts that were being investigated. Each of the individual protocols was read several times to ensure that the constructions of the concepts were fully documented by the researcher and to ensure that no new interpretations emerged from each successive re-reading. The individual protocols were, therefore, read and re-read until the researcher was convinced that there was no evidence of any new trends or interpretations from the text. During the initial analysis of the different protocols, the researcher also noted similarities in terms of how the participants constructed ideas and attached meaning to their constructions.

Then the researcher first reduced the data from interview transcripts by extracting information relevant to the research questions. In-vivo codes (such as "who has the control of the organisation" and "best image in the organisation") were then allocated to segments of text that were relevant to the issues under investigation. These were grouped into first-order concepts based on similarities between them (such as "customer and management leadership in the firm", "organisational culture"). Where available, the researcher adapted their labelling to match more common literature-based terminology (Nemkova, Souchon and Hughes, 2012).

The researcher read every piece of data as it came, line by line and paragraph by paragraph identifying words or statements made by the participants about their experience of the phenomena of the management of information sharing in order processing. Wilson and Hutchinson (1991) calls this process substantive coding, while Glaser and Strauss (1967) refer to the same process as concept specification. Substantive codes are used to describe dimensions, properties, and consequences of the phenomena under study.

In phase two (comparative case study), the first step of the data analysis involved compiling separate case studies for each sector. Once the data were reduced for each casing segment, extracting information relevant to the research questions, in-vivo codes (such as “factors with contracts”, “history building”, “achieved information”, “handling orders”, “information broadcast”, “information sharing”, “information access”, “order problems”) were allocated to segments of text that were relevant to the issues under investigation. These codes were grouped into first-order concepts based on similarities between them. With the help of NVIVO software, the researcher coded every statement as she read the text over and over, line by line. Every piece of data was coded as free nodes. The free nodes looked like a shopping list of words or phrases used by participants to describe the phenomena of information sharing. Later, the free nodes were joined to form tree nodes. Tree nodes started showing some relationships between the words or phrases used by the participants. Tree nodes were also linked together according to the relationships they had. The linked tree nodes formed parent nodes and the parent nodes when linked according to their relationships, formed grandparents. It was from the grandparent nodes that the themes for this study were developed.

The researcher joined the substantive codes together according to their relationships to form categories that were related. The substantive codes, in this case, were the free nodes. When free nodes were joined together, they formed the tree nodes. This was the second level of coding called selective coding (Wilson and Hutchinson, 1991). The third level of coding is called theoretical coding. Theoretical codes were developed from the researcher's interpretation of the data using the selective codes, memos, and field notes to discover the main storyline or a basic social process in the phenomenon of information sharing.

The researcher utilised theoretical sampling to fill the gaps which develop in the emerging categories and concepts. This called for the rephrasing of questions to validate responses and even moving from one setting to another to find different participants. The researcher went back and forth into the data verifying them with the participants, carefully reading and analysing them until all categories were fully developed and the relationships between categories and their properties were identified. The theory which was grounded on the data was developed through the use of both inductive and deductive modes of reasoning (Cheniz and Swanson, 1986).

3.12 Conclusion

This chapter outlined how the research was conducted, illustrating the process used to select the participants, the method used to collect data as well as the approach that was used in analysing the texts. This study aimed to understand the supply chain sector and factors that have affected information sharing in the order processing system at DSA, thereby illustrating one way in which the concepts under investigation are constructed by a group of departments in the same context. The next chapter details the analysis process and describes the findings of the research.

CHAPTER 4

ANALYSIS AND PRESENTATION OF RESULTS

4.1 Introduction

The research methodology was explained in the previous chapter. This involved the in-depth description of the study design, method of sampling, and data collection strategies. This chapter comprises of the data collation and evaluation. The findings of the present study incorporate the interpretation of semi-structured interviews with participants who met the inclusion criteria from the sales, finance, operations and Masta Data departments of DSA.

The objectives of the study were:

- To investigate the state of digital integration in the supply chain management system at DSA, focusing on internal processes;
- To evaluate the state of the current supply chain management on customer relationship management at DSA;
- To determine the state of information sharing and cross functional relationships among departments at DSA;
- To propose improvement strategies for the management of information sharing in the order processing system at DSA in order to create functional relationships among departments at DSA.

4.2 Biographical Information of Sales Department

Out of 16 participants they were seven participants' from the sales department. The seven participants' demographic information is indicated in Figures 10-13 of sales department.

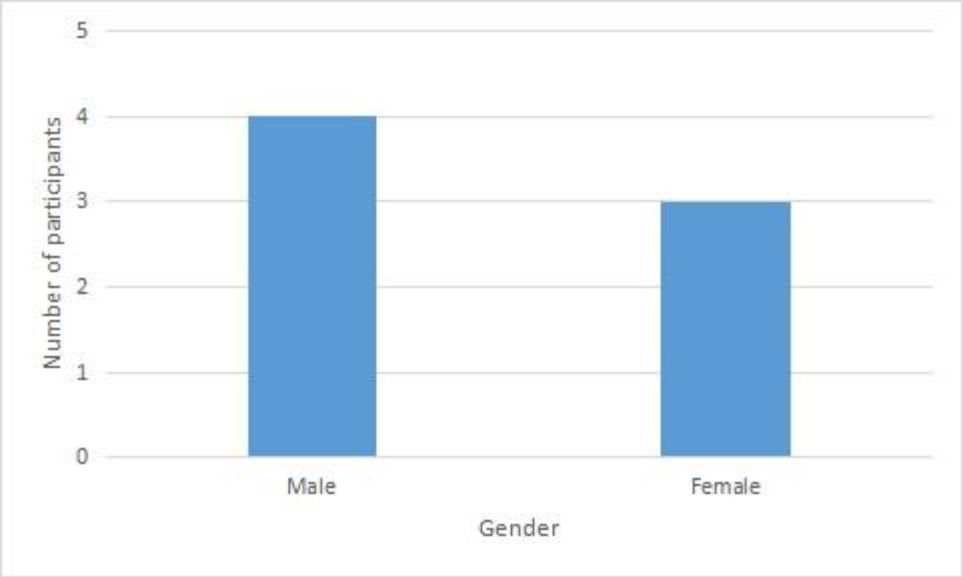

Figure 10: Gender of participants for the Sales Department.

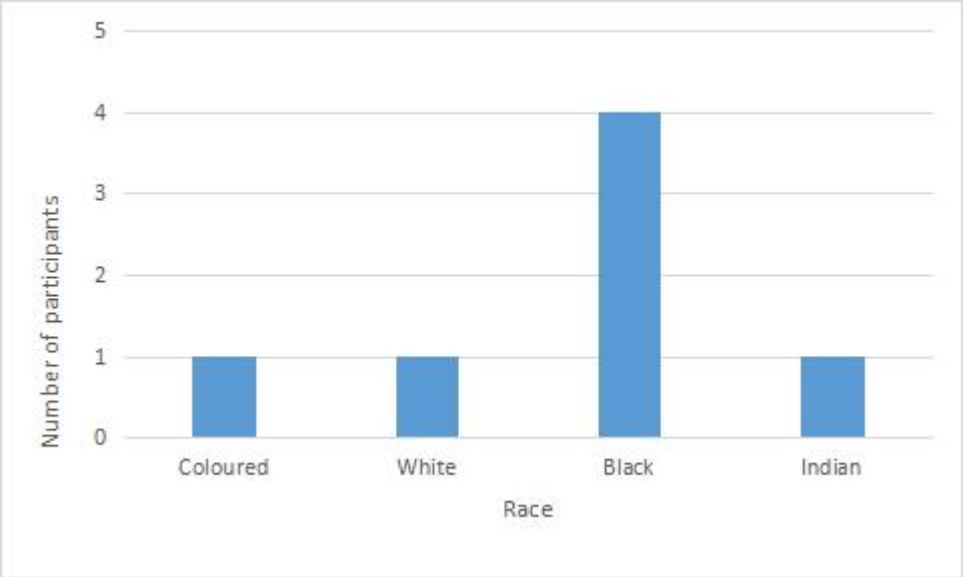

Figure 11: Race of participants for the Sales Department.

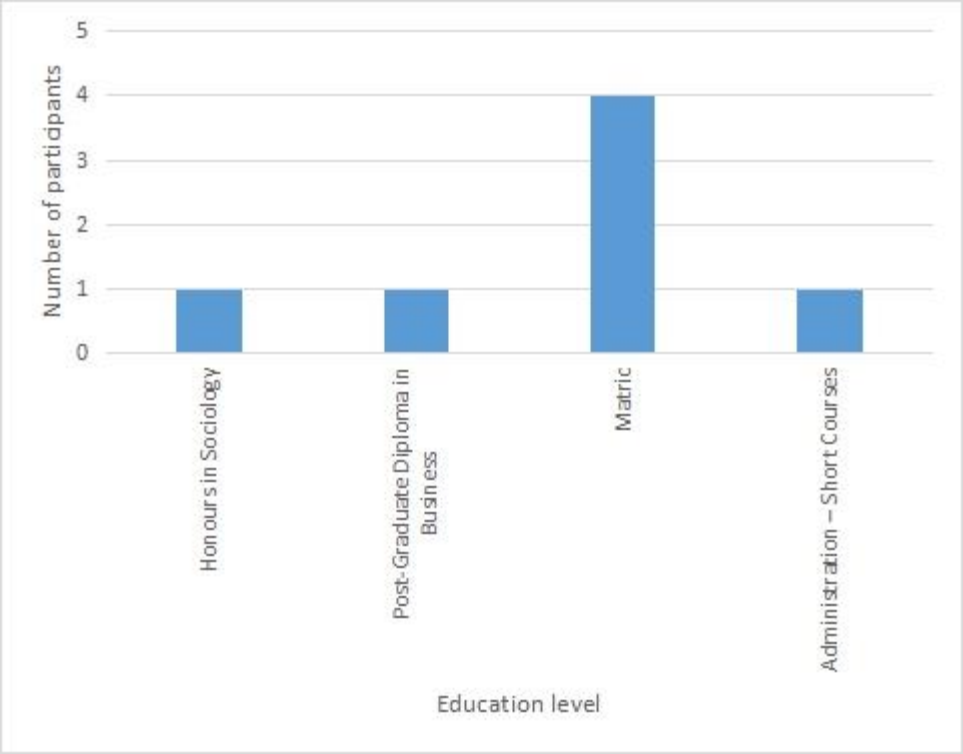

Figure 12: Education level of participants for the Sales Department.

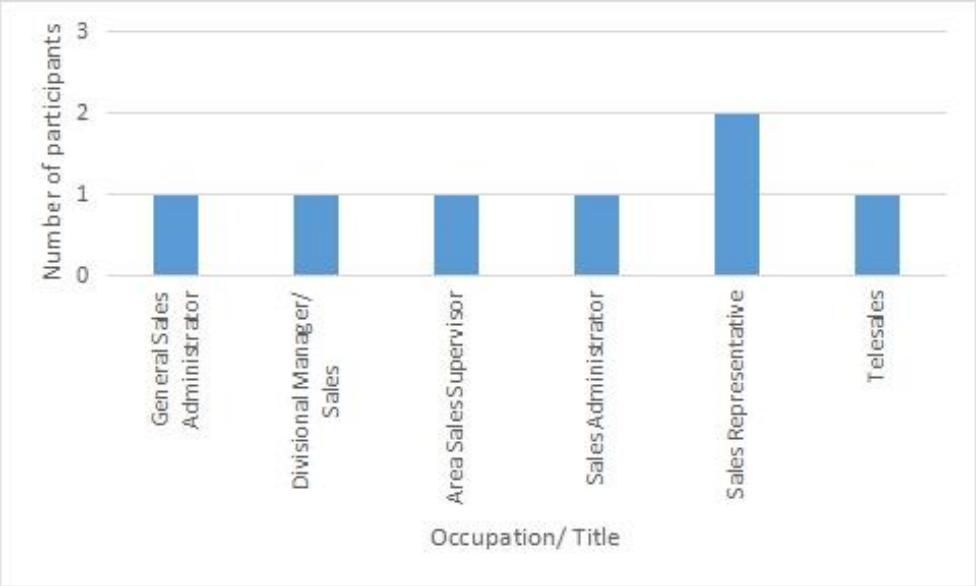

Figure 13: Occupation/ Title of participants for the Sales Department.

4.2.1 Order Processing

Six out of seven of the participants (86%) stated that they were directly involved in processing of any T3 orders on the system (e.g. loading of discounts, capturing the orders, allocating stock, blocking and releasing of orders, planning, picking).

Only 1/7 was not involved in the order processing.

> Interviewee 1 stated: "*No, I just open up the accounts*" (Interviewee 1).

When the participants were asked about order processing they stated that they just open up the accounts because they are not directly involved in the processing of the order. Some participants are involved in the opening of the new accounts which is not related to the order processing. That might be the confusion and lack of transparency from other departments as to who perform certain functions as far as the order processing is concerned. Although finance is involved in the loading of the discounts in the order, however, there is still that lack of transparency within the processing of the order as some members at finance are only dealing with opening of new accounts.

4.2.2 Individual Factors Affecting their Tasks: Challenges in Communication

All participants (7/7) within the sales department outlined that they promptly performed their designated tasks. In addition, their tasks were subject to various factors of which most participants have expressed that they have challenges in performing their tasks when processing orders.

> Interviewee 2 identified: "*yes there are challenges now and again, if the order is not pulling through correctly or they could be pricing issues, normally it's not that bad. But we do find challenges from time to time with stock issues and pricing*" (Interviewee 2).

> Interviewee 3 agreed: "*there are a lot of challenges as far as my job in terms of ordering is concerned. Sometimes the pricing is the biggest issue where there is a certain percentage to load as deals and I send for loading and when the order comes it shows a*

different pricing than initially communicated and at that time I have already discussed and closed the deal with the customer" (Interviewee 3).

Interviewee 5 emphasised: "*Yes the challenges are with the stock issues, you are with the customer capturing the order and stock is available up until it gets released, the stock somehow disappears or moved over to different customer. Other challenge is with Ops department whereby it's already been assigned to order well for delivery the following day however the customer does not get stock and you have to hear that from the customer, when you go back to Operations they tell you that they had too many deliveries for the day so it will go out the following week. The other challenge is finance, it's always a challenge for them to release, on their side it's showing outstanding payment whereas the customer has made payment. Sometimes customer pays upfront, and finance does not want to release citing nonpayment. We try to get finance involved but they always cover each other and the customer suffers in that process*" (Interviewee 5).

Interviewee 6 detailed: "*yes, especially if I don't have all the information, especially if there is no specification of pack sizes and product codes, so I have to follow up with the rep and at times rep is unreachable. With the system, there are no issues if you have the correct information so what you put in, you get out. If you duplicate the product, it notifies you. It also notifies you if the order number already exists*" (Interviewee 6).

Interviewee 7 elaborated: "*if we can have zero capturing so that you knowingly capture the stock knowing there is no stock so that you can communicated that to the customer rather that to tell customer that stock is coming whereas there is no stock. That order can then be put on open orders to wait for stock to come*" (Interviewee 7).

The majority of participants have stated that they have challenges in communication with various departments regarding the processing of the order. Some have suggested that it might be easier if they are notified early if they are changes in the order processing or if there are functions in the order processing that were not performed such as loading of discounts or allocating of stocks.

Participants believe that will eliminates challenges of order processing as they will be communicated on time about the status of the order as it moves in the order processing system.

4.2.3 Proposed Improvement strategies

Participants within the Sales Department also had a variety of possible solutions to improve the difficulties they were experiencing.

> Interviewee 2 proposes: "*I think what needs to be done is that certain procedures need to be put in place so that sales team know exactly what to do, for example if the deals are not loaded on time, we need to make sure that when deals are loaded that it's done properly and tested and everything is 100% in order to eliminate that challenge. With stock constraints it's a bit different because we rely on our forecasting team in ops and demand so we don't have a lot of control over that as a sales team but as a company or whoever is in charge of that division needs to do their best to eliminate those challenges that we have with stock*" (Interviewee 2).
>
> Interviewee 4 suggested: "*Demand needs to get proper forecasting for T3, instead of forecasting for 6 months, they need to forecast for 12 month*" (Interviewee 4).
>
> Interviewee 5 advises: "*Ops needs to phone us or customer care to communicate if the order will not be going out for whatever reason, we have to hear from the customer that stock was not delivered. Finance must also change the process of opening accounts because some documents needed are irrelevant for certain types of accounts such as Cash on Delivery (COD), for example some customers do not have bank accounts hence they choose COD but finance would go on and require bank statement from the customer to open the account*" (Interviewee 5).
>
> Interviewee 6 specified: "*I think the best way is that the rep should provide accurate information especially SAP code and product codes. Also, if the new products could be listed as soon as possible, it's a challenge if we want to capture and the product is not listed, furthermore when you ask for that product to be listed, it takes some time before it*

reflects on the system. So, if it can be listed way before, it would help the process to be quicker. Deals also need to be loaded on time" (Interviewee 6).

The sales department has suggested various improvement strategic solutions to eliminate the challenges in the order processing. For instance, some of the participants have proposed longer period of forecasting from a period of six to twelve months. Others have suggested the efficient use of customer care call center to improve commination and information sharing regarding order processing. Furthermore, there is also a need for accurate information regarding the products such as product codes and SAP codes to eliminate delays in the order processing. Overall, most participants feel that there is a serious need of transparency improvements amongst the departments involved in the order processing.

4.2.4 Interdepartmental Communication

When asked about whether interdepartmental communication occurred, only 2/7 agreed.

Interviewee 2 affirmed: "*there is some sort of communication and collaboration but it could always be better, but from where we were to where we are now, there is definitely a big difference but definitely there is a big room for improvement as far a communication is concerned amongst departments*" (Interviewee 2).

Conversely, Interviewee 3 disagreed: "*no there is no cooperation and collaborating, sometimes you have to phone ops and ask for a favor if your order can be delivered and planned. I do not think they understand and prioritise T3. Finance also does not communicate at all, no information sharing whatsoever*" (Interviewee 3).

Interviewee 4 supported Interviewee 3 and stated: "*I would say no, because if ops finds out that there is no stock, they don't communicate they just continue with their job*" (Interviewee 4).

The interdepartmental communication and collaboration seems to be a big issue amongst the departments. For instance, some participants have stated that there is partial improvement in communication, however, there is still a huge gap in collaboration among the departments that needs to closed.

4.2.5 Overall Performance and Productivity

Participants were questioned about how the performance and productivity of DSA was affected by the challenges that were previously described. Their responses focused on these challenges being detrimental and having adverse impacts on productivity.

> Interviewee 2 recommended: "*all these challenges would have impact on our gross sales and productivity because it gets measured from revenue generated per head, so if there is less revenue generated obviously productivity goes down*" (Interviewee 2).

> Interviewee 4 warned: "*it will ultimately affect the company in a long run and people will lose their jobs*" (Interviewee 4).

> Interviewee 7 indicated: "*It affects my sales because of missed deliveries"* and believes that it can be corrected, proof of payment should be treated as valid instead of waiting for the money to reflect which delays the order on the system. *"Auto releases should be reinstated as well because most of the times as a sales rep I am on the road driving and there is not enough time to stop and send request emails for order releases. The other reason is that with requesting releases I have to wait for SAP numbers which also takes time and sometimes the area I am working on does not have signal so I might end up getting SAP number way too late whereas if the order gets auto released, I don't have worry about SAP numbers*" (Interviewee 7).

Some participants from the sales department were concerned about the turnaround time of the order processing due to the processes followed by other departments such as Finance in processing of the orders in the system. For example, the finance does not consider proof of payment as valid unless they have seen the reflection of the money deposited in their bank account. This is the main thing that delays the process of order processing and might even affects the delivery day of the customers' delivery.

4.2.6 Capturing of orders

Four participants used Appesterix for capturing orders.

> Interviewee 3 stated: "*works fine but still a room for improvement, if they can have a zero stock capture, if they can open that option for us, it could be great because we feel disadvantaged compared to T.*" (Interviewee 3).
>
> Interviewee 7 described Appesterix as having the ability to "*synchronise, select store, open it and start the call and start capturing orders per vendor, one vendor at a time. Once done. Close call and synchronise and wait for SAP numbers*" (Interviewee 7).

Participants were asked to describe the effectiveness of the system.

> Interviewee 3 outlined: "*yes it does perform accordingly but sometimes it gives wrong figures so you have to double check for yourself*" (Interviewee 3).
>
> Interviewee 7 agreed: "*yes because it's a live system, however it is only live if you synchronise it, if only they can have an open order option that communicates that there is no stock but still be able to capture that order that is going to stay on the system to wait for stock*" (Interviewee 7).

With regard to the capturing of orders, participants from the T3 sales department have suggested an improvement in the functions performed by Appesterix. That function would be able to notify the rep whether there is stock or not while they are busy capturing the order. It will also allow them to capture the order even if there is no stock and then reserve it for when the stock becomes available.

4.3 Biographical Information of Finance Department

The three participants demographic information is indicated in Figures 14 – 17.

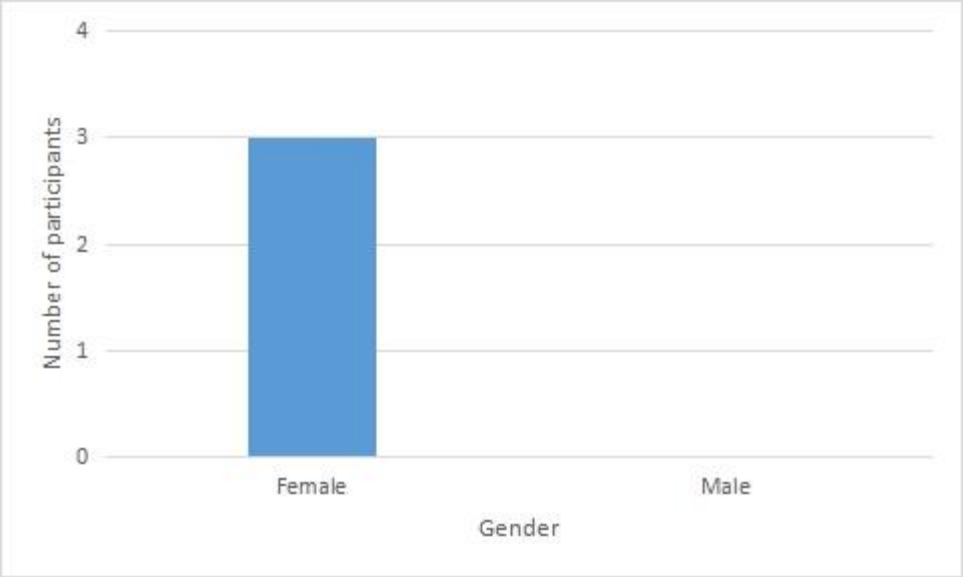

Figure 14: Gender of participants for the Finance Department.

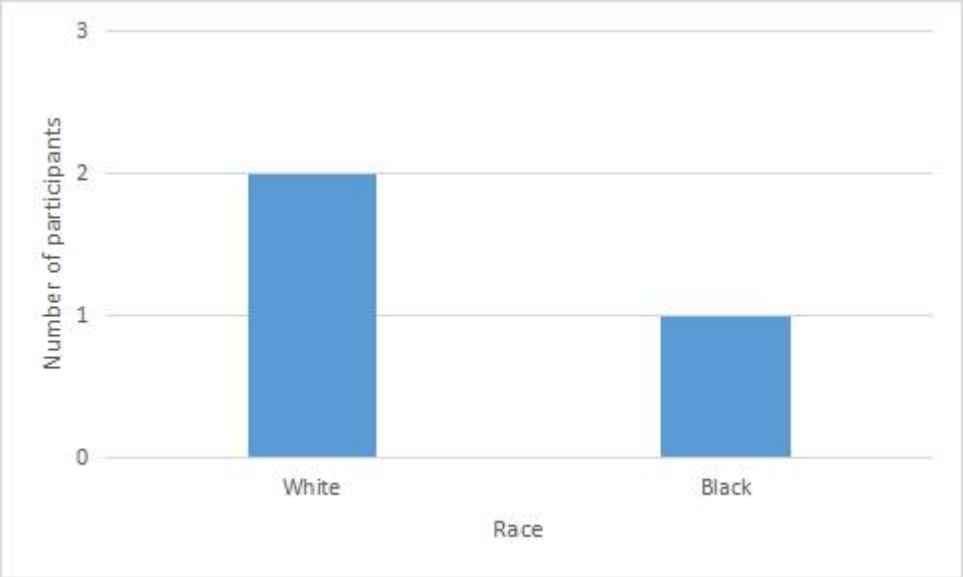

Figure 15: Race of participants for the Finance Department.

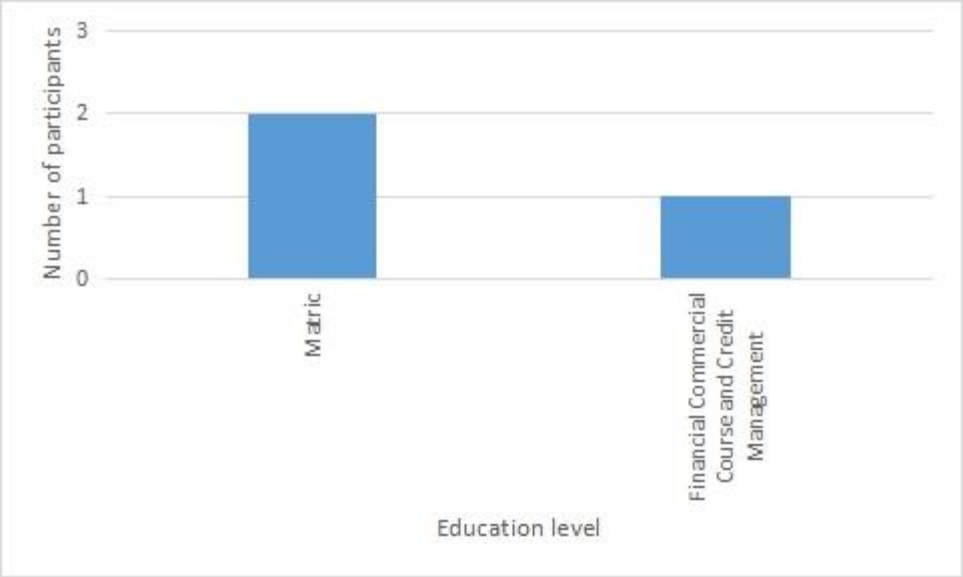

Figure 16: Education level of participants for the Finance Department.

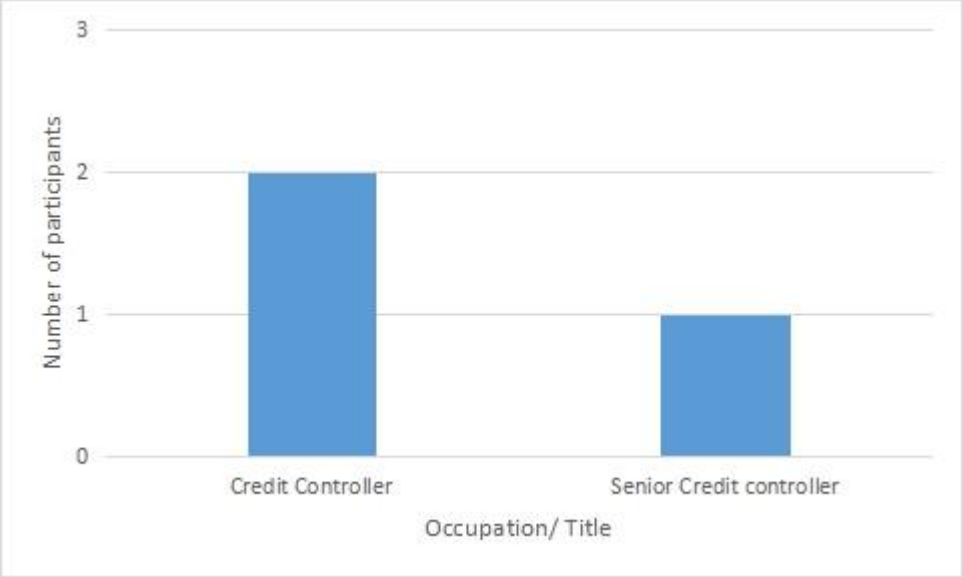

Figure 17: Occupation/ Title of participants for the Finance Department.

4.3.1 Authorisation

Various responses were noted among all (3/3) participants of the finance department when asked if they required authorisation.

> Interviewee 8 said: "*there are plenty of times that I need authorisation, so we have a process that we work according to, so if a request comes and it's out of line of the process then I need authorisation. An example of that would be when a COD customer or a new customer asks for their first order to be released provided the payment would be done before the stock is offloaded at the customer's place*" (Interviewee 8).
>
> Interviewee 9 admitted: "*mostly I use my own discretion to perform certain functions because I know my customers and have a relationship with them*" (Interviewee 9).
>
> While Interviewee 10 explained: "*yes, I can make some decisions on my own but if the value is too high or is an emergency in a sense that the customer has paid but not reflecting on the system yet, I need to get authorisation to release that order. But smaller amounts I can use my own discretion to action whatever function*" (Interviewee 10).

Most participants' responses have mentioned that they do not often need authorisation in performing certain functions in the processing of the order such as the release of orders before payment is made or before the payment is reflected in the bank account. However, they are instances where they need authorisation to perform certain functions, for example, if the amount of the order is too high e.g. over half a million order. This is because this can pose a serious high in case the customer does not pay the amount of the order as promised.

4.3.2 Individual Factors Affecting their Tasks: Follow Up

Two out of the three participants (66%) linked their issues/glitches/challenges in carrying out their functions in the order on the system, to awaiting the relevant authorisation.

> Interviewee 8 emphasised: "*I would say now and again when I cannot get hold of someone to authorise something then it's just a constant follow up process but there is a second or third person that can assist. Now and again, I think when I have to do something that is not according to the process and I need authorisation*" (Interviewee 8).

The remaining participant (33%) linked their issue to having to follow-up.

> Interviewee 9 considered: "*T3 stores are really a pain, because I have to follow up and their phones aren't working*" (Interviewee 9).

Most participants have emphasised the follow up of a key person responsible for authorising certain key functions in the order for them to be able to perform those functions in the order while it is on the system. This eliminates further delays in the processing of the order.

4.3.3 Key Strategies for Improvement

Participants were then questioned about what they thought were suitable strategies to overcome those challenges. The answers were diverse with one participant being uncertain, one believing in improving interdepartmental collaboration and the final participant recommending augmented training.

> Interviewee 8 revealed: "*I wish I knew; we've been trying different systems since I started with DSA, I wish they could just find a system that really works for everybody*" (Interviewee 8).

> Interviewee 9 advocated: "*if finance and sales departments' management can work together and find common ground*" (Interviewee 9).

Interviewee 10 expressed: "*proper training for everyone and that everyone should know what their role is, for example I know that in Durban, there is a truck that goes out once a week to midlands if you miss that delivery that stock is only going to go next week. I think from the start everyone should know that delivery is once a week and therefore push the order through, there is always time to block the order if the customer didn't pay. Everyone needs to make sure there is enough stock and payment done on time to prevent customers from missing deliveries*" (Interviewee 10).

The participants have suggested that there should be proper training to upskill the employees to be familiar with the order processing system at DSA. There is also a need for collaboration especially between the finance and sales departments.

4.3.4 Interdepartmental Communication

Participant responses differed when asked whether collaborative efforts exist between their department and other departments working on the same order on the system. The responses ranged from yes to no to highlighting COVID-19 as a disturbance.

Interviewee 8 supported: "*Yes I think so because the sales, warehouse and finance work with the same order and it flows through the departments, so I would say we share information*" (Interviewee 8).

Interviewee 9 disagreed: "*there is no collaboration because finance follow their own SOP* [standard operating procedure] *and sales department is also following their SOP*" (Interviewee 9).

Interviewee 10 clarified: "*the challenge we have at the moment is COVID-19 and that most people are already at home and we have to rely on email, we don't have all the contact numbers so we have to wait for responses via email*" (Interviewee 10).

With regards to collaboration, the participants differed because of the challenges that came with COVID-19. Participants had different views as some have said yes and some said no, when there were asked about the collaboration and information sharing.

4.4 Biographical Information of Operations Department

The five participants' demographic information is indicated in Figures 18 – 21.

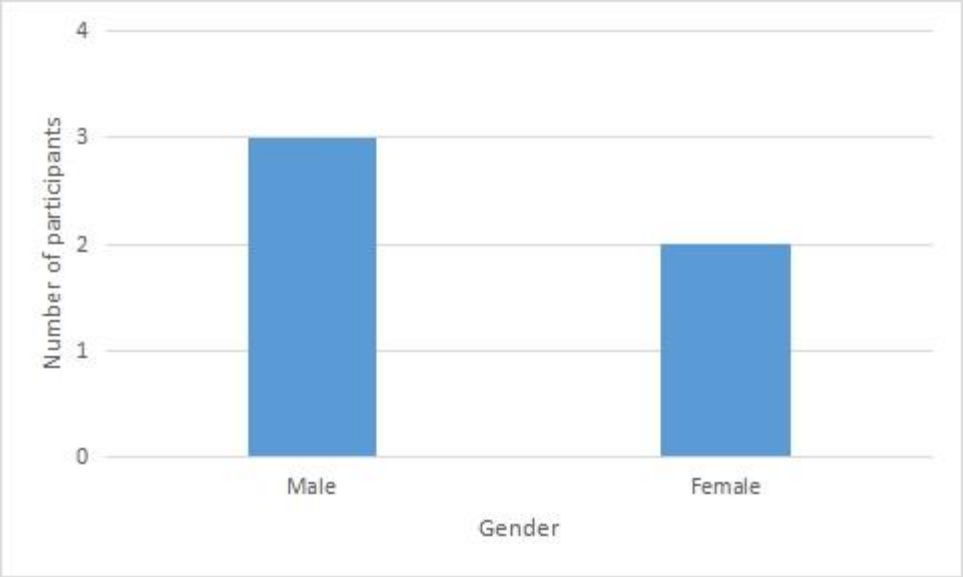

Figure 18: Gender of participants for the Operations Department.

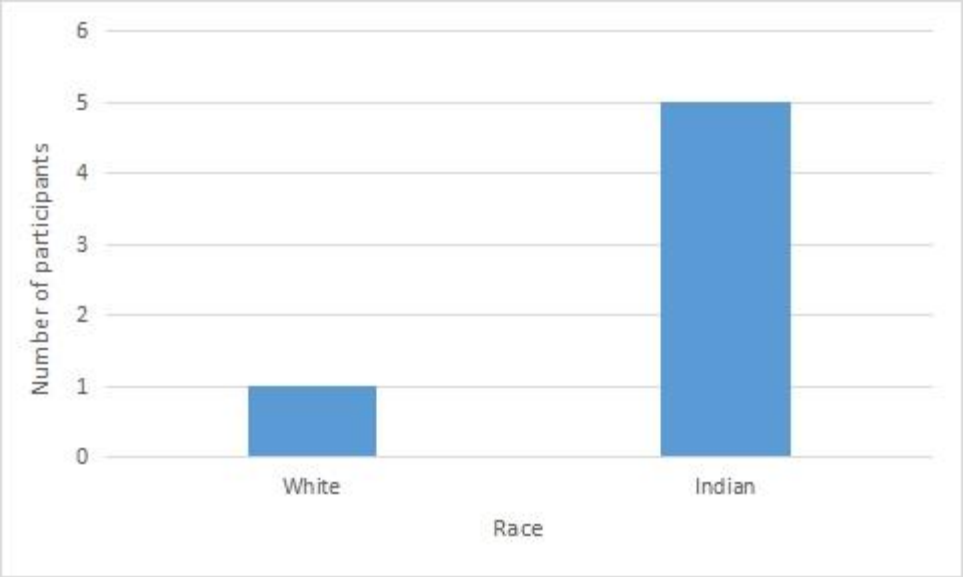

Figure 19: Race of participants for the Operations Department.

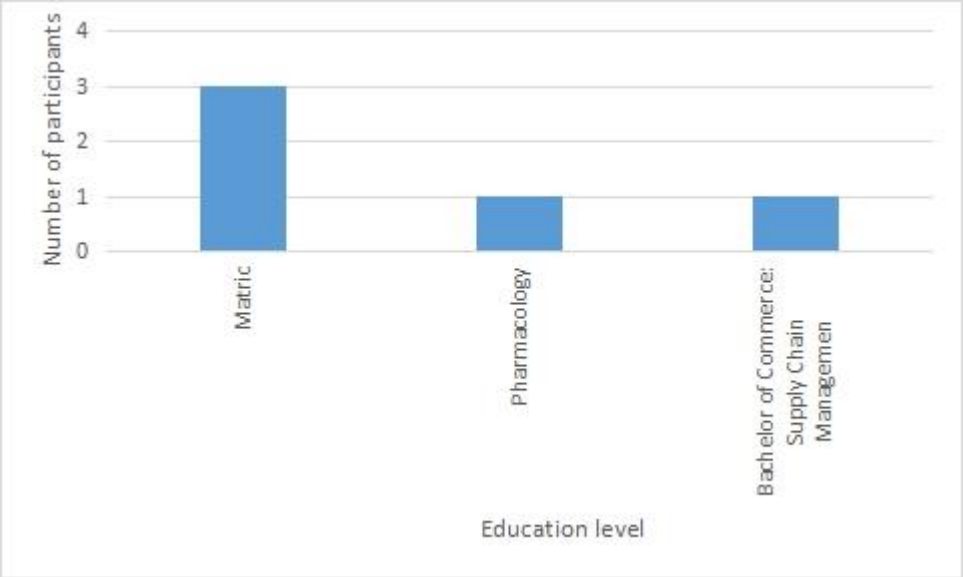

Figure 20: Education level of participants for the Operations Department.

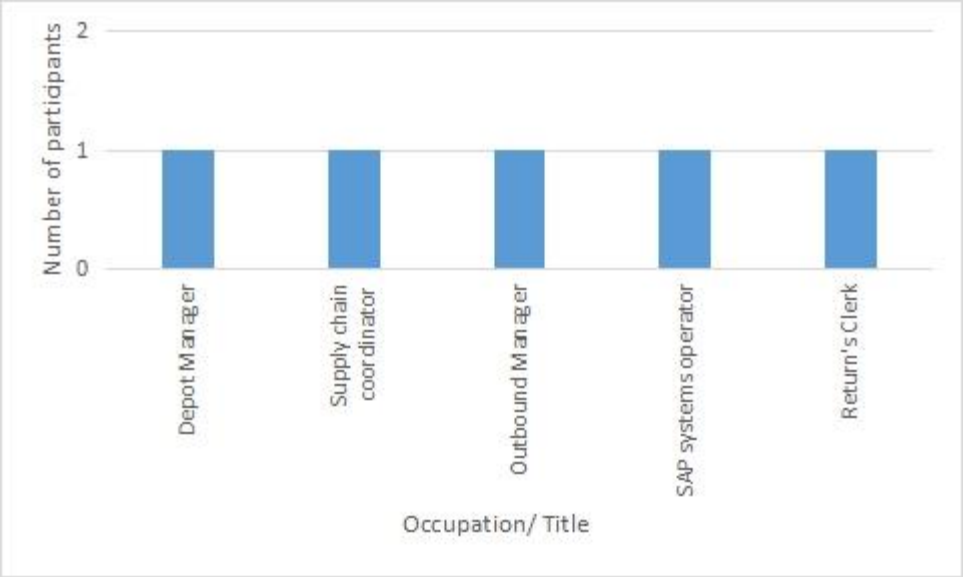

Figure 21: Occupation/ Title of participants for the Operations Department.

4.4.1 Order Processing

Three out of five participants (60%) within the operations department played a role in processing of any T3 orders on the system, e.g. loading of discounts, capturing the orders, allocating stock, blocking and releasing of orders, planning, picking. 2/5 (40%) did not and explained as follows:

> Interviewee 11 declared: "*No, basically in terms of stock, demand is to make sure that there is stock, placing stock at the stock model into T3 reservation, so this is stock model for T3 with PSKUs* [stock keeping units] *are placed T3 reservation and just make sure that the reservation is kept*" (Interviewee 11).
>
> Interviewee 15 said: "*not with capturing orders but only when the customers return orders whether damaged or rejected, I then verify the stock when it comes back and process on the system*" (Interviewee 15).

The participants have expressed here that they are not involved in allocating the stock to the order while it on the system, that is a function of Demand department. They have clarified that once the Demand department has allocated the stock to the order, their function is to physically pick that stock and plan it for delivery.

4.4.2 Individual Factors Affecting their Tasks

All of the participants within the operations department experienced issues/glitches/challenges in carrying out their functions in the order on the system. They include:

Interviewee 12 clarified: "*Orders released late, orders released on time but later gets an email saying now it is blocked for whatever reason, maybe its credit blocked or was released in error, it should have been cancelled and at that time maybe the order is already been picked by Ops and now must be canceler and hopefully the order is not loaded on the truck yet, once it's loaded it makes it more difficult because the order needs to be taken out of the truck*" (Interviewee 12).

"*If we've picked the order and they let us know that there is something wrong with it, then we've already spent resources for the picking and we might end up working an hour overtime because we have picked something for nothing. If it's loaded, then it's cost of the forklift because it's loaded and needs to be offloaded and if it's loaded in front of the truck, we need to offload the whole truck, take that particular order out and load the truck again*" (Interviewee 12).

"*If its picked and loaded and on the way to the customer, nothing can be done, that order is taking a free ride only to come back, hopefully it comes back intact with no damages or missing items, we have to debrief and it has to go back to the pick phase. If it was released late and miss the nominated delivery day (NDD), obviously the impact is on the customer because they waiting for the stock, it's not their fault maybe that we didn't have stock, it goes on the NDD and depends when is the next NDD, if it's a far customer nothing can be done but if the customer is closer, we can make a plan out of NDD*" (Interviewee 12).

Interviewee 11 elucidates: "*We have challenges every day, we have a process called automatic global system (JDA) which we order stock from which gives stock on hand and stock model from each vendor. We log onto that system every day to a specific vendor; it will tell us exactly how much we need to order. The challenge comes in when there is add up orders that sales did not forecast especially for T2 not so much for T3 where there is demand*

query, why is there an order for example 3000 cases Ariel 3kg, is there a promotion? please validate this order. There are so many errors that come in daily, common errors, human errors so like typo errors. Especially if it's a stock keeping unit (SKU) that does not sell fast so we have to be extra careful" (Interviewee 11).

Interviewee 13: "*Yes we do, mainly with orders being on block but no notification where the orders are on the system for us to plan, pick and load but when it comes to the invoicing part its blocked on the system for a reason called blocked for billing, that means it's not cleared by finance or the customer has not paid yet*" (Interviewee 13).

Interviewee 14: "*The only challenge is that when orders are put through and we pick them and we realise that it's not going out and we have to do the whole back process that takes much time to put it back on the system. Space-wise we do not have a big warehouse and its time consuming because we could be doing something else rather than something that is not going to go out*" (Interviewee 14).

Interviewee 15: "*Yes we do, mainly with orders being on block but no notification where the orders are on the system for us to plan, pick and load but when it comes to the invoicing part its blocked on the system for blocked for billing that means it's not cleared by finance or the customer has not paid yet*" (Interviewee 15).

The participants from the Operations department have raised their concerns regarding the lack of information sharing and time wasted during the time when there are performing their own functions on the order which is picking, planning and invoicing the order for delivery. The response from the participants have stated that this have a serious productivity and financial implication to their department and a company as a whole.

4.4.3 Key Strategies for Improvement

According to the operations department, participants felt that identifying and overcoming these challenges can be initiated through custom reports. Another participant categorised the challenges based on chronicity.

> Interviewee 11 believes: "*our challenge whether it's long terms or short term, in the demand environment there is always an out of stock challenges, vendor out of stock is completely out of our control, but at DSA we can control. If an order was placed for example 2000 cases always 9s, we know that we customise the stock if we have singles customisation, Johannesburg* [central planning, head office] *customises about 5000 a day a shift and we know that we can send it to the rep special technical operations* [STO], *the challenge comes when creating the STO making sure that the stock we customise does not exceed the stock that we customise. When we have too many open folds orders, customisation needs that flow… Again, it affects, lead time, cost and freight (CFR) if it's out of stock from the vendor and only getting a partial supply and we have to do split per region, demand does not do that, it's the divisional managers' call to say how much stock goes to which region*" (Interviewee 11).

Two out of five of the participants (40%) strongly believed that the challenges can be resolved through more substantial communication. This sentiment of enhancing the overall support was echoed by the following participant:

> Interviewee 15 stressed: "*Efficiency, the more assistance we get from the rep, customer care or the customer itself, the quicker we can resolve the issue and bring the stock back. Now they've changed it, if there are any returns, we deal with customer care first and not the warehouse, driver phones customer care first and explain the issue that they are having. Customer care then contacts the rep or customer and resolves the issue and gives feedback to the driver*" (Interviewee 15).

Participants have mentioned that they are too many parties involved in the decision making which delays the process, therefore, they have suggested that the process should be shortened and cut out other parties.

4.4.4 Interdepartmental Communication

When asked about the presence of interdepartmental communication, 4/5 (80%) participants highlighted its usefulness and value in ensuring a smooth process. Only 1/5 participant (20%) refuted this.

> Interviewee 11 acknowledged: "*Yes there is. The rep captures the orders, and stock is then allocated and released by demand, and it gets sent to ops central planning, and finance gets involved if there is a problem, if there is a code issue IT gets involved so every department is connected to demand in some way or the other. For example, we have an order well system: every single order is copied on the order well and sent to parties concerned and it communicates the status of the order*" (Interviewee 11).

> Interviewee 13 proclaimed: "*There is a smooth flow as I said it is communication because if finance does not communicate that, that order is blocked or they are waiting for the customer to pay the company, but the order is available for operations, that is the biggest challenge, it should not be available for ops if they are waiting for payment or the order is still on order block. The order should be on overall block so that operations cannot action*" (Interviewee 13).

> Interviewee 15 asserted: "*I do communicate with finance, and credit controllers on why was the stock returned or why wasn't the correct credit given to the customer, sometimes the customer sends back inners but claiming for cartons so there is a pricing issue with uplifts. I check the physical stock to verify that this is what we received from the customer and finance will have to sort it out thereafter*" (Interviewee 15).

Interviewee 14 disputed: "*I don't think so, they don't tell us everything, and how would we know? If the order is blocked for billing, we would not pick it to begin with*" (Interviewee 14).

With regards to communication within the departments, participants have indicated that the communication is sometimes there however it is not clear enough regarding the status of the order. That create confusion to the Operations department as they end up auctioning the wrong function to the order due to lack of clarity.

4.5 Biographical Information of Masta Data Department

The one participant is denoted by the participant code (as indicated in Table 4.1). The table below concentrates on the biographical profile of one participant from the masta data department.

Table 4.1: Participant demographic information for the Masta Data Department

Participant	Occupation/ Title	Gender	Race	Role	Educational Level
Interviewee 16	SAP business partner	F	W	Mobile applications, Ivy, Appsterix and Mio, sales distribution and Masta data	Matric

Abbreviations: F-Female, M-Male, B-Black, C-Coloured, I-Indian, O-Other, W-White.

4.5.1 Individual Factors Affecting their Tasks

The participant from the Masta Data department was asked about the presence of any issues/glitches/challenges in carrying out functions in the order on the system.

> Interviewee 16 explained: "*challenges in terms of users, not so much system related. They don't follow processes*" (Interviewee 16).

The participant identified that people should warrant a more cautious approach to overcome those challenges.

> Interviewee 16 emphasised: "*making people more aware of what they need to do and more consequences for not following processes*" (Interviewee 16).

The participant also alluded to inter-departmental communication and teamwork being present. Furthermore, it was explained that the Appesterix system was live and that once the rep captures the order on the system and gets the Pro-forma invoice, that stock is confirmed together with the quantities captured, provided the account is not on hold. Additionally, stock can be extracted according to the participant.

4.6 Thematic analysis

The study collected primary data using semi-structured interviews and the thematic analysis was conducted by deductive and inductive reasoning guided by the Grounded Theory. The data was presented in the previous section as multiple perspectives of phenomena under investigation. These contrasting perspectives allow the development of higher-order concepts that explain the situation at DSA regarding information sharing in the order processing system of the SC. This section (Figure 22 and Table 4.2) presents the themes related to the comparison of interviews with multiple participants in the context of DSA, according to the study's objectives.

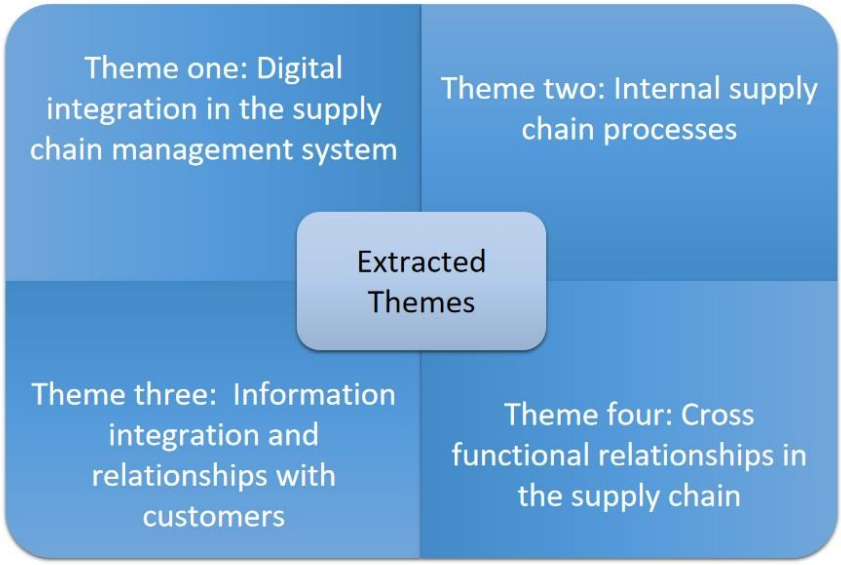

Figure 22: Themes. Source: Developed by researcher (2022).

Table 4.2: Analysis of themes

Themes	Category	Objective
Theme one: Digital integration in the supply chain management system	● Pricing issues on the system ● The need for synchronization to be live on the site.	1
Theme two: Internal supply chain processes	● Communication issues ● Stock availability issues ● Training is needed for	1

	awareness on roles	
Theme three: Information integration and relationships with customers	• The correct information should be available across departments so accurate information is given to customers. • Information sharing needs improvement • Information is not forecasted accurately	2
Theme four: Cross functional relationships in the supply chain	• A proper channel of communication is needed • Relationships are strained due to limitations created by COVID-19	3 and 4

4.6.1. Theme one: Digital integration in the supply chain management system

This theme relates to digital integration or the synchronisation required on the live site.

This is supported by the following responses from the interview sessions:

> *"Once it is captured it takes anything between 45 minutes to an hour to upload on our system for that number to be generated, once we get the stock number then we sent it for releasing so releasing it takes about anything between half an hour or hour to be released, then we get finance to very if anything is in order then finance need to release it, so anything between 2 to 3 hours to complete the whole process"* (Interviewee 2).

"From the time I have captured the orders it takes like 30 to 40 minutes maximum to produce the sales numbers that you use for requesting and then you send the request. It takes maybe a day to reflect on the order well of which those are orders that are released. If they are deals to be loaded you need to get a Pro-forma and then send it to the credit control. So for the whole process it takes me a day to do the whole function" (Interviewee 1).

The participants have raised their concerns regarding the speed within which they can complete their function on the order processing which is to capture the order. They have indicated that due to the time taken by the system to generate order numbers and Pro-forma invoice, they are unable to action their function at a possible fasted time.

4.6.2. Theme two: Internal supply chain processes

This theme relates to communication issues within and between departments, the stock availability issues that hampers quick customer deliveries on ordered items, and the misunderstanding or unawareness of roles among employees.

This is supported by the following responses from the interview sessions:

"Uhm… They are plenty of things that I need authorisation so we have a process that we work according to and if the request comes that is out of line with the process I need to ask for authorisation" (Interviewee 4).

"No I need authorisation. Firstly to bring back the stock, I need to get confirmation from the rep, the rep need to discuss it with the customer, and the rep need to notify us whether we should bring back the stock or not" (Interviewee 6).

The participants have expressed that they are too many functions that they are unable to perform without getting authorisation from certain individuals or departments. This then delays the turnaround time within which they can perform their functions on the order.

4.6.3. Theme three: Information integration and relationships with customers

This theme relates to sharing of correct information across departments so accurate information is given to customers, an improved process for information integration and accurate forecasting of information, so that trustworthy relationships can be created with customers.

This is supported by the following responses from the interview sessions:

> *"Operations need to tell us that they could not make it in time so that we will be fully aware that the customer delivery was not able to be delivered so that when the customer call us regarding the delivery and we can tell the customer when they can expect the delivery because the customer they call sometimes at 5 and by that time operation has already gone home, and when I contact the operation manger they will only tell us they will know in the morning what the issue with the delivery of the customer. We need to be aware so that we can tell the customer when they will get the order"* (Interviewee 1).

> *"Basically we lose sales firstly as customer do not get the order on time and the delivery is not delivered on time and we lose a lot of the delivery days that also a challenge when operation does not able to send deliveries on time of the day once every orders have been released. With also loading of the orders it take time to be finalised and the customers also misses the delivery also because the delivery is taking long to issue a discount of loading"* (Interviewee 3).

> *"We get affected very badly, because if we lose the sales from the customers it means the customer will not be able to make any many and we might end up losing customer"* (Interviewee 1).

The participants have stated that due to these issues of non-delivery with no communication, had a serious impacts on the customer trust and the entire company's credibility to deliver on time as this can result in losing the customers forever. This also can affects the entire company's' profitability as sales are lost to competitors in the process.

4.6.4. Theme four: Cross functional relationships in the supply chain

This theme relates to how a proper channel of communication can be developed and improved since this is strained by Covid-19.

This is supported by the following responses from the interview sessions:

> *"Basically lets starts with operations first, if there are deliveries they must not mix the deliveries and inform us that they are full and they are no longer taking deliveries as we only get that information the following day that the customer did not get the delivery and they will get is next week while we thought the customer will get delivery in that day or tomorrow so I think in that aspects they should be a communication between the operations and us here at sales. We sometimes do not get hold of operations as they already gone at home. Finance must be making the releasing and the rules need to be changed in the future and be looked at so that the releasing will be much easier. Finance is also requesting the bank statements which that takes a lot of time and I do not know why they would do that because the customer have already paid. So those are the challenges that we need to tackle in order to overcome those challenges to make sure we get our system work fast and avoid such challenges"* (Interviewee 12).

The participants have raised concerns regarding the standard operating procedures for different departments, most of the times these SOPs are contrasting. That results in the order being affected in the process, for example, the Operations department works until a certain time after that the sales employees have no one to resolve their issues and queries pertaining to operations. Hence, this delays the processing of the order and the delivery turnaround time which makes the customers unhappy.

4.7 Conclusion

Individual factors affecting the management of information sharing in the order processing system at DSA were dependent on each department. The participants within each department highlighted several challenges they had experienced which affected the supply chain management and business performance within the Diplomat South Africa enterprise. One common area identified for improvement involved facilitating and developing enhanced interdepartmental infrastructures and communication. The themes were also presented. The next chapter discusses the findings of the study.

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 Introduction

The results were presented and explained in the previous chapter. This involved details of the findings obtained from interviews with participants who met the inclusion criteria from the Sales, Finance, Operations and Masta Data Departments of DSA. This chapter provides a discussion of literature based on the objectives and theoretical framework, to establish the answers to the research questions based on the findings.

The objectives of the study were:

- To investigate the state of digital integration in the supply chain management system at DSA, focusing on internal processes;
- To evaluate the state of the current supply chain management on customer relationship management at DSA;
- To determine the state of information sharing and cross functional relationships among departments at DSA;
- To propose improvement strategies for the management of information sharing in the order processing system at DSA in order to create functional relationships among departments at DSA.

5.2. The state of digital integration in the supply chain management system at DSA, focusing on internal processes

Information sharing is a vital manipulator of supply chain management that augments the overall performance of the entire chain (Lee and Whang, 2000; Hassan and Nasereddin, 2018). Performance improvement is attained through improving cooperation and synchronisation of the supply chain processes (Fawcett *et al*., 2007), reducing the degree of insecurity (Mentzer *et al.*, 2001), and facilitating planning and decision making strategies while decreasing costs. Data

sharing also expands the level of confidence among supply chain stakeholders (Fawcett *et al*., 2007), which is essential to establish and maintain constructive relationships.

Some firms in supply chains believe that the information shared does not affect their business operations, or their partners lack the skills to use the shared information appropriately (Jongman, 2017). This has caused adverse effects among firms on sharing information. The lack of organisational and technological resources of some smaller firms of a supply chain may prevent them from sharing information (Fawcett *et al*., 2007; Jongman, 2017). To facilitate information sharing in a supply chain, all members need to be co-operative and work towards it. To advance information sharing, it is essential to understand why it is important and the various circumstances under which trading partners would be open to share information (Khan *et al*., 2016).

The underpinning of strong associations between supply chain partners is an imperative component of supply chain management which increases its chances of success. Ensuring productive inter-organisational relationships is often a challenging area where many firms still struggle (Fawcett *et al.,* 2007; Baba *et al*., 2021). The facets in the relationship dimension, for example trust (Li and Lin, 2006), dedication, power and reliance and personal network (Cai, Jun and Yang, 2010, Cai and Yang, 2014), are the qualities of partnership which highlight the partners efficacy to work together and achieve goals (Mohr and Spekman, 1994; Baba *et al*., 2021).

A large proportion of reviewed papers have focused on the components in the relationship dimension. For effective information sharing to occur, it is essential that four factors: trust, commitment, power and dependence, in conjunction with informal personal networks produce a strong organisational relationship between supply chain partners.

Individuals play a vital role as they facilitate information sharing within DSA. However, they are subject to several individual or personal factors. Multiple studies have concentrated on technology and its use in information sharing, without accounting for the human component (Bakhari and Zawiyah, 2012; Nazifa and Ramachandran, 2019). Considering that information is processed by an individual, it becomes reliant on his/her inclination to utilise the information to contribute towards the requirements of the company. Individuals may be personally motivated to

either share information well or discourage them from performing their tasks effectively (Oye *et a*l., 2012; Nazifa and Ramachandran, 2019).

From the findings, the sales department outlined that the factors influencing the management of information sharing were communication difficulties between staff members of different departments concerning pricing issues and stock availability. The finance department outlined that waiting for authorisation influences the management of information sharing in their division. The operations department also cite human error as an influence that hinders correct and precise information sharing. The Masta Data department cites that improper following of protocols by personnel adds to disruption of internal information sharing.

Their viewpoints are dependent on their attitude towards specific situations concerning information sharing at DSA. The employees at DSA may have varying levels of tolerance and patience with regard to delayed orders and the lack of communication among departments. When employees feel that information sharing is achievable and they are able to convey the information well, this has been shown to have an instant positive effect on the performance of companies and their outcomes (Evans, 2012; Topal and Sahin, 2018). Exploratory probing of employee conduct and their willingness to provide information and expertise could be a potential indicator of their approach toward information sharing. This may have significant implications for companies and their performances.

A positive state of mind and enthusiasm are needed when sharing information internally or externally. Khan *et al*. (2016) highlighted some of the individual factors that could shape employees' information sharing behavior. These factors could include time constraints or deadlines, dominance in sharing information that the other person is expected to know, employees' level of satisfaction, appraisal, level of comprehension, aptitude, criticism, level of expertise, interpersonal relationships, ability to communicate effectively, social skills, education level, discrepancies in age or gender, individuals' culture or race, level of altruism, level of commitment and obligation to the company, and their personal values and beliefs.

Structural characteristics and administration have been generally used as predictors of organisational activities (Moberg, 2000; Dawes, 2016). Inter-organisational information sharing involves adequate in-house efforts for its progression (Baba *et al*., 2021). Aspects that arise

internally between departments and divisions within the organisation are described as intra-organisational dimensions.

Information technology, information quality (Lee *et al*., 2010), upper management dedication (Li and Lin, 2006; Wang *et al*., 2014), reputation, market orientation, diplomacy, complexity of business condition, project payment, supervision and supply network arrangement comprise the ten intra-organisational factors and are considered to have a significant impact on information sharing within supply chains (Gürlek and Tuna, 2018).

Information and communication technology (ICT) plays a fundamental role in expediting information sharing in organisations. Bakhari and Zawiyah (2012) and Chen *et al*. (2020) highlights that ICT is a key constituent in information management. ICT tools are classified into five categories, namely: office applications, groupware, work process systems, analytical systems and information systems. Effective implementation of the ICT tools allows for competent and successful information sharing among employees. Office applications involve emails, messaging, and scheduling. Groupware is the term used to describe databases, application sharing and electronic meeting systems. Information systems encompass portals, e-learning, and information sharing.

Environmental characteristics are inevitable and it is difficult for individual organisations to attempt to control them. However, organisations can curtail the influences of such environmental factors by ascertaining joint relationships with their trading partners which assists in making informed, educated decisions (Li and Lin, 2006). Firms require more information sharing pertaining to customer requirements and desires, scheduling and delivery procedure, market competition, fluctuating government laws and regulations so that they may overcome unexpected challenges whilst maintaining their efficiency.

Both the literature and the findings from various departments pointed out to the digital integration and internal processes as very dynamic in terms of people's interpretations. This could result in a very big disconnect if not approached with a consideration of these many factors influencing information sharing, such as the skills and understanding of the processes, race, culture, gender etc. The findings of this objective were positive in a manner that various

departments were able to acknowledge and admit that to a certain degree, there are glitches in terms of information sharing with other departments.

5.3. The state of the current supply chain management on customer relationship management at DSA

In emerging markets, such as South Africa, inter-organisational interactions are the central basis for innovation which involves the exchange of novel ideas through organisational learning (Baba *et al.*, 2021). These novel ideas may perpetuate new solutions to be devised to address the current prevailing challenges. This may be especially appropriate in promoting growth of various sectors in South Africa. Since manufacturing companies in South Africa are still developing, the trade of information with other stakeholders is imperative for continual progression of businesses.

The purpose of establishing boundary-free organisations (Hanson, 2019) has perceived information sharing as engaging in a paramount part of logistics integration. However, such an undertaking requires companies to: appraise internal information circulation; reassess the positions of their commercial partners; and evaluate their information management. Information sharing-related success factors for integration include electronic data exchange; automation; computerisation and accuracy of production-related information (Hanson, 2019); material requirement planning (MRP); automation of stock management and meticulousness related to stock-related information (Richardson, 1999; Hanson, 2019); and data quality.

In comparison to large businesses, the utilisation of information-related technologies for logistics information sharing has been minimal and this has attributed to the financial limitations of small and medium enterprises (SMEs). However, there is mounting evidence demonstrating that the acceptance of information technologies by SMEs to facilitate their business information sharing, is increasing. This indication also reflects the size of the SME. The concerns of the owner-manager influence the SME information technology advancement and information sharing. Reliability, capability and cooperation of individual chain members affects business performance in a supply chain. This is dependent on supplier quality, flexibility, distribution, cost performance and prompt response. All these factors impact a business enterprise’s performance (Shin *et al.*, 2000).

At DSA, the Finance Department expounded that the automatic global system, which is a stock ordering system, is a function of supply chain management. This system affects business performance negatively by personnel inputting incorrect information and failing to update the system so that up-to-date information is shared. In some cases, the personnel goes ahead with fulfilling an order that was not meant to be delivered on that day. This causes business performance to be jeopardized since the order has to be back-processed. This takes place due to lack of information sharing among the relevant personnel which leads to SCM back log, and causes time and resources wastage.

At present, information is the principal resource in businesses when viewed from an economic perspective. Subsequently, production factors (labour, capital and raw materials) have been converted to secondary resources. Active information sharing has come to be an indispensable instrument for supply chain management to flourish. Information sharing is a multifaceted practice that companies employ both within themselves and among supply chain partners. A growing level of information sharing has originated from being compulsory rather than a choice. To ensure synchronisation between the various components of the supply chain, information sharing and information technologies are important (Ravichandran (2008). Information sharing stabilises production in the supply chain. To remain resilient and to have a competitive edge, the global economy robustly affirms the need for businesses to have access to vital information. Competition is not limited just to companies but rather extends to different networks and this stresses the need for successful information sharing (Ravichandran, 2008; Fawcett et al., 2007; Novitasari and Damayanti, 2018).

The anticipated time-based performance consists of delivery speed (Handfield and Pannesi, 1992); new product development time (Vickery *et al*., 1995); delivery dependability (Handfield, 1995); introduction of new products, manufacturing lead-time; and customer accessibility (Hendrick, 1994; Novitasari and Damayanti, 2018).

Based on previous studies, information sharing between supply chain partners has a noteworthy substantial impact effect on business performance (Rohman *et al*., 2020). Information sharing also permits firms to make better decisions related to gathering, capacity allocations, manufacture and the preparation of particular products. This occurs as a result of increased

perceptibility of demand, supply and record of stock (Lin, Huang and Lin, 2002). Several studies have emphasised that information sharing is a key component in augmenting performance (such as increased proficiency; rapid material flow; shorter order times; increased customer approval) (Rohman *et al*., 2020).

The literature states the importance of supply chain management on customer relationships as of paramount importance, as this is a new way of doing business. Businesses have become compelled to advance in information sharing and technology otherwise they risk to become primitive and to be extinct, as a result of losing competitive edge. The literature also emphises the need of the ability to use these technologies and information sharing tools, otherwise they would not have a positive impact if not used efficiently. According to the findings at DSA, the ability to use information sharing accurately or correctly still proves to be a mountain to climb and a point of focus in terms of mastering the information sharing among the departments. If this is not taken care of with utmost speed, it will negatively impact customer relationships with the DSA customers as already is the case.

5.4. The state of information sharing and cross functional relationships among departments at DSA

Information sharing often boosts the accuracy of demand forecasts, refining pricing structures, updating production scheduling and maintaining the organisation of consumer demand (Chiang *et al*., 2016). By synchronising supply chain processes, the material flow becomes more productive and subsequently lessens inventory costs. Information sharing also initiates efficient supply chain assimilation by sanctioning firms to invest in more reliable deliveries, which would be beneficial to address the challenges at DSA (Choi, Lee and Yoo, 2010; Özer, Zheng and Ren, 2014).

The establishment of mutually shared goals creates the basis for shared levels of trust and commitment building within specific teams (Ahmad and Zailani, 2017). This also creates cohesion among departments and can be used to incite a protocol following a culture that creates a sound SCM at DSA. These can be attained through the generation of certain tactical associations (Ahmad and Zailani, 2017).

A recent study highlights that modern businesses have transitioned to no longer competing as exclusively autonomous entities but as supply chains (Chen *et al*., 2011). Companies should form connections with others within their supply chains in an attempt to achieve their mutually shared goals (Chen *et al*, 2014; Ahmad and Zailani, 2017).

5.4.1 The department viewpoints

Order Processing

Six out of seven of the participants (86%) in Sales stated that they were directly involved in the processing of any T3 orders on the system, (e.g. loading of discounts, capturing the orders).

Three out of five of the participants (60%) within the operations department played a role in processing of any T3 orders on the system, e.g stock forecasting, allocating stock, picking, planning, invoicing and delivering. 2/5 (40%) of the participants did not.

Individual Factors Affecting their Tasks

All participants (7/7) within the sales department explained that they performed their designated tasks; however, carrying out their tasks was subject to various factors. Identification of the factors revealed that they included matters related to pricing, stock availability and interdepartmental disputes. After confirming a price with a customer, sometimes the price would be different following order processing. This appears to be the main issue related to pricing.

Two out of three of the participants (66%) in the finance department linked their issues to awaiting the relevant authorisation while the remaining participants (33%) linked their issue to having to follow-up with the relevant authority. Furthermore, this again highlighted that the human components and decision making were the challenging aspects of the supply chain.

All participants (100%) within the operations department experienced issues/glitches/challenges in carrying out their functions in the order on the system.

Interdepartmental Communication

When asked about whether interdepartmental communication occurred, only 2/7 participants agreed.

Intra-organisational, specifically interdepartmental, collaboration was identified as a key area of concern and had been adversely affecting the supply chain. Participants described the challenges they faced as being detrimental and having negative impacts on productivity.

Participants commented on the effectiveness of the system. They did not identify the system as having serious complications.

5.5. Proposed improvement strategies for the management of information sharing and creating functional relationships among departments at DSA.

Participants within the sales department also had a variety of possible solutions to improve the difficulties they were experiencing. One of them included the use of an automated database system. Miscommunication between departments was identified as a prominent area for improvement.

Participants' responses from the finance department ranged from being uncertain, to requiring improved interdepartmental collaboration and the need for augmented training. According to the operations department, participants felt that the implementation of custom reports could be useful in improving the functioning of the supply chain.

2/5 (40%) of the participants in the operations department considered that challenges could be solved by substantial communication. When asked about the presence of interdepartmental

communication, 4/5 (80%) of the participants highlighted its practicality and importance in ensuring a smooth process. Only 1/5 participant (20%) refuted this.

Individual issues involving the management of information sharing in the order processing system at DSA was contingent on the specific department. The participants within each department emphasised numerous challenges which affect the supply chain management and business performance within the Diplomat South Africa enterprise. One collective area identified for improvement involved facilitating and developing improved interdepartmental communications and exchange.

Various departments have stressed the importance of communication, transparency and willingness to collaborate with other departments in order to improve the management of information sharing in the order processing system. This will strengthen the relationships among the departments so that the customer gets the best service. They also emphisised the element of training on these processes and reports and ensuring that these processes correspond with each other to achieve smooth sailing of the order while it moves on the system.

5.6 Conclusion

Supply chains consists of connections between suppliers and customers. Supply chains comprise of all the processes stemming from the originating of raw materials to the distribution of the completed goods to the consumers. This chapter has described the significance of information sharing and supply chain. A summary of all the factors affecting the supply chain has been discussed in accordance with the research objectives of the current study. Additionally, the chapter has presented supporting literature which outlines possible avenues for improving the components of the supply chain. The chapter also focuses on information sharing and intra-organisational relationships and how to enhance supply chain performance.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The previous chapter provided a detailed discussion of the results. This was based on the responses from interviews with participants who met the inclusion criteria from the Sales, Finance, Operations and Masta Data Departments of DSA. This chapter provides recommendations for best practices and draws a conclusion to the research questions. These findings assists in improving the management of information sharing in the order processing system at DSA.

This study investigated information sharing as a key element for the supply chain at Diplomat South Africa. The research questions focused on the individual factors that influence the management of information sharing in the order processing system at DSA, the influence of supply chain management and business performance within the Diplomat South Africa enterprise, the influence of information sharing on supply chain factors at DSA and the influence of internal information sharing relationships on supply chain performance at DSA.

6.2. Summaries of each chapter

The chapters of the dissertation covered the following aspects:

Chapter One outlined the conditions that initiated the study, together with the research objectives. The background to the study regarding the research problem, research objectives and research questions were presented. The significance, justification and contribution of the study were highlighted.

Chapter Two reviewed the relevant literature on the assessment of the management of information sharing in the order processing system at Diplomat South Africa. The intentions of supply chain management were highlighted. The objections facing supply chain management on

information sharing were delineated. The order processing system was outlined in this chapter and the fundamental elements of the service delivery system were discussed.

Chapter Three presented the research methodology and design used to conduct the study. The study site, target population, accessible population, sampling method, and sampling size was discussed. Then data collection instruments and data analysis methods were discussed together with the measures employed to guarantee data quality and reliability**.** The ethical considerations were also outlined.

Chapter Four presented the qualitative data set that was generated based on the research questions. The data was presented according to the different divisions of DSA and focused on assessing the management of information sharing in the order processing system at Diplomat South Africa.

Chapter Five presented the discussion and the findings of the study. This chapter presented the discussion according to the research questions of this study.

6.3. Recommendations for improving information sharing at DSA

An efficient way to process information is through a life cycle management method. When sharing information, it is critical that the content has been defined well previously (Cai *et al*., 2010). This subject matter usually differs depending on the employees, their departments and the tasks they are expected to perform, which should be defined for DSA. Information procurement is directed by information requirements and should be outlined by DSA before procurement activities are undertaken. To provide insight into the situation, employees must pursue the pertinent information (and other employees or management with the knowledge) to gain the insight needed to perform their occupational activities effectively.

Employees should be able to convey the status and progress to the subsequent department. This facilitates proper functioning of the various components of the supply chain. Information procurement is complex and should be well-defined by DSA. The general information requirements of the company is dependent on the employee's responsiveness and perceptive ability. To meet these demands, a company must ensure that information is well managed and

involves a multitude of people for the information procurement. Valuable information should be generated through a four step process: (i) reliable, planned sources of information, (ii) regular observation and monitoring of the information sources, (iii) the assessment of new sources, and lastly (iv) systematic re-evaluation of sources (Cai *et al*., 2010).

While generating information, the appropriate employee needs to ensure that the content is pertinent to the contextual information. This often occurs in the sales department and it is necessary to confirm that a transaction has been correctly documented (Hsu *et al.*, 2009). This stage involves the process of validating the price, amount, or value of information from the current sources. The organisation and storing phase should focus on the capturing of information and its storage through the creation of a functional depository. The rationale for this phase enhances the quality of information and relays the availability of information to people (Hsu *et al*., 2008).

One technique of creating a functional depository includes the use of IT. IT creates a platform for the provision of the information related to the life cycle process (Cai *et al*., 2010). Chen *et al*. (2014) encourage the use of an electronic storage system which provides a database of information. It would be beneficial to DSA to create a seamless system that streamlines paperwork, improves information handling, stimulates productivity and addresses complications. The use of such a system would be intended to support employees in retrieving appropriate information before reaching decisions, responding to queries, or to salvage historical information effortlessly. An organised database allows for easy access, processing, retrieval, and the management of information (Cai *et al*., 2010). Chen *et al*. (2014) recommend that analytic tools can be applied to filter data for the process of decision making. The information is then processed and distributed based on the relevant product or service, and would be beneficial to DSA (Choon, 2002).

6.4 Areas for further study

Future research should focus on unstructured interviews and focus group discussions (FGD) in the interview process. This allows for a greater depth and richness of information to be obtained and analysed to give thorough insightful information on the study topic.

The topic of supply chain implementation and business performance can be investigated in small, medium and large enterprises in South Africa to give an overview of their coping abilities under trying economic circumstances.

The influence of other personal variables such as the age, gender and life experience of employees can be considered with regards to their influence on the management of information sharing in the order processing system, supply chain management and business performance, information sharing on supply chain factors and internal information sharing relationships on supply chain performance.

6.5 Limitations of the study

This study did not have a large sample size and was conducted retrospectively. In addition, a degree of recall bias may have existed in the participant responses. The next limitation for this study is that the data were solely collected from DSA, and not from other organisations that do similar work throughout South Africa. The present economic fragility that plagues South Africa due to years of slow economic growth and the onset of a global pandemic, highlights the need for optimal business performance and effective supply chains in order for an organisation to remain competitive and to withstand troublesome times.

The acquiring of participants for the study, although convenient, was cumbersome due to times of availability and meeting arrangements. Although this study adds to current global knowledge of management of information sharing in the order processing system in South Africa, the results may differ in South African organisations. Only DSA has been used to determine information sharing in the order processing system and a richer descriptive understanding might be obtained if comparative data were acquired and analysed.

6.6. Contribution of this study to knowledge in supply chain management

This study focused on information sharing as a key element for supply chain at Diplomat South Africa. The knowledge areas that were expounded on that contribute to the literature on SCM include identification of the individual factors that influence the management of information sharing in the order processing system, identification of the influence of supply chain management and business performance, the assessment of the influence of information sharing on supply chain factors, the evaluation of the influence of internal information sharing relationships on supply chain performance and strategies for improvement.

6.7 Final Conclusion

This study focused on identifying the individual factors that influence the management of information sharing in the order processing system at the Diplomat South Africa enterprise. It put forward an explanation for the influence of supply chain management and business performance within the DSA and discussed the influence of information sharing on supply chain factors at DSA. This study also discussed the influence of internal information sharing relationships on supply chain performance at DSA. The recommendations put forward would be useful in information gathering and application of knowledge (Choo, 1995). Regular monitoring of information sharing procedures enhances the efficacy of the supply chain components. Based on the results from this study, it is imperative for DSA to invest the greatest effort into enriching and strengthening intra-organisational, specifically interdepartmental, communication. Identifying the key challenges in each department has been the initial step. Subsequently, DSA needs to address these issues with strategies that are organisation and context specific. These findings assists in improving the management of information sharing in the order processing system at DSA.

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8. APPENDIX A: DEFINITION OF TERMS

Appendix A: Definition of Terms

Information: Information can be described as accurate, timely, specific and organised data that is collected or generated for a purpose (Scott, 2015). Information can be presented within a context that gives it meaning and relevance, and can lead to an increase in understanding and a decrease in uncertainty (Bakhari and Zawiyah, 2012; Gilsenan, 2017).

Technological factors: Technological factors have an impact on how an organisation shares information related to the equipment used within the organisation's environment. Due to increased reliance on equipment, technological factors currently exert a considerably more important effect on the success of a business than they did only a hundred and fifty years ago (Bakhari and Zawiyah, 2012; Nayak And Dhaigude, 2019).

Information sharing: Information sharing describes the exchange of data between various organisations, people and technologies (Bakhari and Zawiyah, 2012; Nazifa and Ramachandran, 2019).

Individual factors: Individual factors are varieties of individuals or personal factors such as age, gender, physical and mental health that have been noted to influence information sharing in organisations (Bakhari and Zawiyah, 2012; Rohman *et al*., 2020).

Organisational factors: Organisational factors play a substantial role in enabling and disabling information sharing management among employees in the organisation. These include workers' capabilities, management approaches and management styles, organisational policies and employee behaviour (Bakhari and Zawiyah, 2012; Rohman *et al*., 2020).

Order processing: Order processing is the process or work-flow associated with the picking, packing and delivery of the packed items to a shipping carrier and is a key element of order fulfilment (Narasimhan and Kim, 2002; Topal and Sahin, 2018).

Capacity: According to Asiedu (2015), capacity is defined as the ability of an organisation to function as a resilient, strategic and autonomous entity.

Quality: Quality refers to the unique attributes or features of the project that excel in all respects, thereby meeting the customer expectations which had led to the project being undertaken (Asiedu, 2015).

Output: Output is defined as the final measurable results obtained upon successful completion of planned activity or tasks accomplished (Asiedu, 2015).

9. APPENDIX B: INTERVIEW GUIDE

Interview questions for Sales Departments (Sales Reps)

1.Do you capture orders for your customers?

2. Once the order is captured on the appsterix system, where does it go next for processing?

3. Which system do you use to capture orders?

4. How does this system works?

5. Are you satisfied with how the system works, does it work effectively?

6. What are some of appsterix fucntions/features, do these functions add value to the processing of the order?

7. Are your customers satisfied with the turn-around time within which they receive their deliveries?

8. What are some of the things that the customers are not happy about?

9. What is your reaction to what the customers are unhappy about, and what do you do to resolve their queries or complaints?

10. What are some of the challenges you are facing with orders not being delivered on time or as scheduled?

11. How do these challenges affect your overall performance and productivity, and how do they affect you personally as an employee?

12. What do you suggest or think can be done to resolve these issues?

Interview Questions for Finance

1.What are the functions you perform on the T3 order once it is on your system, e.g release, block etc?

2.What the reasons of placing the order on block?

3.Once the block is lifted, how long does it take to reflect on the system?

4.Which types of accounts do you have your customers on, e.g 30 days, COD, 72 hours etc?

5.If a customer is allocated a certain amount of credit limit and he uses a portion of that credit limit and later wants to place another order, is h/she able to use the rest of the credit limit before paying for the first order or do they have to pay for the first order first before they can order again?

6.If yes, why? what is the aim of the credit limit if they are unable to use it to the maximum?

7.Do the customers default payments?

8.What methods do you use to ensure the money is paid on time?

9.Those that do not pay on time, what is the process of ensuring that the money is paid?

10.Have you ever written off money due to non-payment?, if yes what went wrong and whose fault was it that the customers ended up not paying?

11.Is there an element of trust between the customers and the company based on the period that they have worked together or the company uses the same approach whether the customer is new or old?

12.Do you consider the payments history/patterns of the customer before deciding to release or block the order?

13.What are some of the risks that your department is facing as far as giving stock to the customers on credit?

14.What is the relationship like between your department and the sales department, are there any misunderstandings or collaborations?

Interview Questions for Operations department

1.Do you have any challenges with T3 orders in your system?

2.What are those challenges?

3.How do these challenges affect your working process?

4.What is the cause of these challenges?

5.What do you think can be done to iron out these glitches?

6.Do you have an open communication with other departments involved in the same order, e.g Sales and Finance?

Interview Questions for Sales Admin

1.Once the Rep captures the order on the system and synchronises, do you capture stock and allocate to the order as captured?

2.What happens in a case of an out of stock (OOS)?

3.In an instance where a T3 Rep captures the order and it confirms the quantity on his side of the system, and the pro-forma invoice is generated also confirming the quantity, however, delivery does not go out because of insufficient stock. In some instances, the order is even released by finance which means it is ready for planning and delivery as per the customer's NDD (nominated delivery day), however the rep gets a call from the customer asking where the order is or stating they received half the order even when they paid for the full order prior to delivery. How and why does this happen?

4.In a case of an insufficient stock even when the system confirmed that the stock is available and is appearing on the order well, is there any form of communication to the sales rep just so they can alert the customer of the situation instead of the customer alerting the Sales Rep?

Interview Questions for Master Data

1.Is the Appsterix system live?

2.Once the Rep captures the order on the system and gets the pro-forma invoice, is that stock confirmed together with the quantities captured?

3.Can anyone be able to extract the stock on that confirmed order if the pro-forma is not deleted to release the stock?

Interview Questions for Demand Planning Manager

1. Is the stock forecasting for Tier 3 orders accurate and are there any challenges you are facing?

10. APPENDIX C: INFORMED CONSENT FORM

UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

APPLICATION FOR ETHICS APPROVAL

For research with human participants

Information Sheet and Consent to Participate in Research

Date: October 07, 2020.

Greetings,

My name is Nokukhanya Khayelihle Dlamini from University of KwaZulu-Natal Westville Campus, College of Law and Management, School of Management, IT and Governance. My contact number is 0796237221 and email address is 216056732@stu.ukzn.ac.za. In addition, my supervisor for the research project is Professor Maxwell Phiri and his office telephone number: 0332605843, email: Phirim@ukzn.ac.za

You are being invited to participate in a study that involves research on ***An assessment of information sharing in the order processing system at Diplomat South Africa***. The primary purpose of the study is to assess the role of information sharing within the departments that are involved in the order processing system at Diplomat South Africa. This study aims to investigate the impact of information sharing or lack thereof within the departments within the company. This study is expected to include 17 participants from Diplomat South Africa Durban branch. It will be conducted as follows: data will be collected from DSA depot/office in Durban. The researcher will arrange or set up appointments with the interviewees, the Tier 3 office will be used as a venue to conduct the interviews where there will be the researcher and one participant at a time, and the interviews will take more or less 20 minutes. The interviewees will be asked questions directly by the researcher and a tape recorder will be used to record the answers. The researcher will also use the note book to jot down the answers and use as back up. The duration of the participation, if they choose to remain in the study is expected to be treated with confidentiality and not shared with any other parties.

The study will not be of any risk or discomfort to the participants. The study will not provide any direct benefits to participants.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval number: HSSREC/00009663/2020).

In the event of any problems or concerns/questions you may contact the researcher at 0796237221 or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban 4000 KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557- Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

Your participation in the study is voluntary and by participating, you are granting the researcher permission to use your responses. You may refuse to participate or withdraw from the study at any time with no negative consequence. There will be no monetary gain from participating in the study. Your anonymity will be maintained by the researcher and the School of Management, I.T. & Governance and your responses will not be used for any purposes outside of this study.

All data, both electronic and hard copy, will be securely stored during the study and archived for 5 years. After this time, all data will be destroyed.

If you have any questions or concerns about participating in the study, please contact me or my research supervisor at the numbers listed above.

Sincerely.

CONSENT TO PARTICIPATE

I _____ (Name in full) have been informed about the study titled: ***An assessment of information sharing in the order processing system at Diplomat South Africa*** by Nokukhanya Khayelihle Dlamini

I understand the purpose and procedures of the study.

I have been given an opportunity to ask questions about the study and have had answer to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at 0747848867 or 214536793@stu.ukzn.ac.za

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001
Durban
4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557 - Fax: 27 31 2604609

Email: HSSREC@ukzn.ac.za

_____ _____

Signature of Participant **Date**

_____ _____

Signature of Witness **Date**

(Where applicable)

_____ _____

Signature of Translator **Date**

11. APPENDIX D: APPENDIX F: ETHICAL CLEARANCE

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

27 June 2021

Miss Nokukhanya Khayelihle Dlamini (216056732)
School Of Man Info Tech & Gov
Westville Campus

Dear Miss Dlamini,

Protocol reference number: HSSREC/00002862/2021
Project title: An Assessment of the Information Sharing Management in the order processing system at Diplomat South Africa
Degree: Masters

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 18 May 2021 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**.

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 27 June 2022.
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,

[redacted]

Professor Dipane Hlalele (Chair)

/dd

Humanities and Social Sciences Research Ethics Committee
Postal Address: Private Bag X54001, Durban, 4000, South Africa
Telephone: +27 (0)31 260 8350/4557/3587 **Email:** hssrec@ukzn.ac.za **Website:** http://research.ukzn.ac.za/Research-Ethics
Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

12. APPENDIX E: EDITOR REPORT CERTIFICATE

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admin@kznlanguageinstitute.com
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Registration number: 131 804 NPO

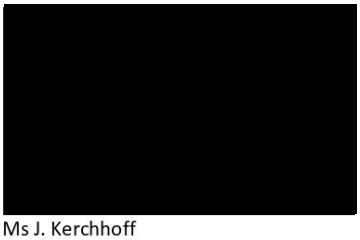
Certificate of editing

18 July 2022

Name: **Nokukhanya Khayelihle Dlamini**

Title**: An Assessment of the Management of Information Sharing in the Order Processing System at Diplomat South Africa**

This serves to confirm that the above document was edited substantively by members of the KZN Language Institute's professional English language editing team. The document was returned to the author with tracked changes and comments intended to correct errors and to clarify meaning. It was the author's responsibility to attend to these changes.



Ms J. Kerchhoff

Director of the KwaZulu-Natal Language Institute

KZN Language Institute – Transforming Words