

**LINKING INVENTORY MANAGEMENT PRACTICES TO INVENTORY AND
WAREHOUSE PERFORMANCE IN THE RETAIL INDUSTRY IN GAUTENG AND
KWAZULU-NATAL PROVINCES**

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**VAAL UNIVERSITY
OF TECHNOLOGY**

Inspiring thought. Shaping talent.

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November 2022

DECLARATION

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree

Signed:

Date: August 2022

STATEMENT 1

This dissertation is being submitted in partial fulfilment of the requirements for the Master of Management in Supply Chain Management

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This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references. A list of references is appended.

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I hereby give consent for my dissertation, if accepted, to be available for photocopying and for interlibrary loan, and for the title and summary to be made available to outside organisations.

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DEDICATION

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ABSTRACT

The application of inventory management practices to improve inventory and warehouse performance is a critical concept in supply chain management. These activities are fundamental in contributing to the value creation of firms' supply networks. The present study investigated the link between inventory management practices, inventory performance and warehouse performance in the retail industry in Gauteng and KwaZulu Natal provinces. The study used a quantitative approach based on a combination of correlation and survey design methods to examine the identified relationships.

A total of 203 supply chain professionals selected from retail outlets in the Gauteng and KwaZulu Natal provinces participated in the survey. The collected data were analysed using the combination of Statistical Package for Social Sciences and the SMART PLS software. Major data analysis techniques employed in the study included descriptive statistics, Exploratory Factor Analysis and Structural Equation Modelling.

The results show that the three inventory management practices: inventory investment, inventory control and ABC analysis, positively influence inventory performance. Two practices: inventory turnover optimisation and shrinkage prevention were statistically insignificant. Additionally, Inventory performance positively influenced warehouse use performance.

Theoretically, the study provides a comprehensive analysis and contributes to the literature on inventory and warehouse management in the retail industry in South Africa. Practically, the study facilitates more informed inventory and warehouse management problem diagnostics and decision-making by managers and supply chain professionals in the retail industry.

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LIST OF ABBREVIATIONS

ABBREVIATION	FULL TITLE
FMCG	Fast Moving Consumer Goods
GDP	Gross Domestic Product
ECM	Error Correction Model
SCM	Supply Chain Management
TOC	Theory of Constraints
MOC	Management of Change
W&RSETA	Wholesale and Retail Sector Education and Training
CR	Composite Reliability
CFI	Comparative Fit Index
GFI	Goodness of Fit Index
IFI	Incremental Fit Index
NFI	Normed Fit Index
TLI	Tucker Lewis Index
RMSEA	Random Measure of Standard Error Approximation
KZN	KwaZulu Natal
SACSC	South African Council of Shopping Centers
POPIA	Protection of Personal Information Act
SMME	Small, Medium and Micro Entrepreneurs
SARS	South African Revenue Services
CPA	Consumer Protection Act
IP	Intellectual Property
CSR	Corporate Social Responsibility
FDI	Foreign Direct Investment
CPFR	Collaborative, Planning, Forecasting and Replenishment
VMI	Vendor Management Inventory
RFID	Radio Frequency Identification

JIT	Just in Time
RMI	Raw Material Inventory
WI	Work in Progress
MRO	Maintenance Repair Operating
FGI	Finished Goods Inventory
ERP	Enterprise Resource Planning
SKU	Storekeeping Units
WMS	Warehouse Management System
SV	Shared Variance
AVE	Average Variance Extracted
LISREL	Linear Structural Relations
AMOS	Analysis of Moments Structures
EMS	Equation Modelling Software
CFA	Confirmatory Factor Analysis
SEM	Structural Equation Modelling
SBT	Shifting Balance Theory
EFA	Explanatory Factor Analysis
KMO	Kaiser-Meyer-Olkin

CHAPTER 1: ORIENTATION OF THE STUDY

1.1 INTRODUCTION

The South African retailing sector is amongst the largest, most lucrative industries in the country and in Sub-Saharan Africa, with an estimated growth of about 1.9 percent reported in 2016 (Makhitha & Khumalo 2019:14). Growth in the retail sphere of South Africa has increased exponentially over the years and is concentrated on the big players in the fast moving consumer goods (FMCG) retail industry (Montandon 2015:125; Neboh & Mbhele 2021:58; Makaleng & Hove-Sibanda. 2022:1). This significant development is attributed to the diversification of operation processes, which has resulted in an increase in product offerings as well as a customisation drive, which are all meant to optimise customers' and consumers' satisfaction (Montandon 2015:125; Goga, Paelo & Nyamwena 2019:2). This highlights the significant visibility and presence of the industry in the country's economic sphere (Nair 2018:315).

The retail industry has experienced an irregular productivity rate, with a recorded 1.4 percent sales decrease in 2018 (Evolution of Retail 2019:2). This is attributed to various challenges such as legislation on the new Consumer Protection Act (Mugobo & Malunga 2015:224; Anyogu & Agubosim 2021:67), a decline in global commodity prices (Signe 2018:23), and excessive inventory (Chiromo, Nel & Sebele 2015:1966; Gautam & Ankit 2020:1140), to mention a few. Notwithstanding the mounting tactical significance of warehouse operations, the retailing sector still lacks the structure and a comprehensive overview of the increase in warehouse performance (WP) (Kembro, Norman & Eriksson 2017:3; Eriksson, Norrman & Kembro 2022:1095).

Based on the discussed literature highlighting the significance of the operational challenges facing the South African retailing industry, the present study suggests that one strategic way to address and mitigate the aforesaid productivity problem could be to streamline the firm's WP (Wangari & Kagiri 2015:79; Adeleke, Robertson-Andersson, Moodley, & Taylor 2021:167). This strategy could be done by adopting inventory management (IM) practices such as inventory shrinkage prevention (ISP), inventory investment (II), inventory turnover optimisation (ITO), inventory control (IC), and ABC analysis; and their strategic influence on inventory performance (IP) (Nalaika & Namusonge 2015:96; Shteren & Avrahami 2017:71; Nallusamy, Balaji & Sundar 2017:169; Akinlabi 2021:137). These practices are important in optimising IP, the latter which requires adopting preventive measures to minimise inventory shrinkage (IS) and turnover (Ekegbo,

Quede, Mienahata, Siwangaza, Smit & Bruwer 2018:57). Hussein and Makori (2018:973) suggest that investing in a firm's inventory contributes to improving its overall IP. Several studies (Breivik 2019:1; Prasad & Venkatasubramanian, 2019:23; Wambua, Okibo, Nyang'au & Ondieki 2015:259) established that inventory turnover optimisation, control and the ABC analysis are critical assessment indicators of inventory performance. As such, the IM practices selected for this study are deemed relevant to the context of the research.

The effectiveness of a warehouse process is based on the efficient management of its inventories to ensure the optimisation of its performance objectives, which in turn, contribute to the growth of the organisation (Li & Disney 2018:253). According to Derick (2018:1), warehousing is an important contributor to an organisation's supply chain network (Staudt, Alpan, Mascolo & Rodriguez 2015:5524; Mogale, Ghadge, Kumar & Tiwari 2019:1). Moreover, Mohamad, Suraidi, Rahman and Suhaimi (2016:300) and Wahab, Hamzah, Sayuti and Tan (2021:161) maintain that one critical determinant of WP resides in inventory turnover's constant availability and management.

Current evidence regarding IP relationship is inconclusive (Elsayed & Wahba 2016:66; Mandipa & Sibindi 2022:1). Repairs and operations in organisations are linked to the accessibility of inventory whenever demands occur, to build customer value (Khajavi, Partanen & Holmström 2016:2; Bhebbhe 2020:29). IP is seen as a critical tool to ensure continuous operational improvement by reducing down times, which result in effective maintenance, thus leading to effective WP (Hancerliogullari, Koksalmis & Calisir 2017:292; Hashmi, Amirah & Yusof 2021:77).

ISP is critical to any organisation because it affects operational optimisation (Fan, Chang, Gu, Yi & Deng 2015:664; Kgobe & Azor 2021:289). Besides, Xu and Zhao (2016:2) and Ngunyule (2020:13) viewed it as a key facilitator that organisations employ to monitor performance by contrasting and analysing optimal inventory record inaccuracies in the supply chains. It is, therefore, essential to understand the critical role that this construct plays as a determinant of minimising stock losses through its effects on stock rates and return on sales (Howell & Proudlove 2017:102; Jepherson, Ngugi & Morongoe 2021:1). Oballah, Wainganjo and Wachiuri (2015:709) and Ali (2020:1) argued that inventory investment (II) is imperative for the business cycle, which refers to the relationship between changes in II and gross domestic product (GDP) during a

recession. Albertson (2017:3) and Wajo (2021:61) highlights that the achievement of successful II forecasts is based on explicit modelling, called the Error Correction Model (ECM). Aro-Gordon and Gupte (2016:3) and Eryatna, Eltivia and Handayawati (2020:191) argue that inventory turnover optimisation (ITO) is critical in evaluating a firm's financial condition. They further described it as the rate at which goods are converted into cash.

Furthermore, Musau, Namusonge, Makokha and Ngeno (2017:1037) deduced that ITO, ISP, and II are significant predictors of firms' competitiveness. Islam, Pulungan and Rochim (2019:1); (Imarah and Roni (2020:319) and Leung, Chen, Yadav and Gallien (2016:3) emphasise the importance of IC and ABC analysis to the IM practices in achieving the required performance. In addition, a study by Khan and Siddiqui (2019:964) found IC as the main indicator with a positive influence on efficiency, which allows effective control as the main aim to achieve IP. Lastly, Indrasen, Rajput and Chaware (2018:134) endorsed ABC analysis to meet all IC systems and performance.

1.2 PROBLEM STATEMENT

South Africa has some of the largest retail outlets in the world and the largest in Africa. Growth in the sector is witnessed in the ever-increasing number of shopping malls (Mafini & Dhurup 2015:1295; Makhitha & Ngobeni 2021:1). A study conducted by Abe and Mason (2016:192) and Asoba and Patricia (2021:1) demonstrated that the retail sector is South Africa's fourth-largest contributor to its Gross Domestic Product (GPD), with direct input of about 15 and 22 percent to employment creation. However, despite its significant contribution to socio-economic development, the sector has been obstructed by a number of predicaments, which negatively affect its overall performance. A study by Makhitha (2016:256) and Etim and Olawande (2020:2) found demanding competition to be one of many challenges of poor retail performance. Other issues include a lack of adequate competitive strategies (Eicker & Cilliers 2017:2), high inventory levels (Cilliers 2018:1), and poor supply chain integration (Eicker & Cilliers 2019:5).

In light of the discussed operational challenges, one strategic solution recommended by this study to address the highlighted problems would be to optimise the capacity and capability of the industry's warehouse systems. This proposition could be achieved by implementing IM practices, such as ISP, II, ITO, IC, and ABC analysis and their effect on IP as a catalyst for the performance

objectives. The significance of this association cannot be understated, as pointed out by Mankazana, Silase and Molefe (2018:389), who advocated for the need to strengthen IM operations because of their roles in improving inventory and WP. However, there seems to be few recent empirical studies focusing on the stated relationships; apart from those conducted by Fan, YunChang, Gu, Yi and Deng (2015:661), Xu and Zhao (2016:3), Eminue and Titus and Udo (2019:45), who addressed the relationship between IP and WP in the retail environment. The fact that these investigations were conducted in contexts, such as online retailing (Goga, Paelo & Nyamwena 2019:1), customer loyalty (Mafini & Dhurup, 2015:1295), and the obesity crisis (Dobbs & Manyika 2015:44) is noteworthy. This research fills this research gap by evaluating the antecedent factors of WP in the South African retailing sector.

The conclusive results of this study could prove useful, not only for the retailing industry and organisations holding inventories at large, but also as a plausible addition to the available Supply Chain Management (SCM) literature.

1.3 AIM OF THE STUDY

The aim of this study is to investigate the influence of inventory management practices on warehouse performance in the retail industry in Gauteng and KwaZulu-Natal provinces.

1.4 OBJECTIVES OF THE STUDY

In order to achieve the aim of the study, theoretical and empirical objectives were formulated:

1.4.1 Theoretical objectives

The following theoretical objectives were formulated:

- 1) To review the literature on the retail industry in South Africa;
- 2) To review the literature on IM practices, namely, ISP, II, ITO, and IC;
- 3) To review the literature on IP;
- 4) To review the literature review on WP.

1.4.2 Empirical objectives

The following empirical objectives were formulated:

- 1) To determine the perceptions of SCM professionals towards IMP practices in the retail industry in the Gauteng and KwaZulu Natal provinces, South Africa.
- 2) To determine the perceptions of SCM professionals towards the level of IP and WP in the retail industry in the Gauteng and KwaZulu Natal provinces, South Africa.
- 3) To examine the impact of IM practices on IP in the retail industry in the Gauteng and KwaZulu Natal provinces, South Africa; and
- 4) To assess the impact of IP on WP in the retail industry in the Gauteng and KwaZulu Natal provinces, South Africa.

1.5 CONCEPTUAL FRAMEWORK

The research framework in Figure 1.1 is constructed to highlight the significance of the predictors' impact on the outcome variable. This framework consists of five variables, namely, predictors, which comprise ISP, II, ITO, IC and ABC analysis, a mediator variable (IP) and an outcome construct (WP). The conceptualised framework of the study is designed as follows:

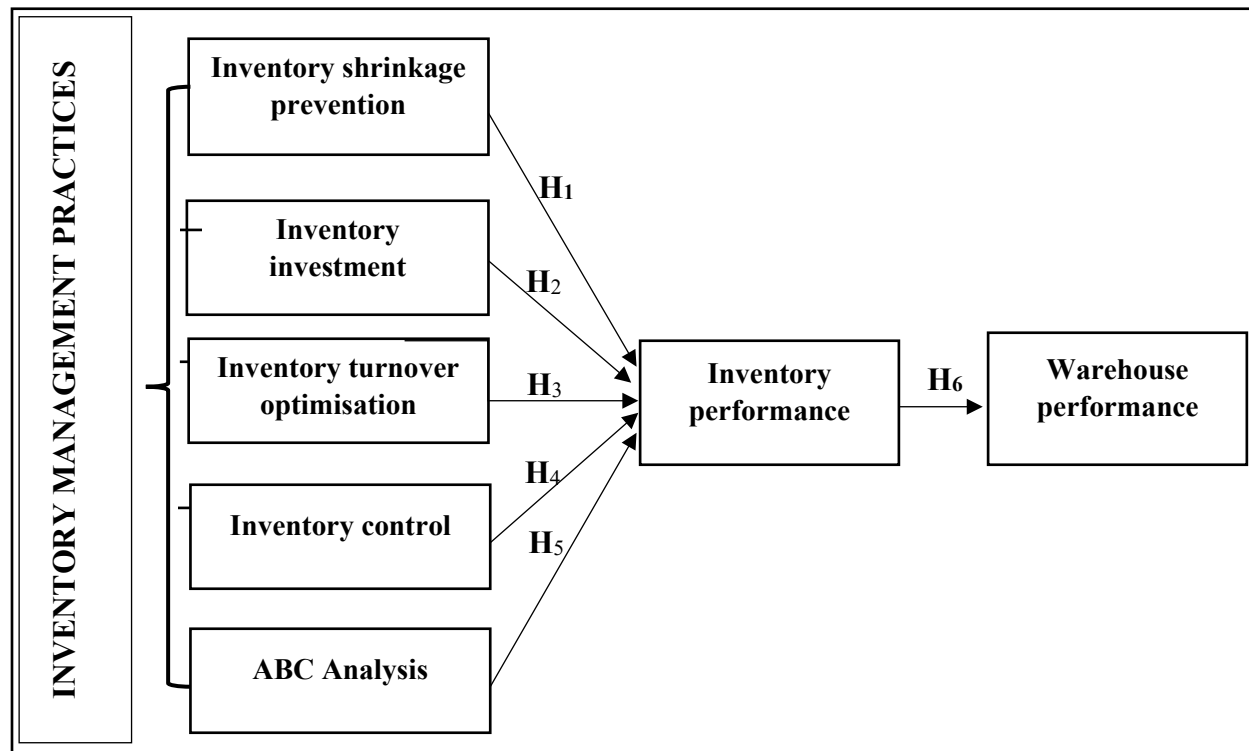


Figure 1.1: Conceptual framework

1.6 HYPOTHESES STATEMENTS

The hypotheses derived from the depicted framework are stated as follows:

H₁: There is a positive and significant relationship between inventory ISP and inventory performance.

H₂: There is a positive and significant relationship between II and IP.

H₃: There is a positive and significant relationship between ITO and IP.

H₄: There is a positive and significant relationship between IC and IP.

H₅: There is a positive and significant relationship between ABC and IP.

H₆: There is a positive and significant relationship between IP and WP.

1.7 PRELIMINARY LITERATURE REVIEW

This section provides an overview of the study's theoretical foundation as well as a brief insight into the literature review of the constructs of the study.

1.7.1 Theoretical framework

The theory of constraints (TOC) was developed as a technique to schedule production in a system, which is linked to the management of change (MOC) (Mabin 2015:3). As such, Okutmus, Kahveci and Kartašova (2015:138) defined TOC as an effective approach designed to manage firms' constraints that prevent them from achieving their goals. Additionally, Costas, Ponte, de la Fuente, Pino and Puche (2014:2) endorsed the significance of this theory as an efficient mechanism to improve the overall system performance and its role in ensuring sound efforts to improve the organisation's bottlenecks.

In respect to the context of this investigation, it could be posited that the TOC theory is a suitable concept to address the challenges retail enterprises encounter in driving up inventory performance. These include, among others, continuous change in the set of competitors, developing and standardising of new material and skills, to mention a few (Ford & Despeisse 2016:1575). Given the premise of the theory, the study further suggests that the effective and sustainable management of the identified inventory management practices, namely, ISP, II, ITO, IC and ABC analysis, is vital to mitigate potential bottleneck which may impede the IP, that ,in the process, hampers firms WP (Izmailov, Korneva & Kozhemiakin 2015:2; Iqba, Malzahn & Whitman 2017:11).

1.7.2 Empirical review

This section offers a brief preview of the literature on the identified constructs of the study.

1.7.2.1. Inventory management practices

IM, also commonly known as stock management refers to a set of processes to organise, manage and avail firms' items to their customers (Wild 2012). In organisations, IM performs the role of connector between different functions, such as purchasing, manufacturing and distribution to ensure that customers' requirements are met. (Miller 2010). Typical IM practices include inventory control (Lysons & Farrington 2006) and process auditing (Hussein & Makori 2018). A study by Oballah, Waiganjo and Wachiuri (2015) focused on stock valuation, IS (preventive), II, inventory turnover and ABC analysis as IM practices. However, the current considered six IM practices, namely II, ISP, ITO, IC and ABC Analysis, which are important elements of inventory and warehouse management. These practices play a critical role in strengthening internal controls that ensure optimal and quality inventory while providing value to customers (Opoku, Fiati, kaku, Ankomah & Opoku-Agyemang 2020:2). They further reduce unnecessary inventory wastages, shortages, theft, production costs while ensuring optimal sales growth, customer satisfaction, competitiveness and eventually survival of manufacturing firms

- **Inventory shrinkage prevention**

Inventory shrinkage (IS) is defined as the difference between the recorded value of stock in the inventory stock system that registers received inventory, and the value of actual inventory in the store, based on the physical inventory count (Eminue, Titus & Udo 2019:45). Therefore, due to these characteristics, the inventory shrinkage rate increases, and the small value of the cost of the unrecovered inventories exceeds the loss of unsatisfied demand of customers (Fan, Tao, Deng & Li 2015:121).

Firms use inventory shrinkage as a critical measuring tool by firms to trace the accomplishment of the lead time to customers, on-time delivery from the supplier base, and achieving freight and budget requirement (Oyebamiji 2018:3). Inventory-generated mistakes have been investigated by many researchers in the inventory operation precesses, with inventory shrinkage known as the

main cause of inventory inaccuracies (Lei, Zang & Zou 2018:3; Dai, Li, Yan & Zhou 2016:457; Zadeh, Sharda & Kasiri 2016:624).

In their study on shrinkage risk management initiatives, Ekegbo, Quede, Mienahata, Siwangaza, Smit and Bruwer (2018:54) refer to ISP as a set of preventive or proactive measures firms take to keep or maintain the level of IS at a minimum.

- **Inventory investment**

The concept of II is defined as a change in the material stock, process and finished goods over a certain period within an organisation (Lee, Zhou & Hsu 2015:38). The manufacturing and retail sectors are regarded as the most vital mechanisms of II of raw materials and supplies, accounting for 20% of production fluctuations (Huang 2016:58).

Low II determines the effectiveness of an organisation's inventory management systems and how a successful company provides high-level customer service (Imeokparia 2015:21). Serrasqueiro and Azevedo (2016:6) also mention debt as one of the determinants of II due to a firm's heavy reliance on external capital such as loans to finance their needs. Organisations keep their II to a bare minimum for internal finance challenges rather than to reduce fixed investments (Gharaibeh, Zurigat & Ananbeh 2016:494).

- **Inventory turnover optimisation**

ITO is the cost of goods sold by a firm to its average inventory level during a given period (Hancerliogullari, Sen & Aktunc 2016:682). It is a tool used by organisations to measure inventory performance levels and profitability. The higher the inventory turnover, the greater the profitability and levels can significantly decrease when the turnover is at a lower level (Nasution 2020:1). Managers and different industries use inventory turnover to ascertain inventory performance (Khan, Deng & Khan 2016:147). It can also be used as a measure of inventory performance (Breivik 2019:1). Although it has been utilised as a performance indicator, some industries, such as manufacturing, use it to facilitate the pace at which goods and products move in and out of the factory (Kwak 2019:2). Also, it is a vital performance indicator of inventory management within procurement for most companies (Cramer & Lakso 2015:4).

- **Inventory control**

IC is defined as the process of coordinating, controlling and ensuring the accessibility and availability of stock and the prevention of any loss or surplus in inventory count (Borade & Sweeney 2015). Furthermore, Abogrean, Own and Akreem (2017:1) posited that customer satisfaction is a key determinant in ensuring adequate adherence to quality inventory. It is essential to note that inaccurate inventory records have a negative impact on warehouse inventory performance; inventory management depends on accurately gathered inventory data (Sahin & Dallery 2015:1).

- **ABC analysis**

ABC analysis is defined as an analytical management tool designed to detect items that influence the overall costs of inventory (Mahagaonkar & Kelkar 2017:616). It is regarded as an inventory categorisation, as opined by Mahagaonkar and Kelkar (2017:616), who further regard it as a method that allocates the following three portions, namely:

A: relatively small in number, but accounts for the high-value items;

B: comprises a middle range between A and C; and

C: encloses the minimum valued items.

It contains an instrument that seeks to identify the overall inventory costs whilst serving as a tool that identifies various stock categories that need to be managed and controlled accordingly (Kumar & Soni 2017:1). It is also used as a tool to categorise inventory that requires a proper controlling technique to understand the carrying costs of holding stocks (Kumar & Soni 2017:1). There have been omissions on how ABC analysis is managed in the retail industry. There is a view that category A consists of critical products that should be of significant attention compared to category B, which involves the middle stocks, with minimal criticality and less critical items are categorised in group C (Ravinder & Misra 2014:257).

1.7.2.2 Inventory performance

IP is regarded as how organisations measure the effectiveness and competence of using and replenishing inventory (Elsayed & Wahba 2016:69). It is further identified in terms of cost, availability and fill rate when optimal safety stocks are used (Hedenstierna & Disney 2016:1084). According to Wang and Petropoulos (2016:5272), it can be measured using tools such as orders'

variance (bullwhip effect), inventory variance and service levels. An organisation must focus on proper inventory management to improve its resources and achieve superior inventory performance (Lee, Zhou & Hsu 2015:36).

1.7.2.3 Warehouse performance

WP refers to the measurement of the optimal use of storage space, customer relations activity, quality level, asset usage and costs (Liviu, Ana-Maria & Emil 2009:307). Performance is generally discussed by how it should be developed, usually by creating measuring instruments in warehouse activities that reduce inventory and increase faster warehouse response times (Lu, McFarlane, Giannikas, & Zhang 2015:2). A study by Mickelson, Thai and Halim (2019:5) describes warehousing as an industry that receives, ships, and supports various products to guarantee consistent supply to the market. The prominence in warehousing and understanding its operation is that any improvement in the performance will eventually be reflected in the performance of the entire retail chain (Abushaikha, Salhie & Towers 2018:6).

1.8 RESEARCH DESIGN AND METHODOLOGY

This section discussed the methodological aspects used to undertake the study effectively. Topics discussed include the research approach and design, sampling design, the procedure to collect data, data analysis and ethical considerations.

1.8.1 Research approach

A research approach is defined as a as an inquiry procedure designed at underlying assumptions through a data collection and research design (Creswell 2014:3). It consists of three main approaches: qualitative, quantitative and mixed methods (Grover 2015:2).

A qualitative approach is a technique that calls for a sound interpretations of events without relying on numerical analysis to attain specific research' objectives. It aims to explain data that assists in human beings' experiences in an interpretive approach (Jackson, Drummond & Camara 2016:23). Apuke (2019:41) viewed a quantitative research approach as a technique that deals with quantifying and analysing variables in order to get results. A mixed method is defined as a combination and integration of both qualitative and quantitative research methods in the same study (Molina-Azorin 2016:39). A quantitative research approach was used for the current study.

This approach contains a large sample and does not take a comparatively long time to collect data (Rahman 2017:102).

A quantitative approach is suitable for this study because the study sought to establish the relationships between different constructs and to understand SCM professionals' perceptions regarding adopting inventory management practices. The study maintained that this approach, anchored on numerical and statistical analysis parameters, provided an objective basis for findings (Daniel 2016:94).

1.8.2 Research design

Research design is viewed as a research structure that holds together all elements of a research project (Akhtar 2016:68). The study used a combination of correlation and survey design methods. The selection of these two design methods is based on the rationale that the study sought to establish the relationship between ISP, II, ITO, IC and ABC analysis and their proposed influence on IP and WP in the retail industry in Gauteng and KwaZulu Natal provinces in South Africa.

This study used a survey design, which is defined as the practice of developing a survey to achieve appropriate and accurate information from the survey research (Odoh & Chinedum 2014:18). This form of research permits the use of different techniques to acquire respondents, data collection and use of various methods of instrumentation (Ponto 2015:168). Data were collected through a survey directed at all supply chain professionals operating in the warehouses of their organisations with knowledge and expertise in inventory management.

1.8.3 Sampling design

Sampling design refers to the plans and methods to be followed in selecting a sample from the target population and the formula used for technical assessment of calculating statistics of the sample (Voss, Zimmermann & Zimmermann 2016:534). Sampling design consists of the following characteristics: target population, sampling frame, sample size and sampling technique (Kabir 2016:170).

1.8.4 Target population

A research's target population is a group of individuals from which information is required to be discovered (Asiamah 2017:1611). For the purpose of this study, the target population was all

supply chain professionals operating in the warehousing facilities in the retail companies in the Gauteng and KwaZulu-Natal provinces in South Africa.

1.8.5 Sampling frame

A sampling frame is a list of the actual cases from which the sample will be drawn (Taherdoost 2016:20). It should also be regarded as representative of the population. For this study's purpose, companies operating in Gauteng and KwaZulu-Natal provinces were selected as the main framework of the study. The selection of the provinces is because they are considered as financial nerve centres, not only in South Africa (Statistics South Africa 2017:59). There was no sampling frame available in the study.

1.8.6 Sampling size

Sample size refers to the number of participants from whom the information will be obtained (Gentles, Charles, Ploeg & McKibbin 2015:1782). The size of the study was determined through the use of the historical sample size approach, as suggested by Molenberghs (2016:164). In line with the historical sample size approach, a review of SCM studies is conducted and presented in Table 1.1.

Table 1.1: Historical sample size

Title of the study	Author(s)	Sample size
Modelling the link between supply chain risk, flexibility and performance in the public sector.	Mhelembe and Mafini (2019)	N=500
Inventory Management and Performance of SMEs in the Manufacturing Sector of Harare.	Muchaendepi, Mbohwa, Hamandishe and Kanyepe (2019)	N=200
Managing logistical supply chain drivers: A predictor of small township retailers' odds of survival	Eicker and Cilliers (2018)	N=500
Enhance supply chain performance through supply chain practices.	Sibanda and Pooe (2018)	N=500
SME owner-manager perceptions towards supply chain management practices and performance and South Africa.	Okoumba and Mafini (2016)	N=500
Supply chain practices and performance: the indirect effects of supply chain integration	Sundram, Chandran and Bhatti (2016)	N=250-500
Role of inventory management on performance of manufacturing firms in Kenya: A case of new Kenya co-operative creameries.	Kimaiyo (2014)	N=500

Source: Author's compilation

Table 1.1 presents historical sample size determination from previous SCM studies. Lalla, Cowden and Karodia (2015:236), Okoumba and Mafini (2016:637), Eicker and Cilliers (2018:1) and Sibanda and Poee (2018:1) used a sample size of n=500, Muchaendepi et al. (2019:254) used n=200. Moreover, Taherdoost (2016b:23) supports the rationale that a larger sample size offers a greater prospect of obtaining more relevant, accurate findings that could be adequately generalised. While Gill, Johnson and Clark (2010:1) postulated that a sample size between n=50 and n= 100000 provides an acceptable basis for obtaining a more accurate representation of a study's population. Therefore, the sample size in this study was pegged at n=500.

1.8.7 Sampling technique

A sampling technique is a process or technique used to search and select the background and/or participants who can deliver rich information on the phenomenon of interest (Moser & Korstjens 2018:10). There are two main sampling techniques: probability sampling method and non-probability sampling (Datta 2018:1). Non-probability sampling, using the purposive technique, was selected for this study, since there was no sampling frame.

1.8.8 Measurement instruments

Data collection is gathered by means of a structured survey questionnaire in this study. The questionnaire was divided into five sections. Section A focused on the firm's general profile, with section B on demographic information of individual respondents with an emphasis on age, gender composition, population group, home language, educational background and employment type (permanent or non-permanent). Sections C to G concentrated on measurement instruments of the constructs of the study.

ISP was measured using a six item-scale adapted from Ekegbo *et al.* (2018:57). II and IC were assessed on a five item-scale derived from Hussein and Makori (2018:973), while ITO was ascertained through a four item-scale from Oballah, Wainganjo and Wachiuri (2015:713). ABC analysis used a four item-scale adapted from Wauna and Obwogi (2015:10). IP was measured using a five item-scale adapted from Awuah-Gyawu, Adzimah and Brako (2015:44). WP used a six item-scale adapted from Hussein and Makori (2018:974). These measurement instruments were assessed on a five-point Likert scale anchored by 1= strongly disagree to 5= strongly agree.

1.8.9 Data collection method and procedure

Data collection is gathering and measuring information variables by establishing systems that enable answers to the specified research questions, test hypotheses and evaluate the outcomes (Kabir, 2016:202). Data collection was done using both a physical distribution of the questionnaires and electronically via email developed on Google forms. This procedure involved two methods: physical distribution, and email. The method used to collect data was chosen due to its efficient way of gaining large volumes of information from large groups of respondents.

1.9 DATA ANALYSIS

This section focuses on the data analysis aspects of the study.

1.9.1 Reliability and validity assessment

The aspects discussed include the reliability and validity properties of the research constructs.

1.9.1.1. Reliability analysis

Reliability refers to how the stability and consistency of results are achieved by measuring a phenomenon (Akib & Ghafar 2015:64). As such, the reliability of the constructs was determined using the Cronbach Alpha coefficient, composite reliability (CR) and Rho_A coefficient as the most commonly used internal consistency measures. As endorsed by Ursachi, Horodnic and Zait (2015:681), Cronbach's Alpha coefficients, CR and Rho_A threshold values should be between or greater than 0.70 and 1.00 for items to be ascertained with the degree of reliability of the constructs.

1.9.1.2. Validity analysis

Validity expresses the degree to which a measurement measures what it purports to measure (Bolarinwa 2015:196). As supported by Ghazali (2016:148), validity analysis was measured using the two measurement properties, namely, content validity and construct validity.

- **Content validity**

Content validity refers to the degree to which elements of an assessment instrument are relevant to, and representative of, the targeted construct for a particular assessment purpose (Yassir, McIntyre & Bearn 2017:402). In this study, content validity was measured using a pilot study where 60 questionnaires were sent to the field to determine their level of validity and reliability.

- **Construct validity**

Construct validity is defined as the fundamental issue of validity research, listing all other types of validity evidence (Ammitzbol, Skovgaard, Holstein, Andersen, Kreiner & Nielsen 2019:5). It was measured using its two variants, namely, convergent and discriminant validity.

- **Convergent validity**

Convergent validity is the extent to which a construct measured in different ways yields similar results (Boateng, Neilands, Frongillo & Melgar-Quinonez 2018:14). It was determined using item-to-total correlation values and item loading values (standardised regression weights) as Yahya (2015:14) specified.

- **Discriminant validity**

Discriminant validity exists when measures of different variables are significant but only slightly correlated with each other or not correlated (Engellant, Holland & Piper 2016:46). Discriminant validity was assessed using the Fornell and Larcker criterion, the threshold or cut-off value of which between constructs, should be no higher than 0.7 (Hamid, Sami & Sidek 2017:2; Coetzee, Marx & Potgieter 2017:5).

1.10 ETHICAL CONSIDERATIONS

The study complied with a number of ethical aspects. These include the following:

- **Permission**

The researcher obtained ethical clearance from the university research ethics committee to ensure the credibility and soundness of the study. Furthermore, informed consent from the potential participants/respondents was sought. This process adhered to the principle of self-compliance from the targeted individuals and protected their privacy.

- **Voluntary participation**

No participants were forced to take part in the study, and participation was entirely voluntary. This is to ensure that the respondent's involvement is protected, fair and with consent.

- **Confidentiality**

The researcher ensured that the responses are anonymous and confidential and the right to privacy was taken into cognisance.

- **Anonymity**

For this study, the researcher maintained the anonymity and confidentiality of the respondents to ensure that respondents were all made aware of the information they were required to provide answers.

- **Accuracy and fairness in analysis and interpretation of results**

This is to ensure that any type of communication about the research was carried out with honesty and transparency. Lastly, the formulation of the questionnaire did not contain any use of offensive, discriminatory or other inappropriate language.

1.11 OUTLINE OF THE STUDY

This research report is organised as follows:

Chapter 1: Introduction of the study. This section provides an outline and background of the study and the problem statement, research objectives and the research methodology.

Chapter 2: Literature review on the retail sector. This chapter addresses the retail sector background of South Africa and its economic impact.

Chapter 3: Literature Review on Research Constructs. This chapter reviews the literature on the research constructs chosen for the current study. The constructs include ISP, II, IC, ITO, TUR, ABC, IP and WP. The section focused on the emergence in the construct, definition, factors influencing them, significance, the outcome and how it is measured.

Chapter 4: Literature review of the variables and the development of hypotheses. This chapter advances the significance of the empirical evidence and findings on the variables employed in the study and the theory used to examine ISP, II, ITO, IC, ABC analysis, IP and WP. Development of the hypotheses is demonstrated and further illustrates the model used in the study.

Chapter 5: Research design and methodology. This chapter provides an explanation of the methodology used, how data is collected, and the sampling method utilised. It outlines the data analysis and techniques that are used for statistics in this study.

Chapter 6: Data analysis. This chapter analyses and explains data, and the research findings are evaluated and interpreted.

Chapter 7: Conclusion and Recommendations. Recommendations based on the main objectives and findings of the study are provided in this chapter.

1.12 CHAPTER SUMMARY

This study aimed to link inventory management practices to inventory and warehouse performance, addressing the retail industry in the South African context. This chapter provides an orientation of the study. It first provides an introduction and background to the study, providing details about the retail sector and its importance to the South African economy. The chapter also presented the problem under investigation, which is the limited performance of the retail sector due to inventory-management-related problems. The chapter presents the aim, objectives, conceptual framework and hypotheses tested in the study. A preliminary review of the literature was presented, with the TOC identified as the theoretical anchor of the study. The chapter provides a summary of the research methodology. The study is based on a quantitative method and used a purposive sample of supply chain professionals drawn from the Gauteng and KwaZulu Natal provinces' retail sectors. The chapter indicates that various ethical considerations were followed, namely, permission, voluntary participation, anonymity, accuracy and fairness in analysis and interpretation of results. The final section of the chapter presents the chapter classification, indicating that the dissertation is divided into seven chapters. The next chapter presents the literature on SCM in the retail sector in South Africa.

CHAPTER 2: LITERATURE REVIEW ON SUPPLY CHAIN MANAGEMENT IN THE RETAIL SECTOR IN SOUTH AFRICA

2.1 INTRODUCTION

This chapter reviews the literature on the importance of SCM in the retail industry of South Africa and its significance in the overall structure of the retail chain. An overview of the retail industry's challenges, role, and impact on the South African economy is discussed. The chapter defines the retail industry in an attempt to understand the supply chain elements throughout the industry's value chain in South Africa. Due to the rapid growth in operations and technology, the chapter addresses the principal characteristics, functions, types of retail and products, and significant role players who positively contribute to the sector. Supplementary to the above efforts of the study, the significance of the industry in the South African economy is classified, based on the contribution of its sales to the GDP, creation of employment, contribution to innovation and last, social welfare, social responsibility and food security.

The chapter also outlines the challenges faced by the South African retail industry, such as operational challenges, high unemployment, weak disposal income, a high debt-to-income ratio, COVID-19, public unrest and acts of God. The last section considers previous research on SCM's role in the retail sector and the conclusion of the chapter is also presented.

2.2 OVERVIEW OF THE RETAIL INDUSTRY IN SOUTH AFRICA

This section provides an overview of the retail industry and further explores its operational characteristics. Besides, specific attention is paid to exploring the key players relevant to the industry.

2.2.1 Definition of the Retail Industry

The concept of retail has received significant attention from various scholars (for example, Beneke & Carter 2015:25; Battersby & Watson 2016:1; Dubihlela & Ngxukumeshe 2016:163). According to Hameli (2018:2), the word retail originates from the French "retailer," which translates as "to cut a piece off" or "to break bulk". It is the term used to define its role in the distribution channel, despite its different characteristics, to interpret its consumers' demands and have required goods

available; at the right time and with the correct specifications (Madhani 2015:205). Moreover, retail is defined as a place where a trade in objective and subjective value trading takes place, and the customer transacts and receives products or services (Chamie & Ikeda 2015:47). From a SCM perception, the term is viewed from two perspectives, as pointed out by Kotzab and Bjerre (2015:17). These include a functional and institutional perspective. The former refers to a combination of utilities that add value to products/services traded to the customers. At the same time, the latter is regarded as a specific institution within a marketing channel that executes retail functions.

Retail can be defined as an activity that begins locally and involves a transaction where a buyer intends to consume a product (Hassan, Sade & Rahman 2013:584). It is a function that comprises a set of activities where products and services are marketed by making them available and supplying them to the consumers (Bagdare 2015:10). Retail is again defined as the basic set of services retailers provide to their customers (Rhodes 2018:4). Furthermore, Dhaliwal (2015:2) viewed it as a convenient, effective, and comfortable selling of goods and services. While Dunne, Lusch, and Carver (2014:6) positioned that it consists of the final activities and steps needed to place merchandise made elsewhere into the consumer's hands or to provide services to the consumer.

Lastly, retail involves the sale of goods to end-users not to resell but for usage by the buyer (Nizam & Hoshino 2015:40). In light of the reviewed literature, it could be observed that the concept of retail is a crucial supply chain element that provides an effective link between the inbound and outbound side of an organisation's value chain of activities. Based on the stated observation, the present study adopts Dunne's conceptualisation, which refers to the last steps and activities required to ensure products and services made by manufacturers are in the consumers' possession.

The South African retailing sector is one of the fastest growing and contributing sectors in the economy; this section accounts for the industry's worth of the operational aspects. Therefore, it is imperative to cover critical aspects that impact the retail sector's overall economic development and growth. More emphasis is given to the South African context of the industry to address the provinces highlighted in the study, which are Gauteng and KwaZulu Natal; some global relevance is provided.

2.2.2 Operational Characteristics of the retail industry in the South African Context

In this section, an emphasis is placed on explaining the industry's core characteristics, outlining its different types and functions, and reviewing its role players.

- **South African retail industry background**

The South African retailing industry has seen massive growth in the past eight years. This contribution is attributed to retail players' growth and development in enlarging the business across the borders (Mantandon 2013:125). Some additional contributing factors in the expansion of the retailing sector are based on the increasing demographic of the South African population and the socio-economic growth in the economy as observed in the last six decades (Venema 2016:1).

Figure 2.1 presents the breakdown of the country's population, which further highlights the correlation between the two factors as one of the main contributors to the sector's growth.

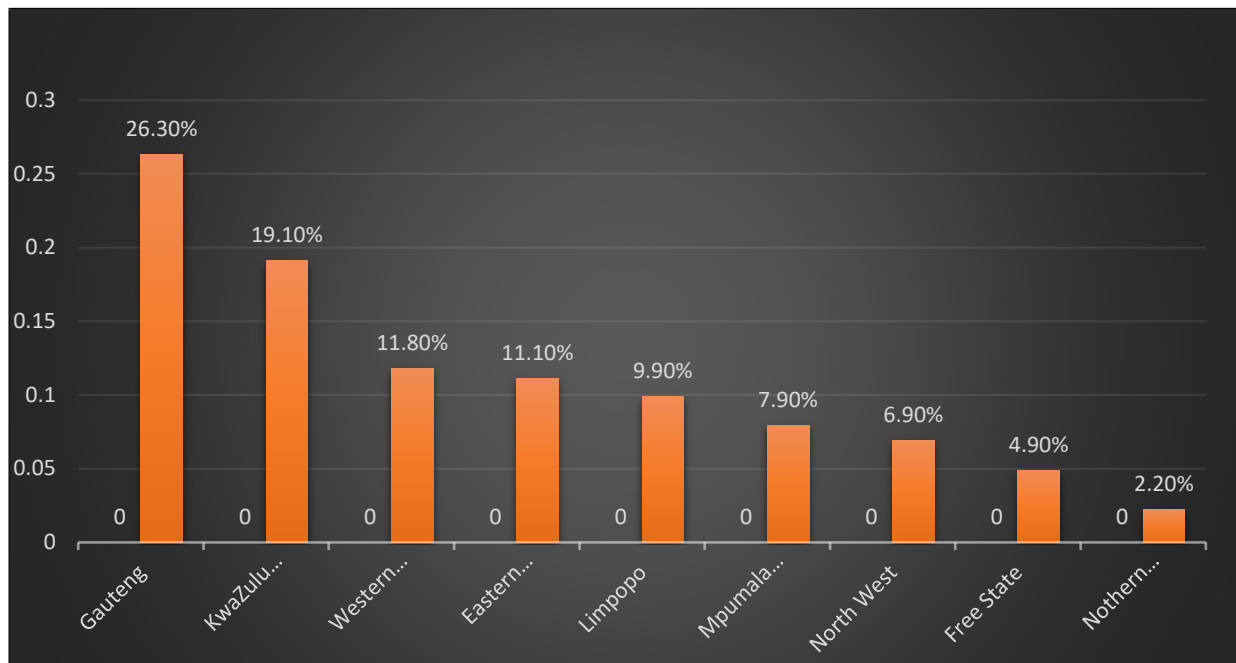


Figure 2.1: Breakdown of South African population

Source: Business Tech (2021)

Figure 2.1 reports the number of people in each province; the report highlights the provinces with the highest and lowest population numbers, respectively. The figures show that Gauteng and KwaZulu Natal have the highest population in the country compared to other provinces; when

including the Western Cape, they account for over fifty per cent of the entire country population. Therefore, it becomes essential to note the significance of this study's focus on the provinces mentioned above as the central points of the South African economy. In light of the provided information, it is crucial to recognise the retail sector as one of the South African major economy boosters (Malgas, Mutize & Mason 2019:8).

The evolution in retail is increasing fast due to changes brought by technology and the ever-changing consumer behaviour (Grewal, Roggeveen & Nordfalt 2017:4). Developed and growing developing countries, such as South Africa, comprised some world-class retail facilities ranking fifth in the world for the maximum total number of retail centres (Prinsloo 2016:1).

Figure 2.2 provides South Africa's global standing as one of the leading countries with the facilities; this indicates its dominance on the African Continent by a significant margin.

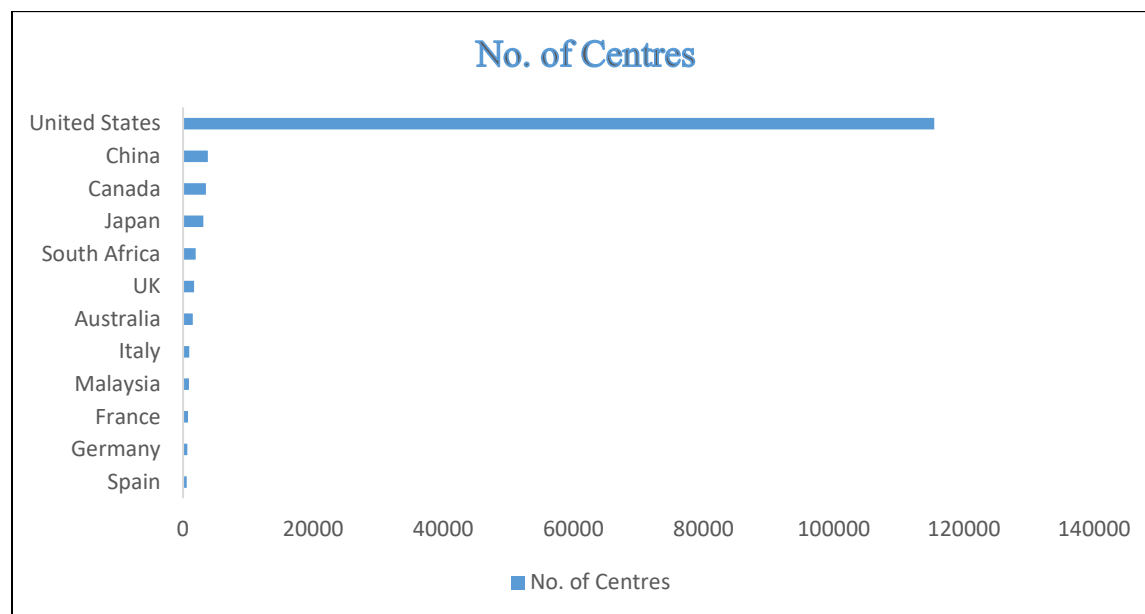


Figure 2.2: World-class retail facilities rankings

Source: Prinsloo (2016:1)

Barriers that impact segregating different countries have been meaningfully reduced due to the extraordinary scale that leading players are operating in (De-Juan-Vigaray & Seguí 2019:6). According to Tran (2015), barriers such as cultural complexities, language barriers, regulations, shipping costs, and tax duties were negatively impacting many businesses doing businesses across the broader environment. Figure 2.2 proves that the South African retail business is ranked among

the best in the world; if it is not the best, it comprises the players that have the capabilities to overcome those barriers.

The firms' strategies' future and sales rely heavily on the number of people flocking into retail outlets to purchase. This section indicates the importance of the population in the provinces involved as a sample for the current study. Based on the above-mentioned information, it is evident that Gauteng and Kwazulu Natal are the first and second largest provinces in the country, respectively. It should also be noted that the numbers in these provinces are based on the migrations from small towns and rural areas for better opportunities. As a result, the high turnover of purchases has placed the South African retail industry in a good position globally, contributing positively to the economy. The key role players are ensuring that all the constraints of venturing into foreign markets are met.

- **Types of retail in South Africa**

South African trade space has generally been described as having a dualistic socio-economic structure divided between formal and informal sectors (Charman, Petersen, Piper, Liedeman & Legg 2015:2). The "formal" retail is seen as highly tax regulated. It exists amongst the structured legal framework, with "informal" existing within the margins of regulation and legality (Charman, Petersen, Piper, Liedeman & Legg 2015:1). The informal sector is defined as unauthorised and unregulated and is mostly legal, but unregistered economic activity that is either solely or partnered (Blaauw 2015:5). The formal sector comprises the medium and large entities that are structurally legal, registered for tax purposes, and portrayed as the primary/secondary sectors (Burger & Fourie 2019:1). Thus, markets in townships and rural areas are regarded as independent retailers because formal entities were unwilling to enter the space during the apartheid period (Makhitha 2017:417).

There are five divisions comprising the South African trade industry: the South African retail chain includes many stores that range from a kiosk to small groceries, supermarket chains, and malls selling various products and services to use at home or are personal to the consumer (Hameli 2018:1). The retail industry is becoming so diverse that some bank functions are now regarded as retail banking; big banking players are strategically entering into partnerships with retailers and supermarkets (Coetzee 2018:9). The industry has various categorisations consisting of groceries,

fast food, clothing, just to mention a few. Figure 2.3 depicts some of the products that exist in the retail industry; it also indicates how popular they are in terms of sales.

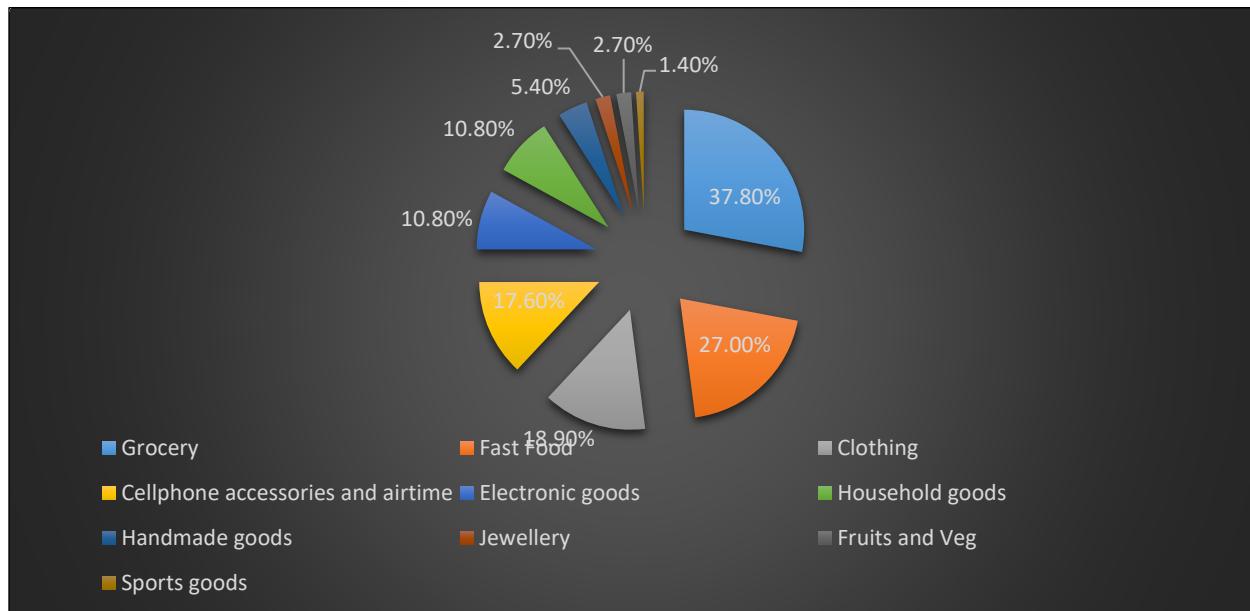


Figure 2.3: Types of products

Source: Makhitha (2019:8)

Figure 2.3 provides information on the type of products sold in the market and how well the customers respond to them. Groceries are the most popular on average with 37.8 percent of customers, followed by fast food at 27.0 percent. As depicted in figure 2.3, it becomes apparent that sportswear is the least popular product in the industry, sitting at 1.4 percent of its popularity. The product and service diversity, customer service levels, and price play a crucial role in customers' decision to purchase a product, affecting the product population. Table 2.1 identifies the types and categorisation of retail outlets in South Africa.

Table 2.1: Complete list of types of retailers in South Africa

Code	Retail Type	Code	Retail Type
62393	Retail Trade in Sports Entertainment and Sports Requisites	62311	Retail non-prescribed Medicines and Pharmaceutical products
62400	Retail Trade in Second Hand Goods in Store	62321	Retail Trade in Men's and Boy's clothing
63310	Sales of new parts and Aaccessories	62322	Retail trade in ladies and girls' clothing
65000	Selling and retail of new plastic bags and products	62323	Retail trade general outliners and by piece goods, textiles, leather and travel accessories
65002	Retail of body clothing	62324	Retail trade in shoes

65004	Retailing of beauty products	62330	Retail trade in household furniture, appliances, articles and equipment
65006	Retail of packing material	62340	Retail trade in hardware, paint and glass
63500	Retail of sale of automotive fuel	62391	Retail trade in reading matter and stationery
65001	Selling of garage equipment	62392	Retail trade in jewellery, watches and clocks
65003	Selling of wooden doors	62399	Retail trade in other specialised stores
65005	Sale of marine equipment and everything to do with boats	63122	Retail sale of used motor vehicles
61510	Sale of new parts and accessories	63311	Sale of tyres

Source: W&RSETA (2020)

The significance of Table 2.1 is a recognised list used by W&RSETA to classify and categorise different retail entities in terms of their specialties. The list clarifies that typical retail businesses can be classified under one code such as "62323: Retail Trade in Ladies and Girls" but still find a store such as Milady's, whose target is completely based on elderly women. It can be concluded that according to the provided information, the list combined all the retail types that operate in South Africa into context.

This section is a follow-through of section 2.2 that addresses the country's population and its impact on the economy and enhancement of retail technological demands. Classification of products shares the sentiments of what customers are looking for in the market. This information is used to categorise the fast-moving to the slow-moving. These reasons have been viewed as reasonable for employing all these practices as the catalyst for the construction of the current study.

- **Major players**

Some of the main players in the South African retail industry are Edcon Pty (Ltd), Pick 'n Pay Holdings Ltd, Shoprite Holdings Ltd, Spar Group Ltd, Woolworths, Massmart, JD Groups (Kim 2016:220; Mantandon 2013:127; Schmidt, Mason, Steenkamp & Mugobo 2016:4). The top five major role players in South Africa are Pick 'n Pay, Shoprite, Spar, Woolworths, and Massmart Holdings Ltd, together made an R467 billion turnover in the 2016 financial year (Makhitha & Khumalo 2019:5; Chizema & Kleynhans 2016:100). The following table portrays the leading five retail outlets from 2016 to 2018.

Table 2.2: Top five leading retail outlets in South Africa

Retailer	2016	2017	2018
Shoprite	24%	24%	24%
SPAR Group	24%	23%	23%
Pick 'n Pay	16%	16%	16%
Woolworths Holdings	4%	4%	4%
Massmart	2%	2%	2.1%

Source: Keen (2018)

Table 2.2 depicts the key role players in the retail markets and how they consistently dominated from 2016 – 2018. It is clear from the evidence provided in the table that the dictating stores are well within the front running for more years to come. It indicates a larger contribution in percentage to the economy. It is also obvious that the first three players are the most dominant, as they share sixty-three percent of the country's retail sales in the retail market value.

There has been great representation from the South African key players such as Pick 'n Pay, Mr Price, Woolworths, Truworths and Massmart, amongst others, who have a big footprint in the continental trade, which is a significant boost for the economy (Dakora, Bytheway & Slabber 2014:2018). The global market has realised the importance of comprehensive protection in the retail sector. South Africa has joined the movement of enacting legislation that supposedly transfers power from the seller to the buyers (Mugobo & Malunga 2015:224).

Given the presented literature, one could advance that the South African retail market's supply chain and retail landscape are unique in the continent, whilst most countries are trying to catch up to join the fastest-growing market. The major players are taking advantage of the situation to expand into unexploited markets and competitive advantage. These outlets are in the formal sector, so it is easier to track and trace their progress, unlike in the informal sector, where most stores are not even in the tax revenue books. This industry shapes the South African economy by creating employment and boosting per capita income.

- **Legislative pieces**

All businesses in South Africa are governed by various laws related to their functions; these are the laws and policies that protect different roles in the industries. This section outlines these laws related to the South African retailing industry.

Although the regulatory environment and all related legislation and compliance, are seen as fundamental challenges for many in the sector, they are also implemented to protect different stakeholders (Nieuwenhuize 2019:667). The expansion of businesses inside and outside the South African borders has resulted in some policies being developed by the South African Government. These include the competition policy, taxation, industrial policy, Protection of Personal Information Act (POPIA), consumer protection, and intellectual property protection (Goga & Paelo 2019:1; Mugobo & Malunga 2015:224). Legislative pieces can force pressure against growth due to uncertainty above controls and developing legislative weight; this includes introduced amendments in the Consumer Protection Act (PWC 2012).

Based on the above literature, six laws and regulations have been identified for this study. These include the Competition Act, Taxation, Industrial Policy, Protection of Personal Information Act (POPIA), Consumer Protection, and Intellectual Property Protection Act. This study briefly explains their roles and relevance in the South African retail industry as a whole.

- **The Competition Act:** Act 39 of 2000 highlights the overall controls and ownership of various sectors, including the retail industry, which is intended to facilitate an economy flexible enough to accommodate ownership by South Africans (Vilakazi & Mavindidze 2014:16). The Act makes provision to simplify and enhance prohibited practices, such as, abuse of domination, price discrimination, promotion of transformation and growth, addressing structures and de-concentration of markets, and protecting Small, Medium, and Micro Enterprises (SMME), among others (The Republic of South African Gazette 2019).
- **Taxation Policy:** Tax complexity has existed over the years mainly through changes to tax legislation, administrative practices, society, and politics, many of which were put in place after the first democratic election in South Africa in 1994 (James, Sawyer & Budak 2016:159). The South African Revenue Service (SARS) administer a wide range of amendments to the South African Revenue Service Act, of 1997, including retail sectors that fall under primary legislation (SARS 2018).

The following Acts are examples of the primary legislation SARS administers that affect the sector:

- Income Tax Act, 1962
- Customs and Excise Act, 1964
- Value-Added Tax Act, 1991
- Tax Administration Act, 2011 and
- Employment Tax Incentives Act, 2013.
- **The Industrial Policy:** The South African industrial policy foundation provides a system that explains investment incentives in detail to broaden economic participation, growth, and job creation (Kaplan 2019:2). The policy supports the entire value chain of the sector to combat the struggle to face the fierce competition arising from entry into the domestic market of global retailers and supply chains supporting them (Department of Trade and Industry 2018:7).
- **The Protection of Personal Information Act:** The South African Law Reform Commission endorsed a piece of data privacy legislation when they approved the inclusion of "Privacy and Data Protection" on 17 November 2000. The President of South Africa approved the piece to be amended to the Protection of Personal Information Act 4 of 2013 (Naude 2014:2). The Act regulates how personal information is processed in South Africa. It makes provision for personal information to be utilised for direct marketing (Veiga, Vorster, Pilkington & Abdullah 2017:16). The Act protects the personal information of employees and consumers so that they are not victims of various crimes that take place and leaves people in dire situations.
- **The Consumer Protection Act:** The South African National Consumer Act (CPA) was passed on the 1st of April 2011. The Act aims to promote fairness and ethical practices to protect consumers in daily transactions with retailers and other businesses (Mugobo & Malunga 2015:224). The Act also provides enhanced principles of consumer information to halt unfair practices, promote consumer behaviour, and enforce all frameworks associated with transactions made by the consumer by promoting consistent legislation (Consumer Protection Act of 2008).
- **The Intellectual Property Protection Act:** Intellectual property (IP) refers to increasing resources in a firm (Holgersson & van Santen 2018:44). This becomes significantly important for companies to have proper management controls over their intellectual property and rights.

South African retailers have aggressively expanded their footprint into other countries. They have provided some American companies, such as Massmart, operating in South Africa as a gateway to the rest of Sub-Saharan Africa (Ntloedibe 2017:4). This section highlights the significance of the retail industry trade in South Africa and how it contributes to the economy.

Given the presented discussion, it could be posited that transparency, fairness, and openness are needed in all markets, hence this section's importance. This section aims at addressing legislation that serves as the intervention of the law in ongoing transactions between the consumer and seller. These are the instruments or laws that protect citizens and organise society.

2.3 SIGNIFICANCE OF THE RETAIL INDUSTRY IN THE SOUTH AFRICAN ECONOMY

The retailing sector in South Africa has been critical to the changes within the sector throughout the entire continent; it has been aiming to reach Africa with its products and services (Abe & Mason 2016:192). The formal and informal retailing sector has been a critical component of the South African economic system amidst all the changes in policies and transformation (Buttersby, Marshak & Mnqibisa 2016:1). As a developing economy, South Africa has enough data ready and available that indicates the critical role and the importance of retailing sales in improving the system domestically, and on the continent (Aye, Balcilar, Gupta & Majumdar 2015:67).

The significant factors that are considered dominant and serve to explain the total economy across all sectors in South Africa are the GDP, unemployment rates, and social responsibilities, which form part of the macro-economic indicators (Akinsomi, Mkhabela & Taderera 2017:28). To emphasise the importance of the retail industry in the South African economy, retail trade for essential food, hygiene and medical products has been permitted to continue operating even under strict lockdown (Arndt, Davies, Gabriel, Harris, Makrelov, Modise, Robinson, Simbanegavi, Seventer & Anderson 2020:13). The list excluded physical retail activity that included clothing stores, furniture and appliance stores and hardware.

This section focuses on the various economic contributions that the retailing industry has to the South African economy; more emphasis is placed on GDP, employment creation, trade, innovation and social welfare (CSR), and food security.

2.3.1 The role and contribution of the retail sector to the South African gross domestic product

This section discusses literature in connection with the retail industry's contribution to the South African economy. The aspects discussed include the role and contribution of retail to the South African gross domestic product. This also includes the significance of both the role and contribution of the sector.

2.3.2 Role of retail in the South African gross domestic product

The retailing industry plays an essential role in developing countries economies, as is the case in South Africa (Kurnia, Choudrie & Mahbubur 2015:3; Roggeveen & Sethuraman 2020:1). There has been growing evidence related to the role and effective contribution of the sector, in terms of the provision and accessibility of goods and services to households (Skinner & Haysom 2016:5).

The retailing outlets perform different roles in low, middle, and high-income areas. This is achieved by implementing both informal and formal economic models (Peyton, Moseley & Battersby-Lennard 2015:2). This indicates the level of involvement the industry is posing in diversifying its products and services in a bid to express its role in having goods and services available to the end-user. Products and services play a vital role in ensuring the pace of growth of any global economy; part of that role includes analysing the modern economy's transformation into the market (Singh 2015:314).

The pressure of enhancing the economy of the country does not only sit with the formal sector, mainly dominating within and outside the South African borders. The informal sector is also playing a huge role in the economy. In the first quarter of 2020, Statistics South Africa recorded that approximately seven percent of the total labour force works in the informal retail sector. An estimated forty-two percent of the retail industry is the informal food retailer who dominates in mainly fresh products (Skinner & Watson 2020:2). The informal retail sector has become an empirical reality, not just a theoretical possibility. The sector's size shows a remarkable increase, even during the high gross domestic product growth (Mahajan 2016:6). Therefore, the evaluation of the retail space has demonstrated the power of the applied market and its impact on the growth of retail supermarkets. The increasingly competitive landscape becomes vital for the growth of the country's GDP (Nair 2019:30). Consequently, retail is a reviewed and defined strategy in the market, due to the requirements of changes.

Based on the literature mentioned above, it could be said that both the formal and informal sectors are playing a significant role in the growth of the South African economy. It is important to note that the retail sector is an essential service provider; this is due to the fact that it provides basic consumer essentials, such as food, water, health care products and services, and medical supplies, just to mention a few. Therefore, it explains the reason why some sectors were operating at full capacity during the COVID-19 epidemic. Lastly, the competitive advantage the retail sector offers in and around the continent is witnessed, and as a result, its robustness promotes growth that enables South Africa to compete with the rest of the world.

2.3.3 Contribution of retail to the South African gross domestic product

Respective global economies always strive for international competitiveness to enhance their growth and the nation's welfare, countries such as South Korea, China and Japan are perfect examples. Contrary to this, there has been a low level of growth in the South African economy (Mongale & Monkwe 2015:271).

The significance of the retail industry to the economy cannot be underestimated. It is recognised as the backbone of the country's economy and is an important driver of socio-economic development (Sibindi & Aren 2015:579). The retail sector is an economic powerhouse in the global context with an average annual growth rate of 3.8 percent since 2008 with an estimated revenue of R393.03 trillion globally; revenue rose to approximately R486.94 trillion by 2019 amidst the world experiencing a global pandemic (Business Wire 2021).

The sector represents 31 percent of the global GDP and employs close to three million people in South Africa, with hypermarkets and supermarkets currently accounting for 35 percent of direct retail sales globally (Naidoo & Gasparatos 2018:126). Table 2.5 below indicates retailers' sales categorised by the types of retailers to understand the types that exist in the South African market.

Table 2.3: Retailing sales

Retailer Type	Apr-Jun 2018	Weight	Apr-Jun 2019	% change between April-Jun	Total change %
General Dealer	93 419	42.2	95 622	2.4	1.0
Food, beverage and tobacco in specialised stores	15 969	7.2	16 094	0.8	0.1
Pharmaceuticals and medical goods, cosmetics and toiletries	16 643	7.5	17 173	3.2	0.2

Textiles, clothing, footwear and leather goods	39 544	17.8	41 118	4.0	0.7
Household furniture, appliances and equipment	10 222	4.6	10 692	4.6	0.2
Hardware, paint and glass	17 419	7.9	17 296	-0.7	-0.1
All other retailers	28 330	12.8	28 957	2.2	0.3
Total	221 546	100.0	226 952	2.4	2.4

Source: Statistics South Africa (2020)

Table 2.3 addresses how each retail type performed in terms of its sales between April and June 2018 compared to the subsequent 2019. Therefore, according to the information mentioned above, it is evident that general dealers were making the most sales, recorded a 1 percent increase a year in 2019. By contrast, food, beverages and tobacco are second during the same period, followed by pharmaceuticals and medical goods, cosmetics and toiletries. Table 2.5 further revealed that retailers, such as hardware, paint and glass, and other retailers are still the lowest-ranked.

The retail sector is also a growing and profitable domain in the South African economy (Rootman & Kruger 2017:1037). It represents almost 14 percent of South Africa's total GDP and reflects a 3.5 percent growth during 2000-2014 (Innovative features 2016:52). Figure 2.4 depicts the contribution of the services sector in South Africa, which includes the retail industry. These major sectors are indicated from 2000 through 2015.

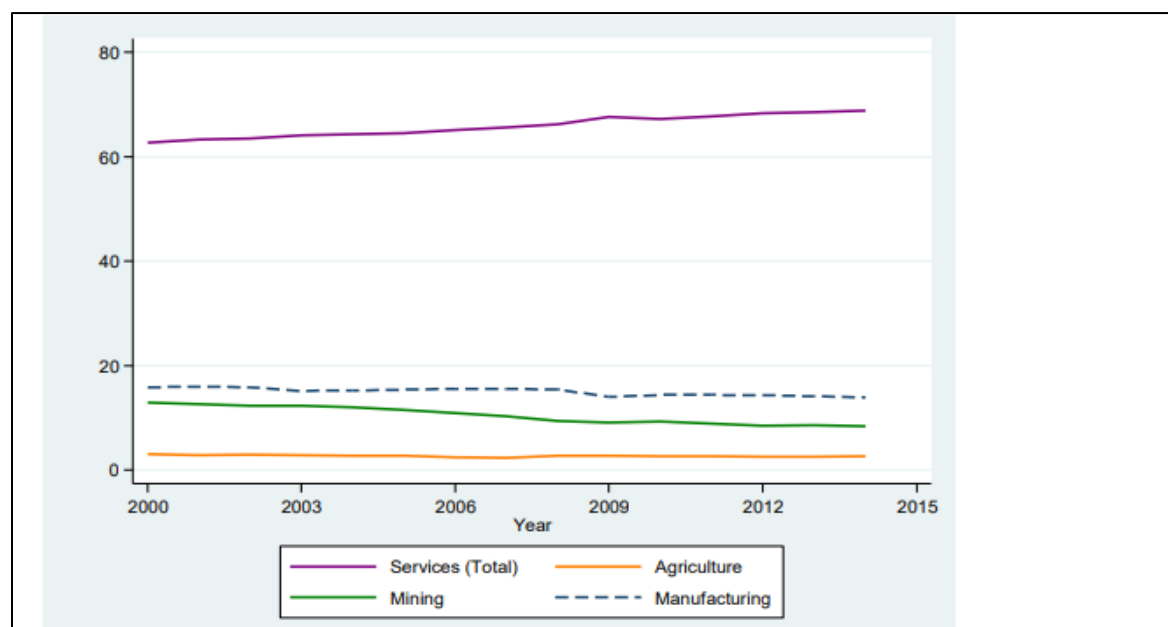


Figure 2.4: Growth in the service sector

Source: Quantec (2016)

As an aggregate, the sectors are the major contributors to the South African GDP, with their statistics have increased over the period (Bhorat, Steenkamp, Rooney, Kachingwe & Lees 2016:7). Figure 2.4 shows steady growth in the GDP contribution of the service sector from 59 percent in 2000 to 65 percent in GDP 2015. At the same time, the mining and manufacturing industries experienced declines, while a stable yet similar trend was observed in the agriculture sector. It is, therefore, positive, according to the information provided to recommend the South African economy as a service-orientated sector.

The breakdown of the sections of services sectors is demonstrated, and information on the industry's contribution to GDP is stated. Wholesale and retail trade is indicated as one of the vital service providers alongside government services. Manufacturing has been instrumental in its contribution to the economy. However, the wholesale and retail trade saw the graph dipping, taking the sector slightly above manufacturing as the second most significant GDP contributor with just over 14 percent from 2007 to 2014.

Figure 2.5 depicts the contribution of the services sector relative to the other major sectors of the economy for the period 2000 to 2014.

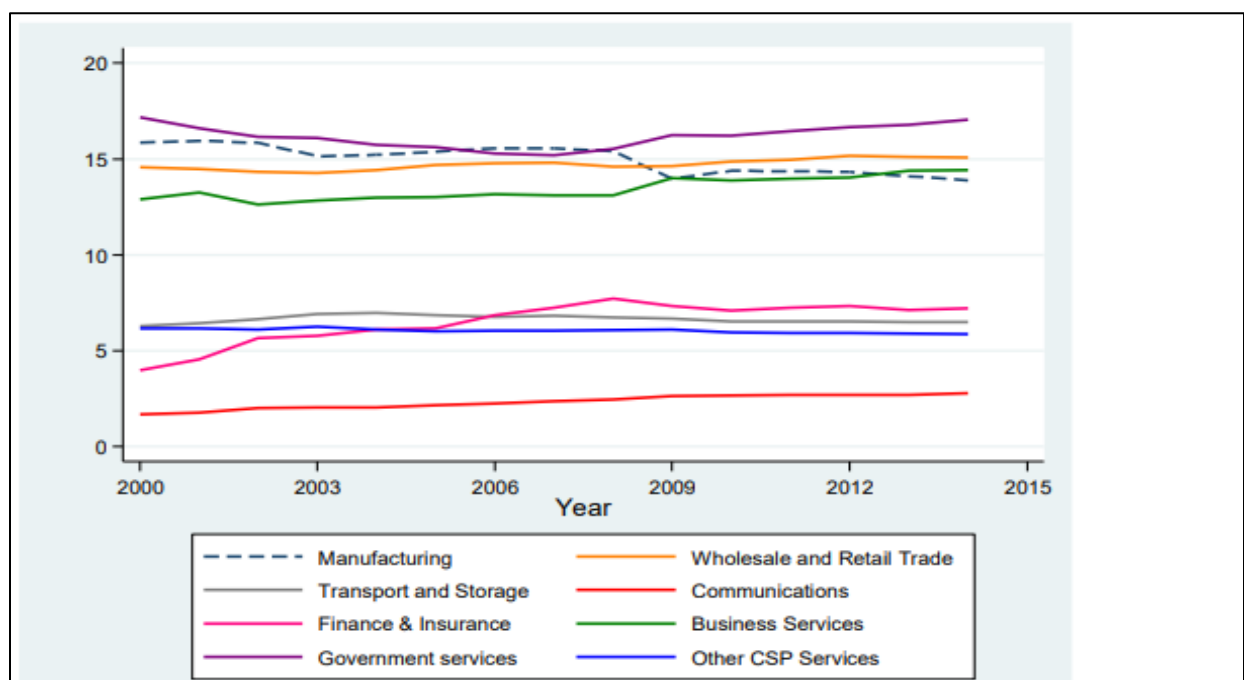


Figure 2.5: Sections of the Service sector

Source: Quantec (2016)

Figure 2.5 paints the services sector as a significant sectoral contributor to South Africa's GDP. Furthermore, the sector's share of GDP in the economy has increased over the period. The year 2018 experienced an increase in consumer confidence which did not translate to expected spending by households. Retail sales increased by 3.2 percent during the first half, with a slight decline at 1.3 percent, mainly due to high fuel prices and electricity tariffs that impacted buying activities (IDC 2019:23). The statistics distributed GDP across economic sectors in South Africa, where retail, amongst the service industry, is indicated to have contributed between 26 and 61.2 percent of the total value-added, respectively (Statista 2019:6).

An overview of the state of the economy and contributions to the South African GDP by the retail sector is provided in this section. The trends have played a key role in ensuring that the notion that the retail industry is one of the significant contributors is realised and adequately conceptualised in the economic spectrum. It is also critical to note explaining a broader term used in sectoral segregation in economic terms. This is the context in which the services industry is mainly grouped before any separation. This section plays an important role in explaining the aspects needed to address the role and contribution of retailing to the GDP.

2.3.4 The contribution of the retail industry to employment creation

Expectations of economic improvement in the country were high post-apartheid, when South Africa transitioned to democracy in 1994, reinforced by supportive monetary policies that prioritised creating jobs and curbing inequality and poverty (Ferreira & Rossouw 2016:807). The unemployment rate in South Africa accounts for only 41 percent compared to approximately 60 and 65 percent which is calculated in both developing and developed countries, respectively (Black 2016:2). Currently, post COVID in 2022 the unemployment rate in South Africa is sitting at 33,6 percent rate, which has dropped as compared to the former.

A study on the impact of local economic sectors found that the agricultural sector, wholesale and retail are the major influencers in the development of South Africa (Battersby & Watson 2019:127). It is also important to look at the role that informal retail plays with 59 percent of women and 49 percent of men employed in the Sub-Saharan region; for Tanzania, Lesotho and South Africa, men are the most dominant source of employment in the industry (Battersby & Watson 2019:127).

Table 2.4 depicts the employment rate of selected African countries derived from the informal sector; the information is in a percentage format.

Table 2.4: Informal sector employment by percentage

Surveyed country	Men	Women	Total
Mali	80	63	71
Cote d'Ivoire	83	61	70
Zambia	70	61	65
Uganda	62	68	50
Madagascar	64	41	52
Tanzania	50	53	52
Liberia	65	33	50
Lesotho	48	50	49
Ethiopia	48	36	41
South Africa	17	19	18
Average	58.7	48.5	51.8

Source: Battersby and Watson (2019:127)

Table 2.4 shows how other countries operate in the informal retail sector. Many of the Western and central countries in Africa have invested heavily in street vendors due to a lack of employment in the formal sector which is attributed to a number of factors.

Mali and Cote d'Ivoire are the highest sittings at over 80 percent of employment, whereas, Lesotho and Ethiopia indicate the lowest second and third, respectively, with a considerable margin from the last. South Africa is sitting last among the surveyed countries. This is looking at the whole retail spectrum in formal and informal operations. The representation on the table denotes that there are more jobs in the formal markets than in the informal in South Africa; this does not take away the informal sector's role in creating employment.

The retail sector structure contributed about 60 percent of formal jobs in 2008; the number has since declined to 54 percent due to the economic depression vulnerability which affected the sector, forcing marginalised people into the informal economy (Malgas, Khatle & Mason 2017:1).

Stats SA provided an analysis of the employment impact between quarter one of 2016 to quarter one of 2022; figure 2.6 demonstrates the changes that have taken effect post COVID-19.

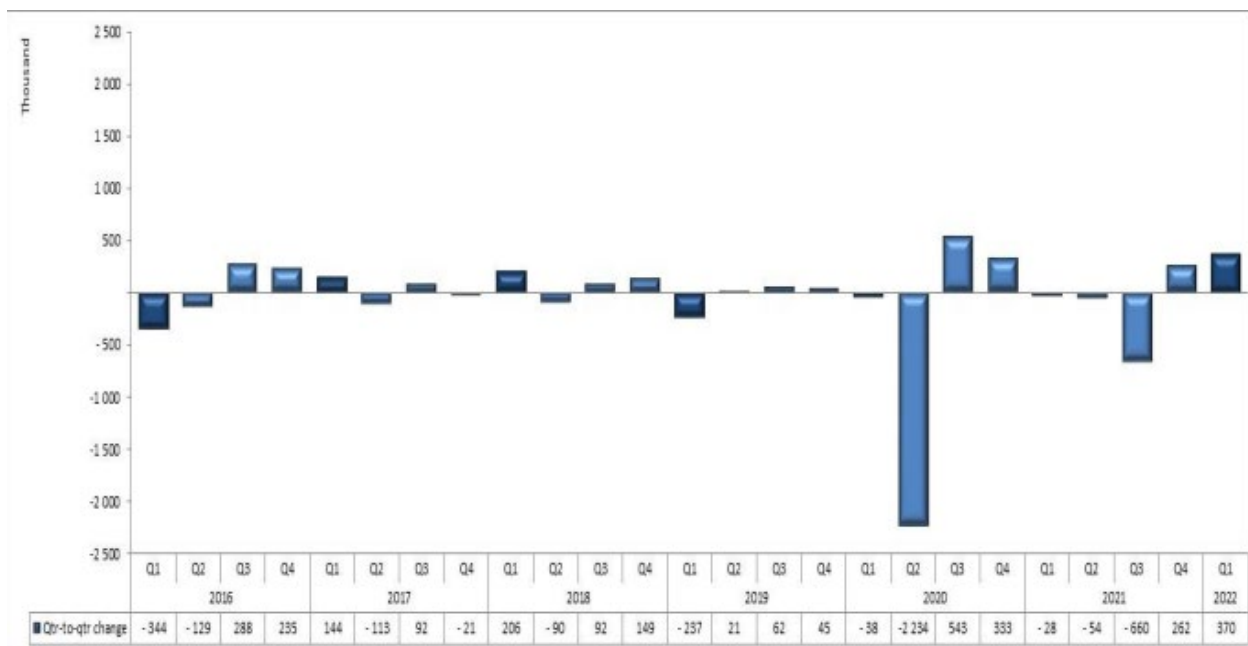


Figure 2.6: Quarter-to-quarter changes in employment, Q1: 2016 to Q1: 2022

Source: Statistics South Africa (2022)

Figure 2.6 shows that employment increased by 370 000 in the first quarter of 2022 following an increase of 262 000 in the last quarter of 2021. As depicted in Figure 2.6, employment has mostly decreased in the first quarter of each year since 2016, except for the increases observed in 2017, 2018 and 2022. The results further confirm that this is the fourth increase in employment since the national lockdown.

Additionally, economic growth has been primarily driven by the services sector, namely the financial and business services sector, construction, wholesale, and retail trade sectors (Bhorat, Naidoo, Oosthuizen & Pillay 2016:32). An example from one of the largest role players in South Africa, Shoprite, concerning the benefits it has received from the state in the form of ownership equity and employment subsidies have helped the operation to have a significant platform in employment contribution in the country (Andreoni, Mondliwa, Roberts & Tregenna 2021:228).

Given the review mentioned above, it could be said that the retail sector is an active driver of employment generation, despite the well-documented economic struggle.

A clear description of the role of the retail industry is outlined in section 2.3.1; the evidence provided is intertwined with the industry's contribution to employment. Growth in GDP can be seen as an increase in sales. An increase in sales can result in expansion, which can be transformed into high employment chances. This section provides the retail industry's strategic role in ensuring employment is created in the country. Its role in employment is limited to the formal sector or domestic employment and covers other parts of the continent. The relationship and policies between the formal and informal retail sectors solidify its involvement in the South African economy. This section explained the significant role that the retail industry plays in the market and any other concepts that might be required to expand on the impact that is already existing.

2.3.5 The role and contribution of the retail industry to trade in South Africa

This section discusses how retail plays and contributes to the country's trade. Firstly, it is important to understand and define what trade is in retail and what the term "trade" is known to be to the general public.

Retail trade can be defined as goods and services offered to the general public by retailers operating from small to large-sized enterprises (Retail Trade 2017). Trade is generally known as buying and selling goods and services. Defining the terms provides a broader context regarding where and who is responsible for trading in the retail industry. Trade exists in both the formal and informal functions of retailing; this makes it evident that the small tuck shops and supermarkets are in the process as much as the larger-sized organisations. Also, it becomes essential to understand the significance of trade as an instrument determined by its functions and its role in ensuring developmental sustainability in the country's trade (Mayorova, Panasenko, Nikishin, Ivanov & Mayorova 2018:928).

The South African retail industry is categorised within the tertiary sector, which falls in the wholesale and retail sub-sector (also known as the trade sub-sector). The tertiary sector accounted for 69.1 percent of the South African economy, 13.7 percent from the Wholesale & Retail and Trade, and 45 percent contribution from the retail trade and repairs goods, which all fall in the wholesale and retail trade sub-sector (Aye, Balcilar, Gupta & Majumdar 2015:67). The South African retail trade has been inconsistent in previous years, with the highest recorded growth rate of 10.26 percent in 2006. This was followed by a decrease in 2009 of 4.88 percent. This decline

was further reported by 1.4 percent in 2018. The clothing and textiles sector was responsible for this decline, with approximately 2.7 percent due to financial pressure on consumers (Broll 2019:2). Figure 2.7 provides a graphical representation of the retail trade growth rate.

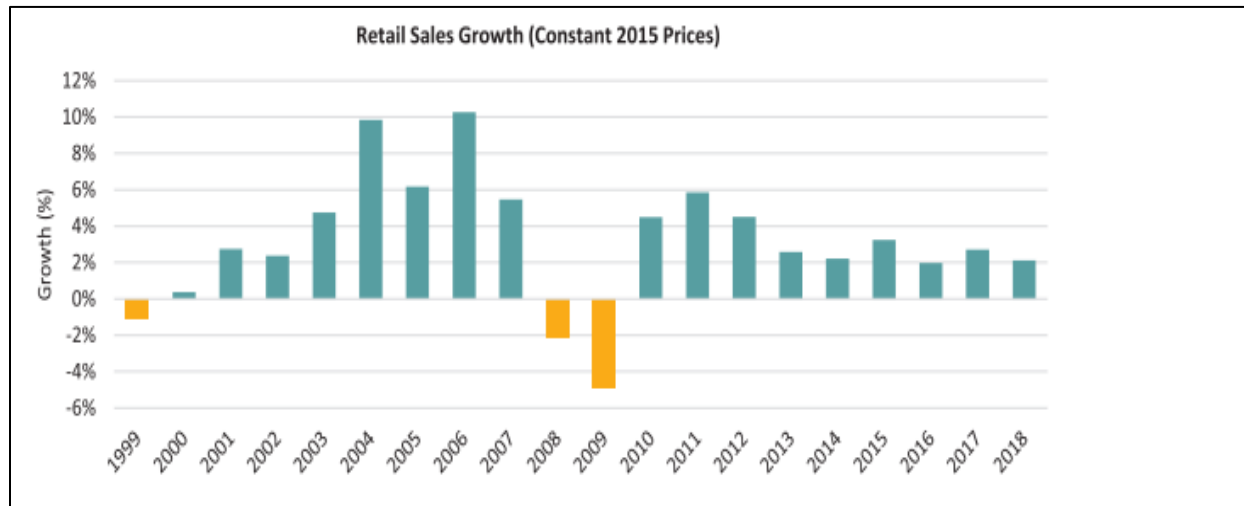


Figure 2.7: Retail trade growth rate

Source: Statistics South Africa (2019:3)

Figure 2.6 based its records on the retail sector sales in the last twenty years, and addresses the inconsistency in the environment. Sales registered a decline in 1999 and started to increase the following year, with a high spine of approximately 9 percent in 2004 and the highest of 10 percent in 2006. Sales The sales plunged from 10 percent in 2006 to almost half in 2007, the quarter four recession during 2008 worsened the sales figures to minus 5 percent in 2009. The figure depicts that the retail sales have not increased over 6 percent since 2004 - 2006, the graph remains steady with just over 2 percent of sales in the industry.

The highlight in the discussed literature is that retail trade and its sales depend on respective subsectors within the industry. It further alludes to the concentration of monetary policies or activities that affect consumer buying power, negatively impacting the sector's trading trends (Adewale 2017:139). Although not too much emphasis is given to the informal retail sector, the literature highlighted its involvement in increasing trading sales in W&R trade sales (Skinner & Haysom 2017:3). Therefore, retail and trade are impacted by a broader aspect of the industry, which includes small businesses, both large and small players are applied because of their relevance to this study.

This section highlights the vital connection or exchange between the buyer and the seller that converts into a trade. It has not been an easy task for South Africa during the past decade, especially in comparison to the years 2004 – 2006, which were more effective at between 9 and 10 percent individually, which is a sign in contrast with 2 – 3 percent from 2013 to 2018. As indicated previously, the major retail players still contribute positively to the economy with the trade they are embarking on outside the country. This section indicates the industry's performance and its role and contribution to the South African economy.

2.3.6 The contribution of the retail industry to innovation

South Africa is regarded as one of the established markets in Africa, with high per capita GDP levels and its penetration in asset management (Global Banking 2018:9). Notably, the higher and more mature a country's market is, the more inventions are required in order to remain competitive in the market (World Economic Forum 2018). Many firms participate in various strategies to drive innovation to satisfy the unfulfilled demands of existing and emerging consumers (Nandonde & Kuada 2018:342). It is not entirely evident that innovation can be associated with economic growth and industry renewal. However, the relationship between innovation and growth tends to be indirect rather than direct (Ayandibu & Houghton 2017:133). The expansion as a need for enhancement occurs if a scale-up effect is to be utilised. Access to adequate costs and financials can significantly impact technological changes in the retail industry (Kumar, Stauvermann, Loganathan & Kumar 2015:24).

Innovation is generally defined as an action to do something differently (Smit, Mostert & Mostert 2016:393). Innovation can be explained or outlined in different ways, such as e-commerce (Goga & Paelo 2019:1), new product development (Ayandibu & Houghton 2017:133) and digital innovations (Watling, McCabe & Seedat 2020:2), to mention a few. It is observed that more and more firms are forced to innovate all their services to remain relevant and competitive in the industry. This demonstrates the key applicability of the impact of innovation and technology on the retail industry; it makes it critical to implement these, whether directly or indirectly linked.

Given the presented review, it could be deduced that technology contributes significantly to how firms operate. For example, it makes things easier to produce, purchase, distribute, and even buy, which has changed the global market's trading approaches. The fourth industrial revolution is taking over in developed countries, driven by innovation in most sectors; the retail industry has

followed suit. It is pointed out in this section that various companies are going through many innovative changes to keep up with the market. Many other innovations not covered in the study are already implemented to improve customer service. The vital role and influence innovation has in the retail industry is outlined in this section.

2.3.7 The contribution of the retail industry to social welfare or corporate social responsibility and food security

South Africa finds itself in difficult living conditions attributed to social issues such as the high HIV rate, unemployment levels, and inequality which put pressure on consumers, especially with the price of food products in retail. The retail sector forms a critical element of the community's economic and social welfare and provides choices regarding the services and products offered (Sibindi & Aren 2015:580). The development and implementation of corporate social responsibility (CSR) can be noted with the value of the brand is more recognised, employee safety, protection, and motivation, access to finance, customer loyalty, and a great public image which can subsequently lead to better overall business performance (Kvrgic, Lukić & Kljenak 2020:186). Besides, CSR is a model utilised to develop communities, and both large and small businesses benefit from its implementation (Ruiz-Real, Uribe-Toril & Gazquez-Abad 2019:2).

The South African government is facing challenges regarding food and security due to coalitions that provided insights into those policy tensions (Thow, Greenberg, Hara, Friel, du Toit & Sanders 2018:1108). These authors further state that according to the African National Health and Nutrition Examination Study (SANHANES) report in 2015, about 54 percent of the population in South Africa is food insecure, and 21 percent is at risk of hunger. As such, the retail sector can contribute in different ways to help address the government's challenges. The latest report from Business Tech (2018) shows an upward trend in confidence due to the retail franchise. Approximately 845 franchisors and over 40 000 franchisees account for R587 billion in sales, a 13.3 percent GDP contribution to the South African economy. This initiative has positively addressed unemployment issues, which subsequently form part of the CSR tool; a number of these franchises are opened in rural areas and townships. The following section looks at the South African retail industry's challenges.

2.4 CHALLENGES FACING THE RETAIL INDUSTRY IN THE SOUTH AFRICAN ECONOMY

The impact of the South African retail trade is well-documented. The ever-increasing changes in the business environment force many firms to maintain their level of competitiveness to keep abreast with global standards (Motau & Kalema 2016:266). The four big players in the South African market (Shoprite, Pick 'n Pay, Spar, and Woolworths) experience various challenges in developing their operational activities (Hall & Cousins 2015:8). Hence, businesses need to identify the challenges they face to provide solutions to mitigate these negative impacts (Makhitha 2016:259).

Most jobs in the retail sector are categorised as low-skill occupations, such as merchandisers, salespeople, petrol attendants, street vendors, and cashiers, to mention a few. The sector accounts for about 70 percent of low-medium skills level occupations (World Bank 2018:89). The development of the skilled labour challenge is not new to South African industry; the retail sector is still one of the most significant contributors to unskilled labour. Lack of development leads to less buying power due to the low-paying scale. Retailers encounter competition challenges, increased purchasing costs, and high inventory, ultimately adding to the impasse by putting severe pressure on consumers (Makhitha 2017:417). The disadvantages in challenges, such as competition, need to be reduced by opportunities created by wealth; they open up the massive accomplishments that South African retail operators have experienced in the continent (Games 2016:42). The next section addresses the challenges that have been identified by the literature, as mentioned above, as the fundamental encounters that the South African markets are facing.

2.4.1 Operational challenges

An operation can be defined as activities that are active or measured tasks that are in effect (Phillips 1968:34). Additionally, operational definition is defined as the showing of certain activities such as variable, term or any entity that is in line with the process requirements or set of validated tests that are utilised to establish its presence and quantity (Harel & Koichu 2010:115). Moreover, the generic definition of supply chain operations includes the systems, structures and processes to plan and execute the flow of goods and services from the supplier to the customer (Centric 2019). Therefore, operational challenges can be defined as a set of validated tests that are planned in the process and have deficiencies that need to be addressed or repaired.

There are operational challenges such as fulfilling orders, unclear requirements in the distribution chain, physical distribution, and reverse logistics (Weber-Snyman & Bardenhorst-Weiss 2018:1). South African retail faces different challenges that counter the opportunities that can benefit the entire retailing sector (Malgas & Zondi 2020:1). Different challenges in South Africa, as categorised by PricewaterhouseCoopers (PWC) (2016) include high unemployment, weak disposable income, and a high debt-to-income ratio. Besides, the increasing sophistication of private-brand label products is a serious threat to consumer goods companies. Lastly, electricity constraints have been proven to negatively impact costs and reduce operating hours. South Africa's operation in an open economy can prove to be a real challenge in the retail industry in terms of compliance with the technical standards and substantial regulatory and conformity assessment regimes, despite the transparency (All Answers Ltd 2018). Table 2.5 provides a comparative challenge on the difficulties facing local businesses versus organisations operating outside the country.

Table 2.5: Comparison across indicators of challenges of doing business in Africa's market

Country	No. procedures to start a business	No. of days to start a business	Impact of policies on FDI (1-7)	The burden of customs procedures (1-7)	Transport infrastructure quality (1-7)
Nigeria	6	25.2	5.1	2.9	2.9
Egypt	4	6.5	3.4	3.9	5.1
South Africa	7	43	4.3	4.2	5.6
Angola	8	66	2.61	1.84	2.37
Algeria	12	20	3.1	3.4	3.7
Morocco	4	9.5	5.1	4.5	4.8
Kenya	7	22	4.5	4.1	4.9
Ethiopia	14	35	3.6	3.6	4.2
Tunisia	9	11	4.5	3.1	3.9
Ghana	8	14	4.6	3.9	3.9

Source: World Economic Economic Form Competitiveness Report (2017-2018)

Table 2.5 revealed that there had been efforts to simplify the process of market entry amongst African countries. Notwithstanding the struggles of creating market access, some regulations still make it challenging to invest in African distribution. Table 2.5 indicates the impact of policies, the burden of customs procedures, and transport infrastructure quality, rated from one as the worst and

seven as the best. South Africa is rated above average on factors such as the impact of policies on FDI and the burden of customs procedures, rated the best regarding the quality of the infrastructure with a 5.6 rating. The South African policies and customs procedures are average but show concern for countries such as Angola, which recognises it as a trade and investment partner. There might be challenges if South African entities were to open businesses in the country (Games 2017:3).

This section has identified various challenges the retail industry faces, which businesses need to focus on to build strategies to counter these to enable a more competitive approach to the market. The section has also given a preview of the impact challenges have on the domestic economy and social stance, which looks not to be improving due to an extreme increase in population and other related factors.

2.4.2 Skilled labour challenges

Skilled labour is described as individuals recruited through Human Resource processes as holders of leadership/management, professional, technician, associate or professional positions (Policy Brief 2015). In principle, candidates who are closely and directly involved in the generational development, spreading and application of knowledge are regarded as skilled labour. Additionally, Hayes (2021:1) defines skilled labour as a section of the workforce that is specialised by training and experience to execute complex, physical and mental responsibilities that are far from routine.

The author further states that skilled labour is commonly categorised by a certain level of education combined with the experience achieved through teaching and knowledge, resulting in a better wage. Retail stores that venture into low-skilled labour are more likely to face an upsurge in value, which is a fundamental driver of differential employment trends (Walcott 2021:163). Employees with levels of education, would lead to skilled, productive and the provision of high standards of goods and services, which will subsequently increase economic growth and standards of living (Somavia 2019:8). Based on the literature mentioned above, skill is a significant input to achieving innovative ideas or processes; low skilled labour can, in turn, obstruct innovative undertakings, which can result in decreased productivity gains (Horbach & Rammer 2020:1).

Based on the rapid changes in technology in the retail sphere, there are high expectations for a surge in skilled jobs to deliver support services for the new technologies (Su, Togay & Cote 2020:341). The South African retail industry is suffering from the opinion that it has a low-skilled

base and poor career prospects sector. Many employees often see it as a short-term, stop-gap employment option (Malgas, Khatle & Mason 2017:503). Figure 2.7 indicates a number of respondents on training programmes planned for selected retail stores.

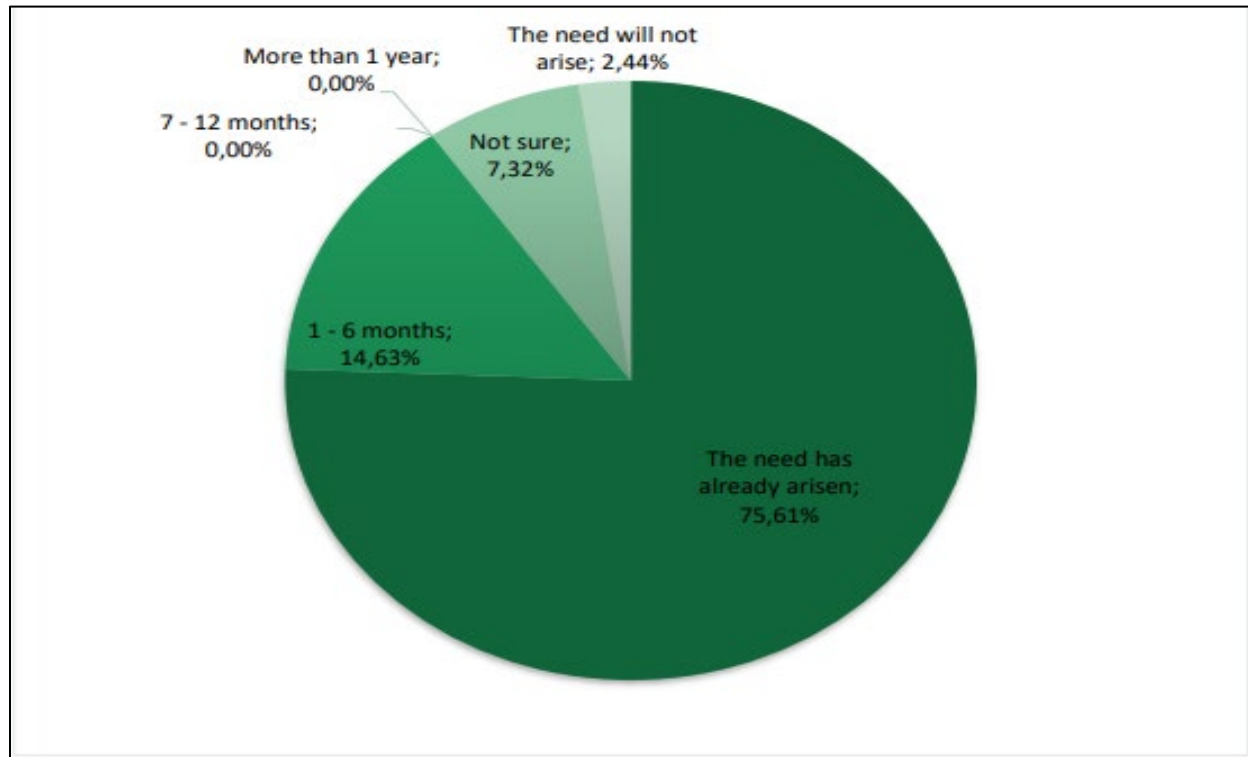


Figure 2.8: Percentage of Respondents Offering Training Programmes

Source: W&RSETA (2021:63)

Figure 2.7 explains a study conducted on retail stores that are training their employees on the new technology that is being implemented in the retail sector. It can be noted that the employees are still not skilled in the job they are doing, but the companies are looking at taking them for necessary training for change management. The seventy-five percent, the highest that sees a need for a training programme, does not constitute a skilled workforce but looks at prospects due to the industry's changes. The lowest is seven percent, which indicates that there is no need for the staff to be sent on any training programme.

2.4.3 Competition challenges

Competition is defined as a situation in which an individual or group of individuals strive to develop dominance over others (Swab & Johnson 2018:2). Hodaei, Alvani, Yazdani and Matin

(2020:16) regard competition as the objective of common interest and creating shared value in the organisations to differentiate competition and profitability in various industries.

The resilient competitive benefit is an objective that is commonly shared amongst many retailers in South Africa and around the globe; various retailers will focus on improvement methods in order to gain a leg up in the industry (Chinomona & Marie 2021:7). International retail trade in Africa makes a significant change, like doing business on the continent. For example, in 2012, Walmart, the world number one retailer, acquired fifty-one percent of Massmart, a South African retailer that operates in 13 countries. Over 90 retail stores were completed in 2016 in South Africa, with approximately 42 stores planned in 12 countries outside South Africa (Nandonde 2019:54). Operating at that level, especially outside the borders of South Africa, comes with broad challenges and responsibilities; competition is one of the aspects that can affect the undertaking. As a result of the current challenges, Walmart has had to close some stores across Africa which proves the difficulties in trading conditions in the sector.

The retail market requires added efforts to increase competition and eliminate regulated retail prices. It is the effort to identify international and global challenges that can hurt retail activities directly or indirectly (Pepermans 2018:1). Trading internationally comes with its challenges that can lead to imports that threaten local retailers' pricing competition, uneven competition amongst the players will be realised as a result (Goga, Paelo & Nyamwena 2019:33). Consequently, competition and regulatory involvement will be paramount as a preventative measure of exertion in the power of the market and control over the market itself and the consumer. Telkom South Africa had to develop a wholesale business, Openserve, due to pressure from the competition authorities (Genna & Hawthorne 2018:3). This implementation has shifted Telkom's access to its network to a wholesale basis. However, their prices are unregulated, contrary to other developing nations where fixed-line operators are separated functionally between wholesale and retail activities.

2.4.4 Increased purchasing costs

Purchasing is defined as an aspect within an organisation that is responsible for the management of the interface within the supply market (Schiele 2019:45). Dewi, Baihaqi and Widodo (2015:480)

describe purchasing cost as the total cost of the product and service that is procured with tax inclusive, shipping costs and other fees and contingencies.

The increasing prominence of a well-managed purchasing function comes from a firm that sells and makes a profit. Thus, this testimonial is calculated, assuming that the industry decreases its purchasing costs by ten percent for it to be able to double its returns on the assets (Schiele, 2018:46; Zijm, Klumpp, Regattieri & Heragu 2019:46). However, there is a possibility to achieve increased purchasing costs by increasing holding costs, the risks of running out of storage capacity, and deteriorating increased cycle time if quantities are purchased in larger quantities (Sebatjane & Adetunji 2019:545). Table 2.6 depicts the identification of purchasing practices looking at specialised retail clusters.

Table 2.6: Identification of purchasing practices

Retail cluster	Cluster 1		Cluster 2		Cluster 2	
	%	Number	%	Number	%	Number
Food & Beverages	81.25	52	10.34	6	5.88	4
Pharmaceutical Medical supplies	6.25	4	84.48	49	2.94	2
Textile & Clothing	12.5	8	5.17	3		68
Total	100	64	100	58		68

Source: Samawi, Abushaikha, Salhieh, Mdanat and Al-Rashid (2019:720)

Table 2.6 explains the classification of various disciplines in the retail industry. In this section, the focus is looking at three of them: food and beverages, pharmaceuticals, and textile and clothing. It is important to note that cluster 1 is the most relevant, which addresses the purchasing practices processes. It indicates 52 of 62 measured firms in the food and beverages sector. The view that is presented by different supply chain professionals in the food industry suggests an emphasis should be placed on cost indicators in the strategic intention. As per purchasing processes, the internal function needs to eliminate costs to support such strategic intentions and the purchasing costs practices are applied in this format. Achieving the above-mentioned includes quantifying transaction costs and obtaining new technologies by comparing them to the associated purchasing costs (Gottge, Menzel & Forslund 2020:16). This would largely impact the logistical and financial performance of retailing industry.

2.4.5 High inventory

High inventory is defined as an unsold product that exceeds the anticipated customer demands for the particular product (Bixler & Honhon 2021:6). Okoth and Getuno (2020:3) describe excess inventory as excess inventory that is at the end of its product life cycle. Therefore, increased inventory would prime high excess inventory holding costs and risk, including possible obsolescence.

Many businesses prefer to keep high inventory levels and pay extra costs in storage to advance the advantage in economies of scale. High sourcing quantities of stock do this at lower prices, increasing receptiveness levels (Eicker & Cilliers 2019:4). The Supply Chain Council utilises collaborative planning, forecasting and replenishment (CPFR). This concept recommends the appropriate high inventory measures at retail stores to expedite timeous replenishment (Mathu 2019:1). On the contrary, recently an investigation on the challenges that encounter the development of independent retailers in the South African industry was conducted. According to Makhitha and Soke (2021:23), high inventory is one of the critical challenges independent retailers face in the industry, which proves ineffective for businesses to stay competitive. The following motivations are achieved when precise profit-driven inventory control levels are kept in the facility (Karamshetty, Vries, Wassenhove, Dewilde, Minnaard, Ongarora, Abuga & Yadav 2021:10):

- The business will be a profit-driven if high inventory is achieved,
- The financial incentive to stock high-demand products,
- Minimal under-stocking costs due to backlogging and informal inventory pooling network,
- Incentives to avoid potential high inventory due to high demand shaping.

A study by Alarmouti and Jawabri (2019:319) suggests that high inventory management supports improvements in a competition that is directly linked to the high impact on the organisation's performance. An enlarged performance gives the firm more capital to invest in the business. High inventory at the retail stores has a higher chance of excessive stock in the logistics warehouse. The higher the inventory, the higher the possibility of stock becoming unsold, redundant, returned or discarded. This causes limited storage space in the warehouse resulting in the disposal of all excessive stock (Tanaka, Ishigaki, Suzuki, Hamada & Kawai 2019:2). Many retailers in South Africa operate at a large scale in malls and have several factors that lead to high inventory. This

can be attributed to a lack of management skills, poor marketing, and limited information on government services (Lamb, Kunene & Dyili 2019:1356).

Evidence provided in this literature makes it clear that the retail industry has challenges that need to be addressed. The industry can contribute more to the South African economy and increase purchasing power, but this can only be achieved when the correct measures are implemented to ensure corrective action. It is not only South Africa that is experiencing the same predicament but other countries as well, especially the top two, which include Nigeria and Egypt, who share similar contributions to the continent's economy with South Africa. All of the challenges mentioned contribute significantly to the improvement of the retail supply chain and the required performance in inventory and warehouse.

2.4.6 COVID 19

The World Health Organisation defines Covid 19 as an infectious disease caused by the SARS-Cov-2 virus (World Health Organisation 2022).

South Africa declared its first COVID-19 case in March 2020; similar to other global events, it caused severe global economic and food security threats (Njomane & Telukdarie 2022:3). As a result, decisions were taken in 2019 when South Africa responded to the Covid-19 crisis, but none of the decisions that were taken was in consideration of the informal retail traders and their essential involvement to food security. Greenberg (2017:468) states that the informal retail sector contributes approximately forty to fifty percent in sales with approximately R360 billion annually. Not only did the pandemic hit the informal, but it affected the formal business, which impacted the South African economy when it was already hitting a low of 1.5 percent in 2019 compared to 3 percent in 2010 (Chitiga-Mabugu, Henseler, Mabugu & Maisonnave 2020:2).

Some of the decisions taken during the COVID-19 period included segmenting alert levels based on the level of cases reported to the national health sector. The emergency alert levels are discussed in table 2.7.

Table 2.7: State of emergency alert Levels for COVID-19 in South Africa

Alert Level	Description of alert level	Control public movement	Control economic activities
Level 1	The low virus spread with high health system readiness	In-country travel with all modes of transport. Restrictions on international travel	All sectors opened
Level 2	The moderate virus spread with high readiness	Movement between provinces and air travel/ car rental allows	almost 100% of economic sectors open
Level 3	The moderate virus spread with moderate readiness	No travel except for essential needs, public road transport opened with strict hygiene requirements, transportation of goods and funerals	Essential services. Plus further economic sectors opening
Level 4	The moderate-high virus spread with low-moderate readiness	No travel except for essential needs, public road transport opened with strict hygiene requirements transportation of goods and funerals	Essential services. Plus other sectors crucial to the economy but have means to observe protocols
Level 5	High potential for virus spread and Low readiness	No travel except for essential needs, public road transport opened with strict hygiene requirements and restricted times and transportation of goods and funerals	Essential services only

Source: Njomane and Telukdarie (2022:3)

Table 2.7 explains the alert level that South Africa was placed under from March 2020, when the government declared COVID-19 a national disaster. Level one affords relaxed rules and the entire economy is allowed to operate under minimum restriction, while level two is implemented when moderate cases are reported and allows almost full operational capacity. Level three means that there are moderate cases with weak readiness, which allow further economic opening; level four means the cases are still high and only permit essential services and certain crucial sectors. Lastly, level five has a high case rate and low readiness and has travel bans and strict measures even on roads and transport.

Njomane and Telukdarie (2022:4) continued to describe the alert levels as a significant set-back on human and consumer behaviour, which took a drastic turn during this period and they include; low demand for non-essentials, improvisation, hybrid shopping, adoption of digital technologies, unconventional shopping times, virtual social gatherings and the discovery of new talents. Retail trade of essential food, hygiene and medical products was permitted; not the same can be said in retail trade such as clothing stores, furniture, appliance retailers and hardware stores which were

closed completely and could only be accessed via online purchases (Arndt, Davies, Gabriel, Harris, Makrelov, Modise, Robinson, Simbanegavi, van Seventer and Anderson (2020:3). The restrictions created many other challenges for both the South African and the international retail sector due to the adjustments that needed to be made. Figure 2.8 indicates the businesses that were trading during COVID-19.

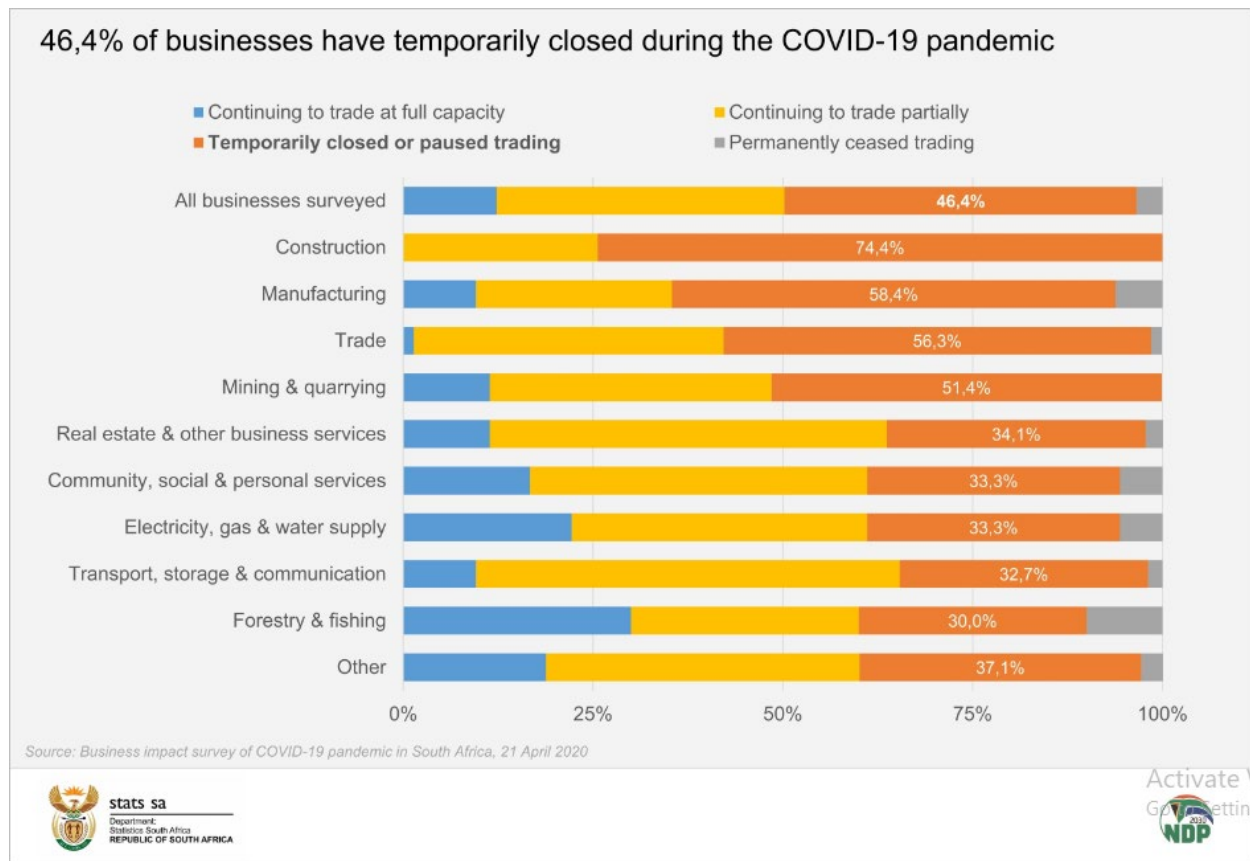


Figure 2.9: Trading status of the businesses

Source: Statistics South Africa (2020)

Figure 2.8 provides a depiction of the operations of the South African businesses during the COVID-19 pandemic. The results highlight that 46.4 percent of closed businesses, construction has the highest number of businesses that were closed and only 25.6 percent were operating partially. Manufacturing, trade, mining and quarrying were operating at over 50 percent, while the rest of the sector was operating at less than 35 percent.

The above literature shows that most organisations did not have any technological means or alternatives for this global pandemic. This observation further demonstrates the devastating impact that the pandemic had on the South African market and economy at large.

2.4.7 Public unrest

Public unrest is defined as demonstrations, protests and the use of political violence (Must & Rustad 2019:505). Inovejas, Mirasol, Recente and Frias (2016:35) describe public unrest as a common term to define various forms of civil disorders and sometimes as civil strife. Public unrest can arise, based on several reasons such as an overwhelming community level of fear, anxiety regarding any pandemic, high death rate or any other valuable services or products that may be compromised due to the commotion (Koonin 2020:7).

Apart from the challenges that are faced by the global market due to COVID-19, there are a number of market shocks such as natural disasters, civil unrest, terrorism and war (Voorhees, Fombelle & Bone 2020:400). These types of market shocks occur globally regularly; it is of importance that the retail industry is aware of them and pays attention them. South Africa has gone through much public unrest in the past year, with many retail outlets looted by the public. Major retailers in South Africa are still in the reconstruction phase after the looting during the July unrest in 2021, which wreaked mayhem in parts of KwaZulu Natal and Gauteng (Daniel 2022). The turmoil came following the arrest of the former president of South Africa, Jacob Zuma. A report by Future Growth (2022) listed five shopping centres which were most impacted by the looting and physical damages from the civil unrest; they are as follows:

- Bridge city Shopping Centre – KwaMashu, KwaZulu Natal;
- Maxwell Shopping Centre – Empangeni, KwaZulu Natal;
- Sontonga Mall – Katlehong, Gauteng;
- Alexandra Plaza – Alexandra – Gauteng;
- Eyethu Orange Farm Mall – Orange Farm, Gauteng.

The following figure highlights the worst affected provinces from the public unrest that took place in July 2021 across South africa. Figure 2.9 provides detailed information.

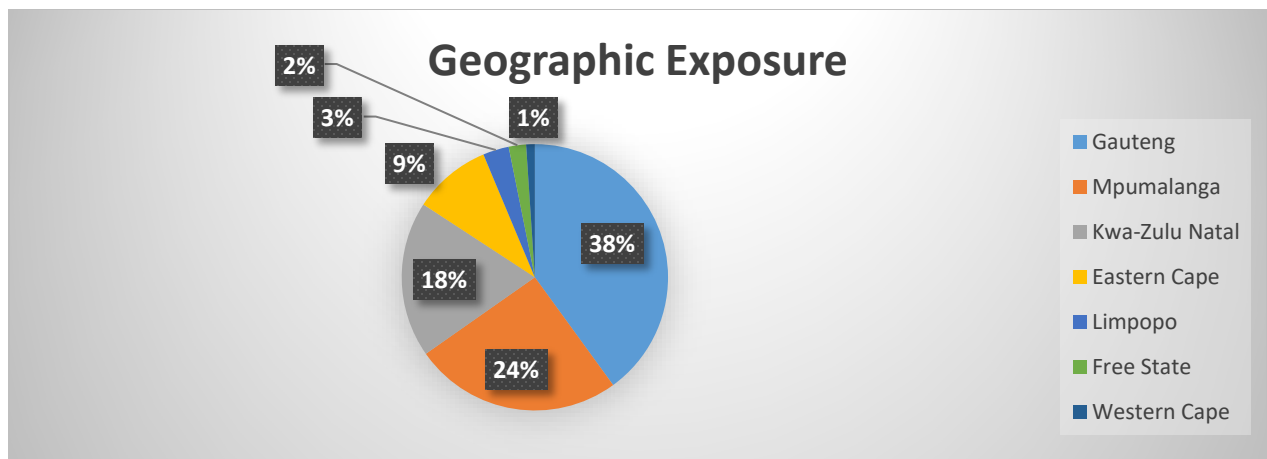


Figure 2.10: Geographic exposure

Source: FutureGrowth (2020)

Figure 2.9 indicates that Gauteng was the most affected with 38 percent, followed by Mpumalanga with 24 percent. KwaZulu Natal is the third affected province with 18 percent. Eastern Cape came fourth, suffering 9 percent of its goods from looting. The remaining provinces were all under 5 percent, which is less than what other big provinces have been through.

Due to the widespread looting, Bloomberg (2022) reported that South Africa had suffered approximately R57 Billion in South African Rands (\$3.4 Billion) in revenue. Figure 2.10 highlights the most targeted stores in the retail industry:

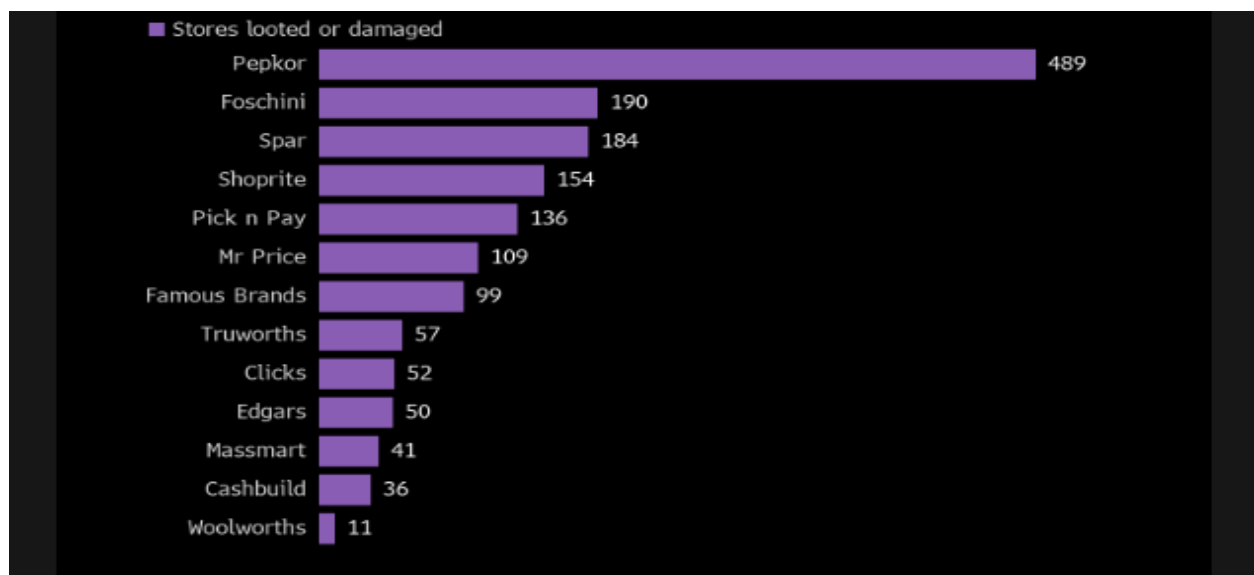


Figure 2.11: Stores looted or damaged

Source: Bloomberg (2022)

Figure 2.10 shows a list of the stores most affected by the July 2021 public unrest. Pepkor is the most affected, with 489 stores looted and damaged during the unrest. Foschini and Spar are second and third, respectively, with 190 stores and 184 for the latter. The food retailers, such as Shoprite have been affected by 154 stores, and Pick n Pay 136 outlets that were broken into and looted. Mr Price had 109 stores affected. Famous Brands, Truworths, Clicks, Edgars, Massmart, Cashbuild and Woolworths all had fewer than 100 stores impacted.

The review of the above empirical evidence demonstrates the devastating effects and the economic toll the South African economy suffered due to the July unrest. High unemployment, high levels of poverty and inequality are among the root cause of these adverse events. As highlighted, the retail sector was among the hardest hit and its contribution to the GDP diminished significantly.

2.4.8 Acts of God

Historically, common law has defined natural hazards/disasters as “Acts of God” (Dodds 2015:46). Faure, Jing and Wibisana (2015:397) define an Act of God as an accident that occurs as a result of natural causes which are impossible to foresee and therefore, impossible to have measures to guard against, while Drake (2019:122) defines it as a severe unforeseen natural disaster or other phenomena of an exceptional, inevitable and irresistible character, the effects of which could not have been prevented or avoided by the exercise of due care or foresight.

South Africa has experienced a wide range of natural and human-induced hazards that can result in natural disasters, which include earthquakes and sinkholes, urban and rural fire, drought, floods and dam failures, storms, epidemics and spillage of hazardous waste and materials (Niekerk, Wentink & Shoroma 2018:3). Africa is well known for drought and floods amongst the “Acts of God” activities, and, floods cause the rural households, farms to be vulnerable due to the need for rain in the agriculture and livestock production (Mucherera & Mavhura 2020:2). However, it is important to look at the impact the existing natural disasters actually have on the South African market, especially in the retail sector.

South Africa was affected by severe flooding and landslides due to heavy rainfall that took the lives of 448 people on the 11-13 April 2022, 40 000 people were displaced and approximately 12 000 houses were completely destroyed in KwaZulu Natal (Co-ordination of Humanitarian Affairs OCHA 2022). The reports further detailed an estimated R7 billion in damages that were affected

by the flooding, causing 31 220 people to lose their jobs, with eThekweni accounting for 68 percent of the jobs. Over 1 000 businesses that are in eThekweni (KwaZulu Natal) were impacted by the “Act of God”, 38 percent belong to the wholesale and retail trade sector (Craig 2022). Because Africa and especially, Southern Africa, is prone to flooding, the government has created laws or disaster risk reduction plans to address any activities that might occur. Table 2.8 explains all the policies that the government has put in place.

Table 2.8: Selected Laws on Disaster Risk Reduction in South Africa

Name of Legislation	Description of Provisions Relevant to Disaster Risk Reduction	Applicable, Chapter or Section
Constitution of the Republic of South Africa, 1996	Bill of Rights	Chapter 2, specifically sections 11, 24
	Principles of co-operative government and intergovernmental relations	Section 41 (1)(b)
	Objects of local government	Section 152 (1)(d)
Disaster Management Act, 2002 (with special reference to the national sphere of government)	Contents of national disaster management framework	Section 7
	Objective of the NDMC	Section 9
	General powers and duties of the NDMC	Section 15
	Disaster management information system	Section 17
	Disaster management plans and strategies	Section 19
	Prevention and mitigation	Section 20
	Monitoring, measuring performance and evaluating disaster management plans and prevention, mitigation and response initiatives	Section 21
	Annual reports	Section 24
	Preparation of disaster management plans	Section 25
	National contributions to alleviate effects of local and provincial disasters	Section 57
Fire Brigade Services Act, 1987	Definition of service includes a provision for the preventing the outbreak or spread of a fire	Section 1
	Regulations regarding the safety requirements to be complied with on premises in order to reduce the risk of fire or other danger or to facilitate the evacuation of the premises in the event of such danger	Section 15 (1)(d)
	Regulations regarding the use, manufacture, storage, or	Section 15 (1)(e)

	transportation of explosives, fireworks, petroleum, or any other flammable or combustible substance, gas, or any other dangerous substance	
National Veld and Forest Fire Act, 1998	Establishment, recognition, duties, and functioning of Fire Protection Associations (FPAs). These FPAs must deal with all aspects of veld fire prevention and firefighting.	Chapter 2
	The prevention of veld fires through a fire danger rating system	Chapter 3
	Veld fire prevention through firebreaks	Chapter 4
Spatial Planning and Land Use Management Act, 2013	Development principles notably the principles of spatial sustainability and spatial resilience	Section 7
	Preparation of spatial development frameworks	Section 12
Mine and Health Safety Act, 1996	Objects of the Act	Section 1
	Health and safety at mines	Chapter 2
Safety at Sports and Recreational Events Act, 2010	Responsibility for safety and security at events	Chapter 2
	Event safety and security planning committee	Section 15
	Functions of event safety and security planning committee	Section 16
	Event safety and security measures	Section 23
Environmental Management Act, 1998	National environmental management principles	Section 2
	Integrated environmental management, general objectives	Section 23
	Duty of care and remediation of environmental damage	Section 28
	Control of emergency incidents	Section 30
National Water Act, 1988	Purpose of Act (specific reference to reducing and preventing pollution and degradation of water resources, promotion of dam safety, and managing floods and droughts).	Section 2
	Preventing and remedying effects of pollution	Section 19
	Control of emergency incidents	Section 20
	Dam safety	Chapter 12
Public Finance Management Act, 1999	Use of funds in emergency situations	Section 16 & 25

Source: Khangale (2016:191)

An “Act of God” is amongst other disasters such as political instability, economic crises and regulatory requirements, to mention a few, which can potentially lead to product recalls and food safety scares, especially in the food supply chain (Agigi, Niemann & Kotze 2016:4). It is for this reason that the government has implemented the guidelines in Table 2.8.

This section has provided information highlighting the level where South Africa is positioned when it comes to “Acts of God”; it is clear that the country is more prone to floods and drought than any other activities. Moreover, the literature mentioned that the retail industry is one of the most vulnerable to natural disasters. Therefore, the sector must have strategies in place to be able to deal with the consequences that come with “Acts of God” to have minimised risks of impacting the overall GDP of the country, unemployment, food shortages and weak food security. The challenges that were experienced by the market, as per the above discussion, provide a path the retail firms require in order to prevent a massive impact on the market.

2.5 PREVIOUS SUPPLY CHAIN MANAGEMENT RESEARCH IN THE RETAIL INDUSTRY IN SOUTH AFRICA

This section focuses on the previous research conducted by authors and researchers on retail supply chains and looks for the research gaps in the studies conducted in the field. Table 2.9 outlines different studies that were conducted in the supply chain industry in South Africa.

Table 2.9: Previous supply chain studies in the retailing industry in South Africa

Author and year of publication	Focus Area	Title of the study	Region in South Africa
Tuomala and Grant (2021)	Food access and security	Exploring supply chain issues affecting food access and security among urban poor in South Africa	Western Cape
Monnagaaratswe and Motatsa (2021)	Competitiveness	Enhancing business competitiveness of medium-sized food produce retailers through supply chain management	Mafikeng
Mathu (2021)	SME competitive advantage	The information technology role in supplier-customer information-sharing in the supply chain management of South African small and medium-sized enterprises	Gauteng
Neboh (2021)	Supply chain designs and dimensions	Supply chain design dimensions for supply chain resilience in the South African fast-moving consumer goods retail industry	KwaZulu Natal
Tuomala (2021)	Urban food security at the intersection of SCM	Urban food security at the intersection of retail supply chain management and development studies	South Africa

Tungande, Meyer and Niemann (2020)	Opportunities and challenges of social media in the SCM	Opportunities and challenges of social media in supply chain management: A study in the South African FMCG retail industry	South Africa
Neboh and Mbhele (2020)	Supply Chain resilience	Supply chain resilience and design in retail supermarkets	Durban, KwaZulu Natal.
Jaqueta, Mashilo, Mocke and Agigi (2020)	Physical distribution challenges and adaptation	Physical distribution challenges and adaptations: A qualitative study of South Africa-based organisations operating in emerging African markets	South Africa
Pooe and Mugobo (2019)	Challenges of African designers	The evaluation of the supply chain management challenges South African fashion designers experience in the retail clothing environment	Gauteng, Western Cape and KwaZulu Natal.
Jacobs and Mafini (2019)	Transactional leadership, supply chain quality and business performance	Transactional leadership, supply chain quality and business performance in the fast-moving consumer goods industry	Gauteng, South Africa.

Source: Compiled by the Author

2.5.1 Food access and security

Tuomala and Grant (2021:1) describe food security as people's access to physical, social and sufficient, safe and nutritious food to preserve health and a balanced lifestyle. This research aimed to discover food access through supply chain distribution, focusing on the urban poor, leading to domestic food uncertainty. The study deployed a 59 semi-structured interview system used in one South African township, and data were recorded, transcribed, translated, and coded using NVivo. The study's findings show societal factors as the common feature affecting food distribution. The standpoint regarding the quality and quantity of food is also affected when looking at a three-dimensional perspective of the retail outlets locations. The practical study gave local retailers and policymakers a direction to add nutritional guidelines in the distribution plan and implications that can be provided socially when implementing new forms of retail food distribution with enhanced security and access for the poor in urban towns.

2.5.2 Competitiveness

The concept of SCM plays a critical role in the success of an organisation and its competitiveness; this includes its objective of guaranteeing customer satisfaction (Monnagaaratswe & Motatsa 2021:1). The study aims to explore SCM and supply chain collaboration developments in the

business competitiveness of medium-sized food and product retailers in Mafikeng town, South Africa. A qualitative research approach was employed to conduct the study, and all interviews were recorded and transcribed after an analysis of data to retrieve results. This examination implied that SCM improves competitiveness in medium-sized food product retailers in South Africa. Publicised effectiveness can be enriched via goods and enhanced supplier/customer relations by achieving a constant movement of goods and services. As a result, the study recommends that managers and owners understand the benefits of embracing SCM initiatives by implementing them. This will enable the business to gain a competitive advantage in the market. However, there is no support evidently for SCM practices found in the SCM of medium-sized food product retailers.

2.5.3 Opportunities and challenges of social media in SCM

Tungande, Meyer and Niemann (2020:1) explored the opportunities and challenges of social media in the SCM within the context of fast-moving consumer goods (FMCG) in the retail industry, monitoring developing countries, such as South Africa. The study adopted a qualitative research method and semi-structured interviews using twelve top and middle managers in the FMCG retail industry in South Africa. Data were analysed using thematic analysis. Social platforms, such as WhatsApp, Facebook and Twitter, have taken over the world by being the predominantly used social sites in the world. However, the findings discovered the significant impact these social platforms have produced on the industry's faster and more collaborative communication among suppliers and customers. The shared content by customers on social media keeps organisations grounded in what the customers need. Finally, the study suggests that managers be aware of the technological changes which require different means of communication between the business and its customers. Allowing social media to be implanted in the supply chain will allow better engagement and relationships between the parties and information will flow from a broader base of various sources.

2.5.4 Small and Medium Enterprises' competitive advantage

The study views SCM strategy as adopting customer-centric methods focusing on product flow from the manufacturer to the end-user. There was a deeper look into exploring how supply chain procedures are synchronised as a competitive advantage for the South African small and medium-

sized enterprises for the FMCG. As a result, this research inhabits the phrase ‘customer is king’ to be the cornerstone of good customer service (Mathu 2021:33). This study used a qualitative approach in which participants (SMEs’ owners and managers) were selected through non-probability sampling. It uncovered the relations between the suppliers in the FMCG and third-party logistics (3PL) transport services. Based on the investigation conducted, the findings declared an improvement in costs through utilising a 3PL system optimisation circulated in the SMEs. Cost-effectiveness can be achieved through a heightened supplier-customer relationship that is retained as far as product and service flow is concerned.

2.5.5 Supply chain design dimensions

The significance of retail businesses to structure and manage SCM to identify the correct balance between inventory, transportation, and manufacturing costs is unquestioned. This paper expects establishing the supply chain design dimension to effectively command the South African retail industry’s ability in the FMCG to perform with resilience (Neboh & Mbhele 2021:58). This paper drew its sampling from managers and supervisors of major South African supermarkets in the FMCG industry. Data were analysed using a univariate and multivariate approach. The examination has discovered that the resilience of product availability relies on transport networks, forming a critical part of the retail industry. The findings stress that the resilient improvement in operational performance echoes appropriate technological investments; consequently, better customer service is realised due to an enhanced transport network.

2.5.6 Challenges of the African designers

Fashion design plays a fundamental role in creating, developing and promoting the retail clothing industry. Hence, countries such as South Africa, Nigeria, and Serbia are leaders in the fashion industry and aim to become global leaders to add to the growing retail clothing lines (Adinolfi, Tichaawa & Banda 2018:247). The above-mentioned literature expresses the need that Poole and Mugobo (2019:68) saw to address the challenges that South African designers are facing in the SCM of the retail clothing industry. The paper alludes to the minimal visibility of designers in the industry due to the challenges they face. This study uses a qualitative approach and semi-structured interviews conducted with twenty-four industry professionals. All questions were responded to according to the designer's professional and personal experiences. The findings of the study

outlined a number of supply chain challenges faced by the retail industry, including skills and knowledge, cash flow and funding, fabric, garment and production quality, market access and location costing and competition, among others, revealed by the respondents. The catalyst's practical implication is a first for the retail clothing industry to eliminate the mentioned SCM challenges. As a result, it is recommended that the supply chain link closeness be observed as a supporting base to the actual communication between members of the supply chain.

2.5.7 Supply chain resilience

Amidst the challenges encountered by the FMCG industry, product and service distribution is constantly flowing to capture the importance of customer satisfaction (Neboh & Mbhele 2020:51). Retail supermarkets must maintain this type of flow in the distribution in order to ensure the product is available to the end-user customer. This study ear-marked the resilience concept as a vital future supply chain research area that can direct interferences without any negative influence on retail business operations. The qualitative research method was chosen for this study. Managers and supervisors of selected FMCG retail supermarket outlets in the Durban area were interviewed, and purposive sampling of an estimated target population of 1509 and a 306 sampling size was executed. Research findings concluded that transport networks, technological advancement and environmental changes are the key contributors to the dimensions that impact the retail supply chain when designing resilience. Therefore, it becomes fundamental for managers and supervisors to understand factors to consider by supply chain retailers when designing resilience in their respective supermarkets. The education system has also been tasked to become a critical body of knowledge by being an experimental study that will build supply chain design and resilience constructs.

2.5.8 Transactional leadership, supply chain quality and business performance

Over and above the challenges that the FMCG industry has experienced, Jacobs and Mafini (2019:1) have identified leadership as a dominant challenge that the South African FMCG industry needs to possess as an appropriate leadership skill. The South African FMCG industry is playing in both domestic and global competitiveness has been proven and evident. However, the industry must withstand the challenges it faces to stay afloat in the sector and continue to prevail. The study scrutinised the connection between transactional leadership, supply chain quality and business

performance in the FMCG industry within Gauteng province, South Africa (Jacobs & Mafini 2019:1). Managers and the professional workforce in the FMCG were selected as the target population for data collection through a survey limited to 73 respondents, using a qualitative research approach. The study found a positive relationship between transactional leadership and supply chain quality and a positive relationship between supply chain quality and the financial and non-financial performance of the business. The research exposed that supply chain quality needs to be achieved for the business to achieve increased financial and non-financial performance. Additionally, transactional leadership impacts supply chain quality in the South African FMCG industry.

2.5.9 Physical distribution challenges and adaptation

Distribution challenges have been researched in other global developing markets, such as Asia and South America. However, this topic has not been substantially covered in the African context (Jaqueta, Mashilo, Mocke & Agigi 2020:1). The study aimed to comprehend the prevailing physical distribution challenges the various retailers are facing in the African industry. Organisations operating in the FMCG, third-party logistics and retail industries are prioritised to overcome the problems. Middle and senior managers were chosen as an appropriate sample for twelve semi-structured interviews, and the researcher also employed a qualitative research method. Respondents highlighted strong views, which are not limited to border congestion, weak infrastructure and informal markets, as the burning contributors to igniting these issues. Consequently, the study is essentially assisting the organisation in understanding the route to take to adapt to their physical distribution operations.

2.5.10 Urban food security

Food security has become a serious concern in the retail fraternity, especially with all the legislation passed to promote and ensure that organisations stay compliant with the law to realise security and access. The experimental investigative research for this study was piloted in the Western Cape, South Africa and Bangkok, Thailand; both contexts have high levels of urban inequality and informality, making them relevant and interesting contexts for this study (Tuomala 2021:3). The author further explains various backgrounds in the society in terms of the demographics and the importance of food in their culture as the facilitator. The researcher further

states the formal mechanisms to deploy in different contexts that can contribute to potential solutions, considering that the urban poor use a diverse variety of retail outlets for groceries (Tuomala 2021:20). The first contribution of this study is to understand the dynamics of underlying factors that impact the retail industry on food security. Data in this study suggest retail chains are not entirely aware of the shopping dynamics in poor areas for them to understand their specific needs; studies that were done in predominantly poor areas always inform retailers and policymakers of the inadequacies of the retail strategies with regard to that urban poor (Tuomala 2021:66).

This section highlighted the importance of SCM in the retail industry in South Africa. It can be observed that it plays a significant factor in contributing to the success and operational flexibility of the industry. Moreover, as indicated by scholars, operational challenges equally pointed out the need to restructure firms' strategies to implement SCM practices better.

2.5.11 Research gaps

The review of the literature presented SCM studies that were conducted in the retail industry. There appears to be a lack of current empirical studies focusing on the nexus between inventory and warehouse performance in the retail industry. Besides, the broader scope of the present investigation underscores its value proposition. Unlike some of the identified research, the current study targets two provinces (Gauteng and KwaZulu Natal) considered economic hubs of the country.

2.6 CHAPTER SUMMARY

This chapter focused on the retail industry, specifically in the South African context. Therefore, the industry is defined, and its operational characteristics are outlined; as a result, the chapter looked into the background of the retail industry, the types of retail businesses, significant players who are dominant in the environment and the governing legislative pieces used for compliance. This chapter provided literature on the significance of the retail industry and its overall contribution to the South African economy; in terms of GDP, employment creation, its influence on trade, technological changes that require innovation and the industry involvement in CSR. The chapter noted the fluctuating trends in retail that existed as a result of government policies and economic activities, leading to a decline in sales revenue and increased unemployment to a certain

extent. Further discussion highlighted the role and implementation of the concept of SCM in the sector and its significance as an enabler of business success. The chapter concluded with a review of supply chain studies, which represented a balanced view of the positive role of the supply chain, as well as the challenges facing retailing firms. The next chapter reviews the literature on the identified constructs of the study.

CHAPTER 3: LITERATURE REVIEW OF THE RESEARCH CONSTRUCTS

3.1 INTRODUCTION

This chapter reviews the literature on the research constructs. The selected research theory is addressed in this chapter, which is the Theory of Constraints. The literature review of the research constructs is addressed with different factors affecting and influencing them and the empirical study conducted, and measurements of WP are tracked in this chapter. This chapter proceeds to discuss capturing the examination of IM practices and how they are integrated with mediating IP and WP. Due to the scarcity of academic literature in the inventory and WP areas, it becomes imperative to have previous studies accompanying the investigation. Previous research that includes authors and year, the focus areas and the region in which it was conducted are mentioned in the chapter. The section discusses the research gaps of the studies selected in the South African context.

3.2 RESEARCH THEORY

This section presents the research theory of the study, which is the TOC. The salient points that are addressed include the definition of the theory and the factors forcing various businesses to implement the nominated theory. This section further explains why it is suitable for the study.

3.2.1 Theory of Constraints

Goldratt's TOC originates from the manufacturing sphere and is regarded as a systems methodology aimed at identifying bottlenecks which may affect firms' operational processes (Kuruvilla 2018:10). Factors such as globalisation, technological advances, intense global competition, and inadequate management are some factors that can impact the firms' supply chain ecosystem (Okutmus, Kahveci & Kartasova 2015:139).

TOC is regarded as the comprehensive philosophy that is used to manage processes. It offers an integrated approach to managing and improving different firms' operations (Sukolova & Ceniza 2015:134).

This method is widely known as the performance enhancer and increases the efficiency of the company and its processes. Since its inception in the 1970s, TOC is still a tool to help identify and manage constraints and guide continuous improvement and change in the organisation (Ikezi, de Sousa, Gupta & Florini 2018:5068). There is no survival for companies if they fail to obtain a competitive advantage in producing high-quality products or services in their inventory turnover. Hence, the importance of TOC implementation (Golmomahadi 2015:39).

Due to the challenging and ever-changing processes in the retail and supply chain environment, the TOC is identified as a suitable model to address the problems in the current study. This applies to the study due to its core focus on identifying and managing constraints that are essential for an industry that can change its processes in any given year or time. These include putting a focus on the improvements of the bottlenecks to continuously improve the performance of the retail operation (Chacko, Shanta, Kumar, Javli & Sreenand 2017:25).

Moreover, developing strategies dealing with the constraints faced by the sector can positively impact the loyalty required by the businesses to the customers. Therefore, the TOC appears to be appropriate for the study as it deals with the required aspects of the industry. In respect of the context of this study, the employment of TOC will assist in providing the necessary support to the strategic aspects of the study which are ISP, II, ITO, IC and ABC analysis to improve IP and WP.

3.3 LITERATURE REVIEW OF THE RESEARCH CONSTRUCTS

This section discusses the literature provided by previous authors on the topic. It is fundamental to understand the concept of inventory management practices to examine their influence on the current study.

The section also reviews the literature on the study's constructs, including the predictors (ISP, II, ITO, IC and ABC analysis), the mediator (IP) and WP as the study's outcome. The topics discussed involve the antecedents, the importance and outcome, and how they can be measured. The chapter concludes with a review of previous studies on IP and WP.

3.3.1 Inventory management practices

The concept of IM is defined as a set of processes to organise, manage and avail firms' items to their customers (Wild 2012). They perform the role of connector between different functions, such

as purchasing, manufacturing and distribution to ensure meet customers' requirements are met (Miller 2010). Typical IM practices include inventory control (Lysons & Farrington 2006) and process auditing (Hussein & Makori 2018). A study by Oballah, Waiganjo and Wachiuri (2015) identified stock valuation, inventory shrinkage (preventive), II, inventory turnover (IT) and ABC analysis as IM practices. According to Ahmad and Zabri (2016:104), IMP have a considerable number of studies, with previous research suggesting many potential variables connected with the concept of the practice from different research contexts. The author further states that the efficiency of IM practices in the retailing industry may have serious implications for the firm's performance. A study by Pasandideh and Niaki (2009:329) looked into the implementation of IM practices before and after implementing Vendor Managed Inventory (VMI) in a model developed for a two-level supply chain consisting of a single supplier and a single retailer, while Smith (2011:433) compared IM practices of six major institutions in different industries, which recommended the ABC analysis method as an IM practice that can enhance company performance.

The gaps between IM theory and practices were examined as developing styles of the FMCG industry. The study found that managers desire to change IM practices as reasonably and quickly as possible and care less about optimal but non-implementable solutions (Kumar, Mishra & George 2013:12).

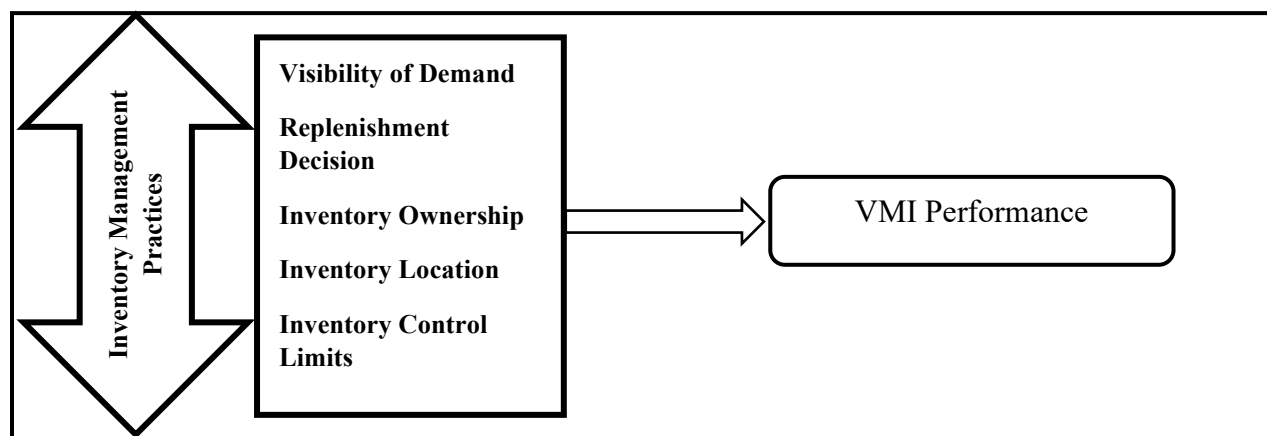


Figure 3.1: The conceptual framework of inventory management practices' effect on the performance of vendor-managed inventory (VMI)

Source: Radzuan, Rahim, Anuar, Naw and Osman (2015:2116)

Figure 3.1 highlights how IM practices can be represented by many, depending on the outcome variable. The conceptual framework demonstrates the impact of the five IM practices on VMI performance. Figure 3.1 shows a positive relationship between the visibility of demand, replenishment decision, inventory ownership, inventory location, IC limits, and VMI performance.

IC is one of the neglected areas in the management of retail firms, as a result, retail outlets are left with an excess amount of inventory due to poor IM practices (Otchere, Adzimah & Aikens 2016:105). Moreover, it is critical to establish the relationship between IM practices and performance, therefore, effective IM practices have a positive impact on the IP and WP of the business and also have an eventual effect on the overall business processes (Munyao 2015:1633).

Based on the review of literature, the study directed attention to the following practices, namely ISP, II, ITO, IC and ABC Analysis. The selection of these practices is based on the fact that they are critical indicators of inventory performance (Ekegbo *et al.*, 2018:57). Adopting preventive measures to minimise ISP and ITO is important to sustaining IP. This view is supported by Hussein and Makori (2018:973) who found that continuous investment in a firm's inventory optimises IP. Besides, several scholars (Breivik 2019:1, Prasad & Venkatasubramanian 2019:23; Wambua *et al.*, 2015:259) indicate that ITO, IC and the ABC analysis is an important yardstick for assessing IP. Therefore, the selected IMPs are deemed relevant predicting factors that drive IP and WP in the retail sector.

3.3.2 Review of literature on the inventory management practices selected for the study

This section reviews the literature on IM practices of this study which consists of ISP, II, ITO, IC and ABC Analysis. As indicated above, these practices were selected as measures of IP and WP in the retail sector in Gauteng and KwaZulu Natal.

3.3.2.1. Inventory shrinkage prevention

The aspects which are discussed include the emergence, definition, antecedent factors, importance, outcome and how the construct has been measured.

- **The emergence of inventory shrinkage**

A study conducted in 1972 by Donnel and Peacock (1972:151) indicated that one shopper who stole merchandise worth R86.17 in the store caused more than 1 600 shoppers to be randomly searched and placed under strict surveillance. According to a study by Neundorf (1977:1) that looked at difficulties during those years of opening small businesses, IS was one of the core reasons many businesses failed. In 1976, scholars such as Blankenburg (1977:1) studied factors determining the probability that shoplifting can be detected to reduce IS. In view of the above literature, it can be suggested that employees and shoplifters have been the cause of increasing IS. It appears to be unclear precisely when the existence of IS emerged.

There were more global research and studies just after the 20th century on IS, and many scholars were starting to investigate the predicament as a measure of supply chain performance (Lapide 2000:287; Levine & Jackson 2002:287 and Rohn, Austin & Lutrey 2003:33). With regards to the view in the literature mentioned above, there have been findings that reveal the significant influence of several aspects to IS, such as stock-taking (Eminue, Titus & Udo 2019:45), the effectiveness of Radio Frequency Identification (RFID) in inventory management (Goyal, Hardgrave, Aloysius & De Horatius 2016:1), the impact of RFID technologies on supply chain decisions concerning IS (Sarac, Absi & Dauzere-Peres 2015:27).

Implementing IS can significantly boost organisational performance as shown in the aforementioned literature. The section provides clear relevance to the results and achievements the retail sector can accomplish, taking the role IS plays in inventory performance. The standard of living in South Africa has worsened significantly since the year 2019. The situation got worse when the global COVID-19 pandemic hit the world. This has affected buying power due to many people being retrenched, hours being cut, and companies going into business rescue. The more people do not work, the more theft becomes an issue in the market. Retail businesses need to implement the necessary equipment and technology to eliminate the numbers contributing to IS. The definition of IS is addressed next.

- **Definition of inventory shrinkage**

The concept of IS is described as losing inventory due to various factors (Knego & Misevic 2016:52). The authors provided the most commonly used definition, which defines it as a loss of

inventory. is can also be defined as a combination of theft of products by employees, shoplifting, vendor fraud, and errors in administration (Alleleyn 2016:10; Yu, Chen & Wang 2019:1).

Although the definition goes against the notion of Hollinger and Davis (2015:206), which indicated the use of IS, shortage, or other terms, such as loss, to describe employee theft, this tends to reflect an attitude of denial and ultimately, decriminalises the incident of employee theft as something other than criminal behaviour. It is still understood that employees are the contributing factors to shortages in stock; this can be directly or indirectly. Figure 3.2 demonstrates the definition of IS.

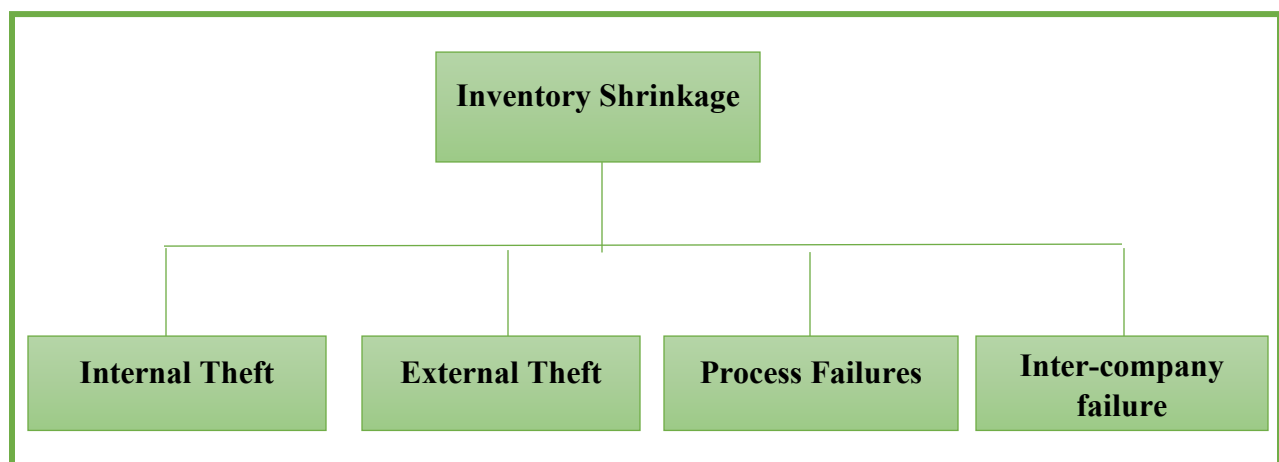


Figure 3.2: Retail definition of inventory shrinkage

Source: Peacock and Fonteijn (2016:5)

Figure 3.2 shows a graphical explanation of how IS is described in the retail supply chain (Peacock & Fonteijn 2016:5). It indicates the four groups that are believed to be the key contributing factors to the inventory inaccuracy caused by stock losses.

Shrinkage is described as the permanent loss of inventory, including theft, spoilage, and supplier fraud (Biswal, Jenamani & Kumar 2020:3). Also, IS is also defined as a stock loss that leads to inventory inaccuracy (Seng & Yew 2019:147). Claudia and Bainson (2016:145) define IS as a loss due to customers' and employees' theft. Boniface (2016:111) further states a distinguished definition as the reduced inventory that a supermarket or retailer operator faces between the point of manufacture or purchase from suppliers to the point of sale in retailers' stores.

The above-mentioned definitions have a collective meaning of what IS is, which is an inventory imbalance that could be due to theft and process failures. This study has adopted Ekegbo *et al.* (2018:54)'s definition of ISP as a set of preventive or proactive measures firms take to keep or maintain the level of IS at a minimum. ISP and IS are use interchangeably in this chapter. The antecedent factors of ISP are discussed next.

- **Factors influencing inventory shrinkage prevention**

The concept of IS was introduced to the retailer due to inventory inaccuracy problems. It has become a critical element for retail outlets to achieve high performance in the supply chain systems. The documented factors such as store records, planning, and staff knowledge have been the main contributors to the inventory spectrum (Chan, Tasmin, Aziati, Rasi, Ismail & Yaw 2017). Ritha and Priya (2016:63) identified inventory inaccuracy in two aspects: loss due to shrinkage, obsolescence, and supplier fraud, and second, being informational loss. However, in light of the literature provided above, there seem to be difficulties that emphasise what should be included and excluded in IS and how it can be calculated.

Figure 3.3 depicts what most of the published surveys and reports have investigated on IS, which Beck (2016:18) identifies as the Four Buckets of Shrinkage.

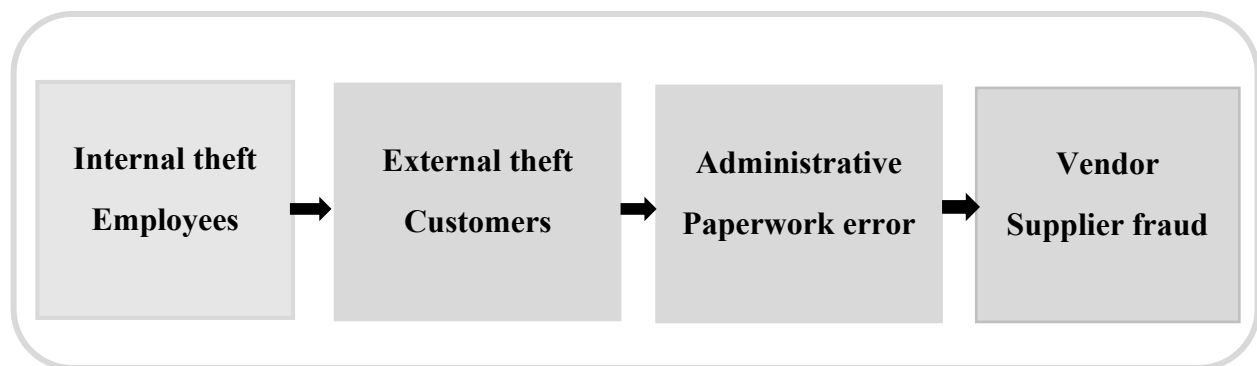


Figure 3.3: The four Buckets of Shrinkage

Source: Beck (2016:18)

Figure 3.3 presents the four buckets of shrinkage, internal theft/employees, external theft/customers, administrative/paperwork, and vendor/ supplier fraud. Numerous authors have reported these buckets when examining IS studies (Alleleyn 2016:10; Yu, et al. 2019:1; Beck 2016:18). Internal and external theft can be easily understood as the more familiar concepts

regarding IS. Beck (2016:18) emphasised that administrative costs can include a wide range of retail costs, while vendor supplier fraud is a complex function to categorise, identify and measure with accuracy. Ekegbo, Quede, Mienahata, Siwangaza, Smit and Bruwer (2016:53) put the factors into perspective and described them as follows:

- **Employee theft is when assets that belong to an employer are taken with intention and without authorisation for personal use.** Numerous factors include employees' gambling habits, employer and employee problems, and low morale among employees, to mention a few.
- **External theft is an act of a person disguised as a customer taking items that belong to the business during official operating hours.** This act, regarded as shoplifting, is caused by individuals making a living out of it and some with connections inside the business.
- **Administrative errors.** These errors are seen as non-malicious, which can be made intentionally and unintentionally by an employee; this is an act of incorrectly recording inventory-related information on the system aspects, such as incorrect product use codes, incorrect pricelists, and point of sale errors.
- **Vendor fraud** refers to deliberately causing discrepancies on purchased inventory against the delivered stock and over-stating invoice amounts by suppliers or other divisions intending to defraud the business.

In light of the review provided above, the retail business must consider these factors to remain competitive in the market with adequate inventory costs. Moreover, businesses need to achieve responsive counter-implementations to address the increasing IS, emphasising retaining core business functions and competitive objectives. Due to the mutual IS predicament, it is evident that shrinkage is a worm that threatens the persistence of large-scale retail channels except if the firms have invested in proper effective stock management tactics. Additionally, there needs to be a collaborative methodology to decrease shrinkage as it affects one business and the entire industry. The importance of ISP is discussed next.

- **The significance of inventory shrinkage prevention**

A concern about acknowledging the importance of shrinkage at the store level was expressed as its widespread use of key performance indicators in retailing. However, it has been neglected in retail operations management (Teller, Holweg, Reiner & Kotzab 2018:5). The technical advancement implemented across the globe is believed to yield positive changes in reducing IS and retail crime, as retail shrinkage is still at a high level (Potdar, Guthrie & Gnoth 2016:715). The information mentioned above is supported by pointing out the critical nature of engagement in the retail partners to ensure better problem resolution to IS.

The demand for companies to be able to implement quick and effective measures to respond to excessive IS has become a priority, especially in retail stores. This is due to operating under the lowest profit margins in the formal retail sector (Kohne & Pekeur 2015:102). An increase in inventory costs is usually attributed to excessive inventory. However, it has been estimated that more than 10 percent of profits are impacted by IS (Tao, Fan, Lai & Li 2016:1). Its importance is limited to the retail industry and society (Kelkar & Emilus 2016:1). Results of reduced employer profits will subsequently have an impact on return on investments for investors, which will lead to higher prices for consumers. Hence, it is important to note IS 's impact on all stakeholders.

The significance of the cost of effectiveness needs to be determined by using a method of IS reduction in the retail sector environment, which allows expected changes in how the retail business operates (Sidebottom, Thornton, Tompson, Belur, Tilley, Bowers & Johnson 2017:13). Europe Shrinkage Group created an approach to combat the stock loss problem. This concept was based on an inter-company collaboration throughout the supply chain; this is an approach used for systemic and systematic designs to deliver benefits to the respective firms. Figure 3.4 depicts the “Shrinkage Road Map” created by ECR Europe (2003).



Figure 3.4: A shrinkage road map

Source: Allen, Diffley and Onofrei (2017:4)

Figure 3.4 was initiated in 2003 in Europe due to high stock losses due to theft and inappropriate internal systems. The map shows a cycle that companies can use when they are looking at minimising their IS. It starts with developing a plan on how to approach the problem. Second, the company will gather the measures and map a way to approach the matter. Third, the fourth stage is analysing the risk, identifying the cause of the problem, and developing the solution. Fifth, implementing and trying out the solutions; last, evaluating the process and integrating the best practices to achieve objectives.

This study has provided key components that indicate the importance of IS, the effectiveness of the element of company costs, the importance of monitoring and managing the concept, and most critical, the shrinkage map, which shows the cycle to minimise shrinkage. The outcome factors of ISP are addressed next.

- **The outcome of inventory shrinkage prevention**

The concept of IS is the difference between the actual inventory and records; it is, therefore, essential to note that it erodes more than 60 percent of firms' profit margins in the retail industry (Li, Song, Sun & Zheng 2019:1). Ouma and Mwangangi (2018:977) posited that IS as part of IM practice, and II and IC can affect IP if they are not well managed. Therefore, the literature supports that IS can negatively and positively impact IP depending on how they are integrated into the systems. Moreover, Agum, Awogbemi and Taimako (2018:31) established that ISP plays a vital role in improved performance and the competitiveness of the organisation.

In view of the information aforementioned, the confirmation is that ISP can have a positive relationship. There is little information that supports negative information as compared to the latter. As such, the variable's connection with other factors may offer successful conclusions that will benefit the decision-makers. How ISP is measured in the study is discussed next.

- **Measurement of inventory shrinkage prevention**

Several studies had measured IS as a uni-dimensional construct. These include Eminue, Titus and Udo (2019:51), who used an eight-item scale. Chan, Tasmin, Aziati, Rasi, Ismail and Yaw (2017:4), Oballah, Waiganjo and Wachiuri (2015:713) and Ekegbo, Quede, Mienahata, Siwangaza, Smit and Bruwer (2018:57) used a five-item measurement scale. This study measured ISP using a six-item scale adopted from Ekegbo *et al.* (2018:57). The second identified practice is discussed next.

3.3.2.2. Inventory investment

This section discusses the origin, and factors that influence and derive from II. It concludes with an overview of how previous studies have measured the concept and the current study's measurement.

- **The emergence of inventory investment**

The rule in II is utilised to realise the flattening of partial stock adjustment about the desired inventory level in an organisation (Allen 1988:248). II gained media attention in the 1990s with the view of what seemed to be the starting point of many studies to follow. The attention was related to three issues (Hornstein 1998:49):

- Firstly, a substantial portion of changes in GDP is due to the changes in II;
- Secondly, the changes in II which was estimated to express useful information about the investment, are destabilising the economy;
- Lastly, II has also inherited those dynamics that destabilise the economy.

The concept of II was also realised when the internal finances were unstable, making it impossible for firms to plan and invest in inventory (Carpenter, Fazzari & Petersen 1994:75). II can be minimised by determining the optimal setting of the factories' stock levels while sustaining the expected customer service in the business (Tsai & Liu 2015:118). Some of the recent studies that

have been carried out on II have little to do with II's connection with the supply chain. There is little evidence proving the notion.

Table 3.1: Previous research studies on inventory investment

Author	Study
Huang (2017:382)	II, Financial Leverage and Firm Performance: Evidence from Chinese Listed Companies of Real Estate
Rubio and Schuh (2017:1)	Monetary Policy and II
Lin and Liu (2016:310)	A study in II affecting the electricity adjustment structure
Chikan, Kovacs, Matysz, Sass and Vakhal (2016:14)	The long-term trends of II in traditional markets and post-socialist economies
Huang (2016:57)	A review of II: The Macro and Micro Perspective

Source: Compiled by the author

Table 3.1 highlights several recent studies that were carried out by scholars on II. According to the chosen studies in the table, it is clear that II is a cross-functional aspect related to business and economics.

There is significance in the argument of II and how it affects the business, the dispute is mainly taken from the close connection between the changes in II and the GDP (Hornstein, 1998:50). Several other scholars based their studies on how II had been strongly linked to the business cycle and economics.

In the view of the presented literature discussed, it could be deduced that the empirical evidence seems to propose a change in how scholars see II, indicating its importance, not only as an economic factor but as an aspect that affects the business in different spheres. The definition of II is discussed next.

- **Definition of inventory investment**

The notion of II can be described as a change in inventory and goods that are in the process in the organisation over a specific time frame (Chod, 2016:2; Lee, Zhou & Hsu 2015:38). Cooper and John (2016:244) describe II as an investment aspect close to changes in production and a relatively

minor component of gross domestic product. II is also described as a dimension of an economy's change in inventory levels from one time to the next (Jim 2020). In contrast, Obaidullah (2018) refers to II as a change to the non-public inventory and an element of private investment in the gross domestic product representing the distinction between production and sale during a specific period. In light of the information mentioned above, it becomes clear that change is critical in inventory investment and an integral part of most definitions. Lastly, Huang (2016:58) describes it as a variation in inventory, work in progress and finished product in an organisation over a specific period of time. Moreover, Abramovitz (1948:1) took the lead by emphasising the relationship between change and II. The author described a change in II volume as suggesting a contrast between II in one period and II in another, comparing the rates of change in inventories in two periods.

Therefore, the operational definition of the study aligned with Chod (2016:2) and Lee, Zhou and Hsu (2015:38) and refers to II as a measurement of change in the levels of inventory for a specific period of time. The drivers of II are discussed next.

- **The factors influencing inventory investment**

The shortage in product costs indicates a positive correlation to II. However, a decline in selling prices has a far more significant impact than when the prices have increased (Long, Ding & Ran 2020:1). Bhandari (2017:78) emphasises the importance of companies determining the optimum level of their II in order to be able to deal with the factors that have a negative impact. These include debt and the cost of borrowing; these are some of the major contributing factors to II, and II is susceptible to cash flow (Serrasqueiro & Azevedo 2016:1). For instance, inventory management also plays a vital role since it supports the idea of minimising high investments on all costs associated with inventory (Bhandari 2017:86).

The importance of forecasting methods has been discussed to highlight their role in II. According to Syntetos, Babai and Gardner (2015:1746), the choice of forecasting method is a significant factor of the customer service that can be acquired from a given level of II. It is also noted that capital market deficiencies have an impact on retrieving sponsors externally; this leads to fluctuations in II. Therefore, organisations choose to reduce II when confronted with a negative shock in the internal finances rather than reduce the fixed investment (Gharaibeh, Zurigat &

Ananbeh 2016:494). Besides, Truong, Sampaio, Carvalho, Fernandes and An (2015:117) point out that several factors affect II. The factors are presented in figure 3.5.

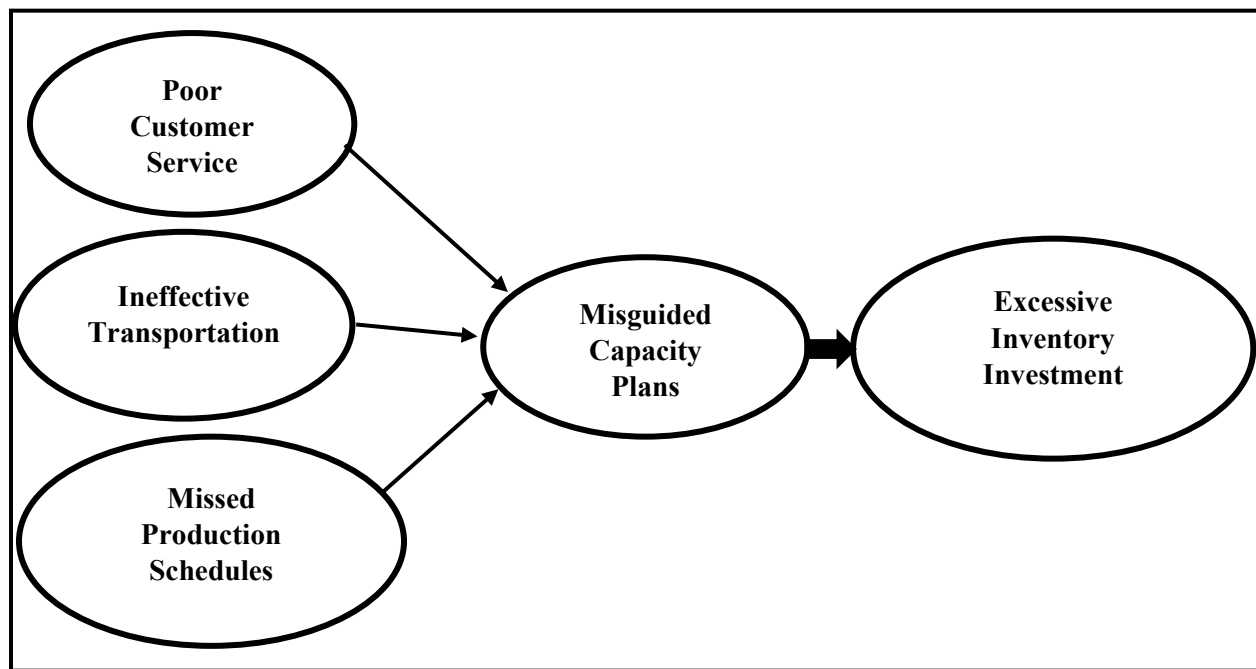


Figure 3.5: Factors affecting II

Source: Truong, Sampaio, Carvalho, Fernandes and An (2015:117)

Figure 3.5 shows how incorrect information can be passed from one end of the retail supply chain to the other, which can produce substantial difficulties during the process. It includes, but is not limited to, poor customer service, ineffective transportation, missed production schedules, and misguided capacity plans that can lead to excessive II. Figure 3.5 show the strategic role of II in defining the success of inventory and warehouse performance if the factors are not well executed.

Therefore, it can be put forward that II as an inventory management practice intends to improve inventory performance to the required level of competitiveness through improvements to the process mentioned in the above literature. Furthermore, warehouse performance's overall achievement depends on the positive relationship between II and inventory performance. The significance of II is discussed next.

- **The significance of inventory investment**

Inventory is a critical strength and represents a substantial investment in an organisation that sells and manufactures a product. These firms include manufacturing, retailing, import or exports, and

others (Shen, Deng, Lao & Wu 2017:21). The main aim of inventory management is to strike a balance between II and customer service (Mankazana, Silase & Molefe 2018:389). The statement above-mentioned agrees with a study by Wangari and Kagiri (2015:81), who studied the influence of inventory management practices on organisational competitiveness. There is theoretical and empirical evidence that the organisation's inventory investment decisions are regarded as major economic factors due to their essential role in explaining the business cycle (Yan, Guariglia, Shi & Peng 2016:4).

Amongst the internally generated funds in an organisation's investment activities, II is a vital reflection of the economy and a significant factor to be examined when assessing a business cycle within an economy (Tan & Avci 2020:182). However, it is important to note how companies manage their inventory as it is vital for material management, which results in II optimisation, aiming at ensuring continuity in inventory availability (Mohopadkar & Patil 2017:229). The efforts of IC and speed of effective customer service help maximise throughput, increase customer satisfaction, quantify the decrease in II, and minimise costs within the company (Barwa 2015:470). In the study, II is considered an inventory management practice.

The plans to monitor unplanned II with incompatibility in the required inventory levels determine the price adjustment and inventory performance (Grasselli & Nguyen-Huu 2018:12). It becomes crucial for managers responsible for inventory management to have sufficient control over inventory. It plays a massive role in realising adequate II (Mishra, Tege, & Agarwal 2017:21). In 1991, the gross national product of the United States dropped by approximately 87 percent due to the fall in II (Zhan & Raff 2018). The author further mentions the correlation of II with sales and production. It indicates a positive relationship between the two factors and states a difference between the variance of orders and sales.

II contributes to the most significant part of current assets and working capital in most activities. Thus, it becomes important to have adequate control and inventory management (Dhere 2015:4). Therefore, firms are encouraged to hold more inventory due to the likelihood of increased production volumes at lower costs, consequently leading to injection into II (Kim 2020:19). With all the efforts of different firms to try and reduce inventory levels in their supply chains, annual II by manufacturers, retailers, and wholesalers still account for over 12 percent of the gross domestic

product in countries, such as the United States, China and Russia (Riza, Purba & Mukhlisin 2018:211).

Higher inventory results in increased II; hence, retailers must maintain optimal inventory levels while fulfilling customer demand with the best service level possible (Salam, Panahifar & Byrne 2016:889). Therefore, II provides enough evidence that the firms' inventory needs to be managed so that it does not affect the costs of II, or it may affect their firm performance (Alrjoub & Ahmad 2017:5). The outcome factors of II are discussed next.

- **Outcome of inventory investment**

There are still limitations in inventory control, especially in small retail outlets. Yet, II accounts for a more significant percentage of the total budget (Atnafu & Balda 2018:3). Kontus (2015:245) found that companies can benefit from maximising their rate of return and minimise the rate of liquidity just by managing inventory. Consequently, II policies are developed to achieve optimal II. It is observed from the literature that using formal inventory management practices is one of the ways to acquire competitiveness, among others, by effectively managing and minimising II (Narayanapillai 2015:606). Rapid technological changes in the supply chain environment force companies to continually preserve technology due to its significance in II and management as a whole (Singh & Rathore 2016:1952).

The concepts that organisations have implemented have generally sought to explain the changes in II due to the following two reasons (Khan 2016:38):

- To reduce the costs of adjusting production levels; and
- To reduce the costs of placing orders for intermediate goods.

The concept of II explains the impact that financial constraints have on II. The changes will assist the organisation in wanting to hold excessive inventory beyond the recommended levels, that result in a financially constrained firm being less competitive in the market (Gharaibeh, Zurigat & Ananbeh 2016:494).

Therefore, it could be opined that II is a big influencer of inventory performance, the bond between how inventory is managed and II is of fundamental importance. More significantly, II enables

improved performance and the company can achieve the required level of competitiveness through customer fulfilment and well-managed finances. How II is measured is discussed next.

- **Measurement of inventory investment**

II has been measured uni-dimensionally by various studies. These include Oballah, Waingango and Wachiuri (2015:714), who used a four-item scale. Muchaendepi, Mbohwa, Hamandishe and Kanyepe (2019:461); Kamau and Kagiri (2015:73) measured it through a five-item scale. In the study, II was measured using five instruments derived from Hussein and Makori (2018:973).

3.3.2.3. Inventory turnover optimisation

This section discusses previous researchers and perceived inventory turnover, where it began, and how and where it was discovered. It provides a definition that the study adopts. Additionally, the section presents determinants of inventory turnover. Lastly, the outcomes and the measurement of inventory turnover are outlined in this section.

- **The emergence of inventory turnover**

There is a lack of consensus on the inception of inventory turnover. However, it is noted that it came from ratios' teachings (Burrell 1928:274). It was then established that some inventory leads and conditions that existed during 1928 in the wholesale and paint distribution sectors showed a considerable amount of inventory turnover that had impacted the departments' position (Alderson & Brommel 1929:8). This led to theoretical opinions that held businesses, due to over-production and over-accumulated stock, encouraged a study of average inventories relative to sales (inventory turnover) (Abramovitz 1950:132). The importance of keeping inventory turnover was outlined in a study done by Knudtson and Collier (1956:5) due to the three aspects below:

- Increase gross margins;
- Hold down the per-unit cost of carrying inventories, and
- Minimise losses caused by deterioration and obsolescence of merchandise.

Although the analogy mentioned above can be seen as the accounting language, it speaks directly to how inventory turnover affects the operations inside different small and large firms. The notion of inventory turnover cannot be associated with the net earnings of any company. It was found that the improvement in inventory turnover averaged about 1.5 percent per year from 1986 to 1995

(Chu 2008:2). A study by Reynolds (1999:54), who analysed inventory turnover in food services, suggested turnover as a tool that improves inventory management practices when dealing with concepts such as delivery monitoring, preferred vendors, stock rotation, and updated price lists. Therefore, this study provides evidence that inventory turnover can often be used as a comparative measure of inventory performance between firms or in evaluating the effectiveness of their inventory management (Kolias, Dimelis & Filios 2011:143). The aforementioned study was taken from the inventory turnover behaviour in the Greek retail sector from the year 2000-2005. In later years, the concept of inventory turnover was directed more in the industries to conceptualise its importance inside organisations, with past research indicating a substantial distinction across all firms.

A significant portion of the variation is mentioned in the study that extended the models of inventory turnover when they examined its effect on the firm size and sales growth rate in the retail stores of the United States of America, models such as gross margin, capital intensity and sales surprise (Gaur & Kesavan, 2015:25). Moreover, the concept of inventory turnover provides further gaps for research in the coming years due to its relevance to the operation of various firms. The definition of inventory turnover is addressed next.

- **Definition of inventory turnover optimisation**

Inventory turnover is defined as the cost of sales of a particular firm that is sold during the same year on average inventory, where a total inventory is denoted with goods sold respectively (Lee, Zhou & Hsu 2015:11). Feng, McVay and Skaife (2015:531) refer to inventory turnover as a company's cost of goods sold, divided by average inventory, with less profitable operations. Comez-Dolgan and Tanyeri (2015:332) only define it as a ratio of cost of goods sold to average inventory.

Over two decades ago, when Caplice and Sheffi (1994:12) studied performance and inventory, they only defined inventory turnover as a measure. Hancerliogullari, Sen and Aktunc (2016:682) expressed inventory turnover as the cost-of-sales ratio that a firm sold to its average inventory level in a specific period and a generic practice metric that measures inventory to sales. It can also be utilised for performance tracking and comparing inventory performance in various firms. Inventory turnover can also be defined as a benchmark to measure inventory productivity, which

indicates that a company can sell its inventory several times during a specific period and be replenished again (Khan, Deng & Khan 2016:155).

The operational definition of the study aligns with Feng, McVay and Skaife's (2015:531) definition, which sees inventory turnover in a strong relationship with the cost of sales allocation in an effort to average minimised operational inventory profits. The antecedent factors of inventory turnover are discussed next.

- **The factors influencing inventory turnover optimisation**

Then the store level is controlled for gross margin, capital intensity, sales growth, and inventory increases with firm size, which creates a gap between retail affiliation and inventory turnover. It was found that even technology does not remove inventory (Breivik 2019:1). Also, firms' capability to prioritise production planning was found to facilitate an increased inventory turnover and ensure that production and inventory levels are concrete and up-to-date (Basaran (2015:42). The FMCG sector experienced the highest average turnover in inventory in the last ten years in India. This observation is based on the view that FMCG is affordable, has a high turnaround off the shelves and are perishable (Singhal & Vyas 2017:591). The above literature advances the importance of the organisation's size as a factor in realising inventory turnover, including the type of products being sold; the faster the product moves, the higher the inventory turnover.

Supply chain innovation aspects, such as horizontal and vertical integration of supply chain links are among those aspects that impact inventory turnover (Stopkova, Stopka & Luptak 2019:2). Working capital turnover negatively influences the company's profitability. In contrast, inventory turnover is seen as a significant influence on performance in the warehouse (Wibowo & Rohyati 2018:95).

The impact of increased product variety on inventory turnover and sales in diverse operations approaches has a solid influence on the performance of inventory and warehousing (Khan, Deng & Khan 2016:51). The factors, such as gross margin, sales surprise, and capital intensity can also be used as determinants of inventory turnover. It is suggested that changes in those variables can be incorporated with inventory turnover to evaluate a firm's inventory productivity (Chandra & Arrawatia 2015:3). The significance of inventory turnover is discussed next.

- **The significance of inventory turnover optimisation**

The significance of inventory and its importance as an asset in the retailing sector is evident, and it signifies what the firm has to offer to its consumers, for example, purchases, while substantial expenses are connected with inventory holding (Breivik 2019:1). Besides, Kwak (2019:2) stressed that an inventory turnover is a critical tool as a performance measure. It is effective as it measures the movement of products to the customers. Lastly, the higher the inventory turnover, the more the cash flow decreases due to slow-moving products that are not sold. It can be said that inventory turnover's significance indicates how quickly inventory turns into receivables through sales.

A high turnover indicates good inventory management, and a low inventory turnover suggests extreme levels of inventory that are justified by the events taking place in sales, such as slow-moving and obsolete inventory (Mwaura 2019:5). An organisation experiences less stock when inventory turnover is higher. As a result, inventory holding costs of a particular product will be significantly reduced (Horvat, Antic & Jeremic 2015:242). In such cases, the available space could be used to accommodate other products in the warehouse and make easy access. The financial analysis done by eFinanceManagement (2019) recommended eight factors that improve inventory turnover. These factors are presented in Table 3.2.

Table 3.2: The three models associated with inventory turnover

Inventory Turnover		
Inventory turnover reveals the number of times inventory is sold in a year (Farooq 2019:52)		
Why improve?	Interpretation	How to improve
<ul style="list-style-type: none"> • A decreased inventory turnover means a stock purchased even when not required. • Inventory turnover increases when there is fast movement in the product sold. 	<ul style="list-style-type: none"> • Excessive inventory and bad sales come as a result of low inventory turnover. • An increased inventory turnover indicates good sales or frequent purchases in small quantities. 	<ol style="list-style-type: none"> 1. Better Forecast 2. Improved Sales 3. Reduced Prices 4. Better inventory pricing 5. Focus on top-selling products 6. Better order management 7. Elimination of old inventory and safety stock 8. Reduced purchase quantity

Source: eFinanceManagement (2019)

Table 3.2 demonstrates three figures to ensure there is always an improvement in inventory turnover. It indicates why inventory turnover should improve and interprets those reasons, showing that ordering unnecessary stock can lead to excess inventory and poor sales. Table 3.2 further signals eight factors recommended to improve inventory turnover; this runs concurrently with the

fact that the higher the inventory turnover is, the better the sales of the company and its productivity.

There are three inventory turnover components: raw materials inventory turnover, work-in-progress inventory turnover, and finished goods inventory turnover (Panayides & Andreou 2015:8), while Burawa (2015:71) indicates four practices, as opposed to the three that are mentioned above. The author suggests firms need to maintain the following functions of inventory:

- **Raw material inventory (RMI):** these are the commodities that go into the initial stage of production of a particular product (Prempeh 2015:2);
- **Work in progress inventory (WI):** these are called semi-finished goods that have not been completed or are awaiting completion for the eventual sale to determine the value of this inventory (Urzoh, Innocent & Izeaku 2016:23);
- **Maintenance repair operating inventory (MRO):** MRO is various materials that are used in the production process in the manufacturing plants, but they are not regarded as being part of the finished product produced (Vieira & Loures 2016:21);
- **Finished goods inventory (FGI)** represents inventory produced in the current period and is available for purchase to satisfy the customers' needs (Ching & Wu 2019:254).

These concepts are key for developing and analysing inventory turnover performance in retail manufacturing. Marodin, Tortorella, Frank and Filho (2017:3) submitted that implementing the reduction in the functions mentioned above has a positive relationship with inventory turnover and improves lean SCM practices.

The impact of inventory turnover in enhancing inventory management practices in the retail supply chain is well noted in this section. The firm might not be able to measure its performance without inventory turnover proportionally. Proper evaluation of the organisation's effectiveness can be realised and monitored when managers and owners implement inventory turnover. The outcome factors of inventory turnover are discussed next.

- **The outcome of inventory turnover optimisation**

Inventory turnover is a guide used to measure and compare organisations' inventory performance (Chandra & Arrawatia 2015:2). The view of inventory turnover supports its relationship with aspects such as the production line, final product, distribution and execution of customer

deliveries. Furthermore, the notion recommends that the relationship between inventory turnover and the aforementioned aspects will turn more effective and will result in positive performance (Devaraj & Jiang 2018:7). According to Mena and Bourlakis (2016:3), literature on retailing performance, inventory turnover is a performance indicator; therefore, retail managers will find it beneficial to use it when measuring and cross-examining their operations against significant competitors.

Global competition and the ever-increasing inventory costs carried by the companies result in the need to speed inventory turnover (Khan, Deng & Khan 2016:148). This view shows that firms experiencing high inventory turnover most likely have poor financial performance (Ahmad & Zabri 2016:85). Moreover, Amanda (2019:15) alluded to the fact that an increase in inventory turnover is not comparable to the increase in operational activities, which means there is tremendous waste in managing inventory management. It becomes fundamental to decrease the number of items stored in the warehouse, especially in a fast-paced environment. When inventory experiences a good rotating state, the company achieves higher profits and the best inventory performance (Batubara 2018:76).

The outcomes drawn from the above empirical discussion demonstrate the crucial part and progressive influence of inventory turnover in improving the company and inventory performance, in terms of the ability to turn inventory over and the financial objectives. How inventory turnover has been measured is discussed next.

- **Measurement of inventory turnover optimisation**

In studying the impact of lean practices on inventory turnover, Marodin, Tortorella, Frank and Filho (2017:34) measured inventory turnover on a five-item scale. Rahim and Cosby (2016:1258) also used a five-item scale adapted from Cortina, Lonsway, Magley, Freeman, Collinsworth, Hunter, and Fitzgerald (2002:270). Ahmad and Zabri's (2016:87) study of the knowledge between inventory management practices and performance used a five-item scale. In contrast, Jonsson and Ivert (2015:130) used a seven-item scale to address performance improvement on four questions. The present study used a four-item scale adapted from Oballah, Wainganjo and Wachiuri (2015:713).

3.3.2.4. Inventory control

Similar to the previous sections, the aspects addressed include the origin/emergence, definition, antecedent factors, importance, outcome effects of adopting inventory control and how it has been measured in previous studies.

- **The emergence of inventory control**

Inventory control is closely associated with accounting reviews of the 19th century. The concept was initially mentioned in work by Scott, Jackson, Filbey, Reighard, Rittenhouse and Paton (1926:18), who looked at the attainability in value that failed in achieving IC. In the late 1980s, IC further emerged due to its contribution to large organisations. Cycle counting was the real issue, although Lee (1981:1) concluded that cycle counting is just an important feature or a major contributing factor to positive IC. One of the first types of inventory errors made resulted in the inability to ship a line on the customer order due to IC and no stock in the physical location (Meyer 1990:15).

It can be noted that the problems that come with decreased IC, bring many problems. According to Meyer (1991:40), there are several problems derived from poor accurate inventory. These comprise the following:

- Loss of worker productivity;
- Manufacturing of unneeded items;
- Broken customer commitments;
- Costly physical inventory, and
- Employer and employee Frustration.

The author explained that inventory control costs are significant; savings resulting from increased IC are substantial. Overstock and understock are the main elements associated with bad IC, as there is a greater understanding between the status of inventory and both elements (Ernst, Guerrero & Roshwalb 1993:1115). In the 20th century, the advance of IC research increased into other spheres. Fennica (2012:211) analysed IC with a cost-plus methodology. The total inventory cost has both the measured costs and the losses from decisions based on the collected information. Therefore, it is important to note that the reduction in inventory inaccuracy may reduce supply chain costs and the actual inventory level (Shteren & Avrahami 2017:74). The literature mentioned

above indicates the importance of maintaining the levels in IC, as both low and high inventory can be a determining factor. The definition of IC is addressed next.

- **Definition of inventory control**

IC is defined as the process of coordinating, controlling and ensuring the accessibility and availability of stock and the prevention of any loss or surplus in inventory (Borade & Sweeney, 2015:6). Swaleh and Were (2014:18) describe IC as the process of holding the correct inventory and reducing the costs of inventory to a minimum. Based on the above empirical evidence, it can be posited that IC can positively impact the retail sector. Therefore, the study adopts Borade and Sweeney (2015:18)'s definition aforementioned definition of IC. The driving factors of inventory control are discussed next.

- **The factors influencing inventory control**

The supply chain's overall performance has experienced poor decision-making in production, planning and control due to information distortion in the retail supply chain and lack of transparency (Drakaki & Tzionas 2017:1). Due to the poor decisions experienced in the performance, IC becomes the main contributor to inventory waste in the supply chain. As a result, IC is seen as the biggest motivator of many organisations to implement modern strategies such as tracking technologies, for example, Radio-Frequency Identification (RFID), to minimise inventory faults to support collaboration amongst the supply chain stakeholders (Cui, Deng, Liu, Zhang & Xu 2016:2028).

Li, Wang and Chan (2016:290) demonstrated that retail costs impact approximately 10 percent of the firm's profits due to inventory inaccuracy. Inventory management performance can deteriorate considerably if there are inventory inconsistencies. Bruccoleri, Cannella and La Porta (2015:803) proposed a behavioural conceptual model based on their assumptions. They assumed that the source of IC is that transaction recording errors are due to the level of motivation of the worker and also the workload and pressure in the work environment. Figure 3.6 presents driving factors for IC.

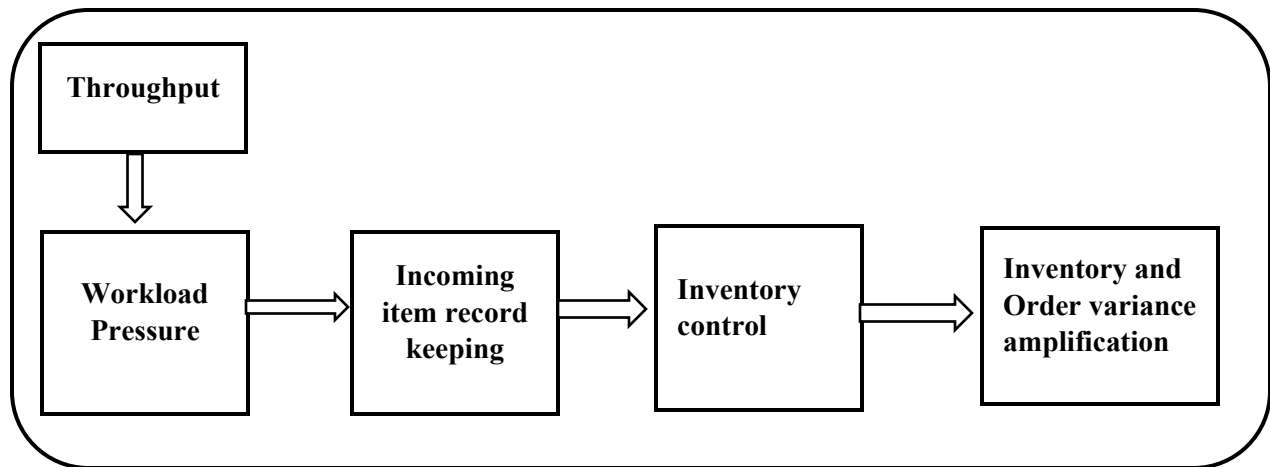


Figure 3.6: Factors associated with inventory control

Source: Bruccoleri, Cannella and La Porta (2015:803)

Figure 3.6 demonstrates the possible factors associated with inventory control and the causes, based on their study. The figure shows the company's throughput, and there is a workload that comes with some pressure on the employees. The operational functions consider recording the items that arrive in stock and the source of IC, which is listed as the information entry error due to the workload. An example of an error is due to identically priced items such as mixed fruit and a strawberry-flavoured yoghurt. The cashier may scan one flavour twice, resulting in incorrect information (Bruccoleri, Cannella & La Porta 2015:803).

The notion of the inefficiencies in IC comes as a natural consequence; the members generate patterns that are affected by inventory errors and distortion when placing orders that do not match current inventory levels (Cannella, Framinan & Dominguez 2016:124). The importance of inventory management with accurate inventory records is influenced by the systems that generate store receipts daily. The systems include automated technologies that replenish inventory for most retailers. The above literature provides evidence that IC is affected by records that do not correspond to the physical inventories due to shrinkage, misplacement and transaction errors, proving to be a significant threat to the retailing inventory performance (Chen & Mersereau 2015:80).

One of the most significant challenges that organisations have faced since the early years of inventory principles is to have efficient stock control. This concept is directly linked to IC. Systems (ERP) that are used to record and store information cannot make mistakes and cause inventory

levels to be incorrect. Such a distortion could be caused by an employee capturing erroneous data, leading to inaccuracy of the data and information in a database. The result of this technical or operational mishap leads to an imbalanced inventory record or shrinkage. As such, it is fundamental that managers and owners invest in training and systems that reduce such discrepancies to optimise firms' productivity and performance objectives. The importance of inventory control is addressed next.

- **The importance of inventory control**

Proper inventory management is critical in every company because an ineffective inventory system can result in loss of customers and sales. More revenue can be generated if inventory is effectively managed, which could directly affect a company's performance (Mohamad, Suraidi, Rahman & Durratun 2016:299). Furthermore, Horatius and Raman (2017:630) alluded to the serious problem of inventory stock records faced by the retail sector, with research showing a range of 65 percent and 80 percent share of incorrect inventory records where they indicate either high or low levels than the actual availability in the store.

A study by Rekik, Syntetos and Glock (2019:11), undertaken for retail organisations in Europe, measured the following IC numbers. Figure 3.7 indicates the IC records.

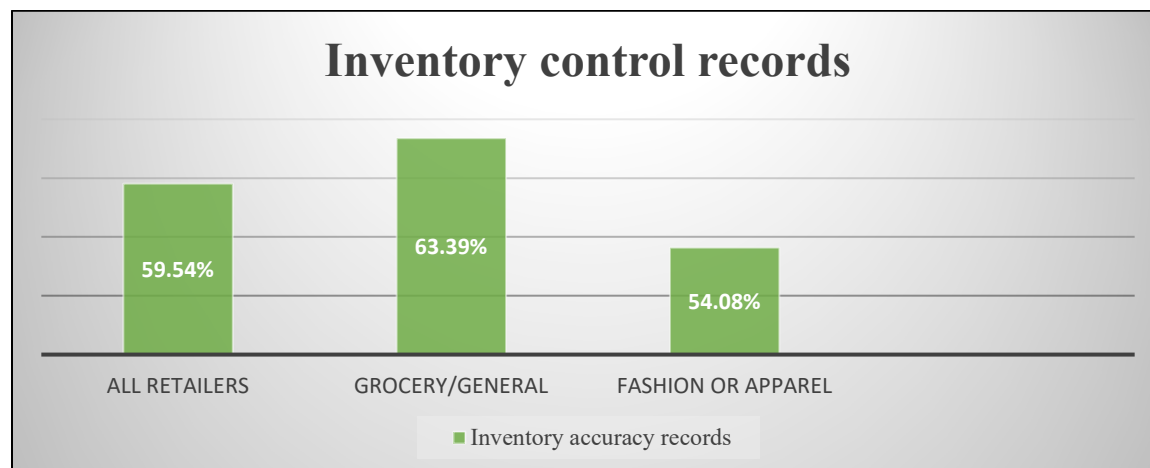


Figure 3.7: Inventory control records

Source: Rekik, Syntetos and Glock (2019:11)

Figure 3.7 highlights that 59.54 percent of the stock in 16 of the audited retailing outlets showed that the inventory on the floor does not correspond with the quantities displayed on the system at

the time of the stock-take. The groceries/ general merchandise retailers are higher with 63,39 percent than the fashion/apparel with approximately 54,08 percent of the difference.

The impact of inaccuracies has forced many companies to implement different technologies, such as RFID, to achieve positive levels of IC. They have demonstrated great impact opportunities in different warehouses in terms of tighter inventory control, a shorter response time and a greater variety in stock-keeping units (SKU) (Alyahya, Wang & Bennett 2016:17). Inventory items are measured as accurate when the actual physical inventory on-hand equals inventory quantity on the system, inside the subsequent acceptances using the ABC classification system; class A items, plus or minus 1 percent quantity variance from perpetual balance, class B items, plus or minus 3 percent quantity variance from perpetual balance and C items, plus or minus 5 percent quantity variance from perpetual balance (Tundura & Wanyoike 2016:85).

The above literature indicates the critical role technology RFID and effective inventory management systems such as ABC analysis play in ensuring IC. It is also important to note that inventory management practices depend on each other to achieve the desired outcome, IC, and ABC analysis.

An investigation developed by Sahin and Dallery (2015:1) on IC control focused on the importance of the following points in maintaining accuracy:

- It is critical to examine the parameters that influence the impact of inventory inaccuracies on the availability of the product and other performance measures in the supply chain;
- Have a more in-depth look at the root causes of inventory inaccuracy and how it influences the performance of the supply chain;
- Appropriate inventory counting policies should be determined, and lastly,
- Determine how to adjust stock and replenishment policies to be more aligned for IC.

The literature above puts the importance of IC into perspective. Also, its significance in ensuring the company's performance in sales and revenue is realised. Therefore, IC must be monitored and effectively managed as it negatively impacts the overall inventory performance. The outcome of IC is discussed next.

- **The outcome of inventory control**

IS and IC depend on each other in the retail-manufacturing supply chain (Dai, Li, Yan & Zhou 2016:457). Both situations have accurate real-time inventory information, such as high-quality information and the situation with statistical inventory information. However, RFID technology is a promising solution to address IC by detecting any items that are being stolen out of the stores without being scanned. This view was supported by Tull (2020:6) who asserted that, due to their ability to decrease the inventory levels by as much as 4 percent and 3 percent of the warehouse's expected savings. The implementation of measuring IS and accuracy provides an indication of how the decrease in inventory inaccuracy and out-of-stock have been among the most significant contributors to imbalanced stock. The analysis made on the literature above indicates an increase in visibility as a possible solution for a positive outcome of performance in the inventory management processes (Goyal et al. 2016:1).

Despite the plurality of empirical evidence on the importance of the inventory inaccuracy issue in traditional in-store retail supply chains, it can be posited that the performance of both inventory and warehouse is measured using IC (Rekik, Syntetos & Jemai 2015:3). In line with the above consideration, a study by Bottani, Mantovani, Montanari and Vignali (2017:62) proposed an evaluation that will provide positive outcomes in the warehouse's total cost and inventory performance.

It is evident from the literature provided above that warehouses cannot achieve increased inventory performances if the retail firms do not utilise IC as one of the measures for performance. Therefore, for positive outcomes to be realised, it is important to conceptualise inventory management practices into inventory performance. The measurement of IC is discussed next.

- **The measurement of inventory control**

Inventory control has received significant attention from various scholarly published studies (Jurjevic, Gasparovic, Milas & Balenovic 2020:1; Drakaki & Tzionas 2019:1). Many of them have measured it as a uni-dimensional variable, with the likes of Chuang and Oliva (2015:8), who adapted a four-item scale. Kefale and Shebo (2019:4), Khan and Siddiqui (2019:972), adapted a five-item scale. Odhiambo and Kihara (2018:156), measured IC using a five-item scale. This study adopts a five-item scale from Hussein and Makori (2018:960).

3.3.2.5. ABC analysis

This section defines ABC analysis and addresses its emergence. The review then shifts to exploring the factors influencing the ABC analysis and its subsequent importance. Lastly, the outcome and how the concept is measured are discussed.

- **The origin of ABC analysis**

The ABC analysis, known as the classification based on the Pareto principle, was established during the 1950s as one of the popular methods to classify the items in inventory (Keskin & Ozkan 2013:2). The ABC analysis is derived from the premise of an Activity Based Costing to assist logistics managers to have full knowledge of links between performing particular activities and the demands those activities make on an organisation's resources (Pohlen & La Londe 1994:1). The ABC analysis further emerged as a tool to use cost and non-cost criteria in the same classification of warehouse inventory and how to formulate specific policies (Ravinder & Misra 2015:257).

ABC analysis aims to classify inventory into different groups; all this was because ABC analysis was simple to understand and easy to use (Lung 2007:253). In 2010, the Pharmaceutical industry realised the importance of ABC analysis when they classified it as VED, which means vital, essential and desirable. It was adopted as routine practice for optimal resource use and eliminating out-of-stock situations in the hospital pharmacy (Nigar, Devnami & Gupta 2010:201). More studies were done as ABC analysis became one of the best strategies to help with company costs (Liu, Liao, Zhao & Yang 2016:19). The definition of ABC analysis is discussed next.

- **Definition of ABC analysis**

The ABC analysis can be described as an analytical tool used to compare demand values of items' inventory control systems based on the rule of 80-20, known as the Pareto principle (Mehdizadeh 2020:20). ABC analysis is also seen as a mechanism that identifies items that will have a significant impact on the cost of inventory while they provide approaches that analyse different categories of inventory that will need different controls and management policies (Liu, et al. 2016:19). Douissa and Jabeur (2020:9525) describe it as a widespread inventory management technique designed to classify inventory items based on their weighted scores into three ordered categories - A, B and C.

Category A contains the most important items, category B includes the items that are neither important nor less important and category C specifies the least important ones. It is also seen as an instrument that aims to determine the items of material expenses that significantly affect the cost and, consequently, the operational management process for making decisions (Nuzhna, Tluchkevych, Semenysheva, Nahirska & Sadovska 2019:798). Kumar and Chakravarty (2015:25) describe ABC analysis as an excellent method to classify activities according to their annual usage value in monetary terms.

The study's operational definition conforms with Douissa and Jabeur's (2020:9525) definition which refers to the classification of inventory according to the A, B and C grouping. The antecedent factors are discussed next.

- **The factors influencing ABC analysis**

Inventory management is the activity that develops and manages inventory levels of raw materials, work-in-progress inventory, and finished goods. Management of the aforementioned activities is so that the appropriate supplies are available and the stock cost is minimal (Pandya & Thakkar 2016:82). This process is vital for a company to be effective and efficient in its operations. Hence, the companies need to close all the gaps in inventory lines. Respective inventory item criteria that have a positive performance can get excessively high weights. Those with bad performance may receive low levels, which they receive issued to ignoring the impact of the classification criteria values for ABC analysis (Hatefi & Torabi 2015:2).

One of the vital factors influencing the ABC analysis is the risk classification through expected damages (Shchekoldin 2016:1). This process determines the classification by the level of damages and risk probabilities. It is regarded as the required tool to monitor and facilitate their processes' effectiveness closely. A study by Ismail and Reddy (2017:1) on the impact of ABC analysis on the competitive advantage of a telecommunication company, indicated the following as the steps to follow due to the impact it has on the growth of the sector:

- To review and evaluate the impact of the use of ABC analysis,
- To explore the challenges encountered in applying the ABC concept, and
- To analyse the impact of using the ABC analysis.

Several factors have been identified as drivers of ABC analysis, including informative flow, distribution, competitive environment, and knowledge of customers as the factors that severely impact ABC analysis (Martino, Fera, Iannone & Miranda 2017:150). Therefore, according to the literature provided, ABC analysis concepts are more effective for companies operating with large volumes of stock-keeping units (SKUs).

Categorising inventory serves as a pillar when identifying inventory. This can be done by splitting critical and non-critical, high to low value, fast-moving and slow-moving, non-warrant and insurance inventory, and light versus heavy items, to mention a few. This process makes it easy for warehouse personnel to account for inventory when purchasing, issuing, picking, storing, counting and dispatching, especially in large operating firms with massive SKUs. The ABC analysis theory is important to apply in any warehouse, as it directly impacts both inventory and warehouse performance. The importance of the ABC analysis is reported next.

- **The importance of ABC analysis**

ABC analysis aims to eliminate the shortages of expired volume-based costing systems and provide more reliable information regarding the production costs, profitability, and decision taken by management on each cost activity respectively (Fei, Namazi & Isa 2017:176). It becomes crucial for companies to implement a proper ABC analysis if they want to control inventory directly. Inventory managers must classify and group all the inventory items (Nallusamy, Balaji & Sundar 2016:165). Retailers must have records of sold stock when sending stock orders to the distributor. Table 3.3 indicates the ABC classification strategy and how products are recorded according to the total inventory of a company.

Table 3.3: The ABC classification strategy

	Percentage of Items	Percentage of annual usage	Actions
AA-class items	About 20%	About 80%	Close day-to-day control
B-class items	About 30%	About 15%	Periodic review
C-class items	About 50%	About 5%	Infrequent review

Source: Pandya and Thakkar (2016:83)

Table 3.3 indicates that the A-items products are the right products with the highest annual consumption value; the authors explain that 80 percent of the top products in the annual consumption value of the company account for approximately 20 percent of the total inventory. B-items are considered inter-class products with an average close to a medium of the lowest consumption value. Besides, 5 percent is the lowest of the three in its annual consumption value, accounting for about 50 percent of the total inventory items.

The integration of ABC analysis proposes a behaviour simulation to establish an interconnected system in the distributing channel, increase service levels and run low on the minimum amount and inventory shelf life (Mehdizadeh 2020:15). Jayakumaran, Shan and Daud's (2020:1) study identified that the efficiency of ABC analysis is mainly associated with giant supermarkets and retailing outlets as they distribute in large quantities to supply different retail outlets. It is also important to note that ABC analysis has a positive relationship with the warehouse layout and order fulfilment, making it easier for inventory turn-around time (Tombus 2018:235).

The sector achieved the retail automotive industry usage of maximum cost saving due to ABC analysis. The concept was introduced to reduce company inventory costs through research and statistical calculations (Kusera & Suk 2019:2). This concept should enable the companies to save money and use it to improve other process optimisation in logistics warehousing. The ABC inventory control tool is also one of the characteristics that are significantly used to cover the warehousing gaps that make it challenging to maintain the item classification, along with Variability: which analyses consumption and multi-perception criteria (Cedillo-Campos & Cedillo-Campos 2015:359). Mahagaonkar and Kelkar (2017:617) mention the following seven benefits of the ABC analysis implementation:

- It allocates direct and overhead expenditures with critical activities of the firm, and this process defines the area from where the company generates profit,
- It supports rigorous and better control of high-priority inventory,
- It also promotes the effective usage of its resources for better control of inventory over its impact on the outcome,
- Cycle counts are the true reflection of allocating resources,
- Efficient management of materials ensures positive achievement of the economy,
- It maintains control of the expensive items with a great deal of investment and,

- It substantially reduces clerical costs and retains stock at optimum levels

The literature mentioned above indicates the criticality of classifying inventory in the warehouse and the strategy that the business can employ for its benefit in order to retain a competitive advantage. Process optimisation and cost saving are highly achievable when the correct measures of grouping inventories are adhered to. The outcome factors of ABC analysis are discussed next.

- **Outcome of ABC analysis**

Companies have various reasons for implementing item classification; they are usually based on storage volumes, customer demand, criticality, and lead times (Hatefi & Torabi, 2015:3; Ravinder & Misra 2015:257). Most retail companies have high pick-setting, which makes it necessary for them to implement ABC analysis to meet customer demands promptly and achieve better performance (Asker & Claesson 2017:32). Moreover, Wambua *et al.* (2015:259) suggest that owners and managers should embrace ABC analysis in their inventory warehousing systems, financial performance and overall performance.

Moreover, adopting ABC analysis was found to positively reduce labour intensity and affect productivity (Jemelka, Chramcov & Kriz 2016:819). The authors further stated that the Enterprise Resource Planning (ERP) system can generate the ABC analysis by itself as the means to measure the outcome of the product classification, and in order to provide the most detailed and accurate outcome, the theoretical knowledge should be compared with practical situations to comprehend the realism of possible movement (Berezina 2016:8). The study also indicated the concept's effectiveness in inventory management (Kaabi, Jabeur & Ladhari 2018:1805). The ABC classification method is vital in improving inventory performance while classifying storekeeping units (SKU) (Lajili, Babai & Ladhari 2015:1).

The presented discussion emphasises the importance of ABC analysis in contributing to inventory and warehouse performance. Therefore, it becomes critical to implement the system in all retail SCM activities. How ABC analysis is addressed next.

- **Measurement of ABC analysis**

Several studies have measured the ABC concept using different instruments. These include, amongst others, Wauna and Obwogi (2015:10), Kannaiah (2015:279), Zinebi, Souissi and Tikito

(2018:6) associated all the ABC analysis classes respectively on a four-item measuring instrument from 1= Rarely, 2= Every once in a while, 3= Sometimes and 4= Almost always. Arasa and Achuora (2020:5) adapted a five-item scale, and this study used a five-item scale adapted from Wauna and Obwogi (2015:10).

3.3.3. Review of literature on the mediating and outcome variables of the study

This section focuses on the mediator and outcome variables, namely inventory and warehouse performance.

3.3.3.1 Inventory performance

As with the previous review, this discussion focuses on aspects, such as the origin, definition, drivers, importance and outcome factors and measurements.

- **Origin of inventory performance**

There is no available information on the inventory performance concept or the articles researched directly linked to the supply chain and warehousing. The origin of the IP seems unclear with a different school of thought tracking it back from the work of Hunt, who conducted a study in the late 1940s on inventory performance (Hunt 1948:396). He was specifically looking at the effect of deliberate deception on Minnesota Multiphasic personality inventory performance.

The concept of IP came into prominence between the 19th and 20th centuries when firms started implementing ERP to improve their inventory performance (Rabinovich, Dresner & Evers 2003:63). Despite enterprises' contribution to the realisation of the objective, the operational processes such as inventory management and customisation may also enhance the organisations' IP. Additionally, the strategic significance of inventory performance and management began to be essential to monitor improvements and further develop the value of the warehousing and supply chain. Chandra and Grabis (2005:337) portrayed inventory performance to improve autoregressive demand, taking as the application of multi-step forecasting to restrain the bullwhip effect. The definition of IP is discussed next.

- **Definition of inventory performance**

The concept of IP is defined as how organisations measure the effectiveness and competence of using and replenishing inventory (Elsayed & Wahba 2016:69). Besides, it is known for measuring

inventory usage effectiveness and replenishment (Ladhar, Lajili & Babai 2015:3). Thus, the operational definition supported by the study is adopted from Elsayed and Wahba (2016:69), who define it as a tool to measure efficiency and capability when using, and to replenish inventory. The significance of inventory performance is addressed next.

- **Factors influencing inventory performance**

The decision in the operational integration for various supply chain functions becomes the main factor in minimising total costs (Darvish, Archetti & Coelho 2019:269). Traditionally, operators have been looking at their costs and function in the economic sphere, neglecting the factors that affect inventory performance. Moreover, IMP have also been examined with financial performance as an essential manager's perception (Shardeo 2015:02). However, a study by Ahmed (2016:3182) linked a very close but sensitive relationship between inventory performance and financial performance, that inventory impacts financial performance.

IP can be well explained through the firm's role of inventory management practices and their inventory costs on order quantity (Atnafu & Balda 2018:7). Research done on logistics and warehousing outsourcing provided an understanding of how the role of inventory management practices leads to increased performance from a firm's policy perspective. The point of firm's policies means that the companies' procurement policies should be well within their objectives of ensuring increased performance (Kavcic, Gosnik, Beker & Suklan 2015:101). This information also negatively impacts the inventory side, where outsourcing impacts inventory performance in emerging markets (Steven & Britto 2016).

The bullwhip effect and forecasting are also seen as factors impacting inventory performance due to high inventory variances (Costantino, Di Gravio, Shaban & Tronci 2015:1773). Ali, Boylan and Syntetos (2018:830) argued that any developments in forecasting accuracy must be differentiated from the improvements in inventory performance, that is, reduced inventory costs or service levels cannot be associated with accurate forecasting. Furthermore, inaccurate forecasting can have adverse effects on firms' operations. This impact can be in terms of the number of stock-outs, loss of sales, or over-stocking, while at the same time, the company is not meeting service level targets (Kourentzes, Trapero & Barrow 2020:1). It is also noted that the usage of inventory data in groups can mislead demand sizes and tendencies, bringing poor performance on inventory control systems (Rego & de Mesquita 2015:2).

The above discussion indicates the capability of organisations to function at the necessary level of the required performance. This comes as a result of various inputs that have been identified. All of these factors contribute to improving the retail supply chain's value chain. Additionally, it could be said that inventory performance in the industry is a major benchmark for the business's success. The importance of IP is addressed next.

- **Importance of inventory performance**

The significance of inventory management cannot be undervalued significantly for retail merchandising, due to the complexity of managing their assets, which influence inventory and firm performance (Alrjoub & Ahmad 2017:4). The influence has, as a driver of performance, become unavoidable. Organisations are forced to take different initiatives to enhance their efficiency and effectiveness. It becomes vital to measure IP because inventory has industry-specific characteristics; this is done by taking into account various industry variables (Na, Kim & Sim 2018). The inventory variables which are essential for determining the role of IM in different aspects of the company are (Chikan & Hohol 2015:41):

- Average turnover rate
- Importance of inventory management
- The extent of computer system integration

The above-mentioned aspects are known as inventory performance factors' variables which significantly influence company competitiveness. A study by Petropoulos, Wang and Disney (2019:2) also identified three aspects of inventory performance that are important, especially to everyday operations:

- Costs (both holding costs and backlog)
- Amplification of inventory and replenishment orders
- Customer service levels

Therefore, firms' ability to apply the presented components as part of their day-to-day operational activities is likely to improve their inventory and financial performance (Jatta & Krishnan 2017:64). This observation was supported by Kwak (2019:9) who established a positive relationship between inventory performance and the company's financial performance in corporate

sustainability, with retail segments, such as textile and clothing retail, machine and equipment, and vehicle manufacturing with high inventory performance ratings.

In addition, Elsayed (2016:1) opined that new ways of IC have not only emerged but have become a need for inventory analysis. This view demonstrates the strategic value inventory performance has in achieving value creation, flexibility, and control. Therefore, a well-managed inventory management system enhances inventory management performance in an organisation and reduces the firm's risk with inventory costs. It means inventory performance will likely increase when the risks are lowered (Vikas & Malik 2020:1420). Lastly, effective IP is paramount in running a business (Muchaendepi, Mbohwa, Hamandishe & Kanyepe 2019:455).

One could argue that the importance of adopting IP as a strategy cannot affect results positively, but it is a key factor in achieving competitive advantage as a significant objective. It is critical for organisations to address IMP as the catalyst to enabling adequate operational procedures through improvements that can affect performance in inventory. The outcome factors of inventory performance are outlined next.

- **Outcome of inventory performance**

IP is seen as a measuring tool used to improve warehouse performance and reduce stock costs (Cheng 2017:23). The costs associated with warehouse activities play a vital role in the warehouse function. Their optimisation and enhanced IP assessment may result in substantial value gain for the performance of the warehouse (Caridade, Pereira & Silva 2017:1093). Moreover, inventory performance contributes to the financial performance of the company. It is also noted that it is strongly connected to the critical strategic decisions of the warehouse and its performance (Wan, Britto & Zhou 2020:2).

Inventory is considered an integral part of management to achieve a high warehouse performance (Staudt, Alpan, Rodriguez, & Mascolo, 2015:3). Therefore, according to the above literature, inventory performance has a positive relationship with warehouse performance. As a result, the overall performance measures, such as inventory performance measures in terms of multiple disciplines such as manufacturing, 3PL, and retail, will be measured by combining the efficiency and sensitivity of warehouse performance with the operation (Laosirihongthong, Samaranayake, Adebajo & Subramanian 2018:4).

It is, however, important to note that the positive relationship between inventory performance and warehouse performance can be either positive or negative, depending on the outcome. If there is an increase in the efficiency of inventory performance, it could positively impact warehouse performance and vice versa. Therefore, it is critical to ensure positivity from the inventory to achieve the same results in the warehouse performance. How inventory performance is measured is presented next.

- **Measurement of inventory performance**

Performance is a multi-dimensional concept with various studies that have measured it as such (Khan 2016:497; Hansen & Schaltegger 2017:21). The effectiveness of inventory management and performance was measured on a five-item scale (Bhandari 2018:82). John, Etim and Ime (2015:405) used a five-point scale to measure inventory management practices and performance. Karadag (2018:80) adopted a nine-point scale to address the VMI management practices and inventory performance. Ahmad and Zabri (2018:87) adapted a seven-item measuring instrument. This study measured inventory performance using a five-item scale adapted from Awuah-Gyawu, Adzimah and Brako (2015:44).

3.3.3.2 Warehouse performance

This section discusses the origin and definition of WP. Additionally, the construct's importance, antecedent and outcome factors are addressed. Lastly, the review of how the variable was measured in previous studies is conducted.

- **Origin of warehouse performance**

The concept of supply chain has been evolving in its core characteristics and functionalities (Staudt, Alpan, Rodriguez & Mascolo 2015:5524). These fundamental components include warehousing. Literature addressing the origin of warehousing seems to be minimal. Apart from one from Stern (1978:48), who tested the rigidity, stiffness, and load-carrying capacity of the pallets made of wood in the warehouses using six western types of wood. Warehouse performance emerged in a study by Watkins (1978:115) where food distribution in the warehouse food stores was assessed.

The evolution of WP was prominent in the 1990s when research started to explore its relationship with technology adoption. This evolution was driven by firms' abilities to embark on an integration drive between data and warehouse operation processes (Inmon, Rudin & Buss 1998:1). Additionally, the concept evolved with the introduction of factors such as warehouse complexity and planning and RFID as important indicators of warehouse performance (Faber, deKoster & van de Veld 2002; Karagiannaki, Papakiriakopoulos & Bardaki 2011:1). The definition of warehouse performance is discussed next.

- **Definition of warehouse performance**

The concept of WP refers to measuring the optimal use of storage space, customer relations activity, quality level, asset usage and costs (Liviu, Ana-Maria & Emil 2009:307). Magoro (2019:13) defined WP, taken from Spencer (1999:1), as the warehouse's ability to add value to the core functions of the warehouse business.

The present study defines WP as measuring the activity performance, programme, or service (Kusrini, Novendri & Helia 2018:2). The antecedents of WP are discussed next.

- **Factors influencing warehouse performance**

The warehousing environment's role is to simultaneously reduce costs, increase productivity and improve customer responsiveness (Faber 2015:10). The author further emphasised that when measuring WP, feedback is generated that compares the requirement and how the warehouse performs. According to a study by Shah and Khanzode (2017:350), it was found that most operational issues have a direct impact and can mutually affect the performance of the warehouse. Their research identified warehouse layout, storage assignment, routing, batch design and control operational issues. The relationship between the operational issues and warehouse performance are depicted in figure 3.8.

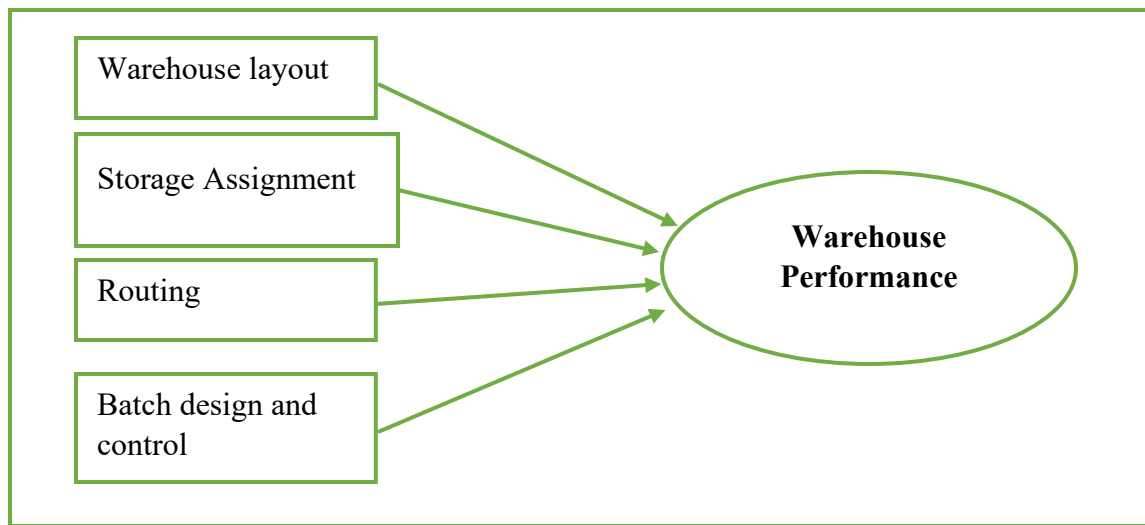


Figure 3.8: Relationship between operational issues and warehouse performance

Source: Shah and Khanzode (2017:350)

Figure 3.8 illustrates the framework of how warehouse operational issues impact warehouse performance. These are the operational functions that are inevitable when running a business. It is required that they be eliminated to have a positive rather than a negative impact on warehouse performance. The operational factors are discussed:

- **Warehouse layout**

Warehouse layouts are significant to the warehouse performance and its costs; the business should take an interest in the theory and practice of warehouse design (Dukic & Opetuk 2015:55). The number of products, and their performance, that are handled in the warehouse will always affect the design of the warehouse (Wang 2016:1120). Effect on the design of the warehouse can have a negative impact as it may take a while when picking stock due to inadequate warehouse design.

- **Storage assignment**

Storage assignment involves placing a set of items in a warehouse so that some performance measure is optimal (Kovacs 2016:312). According to a study by Shah and Khanzode (2017:352), storage is one of the policies that can be utilised to optimise warehouse travel time. It was discovered that storage assignment could obtain a twenty to thirty percent improvement over aisles depending on the warehouse as well as optimised product allocation (Guo, Yu & De Koster 2015:2407).

- **Routing**

Routing is a policy-based process with manual directions outside the warehouse management system (WMS) known as discretionary inputs (Mikleson, Thai & Halim 2019:8). The warehouse operation has approximately fifty percent of the total processing time. In order to maintain or improve the picking time and storage costs, the implementation of proper routing planning will be required (Cano, Correa-Espinal & Gomez-Montoya 2017:229). Thus, the main objective for a warehouse manager is to reduce travel time, and routing does just that and increases warehouse performance (Elbert, Franzke, Glock & Grosse 2015:3948).

- **Batch design and control**

The word “batching” comes from the “batch” which generally means arranging in sets or groups. Koster, Johnson and Roy (2017:6327) approve of batching design and control is tool or policy that improves conventional warehouses’ performance. Warehouses involved in batching processes tend to achieve the benefits of minimising due dates, total travel distance, and processing time (Azadnia, Taheri, Ghadimi, Saman & Wong 2017:3). The literature, as mentioned above, states the significance of the policy and is to improve the performance of the warehouse.

The above factors are providing a convenient understanding of the essence of warehouse performance in the retail supply chain industry. Thus, precise, decisive and accurate implementation of strategies that would deal with these factors mentioned above, can be vital to ensuring that they are utilised to the benefit of the organisation in its achievement of competitiveness. The importance of warehouse performance is discussed next.

- **Importance of warehouse performance**

Most warehouses operate under uncomfortable situations, which calls for companies to embark on projects to improve the processes to achieve warehouse performance (Dewa, Pujawan & Vanany 2017:314). The role of WP in the retail industry is presented in this aspect and its importance in the adequate distribution of goods to different retailing outlets (Pyza, Jachimowski, Jacyna-Golda & Lewczuk 2017:706). Hence, it is noted that warehouses are critical nodes in the supply chain. As such, improving their performance is a crucial issue when trying to avoid unproductive bottlenecks (Ribino, Cossentino, Lodato & Lopes 2018:23). Therefore, the WP aspect is critical in the value chain since it affects customer satisfaction and the relevant reaction efficiency to the

market (Caridade, Pereira & Silva 2017:1097). Market efficiency is the reason why WP is a crucial concern for many retail companies due to its sensitivity to the company's competitiveness (Sidi, Merouani & Abdelouarit 2016:40).

The IMP could improve the overall warehouse performance in distribution and retail businesses (Abushaikha, Salhieh & Towers 2018:911). The authors emphasised the importance of aligning these practices for warehousing because any performance improvement in the warehouse operation will ultimately be reflected in the performance of distributors and retailers. It has been proven in the supply chain that a warehouse is a critical component linking the entire value chain. Thus, this makes the warehouse performance either labour or capital-intensive, influential in productivity and the warehouse costs of operations and the performance of the entire supply chain (Hassan, Ali, Aktas & Alkayid 2015:1025).

The most significant contributor to warehouse performance drive has always been the skills and training (Magoro 2019:13). The author argued that South African people with exceptional and valuable warehousing management skills are rare and therefore pose a threat to the value of warehouse performance in the sector. Since the warehouse is a core function of SCM, the warehouse's performance substantially impacts the overall supply chain performance (Mahroof 2019:177).

The notion of companies constantly investing in warehouse performance measuring tools has been proven in this section. It is important for businesses, including the retailing sector, to ensure they implement the relevant strategies to ensure that warehouse performance is regularly improved. The outcomes of WPe are discussed next.

- **Outcome of warehouse performance**

Organisations' capabilities to enhance the performance of their warehouse facilities are known to be highly competitive in ensuring a continuous flow of supply and minimise unnecessary operational costs (Indrawati, Miranda & Pratama 2018:1). Moreover, Hamdy, Mostafa and Elawady (2018:2557) advanced that organisations can achieve a better warehouse performance, with improved order fulfilment, enhanced packing method, better inventory tracking, and improved overall warehouse performance. How WP is measured is outlined next.

- **Measurement of warehouse performance**

The importance of a firm's warehouse has been established. However, it is crucial to explore how it has been assessed from different empirical investigations (Ledesma, Fabiola, Galvan, Garcia, & Jimenez 2020:261; Yilmaz & Tuncer 2020:148). A four-item scale was used in a study measuring the factors affecting warehouse performance (Razik, Radi & Okar 2016:9). Alemayehu (2018:26) and Hao, Shi, Shi and Yang (2020:6) also adopted a five-item scale. Kusrini, Asmarawati, Sari, Nurjanah, Kisanjani, Wibowo and Prakoso (2018:2) used a nine-item scale. This study used a six-item scale adapted from Hussein and Makori (2018:974). The next section addresses previous recent scholarly published studies on inventory management and warehousing in South Africa.

3.4. PREVIOUS RECENT STUDIES ON INVENTORY MANAGEMENT AND WAREHOUSING IN SOUTH AFRICA

The concept of IM is a critical factor in ensuring and securing supply availability in the warehouse. It places customer requirements at the forefront and contributes meaningfully to the performance of the entire warehouse (Wang, Dang & Nguyen 2020:1). The current study addresses inventory and WP and is aimed at the retail industry in the South African industry. Thus, it is fundamental to ensure that many other research papers that have covered this topic in the South African industry are also outlined.

This section reviews previous studies' content and the gaps between those studies and the current study. Table 3.4 outlines the initial examination of the South African framework's inventory and warehouse performance.

Table 3.4: Previous examination of inventory and warehouse performance in South Africa

Author and Year	Focus Area	Industry	Region in South Africa
Penny, Mpwanyana and Lambert (2021)	Inventory policy	State-Owned enterprises	Gauteng
Kekana, Bakama, Mukwakungu and Sukdeo (2020)	Smart-warehousing	Food Services	South Africa
Lawrence and Chiromo (2020)	Inventory management	Panelboard Manufacturing	Johannesburg

Magoro (2019)	Warehouse performance	Steel manufacturing	Gauteng
Ndlala (2019)	Inventory	Service Operations Management	Gauteng
Magoro and Edoun (2019)	Warehouse order picking performance	Manufacturing	South Africa

Source: Compiled by the Author

Table 3.4 presents current South African studies focusing on inventory and warehousing performance. This empirical research is discussed below.

3.4.2. Inventory

Inventory is a critical function in the warehouse, and managing it can maximise performance significantly. One of the studies that correlate to this notion is that conducted by Ndlala (2019:1) who established that inventory inefficiencies make it challenging to prevent, detect and manage any losses and shrinkage, even in a well-functioning warehouse. This investigation evaluates the influence of loss in inventory conducted at the Spar North Rand distribution centre. The paper embraced a quantitative research strategy that employed a five-point Likert measurement, and questionnaires were distributed to approximately one hundred and fifty employees of the Spar North Rand distribution centre.

Part of the results of the study was the independent variable of the operational performance; it was found that it does not impact the research study negatively. The study also denotes the indication of inadequate training and motivation of employees as a substantial dilemma in operations management. The following aspects were recommended in order to tackle the issues: enhanced communication, appropriate training matrix implementation, incentives programme, process evaluation, reduced errors and optimisation and layout.

3.4.3. Inventory management

Lawrence and Chiromo (2020:689) analysed the experiments that are connected to the inventory management system at South African manufacturing companies. The paper scrutinises challenges associated with an inventory management system. The study was conducted at the warehouse of the Boardplant facility in Johannesburg in the presence of senior management staff. A quantitative approach was employed, using a cross-sectional method to collect data through an open-ended questionnaire. Selected respondents were identified from various departments in the warehouse,

which included operations, sales and planning. The study required employees with one to ten years of experience within the company to take part in the study.

The investigation found that processes, procedures and records were not satisfactory for accurately controlling inventory. The concerns that were raised were that of excessive loss of inventory, the management method to deal with the issue was also not supporting the objectives of the company. Furthermore, the investigation also found poor integration in other crucial functions in the company.

3.4.4. Inventory policy

Penny, Mpwanya and Lambert (2021:1) conducted a study on inventory policies. The authors advocate that it is necessary that every firm formulates, implements and evaluates inventory policies due to the suitable change it can bring to inventory management to ensure an unbroken stream of inventory and customer satisfaction. The study aimed to establish that the inventory policy guidelines are implemented in SOEs such as Eskom and Transnet in the Gauteng province. The examination was conducted using twenty-four staff in the inventory department segregated in SOE1 and SOE2, using a qualitative method design sample. Data collection came in a semi-structured interview format.

It was found that four critical aspects of supply chain practices are not developed or implemented in the SOE processes. The warehouse is suggested to be compliant with inventory policy, violation, implementation and inventory growth rate. This includes the connection that exists in maximising inventory carrying costs. Therefore, the facets mentioned above are major contributors to decreased inventory performance management of SOEs in Gauteng province.

3.4.5. Warehouse performance

Magoro and Edoun's (2019:1122) investigation explored the factors that affect warehouse performance and its role in achieving competitive advantage. A quantitative approach was used and data was collected using a structured questionnaire in a warehouse distribution centre. The results showed that approximately seven point four percent improvements were indicated in the organisation for the implementation of an appropriate warehouse management system. Consequently, an increase in warehouse picking was realised, increasing warehouse performance.

The study has recommended the organisation follow the same patterns with a sequence in batch numbers for accuracy, as the batch numbers are placed in sequence according to use dates. The study emphasised the challenges of performance-related warehouse errors.

3.4.6. Warehouse order picking performance

Optimisation on the sequence of warehouse order picking performance was addressed by Magoro (2019:6). The study aimed at indicating the importance of appropriate order picking lines in batch sequence to achieve efficiency in the warehouse. The authors further argue that the warehouse management system is effective in investigating, recording and implementing, which plays an integral part in safeguarding a consistent performance. The study was quantitative in nature, using a structured questionnaire to collect data from the sampled firms operating in Gauteng province. The respondents consisted of warehouse assistants, packers, cycle counters, drivers, pickers, supervisors, engineers and warehouse managers in the warehouse.

The study found that inventory management is a challenge and that proper warehouse management systems are not employed as a foundation for achieving increased performance. Additionally, the research suggested the adaptation to advanced warehouse applications to assist various organisations in delivering world-class service to customers. The recommendation is the introduction of a Warehouse Management System (WMS), which is an application in a software format that is used to manage systematically, control and maintain records of the warehouse processes.

3.4.7. Smart-warehousing

A study by Kekana, Bakama, Mukwakungu and Sukdeo (2020:771) focused on addressing three factors: understanding amongst warehouse operations relationship and smart-warehousing and customer requirements and loyalty. The aim was to detect warehouse practices that might have a negative impact on the organisations' commitments. A quantitative approach was followed to analyse the collected data in this research investigation. There were a total of ninety participants, sixty from customers and thirty from the warehouse (employees). A structured questionnaire was used to collect information.

The results of the study established a strong positive relationship between the execution of smart warehousing, customer loyalty and satisfaction.

3.4.8. Research gaps

The literature mentioned above addresses some of the problems that organisations encounter regarding the efficiency of their inventory and warehousing operations in South Africa. The presented empirical research contrasts with the current study's proposed conceptual framework, which aimed to explore the nexus between inventory management practices, inventory and warehouse performance. The highlighted previous research did not consider any identified practices (ISP, II, IC, ITO and ABC analysis) as strategic tools to improve retail outlets' IP and WP which underlines the significance of this investigation. Lastly, the geographical scope of the study adds to its relevance, given that it focused on the Gauteng and KwaZulu Natal provinces, which are considered the country's economic hub.

3.5. CHAPTER SUMMARY

Chapter three offers the conceptions of the models drawn up as the representations of this research report. It reviewed the literature on the research constructs and provided details on the research theory chosen for the study, which is the Theory of Constraints. This chapter provided a literature review of the research constructs on inventory management practices. Each variable was discussed, focusing on aspects, namely, the emergence, the definition, the factors that influence and impact them, their importance, the outcome, and how previous researchers measured these factors. It further discussed the previous studies on inventory management and warehousing in South Africa. The study concludes by the type of measurement it will undertake for each variable.

CHAPTER 4: CONCEPTUAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

4.1. INTRODUCTION

This chapter articulates the hypotheses that originate from the theory and constructs of the study. The current study provides the application that is specified in the hypotheses and provides a recommendation of the fundamental relationships amongst the constructs. This chapter presents the conceptual framework of the study and discusses the empirical findings and developing hypotheses.

4.2. CONCEPTUAL FRAMEWORK

This section presents the conceptual framework of the study. Figure 4.1 illustrates the predictor constructs: IS, II, ITO, IC, and ABC analysis. It is followed by the mediating and outcome variables in the form of IP and WP.

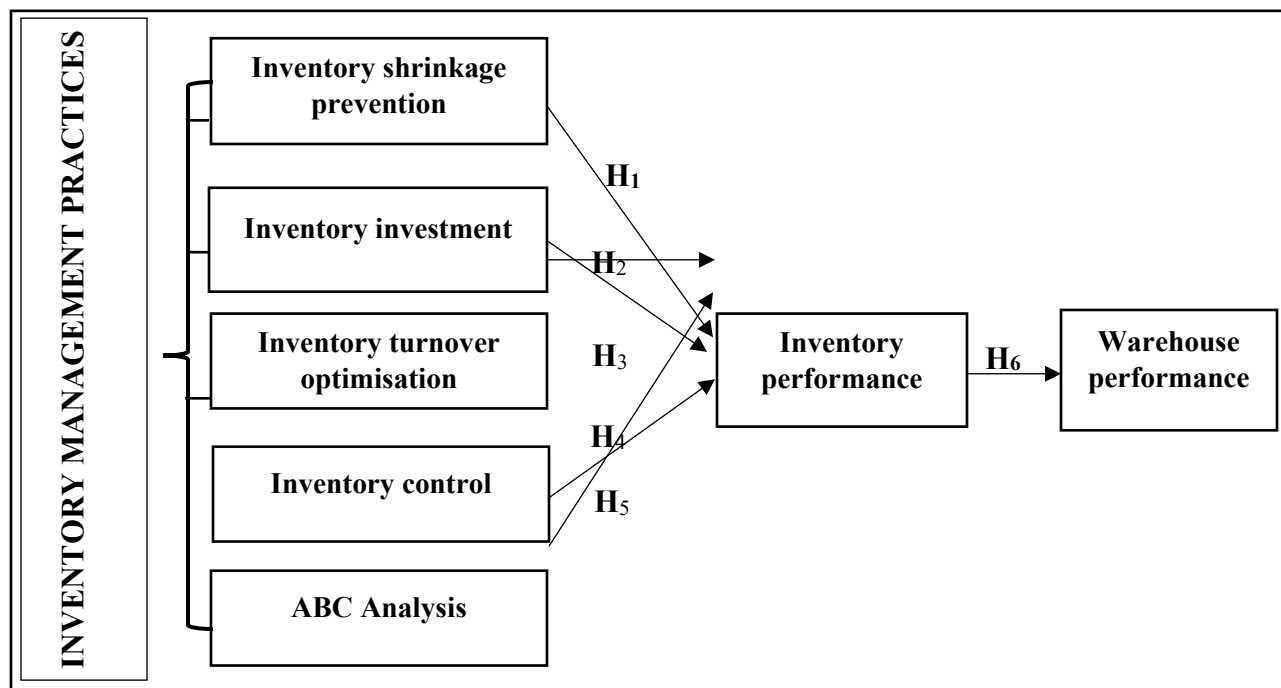


Figure 4.1: Conceptual Framework

Source: Compiled by the Author

4.3. HYPOTHESIS DEVELOPMENT

This section articulates the development of hypotheses depicted in Figure 4.1.

4.3.1. Inventory shrinkage prevention and inventory performance

ISP is one of the four factors that affect IP in retail stores, according to data provided for the store performance indicators (Mekraz & Gundala 2016:2). Businesses face difficult times when the environment becomes more complex and uncertain. Balanced inventory is required to remain intact in the retail industry or any other business (Radzuan, Rahim, Anuar, Nawi & Nadzri 2015:2118). In recent years, retailers have been facing complications with shrinkage in the stores, resulting in product identification through attached labels or tags. The identification mechanism is working for many retailers (Zhou & Piramuthu 2017:285). According to Lee, Zhou and Hsu (2015:36), the identification is proof of why companies need to dedicate resources to enhance processes if they want to reach the objective of superior inventory performance. The authors further state the supporting evidence indicates a significant improvement inside the organisations that drive innovation in shrinkage. They are likely to manage their inventory performance better.

The impact of ISP on firms' IP has been well-documented, as advanced by Abimbola and Kolawole (2017:8), who established that IS contributes significantly to SME retail inventory performance. Empirical evidence provided by Mbah, Obiezekwem and Okuoyibo (2019:79) offered a similar conclusion, in that IS is found to be a critical source of performance through its effects on supply chain technological aspects such as RFID as a driver of performance improvement in retail sectors in manufacturing firms in Nigeria. Smith (2015:259) discovered that preventive IS measures positively affects inventory performance. Therefore, these empirical results demonstrate the strategic nexus between IS and IP. Based on the above literature, the following hypothesis is formulated:

H₁: There is a positive relationship between ISP and IP in the retail industry in Gauteng and KwaZulu Natal provinces.

4.3.2. Inventory investment and inventory performance

The complexity of II can be influenced by many aspects, such as inventory risk, market position, or any other company's financial characteristics that contribute to IP (Huang 2016:60). The

importance of organisations prioritising industry competitiveness is critical in today's retail environment which requires high-level investment and inventory performance monitoring. The effectiveness of IM practices can result from management efforts that optimise investment in inventory, thus leading to superior inventory performance (John, Etim & Ime 2015:393). As such, in the form of adequate investment, II management plays a strategic role in decreasing operational costs and increasing sales levels, thereby enhancing inventory performance (Odhiambo & Gichure 2017:391). The authors further state the importance of managing IP effectively, as it positively influences business due to customer service requirements that can maximise the company's net profit and minimise II.

A study by Syntetos, Babai and Gardner (2015:1747) found a direct association between II and IP. This result was echoed by Hancerliogullari, Koksalmis and Calisir (2017:291), who established that continuous investment in inventory capacities correlates to better-operating performance. Oballah, Waingajo and Wachiuri's (2015:703) study on the organisational performance of the Kenyatta National Hospital established a positive influence between II and inventory with the performance of inventory. II was found to have a significant impact on inventory performance in a study conducted on flour milling companies in Nigeria (Akinlabi: 2021:137). It was further noted by Oni (2019:14) that II has a significant association with inventory performance in the pharmaceutical industry in Ilorin Metropolis. Consequently, the abovementioned observed evidence connects II and inventory performance. As such, the following hypothesis is formulated:

H₂: There is a positive relationship between II and IP in the retail industry in Gauteng and KwaZulu-Natal provinces.

4.3.3. Inventory turnover optimisation and inventory performance

There has been considerable growth in the operations management literature, providing contrasting findings on the relationship between inventory turnover and inventory performance (Elsayed & Wahba 2016:65). ITO has been determined as the measure of inventory performance through its influence on the cost of goods sold to industries' consumers (Comez-Dolgan & Tanyeri 2015:332). Feng, Li, McVay and Skaife (2015:531) opine that inventory turnover is a critical barometer to evaluate performance, and it is the commonly used component to analyse the competitiveness of retail organisations.

The consequences and the interactions between all the inventory types that include inventory turnover were tested on how they impact inventory performance (Andreou, Louca & Panayides 2016:1). Empirical evidence from Li, Liang and Zhu (2018:1) showed that inventory turnover positively influences inventory performance due to its effects on improving IM performance. Moreover, Li, McVay and Skaife (2015:529) reported a positive relationship between inventory turnover and inventory performance in retail services. Similarly, a positive nexus between inventory turnover and inventory performance was found (Hai 2019:9). Lastly, Elsayed and Wahba (2016:65) found that inventory turnover positively influences inventory performance in an organisation. Subsequently, it becomes evident that the relationship between inventory turnover and inventory performance is vital. The following hypothesis is therefore formulated :

H₃: There is a positive relationship between ITO and IP in the retail industry in Gauteng and KwaZulu Natal provinces.

4.3.4. Inventory control and inventory performance

The notion of IC plays a critical role in any organisation. The importance of accurate inventory is due to its role in gaining and keeping inventory (Hellstrom & Wiberg 2015:6), with the principal objective of having a proper correlation between physical inventory and inventory that exists in the system, which will prove to be accurate (Pancho, Pancho & Fadrigio 2018:1). As a result, these inaccurate inventory levels cause failure to many firms. The failure is due to the inability to implement replenishment systems or recommend various replenishment tools to improve real-time inventory issues (Ganesha, Aithal & Kirubadevi 2020:148). According to Solis, Tavizon and Alarcon (2020:183), IC is a cornerstone in its capability and ability to optimise the performance of organisations' inventory capacities. Holding the right amount of inventory can increase business performance by reducing the response time to customer demand, resulting in higher customer satisfaction (Priniotakis & Argyropoulos 2019:6).

IC is an important measure to assess IM as it immediately and directly connects with the performance of the firm's inventory; this can have a major blow to the company's competitiveness if it is not well managed (Feng, Li McVay & Skaife 2015:532). In their investigation on IC, Shteren and Avrahami (2017:74) concluded that removing inventory inaccuracies has a positive effect on firms' value chains, in terms of higher supply chain costs, which could later lead to poor performance. Fleisch and Tellkamp (2015:373) indicated that the elimination of inventory

inaccuracy could reduce costs and out-of-stocks, therefore, citing a positive relationship between IC and IP. This point was echoed by Oballah, Waingajo and Wachiuri (2015:703), who established that IC is linked to inventory performance. Finally, this result was endorsed by Rildwan, Monday and Afolabi (2019:23). Based on the discussed empirical findings, the following hypothesis is formulated:

H4: There is a positive relationship between IC and IP in the retail industry in Gauteng and KwaZulu Natal provinces.

4.3.5. ABC Analysis and inventory performance

The concept of ABC analysis has been addressed as a major topic due to its association with performance appraisal of IM (Douissa & Jabeur 2016:550). Its relevance is further observed when firms encounter significant financial problems due to their inability to properly adopt this system, highlighting the value linked to its implementation as a driver of inventory performance (Nallusamy, Balaji & Sundar 2017:165). This view was supported by Douissa and Jabeur (2020:9525), who asserted that a successful implementation of ABC analysis indicates that the performance of each inventory item is measured, thereby resulting in a reduction of inventory cost value.

Additional empirical findings from Mehdizadeh (2020:1) indicated that substantial developments in the critical performance indicators include increased service level, reduced average value, and inventory performance. According to a survey by Khan, Dong and Yu (2017:119), ABC classification methods influence inventory performance (Lajili, Babai & Ladhari 2015:270). ABC analysis as a function of IM practices has been established to directly and positively impact inventory performance (Kinyanjui 2016:5). A research study shows that the implementation of ABC analysis results in a significant improvement in the vital inventory performance measures (Mehdizadeh 2020:1). As a result, the above-mentioned empirical evidence specifies the significance of the relationship. Therefore, given the discussion mentioned above, the following hypothesis is stated:

H5: There is a positive relationship between ABC analysis and IP in the retail industry in Gauteng and KwaZulu Natal provinces.

4.3.6. Inventory performance and warehouse performance

Analysis of performance measures within the context of the retailing sector appears to be an ideal strategy for every organisation because it provides a clear indication of resource utilisation to enhance performance (Laosirihongthong, Adebajo, Samaranayake, Subramanian & Boon-itt 2018:20). It has become critical to analyse performance in the warehouse environment. It assists managers in evaluating the organisation's performance objectives and making sound decisions in value (Staudt, Alpan, Rodriguez & Mascolo 2015:5524). Besides, managing inventory and warehouse performance (WP) enables the company to generate more sales, positively impacting the organisation's value chain of activities (Mohamad, Suraidi, Rahman & Suhaimi 2016:299).

A study conducted by Kritchanhai, Hoeur and Engelseth (2017:4) found a positive relationship between inventory performance and warehouse performance. Recent research by Islam, Ali, Fathollahi-Fard and Kabir (2021:1) indicates that IP is an antecedent factor of WP. Finally, Wang, Dang and Nguyen (2020:1) found that a firm's inventory level exerts a sound influence on its warehouse performance. Therefore, the following hypothesis can be stated:

H₆: There is a positive relationship between IP and WP in the retail industry in Gauteng and KwaZulu Natal provinces.

4.4. CHAPTER SUMMARY

Chapter four presents the conceptualised model of the study. It further developed the proposed hypotheses required to establish the empirical results. The study hypothesised a positive association between the predicting variables (ISP, II, ITO, IC, and ABC analysis), and the mediator (inventory performance); between the mediator and the outcome variable (warehouse performance). The next chapter discusses the research methodology employed to collect the data.

RESEARCH METHODOLOGY

5.1. INTRODUCTION

This chapter outlines the framework of the research methodology that is employed in this study. The chapter is fundamental to understanding the methods and principles used in conducting the study. The study discusses inductive and deductive perspectives, the two significant elements of reasoning. The chapter continues to discuss the research paradigms, including positivism, post-positivism, interpretivism, and phenomenology. Furthermore, this chapter addresses qualitative, quantitative, and mixed methods and outlines the suitable approach employed for this study.

Additionally, a cross-sectional and longitudinal design is addressed in this section. Lastly, the sampling design and procedures are addressed to determine the data collection process and its subsequent analysis.

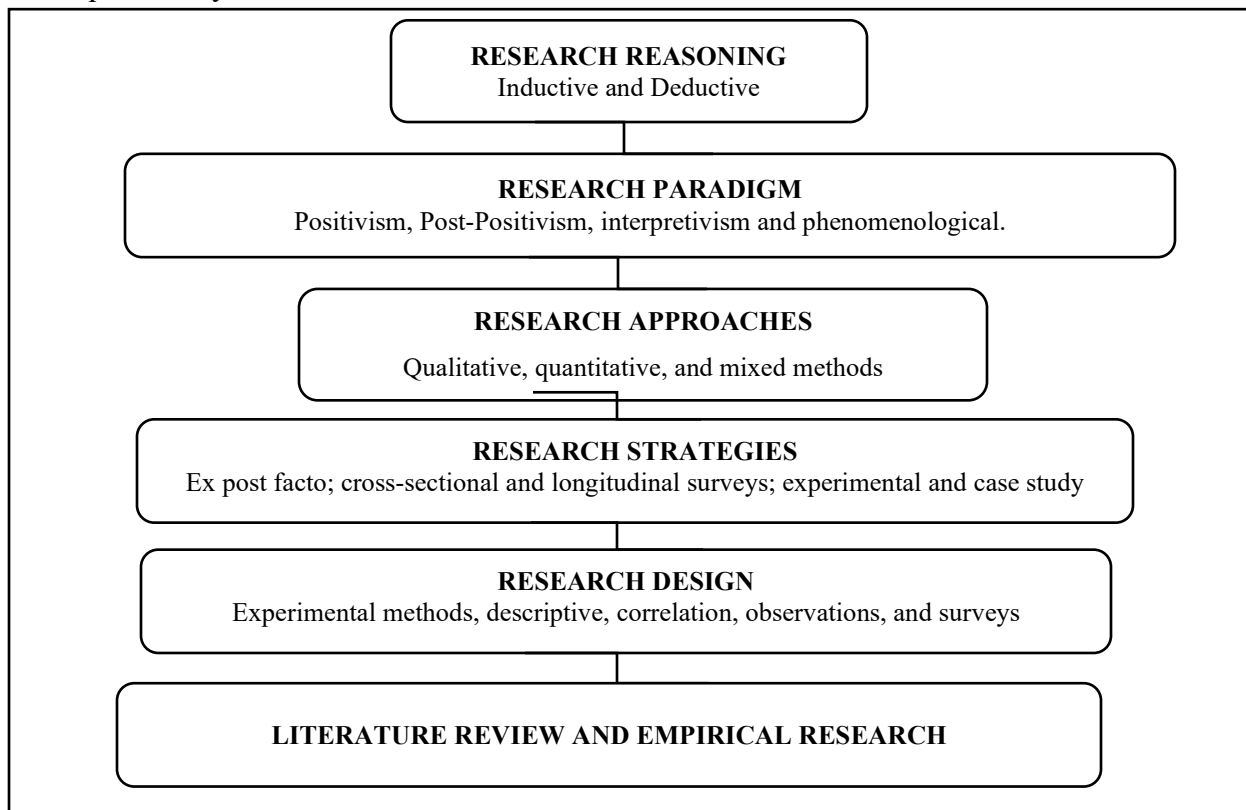


Figure 5.1: Chapter summary

Source: Compiled by the author

5.2. RESEARCH REASONING

The word ‘reasoning’ can be done in public or private spaces while thinking; this can also be done by talking, arguing, or showing in writing (McDonnell 2015:108). Defining research reasoning can often mean emphasising what it is not and the capability of reasoning to express a reasonable conclusion that justifies a particular position (Lakin & Harrison 2020:528). Research reasoning is critical for research purposes (Biehler, Frischemeier & Shaughnessy 2017:132). The study discusses the two types of reasoning, inductive and deductive.

5.2.1. Inductive and deductive reasoning

Inductive reasoning is a logical process in which multiple premises are believed to be found factual, and they are used to consolidate conclusions or to provide evidence for the truth of a decision (Vonk & Shackelford 2017:2). The authors further state that the concept can be used to generate predictions and make forecasts. Inductive reasoning is used primarily when there is an insufficient or limited theory or previous research findings (Armat, Assarroudi, Rad, Sharif & Heydari 2018:219). Inductive reasoning is a concept that is generally associated with qualitative studies. A significant issue is an extent to which the models are reviewed to represent qualitative theoretical explanations (Hayes & Heit 2017:7).

Deductive reasoning is the method of making decisions that can either do or do not necessarily follow from given premises (Liew 2015:9). This reasoning system operates on a model that affects multiple constructs applied to human reasoning (Bibel & Kreitz 2015:933). As a result, deductive justification guarantees the truth in the conclusion. An example of human reasoning that is used by Cramer-Petersen (2019:41) says, “The weather is sunny. John only brings his umbrella when it rains, so he will not bring it today”. This study has identified the deductive reasoning approach as the suitable theory to deploy, given that it is mainly used and supports quantitative studies (Kasim & Antwi 2015:220). This study aims to ascertain the causal association between its identified constructs, including ISP, II, ITO, IC, and ABC analysis, IP and WP derived from the development of hypotheses. The research paradigms are discussed next.

5.3. RESEARCH PARADIGMS

This section provides a brief outline of the elements of research paradigms. A paradigm is described as a fundamental belief system and theoretical framework with assumptions about ontology, epistemology, methodology, and methods (Rehman & Alharthi 2016:51). The author further states that the existence of the world and its studies are understood. The word ‘paradigm’ is referenced back to the American philosopher, Thomas Kuhn (1962), who pronounced the term ‘paradigm’ to mean a philosophical way of thinking (Kivunja & Kuyini 2017:26). Paradigm is viewed as a concept with diverse ways of viewing the world and the foundation of research consisting of assumptions of reality, how knowledge is created, and what is valuable to learning (Davies & Fisher 2018:21). The table below depicts the critical functionalities of all paradigms.

Table 5.1: Paradigm functionalities

Positivism	Constructivism
<ul style="list-style-type: none">• Determination• Reductionism• Empirical observation and measurement• Theory verification	<ul style="list-style-type: none">• Understanding• Multiple participant meanings• Social and historical construction• Theory generation
Advocacy/Participatory	Pragmatism
<ul style="list-style-type: none">• Political• Empowerment issue-oriented• Collaborative• Change-oriented	<ul style="list-style-type: none">• Consequences of actions• Problem-centred• Pluralistic• Real-world practice-oriented

Source: Rahi (2017:1)

Table 5.1 provides a preview of the paradigm functionalities and their characteristics, and each paradigm has four characteristics that reflect the processes behind each of them. The next section discusses all the paradigms:

5.3.1. Constructivism

Constructivism is described as a theory that emphasises the construction of people’s comprehension and knowledge of their surroundings through experience and reflection of those experiences (Adom, Yeboah & Ankrah 2016:2). Constructivism has various meanings. Many of

them are identical in the idea of meaning, to make sense of the both social and collective meaning of the world we live in (Cleland & Durning 2015:51). The author adds the importance of focusing on the meaning which forms an integral part of researchers' thinking. The concept stresses mutual and involuntary influence between the researcher and participant due to the reflexive and rigorous studies that permit a change in opinions as they are empirical objects of the analysis (Hunter, Chung, Gretzel & Koo 2015:104).

5.3.2. Advocacy/Participatory

Researchers who use advocacy achieve their knowledge through the advocacy paradigm, a critical paradigm (Rahi 2017:1). It focuses on groups/individuals that may be marginalised or disenfranchised, and often uses feminist, racialised discourses, queer, disability theories, and perspectives (Vanstone 2017:19). The advocacy paradigm can be defined as a theory used to achieve confirmation and opinions that are utilised in support of a specific foundation or stance (Shannon-Baker 2015:10). The advocacy paradigm is essential for two reasons: an effective advocacy strategy enables proper analysis of the strategic objectives of the research and effective work in advocacy by providing correct and convincing proof to support advocacy (Greenleaf & Williams 2019:2).

5.3.3. Pragmatism paradigm

Pragmatism is defined as a paradigm that aims to counter the gap between the scientific method and the structuralism orientation of the old approach, the natural methods, and the freewheeling orientation of new concepts (Kaushik & Walsh 2019:2). Pragmatism is seen as a significant philosophical support for mixed research approach and considered a true joint venture as underlying assumptions provide the essence for mixing research methods (Maarouf, 2019). It has been proven that pragmatism works well when applied to mixed methods of qualitative and quantitative research (Mitchell 2018:106).

5.3.4. Positivism paradigm

Positivism originates from the Latin word 'positum', which translates to 'posited,' which means that the facts have been posited or positioned to the researcher (Corry, Porter & McKenna 2019:8). Therefore, the objective of positivists is to discover existing truth and is the goal of science. Positivism is associated with a hypothetico-deductive method responsible for verifying a priori

hypotheses and investigation by building measures and variables. The examination outcome is utilised to update and advance research (Park, Konge & Artino 2020:690). As a result, the positivism paradigm is regarded as a methodological philosophy in quantitative analysis, where natural science systems are applied to determine the study of social science (Pham 2018:2).

Positivism was chosen for this study. It was selected due to its rational standpoint in natural science that works with observable reality within society, leading to simplification (Alharahsheh & Pius 2020:41). This study expected to test causalities amongst the variables and uses the hypotheses to examine the influence of IM practices: ISP, II, ITO, IC, and ABC analysis on the IP and WP, which is in line with the positivism paradigm. Section 5.6 presents a discussion of the research approach of the present study.

5.4. RESEARCH APPROACH

A research approach is known as a plan of action that provides direction to conduct research systematically and efficiently (Mohajan 2017:3). According to Ishtiaq (2019:40), the research approach has three approaches: qualitative, quantitative, and mixed-method approaches. A qualitative approach is a methodology that permits scholars to advance and apply relational and subjective skills to their experimental study processes (Alase 2017:9). Teherani, Martimianakis, Stenfors-Hayes, Wadhwa and Varpio (2015:669) describe qualitative research as a systematic investigation into social phenomena in natural settings. Besides, it looks into how people experience aspects of their lives, the behaviour of individuals and groups, how organisations function, and how relations are shaped by interaction (Creswell 2014), whereas, a quantitative approach is when the researcher takes a decision and decides on what to study, asks questions, collects data, analyses data with statistics, and conducts the survey fairly and objectively (Fischler 2015:12). The impact of the research approach is to provide more in-depth data collection and analysis processes (Alase 2017:12).

Lastly, the mixed methods approach uses both qualitative and quantitative methods to collect data (Hall 2015:72). The integration of quantitative and qualitative methods to form a mixed-method draws strength from each method to answer real-life research questions; the method is important for framing investigation within the philosophical and theoretical positions of both methods (Kaur 2016:94).

A quantitative approach was suitable for this study because the study sought to establish the relevance of the hypothesised relationships between variables and to understand the perception of SCM professionals on adopting IM practices. Apuke (2017:43) confirmed that the quantitative approach is suitable for generating numerical data and establishing causal relationships between two or more variables. The process of generating numerical data and relationship establishment is done using statistical methods to test the strength and importance of the relationship (Wilson 2016:1551). This supports the rationale of the present study to ascertain the causal nexus between ISP, IL, ITO, IC, ABC analysis, and IP and WP. The upcoming section discusses the time horizon of the current study.

5.5. TIME HORIZON

Time horizon refers to the period of future studies or chronological horizon of varying breadth, distinguishing three primary time horizons: short-term up to 10 years, medium-term up to 25 years and long-term predicted beyond 25 years (Melnikovas 2018:39). Scott and Udejaja (2015:9) mentioned two aspects of time horizon taken from Saunders et al. (2012): longitudinal time horizon and cross-sectional time horizon. The research time frame can be determined by the researcher who is driven by the research investigation question. The process can be short-term, known as cross-sectional or long-term, regarded as longitudinal (Mohamed, Kindy, Shah & Jusoh 2016:895).

A cross-sectional study is a surveillance study that the researcher uses to simultaneously measure the outcome and exposure of the study participants (Setia 2016:261). The significance of a cross-sectional approach is that a sample or census can be achieved from the expected target population, and the availability or the absence of the result is discovered (Downes, Brennan, Williams & Dean 2016:1). Below are the characteristics of the cross-sectional approach:

- A cross-sectional study can determine the number of people affected by the frequency of the existence that differs across the population and groups (Hemed 2015:7).
- Cross-sectional studies can observe variables or any other type of data performed the same way and the interest in the variables is revolutionised (Zangirolami-Raimundo, Echeimberg & Leone 2018:356).
- The most prominent characteristic of cross-sectional studies is that all data observed is collected at a single point in time (Allen 2017:1).

Longitudinal studies deploy continuous processes to monitor individuals over a long-time; these can last for years and even, decades (Caruana, Roman, Hernandez-Sanchez & Solli 2015:537). Ployhart and Vandenberg (2015:97) define longitudinal research as a study highlighting a change with a minimum of three repetitive interpretations on at least one of the substantive constructs of interest. Therefore, the importance of longitudinal study has developed from clarifying theoretical and methodological issues involved to assessing changes over time (Wang, Beal, Chan, Newman, Vancouver & Vandenberg 2017:1). Moreover, Caruana, Roman, Hernandez-Sanchez and Solli (2015:537) suggest the following as the characteristics of a longitudinal approach design:

- The longitudinal approach is more beneficial when studying issues that are developing or have a lifespan;
- Researchers are able to look at some aspects and change them at different points in life lastly;
- Researchers can explore those reasons as to why there are developmental shifts taking place.

A cross-sectional approach was used for this study, given that the collection of data was done at a single point in time, as advanced by Allen (2017:1). The study intended to gather relevant data from its sampled respondents in two selected provinces (Gauteng and KwaZulu Natal) between April and September. This procedure was to ensure factual information and the view of supply chain professionals operating in the retail sector could be ascertained. Section 5.6 provides a discussion of the research design of the study.

5.6. RESEARCH DESIGN

A research design is a master plan that identifies the techniques and methods for collecting and analysing the required feedback (Zikmund, Babin, Carr & Griffin 2015:66). Research design is reflected as the research structure referred to as the “glue” that keeps all the elements in research intact, simplified as a plan of the proposed research work (Akhtar 2016:64). Therefore, this explains that the execution of the work, which includes the fieldwork, only commences when the fundamental research has agreed that there is sufficient research design (Tobi & Kampen 2017:1217). According to Apuke (2017:43), research design approaches include correlational, empirical, causal-comparative, and survey research.

5.6.1. Correlation research

Correlation research is described as a technique that measures the strength of two variables (Sari 2016:80). It also knows the relationship between the two variables with the results of a quantitative nature. Correlation research design is used to determine the extent of the relationship between different factors, not the extent to which a factor changes in another (Balmes 2017:85). Besides, it is vital to establish two significant distinctions between independent and dependent variables and the difference between experimental and correlational methods (Curtis, Comiskey & Dempsey 2016:20).

5.6.2. Experimental research

Experimental research is a scientific investigation where specific assignments are developed, organised, and controlled with the aim of data collection to enhance the knowledge of the object studied (Gile 2016:220). The rationale behind the experiment ensures that the information that emerges when the experiment is concluded is pertinent to the prediction that is tested and not polluted by external factors (Miller 2019:3). There are emerging discussions in experimental design research and, importantly, the realisation that experimental empirical design research is concerned with humans and faces encounters that do not replicate discussions of experimentation in natural science (Cash, Stankovic & Storga 2016:6). The authors provide an overview of the experimental design types, including randomised or actual experiment, quasi-experimental (known as a natural experiment), pre-experiment, or pseudo experiment.

5.6.3. Causal-comparative research

Causal-comparative research is a strategy that matches the already prevailing distinctions between various groups before the researcher's observation and permits the identification of the cause-and-effect relationships among variables in the study (Olatunji 2017:6). Apuke (2017:45) identified two approaches for causal-comparative research:

- Retrospective causal-comparative research is when the problem investigated has occurred in the past, and the researcher determines whether one variable might have discriminated against the other variable.
- Future causal-comparative research occurs when the investigator begins with the causes and is determined to evaluate the condition's effect.

5.6.4. Survey research

Survey research is defined as collecting information from a sample of individuals through their responses to questions (Ponto 2015:168). Survey research design is known for its contributions to improved data quality and the relevance of research findings (Mauceri 2015:1213). It should also be noted that a survey can only be conducted with a specific research objective in mind (Lebedev, 2015:294). Table 5.2 provides the different types of survey research designs that are available and used in various studies:

Table 5.2: Types of survey research

Survey Type	Advantage	Disadvantage
Online survey	<ul style="list-style-type: none">✓ Fewer costs✓ Quick response turnaround time✓ No response from the interviewer	<ul style="list-style-type: none">✓ Risk in confidentiality✓ Technical problems✓ Minimal responses✓ Access to internet
Postal (Mail) survey	<ul style="list-style-type: none">✓ Intermediate costs✓ Convenient✓ Access to a large number of respondents✓ No interviewer bias	<ul style="list-style-type: none">✓ Low response rate✓ Survey completion difficulties due to literacy, language and version.
Interviews	<ul style="list-style-type: none">✓ A more detailed response due to personal contact✓ Increased response rate	<ul style="list-style-type: none">✓ High costs✓ Small samples✓ Interviewer bias✓ Limited questions

Source: Story and Tait (2019:195)

Table 5.2 illustrates the different types and advantages and disadvantages of survey research methods.

The study employed a combination of correlation and survey design methods. The selection of these two design methods is based on the rationale that the study sought to establish the relationship between ISP, II, ITO, IC, ABC analysiss and their proposed influence on IP and WP in the retail industry in Gauteng and KwaZulu Natal provinces in South Africa. This association was ascertained using the SMART PLS software. Furthermore, the survey design approach was adopted through a structured questionnaire to collect data from the study's respondents, which comprised SCM professionals operating in the identified firms in the two provinces. Section 5.7 discusses the literature review presented in the present study.

5.7. LITERATURE REVIEW

A literature review is defined as an organised, unambiguous, and reproducible method for identifying, evaluating and synthesising the current work of concluded and recorded work produced by researchers, scholars, and practitioners (Booth, Sutton & Papaioannou 2016:9). The literature review is regarded as a critical evaluation technique utilised for academic purposes and is essential for developing a research project and placing research findings into context (Winchester & Salji 2016:308). Snyder (2019:333) clearly states that integrating empirical findings and perspectives is important to help the literature review address research questions in a field that no other study can. Overall, a literature review is fundamental in supporting the researcher to discover limitations from previous studies that need newly recommended contributions in the researched field. It also provides research findings with empirical evidence (Alzahrani 2016:1).

The information mentioned above outlined the vital role of the literature review in research projects. Therefore, it is important to note the previous chapters, namely, chapters two and three reviewed the literature on the factors of the study. Chapter two reviewed literature on the retail industry in South Africa. The literature discussed was based on the overview, significance, and challenges the retail sector faces in the South African economy. Lastly, a review of previous research conducted on the retail industry in the South African context was done.

Chapter three reviewed literature on the research constructs and the research theory which is the theory of constraints was used to ground the study theoretically. The constructs' focus included ISP, IC, II, ITO, and ABC analysis, IP and WP. The review looked at aspects related to the emergence of the constructs, their importance, the factors influencing them, and each construct's outcome.

These chapters' review was completed using information from various scholarly search engine platforms, namely, Researchgate, Academia, Emerald, Google Scholar, and SAGE journals; also, e-books and hard copy textbooks, completed dissertations and theses done in logistics and SCM were included. Section 5.8 discusses the empirical research of the study.

5.8. EMPIRICAL RESEARCH

This section of the study is the empirical research approach that incorporates research elements, such as sampling design, target population, sample frame, sample size, and sample procedure and technique. Structured questionnaires were formulated to collect data and for analysis procedures. The following sub-sections detail the related topics.

5.8.1. Sampling design

Sampling design selects using a multistage, geographically assembled strategy to warrant appropriate analysis of the target population chosen while reducing data collection costs simultaneously (Nguyen, Kress, Villaveces & Massetti 2019:323). The sampling design consists of the following: target population, sample size, sample frame, and sampling frame (Taherdoost 2016:19).

5.8.2. Population

A study population is defined as the number of people living in a particular country (Taherdoost 2016:19). Etikan and Bala (2019:2) viewed it as the targetted people from which a sample will be drawn. For the study, the target population consisted of all supply chain professionals operating in the warehousing facilities of retail companies in the Gauteng and KwaZulu-Natal provinces in South Africa.

5.8.3. Target population

A target population refers to the complete set of subjects whose characteristics interest the research team (Martínez-Mesa, Gonzalez-Chica, Duquia, Bonamigo & Bastos 2016:326). The target population in the study comprised all the supply chain professionals, such as warehouse managers, inventory managers, general managers, shift managers and supervisors, distribution centre managers, supply chain managers and specialists, and related individuals who oversee and manage the performance process operating in the retail companies in Gauteng and KwaZulu Natal provinces.

5.8.4. Sample frame

A sampling frame identifies the sampling units within a population and their locations (West 2016:1). The author further states that the sampling frame is made up of sampling units, or it can be based on the diagram of the population area within which the sampling units can be observed. Sharma (2017:749) defines a sampling frame as a tool that researchers deploy to methodically select a small number of representatives from a pre-defined population for observation or experiments in a study. For this study, the supply chain and warehouse professionals based in the retail sector in the Gauteng and KwaZulu Natal provinces were chosen at the discretion of the researcher to be the respondents in the study. As such, there was no sampling frame available for use in the study.

5.8.5. Sample size

Sample size usually refers to the number of participants (Malterud, Siersma & Guassora 2015:6). Sim, Saunders, Waterfield and Kingstone (2018:6) identified the four general approaches that are taken when determining the correct sample size;

- Rule of thumb, which is based on a combination of methodological considerations and experience;
- Conceptual models which focus on specific characteristics of the proposed study;
- Data guidelines are derived from a practical study, and
- Statistical formulae are based on the prospect of achieving enough sample size from the population.

The study used the historical sample size determination to peg its sample size. The previous SCM studies conducted by Okoumba and Mafini (2016:637), Mhelembe and Mafini (2019:5), Sibanda and Pooe (2018:1), Eicker and Cilliers (2018:1) Muchaendepi, Mbohwa, Hamandishe and Kanyepe (2019:455), Sundram, Chandran and Bhatti, (2016:1453) and Kimaiyo (2014:1) used a sample size confined between $n=200$ and $n=500$. Therefore, the study's sample size was pegged at $N=500$ respondents using the historical approach.

5.8.6. Sample procedure and technique

Sampling is a tool used to measure and test the relationship between variables, including input and outcome variables (Courtois & Timmermans 2018:2). Furthermore, the sampling technique is categorised into two major types, probability sampling and non-probability sampling (Alvi 2016:12). Etikan and Bala (2017:216) state that probability sampling is also known as “random sampling.” This sampling technique allows all items to be given an equal chance of existence when sampling for research purposes. In contrast, non-probability sampling assists researchers in subjectively choosing the units representing the population sampled for a particular study (Etikan, Alkassim & Abubakar 2015:1). Table 5.3 provides the various samplings of probability and non-probability sampling.

Table 5.3: Types of probability and non-probability sampling

Probability Sampling	Non-probability sampling
Simple random sampling	Quota sampling
Systematic sampling	Purposive sampling
Stratified sampling	Self-selection sampling
Cluster sampling	Snowball sampling

Source: Sharma (2017:750)

Table 5.3 presents the different techniques under the probability and the non-probability sampling methods. Table 5.3 indicates that probability sampling consists of four factors: simple random, systematic, stratified, and cluster sampling. Non-probability sampling also consists of four factors: quota, purposive, self-selection, and snowball sampling.

Probability sampling is defined as the concept that specifies to the investigator that each fragment of the identified people will be presented in the sample (Adwock 2015:95). Randomised selection is applied in probability sampling instead of the researcher's arbitrary or purposive sample selection, or even better, uses different self-selection progressions to be entered past respondents (Vehovar, Toepoel & Steinmetz 2016:327).

Non-probability sampling is not an unsystematic technique; respondents should be willing to participate as part of the population target chosen for the study (Lamm & Lamm 2019:54). Hence

there is no significance in a random selection of the sample but rather, a subjective method is deployed to decide which components are encompassed (Etikan, Musa & Alkassim 2016).

In the study, non-probability purposive sampling was employed; although a sample list of respondents was provided. The non-probability sampling was chosen because there was no single sampling frame from which the list of respondents based in Gauteng and KwaZulu Natal could be obtained. Purposive sampling refers to a non-probability sampling method whereby a researcher chooses a sample purposively based on the merit or relevance of the potential sample member (Robinson 2014:30). This technique was selected. This approach is also quick and easy and offers an opportunity to access respondents adequately as the researcher used his discretion in this study's selection process (Vehovar, Toepoel & Steinmetz 2016:328). Section 5.9 discuss the data collection instruments used for measuring the information of the study.

5.9. DATA COLLECTION INSTRUMENTS

Data collections occur when the researcher gathers and measures information on the variables of interest in a proven organised process, allowing answers to the questions provided in the questionnaire and testing the hypotheses (Kabir 2016:202). The author further emphasised that data collection is one of the most critical stages when conducting research. The methods used to collect data have changed over the years; up to the 1970s paper-based questionnaire forms, face-to-face surveys, telephone surveys, and mail surveys were used (Bethlehem 2016:5).

In the study, the collection of data was done through a structured survey questionnaire. The fundamental reason for using a questionnaire was to obtain similarities between the original and adapted questionnaire (Epstein, Santo & Guillemin 2015:435). A questionnaire is defined as any text-based mechanism that provides survey respondents with a sequence of questions to complete or statements to respond to by demonstrating an answer by marking a page, writing a number or checking a box on paper or online (Blackwell 2016:169). The technical layout and other aspects of the study's questionnaire are discussed next.

5.9.1. Cover page of the questionnaire

A questionnaire is a standard methodology applied in social sciences research; its importance is associated with its user-friendliness and the access it can provide to the large amounts of data analysed by inexperienced researchers (Blackwell 2016:160). The author further states that

questionnaires are reasonably cost-effective, rapid, and efficient in obtaining a significant amount of data and information from a large sample of people.

The cover page of the questionnaire consisted of the Vaal University of Technology letterhead, the details of the researcher (student), the email address, and the faculty under which the research is conducted. It further outlined the purpose of gathering information in the research title by linking IM practices to inventory and warehouse performance in the Gauteng and KwaZulu Natal provinces' retail industries. Moreover, the respondent's confidentiality was assured through a statement emphasising non-disclosure of the identities of potential respondents. Specific mention of free participation is also stated, and the core objective of pursuing the investigation was highlighted.

5.9.2. Structure of the questionnaire

The questionnaire contained eight sections that range from A to H. Section A focuses on eliciting demographic information, which consists of gender, highest qualification, employment period in the organisation, years of experience as a supply chain professional, and the position in the organisation. Section B to H encompasses the information related to the constructs of the study, which includes ISP, II, ITO, IC, ABC analysis, IP, and WP, respectively.

5.9.3. Constructs' measurement instruments

The important aspects of constructs are based on the position of the researcher to endorse various classes of performance such as needs, motives, attitudes, habits, character traits, emotional state, beliefs, and some of the other types of constructs (Krause 1976:277). This questionnaire was made up of 34 measurement instruments for this research. Each construct has various items measuring each construct with ISP consisting of a six-item scale adapted from Ekegbo *et al.* (2018:57). Besides, II and IC have adopted a five-item scale derived from Hussein and Makori (2018:973) while ITO utilised a four-item and a five-item scale adapted from Oballah *et al.* (2015:713) and ABC Analysis employed a four-item scale agreed to by Wauna and Obwogi (2015:10). Lastly, IP has a five-item scale adjusted from Awuah-Gyawu *et al.* (2015:44) and WP of a six-item scale drawn from Hussein and Makori (2018:974). These instruments were assessed using a five-point Likert scale anchored by 1 = Strongly disagree and 5= strongly agree, with 2, 3, and 4 expressing a level of disagreement, neutrality, and agreement, respectively.

5.9.4. Measurement items

This sub-section highlights the measurement items and constructs used for the current study. Table 5.4 shows all their constructs and instruments and the sources from which they are adapted.

Table 5.4: Constructs and measurement items

Construct	Item Code	Measurement item	Source
SECTION B			
Inventory shrinkage prevention	ISP1	Our firm constantly conducts quality checks on stock sold to customers and delivered from suppliers	Ekegbo, Quede, Mienahata, Siwangaza, Smit and Bruwer (2018:52)
	ISP2	Our firm’s warehouse facility has fire extinguishers and hose reels	
	ISP3	Our firm constantly conducts inventory counts	
	ISP4	Our staff members are effectively trained to conduct their inventory duties	
	ISP5	Our firm’s warehouse facility is equipped with CCTV cameras to ensure adequate inventory monitoring and staff supervision	
	ISP6	Our firm’s warehouse facility is equipped with adequate theft detection systems at entrances and exit points	
SECTION C			
Inventory investment	II1	Obsolete and excessive inventory reduce our company’s operational costs.	Hussein and Makori (2018:973)
	II 2	Excessive or overstocking reduces taxes paid to the inventory stored.	
	II 3	Our firm is not holding on to obsolete products in the stores	
	II 4	Our firm removes obsolete stock to provide space for the more profitable item.	
	II 5	Our firm’s staff are properly trained to manage our inventories effectively.	
SECTION D			
Inventory turnover optimisation	ITO1	Our firm inventory turnover affects the insurance costs of the company.	Oballah <i>et al.</i> (2015:713)
	ITO 2	Our firm inventory turnover has an effect on the holding costs of the company.	
	ITO 3	Our firm inventory turnover affects the service levels of the company.	
	ITO 4	Our firm inventory turnover leads to low costs of operation.	
SECTION E			
Inventory control	IC1	Our firm ensures that there is the tracking of inventory to enhance coordination of materials accessibility, controlling, utilisation and procuring of materials.	Hussein and Makori (2018:960)
	IC2	Our firm has the correct forecasting methods to reduce stockouts	
	IC3	Our firm is able to predict demand beyond a 4 week Horizon	

	IC4	Our firm forecasting operation is accurate enough to demonstrate improvements and related observations result in inventory markdowns	
	IC5	Our firm has advanced forecasting tools that can enable improvements in cost reduction	
SECTION F			
ABC analysis	ABC1	Our firm’s inventories are well and clearly classified.	Wauna and Obwogi (2015:10)
	ABC2	Our firm’s system of classification is based on a rate of usage.	
	ABC3	Our firm’s inventory classification is done according to usage.	
	ABC4	Our firm’s inventory is classified based on its importance rather than value.	
SECTION G			
Inventory performance	IP1	The effectiveness of our firm’s inventory practices helps to speed up our warehouse operations.	Awuah-Gyawu <i>et al.</i> (2015:44)
	IP2	The effectiveness of our firm’s inventory practices helps to reduce human errors when it comes to stock counting.	
	IP3	The effectiveness of our firm’s inventory practices helps to reduce stockout levels.	
	IP4	The effectiveness of our firm’s inventory practices helps to enhance proper demand forecast.	
	IP5	The effectiveness of our firm’s inventory practices helps to enhance the efficiency of our warehouse operations.	
SECTION H			
Warehouse performance	WP1	Our firm’s warehouse is effective enough to improve cost reduction.	Hussein and Makori (2018:974)
	WP2	Our firm’s warehouse is effective enough to enhance timely deliveries.	
	WP3	Our firm’s warehouse uses automated tools and techniques to enhance order processing and deliveries.	
	WP4	The effectiveness of our firm’s warehouse is dependent on the competence of our staff.	
	WP5	Our firm’s warehouse is effective enough to ensure adequate use of stock cycle counts of the items in the storage.	
	WP6	Our firm’s warehouse is integrated enough to enhance cost reduction, and timely deliveries, improve customer satisfaction and increase the company’s profits.	

Sources: Compiled by the Author

Table 5.4 presents the research constructs and their individual question items as indicated in sections B-H as per the outlined questionnaire. A total of seven constructs have been identified as essential to achieve the purpose of this investigation. They include ISP, II, ITO, IC, ABC analysis, IP, and WP. The constructs mentioned above were examined and evaluated to provide results on the influence of IM practices on warehouse performance.

5.9.5. Adaptation of the questionnaire instruments

Adaptation refers to a process and the outcome of a research study that leads to various explanations and debates on the examination (Simonet 2016:2). The questions adapted from the original questionnaire were compared to achieve consensus and synthesise the two versions into one. Any other changes were made to fit the population participating in the study (Sandeberg, Wenemark, Bartholdson, Lutzen & Pergert 2017:3). The study's target population consisted of supply chain professionals who at least have post-matriculation qualifications. Therefore, the entire questionnaire was written in English the official language of the Republic of South Africa. No translation nor major changes were made to the original questionnaire, and limited changes were made to the vocabulary and presentation due to similarities in adapted questionnaires. Also, minimal adjustment was made to simplify the sentences' wording. Due to the originality of these sentences, they were structured plainly with little uncertainty and fit the context of the study.

5.9.6. Response method employed

The process used to gather and measure information on the respective constructs is established systematically to enable a non-complex way of answering stated research questions, testing hypotheses, and evaluating outcomes (Kabir 2016:202). This process challenges the questionnaire designers to develop a survey measurement tool that captured the responses' real answers (Castellarnau 2018:1523). This is a measuring instrument that is objectively fair. It should provide the same report in every judgment on the scoring performance (Pandey & Pandey 2015:20). The score obtained from the measuring instrument is known as the sum of the accurate score and any error in the measurement process of a study (Mohajan 2017:72).

Likert is defined as a psychometric response scale predominantly used in questionnaires to acquire preferences or degree of agreement from the respondents with a statement or a set of statements (Bertram 2016:1). Rensis Likert initially introduced the Likert concept in 1932 and developed the technique for assessing attitudes (Brown 2015:10). Therefore, a Likert scale was employed as a crucial and commonly utilised psychometric tool in educational and social sciences research (Joshi, Kale, Chandel & Pal 2015:396). Lastly, the importance of utilising the Likert scale is due to its flexibility in being applied as a universal method to collect data. It is an easy-to-understand, useful, and reliable tool for measuring self-efficiency (Brown 2015:10; Subedi 2016:37).

The study adopted a five-point Likert scale as an appropriate instrument compatible with the constructs; the five-point Likert scale used is anchored by 1= strongly disagree to 5 =Strongly agree. The results of the Likert scale are presented in the next chapter under the descriptive statistical analysis results in section 6.5.

5.9.7. Procedures for dealing with data-related problems (Bias)

Bias is defined as a methodical variance amongst the outcomes of the non-randomised studies of the effects of intervention and the results that are anticipated from the target population where the population is a hypothetical randomised trial without the threat of bias (Losilla, Oliveras, Marin-Garcia & Vives 2018:63). Sica (2016:1) defined bias as an error that is systematically bound to disturb the scientific investigations and distort the measurement process. A biased study can lose its validity due to the degree of the bias. Amidst all the possibilities of the study outcomes' integrity, bias can be intentional or unintentional (Simundic 2017:12).

The above-mentioned literature suggests that during a research study, some degree of bias can be encountered when implementing the strategies that collect and analyse data. Therefore, it is critical to note that there are many forms of bias faced in research studies. The forms are not limited to response bias, non-response bias and sampling bias. These misrepresentations can counter the validity and integrity of the study findings. Hence it is critical to find suitable avenues to alleviate the impact before, during and after data collection.

5.9.7.1. Response bias

A response bias can be described as a methodical tendency to reply to various questionnaire items on some basis other than the specific item content (Wetzel, Böhnke & Brown 2016:266). Thus, response bias is seen as the prospective source of error in investigations in social sciences. They usually ensue when the participants answer questions other than the survey or other stimulus questions (Bogner & Landrock 2016:2). Consequently, the timeframe of five months from May 2021 to September 2021 given in the study was more than the actual time to complete the questionnaire; this allowed the respondents to take their time and accurately respond to the research questionnaire truthfully.

In the study, the questionnaire was developed to be as user-friendly and accommodating as possible to allow the respondents to eliminate bias during the completion of the questionnaire.

Additionally, the ethical clearance ensured that the confidentiality of the contributor was a priority; it indicated that no information would be divulged to any third party. All questions established in the questionnaire address different aspects of the study, which unlock expert answers.

5.9.7.2. Non-response bias

The term non-response is well-defined as failing to examine some components in the designated sample (Ayhan 2015:2651). The author further states that non-response bias significantly contributes to the impact experienced in two ways. For example, introducing a possible bias in estimates and increasing the sample inconsistency due to a decreased sample. The difficulty in evaluating non-response bias is that measures of the variables of interest and characteristics of non-responders are generally not observed. Hence, the population field has tended to rely on the presumption that low response rates mean low data quality (Rindfus, Choe, Tsuya, Bumpass & Tamaki 2015:798). This is a clear indication that non-response bias could be experienced when there is a large gap between the respondents who participate and those who did not, due to the following reasons:

- People not agreeing to participate;
- Due to a lack of time or resources to respond;
- A survey that is not well-constructed, and
- Some might even have forgotten to return or complete the survey.

In the study, non-response bias was minimised by providing friendly reminder emails to respondents, encouraging them to complete the survey at their earliest convenience when the three weeks completion period had lapsed.

5.9.7.3. Sampling bias

In sampling bias, the selection of responses with certain features or characteristics tends to be favoured. This explains the reason for sampling bias being the consequence of poor planning (Bineham 2019:2). Sampling bias occurs when the chosen sample does not reflect the targeted population's characteristics (Alvi 2016:12). The most significant distinguishing factor is the bias of non-response while, for a specific purpose, some respondents do not have a chance to appear in the sample study. For instance, they have no internet access to complete an online questionnaire, especially with the current state of disaster. Most companies do not allow walk-ins to distribute

questionnaires for completion; it is recommended to do an online survey that can be completed without physical contact. There can be two causes of this type of bias:

- 1) An incorrect study target population was nominated.
- 2) The study population was all-inclusive, but the poor design of the study introduced bias; for example, only one group within the study population agreed to participate in the study

The study pegged its sample size at N=500 sample size due to similarities in the quota sampling and historical approach; the sampling technique is able to minimise the sample bias in that effect. Only supply chain professional respondents from retail warehousing were eligible to complete the questionnaire in the provinces of Gauteng and KwaZulu Natal. The provinces were selected because they are considered the financial hub in South Africa (Statistics South Africa 2017:59). Section 5.10 discusses data collection procedures used in the present study.

5.10.DATA COLLECTION PROCEDURES

As indicated in section 5.9, a structured questionnaire was chosen to collect data for the current study. The collection procedure was done electronically using emails. Additionally, an electronic survey was also developed via Google forms, comprising a link that the respondent accessed to complete the survey. Upon completion, a notification was sent to the researcher indicating the completion of the survey. This option was due to the COVID-19 restrictions imposed, in which most employees were working from their homes, thereby rendering the physical distribution ineffective. This method offered the best value to access as many respondents as possible while minimising the cost factor.

The collection took four months, between May and August 2021. The respondents were given a reasonable time frame of about three weeks to complete the survey depending on their availability. Most questionnaires were completed and scanned back after completion and others were received via email from Google forms. Financial assistance was provided by the Research Department of the Vaal University of Technology to cover all logistical expenses related to travelling and the online survey design. The upcoming section discusses the procedural data analysis used in the present study.

5.11.PROCEDURAL DATA ANALYSIS

This section focuses on the data analysis procedure which was followed upon the completion of the collection process.

5.11.1. Data preparation

Data preparation prepares both the data and the analyst. The analyst advances a lot of understanding and knowledge when data is adequately prepared, insight content, range of applicability, and limits of data are gained through the process (Soibelman & Kim 2015:4). According to Ross (2016:07), there are two problems associated with the data preparation phase:

- 1) Errors produced when capturing data can cause some of the collected data to be inaccurate.
- 2) Clean-up of computer entry and data before analysing the primary data can take too much time; therefore, the information can easily be regarded as outdated or lose value.

In the study, the data were prepared by screening the collected data from emails and online questionnaires, cleaning, and editing the questionnaires at the preliminary stage.

5.11.2. Data capturing

Data capturing refers to entering and retrieving the relevant characteristics of the study (Rokebrand 2020:26). Ferguson (2019:2) defines data capturing as the conversion of data to electronic data information. For the study, the collected data were entered into an Excel spreadsheet.

5.11.3. Data editing

Data editing is described as the progression that incorporates the evaluation and change of data collected from the survey (Flick 2015:214). To reduce the errors that come with incorrectly captured data, data editing significantly improves information classification (Liu, Verbic & Ma 2019:2). In the study, all the questionnaires that had inaccuracies (missing entries) or were answered incorrectly were discarded.

5.11.4. Data coding

Data coding is defined as organising and sorting quantitative data, which is a step before analysing data (Stuckey 2015:7). The coding method permits the understanding of large divisions of text and

portions of information in new ways; it also analyses how the units were linked to the identification of themes (Belotto 2018:2624). Therefore, the data were coded into an Excel spreadsheet.

In the study, the data were coded according to the coding abbreviation indicated in the questionnaire. Regarding the demographic section (A1–A5), the gender distribution (A1) was given two codes (1 = Male and 2 = Female). the academic qualification was coded (A2) was coded as 1 = Matriculation, 2 = Certificate, 3 = Diploma, 4 = Degree, 5 = Postgraduate, and 6 = Other.

The various sections of the sections were allocated a unique codes to differentiate them. For ISP, the following coding was used; SHR1 to SHR6. For II, the following coding was allocated; INV1 to INV5; ITO (TUR1 to TUR4); IC (ACC1 to ACC4); ABC Analysis (ABC1 to ABC4); IP (IPER1 to IPER5) and WP (WPER1 to WPER6).

5.11.5. Data cleaning

Data cleaning is the process of identifying and removing the errors in the data (Prokoshyna, Szlichta & Chiang 2015:1). Krishnan, Wang, Wu, Franklin and Goldberg (2016:1) described data cleaning as an extensive area that comprehends extraction, deduplication, schema matching to name but a few in relational data.

In the study, data cleaning was performed by verifying the coded data and aligning the information provided on the questionnaire. The researcher also reconciled the missing information provided in the questionnaire and the Excel spreadsheet. For example, a gender identification was specified and the researcher omitted it in the Excel spreadsheet. The value was entered after revisiting the questionnaire.

5.11.6. Descriptive statistics

Descriptive statistics are used to recapitulate data by labelling the relationship between variables in a sample or population (Kaur, Stoltzfus, & Yellapu, 2018:60). The authors further emphasise how vital calculating descriptive statistics is, and herein, this research step of conducting research should transpire prior to making statistical comparisons. Descriptive statistics were conducted on the respondents/ demographic properties using the Statistical Package of Social Sciences (SPSS) version 29.0. Statistical aspects performing a descriptive analysis include frequencies, mean scores, standard deviation and percentage. The descriptive statistics results are presented in chapter

six and conducted in sections A and B of the questionnaire. The results of the demographic statistics are presented in chapter 6 in section 6.3.1 of the study.

5.11.6.1. Frequencies

Frequency is a measure of the number of occurrences of a particular score in a given set of data (Mihaescu 2020:2). Frequency was used as the inclusion of descriptive statistics to analyse the results presented from the collected data.

In the study, frequencies are presented to analyse respondents' demographic properties related to gender, academic qualifications, employment period, experience as a supply chain professional, and position in the organisation and reported in Section 6.3.1.

5.11.6.2. Mean Scores

Mean is defined as the average, which is calculated by adding the values in the data set divided by the number of observations in it (Manikandan 2016:140). The critical element, mean, is used for minimising errors in predicting any value in a data set (Castro, Schillo & Grimm 2018:39). Mean, also known as average, is the most common measure and refers to a group of numbers (Sykes, Gani & Vally 2016:277). Additionally, all the figures are divided by the amount of value which is the average or mean. It is calculated from the formula $\Sigma X / N$. The mean scores were obtained to determine the respondents' perception of the questions posed in the constructs of the study. The application of the mean score was determined by showing the observation of respondents toward each construct. The results are reported in Section 6.5.

5.11.6.3. Standard deviation

The standard deviation is defined as a statistic that estimates the scatter of values around the sample mean (Andrade 2020:409). Standard deviation is commonly employed for analysis (Pandey & Pandey 2015:73). Inaccurate conclusions can be achieved if the standard deviation is omitted; as such, it is deemed significant that standard deviation is employed when the researcher is doing data analysis (Schumm, Higgins, Lockett, Huang, Abdullah, Asiri, Clark & McClish 2017:2). Standard deviation was applied to determine how data values were distributed. The results are presented in Section 6.5.

5.11.6.4. Percentage

Percentage in research needs to be utilised to signify the most personal information variables. It is attributed to age, mean, and standard deviation that needs to be calculated for the final variable, and one needs to be very clear when interpreting results into percentages (Sykes, Gani & Vally 2016:276).

In order to determine the response rate of respondents in terms of the categories defined in sections A and B of the questionnaire survey, a percentage was employed to determine the response rate. Also, the percentage was determined in terms of gender, highest qualification, employment period in an organisation, experience as a supply chain professional and position in the organisation. The results are reported in 6.3.1.

5.11.7. Inferential statistics

Inferential statistics is designed to establish the likely results from a predetermined sample that adequately represents the entire population under investigation (Kühberger, Fritz, Lerner, & Scherndl 2015:1; Sahu, Pal & Das 2015:5). Data collected in the descriptive sections of the questionnaire (section B to H) were used to test the proposed hypotheses of the study using the SMART PLS software and the confirmatory factor analysis (CFA) using SPSS and AMOS version 28.0 were employed to determine the accuracy of the constructs. The results of the inferential statistics are presented in section 6.6.

5.11.8. Exploratory Factor Analysis

Exploratory factor analysis (EFA) is a multivariate statistical method commonly used in quantitative methods (Osborne 2015). It is also widely used as a critical tool in developing and validating theories and measurements (Watkins 2018:219). The author states that EFA aims to pinpoint the slightest number of hypothetical constructs that can prudently describe the covariation detected amongst the measured variables.

Firstly, EFA was used in this study to identify the underlying factors from the assessed constructs and further exclude those deemed not suitable for analysis. EFA consists of a set of techniques, namely Bartlett's test of sphericity and the Kaiser–Meyer–Olkin (KMO), Principal Component Analysis, Communalities of variables, Rotation techniques, Factor loadings, Factor retention, Eigenvalues. The study focused on the factorability of the correlation matrix, which consists of

Bartlett's test of sphericity and the Kaiser–Meyer–Olkin (KMO), Communalities of variables, factor loadings and factor retention, which focused on the eigenvalue.

5.11.8.1. The factorability of correlation matrix

The Bartlett test of sphericity was used to test all constructs based on the acceptable limits that range less than 1 ($P < 0.001$) of which 0.000 was received and Kaiser–Meyer–Olkin with the threshold greater than 1.

5.11.8.2. Communalities of variables

Communality of a variable is defined as the portion of the variance of that variable that is accounted for by the common factors whereas over-determination of variables consists of the number of variables that load on each factor which is expected to be at least 3 or 4 (Mensah, Enu-Kwesi & Rosemond 2019:7). Communality of variable threshold is recommended to be above 0.30.

5.11.8.3. Factor loadings

Factor loading cut-off value is suggested to be valid when greater than 0.30 (Wantara & Tambrin 2019:4). The authors also define factor loading as a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors.

The results of the highlighted EFA indicators are reported in Section 6.4.1.3 in the next Chapter.

5.11.9. Confirmatory factor analysis

Confirmatory factor analysis (CFA) is regarded as a statistical measure that allows measured invariances of tests to be conducted systematically. It involves the analysis of the reliability and validity of research constructs (Joreskog & Sorbom 1979:1). Reliability and validity are the two most significant and crucial components when evaluating any measurement instrument for an appropriate study (Mohajan 2017:58). The results of the CFA are reported in Section 6.6.1.

5.11.9.1. Reliability of measurement scale

Reliability refers to the capabilities of the tests to replicate consistent results in time and space or from various platforms that can present phases of coherence, stability, and homogeneity (Souza, Alexandre & Guirardello 2017:2). Also, it refers to the main stability of internal consistency and equivalency of a measure. Reliability was assessed through Cronbach alpha and item-total correlation and composite reliability (CR) (Morley, Dummett, Kelly, Dawson & Jenkinson 2015:2). These indicators are discussed below:

- **Cronbach Alpha**

Cronbach alpha is mainly used to examine the consistencies in the internal processes or the reliability of summarised rating scales (Vaskea, Beaman & Sponarski 2017:163). According to Sekeran (1992:3), Cronbach's Alpha's value that is lower than 0.6 is poor, and it is only acceptable if it ranges between 0.60 to 0.80. It is also regarded as good if it is above 0.80. These results are further reported in Section 6.6.1 in Table 6.6.

- **Rho_A**

The Rho_A is a measure of internal consistency reliability which does not assume equal indicator loadings (Hair, Hult, Ringle, Sarsterdt, Danks, Bolyai & Ray 2021:183). It is also regarded as a composite reliability indicator computed on unstandardised loadings (Paudel & Kumar 2021:464). As recommended by Mejía-Trejo (2019:69), the acceptable threshold value to determine constructs' reliability using the Rho_A should be equalled to or above 0.07. The reported item-total correlation results in Chapter 6 Section 6.6.1 under Table 6.4

- **Item-total correlations**

Item-total correlation is pronounced as a psychometric measure employed to evaluate the correctness and reliability of measurement scales (Cronk 2018:93). For a measurement scale to be regarded as acceptable, the item-total correlation should be below 0.30 (Kesici & Tunc 2018:93). However, the concept of item-total correlation was initially suggested by Nunnally (1978:1), who stated that the correlation score should be equal or greater than a value of 0.5 for the measurement values to be observed as satisfactory. The reported item-total correlation results appear in Chapter 6 Section 6.6.1 under Table 6.4.

- **Composite Reliability (CR)**

Composite reliability is a direct desired substitute to Cronbach's alpha, which is utilised for testing convergent validity in a reflective model (Garson 2016:63). For this reason, composite reliability is preferred among researchers in PLS-based research as it may lead to higher estimates of true reliability. Therefore, the results of composite reliability are discussed in section 6.6 under Table 6.7.

5.11.9.2. Validity of measurement scales

Validity is regarded as one of the most fundamental indices of measurement that can obtain true values (Mohammadbeigi, Mohammadsalehi & Aligol 2015:1153). Shepard (2016:268) defines validity as the grade at which data and theory correlate with the test scores' clarification for the suggested usage of testing measurements. The following are the types of validity that are discussed in detail in figure 5.2.

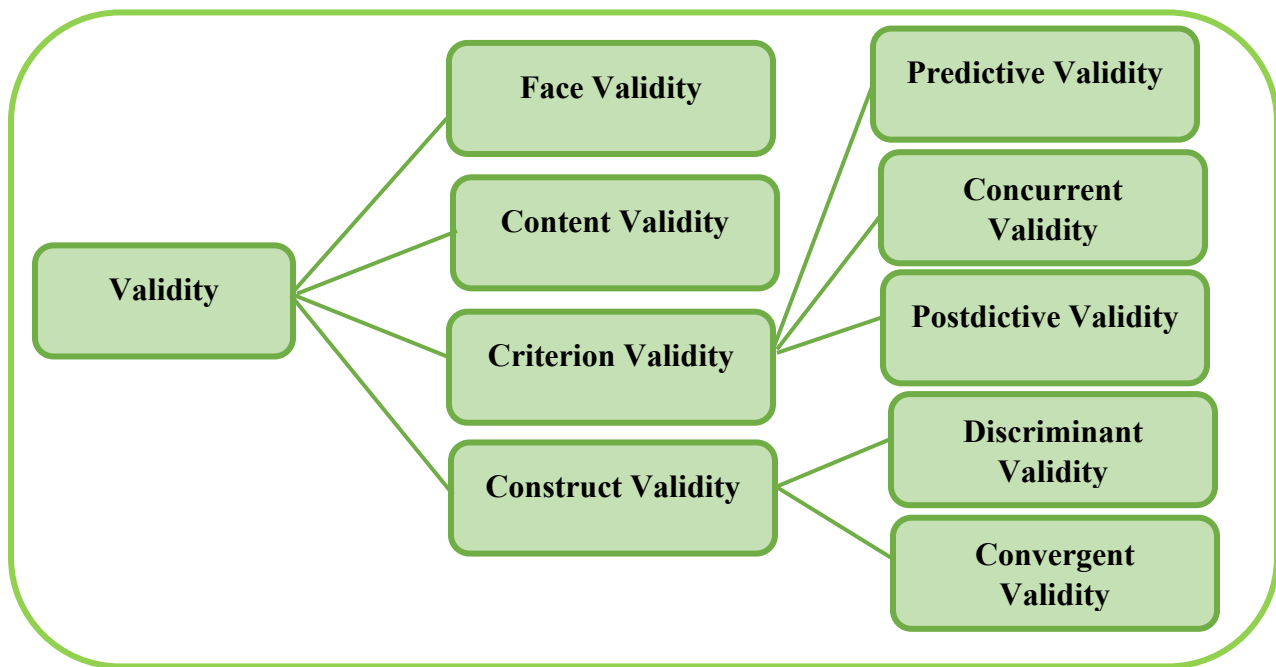


Figure 5.2: Types of validity

Source: Tahersdoost (2016:29)

For the purpose of the present study, the following validity aspects were ascertained. These include: face, content and construct validities.

- **Face validity**

Face validity is defined as a feeling, attitude or opinion of testees, raters or examinees toward a test (Nevo 1985:287). The face validity evaluation occurs during the early stages of test construction, and this is usually done through a small group of independent raters (King, Bellieux, Carragher & Delfabbro 2020:2). It is suggested that the raters interpret the intentions of validating by the research designer, except that the rater may be subjected to knowledge and experience, thereby requiring the validation as the face validity (Moyo & Mann 2018:231).

For this study, face validity was determined by a panel of academic experts from the Vaal University of Technology, whose research interest lies in SCM.

- **Content validity**

Content validity is defined as how the essence of a test is equally representative of the entire domain the test seeks to measure (Fitzpatrick 1983:7). Content validity validates whether the instruments used to assess the evidence are relevant and represent the targeted constructs for a particular study (Almanasreh & Moles 2018:214). For this purpose, content validity is a vital mechanism for reliability; the concept has established itself as a critical instrument for development (Zamanzadeh, Ghahramanian, Rassouli, Abbaszadeh, Alavi-Majd & Nikanfar 2015:165).

In the study, content validity was ascertained by pilot testing a sample of 50 questionnaires to conveniently and purposely identified respondents to determine any potential irregularity in the structure and content of the questionnaire items

- **Construct validity**

Construct validity is described as the level at which a particular measure measures what it is supposed to measure (Peter 1981:134). While Karlsson, Busch, Aboagye and Jensen (2015:2) indicate the extent to which a construct is supposed to be measured. Campbell and Fiske (1959:57) proposed two aspects that can evaluate construct validity:

- Construct validity aims to demonstrate that a measure accurately and thoroughly captures its intended construct or phenomenon (Bamberger 2017:236). Tahersdoost

(2016:29) indicates two types of construct validity which are mentioned and explained below:

- Discriminant validity is the degree to which measures of different traits are unrelated.
- Convergent validity is regarded as the degree of confidence that a trait is well-measured.

Construct validity is more likely to do analytical work when the two measurement tools are used and they measure what they intend to measure (Black, Carvalho, Khanna, Kim & Yurtoglu 2017:2).

In this study, convergent validity was ascertained using the Average Variance Extracted (AVE) that is higher than 0.5. Besides, standardised factor loadings for all items must be equalled to or higher than 0.5. Lastly, the composite reliability (CR) with the acceptable threshold must also be equalled or more than 0.7 (Cheung & Wang 2017:1).

Discriminant validity was tested using the Fornell-Larcker test, which compares the square root of AVE with the correlation of latent constructs factor, with the threshold value higher than 0.7 established as the appropriate cut-off indicator. Fornell and Larcker (2016:221) established the procedure of scrutinising whether the average variance extracted (AVE) value is greater than the highest shared variance (SV). As a result, a greater correlation between the constructs has been established in this process. The study's construct validity results are reported in Chapter 6 under Section 6.6.1.

5.11.10. Structural equation modelling

Structural equation modelling is a methodological tool that represents, estimates and tests a network of relationships between measured variables and latent constructs (Suhr 2015:1). SEM plays a crucial role in assessing the causal direct and indirect proposed relationships of a study (Ali, Rasoolimanesh, Sarstedt, Ringle & Ryu 2016:13). This analysis was conducted using the SMART PLS version (3.0) software.

5.11.10.1. Path modelling analysis

Path modelling is a process of SEM designed to analyse a study's proposed association between its identified variables. As indicated in section 5.11.11, this process was conducted using the

SMART PLS version (3.0) software to ascertain the causal nexus between the chosen IM practices and IP and WP. The results of the path modelling are reported in Chapter 6 under Table 6.8.

5.12.ETHICAL CONSIDERATIONS

The main focus of formal ethical regulation is participant well-being (Kara & Pickering 2017:239). Ethical consideration is critical for strategic decision-making to assist in raising the visibility and applicability of sensible and realistic principles when conducting research studies (Rahanu, Georgiadou, Siakas, Ross & Berki 2021:12). This section offers a synopsis of the important critical concerns of ethics that may be encountered in the research project including the methods that can be employed to challenge them. The study upheld the following ethical aspects:

5.12.1. Informed and voluntary consent

Participation in the questionnaire was voluntary; respondents' rights to no participation and contribution were prioritised to protect them from victimisation. The respondents were made fully aware of the purpose of the study and its merits to enable respondents to understand the investigation. Part of the ethical consideration submitted to the Vaal University of Technology is to ensure information is provided to the participant on the stance in answering the questionnaire. The questionnaire clearly states that the participant can choose not to participate or stop at any time without consequences. Therefore, participation in the piloted study was voluntary without any pressure on the participants.

5.12.2. Right to privacy, confidentiality, and protection of data

The privacy, confidentiality and dignity of the respondents were protected throughout the study and also ensured that the researcher did not invade the respondents' privacy. The survey provides anonymity, meaning that any information collected from the research participants is private, and the study cannot link any of their responses. The Vaal University of Technology Research Faculty has an arrangement that all documents are kept safe with limited access for five years, thereafter all information is destroyed.

5.12.3. Protection from harm and accountability

The ethical application completed by the researcher to the institute includes not exposing any questions that can cause stress, harm, noxious or unpleasant consequences or contain any form of

deception. No access to confidential information without prior consent was tolerated by completing the questionnaire. Therefore, in any situation that may occur due to the study, full responsibility was taken by the researcher. The researcher provided all required details, such as emails, phone numbers and meetings, if necessary, in case of any complications that may arise as a result of any discontent.

5.12.4. Ethical clearance certificate

An ethical clearance certificate was granted, and there is minimal risk of harm to the respondents. The ethical clearance certificate number is Ethics Reference Number: FRECMS-21042021-066. The approved reference number is attached to the ethical consideration form. The process also emphasised anonymity by guaranteeing privacy to the respondents' names and addresses and the different organisations.

5.12.5. Integrity of the thesis

Information used as part of the research literature, such as books, articles, websites, newspapers and magazines, was acknowledged through referencing. The Vaal University of Technology possesses high standards of ethical conduct, by which the researcher needs to abide. The researcher was not allowed to fabricate data to add numbers to the response rate or send it to a third party. The questionnaire does not require personal information, such as names and other personal data; no corrections were made to the respondents' accounts.

5.13.CHAPTER SUMMARY

This chapter discusses the literature on research design and methodology employed to collect data and conduct this study. Discussion into the research reasoning has inductive and deductive, and this study chose deductive as a suitable tool, due to its support for quantitative research. Research paradigms were also discussed, and positivism was most appropriate because of its long-standing efforts in producing simplicity. The quantitative research approach was also identified for the current study as the most appropriate philosophy to apply. The study also used cross-sectional analysis as the main element to conduct the research further. A sample size of N=500 was deemed sufficient to provide evidence of the performance in warehouse and inventory in the retail industry of Gauteng and KwaZulu Natal provinces. The data collection procedures was highlighted, consisting of data preparation, data capturing, data editing, data coding, data cleaning, tests for

normality of data and descriptive analysis. Moreover, the chapter detailed the data analysis procedure used to analyse the collected data. This study concludes by outlining the ethical consideration that was followed throughout the research.

CHAPTER 6: DATA ANALYSIS AND INTERPRETATION OF RESULTS

6.1. CHAPTER OVERVIEW

The previous chapter discussed the research methodology methods and techniques employed to collect and analyse the data of the study. As indicated in the previous chapter, a structured questionnaire was used to collect data for the study. The study targeted the supply chain professionals in the retail industry of two provinces, Gauteng and KwaZulu-Natal. The timeframe of data analysis took approximately five months for data collection to be collected from May 2021 to September 2021. The long duration was due to COVID-19 restrictions and the July unrest, making it challenging to collect data from employees of the targeted industry.

The chapter outlines the main statistical aspects used to analyse the collected data. The main aspects include the descriptive analysis, which encompasses the demographic properties. This is then followed by the exploratory factor analysis (EFA) and the descriptive statistics of the research constructs. The inferential statistics focus on the confirmatory factor analysis (CFA) and the psychometrics properties results. The chapter concludes with the discussion of the structural equation modelling (SEM) results, which include the hypotheses testing results. Preliminary data analysis was coded on a Microsoft Excel Spreadsheet, which was transferred to SPSS (Version 27.0) to conduct the descriptive analysis, EFA, the psychometrics properties and CFA. The Smart PLS software was used to analyse the research hypotheses.

The analysis of the psychometric properties of the measurement scales used in this chapter is also presented by applying the CFA procedure. The presentation of numerous matrices that specify the validity, reliability and model fit results is also incorporated in the chapter. Lastly, the results derived from structural equation modelling (SEM) are presented to test the research hypotheses. It concludes with the linking of the results to the theory. The next section addresses the response rate of the current study.

6.2. RESPONSE RATE

Response rate can be defined as the effect size using the intended response calculated as the number of invited and eligible responders compared to the number of the person who responded

to the questionnaire (Deikerler, Bosnjack & Katja 2020:520). Frey (2018:850) describes response rate as the ratio of the number of participants in a study to the number of participants who were asked to participate. Also, it refers to the percentage of respondents who answered the survey (Saldivar 2017:3). The response result is presented in Table 6.1.

Table 6.1: Rate of response

Description	Frequency
Total number of questionnaires distributed	500
Total number of questionnaires returned	203
Total number of questionnaires not returned	297
Usable responses discarded	1
Valid questionnaires retained	202
Response rate percentage	40.6

Source: Author's compilation

Table 6.1 shows the overall number of questionnaires circulated, returned, discarded and retained for use during data collection and capture. The sample size was set at 500 questionnaires expected to be distributed across the supply chain professionals in the retail industry in both Gauteng and KwaZulu-Natal. The results are taken from 203 respondents who successfully returned feedback, resulting in a 40.6 percent response rate. Only one (1) response was discarded from all the returned questionnaires. A total of 202 questionnaires were retained after confirming that they are valid to be processed for the research. 202 questionnaires were analysed and interpreted in this chapter as they are deemed valid.

There have been many differences amongst authors as to what the acceptable response rate levels should be, including other factors that might hinder the process of receiving good feedback. There is no consensus on the required response rate levels, but they have been reported from 40 percent to 75 percent across different specialities. Sheehan (2001:1) advanced that many quantitative studies using an online survey as a data collection method register low response rates, with a percentage of 40 regarded as suitable. This view was substantiated by Nulty (2008:301), who submitted that, on average, 40% for the online survey is an adequate ratio given the challenges related to online survey distribution in terms of the non-delivery of mail, or if received, respondents can disregard them or view them as spam or received in junk (Vehovar & Lozar Manfreda 2008:177; Fan & Yan 2010: 132).

It is also important to note that the period since March 2020 has been heavily affected at all levels of educational systems by the COVID-19 pandemic, notwithstanding the unrest in both Gauteng and KwaZulu Natal provinces in July 2021 hampered the collection process significantly. The process includes operations of many organisations globally (Mahdy 2020:2). As such, the 40.6 percent response rate achieved in this study is satisfactory due to the factors mentioned above. Section 6.3 discusses the descriptive analysis of the study.

6.3. DESCRIPTIVE ANALYSIS

The current section presents the outcome results from the descriptive statistics, specifically from the preliminary analysis of the data. Emphasis is placed on Section A of the questionnaire to establish demographic details of respondents. The descriptive analysis is determined by gender, age, race, highest qualification, and years in operation.

6.3.1. Demographic profile of respondents

The current study measured the following demographic details of the respondents, which include gender, highest qualification, employment period in the organisation, experience as a supply chain professional and position in the organisation. Table 6.2 indicates the statistical information from the first part of the demographics.

Table 6.2: Statistical information

Variable	Category	Frequency (n)	Percentage (%)
(A1) Gender	Male	166	49.8
	Female	167	50.2
Total		n= 203	100
(A2) Highest qualification	Matriculation	11	5.4
	Certificate	22	10.8
	Diploma	46	22.7
	Degree	87	42.9
	Postgraduate	37	18.2
Total		n= 203	100
(A3) Employment period in organisation	Less than 1 year	20	9.9
	1-2 years	34	16.7
	3-5 years	48	23.6
	6-9 years	37	18.2
	10 years and above	64	31.5
Total		n= 203	100

(A4) Experience as a supply chain management professional	Less than 1 year	20	9.9
	1-2 years	36	17.7
	3-5 years	56	27.6
	6-9 years	31	15.3
	10 years and above	60	29.6
	Total	n=203	100
(A5) Position in the organisation	General Manager	8	3.9
	Warehouse Manager	13	6.4
	Supply Chain Manager	2	1.0
	Procurement Manager	4	2.0
	DC Manager	8	3.9
	Inventory Manager	4	2.0
	Warehouse Supervisor	6	3.0
	Warehouse Superintendent	3	1.5
	Senior Storeman	3	1.5
	Logistics Co-ordinator	2	1.0
	Team Leader	1	.5
	Senior Buyer	7	3.4
	Inventory Planner	2	1.0
	Other	1	.5
	Missing	138	68.0
	Total	n=203	100

Source: Author's compilation

Table 6.2 depicts the results that are gathered from the data collected. It refers to the n=203 respondents that provided feedback on the questionnaires. The table covers preliminary statistical information on gender, highest qualification, organisation employment period and experience as an SCM professional. However, the information is explained in detail in the next section.

6.3.1.1. Gender distribution of respondents

Figure 6.1 demonstrates the gender distribution of respondents.

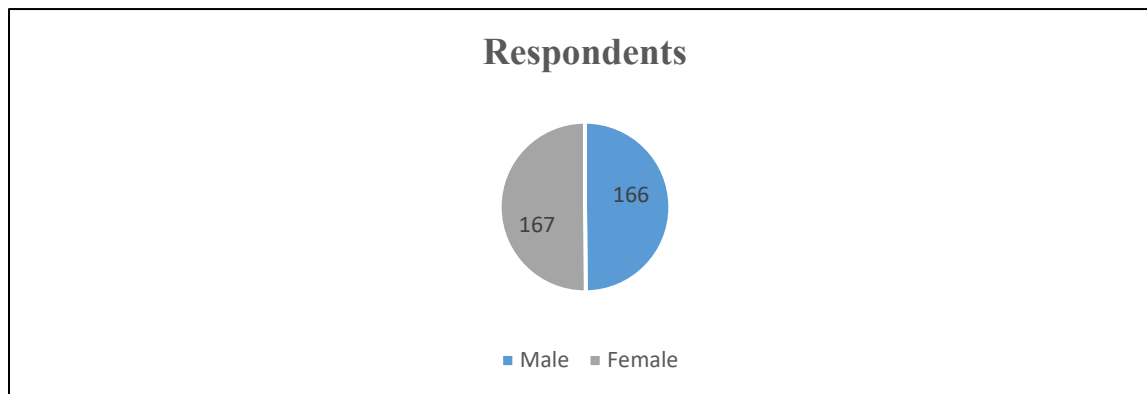


Figure 6.1: Gender distribution of respondents

Source: Author's compilation

Figure 6.1 provides the gender distribution of the surveyed respondents. The graph shows no significant difference in numbers as the numbers of males (49.8%; n=166) are almost comparable to females (50.2%; n=167).

6.3.1.2. Highest qualifications of the respondents

Figure 6.2 presents the results of the qualifications of the respondents.

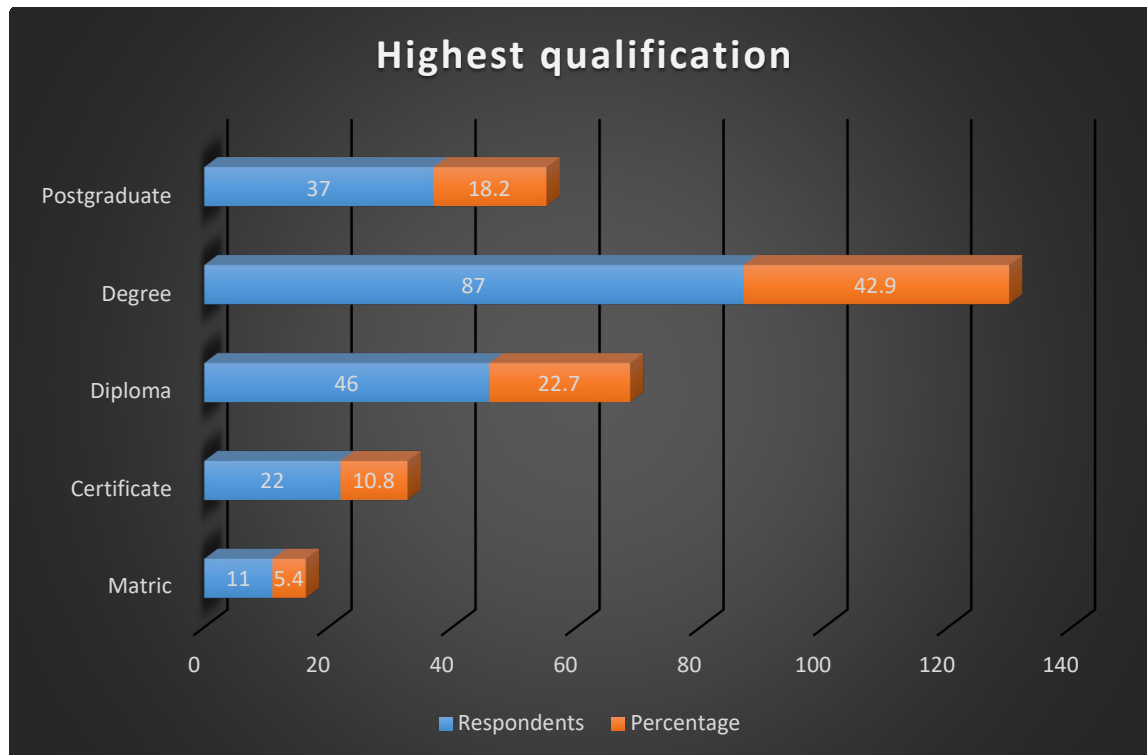


Table 6.3: Highest qualification of the respondents

Source: Author's compilation

Figure 6.2 shows that most SCM professionals hold a bachelor degree regarding the highest qualifications (n=87; 42.9%), followed by a diploma (n=46; 22.7%), while n=37 respondents (18.2%) have completed their postgraduate qualifications. 10.8 percent (n=22) completed a higher certificate. Lastly, matriculation holders rounded off the report (n=11; 5.4%)

6.3.1.3. Employment period in the organisation of the respondents

Figure 6.3 highlights the number of years that participants have spent in their current employment.

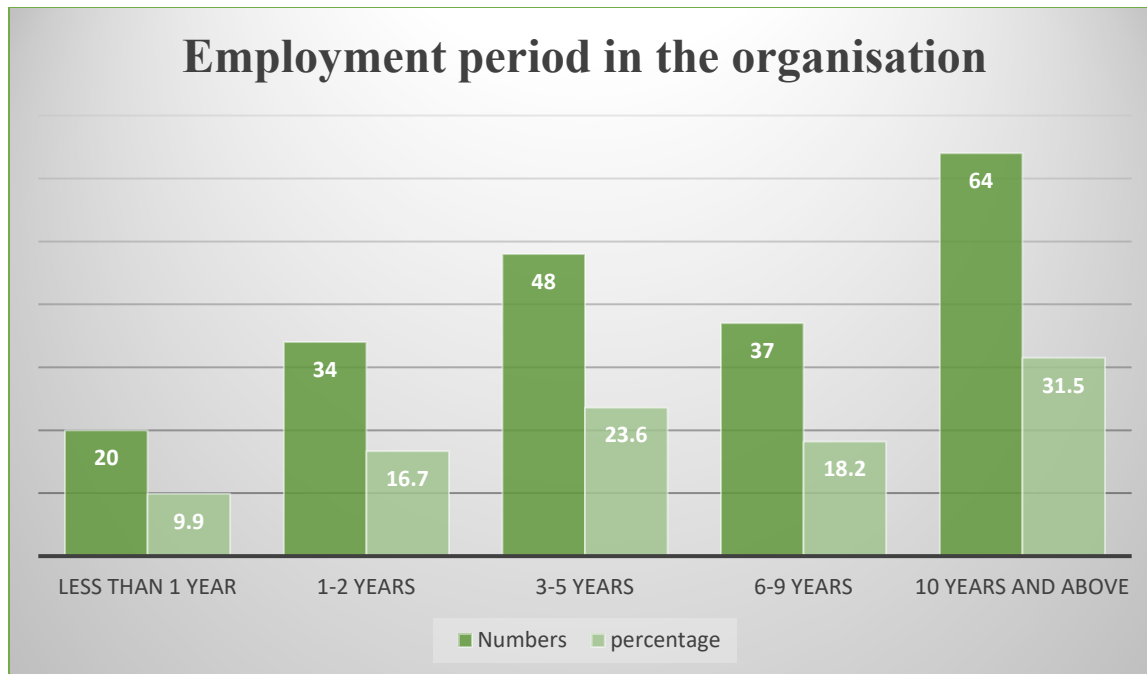


Figure 6.2: Employment period in the organisation of the respondent

Source: Author's compilation

The results presented in figure 6.3 shows that the majority of respondents were employed for more than 10 years (n=64; 31%), followed by 48 (n=48; 23.6%) employed between 3-5 years. A total of 37 respondents (18.2%) were employed for six to nine years, followed closely by 34 respondents (16.7%) employed for one to two years. Finally, 20 of the total respondents (9.9%) were employed for less than a year.

6.3.1.4. Experience as a supply chain professional

Figure 6.4 portrays the number of years of experience respondents have as supply chain professionals in the retail industry field. Relating to the experience of the surveyed respondents depicted in figure 6.4, the outcome developed that the dominant contributors are those who have 10 years and over experience in the SCM industry with a total of 29.6 percent (n=60) responses, followed closely by a close margin of 1 percent by individuals who have 3-5 years of experience which provided 27.6 percent (n=56). Regarding the respondents' experience, the results revealed that 17.7 percent (n=59) were employed as SCM professionals for less than one year. This result is followed by supply chain professionals who possess 6-9 years of experience, with a total of 15.3

percent (n=31) in the industry. Only 9.9 percent (n=20) of respondents have less than a year as supply chain professionals.

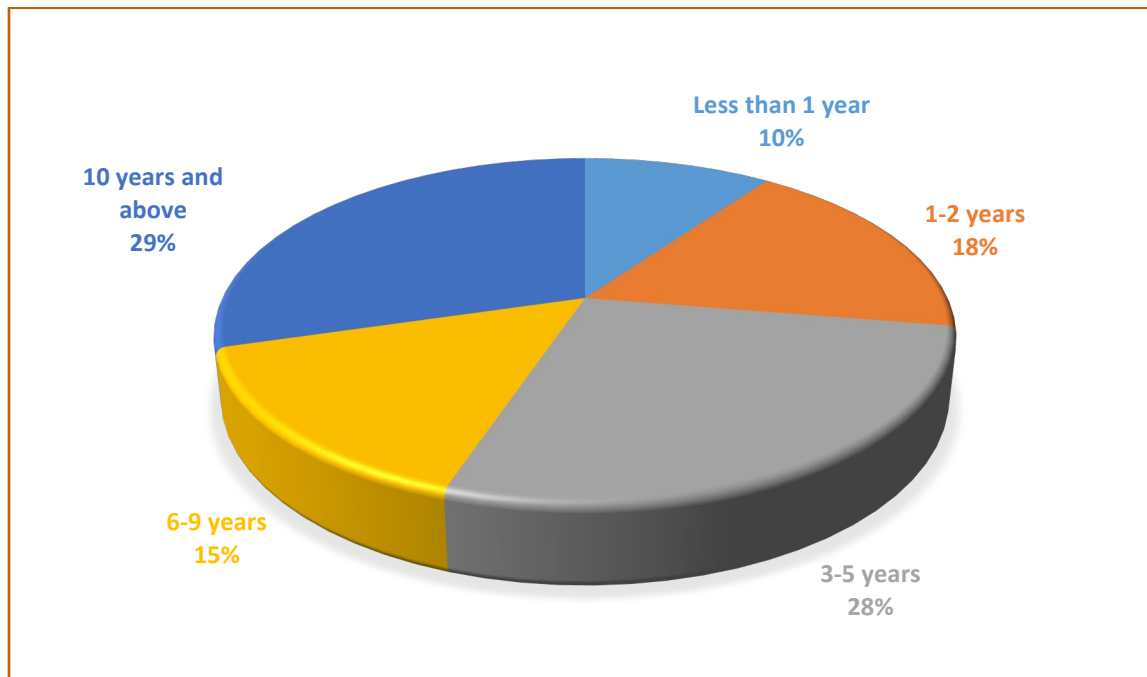


Figure 6.3: Experience as a SCM professional

Source: Author's compilation

6.3.1.5. Position of the respondents in the organisation

Table 6.3 indicates the position of the respondents in the organisation.

Table 6.4: Positions of respondents in the organisation

Variable	Position in the company	N	n	%
Position in the organisation	General Manager	203	8	3.9
	Warehouse Manager	203	13	6.4
	Supply Chain Manager	203	2	1.0
	Procurement Manager	203	4	2.0
	DC Manager	203	8	3.9
	Inventory Manager	203	4	2.0
	Warehouse Supervisor	203	6	3.0
	Warehouse Superintendent	203	3	1.5
	Senior Storeman	203	3	1.5
	Logistics Co-ordinator	203	2	1.0
	Team Leader	203	1	.5
	Senior Buyer	203	7	3.4
	Inventory Planner	203	2	1.0
	Other	203	1	.5
		203	138	68.0

Source: Author's compilation

Table 6.3 presents the results of the representation of the positions held by the respondents. The majority of respondents (n=138; 68%) held positions other than the senior or managerial positions listed. Most responses are received from other positions in different retail companies with a total of (68%; n=138). Table 6.3 shows that warehouse managers are next in line with (6.4%; n=13), followed by a joint percentage between distribution centre (DC) managers and General Managers, whom both have (3.9%; n=8) of responses received. Team leader has 3.4 percent (n=7), while the warehouse supervisor is just behind with a total (3.0%; n=6) responses. Procurement and inventory manager have also contributed to the study with the same number of (2%; n=4), the same joint status between warehouse superintendent and senior storeman who provided feedback of (1.5%; n=3), respectively. The study shows that supply chain managers, logistics coordinators and senior buyers totalled (1%; n=2). Finally, inventory planner is the last with (0.5%; n=1) responses in the industry. The following section deals with the study's explanatory factor analysis. Section 6.4 discusses the explanatory factor analysis for the current study.

6.4. EXPLORATORY FACTOR ANALYSIS

EFA is defined as an inter-correlation that occurs when there are many items in the questionnaire response and apportions the items into smaller groups known as factors (Hooper 2012:1). This is a technique that is commonly used to develop assessment instruments. The procedure is determined to best estimate the number of factors that need to be retained (Courtney 2013:1). Ledesma, Ferando, Trogolo, Poo, Tosi and Castro (2021:340) advanced that EFA analysis is a generally used statistical method employed in research, predominantly for establishing and validating measurement instruments. The analysis of the study was designed to form an adequate structure that can be utilised to test data loaded in the constructs initially proposed in the project.

The EFA process was executed using three criteria: factor loadings, eigenvalue, and communalities. Firstly, factor loadings is a technique explaining the correlation and variation between a study's observed constructs through smaller factors (Dwyer 1937:173). The acceptable threshold value is at least 0.5 (Syahfitri, Firman, Redjeki & Sriyati 2018:2; Mustafa, Nordin, Razzaq & Ibrahim 2020:5026).

The second criterion used is the eigenvalue, defined as a measuring technique that quantifies the mutual variance of the measured variables explained in a factor (Seyranian 1994:207). For a

principal component to have positive reliability, the associated eigenvalue must be greater than one (1) (Kaiser 1960:141). Braeken and van Assen (2016:2) suggest that the greater-than-one rule is tacitly connected to the null model and the number of factors to maintain should they correspond to eigenvalues greater than one.

Lastly, communalities are used as the third criterion of EFA. The communalities are critical and useful elements used to decide the variables that have to be extracted as final results (Ogunsanya, Aigbavboa, Thwala & Edwards 2019:6). Santos, Gorgulhol, Castro, Fisberg, Marchioni and Bala (2019:8) argue that variables can be considered explainable for at least 10 and 25 percent. However, Eaton, Frank, Johnson and Willoughby (2019:4) suggest an acceptable cut-off to the values of 0.25 and 0.4, with ideal communalities of 0.6 or above. This view is supported by MacCallum, Widaman, Preacher and Hong (2001:620), who advocate that communalities should be over 0.60 or an average of 0.7 to justify performing factor analysis.

The predominantly used EFA aims to assess the dimensions and structure of constructs, and it plays a critical role in developing questionnaires and testing constructs (Goretzko & Buhner 2022:132). For the study to identify the underlying factors in the variables of a questionnaire, Kaiser-Meyer-Olkin (KMO) and Bartlett's test for sphericity are required to be used to assess the factorability of data (Shrestha 2021:4). KMO is defined as a measuring technique that declares the suitability of analysed data for factor analysis (Kosar & Besen 2019:1813). Barki, Choudhry and Munawar (2020:3) suggested that the following KMO threshold values should equate to or be above 0.8 (Barki, Choudhry & Munawar 2020:3). Bartlett's test of sphericity is used to test correlation matrix hypotheses, which in turn, indicate unrelated variables which are suitable for structure detection (Ahmad, Widyastuti, Susanti & Mukhibad 2020:964). It is significant when it is less than 1 ($P < 0.001$) (Norhayati & Nawi 2021:4).

Table 6.5: EFA results for all the constructs

Construct code	Item codes	Communalities	Factor loadings	KMO Sampling adequacy	Bartlett's Test of Sphericity	Eigenvalue	Percentage variance explained
SHR	SHR2	0.618	0.786	0.835	$X^2=515.410$ df=10 P=0.000	3.342	66.842%
	SHR3	0.609	0.780				
	SHR4	0.771	0.878				
	SHR5	0.628	0.793				
	SHR6	0.716	0.846				

INV	INV1	0.527	0.726	0.765	X ² =323.858 df=10 P=0.000	2.787	55.737%
	INV2	0.504	0.710				
	INV3	0.715	0.846				
	INV4	0.625	0.790				
	INV5	0.415	0.645				
TUR	TUR1	0.626	0.791	0.681	X ² =154.392 df=3 P=0.000	2.035	67.831%
	TUR2	0.737	0.859				
	TUR3	0.672	0.819				
ACC	ACC1	0.573	0.757	0.768	X ² =235.552 df=6 P=0.000	2.478	61.958%
	ACC2	0.602	0.776				
	ACC3	0.666	0.816				
	ACC4	0.637	0.798				
ABC analysis	ABC1	0.574	0.758	0.766	X ² =673.602 df=6 P=0.000	3.092	77.300%
	ABC2	0.896	0.947				
	ABC3	0.898	0.947				
	ABC4	0.724	0.851				
IPER	IPER1	0.334	0.578	0.810	X ² =483.294 df=10 P=0.000	3.163	63.259
	IPER2	0.587	0.766				
	IPER3	0.772	0.879				
	IPER4	0.733	0.856				
	IPER5	0.737	0.859				
WPER	WPER1	0.688	.830	0.851	X ² =540.750 df=10 P=0.000	3.431	68.616
	WPER2	0.766	.875				
	WPER3	0.668	.817				
	WPER4	0.593	.770				
	WPER5	0.716	.846				
SHR = inventory shrinkage prevention (ISP), INV = inventory investment (II), TUR = inventory turnover optimisation (ITO), ACC = inventory control (IC), ABC = ABC analysis, IPER = inventory performance (IP) WPER= warehouse performance (WP)							

Source: Authors compilation

6.4.1. Interpretation of Exploratory Factor Analysis results

The results of the EFA showed that ISP is a unidimensional construct. There were initially six-item scales of ISP. Item 1 (SHR₁= Our firm constantly conducts quality checks on stock sold to customers and delivered from suppliers) was discarded because of its lower reliability value. Removing that item contributed to a significant increase in the construct's reliability.

The same process has been applied to ITO (TUR₄= *Our firm's inventory turnover leads to the low cost of operation*) and WP (WP₄= *The effectiveness of our firm's warehouse is dependent on the competence of our staff*) were discarded from the results due to lower reliability values.

6.4.1.1. Communalities

Table 6.4 provides a comprehensive report of the results that are taken from the communalities analysis. The values of all scales in the study were above 0.3, which is the acceptable limit

mentioned in the above literature. All constructs communities' values adhere to this acceptable threshold. ISP items scales range between 0.6 and 0.7 (SHR₂=0.618; SHR₃=0.609; SHR₄=0.771; SHR₅=0.628; SHR₆=0.716). II item values are between 0.4 and 0.7 (INV₁=0.527; INV₂=0.504; INV₃=0.715; INV₄=0.625; INV₅=0.415). While ITO items are confined between 0.7 to 0.8 (TUR₁=0.626; TUR₂=0.737; TUR₃=0.672). IC measurement instruments are between 0.5 to 0.6 (ACC₁=0.573; ACC₂=0.602; ACC₃=0.666; ACC₄=0.637). ABC analysis items are between 0.5 and 0.8 (ABC₁=0.574; ABC₂=0.896; ABC₃=0.898; ABC₄=0.724). IP item values are between 0.3 and 0.7 (IPER₁=0.334; IPER₂=0.587; IPER₃=0.772; IPER₄=0.733; IPER₅=0.737). Lastly, WP' item values are between 0.5 to 0.7 (WPER₁=0.688; WPER₂=0.766; WPER₃=0.668; WPER₄=0.598; WPER₅=0.716). The results confirm that the analysed data is suitable for further analysis.

6.4.1.2. Factor loading

As highlighted in Table 6.4, factor loadings for all measured constructs in the study were greater than 0.5. This is observable with ISP (SHR₂=0.786; SHR₃=0.780; SHR₄=0.878; SHR₅=0.793; SHR₆=0.846); II (INV₁=0.726; INV₂=0.710; INV₃=0.846; INV₄=0.790; INV₅=0.645); ITO (TUR₁=0.791; TUR₂=0.859; TUR₃=0.819). Furthermore, IC (ACC₁=0.757; ACC₂=0.776; ACC₃=0.816; ACC₄=0.798); ABC analysis (ABC₁=0.758; ABC₂=0.947; ABC₃=0.947; ABC₄=0.851); IP indicates a range between 0.5 to 0.8 (IPER₁=0.578; IPER₂=0.766; IPER₃=0.879; IPER₄=0.856; IPER₅=0.859); Finally, WP (WPER₁=0.830; WPER₂=0.875; WPER₃=0.817; WPER₄=0.770; WPER₅=0.846).

6.4.1.3. Eigenvalue, KMO and Bartlett's test of sphericity results

The results shown in Table 6.4 on Eigenvalues for all the constructs are accurate and report acceptable limits. The acceptable limits are greater than one (ISP (SHR)=3.342; II (INV)=2.787; ITO (TUR)=2.035; IC (ACC)=2.478; ABC=3.092; IP (IPER)=3.163; WP (WPER)=3.431). KMO results were accepted and range between 0.6 to 0.8 (KMO) [ISP (SHR)=0.835; II (INV)=0.765; ITO (TUR)=0.681; IC (ACC)=0.768; ABC=0.766; IP (IPER)=0.810; WP (WPER)=0.851]. Bartlett's test results were acceptable for all constructs, which significant at $p = 0.000$.

Based on the interpretation of the results from Table 6.4, it can be confirmed that the captured data of the current study is suitable for further analysis procedures. Section 6.5 discusses descriptive statistics of the research constructs of the study.

6.5. DESCRIPTIVE STATISTICS OF THE RESEARCH CONSTRUCTS

This section presents descriptive statistics about the constructs. It also provides the empirical results of the first objective of the study, which pertains:

- 1) To determine the perceptions of SCM professionals towards IMP in the retail industry in the Gauteng and KwaZulu Natal provinces, South Africa.
- 2) To determine the perceptions of SCM professionals towards the level of inventory performance and warehouse performance in the retail industry in the Gauteng and KwaZulu Natal provinces, South Africa.

The presented descriptive statistics include the following: mean and the standard deviations of the study constructs, highlighted in Table 6.5. It provides detailed results about the respondents' perception of the effectiveness of implementing the constructs of the study. The results are gathered in terms of predictors, including ISP, II, ITO, IC and ABC analysis. The mediating and outcome variables, IP and WP are also outlined in the table.

Table 0.6: Mean scores and standard deviations of results

Study Constructs	Sample size (N)	No of items	Means	Minimum	Maximum	Standard Deviation	$\bar{x}$ rank
	Predictor Variables						
Inventory shrinkage prevention	203	5	4.6601	1	5	0.58777	1
Inventory investment	203	5	4.2000	1	5	0.74886	6
Inventory turnover optimisation	203	3	4.1708	1	5	0.47182	7
Inventory control	203	4	4.5542	1	5	0.42159	2
ABC	203	4	4.4741	1	5	0.79541	4

Scale: 1= Strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=Strongly agree							
Mediating Variable							
Inventory performance	203	5	4.4877	1	5	0.51511	3
Scale: 1= Strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=Strongly agree							
Outcome Variable							
Warehouse performance	203	5	4.3724	1	5	0.57612	5
Scale: 1= Strongly disagree, 2= disagree, 3=neutral, 4=agree, 5=Strongly agree							
ISP= Inventory shrinkage prevention; II= inventory investment; ITO= inventory turnover optimisation; IC= inventory control; ABC= ABC analysis; IP= inventory performance; WP= warehouse performance							

Source: Author's compilation

The mean value for ISP is ($\bar{x}$ =4.6601; SD $\pm$ 0.58777). The result shows that the firm strongly agrees that ISP is prevalent in the sampled firms. The results mean that the presence of shrinkage aspects such as shoplifting, waste in the form of expired or obsolete items, incorrect stock count, stock damage, supplier fraud and inventory loss could likely lead to poor warehouse performance (Qu, Obimpeh-Quayson & Sarpong 2019:346) in the sampled firms in both Gauteng and KwaZulu Natal.

Table 6.5 shows the mean value of II as ($\bar{x}$ =4.2000; SD $\pm$ 0.74886). The outcome of the results indicates that the respondents invest in their inventory. It further indicates that the firms support the need to invest in quality inventory to optimise the performance of their warehouse. Such a commitment in aspects like holding relevant and up-to-date stock and having skilled employees might improve the participating firms' performance (Syntetos, Babai & Gardner Jr 2015:1747). Mbah, Obiezekwem and Okuoyibo (2019:78) supported this view and established that proper investment in a firm's inventory results in better operational performance.

The descriptive analysis presented in table 6.5 indicates the mean results of ($\bar{x}$ =4.1708; SD $\pm$ 0.47182) and showed that the supply chain professionals agreed that ITO is prevalent in their firms. The prevalence implies that the higher the level of inventory turnover, the more performant the warehouse activities would be (Li, McVay & Skaife 2015:529). This point was supported by Breivik (2019:2), who opined that inventory turnover activities are regarded as a measuring tool for inventory and operational performance.

The perception offered by the descriptive results on the mean of IC is ($\bar{x}=4.5542$; $SD \pm 0.42159$). The results reveal that the supply chain professionals affirm they control their inventory in their firms. This point suggests that the more they implement accurate practices such as proper procurement/reorder practices, effective management of holding costs and store operations, this could likely result in optimising their warehouse operation activities (Solis, Tavizon & Alarcon 2020:183).

The mean value of the ABC analysis was ($\bar{x}=4.4741$; $SD \pm 0.79541$), which validates the disposition towards the “strongly agree” position on the Likert scale. The results indicate that the supply chain professionals confirmed that their firms employ ABC analysis as a management technique for their warehouse operations process. The process shows that their inventory classification is based on factors such as their importance/attractiveness and usage rate would likely contribute to the increase of their warehouse operations (Douissa & Jabeur 2020:9525).

The mean value presented for IP was ($\bar{x}=4.4877$; $SD \pm 0.51511$) and indicates that the respondent fell in the “strongly agree” category. This result means that the supply chain professionals of the targeted firms view IP as a critical factor in their operational success in terms of its ability to speed up warehouse operations, reduce human errors during stock counting and stock-out levels, enhance accurate demand forecast, and enhance the efficiency of warehouse operations (Wang, Dang & Nguyen 2020:2).

The view of the mean value for WP is validated as ($\bar{x}=4.3724$; $SD \pm 0.57612$), which exhibits an inclination toward the “agree” position on the Likert scale. The result showed that supply chain professionals in both Gauteng and KwaZulu Natal provinces affirmed that the warehouse performance in their firms is central to their competitive aspirations.

This view is based on its role in ensuring cost reduction, timely deliveries, order processing and deliveries, competent workforce, good use of stock cycle counts of the items in storage; improved customer satisfaction and increased company’s profits (Karim, Rahman, Hanafiah, Hamid, Ismail, Kader & Muda 2020:51).

Section 6.6 presents inferential statistics of the study.

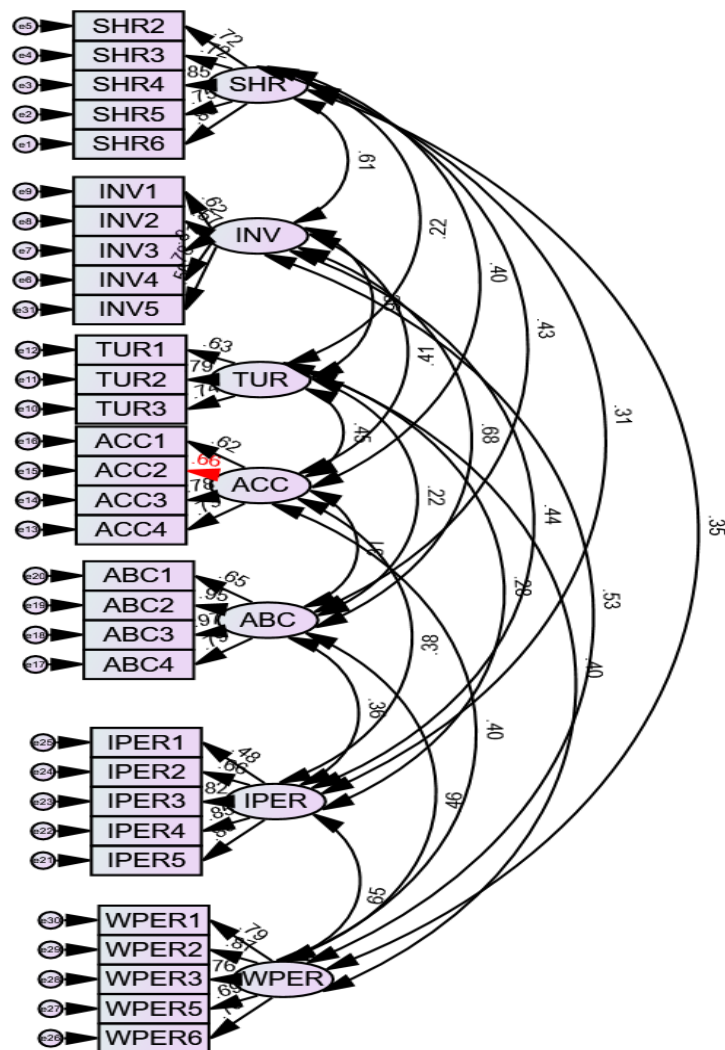
6.6. INFERENCE STATISTICS

This section presents the inferential statistics. It consists of the Confirmatory Factor Analysis (CFA), which involves reliability and validity.

6.6.1. Confirmatory factor analysis

This section provides the results derived from the Confirmatory Factor Analysis (CFA). CFA was performed to assess the psychometric properties of the measurement tools, in terms of reliability, validity and model fit. CFA analysis is a system in which the correlations amongst a set of observed variables can be modelled by a small set of unobserved or latent variables or factors (Hox 2021:2).

Figure 6.5 shows the CFA model of the study, which demonstrates the relationship between the latent and observed constructs.



SHR = Inventory shrinkage (ISP); INV = Inventory investment (II); TUR = Inventory turnover (ITO); ACC = Inventory control (IC); ABC = ABC Analysis; IPER = Inventory performance (IP); WPER = Warehouse performance (WP).

Figure 0.4: Confirmatory Factor Analysis model

Figure 6.5 indicates positive correlations between the latent variables as shown by the double arrows. The factor loadings (also known as standardised regression weights) are shown between the latent and observed variables. Overall, the statistics indicated in the model show acceptable reliability and validity of the data. Table 6.6 presents further details regarding the CFA results.

Table 6.7: Psychometric properties analysis results

Research constructs and item codes		Factor loadings	Cronbach Alpha α Value	Item-to-total correlation	Rho A	C.R. value	AVE value
SHR	SHR ₂	0.719	0.867	0.661	0.828	0.86	0.67
	SHR ₃	0.716		0.648			
	SHR ₄	0.847		0.790			
	SHR ₅	0.746		0.661			
	SHR ₆	0.804		0.746			
INV	INV ₁	0.622	0.788	0.569	0.857	0.80	0.55
	INV ₂	0.572		0.556			
	INV ₃	0.813		0.688			
	INV ₄	0.779		0.607			
	INV ₅	0.559		0.469			
TUR	TUR ₁	0.626	0.754	0.546	0.852	0.76	0.66
	TUR ₂	0.791		0.646			
	TUR ₃	0.742		0.756			
ACC	ACC ₁	0.618	0.795	0.567	0.864	0.79	0.61
	ACC ₂	0.660		0.592			
	ACC ₃	0.784		0.644			
	ACC ₄	0.735		0.622			
ABC Analysis	ABC ₁	0.646	0.902	0.618	0.929	0.90	0.77
	ABC ₂	0.951		0.895			
	ABC ₃	0.968		0.899			
	ABC ₄	0.785		0.742			
IP	IPER ₁	0.475 (0.5)	0.839	0.436	0.894	0.85	0.63
	IPER ₂	0.662		0.637			
	IPER ₃	0.821		0.777			
	IPER ₄	0.848		0.726			
	IPER ₅	0.850		0.725			
WP	WPER ₁	0.794	0.881	0.724	0.916	0.88	0.69
	WPER ₂	0.870		0.794			
	WPER ₃	0.757		0.711			
	WPER ₅	0.689		0.648			
	WPER ₆	0.780		0.739			

c significance level $p < 0.001$; SHR = Inventory shrinkage prevention (ISP); INV = Inventory investment (II); TUR = Inventory turnover optimisation (ITO); ACC = Inventory control (IC); ABC = ABC Analysis; IPER = Inventory performance (IP); WPER = Warehouse performance (WP)

Source: Author's compilation

6.6.1.1. Reliability analysis results

Reliability is used as a measuring tool that specifies that amount which is error-free. It also ensures consistent measurement across time and various items in the instrument (Bastidas-Arteaga & Soubra 2015:53). It is assessed using several indicators such as Cronbach's alpha coefficient (Cronbach α), composite reliability test, Rho_A and item-to-total correlation (Hayes & Coutts 2020:1).

- **Cronbach's alpha test results**

A construct's Cronbach's alpha is deemed reliable or acceptable when the cut-off value is equal to or greater than 0.70 or 0.75 (Christmann & Van Aelst 2006:1661). The results in Table 6.6 indicate the reliability of all the constructs because their respective Cronbach alpha values are above the required cut-off value of 0.7 (ISP = 0.867; II = 0.788; ITO = 0.754; IC = 0.795; ABC = 0.902; IP = 0.839 WP = 0.881).

- **Composite reliability test results**

Composite reliability (CR) is used as another tool to assess constructs' reliability, and it directs internal inconsistencies of the constructs related to Cronbach's alpha (Bacon, Sauer & Young 1995:2). The required minimum threshold is 0.7.

As indicated in Table 6.6, the CR results show conformance with the recommended threshold of >0.7 (ISP = 0.867; II = 0.788; ITO = 0.754; IC = 0.795; ABC = 0.902; IP = 0.839 and WP = 0.881).

- **Rho A**

Rho_A is a measure of internal consistency reliability which does not assume equal indicator loadings (Hair, Hult, Ringle, Sarsterdt, Danks, Bolyai & Ray 2021:183). Rho_A is also regarded as a composite reliability indicator computed on unstandardised loadings (Paudel & Kumar 2021:464). Rho_A thresholds are acceptable when they are ≥ 0.7 (Mejía-Trejo, 2019:69).

The results in Table 6.6 indicate the reliability of all the constructs because their respective Rho_A values are above the recommended threshold value of >0.7 (ISP = 0.828; II = 0.857; ITO = 0.852; IC = 0.864; ABC = 0.929; IP = 0.894 WP = 0.916).

- **Item-to-total correlations**

The item-to-total correlation was also identified as another reliability indicator, with a threshold value equal to or greater than 0.3 (Lord & Novick 1968:331). The results presented in Table 6.4 demonstrate that most of all items loading met the minimum cut-off values, except IP [IPER₁ (0.436)]. Besides, ISP (SHR) range between 0.648 to 0.790; II (INV) from 0.469 to 0.688. ITO (TUR) range from 0.546 to 0.756. IC (ACC) from 0.567 to 0.644. ABC from 0.618 to 0.899. IP (IPER) from 0.436 to 0.777. Lastly, WP (WPER) range from 0.648 to 0.794. The result further indicates that the items measure at least 50 percent of what they intended to measure.

6.6.1.2. Validity Analysis

Validity can be defined as an instrument that measures the behaviour or quality it intends to quantify and is a measure of how well the measuring instrument performs its function (Anastasi & Urbina 1997:259). It is determined using four indicators: criterion validity, face validity, content validity, and construct validity (Taherdoost 2016:29). In this study, specific emphasis is given to construct and content validity.

- **Construct validity**

Construct validity relates to how the measure of a construct sufficiently measures the intended concept (O'Leary-Kelly & Vokurka 1998:387). The construct validity concept is based on the complex pattern of convergent and discriminate validity, which assists in defining the construct validity of the measure (Westen & Rosenthal 2003:608).

- **Convergent validity**

Convergent validity is how different measures of the same construct converge or strongly correlate (Engellant, Holland & Piper 2016:39). Convergent validity is determined using the factor loadings and the average Average Variance Extracted (AVE). The required cut-off limit must be equal to or above 0.5 (Anderson & Gerbing 1988:412). As Browne and Cudeck (1992:238) indicated,

adequate convergent validity is determined when factor loadings are equal to or higher than the required minimum threshold of 0.5. All factor loadings ranged from 0.5 to 0.968 indicating that convergent validity is acceptable. The results are presented in Table 6.6.

Table 6.6 showed conformance with the recommended minimum threshold value of 0.5 with all constructs' item scales registering values higher than 0.5 ISP (SHR=0.648 to 0.790); II (INV= 0.50 to 0.688); ITO (TUR)= 0.546 to 0.756; IC (ACC)= 0.567 to 0.644; ABC= 0.618 to 0.899; IP (IPER)= 0.436 to 0.777; WP (WPER)= 0.648 to 0.794), except for IP (IPER)1 (0.436).

Table 6.6 highlights that all constructs' AVE values ISP (SHR) = 0.668; II (INV)= 0.548; ITO (TUR)= 0.661; IC (ACC)= 0.615; ABC = 0.767; IP (IPER)= 0.631; lastly WP (WPER)= 0.686) were equal or greater than the required threshold of 0.5. The variances also support the acceptance notch of convergent validity.

○ Discriminant validity

Discriminant validity is described as an instrument that measures constructs that do not correlate or are affected by an unrelated construct (Ronkko & Cho 2022:9). This means that each construct is empirically distinctive and captures a phenomenon not represented by other constructs in a statistical model (Franke & Sarstedt 2019:432). In this study, discriminant validity is analysed using Smart PLS. The results of the correlation analysis are presented in Table 6.9:

Table 6.8: Discriminant validity results Smart PLS

Research Construct	Construction Correlation						
	ABC	IC	II	IP	ISP	ITO	WP
ABC	0.876**						
IC	0.333**	0.784**					
II	0.660**	0.326**	0.740**				
IP	0.385**	0.353**	0.391**	0.794**			
ISP	0.446**	0.335**	0.506**	0.265**	0.817**		
ITO	0.209**	0.375**	0.328**	0.261**	0.193**	0.813**	
WP	0.503**	0.348**	0.476**	0.598**	0.318**	0.329**	0.828**
** Correlation is significant at the 0.01 level (2-tailed); ABC=ABC analysis; IC=inventory control; II=inventory investment; ISP= inventory shrinkage prevention; IP= inventory performance; WP= warehouse performance							

Source: Author's compilation

Table 6.9 shows significant positive correlations ranging from 0.193 and 0.660. These positive correlations give an indication of acceptable discriminant validity. Additionally, as prescribed through the Fornell and Larcker (1981:39) Criterion, the square root of the AVE for each construct was higher than its correlations with other constructs. This further confirms the adequacy of discriminant validity in the data. The highest correlation observed between II and IC ($r=0.660$; $p<0.01$) indicates a little correlation. In instances where good or moderate correlations are registered, an increase in one factor is likely to lead to another increase. The inverse scenario is also applicable, whereas, in the instance where there is little to no correlation between constructs, an increase will likely not lead to a similar reaction.

- **Content validity**

Content validity refers to the case in which the specific type of behaviour called for in the test is the goal of training or some similar activity (Sireci 1998:88). Content validity is a prerequisite for other forms of validity. There should be preliminary verifications prior to an assessment instruction development process (Shrotryia & Dhanda 2019:2). The content validity assessment was conducted by a comprehensive review of the study's questionnaire by a panel of academic experts from a selected University of Technology whose research expertise lies in the SCM field. Additionally, a pilot study was conducted, in which 60 questionnaires were distributed to provide a preliminary assessment of the measurement instruments.

6.7. STRUCTURAL EQUATION MODELLING RESULTS

Structural equation modelling (SEM) is seen as an inclusive numerical method to test hypotheses about the relationship between the variables (Royle 1995:1). The data structures determine the suitability of the proposed model. It tests the importance of successive hypotheses which come as a result of the model. The following section discusses the components mentioned above.

6.7.1. Structural Equation Modelling Model Fit Assessment

The main focus of the research model fit for PLS models is discovered when consolidating the indices such as the Standardised Root Mean Square Residual (SRMR) and the Nomed Fit Index (NFI). In this section, the fitness of the model was tested using the SmartPls software. The results of the analysis are presented in Table 6.9.

Table 6.9: Model Fit results using SmartPls

Model Fit indices	SRMR	NFI
Acceptable threshold values	< 0.10 or equal to 0.08	Between 0 and 1 (NFI value to be closer to 1)
Sources	Petrowski, Kliem, Sadler, Meuret, Ritz and Brahler (2018)	Schuberth, Henseler and Dijkstra (2018:10)
Results obtained	0.097	0.713 (0.7)
Decision	Supported	Supported
Note: SRMR = Standardised Root Mean Square Residual; NFI= Norm Fit Index.		

Source: Author's compilation

The results in Table 6.9 indicate all value indicators that are obtained from the analysis are aligned with the required cut-off value (SRMR=0.097 and NFI=0.713) This means the data fit the model.

6.7.2. Hypotheses test results

The results of hypothesis testing are presented in Table 6.12.

Table 6.10: Results of structural equation model analysis

Suggested path	Hypothesis	T statistics	P values	Path coefficients β	Decision
Inventory shrinkage prevention → Inventory performance	H ₁	0.192	0.848	0.015	Rejected
Inventory investment → Inventory performance	H ₂	2.027	0.043	0.169	Supported
Inventory turnover optimisation → Inventory performance	H ₃	1.414	0.158	0.090	Rejected
Inventory control → Inventory performance	H ₄	2.457	0.014	0.199	Supported
ABC analysis → Inventory performance	H ₅	2.060	0.040	0.182	Supported
Inventory performance → Warehouse performance	H ₆	12.307	0.000	0.598	Supported
Significance level <0.05; * significance level <0.01; *** significance level <0.001**					

Source: Author's compilation

Table 6.12 represents suggestions of hypotheses (H_1 , H_2 , H_3 , H_4 , H_5 ; H_6). The table indicates that H_1 : ISP and IP ($\beta = 0.015$) and H_3 : ITO and IP ($\beta = 0.090$) exerted no influence on IP. These hypotheses were, therefore, rejected. However, H_2 : II and IP ($\beta = 0.169$), H_4 : IC and IP ($\beta = 0.199$), H_5 : ABC and IP ($\beta = 0.182$) and H_6 : IP and WP ($\beta = 0.598$) were supported and accepted. The next section discusses the results of the hypotheses test.

6.7.3. Discussion of results of the study

The section discusses the results of the hypotheses tests, which are grounded on the formulated empirical objectives below:

- 3) to investigate the impact of IMPs on IP; and
- 4) to investigate the impact of IP on WP.

Hypothesis 1: There is a positive and significant relationship between ISP and IP in the retail industry in Gauteng and KwaZulu-Natal

The analysed results reject the hypothesis H_1 ($\beta = 0.015$; $t = 0.192$; $p = 0.848$). This observation means that ISP does not predict IP among the sampled retail firms in the selected provinces. The results suggest that an increase in ISP results in a very insignificant increase in IP in the retail industry by 1.5 percent. Empirical results from Shteren and Avrahami (2016:64) support the non-existence of a relationship between the two concepts. Nonetheless, there is a contrast from the study by Agu, Ozioma and Nnate (2016:62) that ISP positively affects a company IP and increases its competitiveness. Furthermore, an analysis of studies, projects and reports demonstrates the direct impact of ISP on material and overall stock losses in the retail industry (Kumar, Nigam, Bhakta, Rakesh & Singh 2020:5077). This view was advocated by Chebet and Kitheka (2019:92), who submitted that approving ISP impacts on inventory and organisational performance. It further highlights the crucial influence of this factor in ensuring an effective and efficient IP and profitability if managed adequately (Eminue, Titus & Udo 2019:45).

Hypothesis 2: There is a positive and significant relationship between II and IP in the retail industry in Gauteng and KwaZulu-Natal

The results showed that there is a positive and significant relationship between II and IP ($\beta = 0.169$; $t = 2.027$; $p = 0.043$). The results imply that II is a predictor factor of IP among the sampled retail

outlets in both the Gauteng and KwaZulu-Natal provinces. The results, therefore, mean that an increase in II leads to an increase in IP in the retail industry by approximately 17 percent. This outcome resonates with Kardan, Vadeei and Imeny (2019:1), who showed that II exerts an influence on firms' IP of the inventory. It is important because reducing II by large retail outlets contributes to various outcomes such as increased current liabilities, decreased inventory holding, and significantly reduced warehouse, insurance, and theft costs. Thus, improving the overall performance of inventory (Wang, Akbar & Akbar 2020:5).

Hypothesis 3: There is a positive and significant relationship between ITO and IP in the retail industry in Gauteng and KwaZulu-Natal

The analysis on H₃ is not supported ($\beta = 0.090$; $t = 1.414$; $p = 0.158$). Therefore, ITO does not predict IP in the participating retail firms in Gauteng and KwaZulu-Natal provinces. This view is based on the fact that an increase in ITO will result in a marginal increase in IP in the retail industry by nine percent. This result contrasts with empirical evidence from Comez-Dolgan and Tanyeri (2015:332), who established that ITO is an important driver of IP through its influence on the cost of goods sold to industrial consumers. It is conceivable that ITO facilitates firms' IP objectives. Further evidence from Mohamad, Suraidi, Rahman and Suhaimi (2016:302) supported this observation. ITO directly impacts the enterprise's IP (Mohamad, Suraidi, Rahman & Suhaimi 2016:302). As such, it is important to implement ITO as it is a scaled inventory to sales. It can be utilised to calculate the progress performance during a specific time by paralleling IP (Surjandy & Ratnasari 2018:32).

Hypothesis 4: There is a positive and significant relationship between IC and IP in the retail industry in Gauteng and KwaZulu-Natal

Hypothesis 4 (H₄) was supported by the results. It is because of the positive and significant association between IC and IP which was recorded ($\beta = 0.199$; $t = 2.457$; $p = 0.014$). The results denote that an increase in IC correlates to an increase in IP in the retail industry by about 20 percent, thus, highlighting the importance of IC as a critical measuring technique for the organisation's performance enhancement of inventory. This observation aligns with Oballah, Wainganjo and Wachiuri (2015:703), who noted that IC positively influences organisational IC. In addition, IC is a critical tool for assessing the sound management of inventory due to its

immediate and direct connection with IP (Cakir, Bezbradica & Helfert 2019:194; Feng, Li McVay & Skaife 2015:532). The optimisation of firms' accuracy of IM could correlate to better operation control by reducing inventory costs.

Hypothesis 5: There is a positive and significant relationship between ABC and IP in the retail industry in Gauteng and KwaZulu-Natal

A positive and significant relationship was registered between ABC and IP (H_5) ($\beta = 0.182$; $t = 2.060$; $p = 0.040$). This outcome indicates that an increase in the adoption of ABC leads to an increase in IP in the retail industry by 18 percent. Thus, supporting the consensus that places ABC analysis as a strategic IM tool and a critical key performance indicator of IP (Nallusamy, Balaji, & Sundar 2017:165). This management technique contributes fundamentally to the improvement of a warehouse management system, thereby maintaining IP objectives (Douissa & Jabeur 2016:550). The ABC method has the ability to decrease inventory levels by up to seventeen percent significantly and still be able to eradicate inactive and slow-moving stock to improve the IP of the organisation (Umry & Singgih 2019:1). Moreover, the success of this strategic instrument is well-documented (Kaabi, Jabeur & Ladhari 2018:1805; Wauna & Obwogi 2015:977). Firms' capability to embrace various stock controlling procedures, such as ABC, has experienced major improvement and efficiency in their IP (Jemelka, Chramcov, Kriz & Bata 2017:2).

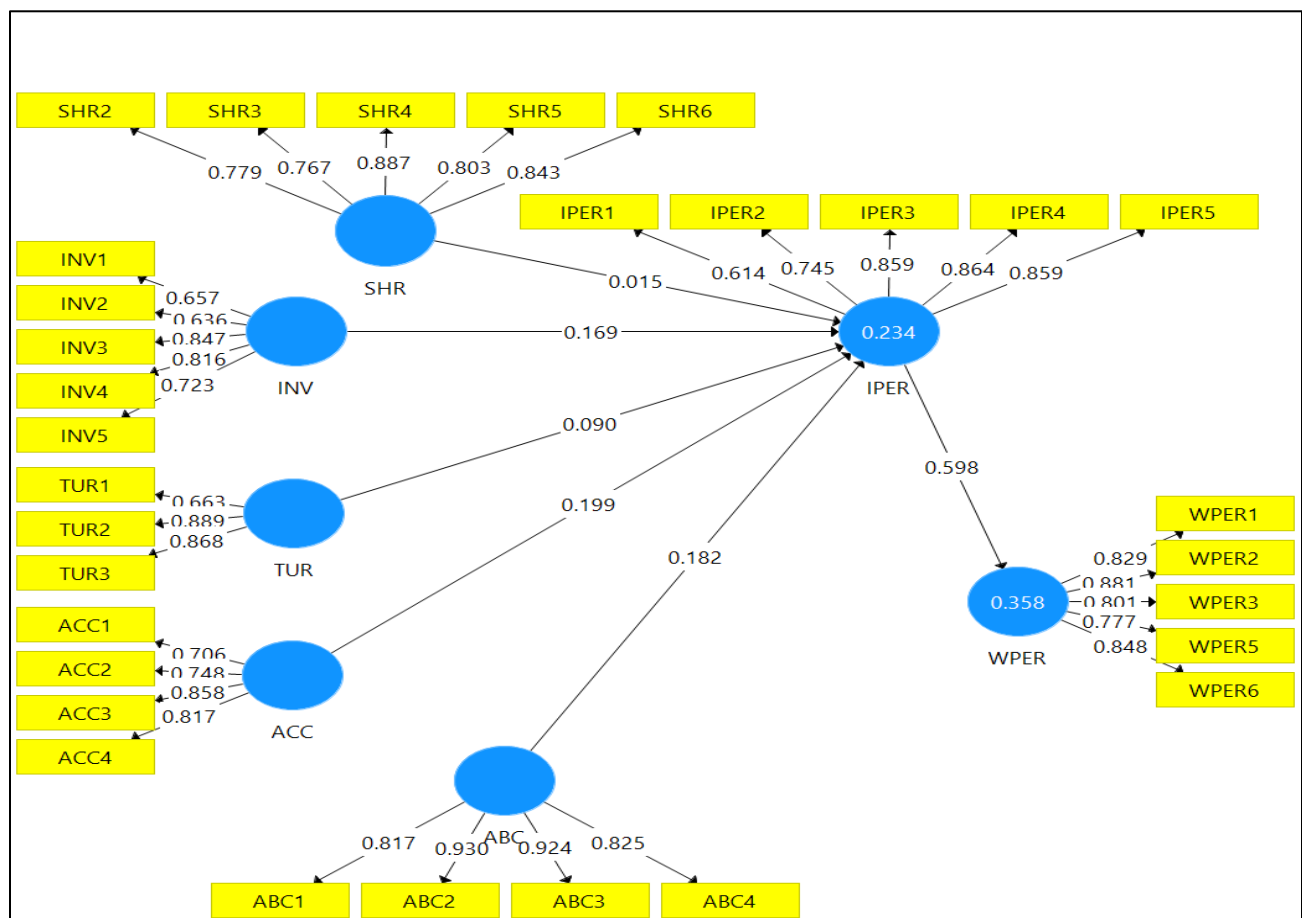
Hypothesis 6: There is a positive relationship between IP and WP in the retail industry in Gauteng and KwaZulu-Natal

The study found that IP exerts a positive and significant influence on WP ($\beta = 0.598$; $t = 12.307$; $p = 0.000$). The results further demonstrate the strategic nature that assessing a firm's IP has in influencing its WP. This observation offers further evidence that an increase in IP results in a significant increase in WP in the retail industry by about 60 percent. This association emphasises the need for retail firms to optimise their IP as a strategic tool to boost their WP. This result echoes Islam, Ali, Fathollahi-Fard and Kabir (2021:1) and Akinlabi (2021:137), who determined a positive and significant relationship between IP and WP. IP ensures that inventory holding and penalties gained from backlogs are reduced to a minimum, increasing WP to achieve better handling in the warehouse (Wang, Dang & Nguyen 2020:3). To improve WP, it is necessary to identify the right Key Performance Indicator (KPI). As such, a significant investment must be

made to optimise the overall performance of inventories of retail outlets in both Gauteng and KwaZulu-Natal. Such a commitment is necessary in ensuring sound warehouse management and enhance supply chain productivity (Kusrini, Novendri & Helia 2018:1). The following section presents the structural model and results from Smart PLS, including the connection of the research constructs.

6.8. STRUCTURAL MODEL

Figure 6.6 highlights the structural model, combined with the results and the path coefficients, on the relationship amongst each research construct.



SHR = Inventory shrinkage prevention (ISP); INV = Inventory investment (II); TUR = Inventory turnover optimisation (ITO); ACC= Inventory turnover (IC); ABC = ABC Analysis; IPER = Inventory performance (IP); WPER = Warehouse performance (WP)

Figure 6.6: Structural Model

Figure 6.6 shows the relationship between the constructs of the current study in the Structural Model. The figure shows that there is no relationship between ISP and IP ($\beta = 0.015$; $t = 0.192$; $p = 0.848$) and ITO and IP ($\beta = 0.090$; $t = 1.414$; $p = 0.158$). On the contrary, II provides results with a positive and significant relation ($\beta = 0.169$; $t = 2.027$; $p = 0.043$) with IP. Figure 6.6 shows the outcome of IC that is positive and significant in association ($\beta = 0.199$; $t = 2.457$; $p = 0.014$) with IP. Additionally, ABC analysis results also demonstrate a positive and significant relationship ($\beta = 0.182$; $t = 2.060$; $p = 0.040$) with IP. Finally, similar to H₂, H₄ and H₅, H₆ - IP shows a strong and significant relationship ($\beta = 0.598$; $t = 12.307$; $p = 0.000$) with WP. The latter results add value to the power and implication of having IP as a mediating variable. The effectiveness of warehousing in the retail industry can be realised through this factor. The results demonstrated that IP is an important antecedent of WP among the sampled retail firms in the Gauteng and KwaZulu-Natal provinces. Thus, a sustainable investment must be pledged to maintain their level of performance and ensure their survival and success. Section 6.9 aims to link the chosen theoretical framework against the study's results.

6.9. THE LINK BETWEEN THE THEORY OF CONSTRAINTS AND THE RESULTS OF THE STUDY

This section links the outcome of the present investigation to the TOC. Chapter three of the study discussed the theory in detail. Okutmus, Kahveci and Kartašova (2015:138) defined TOC as an effective approach designed to manage firms' constraints that prevent them from achieving their goals. Additionally, Costas, Ponte, de la Fuente, Pino and Puche (2014:2) endorsed the significance of this theory as an efficient mechanism to improve the overall system performance and its role in ensuring sound efforts to improve organisation's bottlenecks. The method is well known as a performance enhancer and can increase the organisation's efficiency and its processes. The retail industry is a turbulent environment due to constant changes in processes in its supply chain. The TOC provides a basis for firms to manage and mitigate adverse market-related challenges.

The study shows that three IM practices (II, IC and ABC) are positively linked to IP, which in turn, contributes to WP. By implication, effective IM positively impacts the performance of a warehouse, whereas the reverse is also true. As such, depending on their level of effectiveness or ineffectiveness, the three practices can be viewed as either drivers or constraints to warehouse

performance. WP can decline due to ineffective IM. This implies that IM, if not optimised, can be a bottleneck in the WP, or the weak link constraining the performance of an entire supply chain, in the case of the retail industry. These possibilities are aligned with the TOC.

6.10.CHAPTER SUMMARY

Chapter six delivered insightful practical results that dwelled on the analysed data collected and described in the previous chapter (Five). Emphasis was placed on discussing critical elements, including determining validity and reliability through CFA and structural equation modelling (SEM). The results of this study revealed quite interesting results, which are significant for more research, especially when compared to previously piloted research studies. The chapter also discussed conflicting views in some of the analyses of the results. The composite reliability test and total correlations were used to address the constructs' reliability, including using Cronbach's alpha test (Cronbach α) in the evaluation. Discriminant validity was also established. It has two critical functions, which are convergent and discriminant validity. The inter-factor correlation was applied as a discriminant validity catalyst, followed by the determination of model fit. The fitness of the model is critical for the study. Moreover, the chapter discussed the results of the six hypotheses (H1, H2, H3, H4, H5; H6). Only two of the six hypotheses were rejected, and the analysis accepted the other four. The coefficient scores are as follows: (H1= ($\beta = 0.015$; $t = 0.192$; $p = 0.848$); H2= ($\beta = 0.169$; $t = 2.027$; $p = 0.043$); H3= ($\beta = 0.090$; $t = 1.414$; $p = 0.158$); H4= ($\beta = 0.199$; $t = 2.457$; $p = 0.014$); H5= ($\beta = 0.182$; $t = 2.060$; $p = 0.040$); H6= ($\beta = 0.598$; $t = 12.307$; $p = 0.000$). Four of the hypothesis achieved the required percent level of confidence ($p < 0.01$) apart from H₁ and H₃ which are below the required level. IP is the highest value ($\beta = 0.598$; $t = 12.307$; $p = 0.000$) with the strongest relationship with WP. The levels signify their strong association with the outcome variable. The next chapter offered the concluding remarks and recommendations for further studies derived from the identified limitations encountered during the completion of the study.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1. CHAPTER OVERVIEW

Chapter seven focuses on the conclusions and recommendations, based on the results obtained and discussed in the previous chapter of the study. The chapter provides concluding remarks from the empirical and theoretical objectives. Additionally, recommendations necessary to improve the results and suggestions required for the participating retail firms to sustain their inventory and warehouse performance objectives are offered. Finally, the chapter concludes by presenting the limitations encountered during the completion of the research and the theoretical and practical implications of the investigation.

7.2. REVIEW OF THE DISSERTATION CHAPTERS

The study aims to link IM practices with IP and WP in the retail industry in the Gauteng and KwaZulu-Natal provinces. The identified IMP include ISP, II, ITO, IC and ABC. The study consists of seven chapters addressing specific aspects of the investigation. Chapter one provided the orientation of the study. Chapter two discussed the literature review of the retail industry in South Africa. It also addressed its significance, challenges, role, and contribution to the economy. Chapter three was based on the literature on the constructs (IM practices), the mediating construct (IP), and the outcome variable (WP). Chapter four dealt with a discussion of the study's theory (TOC) and the development of the six research hypotheses. Chapter five outlined the research methodology, techniques employed to collect the data, and the statistical approach used to analyse the collected data. Chapter six discussed the results. Lastly, chapter seven provides the conclusions derived from the results and recommendations as well as theoretical and managerial implications of the study for retail outlets. Figure 7.1 depicts a summarised structure of the study:

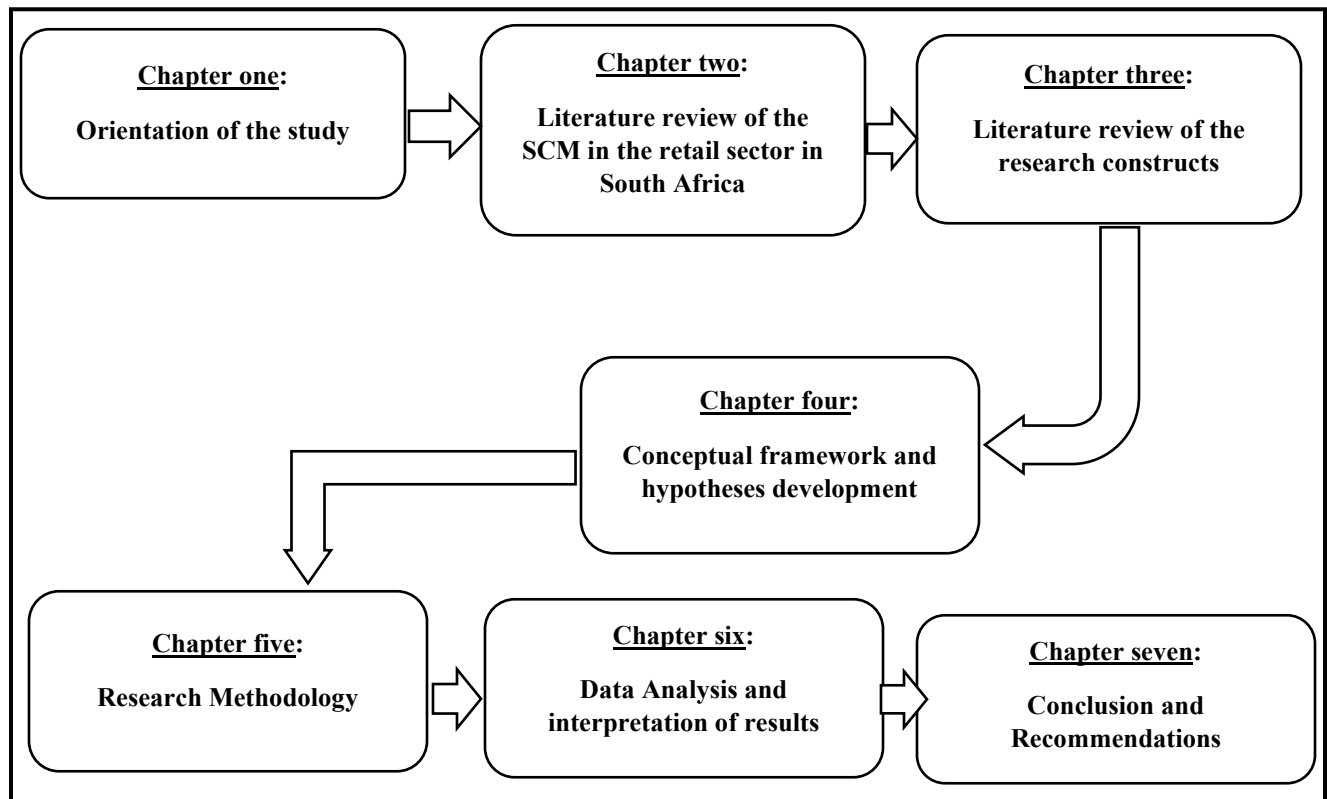


Figure 7.1: Schematic of an overall summary of the study

Source: Author's compilation

The following section discusses the conclusions associated with the formulated theoretical objectives.

7.3. CONCLUSIONS RELATED TO THE THEORETICAL OBJECTIVES

The theoretical objectives presented in this study are as follows:

- 1) to review the literature on the retail industry in South Africa;
- 2) to review the literature on IMP, namely, ISP, IL, ITO, and IC;
- 3) to review the literature on IP;
- 4) to review the literature on WP.

7.3.1. Review of the literature on the retail industry in South Africa

The study's chapter two reviewed the literature on the South African retail industry and its significance and challenges. The body of literature showed that the industry is one of the most

important economic drivers, with its strategic role in the socio-economic growth and development of the country. This conclusion is based on its overall contribution to GDP and employment creation. However, despite the established input and value addition to the country's economic outlook, the industry has faced numerous operational and external challenges that significantly impacted its overall productivity. The major ones include COVID-19, the July unrest and the KwaZulu-Natal flooding.

7.3.2. Review of the literature on inventory management practices, namely inventory shrinkage prevention, investment, turnover optimisation, and control

As mentioned previously, five elements of IMP were selected for the study. These comprise ISP, II, ITO, IC and ABC. Their selection was based on addressing the optimisation of the capacity and capability of the industry's warehouse systems. The following sub-section addresses the conclusions related to the practices.

7.3.2.1. Inventory shrinkage prevention

As established in the reviewed body of literature, retailing outlets need to integrate appropriate systems into the processes, which will allow them to be informed of the inventory inaccuracies resulting in shrinkage in their operating system. Establishing ISP is critical for retail firms to achieve high performance in their supply chain system and significantly boost organisational objectives. The literature further posited that some firms have already achieved increased IP due to the industry's implementation of ISP strategies. The study highlighted four factors that affect the shrinkage in the sector; these include external and internal party theft, a failure because of processes and inter-company transfers. Therefore, the literature emphasises implementing responsive measures to mitigate the increasing ISP by ensuring that core functions are retained, and the firm's objective remains intact. Literature has also suggested that essential concepts such as managing and monitoring inventory significantly minimise shrinkage. Moreover, the literature also highlights the demand from the retail industry for applying robust and effective methods in response to the extreme increase in ISP. Finally, the literature demonstrates that investment in ISP instruments and a review of the operating procedures are necessary for retail firms to remain competitive in the market.

7.3.2.2. Inventory investment

II is regarded as an IM practice that contributes significantly to the current assets and working capital in the supply chain activities. Various strategies such as Just-In-Time (JIT) and forecasting methods are regarded by literature as critical contributing factors to the role of II in the retail industry. Moreover, II is an essential factor which leads to firms' improved sales and production. Hence, the literature emphasises the connection between II and IP. Most importantly, a well-managed and controlled II can enable the company to achieve the required levels of competitiveness, thereby ensuring the optimisation of customer satisfaction through order fulfilment.

7.3.2.3. Inventory turnover optimisation

ITO is regarded as a significant influence on the supply chain's performance. The ultimate objective is to avoid failure to achieve competitiveness in the long run. Besides, it was revealed that inventory turnover uses measuring tools to determine IP. The literature supports the notion that inventory turnover is a critical measure of performance for two reasons; firstly, it measures the movements of products and secondly, it safeguards higher inventory turnover. The study's literature clarifies that inventory turnover's role is to indicate the rate of inventory turning into receivables through sales. Also, inventory turnover defends and protects the firms from losing profits due to needless stock; such stock can sway retail outlets' inventory and sales to a negative position. Moreover, the literature postulates that the higher the inventory turnover, the better the sale and productivity of the organisation. The study literature concludes that ITO plays a crucial role in enhancing performance in the supply chain environment, including IP in the retail industry in South Africa.

7.3.2.4. Inventory control

The literature established that IC has a direct influence on operational performance. Thus, firms must manage their inventory level adequately. Furthermore, IC has a positive impact on IP. The literature further showed that firms' integrated management systems, designed to control and replenish inventory, are prone to easily affect IC, especially in a fast-paced environment such as the retail industry. Due to industry growth and economic and social issues, there has been a significant increase in implementing strategies to address inaccuracies in inventory. The literature

supports that IC is a critical measuring tool for IP and WP. This is possible because of its role in reducing stock imbalances. Therefore, it is conceivable to conclude that IC is a key determinant of IP in South Africa's retail industry.

7.3.2.5. ABC analysis

The ABC analysis emergence is traced back to the Pareto principle in the 1950s, which aims to classify inventory, based on their movement. It is a method critical to categorise inventory in the most effective way possible, based on what is kept by the business. Besides, ABC analysis was found to impact firms' operational performance directly. Adopting the ABC approach as part of firms' warehousing management systems leads to an effective reduction of operational inefficiency and correlates to increased IP. This point is evident through ABC analysis's ability to eliminate expired, obsolete, volume-based inventory and maximise profits and business performance. Thus, the study concludes that IC plays a critical role in enhancing IP in the retail industry in South Africa.

7.3.3. Review the literature on inventory performance

The literature describes IP as a measuring tool for firms' improved financial and IP. Thus, the study stresses that IM systems must be managed adequately to enhance IP. Finally, the literature reveals the importance of mentioning the positive relationship between IP and WP. It can, therefore, be said that enhancing IP is vital to sustaining the overall productivity of firms' warehouse operations.

7.3.4. Review the literature on warehouse performance

The literature provided evidence of the relevance of WP as a critical component of firms' supply chain success. The literature advances that sound warehouse operations management contributes significantly to the competitive success of firms' value chain and supply chain networks. Thus, retail firms must invest significantly to optimise and sustain their warehouse operation activities and processes. Hence, the study concludes that improved warehouse operations facilitate retail firms' supply chain efficiency and effectiveness and further contribute to their competitiveness.

The following sections provide the conclusions drawn from the empirical results obtained.

7.4. CONCLUSIONS RELATED TO THE EMPIRICAL OBJECTIVES

The study proposed the following empirical objectives:

- 1) to determine the level of adoption of IM practices by supply chain professionals in the retail industry in the Gauteng and KwaZulu-Natal provinces, South Africa.
- 2) to determine the level of IP and WP by SCM professionals in the retail industry in the Gauteng and KwaZulu-Natal provinces, South Africa.
- 3) to investigate the relationship between IM practices and IP; and
- 4) to investigate the association between IP and WP.

7.4.1. Assessing the level of adoption of inventory management practices in the retail industry in the Gauteng and KwaZulu-Natal provinces, South Africa

The study has stated IM practices as ISP, II, ITO, IC and ABC. The mediating variable is IP, and the outcome variable is WP. The following section discusses the current study's adoption levels of each variable.

7.4.1.1. Establish the level of adoption inventory shrinkage prevention

The mean result showed that the sampled supply chain professionals affirmed that ISP is prevalent in their firms ($\bar{x}=4.6601$; $SD \pm 0.58777$). The study further indicated that shrinkage aspects, such as, shoplifting, waste in the form of expired or obsolete items, incorrect stock count, stock damage, supplier fraud and inventory loss could likely lead to poor warehouse WP (Qu et al. 2019:346). As such, the study concludes that ISP aspects are present in most sampled retail firms which participated in the survey in both Gauteng and KwaZulu-Natal.

7.4.1.2. Establish the level of inventory control

The perception offered by the descriptive results on the mean of IC is; ($\bar{x}=4.5542$; $SD \pm 0.42159$). The results reveal that the supply chain professionals confirmed adopting accurate inventory processes in their firms. This commitment to optimising their inventory in terms of updating stock and having skilled employees can enhance firms' operational performance (Syntetos et al. 2015:1747). Therefore, the study concludes that IC is effectively adopted in the sampled retail industry in Gauteng and KwaZulu-Natal provinces. This observation is fundamental in ensuring effective and efficient management and control of warehouse operations.

7.4.1.3. Establish the level of inventory turnover optimisation

The supply chain professionals' perception of the presence of ITO was confirmed ($\bar{x}=4.1708$; $SD \pm 0.47182$). This result further indicates that such a level of ITO could be detrimental to the overall performance of retail firms (Li et al. Skaife 2015:529). Thus, it can be concluded that ITO is commonplace in the sampled retail outlets in both provinces.

7.4.1.4. Establish the level of adoption inventory investment

The result obtained from the descriptive analysis on the adoption of II by the participating supply chain professionals indicated that their inventories are accurate enough ($\bar{x}=4.5542$; $SD \pm 0.42159$). Given the presented result, the study concludes that the sampled retail firms implement accurate inventory practices, such as proper procurement/reorder practices, effective management of holding costs and store operations. These practices are essential to optimise warehouse operations (Solis et al. 2020:183).

7.4.1.5. Establish the level of adoption of ABC analysis

On the level of adoption of the ABC analysis, the result showed that the supply chain professionals confirmed the use of the technique ($\bar{x}=4.4741$; $SD \pm 0.79541$) to manage their inventories. The relevance of the ABC method was supported by Douissa and Jabeur (2020:9525), who submitted that it contributes to warehouse performance. Thus, the study concludes that the ABC analysis is employed as an IM technique in the Gauteng and KwaZulu-Natal provinces' sampled retail firms.

7.4.2. Determining the level of inventory performance and warehouse performance in the retail industry in the Gauteng and KwaZulu-Natal provinces, South Africa

7.4.2.1. Determine the level of inventory performance

On the perception of the role of IP, the supply chain professionals confirmed that it is a vital aspect of operational success ($\bar{x}=4.4877$; $SD \pm 0.51511$). This point was endorsed by Wang, Dang and Nguyen (2020:2), who posited that IP is fundamental to operational performance. Therefore, the study can conclude that the sampled retail outlets' IP is optimal enough to ensure seamless, efficient warehouse operations through reduced human errors during stock counting and stock-out levels and enhanced accurate forecasting activities.

7.4.2.2. Determine the level of warehouse performance

On the perception of the supply chain professionals' view of WP, they affirmed that it is central to their competitive aspirations. Therefore, the study concludes that warehouse performance is a fundamental determinant factor of participating retail firms' operational success. This conclusion is based on its impact on cost reduction, timely deliveries, order processing and deliveries, competent workforce, good use of stock cycle counts of the items in storage, improved customer satisfaction and increased firms' profits (Karim et al. 2020:51).

7.4.3. Examining the relationship between inventory management practices and inventory performance in the retail industry in Gauteng and KwaZulu

The study has identified five components of IM practices: ISP, II, ITO, IC and ABC. The following section discusses the conclusions associated with the aforementioned practices.

7.4.3.1. Inventory shrinkage prevention and inventory performance

The study's result rejected the relationship between ISP and IP in the retail industry ($\beta = 0.015$; $t = 0.192$; $p = 0.848$). Su, Rungtusanatham and Linderman (2021:1) contradict this result and opined that ISP could urge retailers to reorganise personnel and invest in reinforcing processes and measures in the security gaps as a way of preventing shrinkage in inventory to improve performance in stock. Furthermore, the retail IP will be superior when there is a negative effect when there is less loss of information (Li, Song, Sun & Zheng 2019:27). This means that the more accurate the information is, the lower the ISP rate and the higher the improved performance. Thus, the study concludes that ISP does not predict IP among the sampled retail outlets in Gauteng and KwaZulu-Natal provinces.

7.4.3.2. Inventory investment and inventory performance

The study's result supported the association between II, and IP ($\beta = 0.169$; $t = 2.027$; $p = 0.043$). The result is similar to Akinlabi (2021:137), who also found a positive and significant relationship between II and operational IP. By implication, having a sound investment drive in a firm's inventory can contribute to its overall operational efficiency (Trapero, Cardos & Kourentzes 2019:4). The study thereby concludes that II is a driver of IP in the participating retail firms in the Gauteng and KwaZulu-Natal provinces.

7.4.3.3. Inventory turnover and inventory performance

The analysis result indicated that the relationship between ITO and IP was rejected ($\beta = 0.090$; $t = 1.414$; $p = 0.158$). This observation contrasts with Kwak (2019:1), who revealed that inventory turnover is a significant indicator of performance and the organisation's financial sustainability. Consequently, ITO impacts the control of factors that are relatively involved in inventory levels, thus impacting IP (Breivik 2019:2). Thus, it can be concluded that inventory turnover does not predict IP among the sampled retail outlets in the Gauteng and KwaZulu-Natal provinces.

7.4.3.4. Inventory control and inventory performance

The study has found that IC exerts a positive and significant influence on IP ($\beta = 0.199$; $t = 2.457$; $p = 0.014$) in the retail industry in Gauteng and KwaZulu-Natal. The finding was supported by Petropoulos, Wang and Disney (2018:251), who state that IC is based on a combination of results, enforcing superiority in favour of IP. The study postulates that the performance of IM systems can be measured using indicators such as inventory visibility, availability and accuracy (Moons, Waeyenbergh & Pintelon 2019:8). As such, the study concludes that IC is a crucial antecedent factor to IP among the participating retail firms in Gauteng and KwaZulu-Natal.

7.4.3.5. ABC analysis and inventory performance

The analysis result established a positive and significant relationship between ABC and IP ($\beta = 0.182$; $t = 2.060$; $p = 0.040$) in the retail industry of Gauteng and Kwa-Zulu-Natal provinces. This finding concurs with Calisir, Cevikcan and Akdag (2018:186), who proposed sorting inventory (ABC analysis) as a treasured concept in the retail industry. The sorting is due to its flexibility to improve IP by eliminating shortages and overstocking. Evidence provided by Abdolazimi, Shishebori, Goodarzian, Ghasemi and Appolloni (2021:2310) endorsed this research's finding and established that ABC is an approach for inventory planning and control. It permits firms to categorise their inventory into meaningful classes to improve IP. Thus, the present study concludes that ABC is a determinant tool for IP among the sampled retail outlets in Gauteng and KwaZulu-Natal provinces.

7.4.4. Examining the relationship between inventory performance and warehouse performance in the retail industry in Gauteng and KwaZulu-Natal

The relationship between IP and WP was supported ($\beta = 0.598$; $t = 12.307$; $p = 0.000$). This means IP exerts a positive and significant influence on WP. This result echoes Moreover, Shin (2021:3), who advanced that improvement in IP correlates to the overall WP. Thus, the study concludes that IP determines effective WP.

The recommendations emanating from the presented conclusions are addressed next.

7.5. RECOMMENDATIONS

This section presents recommendations based on the results obtained.

7.5.1. Recommendations to improve inventory shrinkage prevention in the retail industry in the Gauteng and KwaZulu Natal provinces

The results showed that ISP does not predict IP among the retail firms in Gauteng and KwaZulu-Natal. The study puts forward the following recommendations as a suggestion to improve this association:

- ✓ **Risk Management policies and plan:** It is known that risk management is considered mainstream by the banking sector due to the criticality of protecting cash flow and different robberies, scams, and several opportunistic ideas of siphoning money from the industry. This proves to be a critical but missing factor in the retail industry, mainly due to the technological approach to the element. The study recommends defining and appropriately setting up strategies, processes, and risk management policies that will develop a plan to counter potential risks in the market environment. Figure 7.2 shows a plan to address the risk management process:

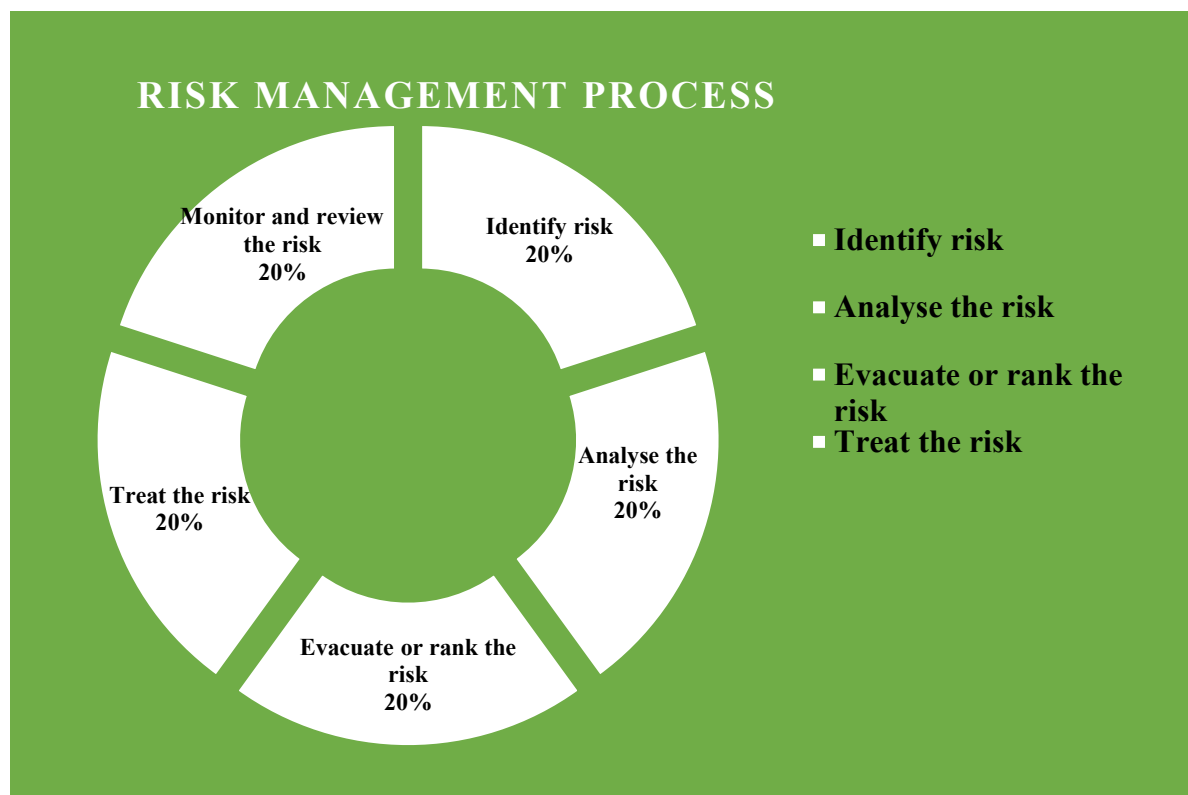


Figure 7.2: Risk Management Process

Source: Pcwldd (2019)

Figure 7.2 demonstrates the process used to manage risk in the retail business properly. The first step is to identify the risks that are constraints in the business. Second, the risk needs to be analysed once it has been detected. Third, analysed risks need to be evaluated and treated as the second last step of the process. Finally, continuous monitoring and review of the risk in the business take place. It is also to be noted that there need to be similar efforts in dealing with all the stages in the process. The following aspects are to ensure more balanced results.

- ✓ **Advanced technology:** CCTV and RFID are critical concepts used in the sector, but they have proven not enough to eliminate IS. The widespread business is recommended to use automated cash management technology. It takes away personnel from coming into contact with cash. Some local retail stores, such as Spar, have implemented the initiative, massively reducing shrinkage and reaping operational excellence from the idea.

- ✓ **Monitoring shrink trends:** This study recommends that the retail industry keep tabs on the latest trends inside and outside the shrinkage factors. The gesture requires investing in specialised personnel who directly deal with implementing practical solutions to get reasonable assistance that retailers can utilise to control shrinkage problems.

7.5.2. Recommendations to improve inventory investment in the retail industry in the Gauteng and KwaZulu-Natal provinces

This study determined that II wields a positive and significant relationship with IP. The significance of implementing the II has the following recommendations for the retail industry:

- ✓ **Appropriate Enterprise Resource Planning (ERP) systems:** Without a doubt, many retail businesses use ERP systems for their daily operations. It can also be put forward that quite a number of the systems are not in line with the nature of the business, as many companies are still suffering from inadequately managing their inventory and performance. This study recommends that organisations need to perform an analysis from either internal or outsourced specialists to recommend the right system for the type and nature of the business. Moreover, a universal ERP system can go a long way to achieving profitability. The notion is derived from many firms using multiple ERP systems to control their inventory, therefore impacting the increase in II. As a result, IP is negatively affected.
- ✓ **Automated IM systems:** Companies still rely on manual transactions to control and manage their inventory. Technological changes are rampant today; thus, organisations must keep up with the technology to enhance the performance in the inventory and achieve the revenue goals to stay competitively afloat. The study recommends using technologies such as drone stock counting and conveyor belts for picking to minimise human errors that are bad for business.

7.5.3. Recommendations to improve inventory turnover optimisation in the retail industry in the Gauteng and KwaZulu-Natal provinces

The study informed a positive but weak relationship between ITO and IP. The study rejected the proposed association between ITO and IP. The following recommendations are put forward to the retail outlets in the selected provinces:

- ✓ **Resell old, excess and obsolete stock:** This study recommends that retail outlets sell the product back to the suppliers for discounted prices. The resell will assist in eliminating the burden of a low turnover ratio.
- ✓ **Improve demand forecasting accuracy:** Inventory planning and analysis is a predicament in the industry. It occurs when ordering products for distribution to the end customer. It becomes apparent and crucial to have accurate forecasting techniques. This study recommends a clear plan that can refine the forecasting constraints. They need to be frequently monitored in order to offer flexibility when ordering classified products (high demand and seasonal).

7.5.4. Recommendation to improve inventory control in the retail industry in the Gauteng and KwaZulu-Natal provinces

The study found a positive and significant relationship between IC and IP. The following recommendations are proposed as a strategic way to optimise this link:

- ✓ **Continuous stock counts programme:** Stock counting is the most effective and efficient way of ensuring that inventory is accurate between the physical and the system, but the process is not as frequent and well-organised. The recommendation is to review the cycle counting procedure and strategies in order to receive maximum protection from inaccuracy in inventory. Regular review in cycle counting might eliminate imbalances and enhance the stock's performance. Continuous counting could result in fewer stock-outs, meaning in-full orders could be increased.
- ✓ **Adequate technology:** The study recommends that organisations select the technology that best suits their needs. Most companies' technology is inefficient and does not work for their needs. A well-thought-through system that might work for the company will benefit the improvement of the performance because it will be able to facilitate an enormous history of data to assist in investigating any discrepancies in inventory.
- ✓ **Organised Warehouse:** A warehouse that is well organised with what is regarded as everything in its place and a place for everything contributes significantly to correct storage, picking and delivery. A disorganised warehouse can cost the industry substantial

amounts of money, and it will also be impossible to retain customers due to unfulfilled or late orders. This study recommends that warehouse supervisors and managers have programmes that will add value to ensuring that the warehouses are organised to see an incline in IP.

7.5.5. Recommendation to improve ABC analysis in the retail industry in the Gauteng and KwaZulu-Natal provinces

The study has established a positive and significant relationship between ABC analysis and IP in the retail industry in Gauteng and KwaZulu-Natal. Nevertheless, it is appropriate to discover the approaches to improve IP when the retail outlets have implemented ABC. The following recommendations are based on the results of the study:

- ✓ **Supplier negotiations:** The retail outlets must ensure that their Service Level Agreement (SLA) with customers is well negotiated. It becomes easy to manage inventory when distribution costs are affected, post-purchase services, reducing down payments and free shipping are addressed. The management process might enable the purchasing department to tighten up the shadow of ABC, and retail businesses will be available to ensure that the industry stays competitive.
- ✓ **Enhanced inventory forecast:** The firm must employ the factor. It is complicated for FMCG to operate without pre-planned inventory. The retail industry has various items which do not have similar demand based on aspects, such as seasonal products. For example, the food restaurant retail industry has three critical phases in volume forecast: Easter holidays, school holidays, and December holidays being the biggest busy seasons. Improving inventory to always have the required stock for the customers is paramount.
- ✓ **Inventory forecasting:** One of the most vital methods of IM processes is IC, and reaching that goal is necessary for a long-standing ABC implementation. This study tasks managers to monitor and collect data regarding the stock items with great customer demand, which requires sales forecasting. This information can be used to establish inventory levels that will benefit the company in obtaining the required objectives.

7.5.6. Recommendation to improve inventory performance in the retail industry in the Gauteng and KwaZulu-Natal provinces

The study found a positive and significant relationship between IP and WP. The following are some of the recommendations that are encouraged by the study:

- ✓ The most significant reason to attain IP is to ensure that the recommended IM practices (ISP, II, ITO, IC and ABC) are developed in the organisation. The main practice is to balance inventory levels between the sold and physical to evade aged and excess stock. It allows the business to keep high-demand inventory on stock at the required levels, meet customer demands, and increase customer satisfaction. These practices are mentioned in the study and include ISP, II, ITO, IC and ABC. It is, therefore, a prerequisite to measure IP if the company is looking at announcing WP.

The next coming section discusses the limitations of the study.

7.6. CONTRIBUTIONS OF THE STUDY

The study offers valuable contributions from a theoretical and practical perspective, with the former viewed to be important to the broader SCM body of literature, while the latter provides strategic insights that supply chain practitioners and business owners could explore.

7.6.1. Theoretical contributions

The results of the study provide new information on the strategic role that IMP play in improving IP. The study establishes that inventory practices, such as II, IC and ABC are crucial drivers of IP. Moreover, IP was a determinant factor of warehouse performance. These associations offer insight into the criticality of IM practices, their role, and value contributions to warehouse management and the broader SCM best practices.

7.6.2. Practical contributions

The results of the study offer practical implications derived from the established relationships. As indicated in section 7.6.1, the results showed that IMP, namely II, IC and the ABC, are antecedent factors of IP. This outcome emphasises the relevance and attention that SCM professionals and business owners should pay to develop strategies to maximise the operational objectives of these

factors. Furthermore, the study demonstrated that IP is a fundamental antecedent of WP. Retail firms should, therefore, invest significantly in optimising their inventory operations and activities to sustain their warehouse value propositions.

7.7. LIMITATIONS AND IMPLICATIONS FOR FURTHER RESEARCH

The study's main purpose was to dwell on the results derived from the anticipated relations amongst the constructs provided. The results that were presented for the study are essential to the direction of future research. Therefore, it is safe to mention that there are gaps developed that leave room for future research in the same line of study. Firstly, the study focused on two major provinces, Gauteng and KwaZulu-Natal, to evaluate the association between IM practices and WP. Future research can be expanded to the other provinces, such as the Western Cape and the Free State, to explore other relations and establish the retail sector's performance.

Furthermore, the COVID-19 restrictions hampered the data collection procedure and represented the most significant challenge encountered in the completion of the study. The study could not reach the anticipated audience due to companies putting measures in place to protect against the spread of the virus in light of the lockdown measures. This decision significantly limited the distribution process as some respondents could not be reached to provide reminders of their commitments to complete the survey. The highlighted challenge has exposed the limitation related to the study's sample size, which was pegged at N=500. Further studies might increase it to N=700 or N=800 to prevent situations of poor turnout from respondents.

Lastly, the study focused only on five IM practices, given that the concept encompasses a wider variety of factors, which can be viewed as a limitation of the scope of the study's conceptual framework. Future research can explore broadening this scope to include more practices which will provide insightful conclusions.

7.8. FINAL REMARKS

This study acknowledged IM practices as critical to the retail industry's IP and WP in Gauteng and KwaZulu-Natal. The study demonstrates that the retail industry needs to invest in II, IC and the ABC as strategic tools to sustain the performance objectives of their inventory and warehouse operations to remain competitive and successful. Continuous research must be done to find

additional factors to combine with the established ones to ensure long-term supply chain productivity. The study provides recommendations that can be useful in the operational well-being of the retail industry of the selected provinces. Recommendations, such as prioritising inventory forecast, adequate technology, and continuous cycle count, to mention a few, have proven to be significant in measuring the performance of both inventory and warehouse.

The current study focused on two provinces, out of nine in South Africa, which has been identified as a limitation, as the study can benefit the entire retail chain in the country. Future studies need to expand their research to cover the remaining provinces in a similar study. The research also noted a lack of adequate response due to COVID protocols. More data could have been collected if the regulations had been eased further at the time of the collection procedure. Lastly, the study's implications show that retail outlets should invest significantly in II, IC and the ABC as input factors to optimise their IP and WP.

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APPENDIX 1: QUESTIONNAIRE

Faculty of Management Sciences

Research conducted by

Mr. MS Jama

Email: Moeketsi.Jama26@gmail.com

Dear Respondent,

You are requested to participate in an academic research study conducted by Mr Moeketsi Jama, a Master student from the Department of Logistics at Vaal University of Technology. The purpose of the study is to gather information on the linking of inventory management practices to inventory and warehouse performance in the retail industry in Gauteng and KwaZulu Natal Provinces. You have been chosen to participate in the study based on your experience of working in the private sector. I, therefore, believe that you will provide relevant information.

Please note the following:

1. This study will provide an anonymous survey. Your name will not appear on the questionnaire, and the answers you give will be treated as strictly confidential. You cannot be identified in person based on the answers you give.
2. Your participation in this study is very important to us. You may, however, choose not to participate, and you may also stop participating at any time without any negative consequences.
3. Please answer the questions in the attached questionnaire as completely and honestly as possible. This should not take more than 20 minutes of your time.
4. The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.
5. Please contact my supervisors, Dr. WV Loury-Okoumba, welbyl@vut.ac.za, Prof C Mafini chengedm@vut.ac.za if you have any questions or comments regarding the study.

SECTION A: DEMOGRAPHIC PROFILE

This section has questions that focus on your background information. Please indicate your answer by crossing (X) in the appropriate block or by filling in your answer.

A1	Your gender	Male	Female
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A2	Highest Qualification	Matric	Certificate	Diploma	Degree	Postgraduate	Other (Specify).....
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A3	Employment Period in organisation	Less than 1 year	1-2 years	3-5 years	6-9 years	10 years and above
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A4	Experience as a supply chain management professional	Less than 1 year	1-2 years	3-5 years	6-9 years	10 years and above
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A5	Your position in the organisation: Please indicate	
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SECTION B: INVENTORY SHRINKAGE PREVENTION

We would like to find out a little more about your views regarding inventory shrinkage prevention in your organisation. Please indicate the extent to which you agree or disagree by ticking the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree).

INVENTORY SHRINKAGE PREVENTION		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
SHR1	Our firm constantly conducts quality checks on stock sold to customers and delivered from suppliers	1	2	3	4	5

SHR2	Our firm's warehouse facility has fire extinguishers and hose reels	1	2	3	4	5
SHR3	Our firm's constantly conducts inventory counts	1	2	3	4	5
SHR4	Our firm's staff members are effectively trained to conduct their inventory duties					
SHR5	Our firm's warehouse facility is equipped with CCTV cameras to ensure adequate inventory monitoring and staff supervision					
SHR6	Our firm's warehouse facility is equipped with adequate theft detection systems at entrances and exit points	1	2	3	4	5

SECTION C: INVENTORY INVESTMENT

We would like to find out a little more about your views regarding inventory investment in your organisation. Please indicate the extent to which you agree or disagree by ticking the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree).

INVENTORY INVESTMENT		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
II1	Obsolete and excessive inventory reduce our company's operational costs.	1	2	3	4	5
II2	Excessive or overstocking reduces taxes paid to the inventory stored.	1	2	3	4	5
II3	Our firm is not holding on to obsolete products in the stores	1	2	3	4	5
II4	Our firm removes obsolete stock to provide space for the more profitable item.	1	2	3	4	5

II5	Our firm's staff are properly trained to manage our inventories effectively.	1	2	3	4	5
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SECTION D: INVENTORY TURNOVER OPTIMISATION

We would like to find out a little more about your views regarding inventory turnover in your organisation. Please indicate the extent to which you agree or disagree by ticking the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree).

INVENTORY TURNOVER OPTIMISATION		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
ITO1	Our firm inventory turnover affects the insurance costs of the company.	1	2	3	4	5
ITO2	Our firm inventory turnover has an effect on the holding costs of the company.	1	2	3	4	5
ITO3	Our firm inventory turnover affects the service levels of the company.	1	2	3	4	5
ITO4	Our firm inventory turnover leads to low costs of operation.	1	2	3	4	5

SECTION E: INVENTORY CONTROL

We would like to find out a little more about your views regarding inventory control in your organisation. Please indicate the extent to which you agree or disagree by ticking the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree).

INVENTORY CONTROL		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
IC1	Our firm ensures that there is the tracking of inventory to enhance coordination of materials accessibility, controlling, utilisation and procuring of materials.	1	2	3	4	5

IC2	Our firm has the correct forecasting methods to reduce stockouts	1	2	3	4	5
IC3	Our firm is able to predict demand beyond a 4 week horizon	1	2	3	4	5
IC4	Our firm forecasting operation is accurate enough to demonstrate improvements and related observations result in inventory markdowns					
IC5	Our firm has advanced forecasting tools that can enable improvements in cost reduction	1	2	3	4	5

SECTION F: ABC ANALYSIS

We would like to find out a little more about your views regarding ABC analysis in your organisation. Please indicate the extent to which you agree or disagree by ticking the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree).

ABC ANALYSIS		Strong ly disagree	Disagree	Neutral	Agree	Strongly Agree
ABC1	Our firm's inventories are well and clearly classified.	1	2	3	4	5
ABC2	Our firm's system of classification is based on a rate of usage.	1	2	3	4	5
ABC3	Our firm's inventory classification is done according to usage.	1	2	3	4	5
ABC4	Our firm's inventory is classified based on its importance rather than value.	1	2	3	4	5

SECTION G: INVENTORY PERFORMANCE

We would like to find out a little more about your views regarding inventory performance in your organisation. Please indicate the extent to which you agree or disagree by ticking the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree).

INVENTORY PERFORMANCE		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
IP1	The effectiveness of our firm's inventory practices helps to speed up our warehouse operations.	1	2	3	4	5
IP2	The effectiveness of our firm's inventory practices helps to reduce human errors when it comes to stock counting.	1	2	3	4	5
IP3	The effectiveness of our firm's inventory practices helps to reduce stockout levels.	1	2	3	4	5
IP4	The effectiveness of our firm's inventory practices helps to enhance proper demand forecast.	1	2	3	4	5
IP5	The effectiveness of our firm's inventory practices helps to enhance the efficiency of our warehouse operations.	1	2	3	4	5

SECTION H: WAREHOUSE PERFORMANCE

We would like to find out a little more about your views regarding warehouse performance in your organisation. Please indicate the extent to which you agree or disagree by ticking the corresponding number between 1 (Strongly disagree) and 5 (Strongly agree).

WAREHOUSE PERFORMANCE		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
WP1	Our firm's warehouse is effective enough to improve cost reduction.	1	2	3	4	5

WP2	Our firm's warehouse is effective enough to enhance timely deliveries.	1	2	3	4	5
WP3	Our firm's warehouse uses automated tools and techniques to enhance order processing and deliveries.	1	2	3	4	5
WP4	The effectiveness of our firm's warehouse is dependent on the competence of our staff.	1	2	3	4	5
WP5	Our firm's warehouse is effective enough to ensure adequate use of stock cycle counts of the items in the storage.					
WP6	Our firm's warehouse is integrated enough to enhance cost reduction, and timely deliveries, improve customer satisfaction and increase the company's profits.	1	2	3	4	5

Thank you for taking the time to complete this questionnaire. Your views are much appreciated.

APPENDIX 2: ETHICAL CLEARANCE CERTIFICATE

RESEARCHER: M Jama

SUPERVISOR: Dr V.W Loury Okoumba

PROJECT TITLE: *LINKING INVENTORY MANAGEMENT PRACTICES TO INVENTORY AND WAREHOUSE PERFORMANCE IN THE RETAIL INDUSTRY IN GAUTENG AND KWAZULU-NATAL PROVINCES.*

Decision: Approved

Ethics Reference Number:
FRECMS-21042021-066

Student number: 219069433

Dear M Jama

Thank you for submitting the above-mentioned Masters project for ethical consideration. The application was detailed and provided useful information. You may commence with your data collection. This clearance is valid for three years from the date of this letter. Please also note the following:

The Ethics Reference number, as stated above, should be used in all correspondence regarding this research project.

As the primary researcher you undertake to:

- *Only follow the procedures for which approval has been given.*
- *Inform the Faculty Research Ethics Committee (FREC) of any significant deviations that may occur in the research project which directly influences what has been approved.*
- *Report any adverse events that might occur, within 14 days of the event, to the FREC. (Refer to the Ethical Guidelines as to what procedure you will need to follow in such an event). ➤ Submit annual progress reports to the FREC.*

Inform the FREC once the research project has reached completion and the findings have entered the public domain.

The FREC would like to take this opportunity to wish you well with your research project.

Kind Regards



Dr FE Mahomed
Faculty Research Ethics Committee Chair
Faculty of Management Sciences

APPENDIX 3: PROOFREADING CERTIFICATE

CONFIRMATION OF PROOFREADING

This serves to confirm that I have proofread this research report and have made the necessary corrections, suggestions, and emendations:

LINKING INVENTORY MANAGEMENT PRACTICES TO INVENTORY AND WAREHOUSE PERFORMANCE IN THE RETAIL INDUSTRY IN GAUTENG AND KWAZULU-NATAL PROVINCES

by

Moeketsi Jama

I have been proofreading articles, Honours, Masters and Doctoral dissertations, research reports and theses for the past 16+ years for, *inter alia*, the following institutions: University of the Witwatersrand; GIBS; University of Cape Town; Milpark; Mancosa; University of KwaZuluNatal; University of Johannesburg; Unisa; Tshwane University of Technology; Stellenbosch; Henley Business School, Regenesys, University of Pretoria, University of Zululand, Vaal University of Technology, the Da Vinci Institute and, more recently, the Stadio Group.

I have also undertaken proofreading for publishers, such as Oxford University Press, Knowledge Resources and Juta & Company, companies, institutions, and non-governmental organisations.

I have a major in English, and excellent knowledge of Afrikaans.



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