DIGITAL TRANSFORMATION WITHIN THE SOUTH AFRICAN RETAIL SECTOR: A CASE FOR SELF-SERVICE TECHNOLOGIES

Takusani Tshivhase

2480946

2480946@students.wits.ac.za

082 570 4827

Supervisor: Dr Tebogo Sethibe

A research report submitted to the Faculty of Commerce, Law, and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business

Johannesburg, 2023

(Version 2022-2023)

DECLARATION

I, Takusani Tshivhase, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in Digital Business at the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Takusani Tshivhase

Signed at Johannesburg

On the 30 June 2023

ABSTRACT

The retail landscape is evolving and transforming at a rapid pace. The same can be said about self-service technology (SST) and its various implementation and roles in retail in South Africa, which was explored in this study. This qualitative study conducted 14 semi-structured interviews with practitioners responsible for digital transformation from different retail organisations. Thematic analysis yielded 17 subthemes and five themes: essentials for adoption, business efficiency and customer experience, strategy and socioeconomic issues, infrastructure stability and reliability and partnership, collaboration and development. Various industries have utilised SSTs for a number of years, with varying results. SSTs enable businesses to increase efficiency and reduce expenses when approved and implemented effectively. However, even though consumer approval and use of SSTS is on the rise, it is important to remember that its implementation requires significant investments, the reallocation of employees' job functions, the risk of robbery, and, ultimately, the possibility of a lack of customer and union acceptance. Technological recommendations include taking cognisance of the required critical capabilities, taking steps to co-create with customers and the importance of conducting pilot projects. Organisational recommendations included reskilling/upskilling existing employees, designing worker-centric systems, aiming for digital culture and maturity, thorough consideration of the deployment sites, incentivising customers to make the change and meaningful engagement with unions. Environmental recommendations included industry-specific considerations, market dynamics and the acknowledgement of the digital divide in RSA.

KEYWORDS:

Organisational view, retail industry, self-service checkout, self-service technology, TOE framework

ACKNOWLEDGEMENTS

Writing this proposal has been the most difficult and significant academic challenge I ever faced in my academic journey. Several people have been instrumental in supporting me throughout the journey.

The following people stand out in supporting my journey:

- My syndicate team, the original A2 – Priscilla Seolebaleng, Sekete Malebana-Metsing, Denzil Philips and Buhle Mdakane, your support, long nights and encouragement, and the relationships we built will forever be in my heart.
- My supervisor, Dr Tebogo Sethibe, supported me through competing priorities over weekends in the early stages of the preparation of this report.
- My fellow classmates and MMDB Leaders for all the demands and messages of support as their class representative.
- Participants, who will always remain anonymous for confidentiality, I am forever grateful for taking the time under very tight timelines.
- To Kume Luvhani for your support and insight in this journey.
- To my unofficial supervisor, Jeri-Lee Mowers, you are a superstar.
- My daughter and CEO, Thikho Tshivhase, for all the interruptions seeking attention in the middle of my work.
- Finally, to my wife, Pamela Tshivhase, for all the weekend “Visas” to attend to the MMDB demands. I am forever grateful for your unwavering support and prayers.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

4IR	Fourth Industrial Revolution
ACSA	Airports Company South Africa
ASC	Automated Self-Service
ATMs	Automated Teller Machines
DT	Digital Transformation
ICT	Information Communication Technology
IS	Information Systems
IT	Information Technology
LSM	Living Standards Measure
RBV	Resource Based View
SARS	South African Revenue Service
SASBO	South African Society of Bank Officials
SSC	Self-Service Checkout
SSK	Self-Service Kiosks
SSTs	Self Service Technologies
TAM	Technology Acceptance Model
TOE	Technology Organisation Environment
UTAUT	Unified Theory of Acceptance and Use of Technology
WEF	World Economic Forum

CHAPTER 1. INTRODUCTION

1.1 PURPOSE OF STUDY

As digital transformation and 4IR continue to add complexity to the operating context for retailers in South Africa, this study investigates retailers' appetite for adopting self-service technologies within the South African retail sector. This qualitative study examines how adopting self-service technologies will affect retailers from the point of view of practitioners responsible for driving digital transformation.

1.2 BACKGROUND OF THE STUDY

With the advancement in information technology, 5G technology has penetrated the retailing ecosystem, thereby promoting the modernisation and adoption of various digital technologies (Asenso et al., 2021). The retail industry has become more intelligent through the adoption of these smart technologies (Baabdullah et al., 2019). These smart technologies have attracted the attention of major global retailers such as Amazon, Alibaba and Walmart with the aim to serve their customers better (Chang & Chen, 2021). Such developments will affect South Africa as the Internet allows customers from anywhere to consume services from these retailers (Ghobakhloo, 2020). Furthermore, Walmart has acquired a stake in Massmart in South Africa and would most likely introduce most of these solutions locally (My Broadband 2018; 2019).

The South African retail sector ranks among the most competitive globally, and many retailers continue to seek new ways to increase market share and gain a competitive advantage (Lincoln et al., 2020). While the retail industry is comparable with prominent global leaders, South Africa is behind in retail self-service technologies (SSTs), particularly at checkout points (Deloitte, 2017; 2022). In this well-contested market, new retailer products, unique customer experiences, and new offerings within centres are vital to maintaining market share (Broll, 2019). This was echoed in a study by Chang and Chen (2021) focused on SSTS developments in China. It highlighted the need to explore similar studies in a developing economy and different demographics, making South Africa suitable for this study.

SSTs are not new, but the fast pace of digital transformation and 4IR is the catalyst for the advancement of most technologies across various sectors. SSTs were introduced in the early 1980s with self-pumping machines at fuel stations and automatic teller machines in financial services (Yang et al., 2021).

Several industries, such as retail, financial services, travel, and tourism, are experiencing a proliferation in the use of SSTs, which aim to improve customer service, improve convenience, efficiency, and ultimately better profitability for the organisations (Thomas-Francois & Somogyi, 2022). Internet and mobile banking are a prevalent part of everyday banking in South Africa, and almost all banks have adopted their use, with digital banks disrupting the financial services sector (Taylor, 2016). This form of self-service has seen wide adoption because of its ease of use, performance, reliability, and enjoyment of use (Moist et al., 2021).

Due to the competitive environment, particularly in developing nations, technology and innovation have played a significant role in the service industry (Alnemer, 2022). While adopting cutting-edge technologies like self-service in stores is considered useful in many ways for merchants, its use becomes negative if customers cannot embrace it (Cebeci et al., 2020).

A self-service technology system is an alternative to the traditional cashier-staffed checkout, comprising interactional technology, multi-channel, multi-device, and physical location-based systems (Jalil & Koay, 2021). According to Aguzman et al. (2020), there are pros to using self-service technology at checkout in a convenience store: shorter wait times by customers, less space utilisation at the checkout counters, and less headcount. The cons related to customer difficulties requiring training to use the technology concern cleanliness and lack of personal interaction.

However, SSTs in retail are viewed with trepidation in South Africa (My Broadband, 2018). This was demonstrated when Pick n Pay ran a pilot in their Observatory store in the Western Cape in 2016 as a trial for self-service checkout (My Broadband, 2019). The response from the public varied among customers and employees. The labour unions vehemently opposed introducing technology as it threatened specific roles

within the sector (ITWeb, 2016). Ultimately, the Pick n Pay SSTS implementation did not advance beyond the pilot stage.

The trade unions particularly remain adamant about their resistance to adopting SSTs within the retail sector due to the fear of job losses, and it seems to be an entrenched position, given the high level of unemployment (My Broadband, 2018). One of South Africa's largest trade unions within the financial services sector, the South African Society of Bank Officials (SASBO), once planned a countrywide strike to protest retrenchments in the local banks caused by the increased adoption of digital banking services. The union blamed the banks for not preparing their members adequately for the looming changes, which resulted in some branches closing (My Broadband, 2019).

According to My Broadband (2019), trade unions may see short-term benefits in holding back technology, leading to job losses, but the long-term impact may be devastating. Most jobs that exist today will likely not exist in the future. Blocking technological advancements will irreparably damage organisations, countries, and the continent. This was demonstrated in a study by Sharma et al. (2021), which was conducted to evaluate the role of frontline staff where self-service checkout is implemented. It highlighted the need for staff to remain relevant by assisting customers who may not necessarily be technologically savvy, which would aid adoption and the initial experience. Furthermore, retailers can use SSTs to acquire valuable insights about customer usage patterns and use them for suitable marketing activities.

The study by Sharma et al. (2021) was performed in supermarkets in the United Kingdom and Australia. The results were similar, which warranted a similar investigation in a developing country and a more comprehensive range of retailers without limiting to supermarkets, which forms the foundation for this study in South Africa.

Given the limited research available in the South African retail sector, the researcher utilised articles related to other sectors (financial, tourism and hospitality, transport) where SSTs were adopted to establish key considerations, opportunities, and potential hindrances. Very few strides are being made in adopting SSTs in the South African retail sector (Lincoln et al., 2020), hence the need for this study.

1.3 CONTEXT OF THE STUDY

The Fourth Industrial Revolution (4IR) and its impacts march on and will significantly impact the job market, where many jobs may change, possibly resulting in job losses for those who do not evolve their skill sets (Mtotywa et al., 2022). As with all previous revolutions, technological advances destroyed many jobs, but many new jobs and businesses were created. In this way, disruptions should be encouraged as a catalyst to grow the economy and create wealth (Kolade & Oweseni, 2022).

Several studies have been conducted on 4IR, focusing mainly on technical skills, hardware, and software (Malomane et al., 2022). There is a considerable gap in the analysis of the potential impact of 4IR on economies and management. Recent studies estimate that 45% to 60% of jobs around the globe are at risk of being automated or computerised (Kolade & Owoseni, 2022). While new roles such as automation engineers, data analysts, programmers, and others are being created, most economies would find the workforce lacking the necessary skills or qualifications (Shaturaev, 2022). Shaturaev (2022) further adds that while 4IR leads to job cuts, it also creates an opportunity to increase global income and raise the standard of living. The success of 4IR is thus highly dependent on management approaches and attitudes towards new digital solutions.

The implementation of SSTs in retail sought to bring benefits for retailers, such as lower labour costs and increased efficiency while providing greater convenience, accessibility, transaction speed and autonomy for the customers. The adoption of SST continues to receive societal apprehension and criticism due to its contribution to dehumanisation and job elimination in the sector (Schweitzer & Simon, 2021).

However, there are positive examples in South Africa. In the past several years, self-service technology, such as automated teller machines (ATMs) and online banking channels from financial institutions, have been available (Mkansi & Nsakanda, 2023). Technology innovation in the banking sector has transformed the financial services sector for customers across the globe (Taylor, 2016). Innovation in ATMs, internet banking, and mobile banking has introduced mechanisms capable of enhancing the banking sector's capabilities to cater to customers' needs more effectively and

efficiently (Alnemer, 2022). The introduction of ATMs led banks to realise cost benefits, which reduced the number of branches while allowing customers to transact after hours at greater convenience. This change is now well accepted, and more and more people are using this option to make their transactions (Hassan & Farmanesh, 2022).

Another example is when eFiling from the South African Revenue Service (SARS) was introduced in 2001 to individual and business taxpayers to aid annual tax submissions (My Broadband, 2019). Airports Company South Africa (ACSA) to has provided check-in terminals, and various airline sites and apps provide online check-in options for airline travellers (My Broadband, 2018). Another area where self-checkout has been introduced is shopping centres for parking (Deloitte, 2017). Now, customers can pay for parking at the designated machines where previously, exit points had had a cashier accepting payment.

SSTs in retail are gradually becoming more popular globally, but adoption in South Africa remains very low (Lincoln et al., 2020). The technology enables customers to complete the purchase process without the help of the retailer's personnel. This does reduce business costs as customers fulfil their purchases such that the cashier can oversee multiple counters, thereby reducing labour costs (Jie & Kamsin, 2021). However, digital transformation drives organisations' attitudes to shift from viewing SSTs for cost reduction to increasing efficiency at the till point and providing improved customer service through faster checkout and fewer store queues (Vakulenko et al., 2019).

The Fourth Industrial Revolution (4IR) has enabled banks to leverage various emerging technologies to reduce operating costs, improve business efficiencies and gain a competitive advantage (Moist et al., 2021). Artificial Intelligence (AI), cloud computing and big data analytics are very dominant in South African financial services organisations (Matsepe & van der Lingen, 2022). While the Matsepe and van der Lingen (2022) study focused on the South African financial services sector, the results can also be applicable to the retail sector. The results of the study highlighted technical skills, personal innovativeness, and trialability promoted technology, and at the organisation level, competitive pressure, regulatory support, customer demands and the decision maker risk orientation influence the adoption of 4IR technologies.

Implementation of SSTs as an in-store service innovation represents major challenges for retailers in terms of organisational change (Knezevic et al., 2020).

Such developments will affect South Africa as the Internet allows customers from anywhere to consume services from these retailers. Furthermore, Walmart acquired a stake in Massmart in South Africa and would most likely introduce most such smart solutions locally (Business Tech, 2020). However, it is imperative to understand the South African labour market dynamics and the potential impact of such solutions.

1.4 RESEARCH PROBLEM

With the increasing technological advancement as well as internet penetration, SSTs rapidly permeated all aspects of life (Fernandes & Pedroso, 2016). With the growing advancement in information technology (IT) and information systems (IS), most businesses have become open to possibilities for substituting or augmenting the concept of individual delivery of services through SSTs, leading to cost benefits and consistent service to the customers (Khalufi & Shah, 2022).

With self-service options becoming more widespread, customer interactions with service workers and technology have changed in retail, hospitality, and other sectors (Schweitzer & Simon, 2021). Many service providers in China are adopting a wide range of SSTs mainly because they believe it improves customer service, increases productivity, and reduces costs (Yang et al., 2021). Customers increasingly value SSTs for their convenience, consistency, and control. SSTs help hotels improve service standards with a wide range of applications to suit the different needs of guests and the hotels (Hakim et al., 2022).

Retail is heavily affected by the increased pace of the life of consumers and increased demand for digital technologies (Galdolage, 2021a). Furthermore, retail is facing growing challenges characterised by rising competition, rapid implementation of new technologies, growth in e-commerce and internationalisation of business activities (Galdolage, 2021b). SSTs are becoming widely spread technology in large retailers like supermarkets and hypermarkets (Knezevic et al., 2020).

The studies refer to significant changes in e-commerce concerning the retail sector in other countries, which require that retailers evaluate business models and introduce innovative capabilities and strategies, keeping new imperatives in mind (Biedenbach et al., 2022). The same challenges are applicable in South Africa; therefore, surviving in this highly competitive digital world environment requires more than just the ability to sell more products. It calls for evaluating existing processes and identifying inefficiencies while creating more operational efficiency and enterprise solutions for delivering transformational customer experiences (Jalil & Koay, 2021).

The adoption of SST resulted in branches closing and jobs lost in the financial sector. Many studies on digital transformation and 4IR highlight the risk of job losses brought by automation and other 4IR technologies (Mkansi & Nsakanda, 2023; Neboh et al., 2022). The implementation of 4IR technologies is challenged by a lack of relevant skills, unavailability of training capacities, expensive technology, and negative perceptions such as industry professionals' fear of job loss (Malomane et al., 2022). Many challenges may arise and positively or negatively impact the success of digital solutions, and understanding these challenges underlies the need for this study in the South African context.

1.5 RESEARCH OBJECTIVES

The primary objective is to explore the adoption of self-service technologies (SST) within the retail sector in South Africa.

The sub-objectives are:

1. Identify key considerations that are essential for retailers to adopt SSTS in the South African retail sector.
2. Examine what retailers consider critical opportunities for SSTS adoption in the South African retail sector.
3. Examine what retailers consider critical hindrances to SSTS adoption in the South African retail sector.
4. Propose what retailers can do to acquire support from key stakeholders for SSTS adoption in the South African retail sector.

1.6 RESEARCH QUESTIONS

The main question: How would adopting self-service technologies affect retailers in South Africa?

The sub-questions:

1. Which key considerations are essential for retailers to adopt SSTs in the South African retail sector?
2. What do retailers consider critical opportunities for SSTs adoption in the South African retail sector?
3. What do retailers consider critical hindrances to SSTs adoption in the South African retail sector?
4. What can retailers do to acquire support from key stakeholders for SSTs adoption in the South African retail sector?

1.7 SIGNIFICANCE OF THE STUDY

Retail is heavily affected by the increased pace of the life of consumers and increased demand for digital technologies (Broll, 2019). Furthermore, retail is facing growing challenges characterised by rising competition, rapid implementation of new technologies, growth in e-commerce and internationalisation of business activities (Bulmer et al., 2018). SSTs are becoming widely spread technology in large retailers like supermarkets and hypermarkets (Knezevic et al., 2020).

SSTs enable customers to independently fulfil their purchases or transactions (Dionardo, 2016). Such technologies have been widespread in banking to increase geographical coverage, reduce labour costs and provide customers with better and consistent service, thereby enhancing satisfaction and loyalty (Hassan & Farmanesh, 2022). The South African government has adopted SSTs within the Department of home affairs, whereby citizens can be authenticated through biometrics to apply for smart IDs and passports. According to Ongena et al. (2020), the adoption of SSTs in the public sector has yielded benefits for the citizens of the Netherlands through improved service.

1.7.1 ACADEMIC SIGNIFICANCE

Several studies refer to significant changes in e-commerce concerning the retail sector in other countries, which require that retailers evaluate business models and introduce innovative capabilities and strategies, keeping new imperatives in mind (Aguzman et al., 2020; Biedenback et al., 2022; Cebeci et al., 2020; Galdolage, 2021b; Hakim et al., 2022; Khalufi & Shah, 2022; Ongena et al., 2020; Sharma et al., 2021; Siah et al, 2018). The same challenges are applicable in South Africa; therefore, surviving in this highly competitive environment of the digital world requires more than just the ability to sell more products (Mapingire et al., 2022; Mubako, 2017; van Dyk & Van Belle, 2020). It calls for evaluating existing processes and identifying inefficiencies while creating more operational efficiency and enterprise solutions for delivering transformational customer experiences (Tungande et al., 2020).

Specifically, this study also answers the call from van Dyk and Van Belle (2019:528) calling for future research on the adoption of digital transformation in the retail sector of South Africa with the aim of identifying new factors that may facilitate or impede adoption.

1.7.2 MANAGERIAL SIGNIFICANCE

With the increasing technological advancement as well as internet penetration, SSTs rapidly permeated all aspects of life. Many service providers in China are adopting a wide range of SSTs mainly because they believe it improves customer service, increases productivity, and reduces costs (Grewal et al., 2020). SSTs were introduced in the early 1980s as self-pumping and automatic teller machines (ATMs). With the advancement in Internet and 4IR technologies, SSTs are now in all aspects of life through the quick and easy provision of high-quality services (Yang et al., 2021)

With the growing advancement in IT and IS, most businesses have become open to possibilities for substituting or augmenting the concept of individual delivery of services through SSTs, leading to cost benefits and consistent service to customers (Khalufi & Shah, 2022).

With self-service options becoming more widespread, customer interactions with service workers and technology have changed in retail, hospitality, and other sectors (Schweitzer & Simon, 2021). SSTs are increasingly valued by customers for their convenience, consistency, and control. SSTs help hotels improve service standards with a wide range of applications to suit the different needs of guests and the hotels (Hakim et al., 2022).

Many challenges may arise and positively or negatively impact the success of digital solutions, and understanding these challenges underlies the need for this study in the South African context. The cost-benefit in most studies is linked to reduced labour costs, which is bound to cause a challenge with labour unions in the South African retail sector (Matebese & Govender, 2022).

Given the limited adoption of SSTs in the retail sector in South Africa, the researcher chose to make references to the adoption of SSTs in other areas like mobile banking, internet banking and airport kiosks. The research is intended to provide insights from the retailers' viewpoints on adopting such solutions in South Africa. The study contributes to South Africa's knowledge of digital transformation and SSTs in the academic context.

1.8 DELIMITATIONS OF THE STUDY

The following delimitations have been identified to enable the researcher to conduct an effective and appropriate study. The self-service technology focuses primarily on the checkout process within the retail sector and is limited to South Africa only. The study focuses on the views from the retailers' perspective. Customers' views on the adoption of SSTS were not included in this study as it would have warranted a mixed method which would not have been feasible given the time constraints.

One of the enablers of SSTS adoption is cashless payment options (Lincoln et al., 2020). Since digital payment is comprehensive, this study did not delve into the details of payment options. The study participants were practitioners responsible for digital transformation from different retail organisations. That included both technology

leadership and human capital managers, who are most likely exposed to engagements with labour unions.

1.9 DEFINITIONS OF TERMS

Two study terms are defined in Table 1.1 below.

Table 1.1: Study definitions

Term	Definition
Digital Transformation (DT)	Integration of the physical and digital worlds is a component of digital transformation (Culot et al., 2020) and “integration and digitisation of the entire value chain of product lifecycle” (Ghobakhloo, 2020, p. 3).
Self-service technology (SST)	Self-service technology is a technological interface that enables service operators to provide essential services without direct interaction with service employees, resulting in non-face-to-face service encounters (Hakim et al., 2022).

1.10 STUDY OUTLINE

The outline of this study follows a six chapter format and the individual chapters are expanded upon in Table 1.2 below.

Table 1.2: Study Outline

ORIENTATION	
Chapter 1	Chapter 1 presents the intent and motivation to research the impact on the feasibility of self-service checkout through technology in the South African retail sector.

LITERATURE REVIEW	
Chapter 2	Chapter 2 discusses the literature around the key topics involved in the study, like self-checkout SST, service quality and operational efficiency, human capital impact, SSTS adoption, and customer satisfaction.
RESEARCH METHODOLOGY	
Chapter 3	Chapter 3 outlines the methodology for the study; it covers the research design, research method, population & sampling, data collection and analysis, limitations, transferability & dependability, and ethical considerations.
FINDINGS	
Chapter 4	Chapter 4 presents the findings obtained from the primary data collection data analysis.
DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS	
Chapter 5	Chapter 5 outlines a comparison between the data analysis presented in Chapter 4 with the literature surveyed in Chapter 2. This chapter includes a discussion of the study findings.
Chapter 6	Chapter 6 outlines the main study findings per secondary research question and then presents recommendations, areas for future research and study limitations before concluding the study.

CHAPTER 2. LITERATURE REVIEW

2.1 INTRODUCTION

The aim of the research is to acquire the opinions of South African retailers on the adoption of SSTs. SSTs are systems that enable customers to independently fulfil their purchases or transaction (Iqbal et al., 2018). Such technologies have been widespread in banking to increase geographical coverage, reduce labour costs and provide customers with better and consistent service, thereby enhancing satisfaction and loyalty (Hassan & Farmanesh, 2022). The successful implementation informs the study of SSTs in retailers abroad, which requires a study in the South African context. Furthermore, SSTs are successfully deployed in other sectors like financial services with Internet and mobile banking as well as in government with revenue services eFiling (Broll, 2019).

The objective of the Literature Review is to examine current literature and provide a foundation of knowledge on the topic. It also enables the identification of the need for additional research within the context of existing research ensuring justification for further study. The background to the study provides the context as well as the examination of the primary motivation for the study. A theoretical lens is selected through a review of various technology adoption models.

Digital Transformation (DT) and self-service technologies (SST) are defined and analysed in the South African retail sector context. The chapter then explores the research questions formulated in Chapter 1 and explores pertinent literature, and outlines existing studies in other countries and industries. An analytical framework is developed and personalised to the dynamics evident in South Africa. The conclusion of Chapter 2 is a summary and synthesis of the findings from the literature.

2.2 DIGITAL TRANSFORMATION IN SERVICE PROVISION

The advancement in Information Communication Technology (ICT) provides organisations with more options for replacing or supplementing service provision with

SSTs (Galdolage, 2021c). Such investments through digital transformation efforts pay off when customers adopt SSTS (Sharma et al., 2021). Many retailers across the globe have adopted SSTs, and studies indicate contrasting viewpoints on the usage of SSTs (Chang & Chen, 2021)

According to Sharma et al. (2021), research on SSTs addresses five significant themes:

a) SSTS characteristics encourage customers to adopt them (ease of use, usefulness, convenience, and reliability).
b) Customer characteristics affect their decisions to use or not use SSTs (education, technology savviness, income, and location).
c) Customer traits impacting preference for personal service (technology anxiety, need for human intervention, and technology readiness).
d) Customer perceptions, attitudes, and behavioural intentions towards SSTs (enjoyment, control, newness, perceived risk, and security concerns).
e) Situational factors influence customers' choice between SSTs and human services at the purchase time (perceived waiting time, task complexity, and companion influence).

Based on the relative success in the United Kingdom and Australia, the study is essential to evaluate in the South African context (Alnemer, 2022). The study establishes a beginning point to examine the drivers or hindrances to SSTS adoption in the South African retail sector. This study focuses primarily on SSTs at the checkout points, obtaining views from retailers only, given the threat of global retailers. Another motivation for the adoption of SSTs emanates from the relative success of SSTs in financial services in South Africa and globally (Moist et al., 2021).

The financial services sector in South Africa faces disruption from new entrants, mainly digital banks (Alnemer, 2022). Technology innovation in the banking sector has transformed the financial services sector for customers across the globe (Baabdullah et al., 2019). Innovation in terms of ATMs, internet banking, and mobile banking has introduced mechanisms capable of enhancing the banking sector's capabilities to cater for customers' needs more effectively and efficiently (Alnemer, 2022; Hassan &

Farmanesh, 2022). While the digital banking SSTs studies were in Saudi Arabia and Europe, it is worth noting the success of digital banking in South Africa.

Digital Transformation is currently one of the top priorities in businesses due to the recent Covid 19 pandemic (Grewal et al., 2020). Most organisations are making investments to respond to the challenges brought by Covid 19, including adopting hybrid work models (Deloitte, 2022).

However, the benefits of SSTs include saving on labour costs, which might be due to job losses with technology taking over the roles (Chigbu & Nekhwevha, 2021). As such, a possible complication may be that South Africa has a highly unionised workforce (Matebese & Govender, 2022). The potential for job losses may lead to strikes and cause major disruptions and destruction of property (Webster, 2022). As previously observed in the banking sector, with branches closing and jobs lost, it is necessary to evaluate retailers' views for and preparedness about SSTs adoption in South Africa (Webster & Ivanov, 2019).

2.2.1 DIGITAL TRANSFORMATION: AN OVERVIEW

There are several definitions for digital transformation, and it can be adapted differently to various sectors or environments (Armstrong & Lee, 2021). Ismail et al. (2017) suggested a detailed definition of digital transformation as a process through which companies converge multiple new digital technologies, enhanced with ubiquitous connectivity, to reach superior performance and sustained competitive advantage. They do this by transforming various business dimensions, including the business model, the customer experience (comprising digitally enabled products and services), and operations (comprising processes and decision-making). This process simultaneously impacts people (including skills, talent, and culture) and networks (including the entire value system).

According to Simsek (2019), digital transformation refers to a journey to adopt and deploy digital technologies and business models to improve performance and value to the business. Organisations predominantly focus on the following three areas as part

of the digital transformation; transform business models, increase customer value and accelerate innovation.

Digital transformation is thus the process of becoming a digital enterprise. Organisations continually use technology to evolve all aspects of their business models and how the organisations interact with the customers – using technology to improve the performance reach of the organisation radically (Meuter et al., 2005). In a digitally transformed business, digital technologies enable improved processes, engaged talent, and new business models (Deloitte, 2022).

A literature review by Osmundsen et al. (2018) explored digital transformation within an organisational context to determine digital transformation's drivers and success factors. The findings reveal that digital transformation can be internally or externally influenced by changing customer behaviour, digital shifts within the industry, and the changing competitive landscape. The success factors include growing information systems capabilities, developing a digital strategy, and ensuring alignment with the business. The digital transformation outcomes can be a new business model and reformed information system organisations.

Verina and Titko (2019) researched the concept of digital transformation to specify the elements and components. An analysis of the textual information and a database with over 30 definitions of the term "digital transformation" and other related terms proposed by academia and other organisations. The outcome yielded three business digital transformation categories: technology, process management, and people.

2.2.2 SELF-SERVICE TECHNOLOGY

Self-service technology (SST) is a technological interface that enables service operators to provide essential services without direct interaction with service employees, resulting in non-face-to-face service encounters (Hakim et al., 2022). So SSTs are technological interfaces that enable customers to use services without direct intervention from the service staff. SSTs were introduced in the early 1980s at filling stations through self-pumping for fuel and automatic teller machines in the banking sector (Yang et al., 2021).

A Self-Service Technology system is innovative as it allows consumers to serve themselves by scanning, placing in bags, and paying without the help of other people (Aguzman et al., 2020). SSTS refers to technologies that promote customer independence and grow exponentially as customers become more comfortable and confident with the technology, and retailers stand to gain a competitive advantage (Vakulenko et al., 2019).

For this study, SSTS refer to technology that customers can use to fulfil their purchases without assistance from the store personnel, particularly at checkout or till points. Examples of technologies may include self-service checkout (SSC), self-service kiosks (SSK), and automated self-service (ASC). SSTS is widely used in Europe, the United States of America (USA), and many other countries but is scarce in South Africa. All these technologies were used in most of the countries' contexts (Khalufi & Shah, 2021).

The introduction of SSTS in the USA had some challenges as it was introduced as a disruptive technology affecting the traditional shopping models. The shift for customers to perform duties previously done through dedicated personnel brought a learning curve that initially faced a level of resistance (Dionardo, 2016). An initial obstacle was persuading customers to be self-sufficient with tasks generally performed on their behalf through cashiers and store assistants. The lessons in the USA during the late 1960s were when petrol stations implemented self-service pumps with the incentive of a discount for the fuel procured (Dionardo, 2016). Most customers became comfortable filling up their vehicles at the petrol stations and processing payment transactions, while a few fuel stations remained with limited assisted service. Payment facilitated through credit cards was a significant enabler, while some SST accepted cash. Self-service solutions were fully integrated payment facilities that made processing transactions easy (Dionardo, 2016).

With self-service options becoming more widespread, customer interactions with service workers and technology have changed in financial service, hospitality, and other sectors. SSTs are increasingly valued by customers for their convenience, consistency, and control. SSTs help hotels improve service standards with a wide range of applications to suit the different needs of guests and the hotels (Hakim et al., 2022).

Most of the studies focused on the adoption of SSTs in other countries. Given the success of SSTs in banking and other sectors, this study aims to introduce the focus to the retail sector in South Africa given the country's dynamics of high unemployment (Kolade & Owoseni, 2022), unionised workforce and, considering the focus on digital transformation post the Covid 19 pandemic (Matebese & Govender, 2022).

2.3 THEORETICAL LENS

This analytical model utilises the Resource Based View (RBV) to study the retailers' adoption of SSTs. Most SSTs are client-focused technologies by design. Customers use SSTs so that they can use the service without the help of service personnel directly (Yang & Park, 2011). The literature on SSTS adoption has mostly been from a customer's viewpoint and used frameworks like the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT) and UTAUT2, which are all suitable for quantitative research.

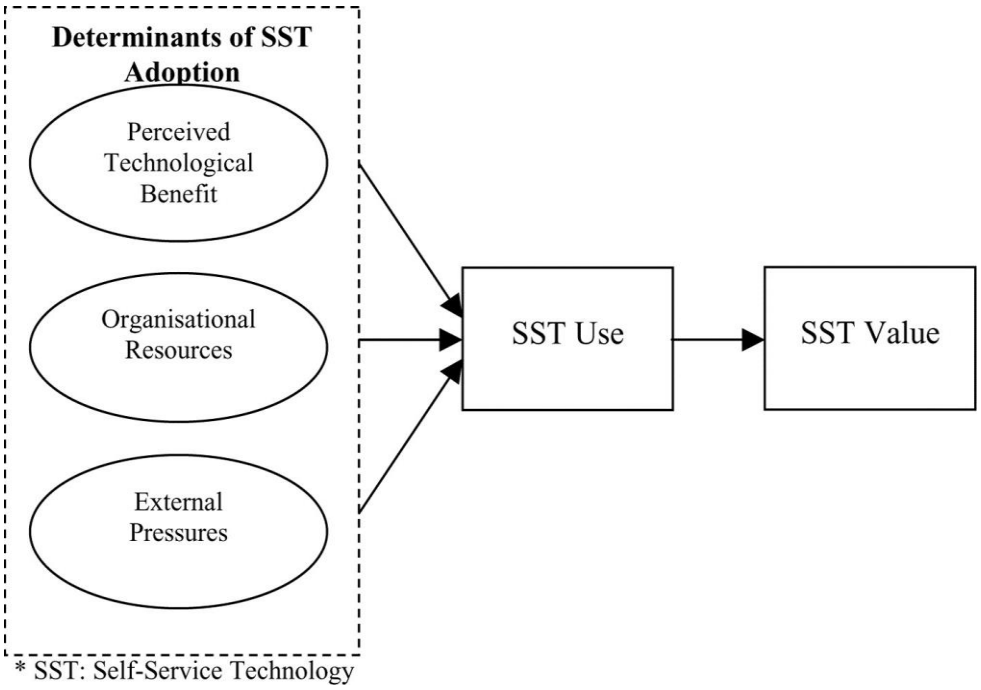

Figure 2.1: Determinants of SSTs adoption

Focused businesses recognise the potential benefits of SSTs. Customers' utilisation will depend on whether businesses adopt it. Customers are the ones who benefit from the organisation's decisions in this way. Given the quick rise in SSTS adoption across

numerous industries globally, it is important to think about a thorough research methodology that describes SSTs adoption, implementation, and post-adoption advantages so that businesses can be properly informed in their SSTS adoption decisions (Meuter et al., 2005).

It is, therefore, essential to develop an analytical model that considers the factors that influence an organisation's adoption of SSTs, SSTs use, and the value of SSTs to the organisation, particularly for a study with different dynamics.

2.3.1 SST USE

The term "SSTs Use" in this study refers to how widely SSTs are being utilised (accepted and put into practice) for value chain activities. The extent to which an organisation utilises SSTs can increase the firm's worth (i.e., service effectiveness and efficiency and firm performance, such as customer service quality, customisation flexibility, and sales growth). Utilising cutting-edge technology, like SST, frequently involves initiation, adoption, and implementation. Use is a different word for implementation. A new technology or technique is put into use when it is adopted, and it is stopped when it is routinised or abandoned.

In other words, implementation refers to all operations that take place until a new technology is either abandoned or integrated into an organisation's routine. The firm's ability to adopt SSTs successfully will affect how well SSTs are used. The next step is to assess the implementation's effects. When successfully implemented, SSTS Use provides benefits to businesses. The term "SSTs Value" is used in this study to refer to how SSTs Use adds value to firms' service effectiveness, efficiency, and performance.

2.3.2 SST VALUE

RBV offers a conceptual framework for connecting SST Use and SST Value. The degree to which SSTs are utilised in the primary processes in the firm's value chain determines the value of SSTs. An organisation increasingly employs SSTs as it

develops distinctive competencies that help the organisation succeed. Businesses use SSTs for a variety of functions, including transactions, customer service, and self-help.

Given that other businesses use the same SSTs for comparable reasons, SSTs in and of themselves may not be the source of sustained competitive advantage (e.g., cost saving). SSTs, however, represent sources of competitive advantage when they are correctly implemented.

For instance, Alibaba and Amazon.com used digital technology to create new business models while disrupting the existing ones (Verhoef et al., 2021). They first recognised the potential of the Internet as a tool for gaining market share. They linked their value proposition with technology at the centre of all their offerings. Their websites are always being improved so that users see their worth through the adoption of new smart technologies.

The study designs three stages of the value hierarchy that SSTs will establish through SST Use using the theoretical application of RBV. There are three layers to it:

- The distinctiveness of the SSTs (i.e., the bottom layer of the value hierarchy).
- Value creation for SSTs (i.e., the middle layer of the value hierarchy).
- How it affects businesses' performance (i.e., the top layer of the value hierarchy).

P4: *Retailers that use SSTs more frequently are more likely to produce better SST Value.*

The study framework for the nomological network of SSTs adoption (i.e., the causes of SSTs adoption, the adoption process, the advantages that follow adoption, and its effect on organisational performance) are illustrated below.

2.3.3 RESOURCE BASED VIEW

According to RBV, a company develops value by fusing diverse and immovable resources that are valuable, uncommon, and challenging to replicate or replace

(Freeman et al., 2021). The company's internal resources are the main indicators of strong financial performance. Each corporation can have various resources that are not entirely transportable and hard to duplicate. The RBV's contribution is the notion that businesses should concentrate on creating the possibility for a long-term competitive advantage (Collins, 2021). RBV focuses on the company's internal structure, complementing the conventional strategy emphasising industry structure and strategic positioning as the drivers of competitive advantage (Freeman et al., 2021).

RBV is predicated on three fundamental presumptions: first, that firms may be thought of as collections of resources; second, that resources are distributed differently within the firm; and third, those resource differences endure across time (Collins, 2021).

2.4 RQ1: WHICH KEY CONSIDERATIONS ARE ESSENTIAL FOR RETAILERS TO ADOPT SST IN THE SOUTH AFRICAN RETAIL SECTOR?

The third-largest industry in South Africa is retail, which several well-known companies dominate. According to NielsenIQ (2022), the total annual sales at South African retailers were R527 billion, which represents an 11% annual increase. The retail sector is the second largest employer after the public sector, with just under 3 million people and is supported by a sound financial services sector supporting various payment methods (Lincoln et al., 2020). The sector has very good coverage extending to townships and rural areas. Most retailers invested in improved eCommerce platforms as necessitated by the recent Covid-19 pandemic (Culot et al., 2020).

The retail sector is comprised of several prominent organisations that combine conventional business practices with efforts to adopt new technologies, improved supply chains, and more successful loyalty programs as a key to differentiation and gaining market share (Lincoln et al., 2020). Technology adoption has the potential to make a significant impact on the retail sector's increasingly challenging business climate (Cebeci et al., 2020).

Many retailers face challenges, including slowing local economies, resultant pressure on the bottom line, new global competitors, and a changing political and regulatory environment (Verhoef et al., 2021). Furthermore, consumers are now in a position of power with the ability to access the global marketplace through their mobile devices, shop and pay for products (Osmundsen et al., 2018). The rise in the use of social media has improved communication from retailers to consumers using big data analytics and affords consumers the power to influence the brand (Aguzman et al., 2020).

Technological developments will affect South Africa as the Internet allows customers from anywhere to consume services from global retailers (Simsek, 2019). Smart technologies have opened the competition for retailers as consumers can now procure goods from anywhere in the globe (McKinsey, 2019). Therefore, competition within the South African retail sector is very fierce, which warrants the study pertinent to the retail sector.

2.5 RQ2: WHAT DO RETAILERS CONSIDER CRITICAL OPPORTUNITIES FOR SSTS ADOPTION IN THE SOUTH AFRICAN RETAIL SECTOR?

Most organisations across all sectors increased the priorities of digital transformation initiatives due to the Covid19 pandemic. While the evidence is rife in banking and some public sector organisations, retail cannot be left behind in digital transformation efforts (Chang & Chen, 2021). Global retailers have made various advances in digital transformation; however, South Africa has seen an increase in eCommerce developments, particularly with the disruption introduced by Takealot's business model (McKinsey, 2019).

Armstrong and Lee (2021) confirm digital transformation as the total of all organisational change efforts in response to technological disruption and results in a marked change in the form and nature of the organisation to improve the organisation. Digital transformation aims to enable the firm to achieve its strategic objectives and

organisational goal in the presence of profound technological change (Westerman et al., 2014). Therefore, the aim is to deliver business outcomes, not technological ones.

One area that lags in South Africa is the adoption of SSTs in the retail sector. With significant success, the banking sector has implemented ATMs, mobile banking applications and Internet banking. Customers can now perform their transactions 24 hours a day with relative ease.

The implementation of SSTs in retail sought to bring benefits for retailers, such as lower labour costs and increased efficiency while providing greater convenience, accessibility, transaction speed and autonomy for the customers (Turner & Szykwiak, 2018). The adoption of SST continues to receive societal criticism due to its contribution to dehumanisation and job elimination in the sector (Schweitzer & Simon, 2021).

With self-service options becoming more widespread, customer interactions with service workers and technology have changed in retail, hospitality, and other sectors (WEF, 2021). SSTs are increasingly valued by customers for their convenience, consistency, and control. SSTs help hotels improve service standards with a wide range of applications to suit the different needs of guests and the hotels (Hakim et al., 2022).

Most of the studies focused on the adoption of SSTs in other countries. Given the success of SSTs in banking and other sectors, this study aims to extend the focus to the retail sector in South Africa, considering the focus on digital transformation post-Covid 19. Given the benefits highlighted in these studies, it would be worthwhile to seek local retailers' thoughts on these benefits.

2.6 RQ3: WHAT DO RETAILERS CONSIDER CRITICAL HINDRANCES TO SST ADOPTION IN THE SOUTH AFRICAN RETAIL SECTOR?

2.6.1 POTENTIAL JOB LOSSES

South Africa continues to struggle with high levels of poverty and unemployment (Ndlovu et al., 2022). The problem is further compounded by poor border controls leading to foreign nationals acquiring jobs locally at the expense of the citizens (Mtotywa et al., 2022). The introduction of SSTs has the potential to induce job losses within the retail sector, which currently employs just under 3 million people.

Evidence from the adoption of SSTs in financial services highlights job losses as a potential reality as banks had to shut down several branches with jobs lost in the process (Matsepe & van der Lingen, 2022). The retail sector in South Africa is a very competitive one; organised labour may mobilise in large numbers and use protest and violence, which hurts the bottom line of retail organisations and the economy at large (Kolade & Owoseni, 2022).

The future of jobs under the Fourth Industrial Revolution is always under scrutiny. It is a sensitive discussion in most South African discussions as the county ranks among the top with the highest unemployment rate (Ndlovu et al., 2022).

Several studies have been conducted on 4IR, focusing mainly on technical skills, hardware, and software (Mtotywa et al., 2022). There is a considerable gap in the analysis of the potential impact of 4IR on economies and management. Recent studies estimate that 45% to 60% of jobs around the globe are at risk of being automated or computerised (WEF, 2021). While new roles such as automation engineers, data analysts, programmers, and others are being created, most economies would find the workforce lacking the necessary skills or qualifications (Shaturaev, 2022).

Shaturaev (2022) further adds that 4IR not only leads to job cuts but also creates an opportunity to increase global income and raise the standard of living. The success of

4IR is highly dependent on the management approaches and attitudes towards new digital solutions.

There is a widespread acceptance that the technologies associated with the Fourth Industrial Revolution (4IR) may lead to the displacement of workers. According to the World Economic Forum (WEF, 2021), more than 85 million jobs may be displaced by the end of 2025. The 4IR will significantly affect economic growth and productivity in many sectors (Ndlovu et al., 2022).

The biggest challenge South Africa face is the high level of unemployment. The advent availability of 4IR technologies leaves organisations with the dilemma of automating at the expense of exacerbating the unemployment challenge. Due to this challenge, organisations continue with manual labour to create and maintain jobs instead of taking advantage of automation or SSTs (Kolade & Owoseni, 2022).

2.6.2 HIGH DATA OR CONNECTIVITY COSTS

A crucial component for enabling digital transformation is access to information and connectivity. Access to data and connectivity is very expensive in South Africa, which creates a significant problem for retailers (Malomane et al., 2022). The stability of networks in South Africa is also a challenge, with most services offline, particularly on weekends and public holidays (Mtotywa et al., 2022).

2.6.3 POOR DIGITAL CULTURE

The notion of digital culture refers to an organisational culture that adopts and proficiently leverages technology to enhance operations and optimise productivity (Mtotywa et al., 2022). The realm of digital culture extends beyond the mere act of digitisation, digital transformation, and the implementation of innovative practices.

The concept of digital culture comprises seven principal attributes, which together form a seven-dimensional construct. These attributes include a digital-first mindset, innovation, data-driven decision-making, open culture, agility and flexibility, and an open culture built on collaboration (Lembani et al., 2020). The realm of digital culture

is indicative of the manner in which employees perceive and experience the seven distinct aspects. The primary objective is to instil a digital-first mentality in all employees and enhance all operational procedures to guarantee exceptional customer experiences (Hongyu, 2021).

In the broader sense, South Africa is still dealing with remnants of the second and third industrial revolutions, with some areas not having electricity (Lembani et al., 2020). The culture of digitisation and computing in society is poor. Some people require assistance to use ATMs due to low levels of technological savviness (Mtotywa et al., 2022). As such, some of the ATMs in South Africa are manned by bank employees to assist users who may lack the capability to interact with the technology.

2.6.4 ORGANISED CRIME AND CORRUPTION

The high crime rate in South Africa is another hindrance that makes improvements and technology adoption difficult (Neboh et al., 2022). The theft of copper cables is a major problem disrupting many services in South Africa (Akpeji et al., 2020). Government efforts to equip some schools are thwarted through vandalism, with computers stolen and facilities vandalised (Mtotywa et al., 2022).

The current state of the electricity supply is also a major hindrance, with retailers having to invest in alternative power supply given the spate of load shedding (Walsh et al., 2020).

2.7 RQ4: WHAT CAN RETAILERS DO TO ACQUIRE SUPPORT FROM KEY STAKEHOLDERS FOR SSTS ADOPTION IN THE SOUTH AFRICAN RETAIL SECTOR?

It is imperative to leverage technology to effectively improve economic development and growth. Awareness and advocacy around various technologies would create an enabling environment that may mitigate the resistance from the various stakeholders. The key stakeholders identified are staff in the respective retail organisations, customers, and labour unions.

2.7.1 STAFF

The organisation should encourage an open discussion with staff about various digital transformation initiatives and their potential impact on the different roles. Staff should be offered training opportunities to prepare for the new roles and accept redeployment to fulfil a new role (Siah et al., 2018). It is also essential to highlight the role of technologies in removing menial and repetitive tasks, which affords human beings more meaningful and value-adding roles (Galdolage, 2021d).

A study by Sharma et al. (2021) was conducted to evaluate the role of frontline staff where self-service technology is implemented at the checkout counter. It highlighted the need for staff to remain relevant by assisting customers who may not necessarily be technologically savvy, which would aid adoption and the initial experience. Retailers should invest in the skills development of existing staff to assist with other tasks, including driving the adoption of new technologies.

2.7.2 CUSTOMERS

In the past, employees have significantly impacted how well customers are served. However, SSTS substitutes a customer-technology experience for the experience of a customer-service employee (Hakim et al., 2022). It is essential to raise awareness and make training available for the customers to utilise SSTs (Leung & Matanda, 2013).

SSTS was proposed as a disruptive technology that would change conventional retail models, which presented some difficulties for its deployment in the USA (Mendat & Mayhorn, 2007; NCR Corporation, 2014). The change in responsibility from specialised staff to customers generated a learning curve that initially encountered opposition (Orel & Kara, 2013). Convincing customers to be independent when cashiers and store workers typically did chores on their behalf presented an initial challenge (Mosteller, 2021). Customers were incentivised to improve the adoption of SSTs through discounts for using the service (Dionardo, 2016); however, additional mechanisms must be needed to deal with the theft and shrinkage common with SSTs (Beck, 2011).

2.7.3 LABOUR UNIONS

If the organised labour in South Africa does not actively engage with the realities of 4IR's disruptive technology, it may lose its support from the workers. While the WEF reported more than 85 million jobs to be displaced by the end of 2025, it is crucial to note the spinoffs from the same 4IR technologies are expected to create 97 million new roles (Ndlovu et al., 2022).

There may be visible resistance to the introduction of 4IR technologies to the degree that they have an impact on employment and worker stability.

The South African retail industry is extremely complicated, and its role players frequently disagree on issues related to 4IR and modernisation, particularly regarding employment issues. The global adoption of 4IR technology alone promises increased productivity (Djelassi et al., 2018). Labour unions are predominantly vocal during negotiations for an increase in remuneration. Given the competitive global landscape influenced by such technologies, it is essential to open the 4IR conversation with labour unions.

Technology unemployment is a form of creative destruction whereby new technologies destroy more jobs than they produce (Parschau & Hauge, 2020). Digital technology advancements will result in a future with a huge rise in machine productivity and an increase in the number of jobs lost to automation (Mukerjee et al., 2019). Organisations should show commitment to secure employment while adopting new technologies through reskilling existing staff to different roles, as done in the financial services sector (Matsepe & van der Lingen, 2022).

Digital transformation is an urgent priority to remain competitive in the international market. For local merchants to stay competitive in an environment where other stores are utilising their e-commerce capabilities, digital transformation must be advanced. It is obvious that retailers must act to protect and increase their market share, given the availability of options like Takealot and Amazon, as other competitors are demonstrating advantages like cost savings and efficiencies for their customers (Malomane et al., 2022).

2.8 SUMMARY OF RESEARCH QUESTIONS

The main question: How would adopting SST affect retailers in South Africa?

Key considerations include the retail sector's strengths and weaknesses, which include the size of the sector and the number of people employed in the sector. The sector contributes significantly to the country’s gross domestic product while employing just under three million people. There is a good spread among communities to have access to these retailers and support smaller retailers in the townships and rural areas.

The threats include new entrants through the advancement of 4IR and other smart technologies enabled by the availability of 5G. The availability of smart technologies is enabling global players to compete for local customers and therefore impact the profitability of local retailers. It is, therefore, essential for local retailers to respond through appropriate digital transformation solutions to ensure they remain competitive. The critical opportunities include cost savings from the deployment of SSTs and other smart technologies. Lessons from the financial services sector and hospitality industries affirm the potential for cost savings. Global retailers also reaped cost savings benefits through the adoption of SSTs.

Hindrances are those factors that can make it impossible to adopt SSTs and other 4IR technologies. One of the major hindrances is the potential to lose jobs, given the high unemployment rate in South Africa coupled with a highly unionised workforce in the sector.

To acquire support from all the stakeholders, it is essential for open engagement between retailers and all the stakeholders. Lessons from financial services further highlight the potential to redeploy staff in new roles such that not all jobs are lost through digital transformation. It is also essential for development opportunities to be made available for staff to acquire new skills relevant to the new roles.

The anticipated contribution of the study entails the contribution to the body of knowledge on digital transformation within the retail sector, focusing on SSTs in South

Africa. The study will further contribute to the debates around SST capabilities for the South African retail sector.

2.9 ANALYTICAL FRAMEWORK

2.9.1 TECHNOLOGY ORGANISATION ENVIRONMENT FRAMEWORK

The Technology Organisation Environment (TOE) framework outlines three context-related factors that affect how a corporation accepts, implements, and uses technological advancements to describe the causes of SSTs adoption (Mamhiyo & Jokonya, 2020). The TOE framework is a general theory of technology dissemination that may be used in the analysis of various inventions.

This framework introduces three contexts of a firm that affect the adoption process, including technology, organisation, and environment (Baker, 2011).

2.9.1.1 TECHNOLOGICAL CONTEXT

The technological context encompasses all the technologies pertinent to the company, including those presently in use there and others that are marketed but not yet used. An organisation's existing technologies influence the adoption process because they place restrictions on the amount and speed of technological change an organisation may make (Mamhiyo & Jokonya, 2020). Existing innovations that are not yet in use at the company have an impact on innovation by defining the boundaries of what is feasible and demonstrating to companies how technology can help them change and adapt (Yang & Park, 2011).

P1$_a$: *A retailer is more likely to reach a higher level of SSTs Use if it experiences larger immediate benefits.*
P1$_b$: *The more indirect benefits a retailer sees, the more probable it is that it will use SSTs to a greater extent.*

2.9.1.2 ORGANISATIONAL CONTEXT

The organisational context describes the features and assets of the company, such as personnel linkages, internal communication channels, firm size, and the number of slack resources (Mamhiyo & Jokonya, 2020). This setting impacts the adoption and implementation decisions in several different ways. First, procedures that connect internal organisational units or cross internal borders encourage creativity (Yang & Park, 2011).

Adoption is correlated with the presence of informal linking agents, such as product champions, boundary spanners, and gatekeepers. Such systems include cross-functional teams and individuals with formal or informal connections to other departments or value chain partners. The organisational structure has been researched more extensively to determine how it relates to the innovation adoption process. Adoption is linked to organic and decentralised organisational systems (Baker, 2012).

P2$_a$: *Retailers that have more financial resources typically use SSTs to a larger extent.*
P2$_b$: *Retailers with more access to technology typically use SSTs to a larger extent.*

2.9.1.3 ENVIRONMENTAL CONTEXT

The industry's organisational structure, the existence or lack of technical service providers, and the regulatory landscape are all examples of the environmental context (Mamhiyo & Jokonya, 2020). Several methods have been used to investigate industry structure. For example, fierce rivalry encourages the use of innovation. Additionally, dominating companies within the value chain might encourage innovation among other value chain participants. Some businesses take advantage of an industry's collapse to innovate by implementing efficiency measures or diversifying into new business sectors. To cut costs, other businesses can forego investing in innovation (Yang & Park, 2011).

P3$_a$: *Retailers under greater external pressure are more likely to use SSTs to a larger extent.*

P3b: *Retailers that deal with more customer readiness are more likely to use SSTs to a larger extent.*

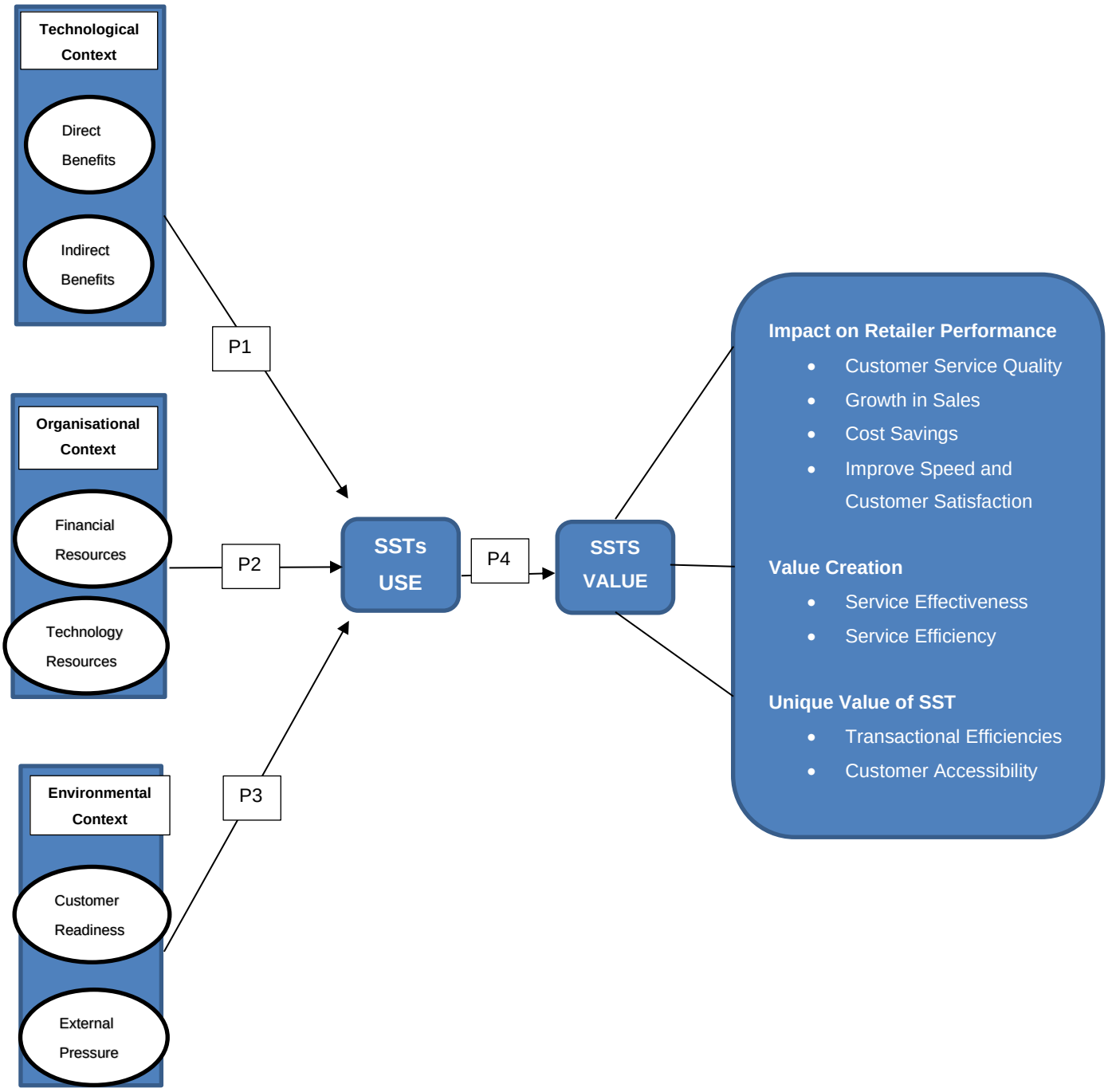

Figure 2.2: Analytical Framework for SSTs adoption for retailers

2.10 CHAPTER SUMMARY

Chapter 2 covered the introduction and background to the study, articulating the need for the study in the South African context. The intended purpose of the study is to

acquire viewpoints from the practitioners of digital transformation on the potential for SSTs adoption, particularly at checkout.

The primary objective of this chapter is to review the current literature to provide a foundation of knowledge on the study. The background highlighted some of the smart technologies introduced by continuous ICT advancement, including SSTs (Galdolage, 2021c; Sharma et al., 2021). The motivation for the study was further informed by the potential for future research, which highlighted the need to conduct a similar study in a different setting in a developing country (Alnemer, 2022; Sharma et al., 2021).

While this study focuses on the adoption of SSTs in the retail sector, some comparison was drawn from the literature on the adoption of SSTs in different sectors like financial services and hospitality (Hassan & Farmanesh, 2022; Yang et al., 2021). The digital transformation and SSTs concepts were introduced to lay the foundation for the drivers of technology adoption (Aguzman et al., 2020; Culot et al., 2020).

An analytical model utilising the RBV to study the retailer's adoption of SSTs was developed since most of the studies focused on customers' adoption and used TAM, UTAUT, and UTAUT2 theories (Hakim et al., 2022; Galdolage, 2021d; Thomas-Francois & Somogyi, 2022), which are more suitable for a quantitative study.

CHAPTER 3. RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter outlines those aspects of the research process used to conduct this study. It provides information about the research approach, the research design and the sampling method of the study. The data collection method and procedure, including the population and sampling methods, are also explained. The chapter also includes the research instrument, ethical considerations, study limitations, reliability and validity and the techniques used to analyse data are also discussed.

This chapter also focuses on the methodologies used to examine the process in place to navigate digital transformation and legacy systems in retail banks. It also highlights the rationale for the selected empirical methods and the approach used to address the research objective.

3.2 RESEARCH APPROACH

The study used a qualitative research approach consisting of semi-structured interviews for data collection. This approach was selected as the study investigates the phenomenon of digital transformation, as it is understood by leadership within the bank. The premise of a qualitative approach is to allow for insights to be gained into the experiences of individuals (Leech & Onwuegbuzie, 2007). Moreover, qualitative data often contain fundamental depth with a strong potential for revealing complexity (Leech & Onwuegbuzie, 2007). In this study, the questions were chosen based on the derived research propositions outlined in Section 2.5 of the literature review.

Qualitative data, according to Leech and Onwuegbuzie (2007), have the following advantages:

1. They provide information that aids research projects in increasing their understanding of phenomena.

2. They are often collected in close proximity to the specific subject that is being researched through direct observation or in a face-to-face interview. This allows researchers to consider and maintain the context from which the insights were derived.
3. They can often contain depth and richness of information, thereby revealing complexity.

3.3 RESEARCH DESIGN

The study design's typology was empirical in character. In contrast to nonempirical research, which relies on existing literature, modelling, and philosophical and conceptual analysis to create new information, empirical investigations allow the creation of new knowledge from the data obtained (Saunders et al., 2019).

By using data to explore the phenomena of technology adoption, the study adhered to an inductive method of theory construction. This method involved reviewing the current theory before creating the research questions.

3.4 DATA COLLECTION METHOD

The primary data was collected using a semi-structured interview targeted at individuals tasked with digital transformation within the retail sector organisations.

A case could be made for the advantage of using semi-structured interviews when undertaking an exploratory study, allowing inferences between the variables (Saunders et al., 2019). Secondly, this instrument allows for probing where the participants are not clear or where an explanation of a subject is required (Saunders et al., 2009). Thirdly, they can lead to the exploration of other areas of a phenomenon which had not previously been considered; and this is notable for the study (Saunders et al., 2019). Fourthly, this allows for assurance to be given to the participants on the way the information was utilised and the confidentiality thereof (Saunders et al., 2009). Lastly, due to the complexity of the subject and the time investment required, interviews were scheduled at convenient times for the participants, thereby reducing possible anxiety due to the conflicting demands.

The interview guide was created based on the literature reviewed. Some questions were adapted from previous literature, while others were self-formulated. To test the validity of the questions, counsel was sought from the academic supervisor, who reviewed the questions to ensure alignment with the research questions. Although an interview guide was used, the questions varied slightly in cases where the participants offered more in one question and a single response. There were also instances where different wording was used to explain a concept in a language more understandable to the participant.

Most retailers' head offices are in Cape Town and Durban; therefore, most of the interviews were via Microsoft Teams to avoid travel costs, but the face-to-face option was an option for individuals based in Gauteng.

3.5 POPULATION AND SAMPLE

3.5.1 POPULATION

A population can be defined as the set or group of all the units to which research findings are applied (Shukla, 2020). This study's target population was retailers' employees working in technology and human resource areas. The researcher utilised existing relationships to access the relevant participants.

3.5.2 SAMPLING

Sampling is the selection of a subset of a population of interest in a research study (Turner, 2020). This study's sample size was fourteen participants comprised of individuals involved in digital transformation with retail organisations.

The method used for this study was a non-probability sampling method, specifically snowballing sampling. To a certain degree, the sampling method used was also convenient as the researcher was previously employed in the retail sector and currently works for an IT solutions integrator, which made it easier to access the participants for this study. Moreover, the time constraints to complete the study was a key consideration. The insights are believed to provide diverse views and opinions on the potential to adopt SSTs in the South African retail sector.

3.6 RESEARCH INSTRUMENT

The research instrument used for this study was a semi-structured interview administered using interview questions in Appendix C. The interviews were semi-structured in that a list of questions was prepared and allowed for additional information or further clarity on the answers provided. The structure of the questions was explained to them before the interview to manage the expectations of the participants. This also aided in guiding the participants' responses, as they could contextualise their responses based on the section of the question.

3.7 PROCEDURE FOR DATA COLLECTION

All the participants in this study were interviewed using Microsoft Teams because they were mainly located outside of Gauteng. The context of the study was explained to the participants at the beginning of each interview based on their experience and involvement in the digital transformation at their organisations, which served as the basis for selection. Before the interview began, the participants were afforded an opportunity to seek clarification on anything pertaining to the interviews themselves or ask questions.

The participants were also asked to sign consent forms (see Appendix B) acknowledging their willingness to participate and being recorded for the purpose of this study.

The following steps were used to collect the data:

1. The sample was determined based on job function, length of service, and seniority in different retail organisations.
2. Identified people were contacted, informed of the purpose of the study, and requested to participate.
3. The participants were reached through email and asked to take part. The participant information sheet was included in the emails to the participants. See Appendix A.

4. In cases where participants' approval to participate was gained, a follow-up email was sent to them and, in some cases, their assistant, requesting time in their schedules.
5. Interviews were scheduled for at least 60 minutes but could be shorter based on the responsiveness of the participant.
6. Each interview started with a brief explanation of the research's purpose and context, giving participants time to ask any questions before the interview. The participants were also asked if they consented to the recorded interview.
7. All the interviews were conducted through Microsoft Teams, and recordings were done with the consent of the participants.
8. The data was transcribed after all the interviews had been conducted.
9. The open-ended questions gave the participants free rein to express their ideas. Further probing was done when needed to gain a more in-depth understanding or clarity on the responses.

3.8 DATA ANALYSIS AND INTERPRETATION

Qualitative data analysis is one of the essential steps in qualitative research because it assists researchers in making sense of their qualitative data (Leech & Onwuegbuzie, 2007). The interview sessions were recorded, transcripts saved on a secure OneDrive, and data will be deleted after a period of five years as agreed with the ethics committee after the completion of the study.

The process of data analysis involved six steps:

- Becoming familiar with the data,
- Generate initial codes,
- Search for themes,
- Review themes,
- Define themes and
- Write up the findings.

The data analysis approach comprises a series of consecutive stages, commencing with the scrutiny of particular quotes and progressively broadening to encompass broader concepts, all the while incorporating multiple levels of analysis (Aspers &

Corte, 2019). The fundamental processes involved a thorough analysis of recorded interviews, that were transcribed and the recognition of recurring sub-themes which are then categorised into clusters named themes (Lester et al., 2020). The aim was to construct an in-depth snapshot of the practical experiences of individuals charged with implementing digital technologies in the South African retail space.

A comprehensive examination of every transcript was conducted to capture the participant-provided narratives concerning their individual experiences. The procedure entailed reducing the text of every transcript to succinct and meaningful codes, which were then classified and structured into sub-themes (Azungah, 2018). Coding is a methodical procedure employed to convert unstructured qualitative data into a logical and dependable storyline (Pandey & Pandey, 2021). The procedure involves the analysis of a considerable quantity of empirical evidence (in form of transcripts), which is then classified using a single term or phrase that concisely describes its essence.

The implementation of coding in qualitative research is critical for the following reasons: it reduces the amount of empirical material required, facilitates easy access to data for analysis, and improves the quality of the analysis and subsequent conclusions (Azungah, 2018). The categorisation of data may be performed manually by investigators or automatically by computer programmes employing specific search algorithms. Atlas T.I was utilised to record the observations and detect emerging patterns (Woods et al., 2016).

Emerging theme identification is an essential element of the analysis procedure, as it denotes a departure from the codes established in the previous phase. Thematic analysis must be free from any researcher bias, as it should be grounded in the personal narratives of the participants regarding their experiences (Lester et al., 2020). Clustering themes entails the recognition, analysis, and incorporation of multiple themes into a cohesive description that encapsulates the unique experiences of each participant (Azungah, 2018). Themes were classified according to their shared characteristics. The final compilation was produced, and consisted of numerous overarching themes accompanied by their respective subthemes (as reported in Chapter 4). The interpretive process was enriched through the incorporation of extracts

from the interview transcripts of the participants into the compilation of the study findings (Aspers & Corte, 2019).

3.9 LIMITATIONS OF THE STUDY

This study had the following limitations, which are outlined as follows:

- Given the time and logistical considerations, the study had a limited sample size.
- The qualitative nature of the study meant there was an inherent limitation of time allocated to this study.
- While efforts were made to reach senior executives at various retailers, other managers in the multiple retailers were used to mitigate the risk of hard-to-access participants.
- While contact meetings were an option, virtual meetings through Teams or Zoom were used where face-to-face interviews were not possible.
- Questions for the participants were not leading but open-ended to allow each participant to frame a suitable response.
- Researcher bias is a common limitation in empirical research; however, the researcher strived to remain neutral to avoid influencing or leading the participant in the answers.
- The non-random sampling method might not have allowed for an ideal representation of the wider population.

3.10 TRANSFERABILITY, DEPENDABILITY, CONFIRMABILITY AND CREDIBILITY

3.10.1 TRANSFERABILITY

According to Bitsch (2005), the term “transferability” describes how well the findings of a qualitative study may be applied to other contexts and settings with various participants.

All study participants' data were collected similarly and uniformly through interviews using the same research instrument (questions). Transferability in the study was improved by this procedure (Tobin & Begley, 2004).

3.10.2 DEPENDABILITY

Dependability is the validity measure of truth or falsity of data captured through the research instrument. It is the stability of the findings over time (Bitsch, 2005).

The stability of the findings over time, including consistency, is referred to as dependability. The data were analysed through the thematic-analysis procedure to provide initial codes, initial themes, and final themes to confirm the study's reliability; other researchers attempting to replicate the study can use this process (Bhattacherjee, 2012).

3.10.3 CREDIBILITY

Credibility refers to the confidence in the research informed by good ethical practice to ensure the study's truthful, credible validity. The trustworthiness and plausibility of the findings and the interpretive analysis should be plausible and persuasive (Macnee & MaCabe, 2008).

When a qualitative study presents a true interpretation of the experiences and perspectives of the participants and when they are able to accept the descriptions' content as an accurate portrayal of their answers to the research questions, it is credible (Baxter & Eyles, 1997).

3.11 ETHICAL CONSIDERATIONS

The entire process of this research, particularly data collection, was conducted at the highest level of ethical consideration. An ethics clearance certificate granted by the Wits Business School ethics committee is attached to this report (Appendix D). The other steps taken are outlined below (Miles & Huberman, 1994):

- The participants' informed consent was obtained.

- Participation was voluntary, and no rewards were offered to the participants.
- The confidentiality and personal details of the participants were protected.
- Data collected was stored securely on Onedrive and will be deleted five years after the completion of the study.
- Participants were treated with respect, and every effort was made that their dignity was maintained.
- Participants' responses were altered, and recordings are stored safely on OneDrive.
- The participants had the right to withdraw from the study without any mandatory justification.
- Participants were subjected to questions about the study.
- Participants were exposed to risk or harm, and virtual meetings were used in case of risk of exposure to Covid-19.

3.12 CHAPTER SUMMARY

The methodology for this study is summarised in Table 3.1.

Table 3.1: Study methodological considerations

Methodological Consideration	This Study
Research design and method	Empirical qualitative technique
Population and sampling	Convenient, purposive and snowball
Data Collection	Interview guide
Data Analysis	Thematic-analysis process
Transferability and dependability	Standardising interview questions

CHAPTER 4. RESEARCH FINDINGS

4.1 INTRODUCTION

The research aims to determine how adopting SSTs would affect retailers in South Africa. The study was conducted using qualitative methods, where 14 participants were interviewed. The collected empirical data was analysed using thematic analysis with the assistance of Atlas.ti 22. The approach was from lower levels of abstraction from meaning units to codes, categories, subthemes, and overarching themes (Erlingsson & Brysiewicz, 2017). The chapter starts with an overview of the sample, followed by themes of the study and then the four research questions. The chapter closes with a summary and conclusion.

4.2 OVERVIEW OF THE SAMPLE

The 14 semi-structured interviews were conducted with diverse participants based on the non-probability method using purposive sampling (Turner, 2020).

Table 4.1: Profile of Participants

PAT	Role	Gender	Experience in Tech Adoption	Job Level
RTP1	Chief Information Officer (CIO)	Male	The individual has over 22 years in various roles in technology and currently leading various digital transformation initiative at a retailer in South Africa.	Executive
RTP2	Chief Data Officer (CDO)	Female	The participant with over 18 years fulfilled various roles in financial services and currently a chief data officer at a leading retailer.	Executive
RTP3	Head of Technology	Male	The participant has 15 years' experience at three leading South African retailers. He is currently responsible for three data centres across South Africa to support the retailers' network.	Senior Management

PAT	Role	Gender	Experience in Tech Adoption	Job Level
RTP4	Head of eCommerce	Female	The participant with over 22 years' experience across many sectors including financial services, public sector and petroleum and currently leading the eCommerce for a well-known South African retailer.	Senior Management
RTP5	Chief Information Security Officer (CISO)	Male	The participant with over 14 years' experience from IT audit and been in retail for 6 years responsible for all cybersecurity and data protection responsibilities at a retailer.	Executive
RTP6	Solutions Architect	Male	The individual has over 8 years' experience in technology with development background. Only worked at this retailer since joining as a graduate.	Middle Management
RTP7	IT Programme Manager	Female	The individual is currently working in financial service but spent over 8 years leading various digital transformation programmes at a retailer.	Senior Management
RTP8	Infrastructure Architect	Male	The individual has over 12 years' experience and began his career through an outsource partner and transitioned into the organisation over 6 years ago.	Middle Management
RTP9	Customer Services Manager	Male	Them participant has been in the retail sector for over 14 years and involved in numerous digital transformation initiatives throughout his career.	Senior Management
RTP10	IT Operations Manager	Female	The participant with over 16 years' experience and spent 8 years at to retail organisations and has since moved on to financial services.	Senior Management
RTP11	Head of IT	Male	The participant had been in technology for over 16 years leading various digital transformation projects within the retail sector.	Senior Management

PAT	Role	Gender	Experience in Tech Adoption	Job Level
RTP12	Supply Chain Director	Male	The participant has 16 years' experience and was involved in digital transformation in the distribution centre for his retail organisation.	Senior Management
RTP13	Digital Commerce Project Manager	Male	The participant has 8 years' experience at the same organisation and was involved in many digital transformation projects.	Senior Management
RTP14	Senior Developer	Male	The participant has 10 years' experience in the retail sector and worked abroad at another organisation	Senior Management

4.2.1 SUITABILITY OF THE SAMPLE

The interviews were aimed at retailers; however, some participants had moved on in their careers but still provided valuable insights from their backgrounds while in retail. All the roles listed in Table 4.1 are suitably qualified to provide insights given their experience in the technology environment within different retail outlets, including apparel, furniture, sportswear, groceries, and wholesalers.

All the participants mentioned that digital transformation investments are in-progress within their organisations, with the primary aim being to improve customer experience. Customer experience dictates the longevity of the customer, which is therefore of paramount importance given the competition in the sector; hence all the participants affirmed the need for investment in digital transformation.

4.3 THEMES OF THE STUDY

Initially, the meaning units were then condensed, meaning units after which 79 codes were developed. The list of the codes is provided in Appendix E. These codes were consolidated into 17 subthemes and then five themes which are essentials for

adoption, business efficiency and customer experience, strategy and socioeconomic issues, Infrastructure stability and reliability and partnership, collaboration and development, with the overarching theme being the adoption of SSTs in the retail sector (Table 4.2).

Table 4.2: Research questions, subthemes, and themes of the study

Research Questions	Subthemes	Themes
RQ1: Which key considerations are **essential** for retailers to adopt SSTS in the South African retail sector?	Readiness to adopt	Essentials for adoption
	Understand consumer behaviour and convenience	
	Resistance to Change	
	Investment requirement	
	Technology limitation and uncertainty	
RQ2: What do retailers consider critical **opportunities** for SSTS adoption in the South African retail sector?	Technology Adoption and Innovation	Business Efficiency and Customer Experience
	Learning and Skills Development	
	Customer Experience and Satisfaction	
RQ3: What do retailers consider as critical **hindrances** to SSTS adoption in the South African retail sector	Lack of strategic analysis	Strategy and Socioeconomic issues
	Employment issues and job losses	
	Technology adoption issues and digital culture	
	Security concerns	Infrastructure stability and reliability
	Connectivity issues and inadequacy of infrastructure	

Research Questions	Subthemes	Themes
RQ4: What can retailers do to acquire **support from** key stakeholders for SSTS adoption in the South	Strengthen employee/ Employer Relations	Partnership, Collaboration and Development
	Strengthen industrial relations (unions)	
	Worker development and upskilling	
	Job relocation (security of jobs)	

4.4 KEY CONSIDERATIONS ESSENTIAL FOR RETAILERS TO ADOPT SELF-SERVICE TECHNOLOGIES

The first research question investigated the key considerations that are essential for retailers to adopt SSTs, and the question can be recapped as follows:

> RQ1: Which key considerations are essential for retailers to adopt SSTS in the South African retail sector?

Five essential considerations were enlisted for the customers' adoption of SSTs in retailers. These were readiness to adopt the technology, consumer behaviour and convenience, resistance to change, investment requirements and technology limitations and uncertainties.

The readiness to adopt the technology is important to understanding the infrastructure issues, power utility stability, and cost implications. This will help to determine the state of readiness to adopt the technology.

> "There are two areas in that space, one being the, uh, the bandwidth, and one is the cost and the lack of infrastructure in some areas, these benefits that I spoke about, previously, they're largely in urban areas. Powers and also, which consequently also affect the network issue, you need to have your network up

and running at all times. So, network, so this, there are powers which are always there, and that is the biggest problem we're having" RPT12.

"The current biggest issue now is, you know, having stable power utilities is, it's an issue now.RPT11.

Understanding consumer behaviour is critical for successfully implementing SSTs in the retail industry. This is because an optimum technology responds to the customer's needs which can be understood through their behaviour and also how the technology can convenience the customer. This includes understanding the target market and their generation mix, with a high propensity of adoption from the younger generation as they are generally technologically savvy.

"There was a point in time where people were used to going to the bank, cashing their check, gaining your cash from a bank, and there was a transition period of customers, switching to self-service as, as simple as putting your ATM card in and withdrawing money." RPT10.

"In terms of automating the processes within the shop itself, that was influenced by the target market that we mainly attract, that most of our customers are young people, technology savvy." RPT12.

"International retailers coming on board, they'll come in looking at a more tech-savvy customer who will gladly accept the functionality of actually servicing themselves." RPT13.

"We understand that our consumers are shifting the way that they buy. So, the old, the old method of just having a store shop face and people were going to walk into it, that is gone." RPT14.

Businesses may increase the acceptance and utilisation of self-service technology by aligning it with customer demands and preferences.

"The reason is that the last thing you do after you have done your shopping is you try on your outfit, and then after you come out of trying them on, you go and

> pay. So instead of you going to the till, bring the till to you. So, the till is not at the back; it's just that the changing rooms are at the back. It's always near the changing fitting room." RPT4.

Another essential consideration is the resistance to change by internal stakeholders and customers. The implementation of SSTs in the retail industry may encounter obstacles due to resistance to change and economic challenges. People's reluctance to embrace new technology and processes may contribute to resistance to change, which may impede the general adoption of self-service solutions. There is a need for a culture change, amongst others.

> "African economy does not fully embrace that. We need to educate and communicate this to people" RPT6.

> From an organisational change, we look at change in a very negative light. And regardless of whether the change is there to enhance or better our lives, it's always received with a bit of angst RPT13.

> Like, it's very hard to change, I would say, like the culture of what people are used to." RPT5.

Technology is also generally expensive, and there is a need for a clear understanding of the investment required.

> "You need to invest in the particular hardware. You need to, uh, on the infrastructure, investment on the infrastructure, investment on the technology, investment on training staff. So that is one thing. It needs some investment".RPT12.

> "If you look at the, from a capital perspective, that will be spent in this technological advancement to then have you opening up a new loophole for someone to then be able to exploit your particular shop, you'll then be operating at a loss". RPT13.

Another essential consideration is creating surety, trust in technology, and understanding technological limitations to eliminate potential doubt and uncertainty. Technological limits and problems with adopting new technologies may impact individuals' and businesses' trust and confidence in employing SSTs.

> "They don't trust this thing of cell phone banking or mobile banking. They really want to be physically there" RPT7.

> "You would see a lot of lines going to the tiller, the questions like, why, so people are not just using the thing because maybe they're don't, not trusting the technology" RPT5.

> "The self-service model relies a bit on trust as well as the maturity of control, security controls that you have in the environment" RPT9.

Consumers sometimes may have reservations about these systems' effectiveness, reliability, or user-friendliness. Having an understanding of the capabilities and communicating with the customers is essential for adoption.

> It's still a trial for those retailers, the ones that I'm aware of. And it's not a solution that's fully been rolled out across the countries" RPT1.

> "Knowing that we are not going to deliver this right now simply because of where we are as a country. But these things are on a roadmap somewhere. It just needs to understand where's the right market and do we go after it." RPT14.

Limitations of technology, including connectivity issues and power supply challenges, pose significant obstacles to self-service adoption in the South African retail sector.

> "At this point, you can bring any powerful robots to do anything, whether to clean the floors in our stores or to replace all the cases and everything. But it'll not take away the human interaction." RPT1.

> “We still need to do more studies on this and make an informed decision. But from where I stand at the moment, that’s, that’s, uh, that’s how I, I’m looking at it. I’m seeing it.” RPT7.

4.5 CRITICAL OPPORTUNITIES FOR SELF-SERVICE TECHNOLOGIES ADOPTION

The second research question investigated the Critical opportunities for SSTs adoption and can be recapped as follows:

> RQ2: What do retailers consider critical opportunities for SSTS adoption in the South African retail sector?

The critical opportunities for SSTs adoption are mainly business efficiency and improved customer experience. The improved customer experience is achieved through technological advancement and digital transformation, ensuring good customer experience and customer satisfaction. The advancements in technology present an opportunity for retailers to leverage self-service solutions and stay competitive.

> “I believe the company can, can, can maybe meet them at some point. But, in terms of technology, it is not going to stop.” RPT3.

> “South Africa being so behind in technology and in technology advancement, you still are in a position where if an area has a mall, have to open a store, a physical store, whereas that’s a cost” RPT6.

> “I think South Africa is quite advanced, and it can easily match what we see in the first old countries. But the adoption side now, I think that’s the point I was raising to say that, um, the consumer, I’m sure the consumer is technology” RPT9.

Embracing digital transformation through self-service technology can help retailers modernise their operations and attract customers. This is critical for the progression of digital transformation in light of increased competitiveness within the industry.

> “In our district, in the distribution centres where you have modernised or automated, I’ll say digitised, because we are talking digitisation, digitised warehouse environment.” RPT2.

> “What I have seen so far with automation and with the transform with digital transformation in general.” RPT9.

The innovation associated with self-service technology can be a valuable opportunity for retailers to differentiate themselves.

> “We are looking at having like some sort of attach devices where it says, okay, you’re looking for this kind of item. Is it available, or if it’s available, how many of those are available? They don’t spend their time looking for things that are not there.” RPT7.

> “The compatibility, the perceived usefulness, user-friendliness of whatever technology we have, this is what is useful.” RPT12.

> “Have this burst of innovation that is going to take over and with whether you survive as a retailer, whether you can actually keep up with what is happening.” RPT14.

Integrating self-service technology seamlessly into existing systems and processes can lead to improved customer experiences and reduce resistance to change.

> “This one is a capital outlay, you, them, the whole shop. This one, you leave the shop as is your focus. You focus on trollies. Imagine if I go to Woolies, for example, I change all the, the not all, perhaps 50% of their trollies are smart trollies, 50% are non-smart trollies.” RPT2.

Also, the issue of learning experiences and scepticism underlines the need to answer questions and concerns about SSTs. As such, the learning experiences dissuade scepticism.

> “Extremely sceptical. And I can almost say, uh, for now, given the current state of the economy, they will not succeed.[RPT1.]

Importantly, self-service adoption has the potential to boost retail operations’ efficiency, and stakeholders may embrace it. Self-service technology can improve operational efficiency by streamlining operations, automating repetitive actions, and reducing waiting times. Self-service solutions’ cost and time savings advantages, which can improve resource allocation and overall business performance, may be valued by stakeholders.

Self-service technology’s convenience may represent a significant window of opportunity for adoption in the South African retail industry. Because of the ease it provides, stakeholders may encourage self-service adoption in the South African retail industry. Customers can use SSTs to do activities quickly and efficiently, minimising the need for employee support and saving time. Stakeholders may understand the importance of convenience in improving client experiences and increasing customer satisfaction.

> “There’s more to be considered other than just the convenience of a 24-hour seven-store that you can walk in anytime. But the 1%, top Living Standards Measure (LSM), will appreciate that. We all know they do not want to queue; they do not want to ask too many questions. They know exactly what they want” [RPT1.]

Ultimately, it will help with customer satisfaction, which is key for repurchase and loyalty. SSTs can enhance customer satisfaction by providing quick and convenient ways for them to complete transactions.

> *“*You know, you can shop up online wherever you are, we can put it in a locker, we send you a pin, you come to a shop, you just click check out, and then you take your item.[RPT2.]

> “In terms of customer satisfaction. Not waiting in queues and lines, making shopping time less.” [RPT3.]

> I think for me, customer satisfaction is the key, having the self-servicing checkouts." RPT5.

Stakeholders who prioritise customer satisfaction and experience may support self-service adoption. They understand that SSTs can empower customers, giving them more control and flexibility in their interactions with the retail establishment. By offering self-service solutions, businesses can cater to customers' preferences and provide a seamless and personalised experience, leading to higher satisfaction and loyalty. Self-service adoption is likely to be supported by stakeholders who value innovation and staying ahead of market trends. They know that implementing self-service technology may portray their retail enterprises as innovative and forward-thinking, distinguishing them from the competition. These stakeholders recognise that harnessing technological breakthroughs and providing self-service solutions can be viewed as a strategic move in order to attract tech-savvy clients and remain relevant in the altering retail scene.

4.6 CRITICAL HINDRANCES TO SELF-SERVICE TECHNOLOGIES ADOPTION

The third research question focused on understanding the hindrances to SSTs adoption and can be recapped as follows:

> RQ3: What do retailers consider critical hindrances to SSTS adoption in the South African retail sector?

The participants identified five critical hindrances: lack of strategic analysis, employment issues and job losses, security concerns, connectivity issues and inadequacy of infrastructure as well as technology adoption issues and digital culture.

The lack of analysis and inadequate integration of SSTs into the business strategy hinder their successful implementation and utilisation in the retail sector.

> “So, we’ve got a lot of data around our customers, their purchases, but we have not really been using that data to analyse and to target the customer. So that is what we are focusing on now, just to know, we call it our customer of the future, so to know who our customer is.” RPT4.

> “So, us as a business, that’s why I’m saying that we need to strike a balance. The balance needs to be; people need to be upskilled to the latest technological trend that is out there.” RPT7.

Economic challenges, such as high unemployment rates and budgetary constraints, may have an even greater impact on businesses’ willingness to invest in and the consumer’s ability to embrace SSTs. The current economic difficulties faced in South Africa, such as the threat of unemployment and income disparities, contribute to the challenges of self-service adoption in the retail sector.

> “Rolling out a solution for the top LSM and not considering the rest unless that’s the company strategy. But for our organisation, we are not there yet. But looking at organisations that are only targeting them, the top LSM” RPT1.

This situation is exacerbated by the streamlining of the process in the South African retail sector, which would result in the potential loss of existing jobs, which might push unemployment further and potentially create discontent from the employees and be viewed as counteractive to the efforts of the government to decrease the unemployment rates in the country.

> “South Africa, unfortunately, with our high unemployment rate, this is not ideal.” RPT1.

> “The risk of jobs given that the store will be fully self-service with no human capital at all. Then we talk of unemployment in South Africa. RPT13.

> “For sure, long term, those waitresses might not be there anymore when people can use more and more people being able to use those machines by themselves. RPT6.

Security concerns, which are synonymous with technology adoption, were also highlighted as a critical hindrance. Challenges with data security exist as most of the technology's data security is not as advanced as in some developed countries, such as the United States of America (USA).

> "You mentioned the USA, which is a first world country, um, and first world country connection is excellent. Security is excellent data, everything else is already smooth". RPT1.

Participant 1 further contextualises this issue of security, indicating that it is not about the technology only. It's also about security; Participant 5 also highlights the cost of adoptions that can be associated with the adoptions to ensure security.

> "It is not just using a self-service technology; it's also trusting the system and the security of the system." RPT1.

> "They are concerned about the security. If I'm going to put it in there, what if it charges me more." RPT5.

The security concerns are not limited to the cybersecurity and security of the data. It is also related to the security of infrastructure due to the high crime rate in South Africa. Security concerns, such as fears of crime and data privacy concerns, significantly hinder the adoption of SSTs in the retail sector.

> "As a country, we are not ready for such a technology, based on the reason of unemployment and a very high crime rate. Cause there will be other additional expenses around the security, and that will be required." RPT1.

> "You find some of the customers may be reluctant in trying digital platforms purely because of crime associated with them." RPT2.

> "Basically, what I am trying to say is the crime in the country that makes it a bit of a challenge to have self-service technologies." RPT10.

The other hindrance is the connectivity issues and inadequacy of the infrastructure. This is a particular problem in South Africa, and things are made worse by the

increasing unreliability of the electricity supply. This forces the technology use not to be sustainable, with the organisation having to constantly revert to traditional manual operation, making the technology not worth it as the organisation cannot maximise its intended outcome: Business Efficiency and Customer Experience.

> "The power issues. It is a challenge. Once you digitise your environment, you rely a lot on your electricity. Again, without this, you resort to manual or traditional methods of doing things" RPT2.

The relationship between potential job losses, security issues, infrastructure and technology adoption issues and low digital culture emphasises how crucial it is to deal with security concerns while introducing SSTs. Businesses and consumers may be hesitant to adopt self-service solutions because of concerns about their data security.

4.7 KEY STAKEHOLDERS' SUPPORT FOR SELF-SERVICE TECHNOLOGIES ADOPTION

The last research question investigated what retailers can do to acquire support from key stakeholders for SSTS adoption, and the research question can be recapped as follows:

> RQ4: What can retailers do to acquire support from key stakeholders for SSTS adoption in the South African retail sector?

The participants highlighted that the retailers could acquire support from key stakeholders for SSTS adoption in South Africa through partnership, collaboration, and development by strengthening employee/ employer relations, strengthening industrial relations (unions), Worker development and upskilling and job relocation (security of jobs).

There is a need for a good employee/employer relationship and a need to manage the industrial relations and bring unions on board as the organisation's key stakeholders.

Participants explain the challenge with the union when it comes to the adoption of technology and narrated as follows:

> “I read about one retailer who sort of trial the search service checkout, and there was an uproar from the unions, in terms of everybody was seeing, when they hear tech, they see job losses. So, there was a union that was up in arms to say, no, this technology can come not come into SA, and so on”. RPT4.

> “The unions need to kind of, you know, push the agenda of people getting more skilled up because obviously, I don’t think the technology is going to wait” RPT5.

> “From an employer perspective, it is our responsibility to ensure that if we want to introduce a self-service checkout with, for whatever amount of human capital we are taking away from this introduction, we actually ensure that we uplift them so they are able to actually service and maintain that machine.” RPT13.

Also, central to acquiring stakeholder support is developing stakeholder trust. The organisation needs to be transparent and build rapport and trust so that its intentions are not doubted. Worker development and upskilling enable the employees to better understand the technology and its capabilities. Furthermore, it gives the employees better insight and more support towards its use because they know how it works and operates.

> “a learning app or the learning module for the store associates so they can actually learn, and they can upskill themselves” RPT5.

> “In my view, I think to maintain the, the, the system was a bit more costly depending on the skillset that we have in it in this country. Do we have enough, excuse me, enough people to support that?” RPT7.

Employment issues, including job displacement and the limited impact of artificial intelligence on employment rates, affect the adoption of SSTs. Acceptance and increased adoption and support can occur if job relocation maintains the security of jobs irrespective of the digitisation and implementation of technology.

> “SA, unfortunately, with our high unemployment rate, this is not ideal, unless there is job security” RPT1.

The self-service deployment will likely gain union favour if employers do not lay employees off. Instead, they upskill them and repurpose their jobs and offer training.

Adoption of self-service is more likely among stakeholders who accept technology and its improvements. They recognise technology’s potential to improve retail experiences, boost productivity, and boost customer engagement. These stakeholders may be more amenable to researching and implementing self-service solutions, seeing them as part of the retail sector’s larger digital transformation path. Stakeholders who emphasise integrating technology into their business models and operations are more likely to support self-service adoption. They recognise the potential of self-service solutions to connect easily with existing systems and procedures. These stakeholders place a premium on the capacity to use technology to improve workflows, improve data analytics, and get important insights for better decision-making. They regard self-service technology as a means of achieving a more comprehensive and integrated approach to retail operations.

4.8 CHAPTER SUMMARY

In this study, 14 semi-structured interviews were analysed to answer the four research questions. The findings revealed that readiness to adopt the technology, resistance to change, investment requirements and technology limitations and uncertainties were essential considerations when adopting SSTs in retailers. The findings also revealed that the critical opportunities for SSTs adoption are mainly business efficiency and improved customer experience. Despite this, there are strategy and socioeconomic issues, which are strategic analysis, employment issues and job losses and technology adoption issues and digital culture, as well as infrastructure stability and reliability, which includes security concerns and connectivity issues and inadequacy of infrastructure. The retailers can acquire support from key stakeholders for SSTS adoption in South Africa through partnership, collaboration, and development by

strengthening employee/ employer relations, strengthen industrial relations (unions), Worker development and upskilling and job relocation (security of jobs).

The findings are discussed in the next chapter, with the limitations highlighted in the last chapter of the report.

CHAPTER 5. DISCUSSION

5.1 INTRODUCTION

SSTs, which include ATMs, online banking platforms, mobile scanning applications, and ticketing machines, have emerged as a distinct area of study, a means of gaining a competitive edge for service providers during an integral aspect of consumers' daily routines (Ongena et al., 2020). The general feedback from the participants in Chapter 4 highlights all retailers' involvement in digital transformation, with the primary aim being to improve customer experience. Customer experience dictates the longevity of the customer, which is therefore of paramount importance given the competition in the retail sector (Khalufi & Shah, 2021).

This study's four research questions were reviewed against the literature and have been discussed in the sections that follow:

- Key considerations for retailers – (Aguzman et al., 2020; Chang & Chen, 2021).
- Critical opportunities for retailers – (Armstrong & Lee, 2021; Chang & Chen, 2021; Yang et al., 2021).
- Critical hindrances for retailers – (Kolade & Owesini, 2022; Matsepe & van der Lingen, 2022; Ndlovu et al., 2022).
- Key stakeholders support – (Hakim et al., 2022; Sharma et al., 2021).

5.2 KEY CONSIDERATIONS ESSENTIAL FOR RETAILERS TO ADOPT SELF-SERVICE TECHNOLOGIES

The first research question investigated the key considerations that are essential for retailers to adopt SSTs:

> RQ1: Which key considerations are essential for retailers to adopt SSTS in the South African retail sector?

Customers' adoption of SSTs in retailers is contingent upon five essential considerations. These were readiness to adopt the technology, consumer behaviour and convenience, resistance to change, investment requirements and technology limitations and uncertainties.

5.2.1 READINESS TO ADOPT

Participants spoke about the importance of understanding the infrastructure issues and Eskom (power utility) stability, where the cost implications of implementing SSTS are contingent upon the readiness to adopt the technology. This, participants say, will aid in assessing the level of preparedness for technology adoption.

This stance makes sense when considering how a check-out station at a retailer is susceptible to potential interruptions (Iqbal et al., 2018). These interruptions encountered at the check-out station may arise from technical malfunctions, organisational inefficiencies, or human fallibility (Hassan et al., 2013). Technical difficulties could arise from factors such as an illegible barcode on the merchandise or a technical malfunction at the point of sale. Inadequate management of the layout for the check-out process can potentially lead to organisational issues. Instances of human error may arise from consumers who fail to weigh certain items, such as fruits and vegetables, prior to arriving at the point of sale. While the mitigation of these hindrances could be achieved through the implementation of an effective management approach by retailers (Galdolage, 2021d), participants are cautioning against power availability in the event of implementation. The participants rightly point out that implementation of the SSTS would need to consider uninterrupted power supply.

The same instances that plague a manual check-out process affect SSTs. Turner and Szymkowiak (2018) emphasised this when the use of SSTs was found to be lacking in customer satisfaction, particularly in instances involving price discrepancies, alcohol purchases, difficulties with barcode scanning, and the processing of refunds or exchanges. The degree of ease of use was found to be a determining factor in the levels of satisfaction and dissatisfaction experienced by users (Thomas-Francois & Somogyi, 2022).

5.2.2 UNDERSTAND CONSUMER BEHAVIOUR AND CONVENIENCE

Comprehending consumer behaviour is of utmost importance in effectively implementing SSTs within the retail sector. Participants said an optimal technology is responsive to the customer's needs, as evidenced by their behaviour and the degree to which the technology enhances their convenience. This entails comprehending the target demographic and their generational composition, with a notable inclination towards adoption from the younger cohort due to their inherent technological proficiency.

Occasionally, consumers may harbour doubts regarding such systems' efficacy, dependability, or ease of use (Baabdullah et al., 2019). It is imperative to possess knowledge of the capabilities and effectively communicate with customers in order to facilitate adoption (Vakulenko et al., 2019). The alignment of self-service technology with customer demands and preferences may increase businesses' acceptance and utilisation (Siah et al., 2018).

Self-service check-outs may present challenges and intricacies for individuals who struggle to acclimate to new technologies (Webster & Ivanov, 2019). Adopting new technology may face resistance from senior consumers who may perceive it as a reduction in service, particularly those born prior to SST. As a result, the elderly population exhibits a tendency to avoid utilising self-service technology, primarily due to a dearth of assurance, reduced interpersonal communication, and the characteristics inherent in the self-service technology itself (Hassan et al., 2013). This was corroborated by Turner and Szymkowiak (2018), who added the notion that SSTs could increase feelings of isolation among more senior users but that most users would use the technology due to increases in time-saving and convenience. Galdolage (2021d) also revealed that similar demographic variances, particularly age, play a crucial role in influencing customers' inclination to engage with SSTs. While age is generally considered a more influential factor than gender, Galdolage (2021b) has shown that young males exhibit greater interest and enthusiasm towards utilising SSTs.

5.2.3 RESISTANCE TO CHANGE

An additional crucial factor identified by participants is the level of resistance to change exhibited by internal stakeholders and customers. The adoption of SSTs within the retail sector may face impediments stemming from both reluctance to change and economic constraints. A shift in cultural norms is required, among other factors.

Kolade and Owoseni (2022) call for prioritising worker-centricity as a fundamental principle that should guide the trajectory of technology utilisation. To clarify, this involves a transition in emphasis from the production-centric value of technology to the worker-centric value of technological advancements. This entails the imperative to develop technology in accordance with the needs of the human workforce, thereby mandating minimal adaptation of the human worker to technology, which reduces resistance to change.

Galdolage (2021a; 2021b; 2021c) proposed a co-creation process with customers to overcome resistance to change and identified sixteen practices related to customer value co-creation in SSTs. These practices were subsequently classified into five distinct groups of integrative value practises, referred to as the 5Cs (Galdolage, 2021d). The first group, co-learning, encompasses practices such as seeking, sharing, and recalling information, following instructions, and providing feedback. The second group, coproduction, includes practices such as producing and personalising the service and delivering it. The third group, cooperation, involves practices such as conforming to requirements, accepting terms and conditions, taking responsibility, changing habits, and tolerating failures. The fourth group, connecting, pertains to practises that involve connecting with the service firm. Finally, the fifth group, correcting, encompasses practises related to preventing and recovering from errors.

5.2.4 INVESTMENT REQUIREMENT

The acquisition of technology is commonly associated with high costs, thus necessitating a comprehensive comprehension of the financial commitment involved. Another crucial factor for participants was establishing confidence and reliability in technology while comprehending its limitations to mitigate potential scepticism and

ambiguity. The constraints imposed by technology and the challenges associated with the integration of novel technological solutions may have an impact on the level of trust and confidence that individuals and enterprises have in utilising SSTs.

Galdolage (2021d:322) emphasised the importance of reviewing digital technologies against critical customer measures, i.e., “improving the usefulness, speed, efficiency, consistency, cost-effectiveness, user-friendliness, reliability and trialability” of implemented SST. Not only was this measure a performance-based criterion, but it also included an expectation of consistency, emphasising the need to evaluate technologies and service providers with the full technological lifecycle in mind. Galdolage (2021b) also spoke to the importance of layout and user-friendliness in the human-machine interface of SSTs. This was corroborated by Turner and Szymkowiak (2018), whose participants emphasised a good use of space and flow in terms of their SSTS experiences being a dealbreaker in terms of SSTS adoption. Simultaneously, companies must uphold elevated security and privacy protocols to instil heightened trust in the technological interface (Khalufi & Shah, 2022).

5.2.5 TECHNOLOGY LIMITATION AND UNCERTAINTY

Participants repeatedly shared how the South African retail sector faces notable hindrances to the adoption of self-service due to technological constraints, such as connectivity deficiencies and power supply limitations.

An information network infrastructure encompasses various components such as mobile broadband, towers, optical fibre, ethernet, and cloud computing (Mkansi & Nsakanda, 2023). These components are crucial for ensuring the viability of digital operations in the long run. The telecommunication infrastructure in urban, township, and rural areas of South Africa has a significant level of penetration, which has resulted in a reduction of barriers to digital technologies (Lincoln et al., 2020). The findings corroborate previous research that has long recognised technological infrastructure’s benefits to businesses within a given context (Mkansi & Nsakanda, 2023).

South Africa is experiencing a severe energy crisis, resulting in households and commercial establishments enduring power outages lasting as long as twelve hours

per day (Akpeji et al., 2020). The persistent inability of Eskom, the national power utility of the country, to fulfil the electricity requirements has been a continuing issue since 2007 and has currently reached its most severe phase (Walsh et al., 2020). The retail industry is subject to a dynamic and complex impact of load shedding, which is particularly noteworthy. It is thus unsurprising that the participants feel limited in terms of technological adoption in this context.

5.3 CRITICAL OPPORTUNITIES FOR SELF-SERVICE TECHNOLOGIES ADOPTION

The second research question investigated the critical opportunities for SSTs adoption:

> RQ2: What do retailers consider critical opportunities for SSTS adoption in the South African retail sector?

The critical opportunities for SSTs adoption are mainly business efficiency and improved customer experience. The improved customer experience is achieved through technological advancement and digital transformation, ensuring good customer experience and customer satisfaction.

5.3.1 TECHNOLOGY ADOPTION AND INNOVATION

Participants shared three main ideas about the SSTS innovation and eventual adoption. Firstly, technological advancements offer a prospect for retailers to exploit self-service solutions and maintain competitiveness. Secondly, the implementation of self-service technology represents a promising prospect for retailers to establish a competitive advantage through innovation. Thirdly, participants said the seamless integration of self-service technology into pre-existing systems and processes could result in enhanced customer experiences and a decrease in opposition to change.

The latest trend in global retail is the emergence of frictionless retail or cashier-less stores, but there currently seems to be a lack of strategic determination regarding its appropriateness for local retail (Lincoln et al., 2020). Considering the headwinds

described by participants (load-shedding, availability of infrastructure etc.), it is perhaps understandable that there is a low appetite for the significant investment SSTs will require (Broll, 2019).

At the organisational level, competitive pressures, regulatory backing, customer expectations, decision-maker risk propensity, opinion leadership, efficient communication channels, and endorsement from top management are factors that facilitate SSTS adoption (Matsepe & van der Lingen, 2022). While it is recommended that leaders engage in calculated risk-taking when adopting technology, it is also emphasised that they must articulate the business rationale for such technologies (Grewal et al., 2020).

5.3.2 LEARNING AND SKILLS DEVELOPMENT

The matter of learning experiences and scepticism highlights the necessity of addressing inquiries and apprehensions pertaining to SSTs, say participants. Therefore, positive educational encounters discourage doubt for employees and customers alike.

Preparing employees is one of the initial measures businesses can take to prepare for the future of work (WEF, 2021). Organisations run the risk of falling behind if employees do not receive the training they need to adapt to changing circumstances, especially given how difficult it is to find employees with new skills in today's competitive labour market (McKinsey, 2019).

However, not only is technology transforming business, but so is the manner in which employees interact with customers (Deloitte, 2022). As a result, employees will need to interact with customers in novel ways, such as by learning to use new platforms, expanding their knowledge of technologies, and enhancing their interpersonal skills (Jie & Kamsin, 2021).

5.3.3 CUSTOMER EXPERIENCE AND SATISFACTION

The South African retail industry may witness an increase in self-service adoption due to the convenience it offers, which stakeholders may promote (Broll, 2019). SSTs enable customers to perform tasks quickly and efficiently, reducing reliance on employee assistance and optimising time management (Osmundsen et al., 2018).

Ultimately, this will enhance customer satisfaction, a crucial factor in promoting repeat purchases and fostering customer loyalty (Simsek, 2019). SSTs have the potential to augment customer satisfaction by offering expeditious and convenient means for executing transactions (Asenso et al., 2021). Stakeholders who place a premium on customer satisfaction and experience may be inclined to endorse the adoption of self-service (Ghobakhloo, 2020). The recognition is present among individuals that SSTs possess the ability to endow customers with greater authority and adaptability in their engagements with the retail enterprise.

The provision of self-service solutions by businesses can effectively address customers' preferences, resulting in a smooth and customised experience, thereby enhancing their satisfaction and loyalty (Verina & Titko, 2019). The acceptance of self-service is expected to be facilitated by stakeholders who place a high premium on innovation and keeping abreast of market developments (Tungande et al., 2020). It is acknowledged that adopting self-service technology can position retail enterprises as progressive and visionary, thereby setting them apart from their rivals (Biedenbach et al., 2022). The stakeholders acknowledge that incorporating technological advancements and offering self-service options can be perceived as a strategic manoeuvre to appeal to technology-oriented customers and stay pertinent in the evolving retail landscape (Verhoef et al., 2021).

5.4 CRITICAL HINDRANCES TO SELF-SERVICE TECHNOLOGIES ADOPTION

The third research question focused on understanding the hindrances to SSTs adoption:

RQ3: What do retailers consider critical hindrances to SSTS adoption in the South African retail sector?

The participants identified five critical hindrances: lack of strategic analysis, employment issues and job losses, security concerns, connectivity issues and inadequacy of infrastructure as well as technology adoption issues and digital culture.

5.4.1 STRATEGY AND SOCIOECONOMIC ISSUES

5.3.1.1 LACK OF STRATEGIC ANALYSIS

Participants said insufficient incorporation of SSTs into the overall business strategy and a dearth of analytical examination impede the effective adoption and utilisation of such technologies in the retail industry. They also said that the economic hurdles, encompassing elevated levels of joblessness and fiscal limitations, could potentially exert a more pronounced influence on the inclination of enterprises to invest in and the capacity of consumers to adopt SSTs. The data showed that prevailing economic challenges encountered in South Africa, including the looming risk of unemployment and income inequalities, pose significant obstacles to the adoption of SSTs in the retail industry.

The phenomenon of automation is known to have a dual effect on employment, where it not only results in job displacement but also generates employment opportunities through various mechanisms (Mkansi & Naskanda, 2023). Throughout previous revolutions, the generation of employment opportunities and the stimulation of demand for pre-existing jobs has surpassed the number of job losses, resulting in heightened prosperity and overall employment as a result of amplified automation and productivity (Mtotywa et al., 2022). However, the more recent implementation of automation has been observed to result in job displacement and de-industrialisation within sectors, as evidenced by the experience of advanced economies over recent decades (Moist et al., 2021). Within this context, the misgivings of participants make sense. However, it is worth noting that job losses in advanced economies cannot be solely attributed to automation, as other factors, such as heightened international competition, have also played a role (Parshau & Hauge, 2020).

5.3.1.2 EMPLOYMENT ISSUES AND JOB LOSSES

The current scenario, as shared by participants, is aggravated by the simplification of the procedure in the retail industry of South Africa, which could lead to the probable elimination of current job positions, thereby intensifying the issue of unemployment and potentially causing dissatisfaction among the workforce. This especially could be perceived as contradictory to the government's endeavours to reduce the unemployment levels in the nation.

The high unemployment rate is not only a concern for trade unions but the country at large. According to participants, South African retailers should continue to focus on skills development to have meaningful and sustainable jobs, even with the introduction of new technologies and self-service channels. The data showed that introducing any technology which impacts specific roles requires a lot of education and lobbying with stakeholders. It is thus essential to introduce SSTs but focus on the empowerment of staff such that they embrace technology and benefit in the new value chain.

Several academic studies forecast that the forthcoming wave of automation technology, primarily propelled by advancements in artificial intelligence, will enable a greater number of occupations across various industries to be entirely automated, resulting in an escalation of unemployment (Mtotywa et al., 2022; Webster & Ivanov, 2019). The implementation of said technologies in South Africa has been sluggish thus far, and no definitive proof exists to indicate a significant deviation from the established trend of automation's impact on employment (Deloitte, 2022). Although certain studies have validated the displacement of jobs in specific industries due to AI-driven automation, there is a lack of definitive evidence to indicate that the overall effect on employment has been noteworthy in both advanced and developing economies (Parshau & Hauge, 2020). Several studies have emphasised the potential of automation technologies to generate employment opportunities by enhancing output and productivity. Notably, the utilisation of AI-powered technologies remains limited, particularly in emerging economies, thereby impeding the ability of empirical investigations to fully capture their impact (Parshau & Hauge, 2020).

To illustrate, Turner and Szymkowiak's (2019) study participants specifically recommended that more employees be available around check-out points to be readily on hand to assist new SSTS users and also in the event of SSTS issues with check-out or payment or exchanges or errors.

5.3.1.3 TECHNOLOGY ADOPTION ISSUES AND DIGITAL CULTURE

The adoption of self-service technology as a means of digital transformation can aid retailers in modernising their operations and drawing in customers (Bulmer et al., 2018). The aforementioned is of utmost importance for the advancement of digital transformation in the context of heightened competition within the sector, say participants. Additionally, there must be cognisance of the internal digital culture of the organisation as well as the digital culture of society at large. Participants stress that allowances must be made to ensure that employees and customers alike are empowered to be able to leverage digital technologies.

RSA's digital culture is limited by socioeconomic barriers, which encompass a range of factors, such as limited awareness and knowledge of technology, insufficient acceptance of technology, and inadequate resources for maintenance (Lembani et al., 2020). The lack of access to the internet and technology is recognised as a socioeconomic obstacle, which poses a significant challenge in today's society, where technology and the internet are ubiquitous (Mtotywa et al., 2021). This is further exacerbated by periods of electricity unavailability due to load-shedding and the high cost of data.

5.4.2 INFRASTRUCTURE STABILITY AND RELIABILITY

5.3.2.1 SECURITY CONCERNS

The impediment of security concerns was identified as a crucial factor often associated with adopting technology. The issue of data security presents a challenge due to the relatively less advanced nature of technology-based data security measures in comparison to certain developed nations, such as the USA. However, the scope of security concerns extends beyond the aspects of cybersecurity and data protection,

say participants. The security of infrastructure in South Africa is closely linked to the region's elevated crime rate and, in the case of retailers, more instances of theft.

The issue of crime in South Africa presents a significant obstacle to progress, hindering the nation's ability to effect positive change (Lembani et al., 2020). An instance that illustrates this issue is the pilferage of network connectivity cables, specifically copper cables and optic fibres. This occurrence leads to a disruption in connectivity, making it arduous to maintain data and technology (Mtotywa et al., 2022). This has created a hindrance to the utilisation of opportunities presented by the 4IR. The adoption of SSTs in the retail sector is thus significantly impeded by security concerns, which include apprehensions regarding crime and data privacy.

5.3.2.2 CONNECTIVITY ISSUES AND INADEQUACY OF INFRASTRUCTURE

Another obstacle pertains to connectivity challenges and insufficient infrastructure. The escalating unreliability of the electricity supply exacerbates the issue, particularly in South Africa. The lack of sustainability in technology usage, say participants, necessitates frequent recourse to traditional manual operations, thereby undermining the technology's value proposition of enhancing business efficiency and customer experience.

Within the context of recurrent service disruptions, various strategies are implemented by organisations to mitigate the consequences. According to Walsh et al. (2020), there are two distinct forms of economic resilience concerning power outages, inherent and adaptive. Inherent resilience is defined as a firm's capacity to react to situations within the scope of normalcy. Adaptive resilience refers to a firm's capacity to react effectively to crisis situations through the application of additional ingenuity or effort.

An illustration of this concept is a company that possesses inherent resilience against power outages by executing procedures or operations that do not depend on electricity supplied by the grid. The company has the potential to transition to an alternative energy source or modify its production schedule, potentially at a later time of day or at a different facility, without compromising its overall productivity. The concept of adaptive resilience pertains to strategies that organisations can adopt to address

frequent disruptions, such as implementing technological solutions to conserve energy or decrease dependence on electricity, modifying production procedures, identifying alternative sources for essential inputs in cases where the outage has impacted production, or extending work hours to recover lost output following the resumption of power supply (Walsh et al., 2020).

Typically, these measures are accompanied by expenses; however, consumers are inclined to assume the costs provided that the prospective benefits surpass the expenses (Akpeju et al., 2020).

5.5 KEY STAKEHOLDERS' SUPPORT FOR SELF-SERVICE TECHNOLOGIES ADOPTION

The last research question investigated what retailers can do to acquire support from key stakeholders for SSTS adoption:

> RQ4: What can retailers do to acquire support from key stakeholders for SSTS adoption in the South African retail sector?

The participants highlighted that the retailers could acquire support from key stakeholders for SSTS adoption in South Africa through partnership, collaboration, and development by strengthening employee/ employer relations, strengthening industrial relations (unions), Worker development and upskilling and job relocation (security of jobs).

5.5.1 STRENGTHEN INDUSTRIAL RELATIONS (EMPLOYEES & UNIONS)

Establishing a positive employee-employer relationship and effectively managing industrial relations, including engaging with unions as key stakeholders, are imperative for organisational success. Further, participants also shared that developing stakeholder trust is crucial to obtaining stakeholder support. The organisation must establish transparency and cultivate a positive relationship with stakeholders in order

to mitigate any potential scepticism regarding its motives. Participants shared that if employers refrain from laying off employees, it is probable that the SSTS deployment will receive support from unions. Rather than terminating employees, organisations must opt to enhance their skill sets, reassign their roles, and provide them with training opportunities.

A significant concern raised by sceptics and critics pertains to the potential of SSTs to exacerbate unemployment and inequality by conferring a disproportionate amount of power to capitalist proprietors of emerging technologies (Webster, 2022). The argument posits that the proprietors of capitalist technologies would acquire the excess value generated by digital technologies, resulting in significant harm to the marginalised workers who are displaced in the Industry 4.0 economy. From this perspective, critics envisage a dystopian reality for low-skilled workers who are replaced by automation and face disadvantages due to the ownership structure of technology (Kolade & Owoseni, 2022).

One key aspect is imperative for national governments and multilateral institutions to implement appropriate policy instruments and interventions driven by an active citizenry in order to tackle this issue (Kolade & Owoseni, 2022). One potential strategy is to establish suitable tax policies that can leverage the benefits of Industry 4.0 technologies and allocate the resulting revenues to initiatives aimed at enhancing the skills and knowledge of workers who are at risk of losing their jobs or facing other forms of disadvantage. The implementation of these interventions is imperative, not solely to address the productivity and growth prospects offered by Industry 4.0 but also to prevent significant societal disruptions resulting from the displacement of workers who are left to navigate precarious circumstances on the periphery (Mtotywa et al., 2022).

The implementation of said technologies in South Africa has been sluggish thus far, and no definitive proof exists to indicate a significant deviation from the established trend of automation’s impact on employment (Lincoln et al., 2020). Furthermore, while numerous research endeavours anticipate employment reduction, alternative investigations advise against such assertions, instead projecting labour force reorganisation or retraining (Parshau & Hauge, 2020). In their study on the effects of automation in the South African apparel industry, Parshau and Hauge (2020) did not

find that increased automation was leading to reduced employment. Instead, automation leads to higher productivity, resulting in cost savings and lower retail prices, stimulating customer demand and reinforcing the need for more (albeit differently skilled) employees.

RSA labour unions are facing a significant challenge with a decline in membership, particularly among the younger demographic (Matebese & Govender, 2022). This phenomenon is also observed in labour unions worldwide. The issue of unemployment poses a significant challenge for both labour unions and governmental bodies in RSA (Webster, 2022). The lack of employment opportunities created by the South African government is a contributing factor that hinders the enhancement of union membership, as not all individuals entering the labour force may be inclined to become union members.

South African labour unions face significant obstacles as they engage in protracted strikes that impede productivity while simultaneously advocating for increased wages that may deter foreign direct investment (Webster, 2022). Leaders of unions in this particular sector exhibit a deficiency in social dialogue competencies, which results in their inability to establish constructive tripartite relationships (Matebese & Govender, 2022). Additionally, they lack effective strategies for managing the impact of globalisation and the 4IR in the evolving landscape of employment.

5.5.2 WORKER DEVELOPMENT AND UPSKILLING

The process of worker development and upskilling facilitates enhanced comprehension of technology and its potential among employees. Moreover, it provides employees with enhanced understanding and increased assistance in utilising the system, as they possess knowledge of its functionality and operation. Participants say that with the increase in 4IR technologies, most retailers focused on developing new skills to respond to the skills challenges brought to by the various technologies. A few of the participants indicated the development of data scientists from the current workforce as something they actively drive in their organisations.

The implementation of an automatic self-checkout system is anticipated to facilitate smoother overall operations in retail establishments, with an increased pace of movement (Jalil & Koay, 2021). The implementation of this technology can thus enable retailers to decrease the number of cashiers. Implementing an automated self-checkout system can potentially shift the employee's responsibilities from operational to supervisory (Hassan et al., 2013). For instance, it may be possible for a lone employee to oversee the operations of three to four check-out counters instead of being assigned to a single check-out counter as an operator.

5.5.3 JOB RELOCATION (SECURITY OF JOBS)

The adoption of SSTs is influenced by employment concerns such as job displacement and the effect of artificial intelligence on employment rates. Participants say the likelihood of acceptance and heightened adoption and support may be heightened if job relocation ensures job security, regardless of the digitisation and integration of technology.

The consensus among thought leaders of the 4IR is that the potential benefits outweigh the drawbacks. The primary concern regarding the negative aspect pertains to job restructuring. Nonetheless, this is a recurring trend observed in past revolutions, and the global community has successfully adapted and coped with this reality (Mtotywa et al., 2022). It is evident that capitalising on opportunities is a challenging process, particularly for societies with inadequate social and economic frameworks (Ndlovu et al., 2022). This assertion holds merit as African nations are commonly associated with economic impoverishment, a technological lag, and underdeveloped infrastructure, as well as lower levels of literacy and significant rural demographics (Neboh et al., 2022). Therefore, these obstacles continue to be a significant issue for nations, and if not addressed, they have the potential to impede the positive prospects presented by the 4IR (Mtotywa et al., 2022).

5.6 CHAPTER SUMMARY

The adoption of self-service has the potential to enhance the efficiency of retail operations, and it is likely that stakeholders will be receptive to it. The implementation

of self-service technology has the potential to enhance operational efficiency through the optimisation of processes, automation of routine tasks, and mitigation of wait times. The convenience offered by self-service technology presents a noteworthy opportunity for adoption within the retail industry of South Africa. The potential benefits of self-service solutions in terms of cost and time savings can enhance resource allocation and overall business performance, thereby garnering appreciation from stakeholders.

The interdependence among potential employment reduction, security concerns, infrastructure and technology adoption challenges, and low digital culture underscores the criticality of addressing security apprehensions during the implementation of SSTs. Apprehensions regarding safeguarding their data may impede businesses' and consumers' adoption of self-service solutions.

The likelihood of stakeholders adopting self-service is positively correlated with their acceptance of technology and its advancements, especially where the potential of technology to enhance retail experiences, increase productivity, and augment customer engagement is acknowledged. In such a case, the stakeholders could potentially be more inclined towards exploring and executing self-service solutions, perceiving them as an integral component of the retail industry's broader digitalisation trajectory.

Similarly, stakeholders who prioritise the incorporation of technology into their business models and operations are inclined to endorse the adoption of self-service. The participants acknowledge the potential of self-service solutions where they facilitate seamless integration with pre-existing systems and protocols. Specifically, prioritise the ability to leverage technology to enhance workflows, optimise data analytics, and gain valuable insights to inform more effective decision-making. Self-service technology is thus perceived as a mechanism for attaining a more comprehensive and integrated approach to retail operations by business leaders.

CHAPTER 6. CONCLUSIONS

6.1 INTRODUCTION

The concept of retailing has gained widespread acceptance among consumers, particularly in urban and suburban areas. The availability of a diverse range of products and brands has emerged as a key factor driving consumer demand for basic necessities and household items. This contemporary retailing approach is distinguished by its emphasis on consumer self-service, where shoppers independently navigate the store, select items from the shelves using a trolley or basket, and proceed to the check-out counter to complete their purchases. Thus, the sole point of interaction between the consumer and the service provider occurs exclusively at the check-out station. The retail check-out station represents the exclusive location where customers receive comprehensive service from retailers. Thus, the check-out station holds paramount importance in the overall functioning of a retailer (Fernandes & Pedroso, 2016).

Effective management skills are consistently necessary to prevent the check-out station from becoming a bottleneck in the overall operations of a retailer. The advent of digital technology has facilitated the potential for the current self-service retailing model to be transformed into a fully automated self-service model through the replacement of conventional cashiering procedures with automated self-checkout stations (Chigbu & Nekhwevha, 2021). Thus far, the SSTS check-out system has not been fully converted into a self-service operation within the retail landscape of RSA (Lincoln et al., 2020). Given that numerous contemporary predictive analyses adopt a worldwide perspective and employ intricate methodologies that are likely to overlook various country-specific and industry-specific circumstances and hindrances to the implementation of SSTS technologies, this research examined the particular factors that promote or impede the adoption of SSTs in the retail sector of a developing nation (Sharma et al., 2021).

6.2 MAIN STUDY FINDINGS

RQ1: Which key considerations are essential for retailers to adopt SSTs in the South African retail sector?

SSTs adoption in retailers depends on five factors: readiness to adopt, consumer behaviour and convenience, resistance to change, investment requirements, and technology limitations and uncertainties. Understanding infrastructure issues and Eskom stability is crucial for assessing readiness. Implementing SST requires an uninterrupted power supply, understanding consumer behaviour, and addressing concerns about the system's efficacy and ease of use. Younger consumers are more likely to adopt SSTs due to their technological proficiency. Resistance to change from internal stakeholders and customers may also impact adoption.

A shift in cultural norms is needed to prioritise worker-centricity in technology usage. The 5Cs, or customer value co-creation practices, are essential to overcome resistance to change. The acquisition of technology is often associated with high costs, and establishing confidence and reliability in technology is crucial. Companies must evaluate digital technologies against critical customer measures, such as usefulness, speed, efficiency, consistency, cost-effectiveness, user-friendliness, reliability, and trialability. The South African retail sector faces challenges due to technological constraints, such as connectivity deficiencies and power supply limitations. The telecommunication infrastructure in urban, township, and rural areas has reduced barriers to digital technologies.

RQ2: What do retailers consider critical opportunities for SSTs adoption in the South African retail sector?

SSTs offer retailers significant opportunities for business efficiency and improved customer experience. Technological advancements provide retailers with a competitive advantage through innovation and seamless integration into pre-existing systems and processes. However, there is a lack of strategic determination regarding the appropriateness of frictionless retail or cashier-less stores in local retail. Factors facilitating SSTS adoption include competitive pressures, regulatory backing, customer

expectations, decision-maker risk propensity, opinion leadership, efficient communication channels, and endorsement from top management.

Preparing employees for the future of work is crucial, as technology is transforming business and employee interactions with customers. Positive educational encounters discourage doubt, and positive educational experiences discourage doubt for both employees and customers. The South African retail industry may see an increase in self-service adoption due to its convenience and ease of use. Stakeholders who prioritise customer satisfaction and experience may be inclined to endorse the adoption of self-service. Self-service solutions can effectively address customers' preferences, resulting in a smooth and customised experience, enhancing satisfaction and loyalty. The acceptance of self-service is expected to be facilitated by stakeholders who prioritise innovation and stay updated on market developments.

> RQ3: What do retailers consider critical hindrances to SSTs adoption in the South African retail sector?

Insufficient incorporation of SSTs in the retail industry and economic hurdles, such as joblessness and fiscal limitations, hinder their effective adoption. Automation has both job displacement and employment opportunities, but recent implementation has led to job displacement and de-industrialisation. The automation of the retail industry in South Africa could lead to job elimination, intensifying unemployment and workforce dissatisfaction. Retailers should focus on skills development and empowerment to embrace technology and benefit from the new value chain. However, the implementation of AI-powered technologies in South Africa has been slow, and empirical investigations are limited.

Self-service technology adoption in retail can help modernise operations and attract customers. However, socioeconomic barriers, such as limited awareness, insufficient acceptance, and inadequate resources, hinder the adoption of technology. Security concerns, such as data privacy and crime, also hinder progress. Connectivity challenges and insufficient infrastructure also hinder the adoption of SSTs. Organisations can mitigate these challenges by adopting inherent and adaptive economic resilience strategies, such as transitioning to alternative energy sources or

extending work hours. Consumers are willing to pay for these measures if the benefits outweigh the costs.

RQ4: What can retailers do to acquire support from key stakeholders for SSTs adoption in the South African retail sector?

Retailers in South Africa can adopt SSTs by strengthening employee/employer relations, industrial relations (unions), worker development and upskilling, and job relocation. Establishing a positive relationship with stakeholders, including unions, is crucial for organisational success. Stakeholder trust is essential for obtaining support, and organisations should avoid terminating employees.

However, concerns about the potential exacerbated unemployment and inequality arise from the disproportionate power of capitalist proprietors of emerging technologies. Critics argue this could lead to a dystopian reality for low-skilled workers displaced in the Industry 4.0 economy. National governments and multilateral institutions should implement appropriate policy instruments and interventions to address this issue.

The implementation of SSTs technologies in South Africa has been slow, with no definitive proof of a significant deviation from the established trend of automation's impact on employment. Instead, studies suggest higher productivity, cost savings, and lower retail prices, which stimulate customer demand and demand for more skilled employees. Labour unions in South Africa face challenges in addressing unemployment and the lack of employment opportunities created by the government. Leaders of unions in this sector lack social dialogue competencies and lack effective strategies for managing the impact of globalisation and the 4IR in the evolving landscape of employment.

The adoption of SSTs is influenced by employment concerns such as job displacement and the effect of artificial intelligence on employment rates. Job relocation ensures job security, regardless of the digitisation and integration of technology. The consensus among thought leaders of the 4IR is that the potential benefits outweigh the drawbacks, with job restructuring being a primary concern. However, capitalising on opportunities

is challenging for societies with inadequate social and economic frameworks, such as African nations with economic impoverishment, a technological lag, underdeveloped infrastructure, lower literacy levels, and rural demographics.

6.3 RECOMMENDATIONS

The TOE framework outlines three factors, technology, organisation, and environmental contexts, and was used to develop the analytical framework for this study (Baker, 2012; Yang & Park, 2011).

6.3.1 TECHNOLOGY

6.3.1.1 CRITICAL CAPABILITIES

Digital technologies must be reviewed against critical customer measures, such as improving usefulness, speed, efficiency, consistency, cost-effectiveness, user-friendliness, reliability, and trialability, for implemented SSTs (Galdolage, 2021d). This measure is performance-based and includes expectations of consistency, emphasising the need to evaluate technologies and potential service providers with the full technological lifecycle in mind. Layout and user-friendliness are crucial in the human-machine interface of SSTs, and companies must also uphold security and privacy protocols to instil trust in the technological interface (Khalufi & Shah, 2022; Turner & Szymkowiak, 2019).

Management is encouraged to stay updated with technological advancements (Armstrong & Lee, 2021). Organisations must cultivate a sensory business capability of the broader environment, which can be achieved through attending seminars and conferences related to SST (Jie & Kamsin, 2021).

6.3.1.2 CO-CREATE WITH CUSTOMERS

The six steps listed below are recommendations on how to co-create in partnership with customers for higher buy-in, competitive advantage and customer engagement (Osmundsen et al., 2018; Vakulenko et al., 2019):

- Consider the business challenge, the audience you wish to communicate with, the business's purpose, and why customers should care.
- Recruit a temporary community of end users and designers or use social media and web listening techniques to generate conversational stimuli.
- Pose intriguing questions to your customers to spark conversations that are pertinent to you and your business. This encourages the community to co-create new ideas, potentially producing innovations.
- Create new product or service concepts or propositions that align with the company's brand and strategic objectives and test them early on to determine which concepts to pursue.
- Transform ideas into prototypes and expose them to the customer community for validation, refinement, and prioritisation via online voting, ranking, and discussion. Analyse quantitative and qualitative data to determine which products and services to bring to market and why.
- Utilise social media and the customer community to promote trial and assess people's reactions. Interact directly with the audience in real-time to comprehend their selections and remarks, thereby facilitating decision-making enhancements.

6.3.1.3 IMPORTANCE OF PILOT PROJECTS

SSTS implementation projects don't always work as intended. Several participants highlighted some trials on the self-service check-out and the valuable lessons learned from the trials. The location of the check-out device is critical to increasing usage and adoption (Meuter et al., 2005; Westerman et al., 2014). One of the participants in an apparel retailer had the check-out device in the back of the store next to the fitting rooms. The aim was to allow a customer who fitted an item to pay and leave the store quickly. However, too many people would try not to buy the item, which led to very low technology usage in those stores. Luckily this was discovered during a pilot, so the investment could be mitigated.

6.3.2 ORGANISATION

6.3.3.1 RESKILLING/UPSKILLING EMPLOYEES

A significant portion of employment opportunities in the Industry 4.0 era will involve diverse modes of interaction and cooperation between human workers and technological systems (Webster & Ivanov, 2019). However, the resultant reorganisation of labour between humans and machines presents various challenges for human workers (Kolade & Owoseni, 2022). The rapid and unparalleled rate of technological advancements in the current era necessitates that individuals must embrace the challenge of consistently reskilling and up-skilling themselves in order to effectively utilise technology as tools or engage in collaborative efforts with robots and AI systems (Kolade & Owoseni, 2022).

6.3.3.2 WORKER-CENTRIC SYSTEMS

In the development of SSTS solutions, it is imperative that the perspective of the individual worker is given utmost consideration in both the design and evaluation processes (Turner & Szykwiak, 2018). It is imperative to design novel work tools and associated work methodologies that yield significant, stimulating, and engaging work assignments (Galdolage, 2021d). Thus, it is imperative that the design results yield favourable effects on employee welfare and organisational advantages, which should translate to better customer experiences.

6.3.3.3 DIGITAL CULTURE AND MATURITY

In order to effectively capitalise on the potential benefits of digitisation and secure their longevity in the contemporary digital era, organisations must undertake the formidable endeavour of readying themselves for a digital future through the process of organisational transformation towards digital maturity (Mtotywa et al., 2021). The concept of digital maturity refers to the attainment of a state in which a company has achieved digital congruence. This state is characterised by the alignment of the company's strategy, structures, culture, processes, people, and digital capabilities towards a set of company goals. A good first step would be assessing the digital capability and literacy among business leaders, and managers is essential to address

potential apprehension towards innovation and reluctance to embrace change (Culot et al., 2020).

6.3.3.4 CONSIDER THE DEPLOYMENT SITES

The general feedback from the participants was that SSTs would improve customer service in their stores but only for a certain subset of society (specifically the medium to high LSM). A participant from a grocery retailer highlighted that more than 80% of their customers are from the lower LSM and primarily use cash to complete their purchases. They were adamant that such technologies could serve the higher LSMs and not so much their retail environment considering the technology savviness of their customers. While their stores have long queues, they preferred adding more cashiers to maintain good queue movement and customer engagement.

According to the participants, South Africa is not ready for a 24/7 store operation like the Amazon Go concept (My Broadband, 2018). The primary reason for this view is the high crime rate which will impact the retailer and the customers travelling to the store at unusual hours. One participant mentioned that the concept could work in residential security estates and university campuses, specifically for convenience outlets. In the participants' view, townships and rural areas should never be considered for SSTs solutions.

The participants also noted the influx of international retailers coming to RSA shores, which would influence some of the adoptions of various technologies and increase competition. Furthermore, a participant from one of the wholesale outlets highlighted the mobile point-of-sale terminals as a measure to reduce the long queues in their outlets. Dedicated staff walk along the queue, identify customers and start scanning their goods; once complete, they simply move to the front of the queue with a barcode to be scanned once, and the sale can then be concluded. Mobile point-of-sale devices are also used to complete the sale on the spot, provided the customer is performing card payments.

6.3.3.5 INCENTIVISE THE BEHAVIOUR CHANGE

One participant compared retail to financial services and urged retailers to provide incentives for customers using the self-service check-out through additional discounts or more reward points as it might increase the usage. Banks were very good at this through higher charges for in-branch transactions versus online (Alnemer, 2022). Retail should focus more on training the users such that more users can be comfortable with using self-service.

6.3.3.6 ENGAGE WITH UNIONS

The implementation of SSTs poses a significant challenge as trade union action is a tangible risk. Therefore, it is imperative that the negotiation of SSTS implementation be considered a bargaining matter between retail companies and their respective employees. The negotiation strategy may need to incorporate assurances of job security for impacted cashiers. From a strategic perspective, it is advisable to prioritise negotiations that centre on the technology involved and the potential benefits for customer service.

Companies can also implement awareness initiatives aimed at mitigating negative attitudes towards organisations and their technologies (Galdolage, 2021b). These programmes should focus on promoting positive perceptions, emphasising the ways in which these technologies contribute to the betterment of individuals and society rather than being solely associated with negative impacts (Galdolage, 2021d).

Organisations must also demonstrate a proactive approach to engaging in constructive dialogue and negotiation with opposing parties, including labour unions, activists, and non-governmental organisations (NGOs) regarding the implementation of SSTs (Matebese & Govender, 2022; Webster, 2022).

6.3.3 ENVIRONMENTAL CONTEXT

6.3.3.1 INDUSTRY-SPECIFIC CONSIDERATIONS

The retail industry in South Africa faces the challenge of delivering superior customer service. Service quality is the difference between a customer's expectation of how a service should be performed and their perception of how it was performed (Verina & Titko, 2019). Retailers in South Africa have encountered tremendous growth over the past two years (McKinsey, 2019). However, the FMCG retail industry has one of the most difficult and complex supply chains to manage due to the complexity of its products and services and because it is so focused on the end consumer (Lincoln et al., 2020).

Incorporating SSTS throughout the end-user supply chain, which enables the development of meaningful customer relationship management with current customers, is one method for retailers to address the pressures to remain competitive (Yang et al., 2021).

6.3.3.2 MARKET DYNAMICS

Given the dynamic nature of the business environment, businesses must update their business models in order to effectively manage uncertainties. Technology presents a promising opportunity for businesses to leverage (Thomas-Francious & Somogyi, 2022). Supply chain retailers and stakeholders must acknowledge the impact of macro-environmental factors on their business operations and implement measures to enhance their resilience in mitigating or eradicating these effects (Deloitte, 2022). The concept of environmental scanning involves gathering crucial information to assess an organisation's internal and external environment, aiming to identify potential threats and opportunities (Freeman et al., 2021). This approach motivates retailers to implement the principles of supply chain resilience, which are critical for ensuring business continuity and preparedness during times of disruptive events (Collins, 2021).

6.3.3.3 DIGITAL DIVIDE

The digital divide is a socioeconomic reality in RSA, and technology, in both its tangible and intangible manifestations, is a multifaceted tool that possesses the potential to both exacerbate and alleviate inequalities (Kolade & Osoweni, 2022). If used effectively, digital technologies have the potential to rectify the power imbalance that they have caused. The socioeconomic environment of the areas where the deployment of SSTs is proposed requires extensive forethought and analysis (Lembani et al., 2020).

6.4 AREAS FOR FUTURE STUDY

As the study solely focused on the retail sector, the findings may exhibit slight variations across industry contexts. As such, an area for future study would be to explore and examine the implications of SSTs in different industries in the South African context.

Contemporary studies on check-out procedures primarily focus on the determinants that influence the selection and utilisation of SSTs. Despite mounting evidence that a hybrid approach utilising both human and technology-based services provides optimal service encounters for customers in the retail industry, there is a paucity of research comparing the effects of self-checkout versus traditional staff-assisted check-out methods (Sharma et al., 2021). Consequently, it is imperative to investigate and comprehend the individual and collective consequences of diverse check-out techniques on the shopping encounter of consumers and the potential influence of said encounters on their loyalty towards the retailer (Parshau & Hauge, 2020).

Subsequent studies ought to investigate the influence of staff, whether physical or virtual, on the user experience of SST. This inquiry should determine whether providing additional verbal cues and explanations to users would yield advantageous outcomes and whether there is a necessity for enhanced staff training or the integration of further automation or digitisation into the process (Turner & Szymkowiak, 2018).

In light of the need to maintain good industrial relations with both employees and unions, the question arises as to the financial responsibility for the retraining, reskilling, and up-skilling of workers to adapt to the demands of Industry 4.0 (Kolade & Owoseni, 2022). Numerous employers have acknowledged the necessity of incorporating employee training as a fundamental component of their organisational strategy in order to attain and sustain a competitive edge (Deloitte, 2022; WEF, 2021). The idealistic stance adopted by numerous employers is, nonetheless, hindered by the actuality of rising labour mobility and employee attrition rates within the Industry 4.0 framework (Kolade & Owoseni, 2022). The aforementioned has significant implications for employers' investments in employee training and the anticipated returns on such investments.

Where retailers are implementing pilot projects, management will require a way to measure the SSTS system to evaluate against the two desired outcomes, namely customer experience and value creation (i.e., time saved, convenience, etc.) (Biedenbach et al., 2022). It is imperative for managers to possess a mechanism to construct a measurement framework and assess the processes of customer experience and value creation (Valulenko et al., 2019). The evaluation and measurement of SSTS network performance are imperative in both the pre-implementation and post-implementation phases. The outcomes of measurement and evaluation have the potential to enhance the performance of the SSTS network by identifying the areas of weakness in the customer experience and value creation procedures (Valulenko et al., 2019). Such a tool could be a source of competitive advantage for customer relationship management and a key input to drive market strategy.

6.5 STUDY LIMITATIONS

The TOE framework exhibits certain limitations. A potential drawback of this approach is its tendency to exhibit excessive breadth and generality, thereby posing challenges in its practical application within particular contexts. Furthermore, it is possible that the framework may not comprehensively encompass the intricacies of technology adoption

and implementation, particularly in swiftly evolving contexts where external variables can exert a substantial influence on technology-related decisions.

This study had a time limitation, meaning cross-sectional data collection was the most feasible option. Data collected at different points may elicit different insights. Moreover, the scope of this investigation was limited to the Republic of South Africa, which is situated in a developing context, with the study solely focused on the retail sector. The findings may exhibit slight variations across diverse geographic, cultural, or industry contexts, particularly between developing and developed regions.

The generalisability of the findings can be enhanced by utilising a random sampling method for sample selection. Nevertheless, the sampling method employed in this study was non-probabilistic. The primary reasons for opting for snowball sampling over random selection were the absence of a sampling frame and the enhanced convenience of obtaining an adequate sample size.

6.6 CONCLUSION

Retailing has gained widespread acceptance in urban and suburban areas due to the availability of diverse products and brands. This contemporary approach emphasises consumer self-service, with the check-out station being the sole point of interaction between the consumer and the service provider. Effective management skills are crucial to prevent the check-out station from becoming a bottleneck in retailer operations. Digital technology has the potential to transform self-service retailing into fully automated self-checkout stations. Despite its widespread adoption in the USA and UK, SSTS still encounters varying levels of customer feedback. However, the SSTS check-out system has not been fully converted in the retail landscape of RSA.

This research examined factors that promote or impede the adoption of SSTS in the retail sector of a developing nation. Self-service technology can improve retail operations by optimising processes, automating routine tasks, and mitigating wait times. It offers convenience and cost savings, enhancing resource allocation and overall business performance. However, security concerns, infrastructure challenges,

and low digital culture must be addressed before implementing self-service solutions. Stakeholders who recognise the potential of technology to enhance retail experiences, increase productivity, and improve customer engagement are more likely to adopt self-service solutions. They prioritise seamless integration with pre-existing systems and protocols, leveraging technology to enhance workflows, optimise data analytics, and gain valuable insights for effective decision-making.

REFERENCES

Aguzman, G., Pangaribuan, C. H., & Sasongko, A. H. (2020). Self-Service Checkouts: The Role Of Service Innovation In Indonesian Convenience Stores. *Psychology and Education Journal*, *57*(9), 81–87. https://www.researchgate.net/profile/Christian-Pangaribuan/publication/349039227_Self-Service_Checkouts_The_Role_Of_Service_Innovation_In_Indonesian_Convenience_Stores/links/601c112745851589398044bc/Self-Service-Checkouts-The-Role-Of-Service-Innovation-In-Indonesian-Convenience-Stores.pdf Date accessed: 10 Mar 2022.

Akpeji, K. O., Olasoji, A. O., Gaunt, C. T., Oyedokun, D. T., Awodele, K. O., & Folly, K. A. (2020). Economic impact of electricity supply interruptions in South Africa. *SAIEE Africa Research Journal, 111*(2), 73–87. https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=9099495 Date accessed: 08 Mar 2022.

Alnemer, H. A. (2022). Determinants of digital banking adoption in the Kingdom of Saudi Arabia: A technology acceptance model approach. *Digital Business*, *2*(2), 100037. https://doi.org/10.1016/j.digbus.2022.100037

Armstrong, B., & Lee, G. L. (2021). *Digital Business.* Silk Route Press.

Asenso, G. B., Asamoah, D., & Agyei-Owusu, B. (2021). Exploring the factors that drive use of self-service technologies in air travel in an African country. *International Journal of Logistics Systems and Management*, *39*(3), 273–291. https://doi.org/10.1504/IJLSM.2021.115791

Aspers, P., & Corte, U. (2019). What is qualitative in qualitative research? *Qualitative Sociology, 42*(1), 139–160. https://doi.org/10.1007/s11133-019-9413-7

Azungah, T. (2018). Qualitative research: deductive and inductive approaches to data analysis. *Qualitative Research Journal, 18*(4), 383–400. https://doi.org/10.1108/QRJ-D-18-00035

Baabdullah, A. M., Rana, N. P., Alalwan, A. A., Islam, R., Patil, P., & Dwivedi, Y. K. (2019). Consumer Adoption of Self-Service Technologies in the Context of the Jordanian Banking Industry: Examining the Moderating Role of Channel Types. *Information Systems Management, 36*(4), 286–305. https://doi.org/10.1080/10580530.2019.1651107

Baker, J. (2012). The technology–organization–environment framework. In Dwivedi, Y., Wade, M., Schneberger, S. (eds). *Information Systems Theory: Explaining and Predicting Our Digital Society* Vol 28. Springer, pp. 231–245. https://doi.org/10.1007/978-1-4419-6108-2_12

Baxter, J., & Eyles, J. (1997). Evaluating qualitative research in social geography: Establishing 'rigour' in interview analysis. *Transactions of the Institute of British Geographers, 22*(4), 505–525. https://doi.org/10.1111/j.0020-2754.1997.00505.x

Beck, A. (2011). *The Impact and Control of Shrinkage at Self-Scan Checkouts.* ECR Europe White Paper. http://global.networldalliance.com/downloads/white_papers/NS_G_Self-Checkout_To%20Launch.pdf Date accessed: 23 Jun 2022.

Bhattacherjee, A. (2012). Social Science Research: Principles, Methods, and Practices. *University of California Scholar Commons,* pp. 113–129. https://digitalcommons.usf.edu/cgi/viewcontent.cgi?article=1002&context=oa_textbooks Date accessed: 30 Mar 2022.

Biedenbach, G., Biedenbach, T., Hultén, P., & Tarnovskaya, V. (2022). Organisational resilience and internal branding: investigating the effects triggered by self-service technology. *Journal of Brand Management, 29*, 420–433. https://doi.org/10.1057/s41262-022-00275-9

Bitsch, V. (2005). Qualitative research: A grounded theory example and evaluation criteria. *Journal of Agribusiness, 23*(1), 75–91. http://dx.doi.org/10.22004/ag.econ.59612

Broll. (2019, April 04). The competition in the SA retail market is intense. IOL. https://www.iol.co.za/pretoria-news/business-report/the-competition-in-the-sa-retail-market-is-intense-broll-report-20545494 Date accessed: 10 Mar 2022.

Bulmer, S., Elms, J., & Moore, S. (2018). Exploring the adoption of self-checkouts and the associated social obligations of shopping practices. *Journal of Retailing and Consumer Services, 42*, 107–116. https://doi.org/10.1016/j.jretconser.2018.01.016

Business Tech. (2020, September 17). A look inside Game's awesome new concept store – with self-checkout counters. https://businesstech.co.za/news/business/434175/a-look-inside-games-awesome-new-concept-store-with-self-checkout-counters/ Date accessed: 10 Mar 2022.

Cebeci, U., Ertug, A., & Turkcan, H. (2020). Exploring the determinants of intention to use self-checkout systems in super market chain and its application. *Management Science Letters*, *10*(5), 1027–1036. https://doi.org/10.5267/j.msl.2019.11.007

Chang, Y. W., & Chen, J. (2021). What motivates customers to shop in smart shops? The impacts of smart technology and technology readiness. *Journal of Retailing and Consumer Services*, *58*, 102325. https://doi.org/10.1016/j.jretconser.2020.102325

Chigbu, B. I., & Nekhwevha, F. H. (2021). The future of work and uncertain labor alternatives as we live through the industrial age of possible singularity: Evidence from South Africa. *Technology in Society, 67*, 101715. https://doi.org/10.1016/j.techsoc.2021.101715

Collins, C. J. (2021). Expanding the resource based view model of strategic human resource management. *The International Journal of Human Resource Management, 32*(2), 331–358. https://doi.org/10.1080/09585192.2019.1711442

Culot, G., Nassimbeni, G., Orzes, G., & Sartor, M. (2020). Behind the definition of Industry 4.0: Analysis and open questions. *International Journal of Production Economics, 226*, 107617. https://doi.org/10.1016/j.ijpe.2020.107617

Deloitte. (2017). Disruption in Retail through Digital Transformation. Reimagining The Store of The Future. https://www2.deloitte.com/content/dam/Deloitte/in/Documents/CIP/in-cip-disruptions-in-retail-noexp.pdf Date accessed: 10 Mar 2022.

Deloitte. (2022, May 24). Future of Work. https://www2.deloitte.com/za/en/pages/digital/topics/future-of-work.html?icid=nav2_future-of-work Date accessed: 09 July 2022.

Dionardo, R. (2016, May 24). Self Checkout reaches critical mass. https://losspreventionmedia.com/self-checkout-reaches-critical-mass Date accessed: 10 April 2022.

Djelassi, S., Diallo, M. F., & Zielke, S. (2018). How self-service technology experience evaluation affects waiting time and customer satisfaction – A moderated mediation model. *Decision Support System, 111*, 38–47. https://doi.org/10.1016/j.dss.2018.04.004

Erlingsson, C., & Brysiewicz, P. (2017). A hands-on guide to doing content analysis. *African Journal of Emergency Medicine*, *7*(3), 93–99. https://doi.org/10.1016/j.afjem.2017.08.001

Fernandes, T., & Pedroso, R. (2016). The effect of self-checkout on customer satisfaction and patronage. *Service Business, 11*(1), 69–92. https://core.ac.uk/download/pdf/143406804.pdf Date accessed: 10 Mar 2022.

Freeman, R. E., Dmytriyev, S. D., & Phillips, R. A. (2021). Stakeholder theory and the resource-based view of the firm. *Journal of Management*, *47*(7), 1757–1770. https://doi.org/10.1177/0149206321993576

Galdolage, B. S. (2021a). Customer Value Co-Creation Intention, Practices and Experience in Self-Service Technologies. *Journal of Scientific Research and Reports, 27*(4), 12–26. https://doi.org/10.9734/JSRR/2021/V27I430375

Galdolage, B. S. (2021b). Interplay between Performance and Convenience in Customer Choice of Self-Service Technologies. *Journal of Applied Science and Technology, 40*(10), 80–91. https://doi.org/10.9734/CJAST/2021/v40i1031361

Galdolage, B. S. (2021c). Prominence of Information Richness in Accepting Online Based Self-Service Technologies. *Archives of Current Research International, 21*(2), 31–42. https://doi.org/10.9734/ACRI/2021/V21I230231

Galdolage, B. S. (2021d). *Value co-creation intention, practices and experience in self-service technologies.* Doctoral thesis from University of Hull. https://hull-repository.worktribe.com/preview/4223201/content-hull_18323a.pdf Date accessed: 29 May 2022.

Ghobakhloo, M. (2020). Industry 4.0, digitisation, and opportunities for sustainability. *Journal of Cleaner Production, 252*, 119869. https://doi.org/10.1016/j.jclepro.2019.119869

Grewal, D., Kroschke, M., Mende, M., Roggeveen, A. L., & Scott, M. L. (2020). Frontline Cyborgs at Your Service: How Human Enhancement Technologies Affect Customer Experiences in Retail, Sales, and Service Settings. *Journal of Interactive Marketing, 51,* 9–25. https://doi.org/10.1016/j.intmar.2020.03.001

Hakim, A. H. L., Ibrahim, H. M., & Pauline, T. P. L. (2022). Customer Perception on the Adoption of Self-Service Technologies in Klang Valley Hotels. *Journal of Tourism, Hospitality & Culinary Arts, 14*(1), 200–216. https://ir.uitm.edu.my/id/eprint/68149 Date accessed: 10 Jun 2022.

Hassan , H., Sade, A. B., & Rahman, M. S. (2013). Self-service technology for hyper checkout stations. *Asian Social Science, 10*(1), 61–65. https://www.researchgate.net/publication/269668360_Self-service_Technology_for_Hypermarket_Checkout_Stations Date accessed: 03 Mar 2022.

Hassan, H., & Farmanesh, P. (2022). Customer adoption of self-service technologies in Jordan: Factors influencing the use of Internet banking, mobile banking, and

telebanking. *Management Science Letters, 12*(3), 193–206. http://dx.doi.org/10.5267/j.msl.2022.1.002

Hongyu, L. Y. W. (2021). Digital Humanities from the Perspective of Cultural Techniques Theory. *Digital Humanities Research*, *1*(3), 3. http://dhr.ruc.edu.cn/EN/abstract/abstract20.shtml Date accessed: 07 Mar 2022.

Iqbal, M. S., Hassan, M. U., & Habibah, U. (2018). Impact of self-service technology (SST) service quality on customer loyalty and behavioral intention: The mediating role of customer satisfaction. *Cogent Business & Management*, *5*, 1–23. https://doi.org/10.1080/23311975.2018.1423770

Ismail, M. H., Khater, M., & Zaki, M. (2017). Digital Business Transformation and Strategy: What Do We Know So Far? *Cambridge Service Alliance.* https://cambridgeservicealliance.eng.cam.ac.uk/system/files/documents/2017NovPaper_Mariam.pdf Date accessed: 31 Mar 2022.

ITWeb. (2016, September 29). Furore over Pick n Pay's self-service tills. https://www.itweb.co.za/content/xo1Jr5MxpewMKdWL Date accessed: 03 Mar 2022.

Jalil, N. A., & Koay, K. Y. (2021). Consumers' intention to use self-checkout technology in a retail context: a comparison of alternative competing models. *International Journal of Business Information Systems, X*(Y), 1–17. https://www.researchgate.net/profile/Koay-Kian-Yeik/publication/349867448_Investigating_young_consumers'_intention_to_use_the_self-service_checkout_system_A_comparison_of_alternative_competing_models/links/60efcf31fb568a7098ae94da/Investigating-young-consumers-intention-to-use-the-self-service-checkout-system-A-comparison-of-alternative-competing-models.pdf Date accessed: 22 Apr 2022.

Jie, N. X., & Kamsin, I. B. (2021). Self-Checkout Service with RFID Technology in Supermarket. In *3rd International Conference on Integrated Intelligent*

Computing Communication & Security (ICIIC 2021) (pp. 495–502). Atlantis Press. https://doi.org/10.2991/ahis.k.210913.062

Khalufi, N. A. M., & Shah K. A. M. (2022). Factors Impacting User Behavioural Intention to Adopt Self-Service Technology: An Empirical Study. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies, 13*(7), 1–13. https://doi.org/10.14456/ITJEMAST.2022.136

Khalufi, N., & Shah, K. A. M. (2021). Factors influencing the adoption of self-service technology in retail industry in GGC moderating role of salespersons' interaction. *Turkish Online Journal of Qualitative Inquiry*, *12*(3), 966–975.

Knezevic, B., Mitrovic, I., & Skrobot, P. (2020). Consumers Attitudes towards Self-Checkout Systems in FCMG Retail in Croatia. *Journal of Service, Innovation and Sustainable Development*, 37–50. http://www.aasmr.org/sisd/Vol.1/Vol.1.1.3.pdf Date accessed: 10 Mar 2022.

Kolade, O., & Owoseni, A. (2022). Employment 5.0: The work of the future and the future of work. *Technology in Society*, 102086. https://doi.org/10.1016/j.techsoc.2022.102086

Leech, N., & Onwuegbuzie, A. (2007). An Array of Qualitative Analysis Tools: A Call for Data Analysis Triangulation. *School Psychology Quarterly, 22*(4), 557–584. https://doi.org/10.1037/1045-3830.22.4.557

Lembani, R., Gunter, A., Breines, M., & Dalu, M. T. B. (2020). The same course, different access: the digital divide between urban and rural distance education students in South Africa. *Journal of Geography in Higher Education, 44*(1), 70–84. https://doi.org/10.1080/03098265.2019.1694876

Lester, J.N., Cho, Y., & Lochmiller, C.R. (2020). Learning to do qualitative data analysis: a starting point. *Human Resource Development Review, 19*(1), 94–106. https://doi.org/10.1177/1534484320903890

Leung, L. K., & Matanda, M. J. (2013). The impact of basic human needs on the use of self-service retailing technologies: A study of self-determination theory.

Journal of Retailing and Consumer Services, 20(6), 549–559. https://doi.org/10.1016/j.jretconser.2013.06.003

Lincoln, L. R., Dassah, R. Y., & Mason, R. B. (2020). *Project 2019/28: Status and Challenges of Automation in the South African Retail Sector, Including Automated, Self-Service Checkouts*. Wholesale & Retail SETA. https://wrlc.org.za/wp-content/uploads/2020/03/2019_28-Automation-in-the-retail-sector.pdf Date accessed: 31 Jul 2022.

Macnee, L. C., & McCabe, S. (2008). *Understanding nursing research: Using research evidence-based practice.* Lippincott Williams & Wilkins.

Malomane, R., Musonda, I., & Okoro, C. S. (2022). The opportunities and challenges associated with the implementation of fourth industrial revolution technologies to manage health and safety. *International Journal of Environmental Research and Public Health*, *19*(2), 846. https://doi.org/10.3390/ijerph19020846

Mamhiyo, G., & Jokonya, O. (2020, December). Factors Influencing Digital Customer Experience Transformation in the Retail Industry. In *International Conference on Multidisciplinary Research* (Vol. 2020, pp. 100–116). https://doi.org/10.26803/MyRes.2020.08

Mapingire, K., Smuts, H., & Van der Merwe, A. (2022). Components of a Digital Transformation Strategy: A South African Perspective. In *Proceedings of Sixth International Congress on Information and Communication Technology: ICICT 2021, London, Volume 2* (pp. 437–447). Springer Singapore. https://doi.org/10.1007/978-981-16-2380-6_38

Matebese, H., & Govender, C. M. (2022). Exploring global unionism to inform South African ICT sector union strategy. African *Journal of Business Management, 16*(5), 117–129. https://doi.org/10.5897/ajbm2021.9315

Matsepe, N. T., & Van der Lingen, E. (2022). Determinants of emerging technologies adoption in the South African financial sector. *South African Journal of Business Management, 53*(1), a2493. https://doi.org/10.4102/sajbm.v53i1.2493

McKinsey. (2019). Future of work in South Africa – Digitisation, Productivity, and Job Creation. https://www.mckinsey.com/~/media/mckinsey/featured%20insights/middle%20east%20and%20africa/the%20future%20of%20work%20in%20south%20africa%20digitisation%20productivity%20and%20job%20creation/the-future-of-work-in-south-africa.pdf Date accessed: 01 Apr 2022.

Mendat, C. C., & Mayhorn, C. B. (2007). An evaluation of self-checkout systems. Researchgate. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting,* 51(17), 1011–1014. http://dx.doi.org/10.1177/154193120705101703

Meuter, M. L., Bitner, M. J., Ostrom, A. L., & Brown, S. W. (2005). Choosing among alternative service delivery modes: An investigation of customer trial of self-service technologies. *Journal of Marketing*, *69*(2), 61–83. https://doi.org/10.1509/jmkg.69.2.61.60759

Miles, M. B., & Huberman, M. (1994). *Qualitative Data Analysis: Expanded Sourcebook.* SAGE Publications.

Mkansi, M., & Nsakanda, A. L. (2023). Mobile application e-grocery retail adoption challenges and coping strategies: a South African small and medium enterprises' perspective. *Electronic Commerce Research*, 1–46. https://doi.org/10.1007/s10660-023-09698-1

Moist, J. A., Anitsal, I., & Anitsal, M. M. (2021). The Customer Value Model and Mobile Banking: Evaluation of Technology-Based Self Service (TBSS) Gaps. *Atlantic Marketing Journal*, *10*(2), 2. https://digitalcommons.kennesaw.edu/amj/vol10/iss2/2/ Date accessed: 10 Mar 2022.

Mosteller, A. (2021, August 05). The pros and cons of using self-checkouts. https://www.business.org/software/point-of-sale/the-pros-and-cons-of-using-self-checkouts/ Date accessed: 10 Mar 2022.

Mtotywa, M. M., Manqele, S. P., Seabi, M. A., Mthethwa, N., & Moitse, M. (2022). Barriers to Effectively Leveraging Opportunities within the Fourth Industrial

Revolution in South Africa. *African Journal of Development Studies*, *2022*(si2), 213–236. https://doi.org/10.31920/2634-3649/2022/sin1a10

Mubako, A. (2017). *Digital transformation. The realignment of information technology and business strategies for retailers in South Africa.* Anchor Academic Publishing.

Mukerjee, H. S., Deshmukh, G. K., & Prasad, U. D. (2019). Technology readiness and likelihood to use self-service checkout using smartphone in retail grocery stores: Empirical evidence from Hyderabad, India. *Business Perspectives and Research, 7*(1), 1–15. https://doi.org/10.1177/2278533718800118.

My Broadband. (2018, October 30). Why the supermarket of the future won't come to South Africa. https://mybroadband.co.za/news/technology/282245-why-the-supermarket-of-the-future-wont-come-to-south-africa.html Date accessed: 10 Mar 2022.

My Broadband. (2019, October 28). The senseless fight against technology advances in South Africa. https://mybroadband.co.za/news/business/324673-the-senseless-fight-against-technology-advances-in-south-africa.html Date accessed: 10 Mar 2022.

NCR Corporation. (2014). Self-Checkout: A Global Consumer Perspective. https://www.ncr.co.jp/wp-content/uploads/files/solutions/self/fl/fl_wpa/RET_SCO_wp.pdf Date accessed: 10 Mar 2022.

Ndlovu, X. A., Ngwane, Z., & Mongae, M. (2022). The Fourth Industrial Revolution and the Political Settlement in South Africa's Mining Industry. *The Thinker, 90*(1). https://doi.org/10.36615/thethinker.v90i1.1172

Neboh, N. D., Ganiyu, I. O., & Shakantu, W. (2022). Drivers of supply chain resilience in the South African retail industry in KwaZulu-Natal. *Journal of Contemporary Management*, *19*(1), 457–486. https://doi.org/10.35683/jcm21078.156

NielsenIQ. (2022, August 15). NielsenIQ State of the Retail Nation report reveals pockets of positivity.

https://nielseniq.com/global/en/insights/analysis/2022/nielseniq-state-of-the-retail-nation-report-reveals-pockets-of-positivity/ Date accessed: 10 Mar 2022.

Ongena, G., Staat, S., & Ravesteijn, P. (2020). Factors affecting the adoption of self-service technology (SST) in the public sector: An empirical examination of housing corporations. *International Journal of Public Administration in the Digital Age*, *7*(3), 32–46. https://doi.org/10.4018/IJPADA.2020070102

Orel, F. D., & Kara, A. (2013). Supermarket self-service checkout quality, customer satisfaction, and loyalty: Empirical evidence from an emerging market. *Journal of Retailing and Consumer Services, 21*(2), 118–129. https://doi.org/10.1016/j.jretconser.2013.07.002

Osmundsen, K., Eden, J., & Bygstad, B. (2018). Digital Transformation Drivers, Success Factors, and Implications. *Mediterranean Conference on Information Systems,* 1–15. https://aisel.aisnet.org/mcis2018/37/ Date accessed: 26 Mar 2022.

Pandey, P., & Pandey, M. M. (2021). *Research methodology tools and techniques.* Bridge Center.

Parschau, G., & Hauge, J. (2020). Is automation stealing manufacturing jobs? Evidence from South Africa's apparel industry. *Geoforum, 115*, 120–131. https://doi.org/10.1016/j.geoforum.2020.07.002

Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research Methods for business students.* Pearson Education.

Saunders, M., Thornhill, A., & Lewis, P. (2009). *Research methods for business students* (5th ed.). Prentice Hall.

Schweitzer, V., & Simon, F. (2021). Self-construals as the locus of paradoxical consumer empowerment in self-service retail technology environments. *Journal of Business Research, 126*, 291–306. https://doi.org/10.1016/j.jbusres.2020.11.027

Sharma, P., Ueno, A., & Kingshott, R. (2021). Self-service technology in supermarkets – Do frontline staff still matter? *Journal of Retailing and Consumer Services, 59*, 102356. https://doi.org/10.1016/j.jretconser.2020.102356

Shaturaev, J. (2022). Economies and management as a result of the fourth industrial revolution: An education perspective. *Indonesian Journal of Educational Research and Technology, 3*(1), 51–58. https://doi.org/10.17509/ijert.v3i1.45652

Shukla, S. (2020). Concept of Population and Sample. https://www.researchgate.net/publication/346426707_CONCEPT_OF_POPULATION_AND_SAMPLE Date accessed: 11 Mar 2022.

Siah, J. W., Fam, S. F., Prastyo, D. D., Yanto, H., & Fam, K. S. (2018). Service Quality of Self-Checkout Technology in Malaysian Hypermarket: A Case Study in Johor. *Journal of Telecommunication, Electronic and Computer Engineering, 10*(2–8), 109–112. https://jtec.utem.edu.my/jtec/article/view/4470 Date accessed: 14 Mar 2022.

Simsek, B. (2019). Gaining Competitive Advantage Through Digital Transformation. Academia – Technology Arts Sciences. https://www.academia.edu/40718239/Digital_Transformation Date accessed: 14 Mar 2022.

Taylor, E. (2016). Mobile Payment Technologies in Retail; A Review of Potential Benefits and Risks. *International Journal of Retail and Distribution Management, 44*(2), 159–177. https://doi.org/10.1108/IJRDM-05-2015-0065

Thomas-Francois, K., & Somogyi, S. (2022). Self-Checkout behaviours at supermarkets: does the technological acceptance model (TAM) predict smart grocery shopping adoption? *The International Review of Retail, Distribution and Consumer Research*, 1–23. https://doi.org/10.1080/09593969.2022.2051195

Tobin, G. A., & Begley, C. M. (2004). Methodological rigour within a qualitative framework. *Journal of Advanced Nursing, 48*(4), 388–396. https://doi.org/10.1111/j.1365-2648.2004.03207.x

Tungande, F., Meyer, A., & Niemann, W. (2020). Opportunities and challenges of social media in supply chain management: A study in the South African FMCG retail industry. *Acta Commercii, 20*(1), a864. https://doi.org/10.4102/ac.v20i1.864

Turner, D. P. (2020). Sampling Methods in Research Design. *The Journal of Head and Face Pain, 60*(1), 8–12. https://doi.org/10.1111/head.13707

Turner, J. J., & Szykwiak, A. (2018). An analysis into early customer experiences of self-service checkouts: Lessons for improved usability. *International Society for Manufacturing Services and Management Engineering, 11*(1), 36–50. https://doi.org/10.2478/emj-2019-0003

Vakulenko, Y., Oghazi, P., & Hellstroom , D. (2019). Innovative framework for self-service kiosks: Integrating customer value knowledge. *Journal of Innovation and Knowledge, 4*(4), 262–268. https://doi.org/10.1016/j.jik.2019.06.001

Van Dyk, R., & Van Belle, J. P. (2019, September). Factors influencing the intended adoption of digital transformation: a South African case study. In *2019 Federated Conference on Computer Science and Information Systems (FedCSIS)* (pp. 519–528). IEEE. https://dx.doi.org/10.15439/2019F166

van Dyk, R., & Van Belle, J. P. (2020). Drivers and challenges for digital transformation in the South African retail industry. In *Information Technology for Management: Current Research and Future Directions: 17th Conference, AITM 2019, and 14th Conference, ISM 2019, Held as Part of FedCSIS, Leipzig, Germany, September 1–4, 2019, Extended and Revised Selected Papers 17* (pp. 42–62). Springer International Publishing. https://doi.org/10.1007/978-3-030-43353-6_3

Verhoef, A., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and

research agenda. *Journal of Business Research, 122*, 889–901. https://doi.org/10.1016/j.jbusres.2019.09.022

Verina, N., & Titko, J. (2019). Digital transformation: conceptual framework. In *Proceedings of 6th International Scientific Conference Contemporary Issues in Business, Management and Economics Engineering.* https://doi.org/10.3846/cibmee.2019.073

Walsh, K., Theron, R., & Reeders, C. (2020). Estimating the economic cost of load shedding in South Africa. Nova Economics. https://www.nersa.org.za/wp-content/uploads/2021/09/Appendix-C_Estimating-the-Economic-Cost-of-Load-Shedding-in-South-Africa-Report.pdf Date accessed: 10 Jul 2022.

Webster, C., & Ivanov, S. (2019). Robotics, artificial intelligence, and the evolving nature of work. In *Digital transformation in business and society* (pp. 127–143). Palgrave Macmillan.

Webster, E. (2022). The rise of social-movement unionism: the two faces of the black trade union movement in South Africa. In *State, resistance and change in South Africa* (pp. 174–196). Routledge.

Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading Digital: Turning Technology into Business Transformation.* Harvard Business Review Press.

Woods, M., Paulus, T., Atkins, D. P., & Macklin, R. (2016). Advancing qualitative research using qualitative data analysis software (QDAS)? Reviewing potential versus practice in published studies using ATLAS.ti and NVivo, 1994–2013. *Social Science Computer Review, 34*(5), 597–617. https://doi.org/10.1177/0894439315596311

World Economic Forum (WEF). (2021). The Future of Jobs Report. https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf Date accessed: 24 May 2022.

Yang, K., Choi, J., & Chung, J. (2021): Extending the Technology Acceptance Model (TAM) to explore customer's behavioural intention to use Self-Service

Technologies (SSTs) in Chinese budget hotels, Global Business & Finance Review, 26(1), 79–94. https://doi.org/10.17549/gbfr.2021.26.1.79

Yang, M., & Park, K. H. (2011). Self-service technologies (SSTs): determinants of adoption and its post-usage outcomes from a focal company perspective. *International Journal of Services and Operations Management*, *8*(3), 305–321. https://doi.org/10.1504/ijsom.2011.038974

APPENDIX A – PARTICIPANT INFORMATION SHEET

Wits Business School | University of the Witwatersrand

PARTICIPANT INFORMATION SHEET

Dear Sir / Madam,

My name is Takusani Tshivhase, and I am a master's in Management in Digital Business student at the University of the Witwatersrand, Johannesburg. As part of my studies, I must undertake a research project. I am investigating digital transformation within the South African retail sector under the supervision of Dr Tebogo Sethibe. This research project aims to determine retailers' challenges and potential benefits of the adoption of self-service technologies.

As part of this project, I would like to invite you to take part in an interview. You will be required to answer questions on self-service technologies, which will take about 60 minutes. I would also like to audio record the interview on Teams with your permission. This recording will be stored in a secured Onedrive folder, and only I, Takusani Tshivhase, will access this recording. It will be deleted after six months of completion of the degree.

Participating in this research project will not incur any personal costs. You will not receive any direct benefits from participation, and there are no disadvantages or penalties if you do not choose to participate in the study. You may cancel at any time or not answer any questions if you do not want to. You also have the choice to withdraw from the study at any time. The interview will be confidential and anonymous, as I will not ask for your name or any identifying information. The information you give me will be held securely and not disclosed to anyone. I will use a pseudonym (false name) to represent your participation in my final research report.

If you have any questions about this research, please don't hesitate to contact me at the details listed below. This study will be written as a research report and published online through the university library website. The data collected from this research project will be stored in a secure Onedrive folder and kept for six months.

If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical) telephonically at +27(0) 11 717 1408 or via email hrecnon-medical@wits.ac.za.

Yours sincerely,
T Tshivhase

Researcher: Takusani Tshivhase
Email: 2480946@students.wits.ac.za

Supervisor: Dr Tebogo Sethibe
Email: sethibet@arc.agric.za

APPENDIX B – PARTICIPANT AGREEMENT FORM

Wits Business School | University of the Witwatersrand

CONSENT FORM

Research working title: Digital Transformation in the South African retail sector – A Case for self-service technologies.

Name of researcher: Takusani Tshivhase

I, ……...., agree to participate in this research project. The research has been explained to me, and I understand what my participation will involve. I agree to the following:

(Please indicate the relevant options below)

I agree that my participation will remain confidential.	YES	NO
I agree that the researcher may use anonymous quotes or false names in his research report.	YES	NO
I agree that the interview may be audio recorded.	YES	NO
I agree that the information I provide may be used anonymously after this project has ended for academic purposes by other researchers, subject to their own ethics clearance being obtained.	YES	NO

…… (signature)

…… (name of participant)

…… (date)

…… (signature)

…… (researcher's name)

…… (date)

APPENDIX C – RESEARCH INSTRUMENT

Wits Business School

University of the Witwatersrand

RESEARCH INSTRUMENT

Research working title: Digital Transformation in the South African retail sector – A Case for self-service technologies.

Name of researcher: Takusani Tshivhase

The researcher will use an interview research instrument. The guiding questions are outlined below.

The main question: How would adopting self-service technologies affect retailers in South Africa?

The sub-questions:

1. Which key considerations are essential for retailers to adopt SSTS in the South African retail sector?
2. What do retailers consider critical opportunities for SSTS adoption in the South African retail sector?
3. What do retailers consider critical hindrances to SSTS adoption in the South African retail sector?
4. What can retailers do to acquire support from all stakeholders for SSTS adoption in the South African retail sector?
5. Would the introduction of self-service technologies benefit your organisation and customers?
6. Would the adoption of SSTs provide any benefit to you as a retailer? If yes, how? If not, why not?

7. The concept of 4IR is always punted across industries. What does it mean for your organisation?
8. Are there any 4IR technologies currently utilised in your organisation or in the pipeline or planned?
9. What drivers will inform investment in SSTS such that it is supported within an organisation?
10. Do you believe the adoption of SSTs and other 4IR technologies will influence your key stakeholders?
11. What development opportunities are available to staff, given the major changes in technology?
12. What opportunities are available to staff in case their roles are impacted by technology adoption?
13. South Africa is faced with the challenge of load shedding and cable theft, amongst others. What contingency plans do you have in place for such eventualities?
14. Could your organisation adopt a 24-hour operation using SSTS and other digital transformation technologies?
15. Would SSTs improve productivity within your stores?
16. Do you believe South African retailers are ready for the adoption of SSTs within our stores?
17. Would your organisation benefit from a 24-hour operation like an Amazon Go store?
18. May you provide any thoughts on SSTs and other technologies relevant to your organisation?
19. Are your employees affiliated with a labour union?
20. If yes, how is your organisation’s relationship with the labour unions?
21. Has your organisation engaged the union on the potential impact of 4IR technologies within your company?

APPENDIX D – ETHICS CLEARANCE APPROVAL

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/DB2480946/872

This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

This certificate is only valid if accompanied by formal permission from the relevant stakeholder(s).

Project title	Digital transformation within the South African retail sector: a case for self-service technologies
Investigator / Researcher	Mr Takusani Tshivhase
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentialty.
Issue Date of Certificate	2023-05-05
Expiry date	Date of submission of the project / research report
Chairperson	Dr Pius Oba ☎ +27 11 717 3976 +27 82 733 6587 ✉ pius.oba@wits.ac.za

Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethics Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Tshivhase
Signature

15/05/2023
Date:

APPENDIX E – LIST OF CODES

Automation	Labour Unions
Barriers To Technology	Limited Impact Of AI On Employment Rates
Business Management	Localisation
Career Planning	Market Segmentation
Collaboration	Negotiation
Collaboration (Union/Employer)	Organisational Development
Connectivity Issues	Partnership
Convenience	Power Supply Issues
Cost Cutting	Power Supply Issues
Cost Savings	Professional Development
Crime	Security Costs
Cultural Habits	Security/Privacy
Customer Analysis	Shopping Habits
Customer Convenience	Social Inequality
Customer Convenience	Targeting
Customer Satisfaction	Technological Acceptance
Customer Service	Technological Acceptance
Customer Service	Technological Advancement
Digital Literacy	Technological Advancement
Digital Transformation	Technological Change
Digital Transformation	Technological Change
Digitalisation	Technological Explanation
Digitalisation	Technological Impact
Economic Difficulties	Technological Readiness
Economic Inequality	Technological Readiness
Education	Technology
Employee Retention	Technology Acceptance
Employee Rights	Technology Adoption

Employment Issues	Technology Adoption
Fear Of Crime	Technology Impact
Impact On Human Labour	Technology Integration
Income Disparity	Technology Integration
Industrial Relations	Technology Limitations
Industry Trends	Technology Limitations
Infrastructure Challenges	Traditionalism
Innovation	Unemployment
Job Displacement	Union Participation
Job Losses	Wages
Job Reallocation	Workforce Development
Labour disputes	