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Project 2019/28:

Status and Challenges of Automation in the South African Retail Sector, Including Automated, Self-Service Checkouts

APPLIED RESEARCH
LEADERSHIP DEVELOPMENT
SERVICE TO RETAIL COMMUNITY

Project 2019/28:
Status and Challenges of Automation in the South African Retail Sector, Including Automated, Self-Service Checkouts

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ABSTRACT

This paper will research the state of retail automation with a special focus on transaction payments at the point of purchase (POS) in South Africa retailers and include a special focus on self-service checkouts. There have been a number of ground-breaking technologies that are beginning to reshape the nature of customers' interactions and transform how shoppers experience the shopping journey. The main focus of this paper is on the current availability and use of self-service checkouts (SSC) in South Africa and its potential impact on customer service and consumer attitudes. The research is significant as the retail industry has undergone major transformation in terms of how technology has redefined how customers interact with retail stores and the nature of the overall shopping experience. The popularity of online shopping and the latest advances in retail technology (retail automation) has witnessed the introduction of omnichannels thereby creating new avenues for building customer loyalty by offering consumers a range of innovative consumer experiences.

Self-service payment points have become ubiquitous worldwide, even though opinion is divided as to their benefits and efficacy. In South Africa only one retailer has implemented self-service in one store as a limited pilot. This research will investigate the background to this as well as some of the latest digital payment systems that are currently in use.

Keywords: self-service technology; self-checkout; self-service checkout; cashierless; retailing

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CHAPTER 1 - INTRODUCTION

1.1 BACKGROUND

South African (SA) retailers are in some respects on a par with their counterparts in developed countries, but still lag behind in the introduction of self-service payment technology in grocery stores and similar FMCG outlets. This study explores the current state of the self-service technology (SST) and the attitudes in the industry regarding future developments in the field of SST. However, the main focus on SST will be on the aspect of self-service checkouts (SSC).

South African retail is regarded as one of the most competitive in the world and retail organisations are constantly seeking out opportunities that will increase market share and customer loyalty. "Competition within the South African retail market is rife. As such, new offerings within centres, new retailer products and unique experiences for customers are vital in order to attract market share. The retail market is changing and evolving at a rapid pace, with innovation being one of the key success factors to survival" (Broll Report, 2019).[1]

The introduction of SSC units in grocery stores has been a controversial topic ever since Pick n Pay introduced the first system in its Observatory store in 2016 for a trial period. Reaction from the public was mixed as consumers came to terms with the new technology but, due to no further implementation of self-payment systems in retail grocery stores, it has not been of much interest. However, South African Commercial, Catering and Allied Workers Union (SACCAWU), the main union in the retail space together with COSATU, were less ambivalent and strongly opposed the introduction of the new technology because of the threat of major job losses in the industry. This was extensively covered in the media and local trade publications, such as Supermarket and Retailer (January/February 2019).

The question remains whether SSCs will, in some form or another, be introduced in South African retail outlets on a wider scale at any time in the near future. As of the present, it *appears, anecdotally, that the only obstacle to its implementation is the social and economic* realities of a country that straddles the spectrum from highly developed to severely under-developed. However, this has not prevented the emergence of a whole range of other

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[11] Downloaded on 09 March 2019 https://www.iol.co.za/business-report/economy/the-competition-in-the-sa-retail-market-is-intense-broll-report-20545494.

technologies from taking root in the chain store sector, including advanced analytics, predictive stock management and digital payment technologies.

This research is challenging as only one retailer has implemented SSCs in this country, albeit in a very limited scenario. Self-service formats are widely available in many other areas that serve consumers in the form of self-service kiosks (SSK). Examples are the use of electronic dispensers for medicines (introduced by the government); kiosks for payments at key foot traffic points in public spaces; self-payment kiosks for parking; self-check in kiosks at airports.

The main objective of this research is to investigate why the SA retail industry has not yet implemented SSCs on a wide scale. SSCs are ubiquitous in many countries around the world. Anecdotally it seems that one of the reasons is the objection from organised labour and subsequent fear of damage to businesses due to strike action should there be large-scale introduction of self-service at payment points in retail stores. In addition, a number of innovative new technologies are beginning to reshape the nature of consumer relationships and how people shop for goods and services. These technologies have the power to totally transform the entire nature of retailing and how shoppers experience the shopping journey.

Developments in the field of robotics, AI, digitization, the Internet of things (IOT), etc. are already appearing in retail stores worldwide. For the field of retail automation, seven new areas of technology were identified as the main drivers for retailers in the coming 10 years:

- Customer expectations
- Ecommerce
- Digital transformation
- Omnichannel retailing
- Physical stores
- IT systems
- Supply chain.
- Consumer experience[2]

There is greater emphasis on how consumers feel about the total shopping experience across the whole store and this may be a more critical factor than just SSCs. It has been

[2] Adapted from a report by DocuSign. Accessed on 23 February 2020. https://www.docusign.com/sites/default/files/final_retail_phase1_ebook_r4_123.pdf

suggested that the adoption of new technologies and new shopping models and formats are game-changers and it is already evident that retailers who lag behind may find themselves in a perilous state as customers move to online shopping and more technologically integrated shopping spaces (Grewal et al., 2017: 1).

Retail payment options have increased dramatically in recent times with the introduction of a number of digital-led payment technologies. These range from app-driven systems, smartphone capabilities and a number of payment sites, such as Snapscan, Mobimoney Wallet [3] and similar e-wallets that are increasingly penetrating the South African payments space. Currently cash is still the most widely used method of payment in South Africa and large parts of Africa, although its share is declining. [4]

1.2 RESEARCH AIM

The objective of this study is to understand the reason why large retail grocery chains in South Africa have not implemented SSC units in their branches in spite of their wide acceptance in many other countries. A second objective is to identify consumers' attitudes towards whether they would welcome the implementation of SSCs and their preparedness to use self-service technology (SST).

1.3 RESEARCH STATEMENT

Technological advances in the last decade have completely changed the face of retailing. The tremendous growth in online shopping has resulted in many brick and mortar brands disappearing completely, as in the case of Borders Books in America, the Stuttafords department store chain in this country and the troubled Edgars chain (Bulmer et al., 2018). The key emerging factor is that consumers want a seamless shopping experience that connects the online store and the traditional store format. The arrival of Omnichannel shopping has made consumer consumption more demanding. Consumers expect that the in-store experience aligns a retail brand with the digital expectations experienced online. Shopping experiences in this context demand that the store format must be able to offer convenience, speed and appropriate technologies that will add value to the brand and its customers (Grewal et al., 2017)

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[3] Mobiwallet technology enable users to conduct deposits, pay for purchases, transfer money and make deposits by cell phone. Mobiwallet is linked to Nedbank customers at this stage.

[4] https://www.itnewsafrica.com/2019/02/10-things-to-know-about-mobile-payments-in-africa/

1.4 RESEARCH QUESTIONS

1) To what extent will the advent of SST improve the shopping experiences of consumers?
2) Will consumers be prepared to scan and pack their own purchases without assistance from store employees?
3) Are large South African wholesale and retail companies willing to invest in implementing SSC technology?
4) What other factors may deter wholesale and retail companies from investing in SST units?
5) What factors will make an investment in SST a favourable decision in terms of improving shopping experiences?
6) Besides the large supermarket type format, will SSCs be suitable for smaller formats like the convenience store category?

CHAPTER 2 - LITERATURE REVIEW

2.1 INTRODUCTION

2.1.1 The modern era: Retail payment innovations

The pace and scale of developments in retail automation globally has become one of the key factors affecting strategic retail decision-making. The invention of the Internet in the 1990's heralded the beginnings of e-commerce and made the capacity to offer online payments a necessity. The size of the mobile payments market, for example, was worth about $600 billion but has been forecast to exceed $4,745 trillion by 2023. This includes use of SMS, wireless application protocol (WAP) and Near field communication (NFC). The size of the electronic payments market can be seen as one of the most active and innovative segments of modern retailing (Allied marketing report, 2018) [5]

Self-service technology (SST), in the form of self-service checkouts (SSCs), is available in several forms, such as ATM's, online banking, hand-held scanning devices, and has become a separate line of research. Furthermore, as the technology expands, retail technologies that promote consumer independence have grown exponentially as more consumers become technology ready and confident with the technology, while retail organisations globally accept new technologies as a means to leverage competitive advantage (Vakulenko & Hellström, 2018).

For decades, service providers have been using various self-service delivery tools, such as interactive voice response systems, internet-based services, interactive kiosks, mobile self-services, and individual health care devices. The global non-internet-based SST market is expected to garner $31.75 billion by 2020 (Vakulenko & Hellström, 2018: 1).

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[5] Mobile Payment market by transaction (SMS, NFC, WAP), type of mobile payment (mobile wallet/bank cards and mobile money), and application (entertainment, energy utilities, healthcare, retail, hospitality & transportation, and others) – global opportunity analysis and industry forecast 2016-2023.https://www.alliedmarketresearch.com/mobile-payments-market)

The last ten years in retail have been characterised by a series of disruptive technologies. [6] Similarly, the introduction of ATM's in the banking industry in the late 1960's [7]acted as a disruptor, as it enabled banks to offer clients a cash withdrawal service outside of regular banking hours at greater convenience and at a lower cost. Banks on the other hand realised the opportunity to lower operational costs by employing fewer staff and thus being able to decrease the number of brick and mortar banks. This accelerated later as online banking became more acceptable to consumers because of the convenience factor.

In a broader context, the introduction of cloud-based systems with bigger data capacities and faster computing speeds enabled greater integration of retail IT systems, and the integrating of the entire store environment to enhance data management abilities. By means of loyalty cards, retailers could link actual purchases and trends with store operations systems (Grewal et al., 2017; Bulmer et al., 2018).

2.2 CHECKOUT INNOVATIONS

2.2.1 Background

Retail automation, including at point-of-sale, has, in the last two decades, introduced a number of changes for consumers with varying degrees of complexity, as mass market retailers seek opportunities for competitive advantages by improving shopper experiences. The effects due to technological changes of these improvements in shoppers' overall experiences in a store have not been studied in depth, nor how these have influenced loyalty and organisational performance been adequately studied (Bulmer et al., 2018; Bitner et al., 2002; Alexander et al., 2008, 2009). On the issue of SST, consumer attitudes (Walker & Johnson, 2016) to this technology will be canvassed by means of online questionnaires with consumers to understand their attitudes to in-store innovations.

Reducing cash payments with cashless options (and in future cashierless stores and self-checkouts), will need to be evaluated in the context of how these concepts evolved and the manner in which they were and are being implemented, using the current literature as a theoretical basis. Self-service checkouts (SSCs) present retail enterprises with a number of

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[6] Disruptive technology is an innovation that significantly alters the way that consumers, industries, or businesses operate. A disruptive technology sweeps away the systems or habits it replaces because it has attributes that are recognizably superior (Investopedia.com)

[7] A Brief History of the ATM, *The Atlantic* 26 March 2015. Retrieved 09 March 2020.

business advantages, but customer perceptions and attitudes appear to be mixed, particularly when faced with self-scanning their own purchases as an opportunity to improve the shopping experience (Bulmer et al., 2018; McWilliams et al., 2016; Vakulenko & Hellström, 2018; Turner & Szymkowiak 2019). Mass-market retailers saw the marketing opportunities of SSCs as promoting convenience, autonomy and speed at the final part of the shopping experience. However, an underlying motive for business was the need to reduce operational costs, primarily by reducing the number of cashiers, but without the risk of negative reactions to the implementation of SSCs. This factor is of extreme importance in the South African situation, when compared with the international experience with self-service options. Additionally, retailers were reported to have reduced the space allocated to the checkout area and put this into use as revenue earning sales and merchandising areas (Bitner et al., 2002). On these issues the range and types of literature is extensive, and a selection of these papers were explored during the course of this research (Bulmer et al., 2018).

For customers, a cashless option promotes convenience by not having to carry cash or having to draw money before shopping or having to use debit, credit or charge cards, as these can be integrated into one payment medium, such as a smart phone, with or without an app, depending on the choice of the consumer. It also promotes consumer convenience in enabling an accessible method to reconcile personal spending on a smartphone. In a 2013 survey it showed that 83% of Canadians have smart phones of which 77% use the device for banking and shopping. Visa has called their mobile cashless service “Online Checkout”, thus promoting the concept of cashless (online) payments. According to Forrester Research, “*mobile payments are set to become a standard point-of-sale option for most retailers, and relatively soon*” (Nuckles, 2017). [8]

2.2.2 Self-service checkouts

There are a number of technical names for a ‘till point’ or Point of sale (POS) that operates as a self-service checkout. Some of the terms used are:

[8] ‘Mobile technology is changing the way that consumers pay, so businesses must be ready, ‘in https://www.business.com/articles/mobile-payment-retailers-faq/

- Self-service checkouts[9]
- Self-checkouts
- Automated self-service checkouts (ASC)
- Semi-attended customer-activated machines (SACAT)
- Self-service kiosks
- Self-service checkout (SSCO)

"Self-service checkouts are tills that have been adapted to enable customers who demand convenience and speed, and are willing to scan and process their own purchases and payment with little to no human intervention"[10]

The earlier precursor that led to Americans adopting the concept of self-service retail machines without human interventions goes back to1888 when the first gumball vending machine was installed. The use of vending machines spread rapidly, and a consumer was able to self-purchase cigarettes, personal items and many other products. Automated teller machines, introduced in New York in 1969, soon became common place across the globe. The self-service checkout was modelled on the concept of the automated teller machine invented in 1984 by David R. Humble, who became frustrated with waiting in long checkout lines at a grocery store.[11] The first SSC units were installed in 1992 in mainly large American chain store grocery outlets. According to an NCR study, since then the number of SSCs are

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[9] For this research paper, we will use the term, 'self-service checkout' abbreviated as SSC when referring to a 'till'. The project scope speaks of 'automated self-service checkouts,' but the level of automation in terms of its technology is relatively narrow as the scanning functions and interface of the unit is similar to that carried out by a cashier, but adapted for easy use by customers.

[10] These devices are not totally without human assistance as an attendant/s is always present to assist customers who have difficulties with the system or product problems.

[11] https://www.bbc.com/future. Interestingly, David R. Humble is responsible for a whole range of retail automated systems, besides only the SSC. These include a self-service retail distribution system (1984), a reader for processing UPC labels (1985), A retail security system for processing items (1985), display units for promoting stock at POS (1986), electronic coupon validation system (1988), besides only the SSC unit and its related software systems. These details were extracted from a US patent website: https://patents.justicia.com/in

expected to grow to an estimated 325 000 by 2019 (NCR Corporation Report, 2019; RBR Report, 2016; Bulmer et al., 2018).

2.2.3 What does a self-service checkout do?

The purpose of SSCs units is to provide customers with the opportunity to scan and process payments without the intervention of a cashier-serviced lane. The SSC is seen as a system rather than a standalone till point. Each SSC device contains the required hardware and software that is integrated with other store systems so as to record sales and provide stock management data at SKU level. The system is ergonomically designed to make the scanning and payment transaction process relatively easy for consumers, with basic computer skills, to be able to navigate through the stages. The customer scans the bar codes of the selected products and places the products onto a space provided by the system for packing. The system prompts the customer to pay by suggesting the various payment types available: cash, debit or store cards as well as app payment technologies like Zapper, Snapscan, PayPal and others. In most installations of SSCs, an attendant is in position close by to assist customers with any problems encountered. The newer SSC units have two scales - one weighs the products before it is scanned and the second after it has been scanned. The weight of the products must agree. if it does not, a beeper is sounded, and an attendant will assist with the transaction. The intention is to prevent shoplifting by by-passing the scanner section (McWilliams et al., 2016; Bulmer et al., 2018). According to McWilliams et al. (2016) and Bulmer et al. (2018), where retailers have implemented SSCs, their motivation was as labour-saving devices and to offer an enhanced shopping experience. Another factor was to better utilise merchandising displays as additional promotional display space, besides the benefit of integrated technological systems.

Retail organizations' attitudes shifted from seeing SSCs as a cost measure to reduce labour costs and to reduce waiting times at tills, to one in which SSTs can contribute towards more efficient service environments and increasing demands for consumers who are seeking a more integrated shopping experience (Vakulenko & Hellström, 2018: 5). Furthermore, SST is but one form of contact between customers and retail establishments, *"… assigning to the customer the role of service conductor and, consequently, co-creator*" (Hsieh et al., 2004). Starting originally with SSCs, a new service paradigm has emerged in which retail services use SSTs in different forms throughout the shopping journey (Vargo & Lusch, 2008). How SSCs add value to retail enterprises by saving time for customers has not been widely explored in the literature, (Vakulenko & Hellström, 2018; Cho & Fiorito, 2010),

“For a given self-service tool, the successful application and performance of both SSK networks and customer experience management rely on service providers understanding of the applicable customer value creation process” (Vakulenko & Hellström, 2008).

A conclusion to be drawn is that SSCs in retail settings are more than merely tools for speed and convenience, but are part of a wider acceptance from consumers to be in control of their purchasing decisions and a demand for a technically inclusive shopping experience as is expected in an omnichannel and in a technologically integrated world. The introduction of frictionless shopping seems to bear this out, although this concept is still in its infancy. However, the notion of a radical technology-driven retail experience is important enough to be on the strategic map of retail executives. See Grewal et al. (2017: 3-4) on consumption and engagement.

2.2.4 The international experience with self-service checkouts

The introduction of an SSC transaction system in the United States was not without its own problems. The move to introduce SSCs was regarded as a radical departure from the then current modes of shopping. The expectation that customers would be readily willing and able (technology ready) to scan and process their own purchases was always going to be challenging, as subsequent experience showed (Dionardo, 2016).

The first hurdle was to persuade customers to assume the burden of performing the work traditionally performed by cashiers. There was a precedent in the US in the late sixties with petrol stations that began to offer self-service pumps, [12] albeit with the inducement of a discount in the price per gallon of fuel. After a while, consumers became accustomed to filling their own cars at petrol stations and processing the payment transactions. [13] The second issue was how to handle the money and credit cards. Here, the growth of sophisticated vending machines and ATMs paved the way. SSCs were equipped with completely automated payment tendering equipment that made it reasonably easy to process payment transactions.

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[12] The very first self-pump unit was in fact in Los Angeles in 1947 but were a combination of manual and computer assisted pumps (Wikipedia.com)

[13] From an historical context, the first self-service retail device can be traced back to the first gumball vending machine in 1888.

American grocery retailers pioneered the installation and use of SSCs and a number of other countries soon adopted this type of scanning technology. The growth of the number of SSCs is probably due to its acceptance by consumers who were willing to use these devices. SSCs have been primarily implemented in grocery and mass merchandise stores, with less of a presence in department store formats.

2.2.5 Self-Checkouts only for supermarkets?

Most SSCs pioneered in the US came with features that tended to support the operational characteristics of traditional supermarket type stores with a front-end checkout area at the entrance/exit. Sophisticated self-checkout equipment is relatively expensive. Aside from equipment costs, retailers must pay for the integration into existing POS and payment systems. Economic returns are derived from space savings and saving on labour costs. It is therefore unlikely that stores with limited foot traffic and relatively low transaction values per customer, like furniture, clothing or specialty stores, would benefit from the introduction of SSCs to warrant the heavy capital investment.

The implementation of SSCs has not been uniformly implemented due to some retailers' scepticism. In a detailed study by Taylor (2016), she observed that some retailers withdrew the SSC units because of shopper reluctance to use them and especially because of increased theft. According to Poulter (2014) consumer reactions to the introduction of SSCs has been presupposed on pre-implementation perceptions of consumer behaviour. This led Bulmer et al. (2018: 107) to comment on the fact that the introduction of SSCs has always been led and based on the views of the retailers, rather than involving consumers in the decision-making process. Retailers have assumed that consumers would accept self-scanning, payments and packing based on historical assumptions of what constitutes convenience and related benefits (Bulmer et al. 2018). An important point made by both Bulmer et al. (2018) and McWilliams et al. (2016) is that innovations in retail automation that involve checkout and payment systems must consider the attitudes, ability and willingness of consumers to adapt to these changes (Poulter, 2014). Given the diverse nature of the social and economic reality in South African, this study tries to investigate how local big retailers consider decision-making concerning the implementation of self-checkout in South Africa. The evolving use of mobile and card payment technologies necessitates a higher level of consumer involvement due to increasing familiarity with the technology via regular use of mobile phones and familiarity of debit and credit card usage. It may be possible to conclude

that consumers who use these technologies on a regular basis may be more willing to adopt the use of SSCs in retail stores.

If properly implemented and marketed, there are distinct benefits to retailers, as described by Inman and Nikolova (2017). They concluded that technological innovations have a two-fold impact in that there are distinct business benefits to the retailer who is able to gather and analyse massive amounts of data about shopper behaviours related to their purchases, lifestyles and relationship building, and by targeting individual customers directly to offer promotional items tailored to each shopper's personal preferences. The technology benefits retailers by reducing costs and increasing business efficiencies.[14]

2.3 THE LITERATURE SEARCH

2.3.1 Introduction

The literature search was in many respects a challenge due to its spread and range both in the number, quality and applicability, of retail technology, and the cross-over between diverse sub-topics and forms of media. While a vast amount of material exists in the public domain, these are scattered across countless websites on the Internet including articles on retail technology ranging from blogs, academic studies, conference papers and reports from local and international financial sources. There are also online posts by technology vendors who, it is presumed, have a measure of self-interest to promote their retail technology brands and products. On a more formal level, there is also a considerable number of research papers in peer-reviewed journals of which a small proportion is on self-service checkouts and various forms of related retail automation. We have not been able to locate any major studies on the subject of SSCs or on issues related to checkout/payment systems specifically for South Africa.

The first part of this research report deals with the international trends and a broad overview of self-checkout technology. The second investigates a number of issues related to self-checkouts with a focus on payment technologies. According to Supermarket & Retailer,

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[14] Kroger in the United States as an example, uses technology to dramatically reduce waiting times at checkouts with "infrared sensors over store doors and cash registers, predictive analytics, and real-time data feeds from point-of-sale systems." The result has reduced the waiting time in Kroger stores from average of 4 minutes to 30 seconds. https://www.informationweek.com/strategic-cio/executive-insights-and-innovation/kroger-solves-top-customer-issue-long-lines/d/d-id/1141541

South Africa is 20 years behind with the introduction of self-checkouts (Jan/Feb 2019). This is despite KFC and McDonalds already using self-service kiosks where customers order and pay for their food orders. The research will focus on two investigative routes by first asking retail executives about their perceptions of self-checkout technology and suitability for their businesses, and second, researching customer attitudes regarding self-checkout use. The use of self-checkouts is not available in South Africa yet, so in both instances, the questions asked of the two sample targets, are hypothetical in nature.

2.3.2 Search methodology

To facilitate the search for relevant literature, a systematic approach, as suggested by Tranfield, Denyer and Smart (2003) and Vakulenko and Hellström (2018) is to identify and select relevant articles on SSCs on and related topics in general and then to apply a filtering method until a core of useful texts will be available to guide the research.

2.3.2.1 Search delimitation

The search for relevant studies has therefore restricted itself to recent studies from 2015 to 2020 to cater for the rapid changes in technological innovation. This limit on the studies used allows for currency and relevance in terms of its contribution to the research. However, a small number of earlier research articles have been included due to these being widely cited and which are still important and relevant in a study about self-checkouts. This method allows for a solid overview of the earlier background of SST in general, and for the introduction of some of the latest digital adaptations that have been recently introduced in retailing. For example, the introduction of frictionless shopping (cashierless stores) by Amazon Go in 2016 was still in a test-phase, but new entrants into the cashierless space (frictionless retail technology) were driving improvements to the technology. 7-11 convenience stores announced in February 2020 that it has opened a pilot frictionless store in Texas with app-based innovations to improve on the existing format (Retail Dive, 2020). [15]

2.3.2.2 Search timing and sources

Searches for primary data were originally planned for July 2019 and to be completed by end of mid-August 2019. However, due to the 3-month delay to the start of this research project, it resulted in the literature search only being finalised during the month of December 2019.

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[15] https://link.retaildrive.com/

This project used a number of online databases that were accessed from the facilities of Stellenbosch University search platforms. The snowball technique was employed to acquire further studies and to search searches for additional sources, documents and reports that apply to retail automation in South African

The library facilities from the University of Stellenbosch were used for the search. The following data bases were used to locate appropriate material: EBSCOhost, Science Direct, Emerald Insight, and Springer Link. This allowed the research to obtain the best studies that were available and to ensure a reliable mix of peer-reviewed and selected articles sourced from a variety of different media (Vakulenko & Hellström 2018). The following key word terms served as general search criteria.

- Retail automations
- Retail technology
- Self-checkouts (and various cognates on this device)
- Retail digital technology
- Retail trends
- Retail payment systems
- Retail formats, alternatively, new retail formats
- Amazon Go
- Frictionless retail
- Retail shopping experience and technology
- Retail convenience shopping
- Suppliers of retail technology and services
- Retail trends in South Africa
- Retail automation trends in South Africa

Additional searches for sources of information, documents and reports that apply to a wide range of retail technology and consumer attitudes internationally and in South Africa was also undertaken within the range of the following sources.

- A search of international retail trade journals with specific reference to technology and consumer perceptions of convenience, speed and services.
- An extensive search of websites that specialise in retailing subjects with a focus on the South African experience.

- Glossaries from books with special reference to the topics enumerated above.

2.3.2.3 Inclusion/exclusion criteria

Given the enormous cache of literature that had reference to the research, a process was then undertaken to refine the literature items even further in order to exclude or include those required for research purposes. This process was governed by the following criteria:

Inclusion: Documents that provided a bibliometric analysis of retail automation, retail technology, and self-service checkouts. Focus was placed on subjects related to retail technology but cross-referenced to self-checkout systems and technology and specifically, to the international retailing aspects involved.
The literature is very fragmented, and it became necessary to further structure the search and selection process across a number of sub-topics; the subject of self-service checkouts together with retail automation was cross-referenced with a more selective domain, including the following inter-related activities:

Following the initial search phase for applicable literature, we began a process to refine the 'mass' of texts that was found and bookmarked those that were potentially aligned to the research scope. The search yielded a total of 33 peer-reviewed journal publications, in English only, that met the inclusion criteria. A further examination of the bibliographies yielded and additional 18 publications. These were related mainly related to more recent publications on the following topics:

- Cash payments
- Cashless societies
- Mobile phone payments
- Card payments
- Contactless payment cards
- Frictionless shopping
- Self-service kiosks
- Consumer attitudes to technology
- Theft as a result of SSC implementation

Exclusion: The process to exclude texts was absolutely essential. The sheer volume of items available, especially electronic texts was massive, and appeared unending as new

posts onto websites continue unabated. Literature items that excluded references to SSC, checkouts, references to cashiers, consumer experience with checkout transactions, were excluded as these were too generic for the research purposes. One of the most challenging aspects of the literature search was the dating of the many online and published documents. A decision was to only include those who had been published or posted onto the web from beginning 2015 onwards, with exceptions for works that had historical reference to the research.

2.3.2.4 Analysis of focus areas

Literature sources included in the review were sorted into three focus areas aligned to the scope and outcomes of the project. They were:

1. Retail automation innovations globally and its impact on the local scene in terms of the adoption of latest technology in the chain stores that participated with this research project.
2. South African retail trends and current technology that were of relevant to the scope of the research.
3. Consumer feedback and perceptions of technology shopping satisfaction and service elements.

Existing literature in textbook formats deal only tangentially with SSCs' and payment transactions and focus on the traditional curricula for retail studies (Berman and Evans 1985, Diamond and Pintel, 2013; Levy and Weitz, 2009; Terblanche et al., 2014).

2.4 TECHNOLOGY DEFINITIONS

2.4.1 Self-service definitions

Self-service technology covers a growing range of software and hardware and increasingly digital applications. These can be confusing, and a brief definition and description will result in a better understanding of the terminology used in this study follows:

- **Self-service kiosks (SSK) is** an umbrella term that includes SSCs. An SSK is also known as interactive self-service kiosk. It is a "… small, self-standing structure, used to display information or facilitate an action. It could be a point of sale (PoS) self-service touch screen kiosk check-out, like those used in supermarkets, … an information point in a tourist attraction, or a kiosk in an airport that allows people to

check-in without joining a counter queue". [16] Besides the retail space, SSK's are found at McDonalds on which to pace an order, tourist sites, museums and banks.

- **Self-service technology (SST) is** a more generic term used to describe all devices that use specialised technological interfaces by which customers can perform services without the intervention of staff. This could include ATM's ticketing kiosks at airports and any similar device that allows consumers to interact with it in order to obtain information about services and products and to withdraw money.
- **Self-service Checkouts (SSC/SSCO)** These are devices placed at the front (the checkout area) of a store at which customers can self-scan, pay and pack their own products without any interaction with a cashier. There a number of store employees available to assist customers in the event that prices fail to scan, user problems and any other problem that may arise. The SSC units are protected with an array of cameras, and these are sometimes monitored live by store staff to minimise incidents of theft. An additional feature for the retail company is that SSC unit takes up less place thus allowing for additional merchandising space in a primes sales area. Or, for additional checkout units to be placed there for added convenience (Grewal et al., 2017: 1-2).

SSCs are more than merely technical adaptations to an expected service, but also impact on how customers experience the shopping journey and may enhance the experience or force customers to reassess where they prefer to shop (Siah & Fam, 2018; Chiu et al., 2010).

2.4.2 Security

According to a Sensormatic Global Shrink Index (2018), Global retail theft amounted $99.56 billion from a survey of 14 countries, excluding South Africa. The issue of security and risk of shrinkage has been cited by researchers as a common refrain from retailers (Sensormatic Global Shrink Index 2018). According to providers of SSC technology, the latest self-checkout systems have been designed to accommodate and enhance all of the existing loss prevention methodologies, such as electronic article surveillance (EAS), closed-circuit television (CCTV) and POS exception-reporting software. EAS deactivation occurs as the items are scanned, and video surveillance and recording activities can be undertaken as if the lanes were manned. But these features may not be sufficient to deter would be shoplifters in a situation where they may not be observed closely by a sales associate

[16] Retrieved on 09 March 2020. https://www.ergonomic.solutions/blog/2019/04/11/the-rise-and-rise-of-self-service-kiosks/

(Dionardo 2016). The study by Taylor (2016) in which she examined how SSCs contributed to retail theft and shrinkage, the author suggests that up to a third of all retail shrinkage is due to the implementation of SSCs. Studies of dishonesty by employees and customers from SSCs is not available as there are no SSCs implemented in this country. However, there are a few studies based on overseas experience.

This study paid attention to this issue and this question was included in the survey questionnaires due to the current high levels of retail theft. There are numerous online articles and reports regarding this issue. In an online site from Australia, SSC theft is specifically highlighted as one of the main contributors to that country's retail crime figures (A$ 3.3 billion between Australia and New Zealand), after shoplifting (Canstar, 2019). [17]

2.4.2 Frictionless stores

(Key words: Frictionless shopping. Seamless shopping experience)

In 2016, Amazon introduced the world's first cashless payments store (sometimes termed 'frictionless stores') when it launched a brand called Amazon Go on its campus in Seattle. This single innovation has taken the concept of customer convenience to a higher level and challenged the established perceptions and future status of retail automation. The impact of a retail outlet in which consumers are already able to walk in, select products and simply walk out without any direct interaction with machines or people, cannot be ignored. This challenges long held perceptions of what a retail outlet is supposed to be. Retailing is defined by its structural configurations such as, its physical layouts and ending with a physical structure, commonly called 'the checkouts,' a space reserved for payment of goods. Another concept difficult to accept is the non-availability of human interventions in the form of cashiers.

"It's taken deep root in the industry (Amazon Go). It's making us think about the way we interact with a store, not just a vending machine, and that's exciting. As a result, automated retail is now a broad area including everything from vending machines to unmanned kiosks to unattended grocery

[17] Accurate South African retail statistics are notoriously difficult to come by. Available data mostly reports on shoplifting and excludes other forms of retail theft and the cost of containing shrinkage. A reliable source in retail security requested anonymity, but said a reliable figure would be 2.5% of total annual retail spend.

stores. In all cases though it sees the customer self-serving in a retail environment that is typically unmanned. That provides a lot of scope for innovation – and growth (Trotter 2018)."[18]

The concept is based on a form of scan-and-go technology by using a smartphone to link customers via the retailer's App. In this scenario, all the normal payment processes are eliminated; customers connect via the app on entry to the store and then commences to collect their purchases. There are no cashiers or checkouts, the customer merely leaves the store and the app automatically calculates the payment and this is deducted from a customer's credit card as loaded onto the app. There is an ever-increasing body of literature emerging as the concept has started to take off in a number of countries around the world. The concept is a mix of different technologies including computer vision, sensor fusion and deep learning applications. The capital costs of setting up frictionless shopping is thus extremely high, and its ultimate impact still needs to be evaluated as more consumers accept or reject the technology (Grewal et al., 2017: 1- 2). On shopper value created by frictionless shopping see also Vakulenko & Hellström (2018: 507-527). The US subsidiary of 7-11 announced that it has introduced a pilot cashierless/frictionless store to assess its efficacy in the convenience formats [19] A detailed list of studies conducted on SSCs and their impact on customer experiences can be found in Fernandes and Petroso (2017).

The concept of cashierless stores is raised in this study as a means to assess current plans and attitudes from a small sample of retailers, even though its implementation on the SA retail scene is likely to be quite distant into the future. However, the concept is an important one, as it seems to be part of a logical progression from the SSC format to electronic payment convenience to one in which all 'friction' has been eliminated to create a seamless journey without having to physically engage with any staff at all from beginning to end.

2.4.3 Retail payments

A payment is defined as an interaction between consumers and the retail entity, either in the form of a brick and mortar store or in an online transaction. Retail payments are performed

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[18] For the impact of retail innovations on the retail industry and predictions for its future, see Cate Trotter who is a retail analyst and speaker on retail trends and innovations. She presents to retail audiences around the globe and is also a contributor to www.insidetrends.com

[19] Retrieved 22 February 2020. https://www.retaildive.com/news/what-7-elevens-cashierless-ambitions-signal-about-the-future-of-convenienc/572480/.

using payment instruments such as cash, mobile phone technology, debit or credit cards etc. Originally payments for goods and services were enacted in the form of bartering. This was a process of exchanging one type of goods for another, for example eggs for loaves of bread. Over time, currency was developed, as ancient civilizations evolved to use precious metals, leather, and paper money to pay for things (Finley 1999). In 1816, England established gold as its standard of value. Credit cards appeared on the scene in 1912, and it wasn't until 1994 that digital payments were introduced.

2.4.4 Cash payments

An important source of payments history, current trends and future planning is that of the Payments Association of South Africa (PASA). This study will make specific use of its 2017 report in which details of how South Africans spend their money and pay for goods and services. This information is crucial for determining current and future trends on retail automation. According to the 2017 report, cash is still the dominant form of payment, averaging 52% of all consumer transactions. Cash payments have on an annual basis, grown by 13%, given the socio-economic background of the SA population, cash is mostly relevant to the lower LSM's. PASA claims its attraction is the lower bank and transaction costs and the trust factor (PASA, 2017: 7).

2.4.5 Cashless societies

It is important to provide some context regarding cash payments in traditional shopping environment. The last 10 years have seen the introduction of different forms of payment transactions and these currently co-exist with cash as preferred tender in South Africa. The trend to eliminate cash from commerce cannot be ignored. There is widespread acceptance many cities around the globe, are moving towards a cashless society. [20] A cashless society is one in which the physical payments for goods and services by means of physical money (paper notes, cheques and coins) has been replaced with various forms of digitally transacted payments. The primary objectives to replace 'hard cash' with digital payments have been on reducing the cost burden of producing physical currencies, the cost of banking cash, the safety and security of not holding and transporting physical money and most of all the convenience for customers who do not need to draw and carry money.

[20] According to a Visa report (2019), 29% of Americans do not use cash for as a medium of payment when making weekly purchases of goods and services.

For retailers, an added incentive is faster cash flow due to the speed of transferring payments into retailer accounts. These forms of non-cash payments are often termed ‘digital currencies,’ but should not be confused with ‘virtual currencies’ such as bitcoin, which is a medium of exchange controlled by its developers of these currencies. In the case of digital payments, (e-wallets, credit and debit cards etc.), the payment systems are developed, marketed and managed by financial institutions, retailers/wholesalers, intermediaries) and (Visa, MasterCard and others) and are regulated by legislation and regulatory authorities.

Sweden, Netherlands, Singapore, Canada and UK have been classified as globally the most advanced in implementation of widespread forms of cashless payments. In a MasterCard study, South Africa was classified as currently at an early stage of digital payment use (Thomas 2017). This study considered (1) current and future access to financial services, (2) macro-economic and cultural factors, (3) merchant scale and competition and (4) technology and infrastructure. [21]

According to the 2016 FBIC survey, “The European Central Bank (ECB) considers NFC-based mobile payments among the most promising payment methods for consumers. Suppliers are making consistent investments to update their NFC (Near Field Communication) hardware and merchants are installing contactless points of interaction based on NFC technology.” [22]

This study also includes figures from a 2014 study, in which12% of Southern African adult consumers were active users of mobile payment accounts, compared to 2% worldwide at that time (World Bank Report 2015: 15-16). These figures would have increased by 2019, depending on the rate of digital payment system (Global Findex Database Report: 2014). The relative high use of cashless and increasingly, digital payments, can be ascribed to the introduction of payment products like M-Pesa that was launched in Kenya by Vodacom and Safaricom in 2007.

There is the perception that mobile payments in South Africa is a trend that has not yet reached its peak, but current and future technological developments, will see a declining

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[21] This study included cheques in the category of cash although in the SA context, cheques have largely disappeared as a method of payment accepted by most retailers.

[22] NFC has been mainly in use on Apple Pay and Samsung enabled smartphones, but is increasing its payment partners.

growth in this payment format for added digitisation with cards, apps and other radical payment issues like enhanced identification technologies, such as facial and iris recognition, to name some of the newer waves of payment possibilities. Chris Woods, the Payments Executive for Nedbank, said in an article on the South African payment context in *My Broadbrand:*

"*The digitisation of payments is accelerating at an eye-watering pace, which, in all likelihood, means that the days of plastic cards may be numbered,"* Woods further noted that the popularity of credit card payments is still rising due to its digital nature and its tangible connection to people's money.
"*The plastic card is the only long-term, physical representation that people have of their relationship with their money*," Wood said. "*Of course, this relationship that people have with their physical credit cards is steadily changing, particularly amongst younger consumers."*

He added that the speed at which the majority of young people have embraced contactless card payments is a good example of 'emerging' customers feeling more at ease with digital payment methods, either with a card or tap and go enhancements.

"*Ultimately, a fast-growing need for mobility and flexibility of payments will drive the evolution of credit card payment transactions and lead to the eventual disappearance of plastic cards entirely,*" Wood said. "*When that day might come is, of course, anyone's guess."*

"*But irrespective of if, or when, plastic credit cards do become obsolete, the onus remains firmly on financial institutions to understand that the concept of credit cards has very little to do with the actual plastic card, and everything to do with the customer need for convenient, secure, and instant payment mechanisms*." (McKay 2019).

2.4.6 Mobile phone payments [23]

In an article in the Guardian (09 January 2017), reporter Adam Forrest wrote about "smart cities' in which entire areas become cashless and payments are enacted with contactless technology. Forrest identified cities in India, Sweden, London and many others. "From Seoul to Bergamo cities big and small are at the forefront of a global drive to go digital. Many of us are happy to tap cards or phones to hop on a bus, buy a coffee or pay for groceries,

[23] Mobile payments require a smartphone or a suitable equivalent and a bank account.

but it raises the prospect of a time we no longer carry any cash at all."[24] A 2016 survey conducted by Deborah Weinswig for Fung Global Retail and Technology, provides a comprehensive summary of the worldwide trend towards a cashless society.

"*Mobile payments take place at a point-of-sale (POS) or checkout when the customer arrives to pay for the selected products. This is also known as 'peer-to-peer 'transfer; or, in an onsite retail transaction, it becomes an 'in-person' mobile payment. In online payments, it is called a 'remote' mobile, all of which are equipped with a suitably enabled smartphone"* (Forrester Research 2014) [25]

2.4.7 Contactless payment cards

(Key terms: Customer-centric, near field communication (NFC), payment ecosystem, mPOS)

As noted in an ECB report (2018), both mobile and cards use the same stakeholders in "a payment ecosystem. This is particularly effective system when combined with Near Field communication (NFC technology). Once the NFC devices have been enabled, then the processes have been reduced from both the retailer's side and the shopper who merely has to tap a card or hold it in proximity to the NFC device. The ease of use eliminates card machines, cashier intervention is reduced, shoppers do not have to insert pin numbers and so on, thereby making the shopping experience more customer-centric.

From the retail perspective, mPOS, or 'mobile point of sale' technology frees retailers from limiting payments at a central store location. For example, stores with multi departments,

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[24] See also Deborah Weinswig 2016: "Mobile Payments: Supporting Europe's Move to a Cashless Society, "for a comprehensive overview of cashless payments throughout Europe: FUNG GLOBAL RETAIL & Technology (https://www.fbicgroup.com/sites/default/files/Mobile Payments Europe by Fung Global Retail Tech July 6 2016.pdf)

[25] Coca-Cola receives credit for offering the first mobile payment transaction in 1997. The beverage retailer created special vending machines that enabled consumers to pay for their drinks by sending text messages from mobile devices. Since this time, mobile payments have skyrocketed in popularity. Now, more people than ever before are paying on the go, and more merchants can accept payments anywhere, without being tied down to a cash register. Retrieved 09 March 2020. https://squareup.com/us/en/townsquare/history-of-money-and-payments

can give salespersons their own mPOS device in order to execute on-the-spot payment transactions, thereby reducing the number of centrally located cashiers (Salman 2019).

One of the most reliable sources of information on payments technologies and current and future trends, is found in a joint Deloittes and MasterCard report (2019). It contains a comprehensive summary of the regulatory framework on retail payments and the technological aspects. The South African government in its National Development Plan (2012) recognised the crucial importance of technology in the economic growth of the economy. The Plan provides the framework for regulating and implementing current and future payment policies. This Plan details the integrated nature of payment technology and practices and is also a comparison of how South Africa positions itself in terms of the global payment situation. The National Development Plan 2012 set a target of 90% financial inclusion for all South Africans by 2030. Currently the figure stands at 80% from a previous low of 46% of the population using various banking services. The objective has been to increase the number of South Africans who formally used banking services. The importance of the Vision 2030 goals for retail in particular can be seen in this comment:

“At the same time, financial services sector transformation is unabated. The industry continues to embrace modernisation both through plans like Vision 2025 as well as through rapid developments in digital technologies, disrupting but also enabling change. Digital technologies have given rise to new market entrants and solutions from adjacent industries that are actively playing in and shaping the payments space. These technologies have had the ability to disrupt more traditional business models, blur the boundaries of previously disconnected sectors, such as banking, telecommunications, retail, while at the same time enabling financial inclusion.”

Convergence is also happening in the retail sector; many retailers are covering a range of financial services products including money transfer services, lending and insurance products, and seeking to deepen customer loyalty in the process. A further example is the convergence between social media and retail, with payments being the enabler for social media-driven ecommerce.

The area where this is most notable is the convergence between telecommunications and banking. The rapid adoption of mobile phones and resultant high mobile penetration rates has played a vital role in delivering digital financial services to those still unbanked or underbanked, at more affordable prices. From a 2015 World Bank report, 14.4% of South

Africans have mobile accounts compared to 11.5% for the sub-Saharan, driven mainly by increasing numbers of the population owning debit cards (World Bank Report 2015: 15-16).

Mobile network operators (MNOs), have contributed to the growth in financial convergence by leveraging on their large customer base. This convergence between cell phone operators allows consumers everywhere to enact digital payments and increases the utility of mobile phones. (IT News Africa online article: 2018). In light of the drive towards payments modernisation, and the continual advancements in technologies, the convergence across industry sectors and new partnerships become key to deepening financial inclusion and driving the shift away from cash (Selective extracts from The National Development Plan 2012). [26]

[26] See also a report from the SARB, (Undated), The National Systems Payment Framework and Strategy – Vision 2025. This vision discusses current and future challenges and provides proposals for a strategy to attain sustainable and inclusive growth based on the National Development Plan 2012

CHAPTER 3 - RESEARCH METHODOLOGY

3.1 RATIONALE FOR THE STUDY

This study deals with the current state of retail automation in the South African retail sector. Its specific scope is on self-service technology (SST) in the checkout areas of the major grocery chain store groups in South Africa. Currently there are no SSCs installed in any grocery or other type of retail store in this country. The study will therefore explore the reasons why only one of the largest chain store retailers have adopted SST, but in a limited implementation. Worldwide there are reported to be to be close to 400 000 SSC units in operation (NCR Corporation Report 2019). In a trial by Pick n Pay in 2016, man SSC unit was placed at the front end-area of the Observatory branch. This trial was challenged by trade union intervention. It would be unreliable to assume that all other mass retail organisation in South Africa have been deterred from introducing SSCs only because of the threat of trade union opposition. The issue is far more complex. It is widely assumed that SSCs are able to reduce overheads, increase levels of customer satisfaction and attract new customers (Considine and Cormican 2017 in Vakulenko *et al* (2019). There is a great deal of evidence, both in quality studies and informal posts on the Internet as to its success as creating more consumer convenience and enhancing the overall shopping experience. Other views have shown that the SSC units are slower, cumbersome and slow down the shopping experience. The topic of theft by consumers using the SSCs has been widely canvassed in both formal and informal studies.

This research therefore attempted at first to investigate attitudes towards SSC implementation by means of a survey aimed at senior executives from four of the major grocery and general merchandise retailers. A second part of this project has been to approach consumers by means of a structured online questionnaire as to their opinions about the use of SSCs and their willingness to engage with an SSC till. This study may contribute further to the field on retail automation; Bulmer, Elms and Moore (2018: 107), have noted that despite a number of contributions, '… research on consumers' experience of retail innovations in-store, including SSCO, remains limited, and arguably, requires further investigation.'

3.1.1 Research method

The approach for this study followed a qualitative method. It was felt that this was the most suitable approach as it allowed a practical way to obtain responses to the specific questions

posed in this study. This was done by drafting a pre-determined set of questions based on the research objectives. The researchers expected that there would be challenges in getting the participants, who were all senior executives in their respective retail organisations, to willingly respond to matters of strategic importance. With this as background, a qualitative method for this study was appropriate for the researchers to understand the responses from the perspective of the representative companies and the contexts of each organisation's environment and responses to retail trends. Even though the sample was exceedingly small with regards to the retailer group, the second sample was aimed at consumers for their perceptions on SSCs. This questionnaire was conducted by means of an online set of questions. This too would have provided contextual feedback.

3.1.2 Research design

The research design applied in this study is based on structured and semi-structured interviews. The structured portion consisted of online questionnaires that were sent to senior representatives of retail organisations. A second questionnaire was compiled and emailed on a randomised basis to a sample of consumers. A follow up semi-structured interview would then be conducted by the researchers with a selected number of chain store participants who had completed the online questionnaires. The objective was to gain further insights into the reasons given in the questionnaire concerning implementation of SSCs in their business and for this study to gain a more nuanced and contextual understanding of their attitudes towards the technology. The questions were formulated using Likert scales with requests for additional information where responses were subjectively linked to organisation-specific information. This has been found to be a reliable method to measure "broader attitudes and values" (Johns 2010). The Likert scale was ideal for this study as it allows for a range of attitudes ranging from negative to positive on the scale and this enabled the research to ascertain how positive or negative the respondents felt about self-checkouts in the South African context.

3.2 DATA COLLECTION

3.2.1 Questionnaire derivation and administration

The data collection commenced with a review of literature and an exploratory study of self-checkout experience internationally and as much as could be gleaned from reports of the situation in South Africa. The researcher met, and had telephonic discussion with, four consultants and one large retailer on retail automation trends in South Africa. This provided sufficient insight and guidance into background for data collection. Subsequently appropriate

survey questions were drafted, and the target population selected. The two sets of questionnaires (see Appendices C and D) were sent by email with explanatory cover letters (Appendices A and B) requesting participation. A short video with a link was attached to show how SSCs worked as there was a concern that especially the consumer group had little no exposure of this system.

The expectation that senior retail executives would complete the online surveys did not materialise. Only one consultant had done so. It was assumed that the retail

3.2.2 Population

The first target population for the resear*ch* was focused on the heads of IT departments, chief financial officers or executives in charge of organisational strategy. The second group was a representative sample of consumers. The survey was focused on only the large grocery/FMCG chain store groups. These would support the project scope and would have been the group most likely to implement self-checkout systems.

3.2.3 Sampling

The sample for this research included a total of five retail organizations which represented 4 large and 1 medium sized organization and one industry expert consultant. This amply met with the requirements of the research scope. A total of 67 consumers completed the online questionnaires which was also adequate. The project terms called for including store managers for their views of self-checkouts as noted in the research specifications: “Interviews with retail managers at shops that have self-service checkouts.” As there are no retail stores that currently feature SSCs, the researcher decided not to interview this group. Another factor was that store managers would have required head office permission to participate and this would have been a challenge to arrange. The research specifications also required in-store interviews with consumers, but this too was logistically a challenge and the reliability of data acquired in a busy retail setting was not the most desirable way to proceed. The consumer survey was therefore conducted by means of an online survey by a reputable research survey service provider.

3.2.4 Data analysis

Due to a delay of three months in the start of the research permission was given to recruit a reputable and professional survey research service provider. This allowed the project to be completed by the scheduled date. The outsource provider was tasked to analyse and present the online submissions.

3.2.5 Ethical aspects

The entire process of this research, particularly data collection was conducted in the highest level of ethical consideration. An ethics clearance certificate was granted by the Cape Peninsula University of Technology's (CPUT) ethics committee (see Appendix E). The approval of the ethics clearance is based on acceptance of ethical considerations of the research which is within the boundaries of the ethics policy of CPUT. Participants were guaranteed confidentiality and the purpose of the study was explained. The participants will also be made aware that their participation on the study is not an obligation and thus they have the right to not answer any question they feel not comfortable in responding to.

The following issues were discussed with the participants prior to their participation in the study:

- The participants were made aware that the study includes observation and thus their reactions will be observed.
- Participants were advised that they may withdraw from the study anytime without a reason.
- Participants are not obliged to answer any questions they do not feel comfortable answering.
- Participants were assured the confidentiality of their personal information and that personal details would not be published or used for any reason other than for the study being conducted.
- Participants may also request a copy of the study from the researcher upon completion
- Participants were briefed before and after their participation about the full study and the value of their contribution

CHAPTER FOUR - DATA ANALYSIS AND INTEPRETATION

4.1 RETAIL STORE SURVEY

4.1.1 Introduction

The research realised that the sample size was going to be limited and would focus only on decision-makers within the large FMCG food retail sector and the aim was quite clear: Will your business introduce SSCs in the future and if not, what are the reasons for the reluctance to do so. The second leg of the research was to canvas consumers attitudes on SSCs, even though most would most likely not have used one.

4.1.2 Company participation

It was always going to be a challenge to connect with and engage with senior management, especially on a strategic topic concerning technological implementation. It was in fact it became evident that it was more difficult than expected to contact the intended company executives and alternative plans had to be made. Calls were first made to the offices of the selected respondents (mostly the PA's) in order to request co-operation from the IT or Finance heads of departments or alternative company officials who were most suited to complete the task. The covering letters and on-line links were then emailed in Mid-January 2020 to the 4-large retail organisations. There were no responses. The researchers then contacted the companies again and managed to speak directly to two of the senior managers and both confirmed that they would complete the online surveys. However, they did not respond. By mid-February, it became clear that another tactic had to be taken and over a period of 4 days starting at the beginning of March, 4 telephonic interviews were conducted based on the set questionnaires, A fifth retailer from a mid-sized format was contacted and a telephonic interview conducted and a franchise group was also invited to respond. In all, there were a total of 5 retailers who participated. Although the sample is small, it does however represent a major portion of the market share in SA.

Table 4.1: Retailer participation

Large Retailers	3
Mid-sized retailer	1
Franchise group	1
Consultant	1
Total	5

Respondents included two IT Managers, one each Head of Enterprise Systems, Supply Chain Director, IT Customer Services, Group Financial Director and one consultant in the supply chain discipline participated. Two consultants from the IT field were invited to respond to the surveys and both did so.

The lack of interest to be part of the survey by many retailers may be attributable to a number of factors. Nonresponse to surveys has been the subject of numerous studies, and non-responsiveness may be attributable to a wide range of causes (Brick and Williams 2013; Haunberger 2011), for example:

1. Not interested/couldn't be bothered
2. No time/busy
3. Antipathy to surveys in general
4. Protect privacy
5. Protect data from third parties
6. Generalised hostility to the researchers requesting information
7. Does not understand reasons for survey

4.1.3 Retailer research objectives

With this background and despite the challenge to encourage retailer participation, the researchers are confident that data that was eventually obtained would provide a reliable outcome to meet the project's objectives, namely to:

1. Identify status of SSC in international and SA retailers
2. Identify attitudes towards self-check systems of retailers and consumers
3. Identify problems with self-checkout systems both technical and longitudinal

The documented interviews and the online submissions were analysed by the outsourced research company and the main conclusions are presented below.

4.1.4 Analysis: Retailers

All retailers were asked the question: Does your organisation currently have any **self-service checkouts implemented** in any of its retail outlets? Figure 4.1 shows that the predominant answer was 'No'. One retailer at first also said no on the survey questionnaire but during the interview

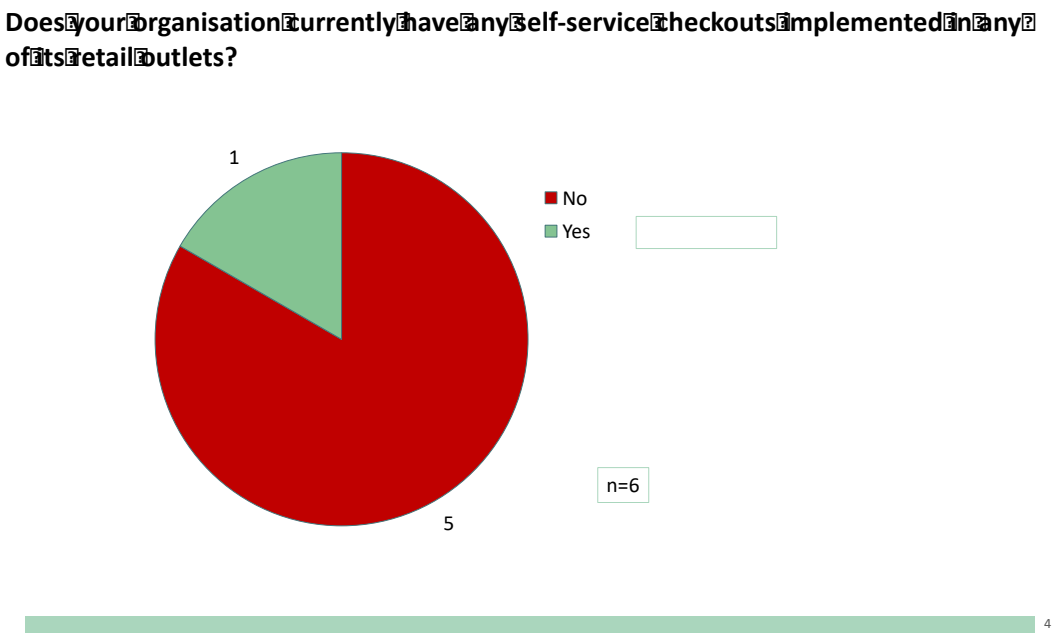

Figure 4.1: Presence of SSCs in SA retailers

The research wanted to find out how much **interest existed in self-service technology** in the sector. Figure 4.2 shows interest split evenly with disinterest.

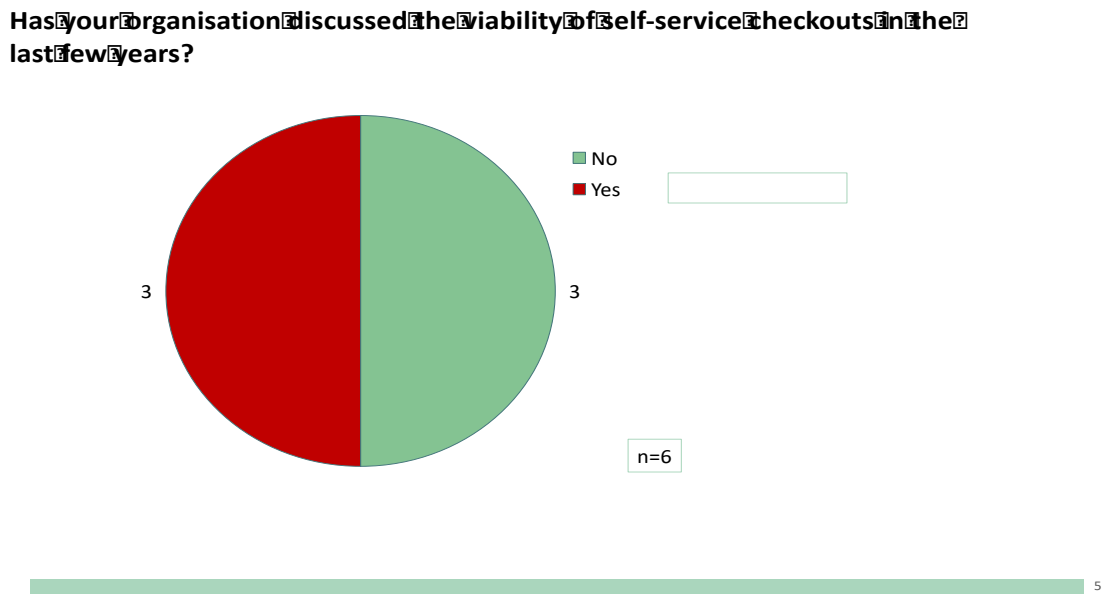

Figure 4.2: Interest in SSCs

The responses indicated that half of the retailers polled have been discussing the developments concerning SSCs. It is possible that this is driven by the considerable publicity in the media for the Amazon Go cashierless store. But it may also show potential for **implementation in SA retail** stores.

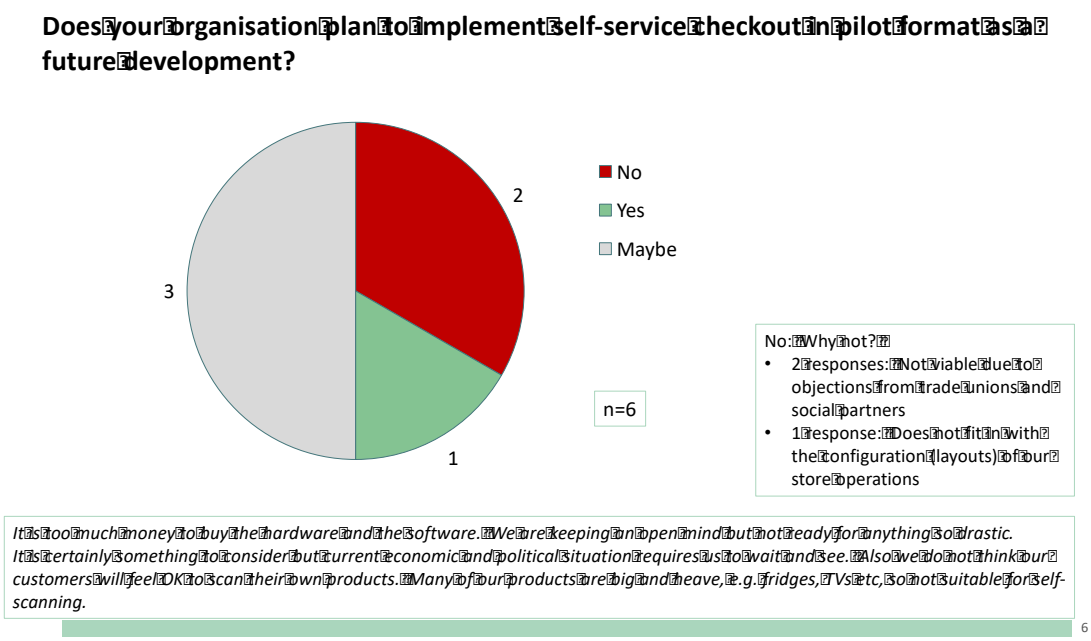

Figure 4.3: Plans to pilot SSCs

Assuming that a roll out of self-service technology would be preceded by pilot installations first, the responses (50%) expressed **uncertainty as to possible future developments**.

When interviewed about this, the responses were as follows:

- 2 retailers said that it was simply not viable due to expected opposition from trade unions
- 1 retailer stated that the SSC unit would not fit in with its store configuration
- 2 retailers replied that "It is too much money to buy the hardware and the software. We are keeping an open mind but not ready for anything so drastic."
- 1 retailer stated that "at this stage and due to the current economic and political situations, we would rather take a waiting stance. It was also too expensive to invest in the systems for now."
- 1 retailer commented that their "…customers would probably not feel happy having to scan their own products." The same respondent also noted that many of their "…products were big and heavy, e.g. fridges, TVs etc., so would not be suitable for self-scanning."

Given the **competitive nature** of mass market retailing in SA and the continuous pursuit of market share improvement, the research wanted to understand what impact there would be if one of the main organisations in the sector should implement self-scanning.

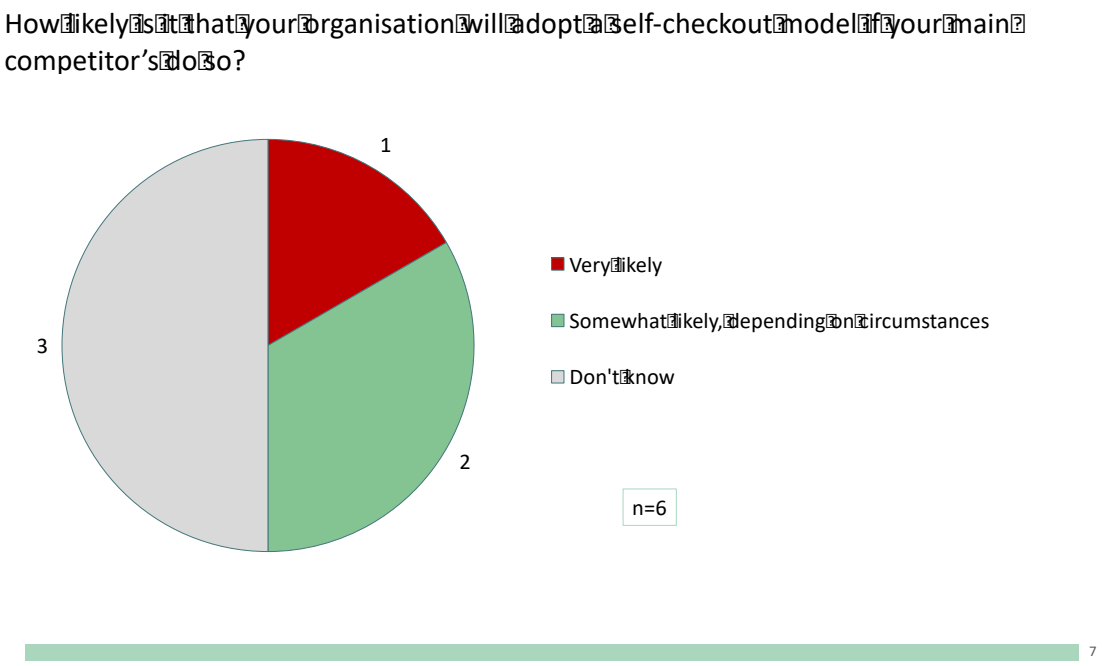

Figure 4.4: Likelihood of adopting SSCs if competitor implements

The large number of respondents who "don't know" is a fair reflection based on a hypothetical question. However, past experience indicates that there have been a number of situations in which retailers respond to market threats and potential loss of customers because of competitor innovations.

When one retailer launched a financial service, other retailers soon followed suit. Although Clicks was the first retailer to introduce their Club Card, some years later a number of other retailers launched their own loyalty programmes.

But the uncertainty and variety of reactions is evident in the next Figure (Figure 4.5) that reflects the uncertainty in the sector regarding self-checkout approaches. There does not appear to be clarity within retail organisations regarding the implementation of self-checkout facilities, quite likely because of a lack of policy and strategic direction in this regard

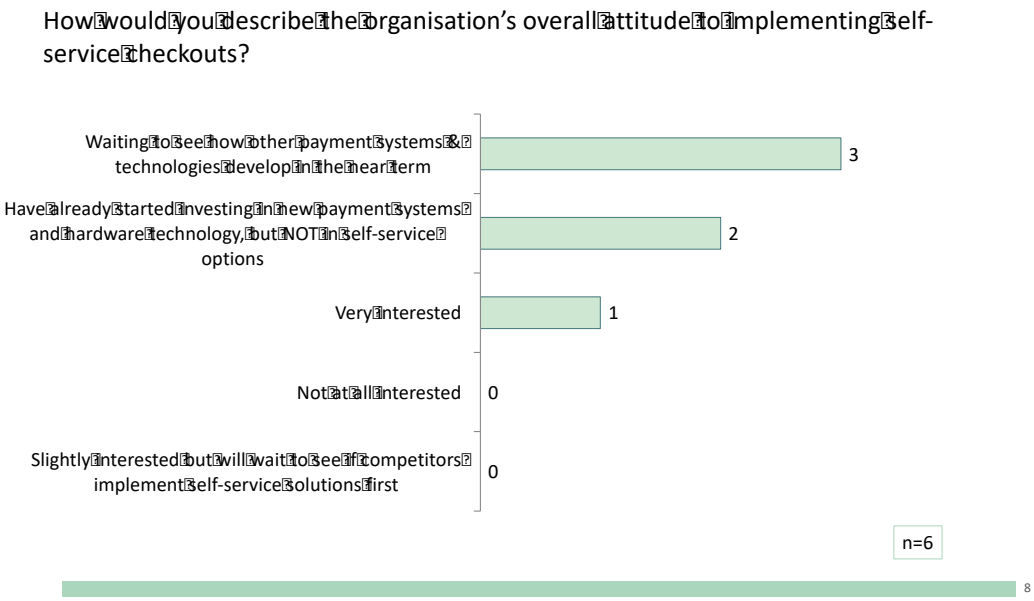

Figure 4.5: Organisational attitude to SSCs

A critical factor with SSC implementation is the purported **financial benefits** accruing to organisations that introduce the technology. Figure 4.6 indicates that the main benefits perceived by the retailers is reduction in people costs.

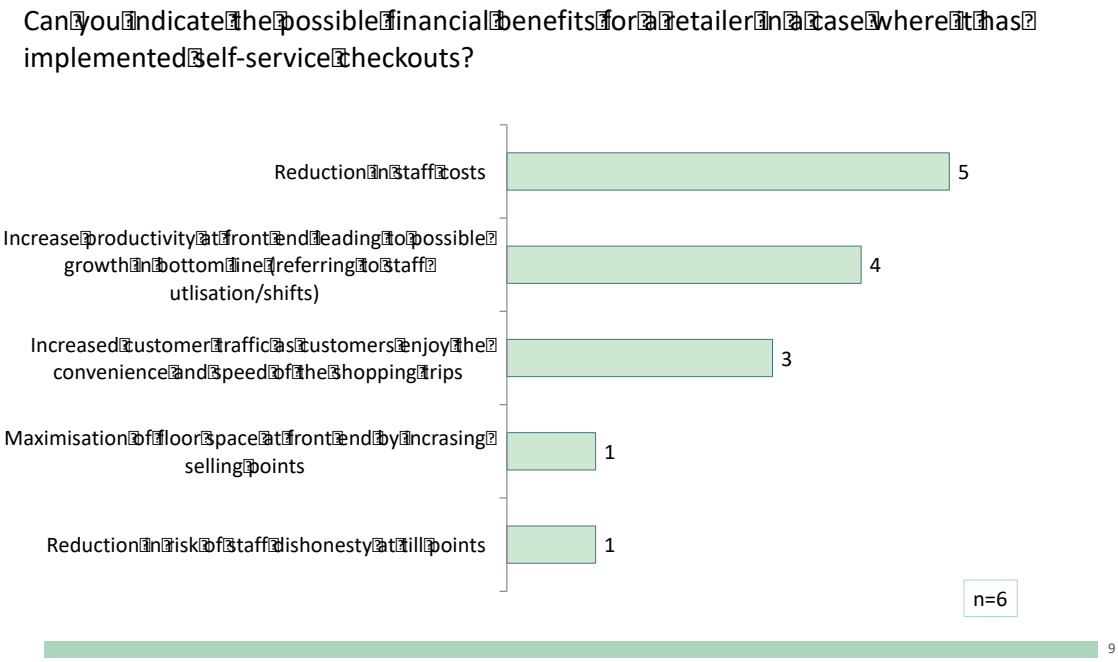

Figure 4.6: Perceived financial benefits of SSCs

The data reflected in Figure 4.6 examined potential financial benefits; however, what was not raised in the research was the potential business and service efficiencies. The studies in

the literature provide little detailed information about financial benefits. The one factor that is common to all the studies is the cost benefit of reducing the number of cashiers. However, an essential feature of the SSCs is that it requires a number of customer staff to be on hand when problems arise (Grewal et al., 2017). Depending on the number of installed units, this may mean that currently employed cashiers would have to be moved into a service support role. Bulmer et al., (2018: 114) commented on the problems encountered when support staff are insufficient, which causes delays, inefficiencies and negates the whole point of implementing SST. At what point does the productivity (speed and accuracy) actually result in cost savings? One of the key issues is wait times at the checkouts. Grewal et al. (2017) commented that cost reductions are apparent only when technology is used to calculate how many till points are required based on sales and average wait periods using predictive analytics (Grewal et al., 2017: 2-3). Kumar, Anand and Song (2017) describe the importance of analytics to profitability when using data to supplement "…thought through retail strategies supplemented with analytics… and its link to profitability." Analytics from data should be key when making the strategic decision of whether to implement SST in order to gain the benefits from the technology that provides more reliable data.

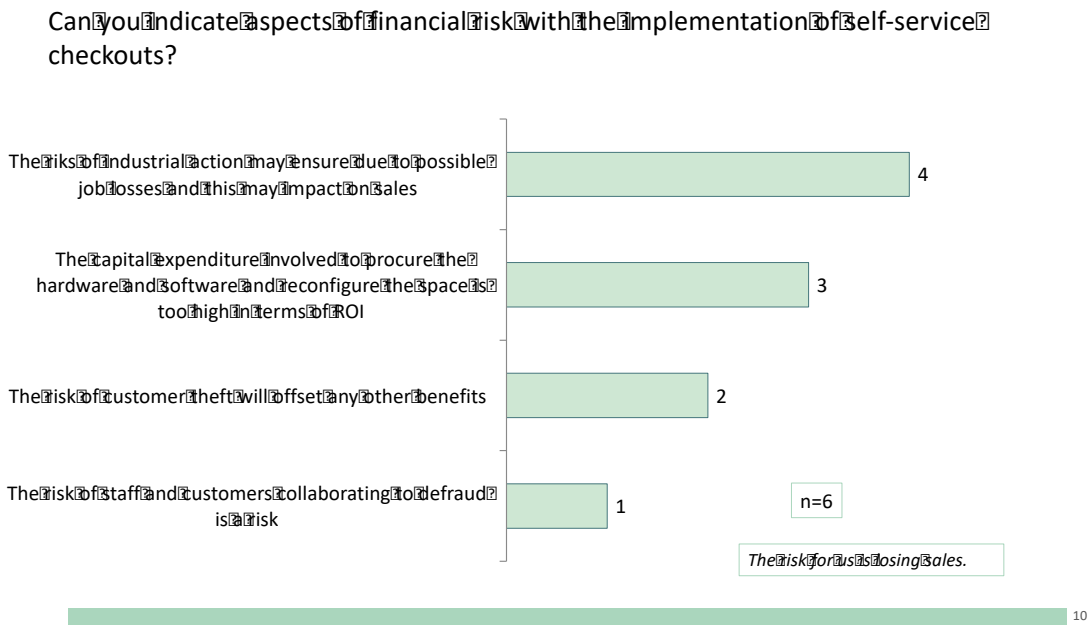

Figure 4.7: Financial risk of SSCs

Industrial action is noted by the respondents as the major reason for **risk**. It is not totally clear if this issue is a real risk or a perceived risk. But if it is, it illustrates the risk-averse nature of SA retailers and the apparent unwillingness to engage with trade unions in a mature way.

Risk of theft is a real phenomenon that has been covered in numerous studies. Most of the latest versions of SST systems are equipped with a range of processes to reduce stealing and fraud, yet this is not always fool proof as methods of dishonesty evolve. This occurs mainly because employees are not always able to monitor customer transactions as closely on self-checkouts and so it is easier for customers to steal. Some examples would be replacing bar codes of high-priced items with lower priced items or just not scanning an item or two. When caught, it is possible for customers to plead ignorance or blame it on an equipment malfunction (Pratt, 2013). The following quotation on the topic of stealing via SSCs is current and descriptive of the problem, and so is provided in full:

“According to a recent survey from the U.K., approximately 19% of shoppers admitted to stealing from self-checkouts with the majority of those claiming they did so regularly. Around 57% of those indicated they first started stealing at self-checkouts because they couldn’t get an item to scan. George Charles, spokesperson for VoucherCodesPro.co.uk, which conducted the survey of 2,634 shoppers regarding their use of self-checkouts, told The Daily Telegraph, "I’m sure most of those who now admit to stealing via self-service checkouts didn’t initially set out to do so - they may have forgotten to scan something and quickly realized how easy it could be to take items without scanning them." After being unable to scan, the second reason given for stealing at self-checkouts were "Less likely to get caught" (51%), followed by "The machine is easy to fool" (47%), "Didn’t have enough money" (32%), and "At the time I didn’t realize it hadn’t scanned" (6%).

The top items people admit stealing from self-checkouts are (Retailwire.com, 2014):

1. Fruit/vegetables – 67%
2. Bakery – 41%
3. Confectionery – 32%
4. Toiletries – 26%

With shoppers shown to be less tempted to thieve if they think someone is watching them, many stores are said to be increasing the number of staff monitoring self-checkouts and also training them around detection. But some high-tech solutions are arriving to combat self-checkout theft. According to a separate story in The Telegraph, one company has applied to patent a system to profile customers at self-checkouts. Based on factors such as time of day, shopping history and checkout length, an algorithm may alert a shopping assistant if a customer is "high risk".

StopLift's Self-Checkout Accelerator system, using overhead cameras to constantly monitor security video, detects merchandise left in the shopping cart or bagged outside of the bagging area without scanning.

In an article in Security Director News exploring Woods Supermarkets adoption of StopLift's system, Malay Kundu, StopLift's president, said, "*Self-checkout is completely open to abuse, but it's here to stay. I believe that it will become as ubiquitous as self-service kiosks at airports. What we're seeing are growing pains*." (Retailwire.com, 2014)

Retailers felt that there existed **other (social) risks** due to job losses and impoverishment of vulnerable groups, which are reflected in Figure 4.8.

Figure 4.8: Other (social) SSC risk factors

No information could be found of SSCs resulting in large-scale job losses. A factor to consider is that most of the large and medium-sized retailers work with reduced numbers of cashiers anyway, so as to avoid having excess cashiers during quiet sales periods. [27] It must

[27] The lead researcher on this study has extensive personal experience and was closely involved in implementing productivity projects aimed at managing work schedules and to

be questioned if there will indeed be large-scale job losses as a result of introducing SSCs in the sector.

Figure 4.9 indicates the frequency of use of the different **payment options** available in the respondents' organisations.

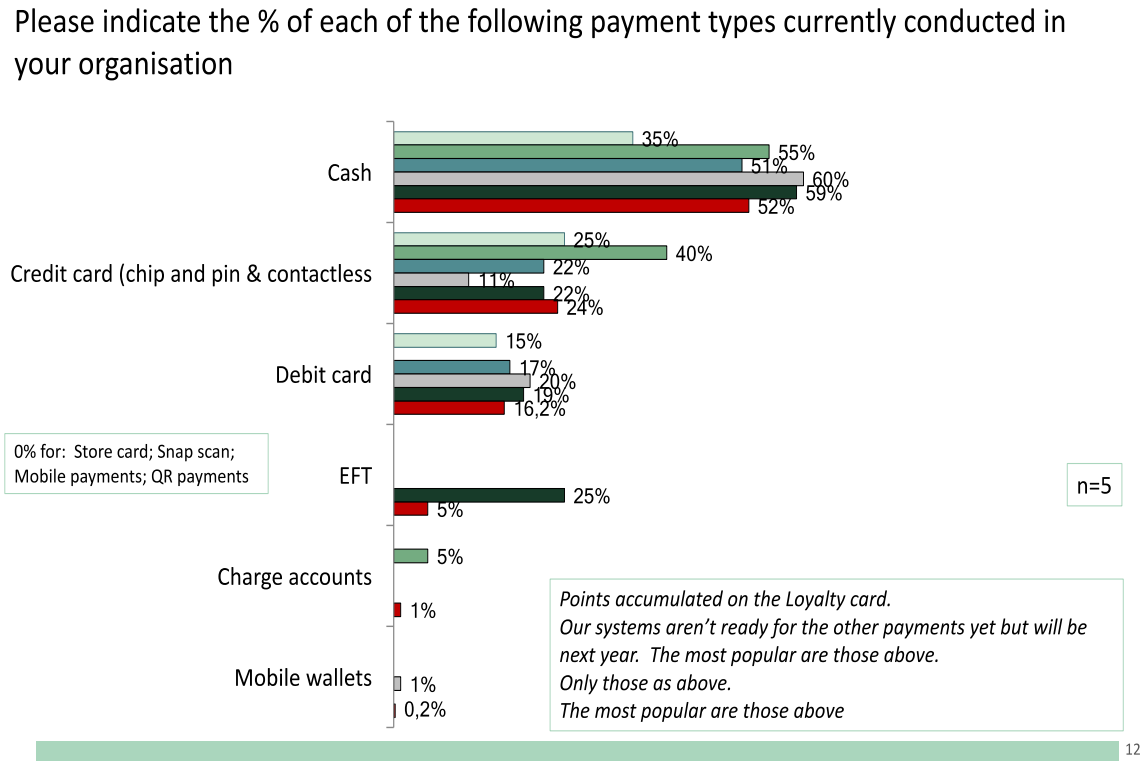

Figure 4.9: Payment types used

The colours represent the five retailers who participated. It is clear that cash still remains the dominant method of payment in SA. The comment in the bottom right-hand of the diagram refers to one retailer. The use of mobile wallets is very small in contrast to other African countries. (Ng, D. 2017). According to one report, the global value of mobile wallets exceeds $721 billion in 2017. *"Africa ranks second in the world in terms of mobile money usage by continent. Mainly thanks to the efforts of Kenyan mobile payment pioneers, M-Pesa, yet South Africa, with the most developed financial services industry on the continent, lags in mobile payments"* (2019(www.itnewsafrica.com)

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improve labour productivity. This researcher has also been a consultant in this regard to a number of prominent retail organisations.

Current mobile payments in SA is from SnapScan, MasterPass, Zapper, mPesa, PayPal and to a lesser extent, Flickpay and eWallet. At this stage acceptance by retailers in SA is very low (www.mediaweb.co,za)

The mobile wallet spend is to grow by 12.9% to reach US$ 29,424.3 (R540 million at exchange rate of R18.00 to dollar) by 2025. The mobile wallet payment segment in value terms increased at a growth rate of 12.6% during 2018-2025 (prnweswire.com, 2019).

Regarding **retail automation**, Figure 4.10 reveals a spread of activities and interest in some of the key retail automation technologies. It illustrates how self-checkout technologies has a relatively low rating in terms of adapting to international technological trends.

Listed below are a range of some of the latest trends in technology in the field of retail automation and services. Please indicate the level of interest for each one in terms of your retail organisation

	Very interested	Somewhat interested	Not for us	Partly implemented	Fully implemented
Demand forecasting applications	1			2	2
Robotic applications	2	1	2		
Demand forecasting/inventory management	1			3	1
Artificial intelligence	1	1	2	1	
BOPIS (Buy online - pick up at a store)	1		2	2	
Online shopping applications	2	1		1	1
Change agility	2			3	

Other
Predictive analytics, Virtual reality.

n=5

13

Figure 4.10: Interest in retail automation technologies

Regarding frictionless/cashierless technology, i.e. stores where consumers can “walk in, select products and walk out”, Figure 4.11 shows an ambivalence towards this technology, maybe because of a lack of knowledge and understanding of the technology (Demoulin & Djelassi 2016)

Please indicate below your organisation's view on frictionless stores, primarily one which includes a "walk in, select products and walk out" format

	Yes	No	Not sure
Do you think this is a format which may be introduced in SA retail within the coming 10 years	2	1	2
Frictionless self-shopping and cashierless stores will be a success in convenience stores only, for example garage stores; limited range and similar formats	2		3
Frictionless self-shopping and cashierless stores can be adapted eventually as a model for a traditional supermarket format	1	2	2

n=5

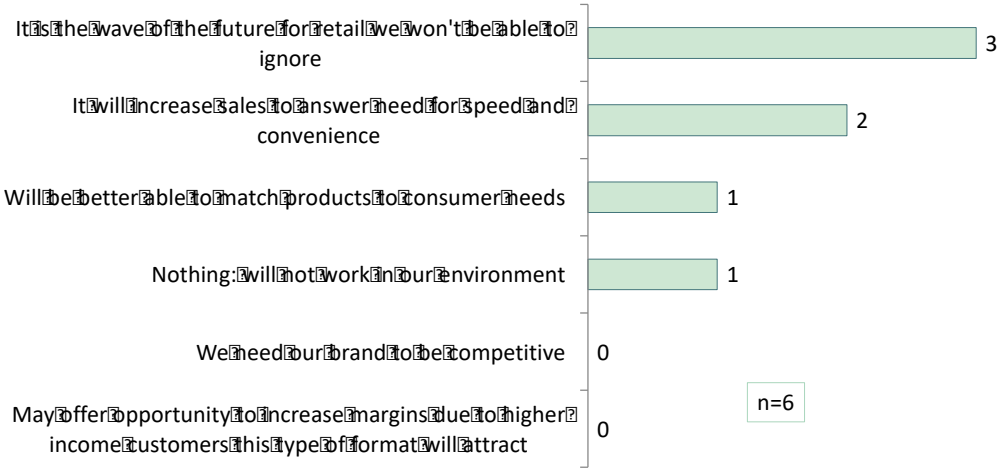
Other
The answer I gave is only important is not cashier stores are the flavour of the day.

15

Figure 4.11: Attitudes on frictionless/cashierless technology

The attitudes towards frictionless stores are expanded on in Figure 4.12, explaining what respondents feel would cause eventual acceptance of the technology.

Which of the following reasons do you feel would compel your organisation to develop cashierless stores?



Other
Too new on the scene to have an option but as tech improves and cost reduces we will have to take an interest.
It does not suit our type of business.

16

Figure 4.12: Reasons compelling adoption of frictionless technology

The next figure, Figure 4.13, indicates what respondents felt is discouraging the adoption of frictionless technology.

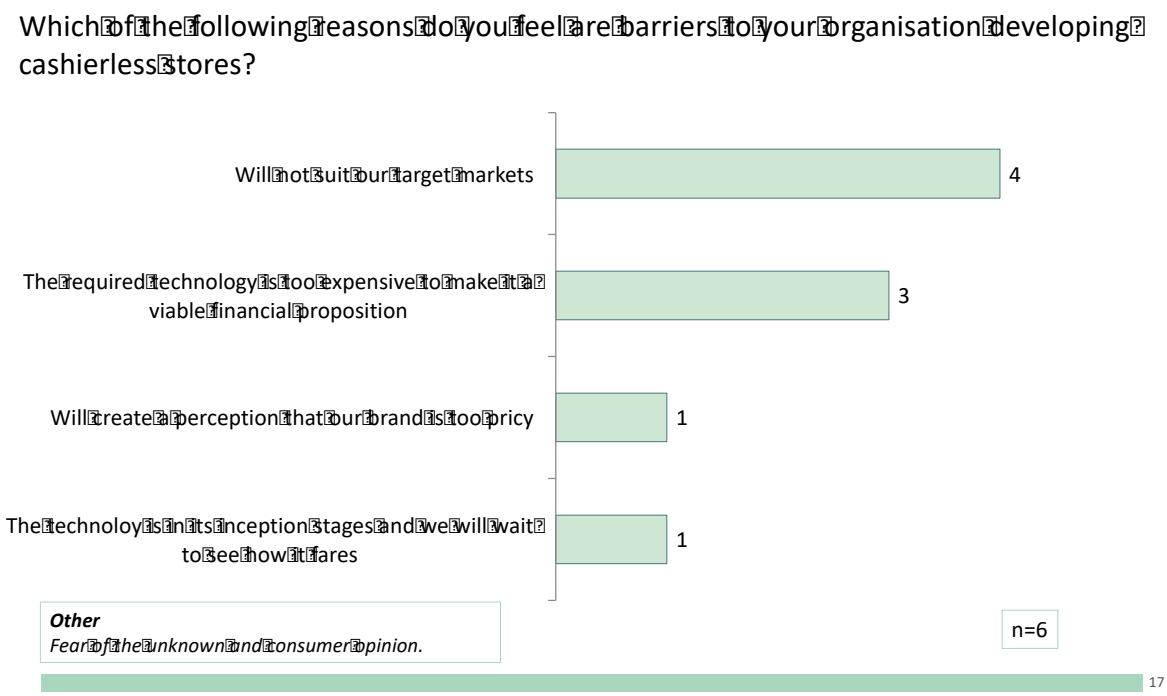


Figure 4.13: Barriers to adoption of frictionless technology

This high degree of uncertainty about cashierless stores appears to also be indicated by Figure 4.14. It is also apparent that respondents feel that the context in which a cashierless store is implemented is critical to whether it is successful or not.

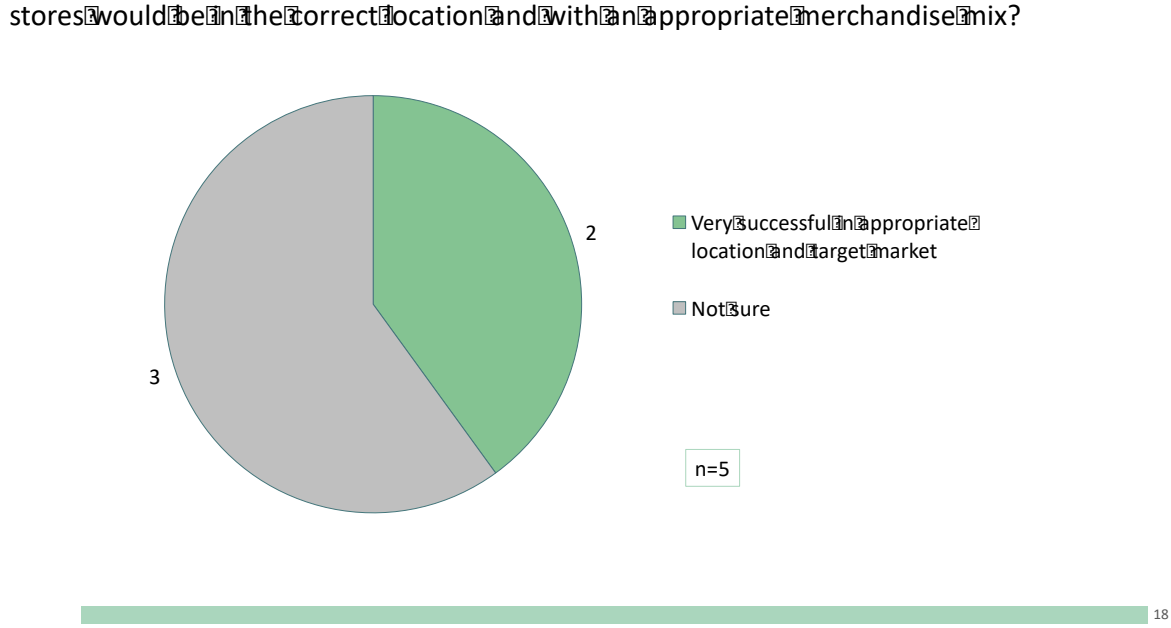


Figure 4.14: Beliefs about the success of cashierless stores

The data reveals the uncertainty of the cashierless model, which is to be expected at this early stage of the technology. This is the trend even in the US, where some cities have banned cashierless formats. For example, the New York City council passed a bill to ban cashierless retail stores and food establishments in January 2020. [28] Philadelphia, New Jersey, San Francisco, Washington D.C. and Chicago are also discussing a bill to restrict cashierless establishments. The argument from these cities has been based on the arguments that cashierless formats discriminate against the unbanked or underbanked (Retail Dive, 2020).

4.1.5 Retail Stores - Conclusions

The survey was challenging in many respects, but specifically in terms of engaging with retail representatives from the small number of stores required for the sample. The lack of reaction forced the researchers to use telephonic interviews in order to collect data. However, we were still able to gain important insights into the attitudes and future plans from a sample of South Africa's biggest retail companies.

1. The final tally of participating companies planned for was 4, and this was achieved. In addition, it was decided to include a medium-sized retailer and also to get the views of a large retail franchise organisation, which gave a total of 6.
2. Three participants completed the online questionnaires. Three interviews were eventually conducted by phone using exactly the same tool as those who submitted online. Additional information was also obtained during the phone interviews.
3. One consultant submitted an online submission. The consultant works extensively in the retail technology field and is internationally recognised for his achievements.
4. The researchers attempted to contact the South African Catering and Allied Workers Union (SACCAWU), the largest registered trade union for the retail sector. A request to speak to the General Secretary, Mr Bones Skulu, was not successful. An email was sent on 20 February 2020 and then he was phoned on 26 February, 29 February and 03 March without success. The researchers decided to abandon this plan, since SACCUWU's opinions on SSCs are well known through media reports.
5. An overall assessment of the data shows mixed opinions and considerable uncertainty on the implementation of self-checkout technology.

[28] The bill awaits the mayor of New York to sign the bill to make law.

a) Half the sector reported that it had not discussed introducing SSCs
b) Only 1 respondent had SSCs installed in one store on a trial basis. Three answered ‘maybe’ and one said ‘no’.

6. Three retailers claimed that they would and see what new types of technologies were still to emerge in the future, one declared it was interested and only one was investigating future trends.
7. The responses did not indicate that there was great interest in introducing SSCs. It is uncertain if these organisations do not see it as a viable proposition regarding South African conditions or if SST is simply off the agenda. During the phone interviews, there arose a subjective feeling that retailers were not well-informed on the benefits or lack thereof of SSCs.
8. The majority expressed the view that SST would reduce front-end staff costs and, secondly, would improve efficiency and productivity. International views on labour cost reduction is very mixed. And from a SA point of view, greatly exaggerated. If it is assumed that SSCs will replace the ‘express checkouts’ commonly found in most grocery retailers and mixed merchandise stores, it will mean that cashiers currently on express tills will be moved to customer support roles at the SSC section. SSC units are intended to cater for small purchases, restricted for speed and the space for scanning goods. On an average basis of five express tills, it can be extrapolated that a minimum of two or more cashiers will become customer service clerks; or if there are multiple shifts all would fulfil that role. It is doubtful given the high staff turnover rates that a handful of staff could not be placed into shelf-packing or similar jobs. It is therefore highly unlikely that there will be any significant labour cost reductions. A cost/benefit analysis would have to be performed to ascertain the financial benefits
9. Risk, both financial and social, are compelling factors to be considered. The majority of participants assign these to loss of sales due to organised industrial action, the large capital investment required over a large number of stores and the threat of theft by both customers and staff. Social risk is in the form of job losses and the well-being of employees, their families and communities. In the SA context, the possibility of mass boycotts is always likely. This may be due to a faulty perception based on the experience of Pick n Pay when this company introduced SSCs. It is not certain as to what will happen in the current context. Retailers would have to consult widely and take a strategic decision as to the viability of SSCs and the likelihood of industrial action. One strategic option could be a phased in process, starting with high income urban stores.
10. The reality is that trade union action is a real threat and the phasing in of SSCs needs to be a bargaining issue between individual retail firms and their employees.

The focus and tactic of such negotiations may have to include guarantees of no retrenchments of affected cashiers. From a strategic point, negotiations should focus on the technology and the benefits for customer service.

11. Payments at till points, excluding online purchases, are characterised primarily by cash, followed by a mix of credit and debit cards. Mobile payments are relatively small, but it can be assumed that when retailers begin to accept mobile wallets this will grow exponentially.
12. Retail automation applications are detailed in the Figure 4.15 below. During the interviews, three retailers were very reluctant to reveal their current progress in terms of the listed technologies. The column, 'not for us' were the views expressed by the smaller retail participant only. From this sample, one can conclude that SA retail organisations are adopting new innovations and trends in line with international practices.

Listed below are a range of some of the latest trends in technology in the field of retail automation and services. Please indicate the level of interest for each one in terms of your retail organisation

	Very interested	Somewhat interested	Not for us	Partly implemented	Fully implemented
Demand forecasting applications	1			2	2
Robotic applications	2	1	2		
Demand forecasting/inventory management	1			3	1
Artificial intelligence	1	1	2	1	
BOPIS (Buy online - pick up at a store)	1		2	2	
Online shopping applications	2	1		1	1
Change agility	2			3	

Other
Predictive analytics, Virtual reality.

n=5

13

Figure 4.15: Interest in various technology trends

13. Figure 4.16 confirms that digital transformation based on Internet connectivity is transforming the sector.

With your own organisation in mind, please rate how critical the following retail technological trends will be for the next 10 years

	Most critical	Somewhat critical	Not critical at all	Don't know
Digital transformation	4	1		
Artificial intelligence	2	1	1	1
The Internet of Things	2		2	1
Cybersecurity	3	1	1	
Augmented/virtual reality to enhance shopper experience	3	1		1
Improved data management, e.g. edge analytics	5			

n=5

Other
Store operations systems to improve stock control, quality and staff productivity.
Consumers will move to more of a club type of buying behaviour to meet their dieting needs and pay a subscription for a time period. Through this they would avoid shopping spree's. Shopping will have more of an entertainment value. Traceability will become key as consumers want to know how product is sourced and what happened at its origin.

14

Figure 4.16: Importance of various technology trends over next 10 years

14. Frictionless retail or cashierless stores is the trending development in international retail. It does not appear that there has been any strategic decision made as to its suitability in local retailing. This report previously mentioned the negative attitudes towards cashierless stores (and the elimination of cash as form of payment) in major cities in the US. The responses given in our research as shown in Figure 4.17 are, in the main, positive concerning this format

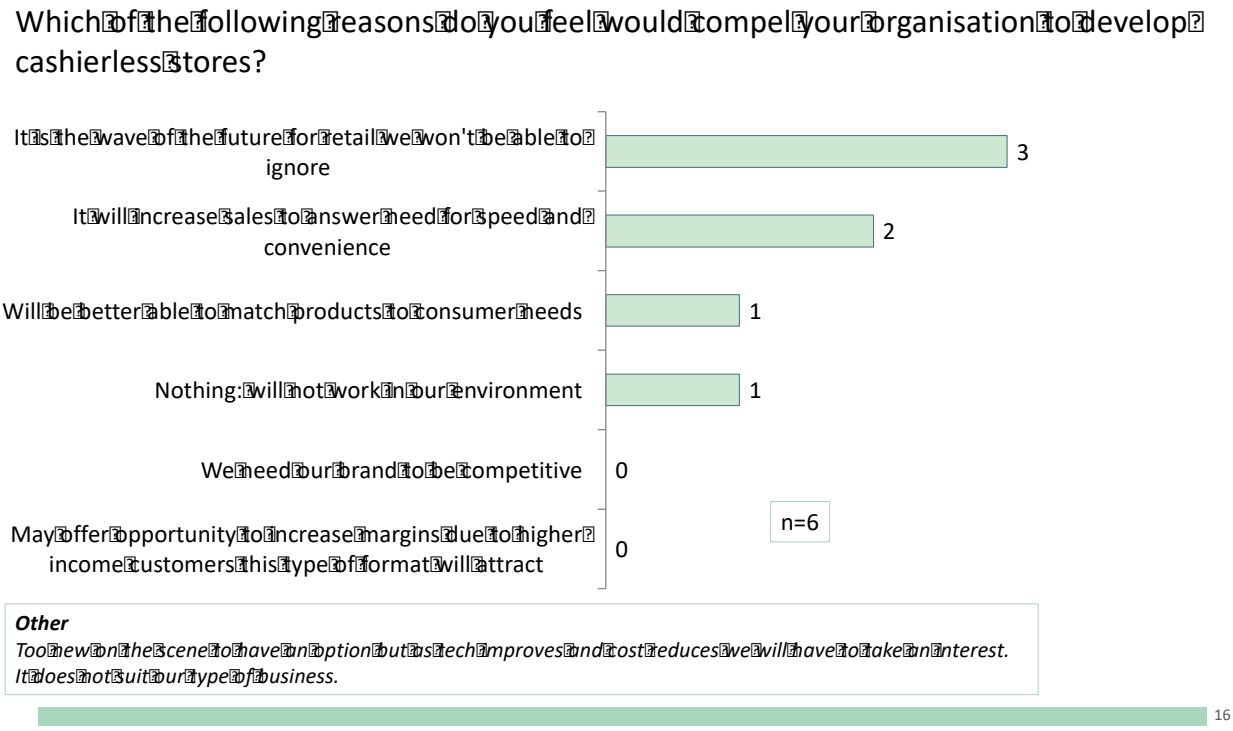


Figure 4.17: Reasons for adopting cashierless stores

However, this technology requires steep financial capital investment, as the technology is still in an experimental state and thus demand is low. It is certainly a decision that will take some time to stabilize. Amazon started app-based cashierless stores only two years ago with the first experimental store on its campus in Seattle. It appears from the Amazon Go experience that cashierless stores are targeted at affluent target markets. The pilot project by 7-11 in America is interesting in that it is being investigated for its applicability in the convenience store space. The cashierless stores, given the limited nature of the roll out, carry limited ranges of mostly food-to-go and basic everyday products. Amazon Go is currently found in 25 locations, in New York, Seattle, San Francisco and Chicago. Amazon own the Whole Foods brand and market speculation is that it will introduce a cashierless format in very large retail units. In a news item from the Guardian newspaper (14 March 2020) it has been reported that Amazon will open its first Amazon Go outlet in London (Mann, 2013).

15. Of significance for this study, the Guardian report added that, “This is not the first experimental version of frictionless retail in the UK; Tesco and Sainsbury’s have both tested cashless stores in London. Sainsbury’s ditched its test after it found shoppers less than keen to sign up to its special app, which put off passing trade. Automated tills and other existing technologies are already quick to use, meaning there is little incentive for shoppers to sign

up to something new." Waitrose have taken a less risky route and have begun to promote mobile payments as a preferred form of payment.

16. This study is of the view that for SA, cashierless/frictionless retail formats are best suited in the convenience market. It is ideal in limited assortment space, as in forecourt outlets and smaller franchise stores that trade 24 hours a day. However, given the experience in the UK. The most likely future outcome will be some form of hybrid store that will offer a combination of the current experimental shopping experience, combining speed, high levels of stock availability and mobile payment systems.

4.2 CONSUMER RESEARCH SURVEY

Online research was conducted, by an outsourced research provider, among consumers on their attitudes towards SST and SSCs. The survey was conducted via online submissions. Respondents were selected via a randomised and representative sample covering the demographic profile of all South Africans, using a standardised online research methodology. This consumer analysis is thus of a valid and reliable sample of South African consumers.

Since it was likely that many consumers would not know of what SSC technology is, we started the survey by showing a video of what SSC technology is - see Figure 4.18.

Respondents were shown a video demonstrating a self-service checkout

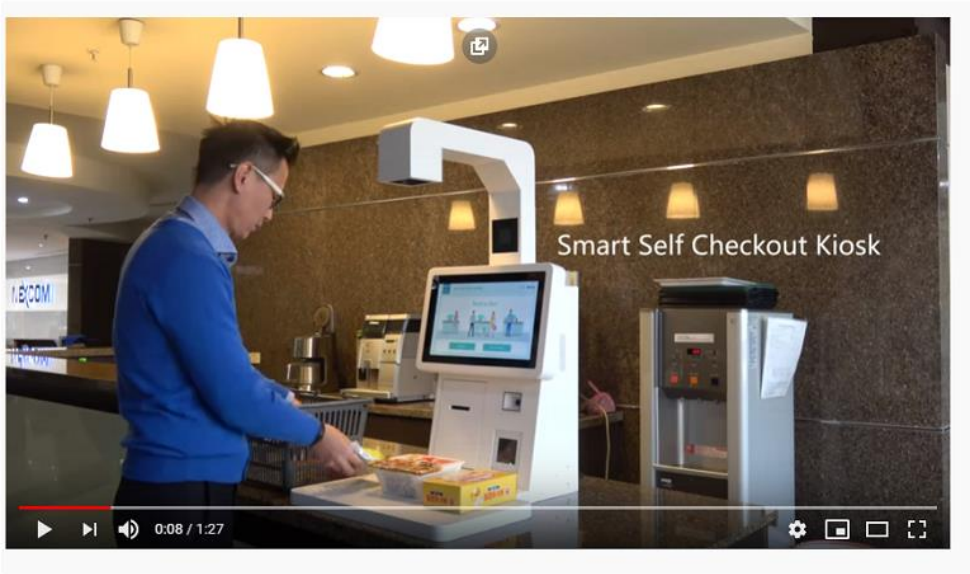


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Figure 4.18 Clip from video showing what SSC is

4.2.1 Consumer demographics

A total of 67 consumers completed the online questionnaire between 4 and 18 February 2020. Figure 4.19 provides a profile of the sample.

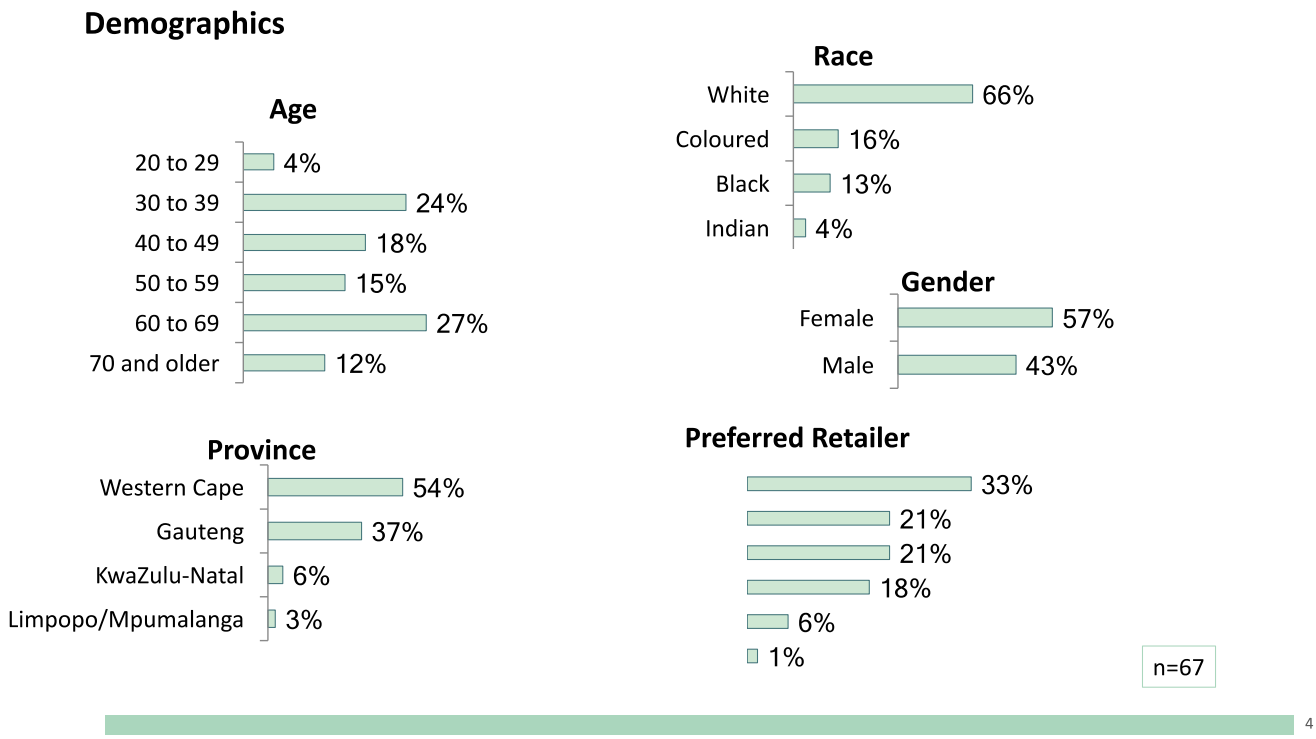

Figure 4.19: Demographic profile of consumer respondents

4.2.2 Analysis: Consumers

The data on the question about preferred retailer most frequented has not been shown in the interests of confidentiality of the research project.

The study by Bulmer et al. (2018) provides a useful synthesis of the key issues in favour of SSCs and also identifies the main problems encountered by customers who have experienced SSCs. The findings in the Bulmer et al. (2018) study are reflected in most other studies, namely those concerning service problems and attitudes towards SSCs in general. Our study surveyed these concerns according to the following themes: Time, conveniences, problems encountered when scanning and potential job losses. The consumer responses in this study are significant for any retailer contemplating introducing self-checkout services.

The data collected by the Bulmer et al. (2018) research project displayed that views amongst consumers were divided between those who favoured SSCs and those who did

not, and this is the outcome in our research as well. This created an ambivalence regarding consumers' experience on the use of SSCs.

An important factor to note is that the Bulmer et al. (2018) study was based on a situation in which consumers surveyed were already using, or not using, SSCs. In the case of our research, we were aware that the responses would have been "potential" and respondents were asked to give their attitudes on a hypothetical situation. We believe that the data is still valid and will be invaluable as a starting point of reference for any retailer who plans to implement SST.

The research findings will follow five themes related to consumer perceptions and each one will be analysed with reference to local conditions.

4.2.2.1 Time

Time spent in lines at checkouts is one of the most prominent problems consumers experience when shopping. The selling point of SSCs is that they reduce waiting time by speeding up the time and effort it takes for customers to scan their purchases and finalise the transaction. Differentiation has to be taken into account of the size and nature of the shopping basket. This outcome is critical for time-pressed consumers for whom convenience is defined by speed.

The survey asked what impact there would be on the time spent shopping in a store with installed SSCs. Figure 4.20 illustrates the responses.

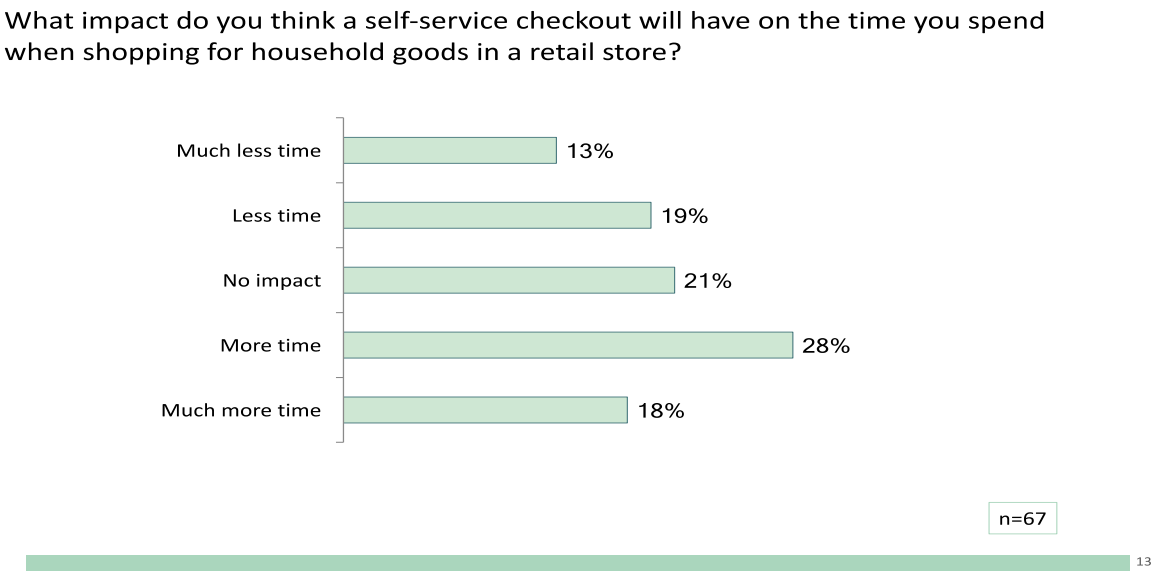

Figure 4.20: Effect of SSC on time spent in store

The responses confirmed that even though it is likely that most of the consumers had never used a SSC, they would expect this to be the case. However, this is a situational experience, because at an SSC there could also be unforeseen delays, due to customers not being able to use the technology or scanning breakdowns. However, clearly time is one of the most important success variables, and when this variable is not achieved, the system becomes a major irritant.

4.2.2.2 Engaging with self-service technology

Although 72% expressed a willingness to use SSC technology, as reflected in Figure 4.21, it is however based on a hypothetical view. It is assumed that the respondents are reasonably comfortable and experienced in the use of service type systems such as online shopping (Elliott, Meng & Hall, 2012; 2013; Lemon & Verhoef 2016).

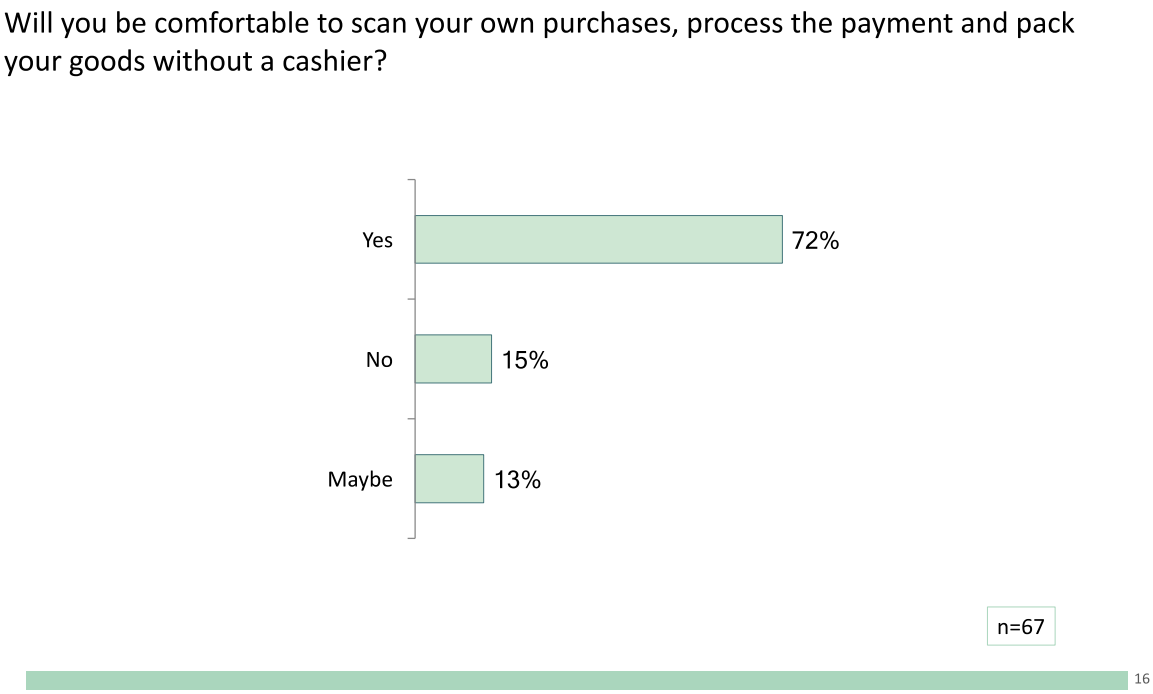

Figure 4.21: Consumers' comfort at scanning and packing their purchases

This point is borne out by Figure 4.2. 2, which shows that 94% of the survey were using computers for work and leisure. However, this could have been a result of the demographic profile of the sample in which many of the participants may have been of a higher socio-economic background (Chiu, Fang, & Tseng. 2010).

How often do you currently use the following technologies?

	A computer for work purposes	A computer for leisure time	Online shopping using a computer	Online shopping using a smartphone	ATM
More than 5 times a month	94%	79%	28%	22%	16%
Less than 5 times a month	1%	13%	57%	43%	66%
Never	4%	7%	15%	34%	18%

18

Figure 4.22: Frequency of use of technology

4.2.2.3 Engaging with store personnel

This dimension is raised by Bulmer et al. (2018) and in Elms et als.' (2016) study. It came to light that some consumers were not interested in chatting to store personnel. Neither Bulmer et al. (2018) nor Elms et al. (2016) provide a satisfactory reason for this, beyond the view that it may be a result of shoppers preferring the anonymity of online shopping. It is suggested here that apparent preference for anonymity may be due more to the need for speed and that conversations may cause delays to that aspect of convenience. (Davis & Wiedenbeck (2001).

Reluctance to engage in discussions may be explained by Figure 4.23 below, in which the first, and most frequently mentioned, two variables relate to time and convenience.

Figure 4.23: Reasons for preferring store with SSCs

4.2.2.4 Efficiency

The expectation concerning SSCs is that they are by their very nature perceived as more efficient than a normal cashier-operated process. According to Elms et al. (2016), the shopping experience has been shortened as a result of SSCs. However, this is not without its problems. Efficiencies derive from, and rely on, the system replicating the scanning and payment processes continuously, without unintended events (Collier & Kines 2013*).* One of these processes involves the application of company policies that require the intervention of a supervisor to finalise certain transactions. For example, gift vouchers, trade coupons and other transactions may cause the system to stall and lead to delays to sort this out and finalise the transaction. Most common is the processing of refunds or exchanges that require human intervention. Customers then perceive the system as inefficient (Elliott & Hall, 2005.

When system delays occur because of constraints of the SSCs, the perception of being in control is reduced and therefore customers feel ‘out of control’ and annoyance sets in. This is illustrated by Figure 4.23, with only 34% of respondents indicating that they would “feel more in control”.

4.2.2.5 Competence

Efficiencies are also negatively perceived when delays are caused by customers who have difficulty in processing the scanning operation. Typically, such customers become the focus of attention and an atmosphere of hostility ensues (Bulmer et al., 2018). Competence in using the SSC is a product of being technology able/ready, particularly in the younger age bands. See Elms and Tinson (2012: 112) on competence/incompetence with technology who say "*When system delays occur due to constraints of SSCs, the variable of being in control is reduced and therefore customers feel 'out of control' and annoyance sets in*".

4.2.2.6 Store readiness and influence

The variable of efficiency and its corollary, speed and convenience, is one of the biggest challenges to maintain with SSC operations. The problems leading to non-fulfilment of the system are due either to delays and mishaps by customers when processing their purchases, or by the store and its employees. This is due to lack of training of own staff especially when they do not understand how customers are affected by negative events. Often the delay is a technical event, but the service support staff display a lack of empathy and care when handling the delay or other problem. This aspect does not appear in the literature. Bulmer et al. (2018), however, does raise the issue of a lack of training of staff at the time of introducing SSCs and thus creating a negative experience for customers. SSCs, although perceived as electronic devices, still require human contact.

In summary, the creation of ambivalence is common in most studies on SSCs. It seems that in the human versus machine interactions, there exist both benefits and disadvantages, sometimes in the delivery of the desired service

4.2.2.7 Loss of jobs

The issue of job losses is often cited as an outcome of the introduction of SSCs. This was posed as one of the questions in the survey and we commented that this may be a fallacy. This issue was included in the consumer portion of this research project as it was felt that this is a sensitive topic in the South Africa context and that this poses an element of risk should retailers introduce SSCs.

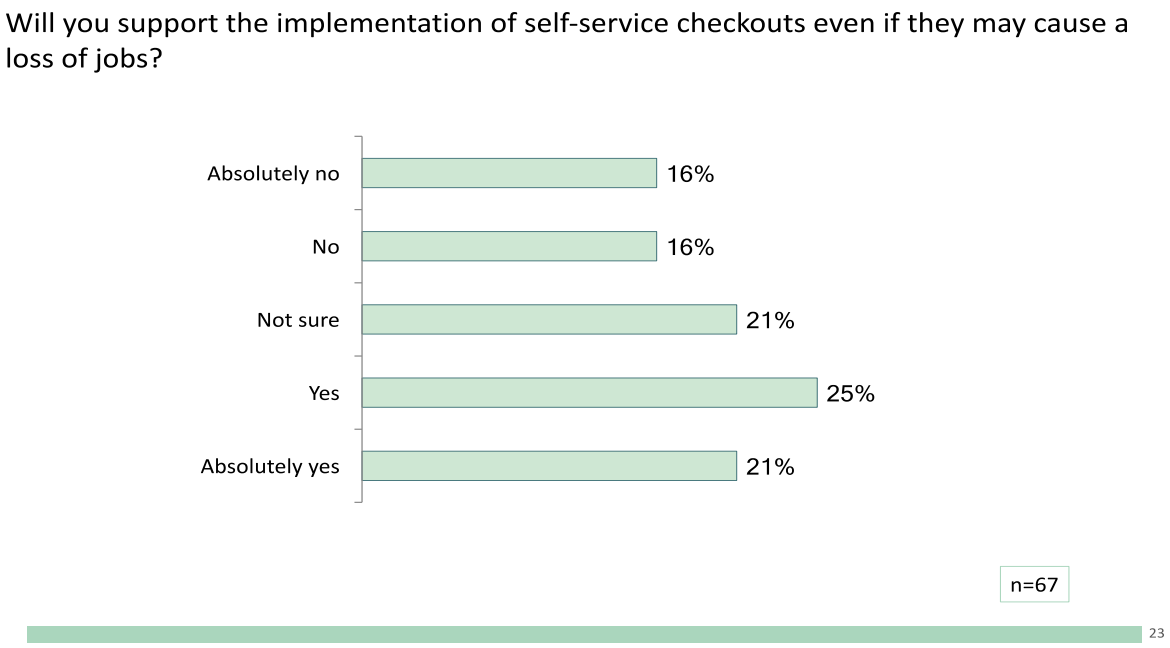

Figure 4.24: Support of SSCs if they cause job losses?

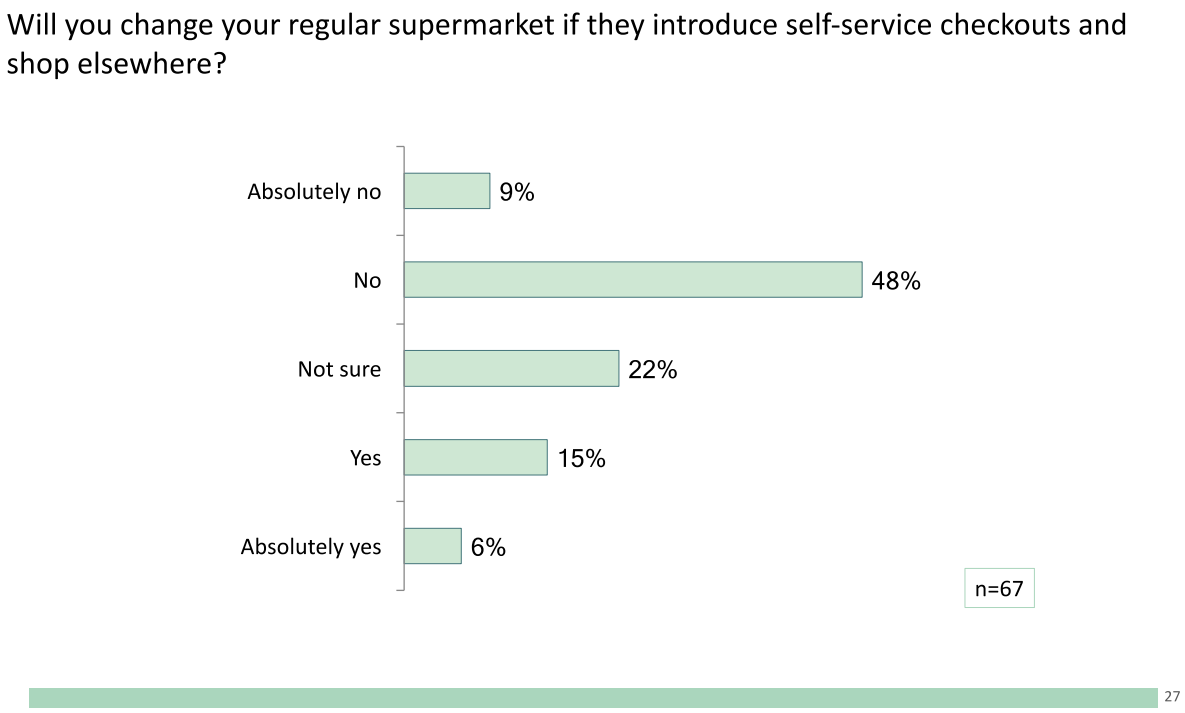

Figure 4.25: Change your supermarket if they introduce SSCs?

In both Figure 4.24 and Figure 4.25, consumers do not register the job loss problem as particularly problematic. The research did not probe any further as to the attitudinal reasons for this outcome. However, this finding does support the conclusion arrived at in the retailer

section, namely that this issue is possibly exaggerated as an obstacle to the introduction of SST. Therefore, further in-depth research is required to arrive at a realistic assessment and judgement about the significance of potential job losses as a barrier to the introduction of SSCs.

4.2.3 Conclusion: Consumer survey

There exists a large body of literature on consumer attitudes to, and perceptions about, the use or non-use of self-service technology. Almost all the recent studies are based in countries where SSCs have become common in retail supermarket outlets. Research in these countries is based on tangible experience by customers. In the current South African scenario, our project asked participants for their views on a technology they were not fully familiar with. It was akin to asking someone for their views on cell phone use when they had never used one before. This brings into question the validity of the data. In a positive sense, the issues that were raised by respondents are the same as those raised in overseas studies, namely, convenience, speed, technological readiness/ability, control of the technology, store ability to maintain efficiencies and the perception of job losses.

The implementation of self-checkouts in South Africa therefore need to be preceded by a thorough analysis of the following factors:

a) The social and economic landscape in the regions where it is intended to implement SSCs
b) A willingness to positively engage and negotiate with opposition to SSCs, including with labour organisations, activists and NGO organisations
c) To move beyond speculation regarding job losses and to evaluate the actual financial benefits to the organisation and the communities in which it conducts its business.
d) From the feedback provided by the consumer survey, it is clear that there is a willingness by consumers to engage with new retail technologies.
e) There have been many innovations that the retail industry worldwide seems to be struggling to come to terms with. Therefore, it will be important to monitor how the retail sector in SA will evolve and cope with these challenges of the new technologies.

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APPENDICES

Appendix A- W&RSETA introduction letter

W&RSETA
WHOLESALE & RETAIL SETA
Skills Development for Economic Growt

27 August 2019

Dear Stakeholder

Re: Status and challenges of automation in the retail sector, including automated, self-service check-outs

The W&RSETA established the Wholesale and Retail Leadership Chair at the Cape Peninsula University of Technology (CPUT) in November 2012. One of the purposes of the Chair is to undertake extensive research in the sector in collaboration with the W&RSETA, the retail industry and other identified partners.

The Wholesale and Retail Leadership Chair has subsequently commissioned Dr Lawrence Lincoln to conduct research on Status and challenges of automation in the retail sector, including automated, self-service check-outs.

We would like to appeal for your participation in contributing towards the successful completion of this study and urge you to kindly avail yourself for further engagement with the Researcher.

Should you require more detail about this study, or should you have any enquiries, please don't hesitate to contact me.

We look forward to your positive participation. Thank you.

Kind Regards,
Mxolisi Maphakela
Acting Manager: Skills Planning and Research

03/09/19

Board: Yvonne Mbane (Chairperson), Zinhle Tyikwe, Reggie Sibiya, Lwazi Koyana, Praise God Ndaba, Mogomotsi Masoabi, Themba Mthembu, David Makuwa, Fachmy Abrahams, Sibusiso Busane, Margaret Bango.

higher education & training
Department: Higher Education and Training
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Tom Mkhwanazi, Chief Executive Officer

Appendix B – Letter of information

Cape Peninsula University of Technology
Special Projects

RETAIL AUTOMATION RESEARCH PROJECT

Cape Peninsula University of Technology in collaboration with the Wholesale & Retail Sector Training Authority (WRSETA) have initiated a research project on the latest trends in automation in the Retail sector.

> It is evident that new technological innovations in retail is going to become a game-changer as new retail business models evolve. "The shopping process is on the verge of a quantum leap into an unknown shopping realm" (Grewal et al 2017. The Future of Retailing in *Journal of Retailing*: 1-6).

The adoption of 'frictionless stores' in which engagement between customers and store employees is drastically minimised, is starting to take traction in a number of developed economies. The prime example of this is the Amazon Go concept. Early studies have revealed overwhelming consumer acceptance with both the concept and the technology.

This research project focuses partly on self-checkout operations. Self-service checkouts are common in many developed economies around the world. South African retailers have not yet implemented the self-checkout concept. Nevertheless, it still bears investigating the attitudes and perceptions on this topic. This survey also deals with some cutting-edge digital retail innovations in order to ascertain current and future applications in the South African retail scene

Summary of Research outcomes

- Provide a summary of the status of retail automation both locally and internationally.
- Identify and analyse the challenges concerning the implementation of retail automation in South Africa.

It stands to reason that the information we ask is of a highly confidential nature. All participant retailers will at no stage be identified by brand or otherwise, but as A, B, C and so on. This includes all stages of reporting and in any presentation of the data. CPUT's code of ethics is included in this mail for your reference.

We prepared in total three different online questionnaires.

1. Questionnaire for senior executive/senior IT managers (see the link below), and we kindly request that you complete only this questionnaire.
2. Store manager questionnaire to elicit their attitudes and approach even though they are not decision-makers in strategic decisions. This will be conducted separately via the Human Resources departments.
3. A consumer questionnaire on their attitudes regarding self-service checkouts. This has been conducted by Lodestar on our behalf and we received numerous responses

Questionnaire 1: Executive and senior managers, Marketing executives, operational managers.

We ask that you kindly email the questionnaire to a range of colleagues in the IT department, a number of senior operational managers and others in your business who are involved in technology especially concerning payment processes and checkout technology. Ideally, we require only 10 individual responses from IT and other senior managers in this field

https://surveys.lodestar-research.co.za/index.php/412592?lang=en Click on this link above When completed – press submit

NOTE:

Due to the sensitive nature of the information provided, the participating retailers will not disclose the identity of the retail organisations. All retailers will only be referred to by a code: Retailer A, retailer B etc. All information will be kept confidential during all stages of the research project and publication of the research outcomes

In the event of queries and if you wish to discuss anything with regards to this research project, I can be contacted on 083 284 3363 or mailto:llincoln@tfnd.co.za

Dr. Lawrence Lincoln (Ph.D. Stellenbosch)

Appendix C – Retailer questionnaire

RETAIL AUTOMATION SURVEY QUESTIONS

Self-service or self-checkouts have become a regular feature in many FMCG retailers in developed economies. The technology was introduced as a means to increase consumer convenience through speed. Currently there are more than 400, 000 installations in USA, some European states, and a number of Asian countries.

According to information sourced by the researchers on this project, there are no self-service checkouts installed at any South African retail & wholesale organisations.

There is a great deal of anecdotal reasons that attempt to explain the reasons for this. However, during this period while SSC were being implemented in a global context, there have also been a number of new technological advances concerning payment systems and technologies, including the rise of application-driven solutions aimed at improving customer experience and company efficiencies. Therefore, this survey also addresses retail automation in a wider sense with a focus on current and emerging technological innovations. It also includes cashierless/frictionless stores such as that pioneered by Amazon Go.

Demographics
First name:
Surname:
Nam of organisation:
Your position in the organisation:

A. The first part of this survey deals with your <u>organisation's attitude and approach</u> to self-service checkouts.

1. Does your organisation currently have any self-service checkouts implemented in any of its retail outlets?

Yes/No

2. Has your organisation discussed the viability of self-service checkouts in the *last few years*?

Yes/no

3. Does your organisation plan to implement self-service checkouts in pilot format as a future development?

Yes, no, maybe

4. If no: Why not?
    - Do not believe it will suit our target market
    - Too costly an investment
    - Does not form part of our technology strategy
    - Has not been tabled for discussion
    - Not viable due to objections from trade unions and social partners
    - Does not fit in with the configuration (layouts) of our store operations
    - Other: please specify
5. How likely is it that your organisation will adopt a self-checkout model if your main competitor/s do so?
    - Very likely
    - Somewhat likely depending on circumstances
    - Not at all
    - Don't know

6. How would you describe the organisation's overall attitude to implementing self-service checkouts?
    - Very interested
    - Not at all interested
    - Waiting to see how other payment systems & technologies develop in the near term
    - Have already started investing in new payment systems and hardware technology, but NOT in self-service options.
    - Slightly interested but will wait to see if competitors implement self-service solutions first
7. Can you indicate the possible financial benefits for a retailer in a case where it has implemented self-service checkouts?
    - Reduction in staff costs.
    - Maximisation of floor space at front end by increasing selling points
    - Increased customer traffic as customers enjoy the convenience and speed of the shopping trips
    - Increased productivity at front end leading to possible growth in bottom line (referring to staff utilisation/shifts)
    - Reduction in risk of staff dishonesty at till points
    - Other: please specify

8. Can you indicate aspects of financial risk with the implementation of self-service checkouts?
    - The capital expenditure involved to procure the hardware and software and reconfigure the space is too high in terms of ROI
    - The risk of customer theft will offset any other benefits
    - The risk of staff and customers collaborating to defraud is a risk
    - The risk of industrial action may ensue due to possible job losses and this may impact on sales
    - Other: please specify
9. Indicate any other factors that would make self-service checkouts a risk
    - There may be negative social consequences such as job losses that will impact on individual employees and communities
    - Customers may object that they have to do the "work" of a cashier, ~~a~~ service consumers expect to be provided as part of traditional customer experience. We prefer to wait and see until a competitor introduces self-service checkouts first and then make a decision
    - There are currently a host of new retail automation technologies emerging and we prefer to weigh up our options on which is the most strategically important for our business
    - Other: please specify

B. Payments

10. Please indicate the % of each of the following payment types currently conducted in your organisation. The total must add up to 100%

Payment type	Average %
Cash	
Credit card (chip and pin & contactless)	
Debit card	
Store card	
Charge Accounts	
Mobile wallets	
Snap scan	
Mobile payments	

QR payments	
EFT	
Other	
Total	100%

11. What other payment types are used in your organization?

Open-ended answer

C. Retail automation

Over and above just self-service technology, the field of retail automation now includes an extensive range of digital and related innovations, including artificial intelligence (AI) and robotics, amongst others.

The latest technological developments have been around artificial intelligence (AI) and various automation technologies, from inventory management to customer service. Recent measures by large retailers, both locally and globally, has focused on the integration of data analytics into every touchpoint of the shopping experience, including sales predictions, store optimisation features and the ability to communicate with customers on products and services across different media platforms. Overseas research has shown considerable acceptance and enthusiasm from consumers towards the new technologies and positive feedback concerning the heightened consumer expectations around the shopping experience driven by technological innovations and changes.

12. Listed below are a range of some of the latest trends in technology in the field of retail automation applications and services.

Please indicate the level of interest for each one in terms of your retail organisation

	Very interested	Somewhat interested	Not for us	Partly implemented	Fully implemented
Demand forecasting applications					
Robotic applications[29]					
Demand forecasting/ inventory management					

Artificial intelligence					
BOPIS (Buy online – pick up at a store)					
Online shopping applications					
Change agility					

13. Are there any other technology trends that could be included in this list?

Open-ended answer

D. The next 10 years

“We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next 10. Don’t let yourself be lulled into inaction.” (Bill Gates)

14. With your own organisation in mind, please rate how critical the following retail technological trends will be for the next 10 years.

	Most critical	Somewhat critical	Not critical at all	Don’t know
Digital transformation				
Artificial intelligence				
The internet of Things				
Cybersecurity				
Augmented/virtual reality to enhance shopper experience				
Improved data management, e.g. edge analytics				

15. Are there any other technology trends that you see as critical in the next 10 years?

Open-ended answer

E. Frictionless shopping

A frictionless shopping experience describes retail stores that have been configured to reduce all or most interactions with staff, processes and anything that slows down the

shopping journey. This includes cashierless facilities, less waiting in lines at bakeries, butcheries and delis. A customer enters the retail store after “logging-in” with a mobile-based app and then proceeds to select products and leaves without having to engage with scanning or payment processes.

16. Please indicate below your organisation’s view on frictionless stores, primarily one which includes a “walk in, select products and walk out” format.

	Yes	No	Not sure
Do you think this is a format which may be introduced in SA retail within the coming 10 years?			
Frictionless self-shopping and cashierless stores will be a success in convenience stores only, for example garage stores; limited range and similar formats			
Frictionless self-shopping and cashierless stores can be adapted eventually as a model for a traditional supermarket format			

17. Which of the following reasons do you feel would compel your organization to develop cashierless stores?
    - We need our brand to be competitive
    - It will increase sales to answer need for speed and convenience
    - It is the wave of the future for retail we won’t be able to ignore
    - Will be better able to match products to consumer needs
    - May offer opportunity to increase margins due to higher income customers this type of format will attract
    - Nothing: will not work in our environment *(Go to Q18)*
    - Other: please specify
18. If nothing: why do you say this?

Open-ended answer

19. Which of the following reasons do you feel are barriers to your organization developing cashierless stores?
    - The required technology is too expensive to make it a viable financial proposition
    - Will not suit our target markets
    - Will create a perception that our brand is too pricy
    - The technology is in its inception stages and we will wait to see how it fares

- Other: please specify

20. In terms of consumer attitudes and preferences, how successful do you feel they would be in the correct location and with an appropriate merchandise mix?
    - Very successful in appropriate location and target market
    - Will not attract customers at all
    - Not sure
    - Don't know
    - Other: please specify

In a survey conducted in the US in 2019, 76% of a total surveyed said they prefer to use self-service options than standing in line. Most participants were willing to scan and pay their own goods without engaging with a cashier. (Survey was conducted by mobile device management consultants, SOTI). [30] The survey went further and canvassed consumer views on mobile technology platforms on payment options: "At the same time, about 76% of respondents said retailers that use mobile technology—in the form of both self-service mobile tools and mobile tools used by sales associates— helps provide a faster shopping experience, an increase from 67% in last year's study."
Survey results and report can be accessed by the attached link:
https://www.retaildive.com/news/study-73-of-consumers-want-self-service-technology/546044/

Thank you for taking the time to complete the questionnaire.
Your participation is appreciated.

Appendix D – Consumer questionnaire

Shopper attitudes towards self-service checkouts

Self-service checkout units allow customers to scan and pay for their purchases without the need for a cashier. It can be described as a checkout without the presence of a cashier to scan, process the payment and pack the goods.

Self-service checkouts are found in many countries, including the United States, Britain, France, Japan and others. Currently there are self-service checkouts available in South Africa.

The purpose of this survey is to explore your personal attitude towards the use of self-service checkouts in South African grocery supermarkets.

NOTE: This survey is part of a research project on behalf of the Cape Peninsula of Technology and is not an indication of any plans or measures to introduce self-service checkout systems in the foreseeable future.

DRAFT SURVEY QUESTIONS.

A. To what extent will a self-service checkout impact on the time you spend when shopping for household goods in a retail store?

B. Will you be comfortable to scan your own purchases, process the payment and pack your goods without a cashier?

C. Indicate which of the following technologies you currently use and how often:

a. ATM

b. A computer for work purposes

c. Online shopping using a computer

d. A computer for leisure time

e. Online shopping using a smartphone

ID. Indicate which of the following payment methods you use most often when shopping

a. Cash (insert scale)

b. Debit card (insert scale)

c. Credit card (insert scale

d. Store card (insert scale)

e. Snapscan (insert scale)

f. Zapper (insert scale)

g. Smartphone payment

h. Other: Please add what

E. Will you support the implementation of self-service checkouts even if they may cause a loss of jobs?

F. In terms of using a self-service checkout, indicate your agreement with the following statements below: (I presume a scale of 1 to 5 agree to disagree?

a. I would find Self-service checkout easy to use

b. Learning to use a self-service checkout would be easy for me

c. I would find it easy to use a self-service checkout

d. I would become quickly skilled at using a self-service checkout

e. I would find the absence of a cashier at a checkout a problem

G. Will you change your regular supermarket if they introduce self-service checkouts and shop elsewhere?

H. Indicate the reasons why you will prefer to shop at a retail store that does introduce self-service checkouts?

Convenience

Reduce time spent shopping

Like to follow new technologies

Greater efficiency

Better security from fraud

Better able to check prices are correct

I feel more in control

Will never use a self-service checkout

Using a self-service checkout will make my shopping more enjoyable

I will use SST wherever it is available

Note that this was an electronic questionnaire, and the various response categories, e.g. yes/no, Likert scales, etc. were inserted via the questionnaire software package.

Appendix E – Ethics clearance certificate

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Office of the Chairperson Research Ethics Committee	Faculty: **BUSINESS AND MANAGEMENT SCIENCES**

At a meeting of the Faculty's Research Ethics Committee on **30 April 2019**, Ethics **Approval** was granted to **Prof Roger Mason** for research activities at Cape Peninsula University of Technology.

Title of dissertation/thesis/project:	STATUS AND CHALLENGES OF AUTOMATION IN THE RETAIL SECTOR, INCLUDING AUTOMATED, SELF-SERVICE CHECK-OUTS Lead Researcher/Supervisor: Prof R Mason

Comments:

Decision: Approved

Signed: Chairperson: Research Ethics Committee	17 June 2019 Date

Clearance Certificate No | FOBREC678

Appendix F – Turnitin similarity report

Appendix – Turnitin similarity report

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Project 2019/28: Status and Challenges of Automation in the South African Retail Sector, Including Automated, Self- Service Checkouts I Project 2019/28: Status and Challenges of Automation in the South African Retail Sector, Including Automated, Self-Service Checkouts March 2020 Prepared by: Lead researcher: Dr LR Lincoln, Training Fundamentals Research team: Mr RY Dassah, CPUT Professor RB Mason, WRLC, CPUT Wholesale and Retail Leadership Chair Cape Peninsula University of Technology Cape Town "Collaboration opens the window to a world of opportunities" ii Copyright, Cape Peninsula University of Technology, 2020. Copyright for this report is held by Cape Peninsula University of Technology. No part of this report may be published in part or in whole, reproduced, stored in a retrieval system, or transmitted, in any form or by any means, unless permission has been obtained from the Cape Peninsula University of Technology. All reasonable care has been taken in collecting data and in the resultant interpretation of this data. Cape Peninsula University of Technology, the Wholesale & Retail Leadership Chair, and the author(s)/editor cannot accept any liability for any direct or indirect loss that might result because of unintentional errors or omissions in the data and interpretation thereof. The opinions and conclusions in this report are those of the author/s and the W&R Leadership Chair and are not necessarily those of Cape Peninsula University of Technology. ISBN 798 -0- 9946970-6-6 This report is available online at: www.wrlc.org.za iii ABSTRACT The aim of this research is to determine the factors that affect self-