The digital transformation of food and grocery retailing under the covid-19 pandemic: a case of major South African retailers

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ABSTRACT

This article explores the adoption of digital technologies and innovation by South African food and grocery retailers during the Covid-19 pandemic to engage their customers and how this unprecedented level of innovation could lead to a paradigm shift in the sector. In the wake of the Covid-19 pandemic in 2020, South Africa experienced one of the harshest national lockdowns, with only businesses that sell food and essential services allowed to operate. Food and grocery retailers were among those allowed to trade. These organisations had to introduce new ways of operating by adopting technology and innovation to increase sales while keeping their customers and employees safe. Their initiatives contributed to a record increase in online sales of more than 50% in the country for 2020. This study reviews the 2020 annual reports of the major South food and grocery retailers to determine the kind of digital technologies adopted and their general innovative approaches in response to the pandemic to determine the future trajectory of the sector post-Covid-19. The findings show that South Africa has a pandemic-led disruption of the food and grocery retail sector. The findings further demonstrate an impressive adoption and implementation of digital technologies including mobile applications, click, and collect by retailers, pointing towards a digital transformation of the sector. The investment in digital technologies and innovation will enable them to transition and compete effectively in the new world of post-Covid-19 retailing while providing better shopping options for their customers.

Keywords: Food and grocery retailing, Covid-19, digital technology, Innovation, Online Shopping

INTRODUCTION AND BACKGROUND

The Covid-19 pandemic has forced retailers of all kinds to consider going digital in one way or another to stay afloat and service their customers while adhering to the Covid-19 protocols, including social distancing, sanitisation, and enforcing the wearing of masks. South Africa has been noted to have implemented strict national lockdown measures in response to the pandemic. In South Africa, the uptake in online retail activity or e-retailing has been slow, especially in the food and grocery retail sector. However, the Covid-19 pandemic and the lockdowns from March 2020 appear to have forced food grocery retailers to be innovative and embrace digital technologies, catapulting the sector into a digital revolution. The result of these initiatives by South African retailers is a spike in online retail growth of 66% in 2020 (World Wide Worx, 2021).

The international Covid-19 protocols and the South African lockdown regulations required of retailers to rethink and rearrange their operations to keep customers safe and satisfied at the same time. They have also reorganised their marketing, supply chain, and logistics in unprecedented ways to make this possible. Food and grocery retailers globally have moved swiftly to embrace digital technologies to facilitate their transactions leading a total digital revolution of the sector (Tortora et al., 2021).

However, in-store operations presented other challenges related to the control of panic buying, crowd management, out-of-stock situations, and staff safety at the beginning of the lockdown in March 2020. All of this compounded the quagmire that beset retailers as they strived to operate during the global pandemic. As more and more customers resorted to buying their essential items online, the retail industry globally has experienced a tremendous increase in online and digitally enabled food and grocery retailing activities since the start of the Covid-19 pandemic (Goddard, 2020; Siawsolit & Gaukler, 2021). We have Amazon (an on-line retailer) moving up to second place in the world's top retailers list in 2020 (Deloitte, 2020).

As reported by World Wide Works (WWW) (2021), online retail sales have more than doubled in South Africa between 2018 and 2020, with a growth of 66% in 2020, accounting for a revenue of R30.2 billion, compared to R14.1 billion in 2018. This Covid-19-led growth in online retail growth is unprecedented, especially in a country where uptake in online retailing has been very slow. The food and grocery retailing sector would have contributed significantly to this growth, as it was the ones allowed to operate for most of 2020. This growth is expected to continue, as the pandemic is still causing havoc and the lockdown restrictions are still in place.

The growth of online retail has been particularly slow in the South African food and grocery retail space until the digital boom that came with the Covid-19 pandemic, which saw online retail activities exceeding 50% of growth in 2020 alone (World Wide Worx, 2021). Few South African supper market chains including Pick n Pay and Woolworths have operated e-commerce sites over the last decade in a limited way. However, this has changed, with most food and grocery retailers turning to the use of digital technologies to serve their customers during the hard lockdown in South Africa. Pure online or platform retailers have also intensified their efforts and increased their ability to attract and serve more customers. They include Takealot.com, Jumia, and Loot.com.

The slow pace of the online food and grocery retail growth in South Africa pre-Covid-19 can be attributed to three main factors: 1) South Africa is home to approximately 2 000 shopping malls with plans to develop more, and ranks number eight in the world for having the most shopping centres (SACSC, 2017); 2) data costs in South Africa have been among the highest in the world (South Africa. Competion Commission, 2019); and 3) retailers with online stores did not reinvest profits made from online sales in advancing their online operations to provide superior services (World Wide Worx, 2019).

The three factors mentioned were affected during the Covid-19 pandemic and the hard lockdown in 2020. Access to shopping malls was restricted, as only supermarkets and chemists were allowed to operate and sell only essential products. At the same time, data costs were drastically reduced by major telecommunication operators, with both MTN and Vodacom reducing their mobile data costs by 50% in April 2020 (RIA, 2020). These efforts not only helped people work and study from home, but also bought online. Additionally, a preponderant increase in the demand for home deliveries forced food and grocery retailers to invest in innovative online stores, digital technologies, and services to meet this demand.

In this paper, we explore the nature of food and grocery retail innovation and digital transformation in South Africa forced by the Covid-19 pandemic and the extent to which this new retail digitisation could shape the future of the sector. We do this by addressing the following: 1) we discuss technology and innovation in retail, as well as the adoption of digital technologies and innovation in food and grocery retailing globally; 2) we provide a theoretical framework to explain the diffusion of technology and innovation in retail; 3) we describe the methodology for this exploratory review; 4) we review the 2020 annual reports and websites of the top five South African food and grocery retailers to provide evidence of the kind of digital technologies and innovations employed to engage their customers during the pandemic; 5) we discuss key insights based on emerging themes from the retail reports; and 6) we identify future research areas relevant to the South African environment.

TECHNOLOGY AND INNOVATION IN RETAILING

In defining retail technologies, we adapt the one by Roggeveen and Sethuraman (2020) and define retail technologies to include mobile apps, devices, tools, techniques, and models that have some bearing on engineering and are linked to the retail operation. This definition is relevant to the study reported here, because it is well with

innovation and not only technology. Innovation concerns new products or services and new ways of doing things better. The Oslo Manual (2018) defines innovation as a new or improved product or process, or both, that differ significantly from the previous products or processes and are used by customers (product) or the organisation itself (process). Digital technologies such as smartphones, mobile apps, websites, robotics, artificial intelligence, big data analytics, cloud computing, machine learning, and the Internet of things are changing the way retail organisations operate and interface with their customers (cf. Deloitte, 2017).

The use of technology and innovation in retail affects both the demand and supply sides, through connecting with suppliers and managing the supply chain, engaging with customers and demonstrating opportunities for them to research, purchase and make payments, and choose delivery options (Shankar et al., 2021). This article focuses on the adoption and use of customer interfacing digital technologies by the top five food and grocery retailers in South Africa to drive their online retail activities during the pandemic. The high growth in online retailing under the Covid-19 pandemic is propelled by online retail activities by large brick-and-mortar retailers who have adopted technologies to improve their service offerings and improvements in their home delivery and pick-up services.

ADOPTION OF DIGITAL TECHNOLOGIES AND INNOVATIONS IN FOOD AND GROCERY RETAILING

Before the pandemic, there was already a steady growth in retail innovations through the use of artificial intelligence (AI), the Internet of things (IoT), and Robotics to manage data and to ensure efficiencies (Wingfield, 2021). The adoption of technologies saw an upward trend and market growth in food and grocery retail globally (Grand View Research, 2020). Yet, Shankar et al. (2021) argue that innovations in retail, including in-store robots and delivery drones had a limited presence in retail before the Covid-19 pandemic. Food and grocery retailers have been slow in increasing online activities due to particular difficulties in the sector, ranging from handling a large variety of products, logistical challenges and temperature control, customer expectations and preferences, and low-profit margins (Vaz de Magalhaes, 2021). Another area of concern has been customers' trust in the food and grocery retailers' efficiency (Grand View Research, 2020), and capability to deliver, when it comes to online food and grocery shopping.

However, the food and grocery retail sector globally has seen an uptake in digital technologies recently, which has been accelerated by the pandemic. Hood et al. (2020) and Vaz de Magalhaes (2021) investigate online grocery shopping behaviours and factors that influence customer decisions. They found logistics and delivery systems, and socioeconomic issues to be part of the factors influencing customer decisions. In another study on online grocery shopping, Brand, Schwanen, and Anable (2020) have identified behavioural segments of customers, including Intensive Urbanites and Online Omnivores, and resisting and responsible shoppers, based on psychological, demographic, and socioeconomic characteristics. The advent of Covid-19 interacted with regular decisions and preferences of food and grocery retailers and their customers as online shopping picked up speed (cf. Goddard, 2020).

In addition to the relevance of sociodemographic factors in driving online grocery shopping, Hood et al. (2020) have observed a shifting trend from home delivery to click-and-collect in Great Bratain, and argue that localised infrastructure would be necessary to support the dynamic nature of grocery e-commerce. Click-and-collect is the situation where the customer sends in the order drives to collect later, an option likely to deal with trust issues and an added social distancing measure. In their study of click-and-collect for perishable products, Siawsolit and Gaukler (2021) report that two-day orders can increase profit, reduce inventory and spoilage, and maintain availability levels.

However, offsetting operating cost within an Omni-channel environment largely depends on the average cart value, the proportion of short life items, handling time, and order pick rate (Siawsolit & Gaukler, 2021). This finding reaffirms the complex nature of food and grocery retail operations and could make it difficult for additional channels to be integrated profitably (Vaz de Magalhaes, 2021). However, going forward, we may see hybrid retail formats (Shankar et al., 2021) and multichannel or Omni-channel operations (Chopra, 2016) as customer demands for such options gain momentum.

The idea of localisation of infrastructure in terms of technology and innovation adoption is important because contextual differences in socioeconomic and geopolitical conditions might present unique opportunities and

challenges. Chopra's (2016) study of Omni-channel retailing highlights the complementary benefits that can accrue from the hybrid structure of physical and online channels, where the physical channel can also serve as a showroom and pickup location for the online channels. Chopra further suggests that this hybrid structure can be particularly effective in emerging markets where new online players can partner with existing local retailers to benefit both parties and the consumer.

Table 1 presents a summary of recent literature in technology and innovation in food and grocery retailing. Grewal et al. (2019) detail futuristic in-store technologies their impact on sales. Similarly, Erdmann and Ponzoa (2021) studied digital inbound marketing in grocery e-commerce and highlight the need to appreciate format differences as well as different country contexts. Our paper brings the unique South Africa food and grocery retail context and presents how the major retailers have reacted to the Covid-19 pandemic through the adoption of digital technologies and innovation, and implications for the retail system.

Other South African studies focused on the impact of Covid-19 on the retail industry include Cant's (2020) assessment of employee engagement by retail organisations during the pandemic and how it contributes to performance. A review of public health management (Opute et al., 2020) from the point of view to highlight implications of the pandemic in South Africa and Nigeria. All these studies report on various ways in which the pandemic hasFurthermore, South African retailers' adoption of new communication channels (including mobile applications) in engaging with their key stakeholders was analysed by Ecim et al. (2020) to explain the communication strategies and platforms used by retailers to provide support to their stakeholders during the pandemic. Similarly, Steynberg et al. (2020) explore the critical role of high-education institutions in capacitating the retail industry as it moves into a new normal of Omn-channel, blended formats, and heightened adoption of technology and innovation. Our study expands on these studies, but pays specific attention to the food and grocery retail sector for evidence of digitisation and how that might impact the future characterised by Steynberg et al. (2020).

THEORETICAL FRAMEWORK

Digitisation in retailing has been expressed in many ways against the backdrop of technology advancement and leads to dramatic changes in retail format, operation models, and news ways engaging with both customers and suppliers (Pantano & Vannucci, 2019). Rogers's (1983) diffusion innovations theory helps us understand how organisations adopt and use new technologies and innovations. Rogers posits that the diffusion of innovation is the process by which innovation is communicated through certain channels over time among the participants of a social system. This process often leads to a social change, altering the structure and function of a social system (Rogers, 2003), and influences by actors within the system. These actors include nodes, social networks, and partners.

The diffusion theory also explains the how, why and at what rate the innovations are adopted in a given setting (Rogers, 1995; 2003). The rate of adoption is interesting, because it departs diffusion from the singular act of adoption and highlights the speed and spread of the adoption over time among the categories of adopters for a possible critical mass. According to Rogers (1995; 2003), there are categories of innovation adopters identified as innovators, early adopters, early majority, late majority, and laggards, implying a process. Therefore, diffusion includes a process of communicating the technology or innovation among its users over time (Rogers, 1995; 2003).

The innovation diffusion theory has been used in many ways to explain technology and innovation adoptions in business organisations, including retail. Pantano et al. (2017), in scoping the innovation landscape retailing, report a possible shift in the sector towards innovation-oriented strategies in order to offer innovative consumer solutions. Moreover, technology and innovation diffusion in retailing is largely dependent on the adoption rate of key stakeholders, including customers, employees, suppliers, and competitors (cf. Shankar et al., 2021).

With the focus of this study on food and grocery retailer adoptions, the factors driving adoption are important due to the sudden rise in online retailing. Pantano's (2014) three drivers of innovation adoption in retail: (1) demand for innovation,, (2) availability of innovation and (3) uncertainty in adopting innovations) are useful in helping to understand the rise of online retailing in South Africa during the Covid-19 pandemic.

TABLE 1
SUMMARY OF RECENT LITERATURE ON TECHNOLOGY AND INNOVATION USE IN FOOD AND GROCERY RETAILING

Reference	Area of focus	Key message
Siawsolit and Gaukler (2021)	Click-and-collect for perishable products.	The results indicate that two-day orders can increase profit, reduce inventory and spoilage while maintaining the overall availability level.
		Average cart value, the proportion of short life items, handling time, and order pick rate are strong determinants of the extent that two-day orders can offset Omni-channel fulfillment cost.
Vaz de Magalhaes (2021)	Online grocery shopping	Highlight the usefulness of understanding consumer behaviour concerning e-grocery.
		Explains factors affection logistics requirement and the final decision for online grocery shopping.
		Insights on attributes that influence the effectiveness of e-grocery, and their consequences on business logistics, especially during pandemics.
Goddard (2020)	Impact of COVID-19	Preliminary assessment of the impact of Covid-19 on food retail and foodservice in Canada.
		Online food retailing increased about 30% when the pandemic began.
Brand, Schwanen and Anable (2020)	Online Grocery Shopping behaviour segments	Identified segments include: Intensive Urbanites and Online Omnivores, and resisting and responsible shoppers.
		Distinguishing features include convenience, perceived benefits, costs, and risks, technology affect, time pressures and fit into daily schedules as well as social and environmental dimensions of personal norms and beliefs.
Chopra (2016)	Omni-channel retailing	Omni-channel can benefit customers through a complementary hybrid structure of offline and online channels.
		The physical channel can also serve as a showroom and pickup location for the online channel
		This hybrid structure can be particularly effective in emerging markets where new online players can partner with existing local retailers to benefit both parties and the consumer
Hood, Urguhart, Newing and Heppenstall (2020)	Consumer behaviour and preferences for e-commerce in the grocery retail industry in Great Britain (GB)	Sociodemographics are an important driver of groceries e-commerce usage and channel choice
		Localised infrastructure to support grocery e-commerce is important
		A shift from home delivery to click-and-collect with the cost of delivery faced by the customer
Erdmann and Ponzoa (2021)	Digital inbound marketing in grocery e-commerce	E-commerce is optimizing Digital Inbound Marketing
		Retail format differences apply
		Country differences apply

Reference	Topic	Description
Grewal, Noble, Roggeveen and Nordfält (2019)	In-store technology	A conceptual framework for understanding new and futuristic in-store technology - infusions
		A matrix of innovative and futuristic technologies based on convenience level and consumer social presence can explain the effects of in-store technology on sales.
		Moderating factors: consumer traits, product/service dimensions, mental models, and social networks.
Marcucci et al. (2021)	Bricks and Clicks. Focus on grocery market in Norway	Using stated preferences to estimate market shares for e-grocery in Norway.
		It investigates the role of various purchase characteristics including the product price, service cost, lead-time, time window, travel time, and product range for choosing between bricks and clicks purchase channels.
		Results suggest that the most important characteristics for consumers are related to price, in particular, product price.
Cavallo, Sacchi and Carfora (2020)	Food consumption behaviours under Covid-19 in Italy	This paper provides an overview of the recent changes in consumption patterns that occurred as a result of the Covid-19 lockdown in Italy.
		It further assesses how evolutions in behaviour are intertwined with the evolution of the main food supply chains
		Out-of-home consumption was replaced by home meal preparation and home delivery
		Laggard e-commerce consumers were pushed to bridge the digital divide
		E-commerce platforms and instant Messaging mediated this process.
		Small retailers and producers benefited from this process of digital transformation
Roggeveen and Sethuraman (2020)	Retail technologies in 2020 and beyond	Provides classification and commentaries on 40 retail technologies and how they are shaping the world of retailing during the Covid-19 pandemic and beyond.
		Future research questions were identified including the impact of Covid-19, measuring returns on technology, collaboration, and vertical integration, organising for technology, and data privacy among others.

Moreover, Shankar et al. (2021) expand the drivers of retailer adoption of technology to include: advancement in core technology, consumer demand due to lifestyle changes, competitor innovation or adoption, safety and security, and regulation. Other studies in retail have made use of the innovation diffusion theory to explain the adoption of technology and innovation. Pantanoa and Vannucci (2019) use the innovation diffusion theory to explain the adoption of digital technology by different categories of retailers in the UK. Similarly, Kwon et al. (2021) provide an account of external pressure exerted by Covid-19 on the adoption of social medial technology by small retailers.

METHODOLOGY

The explorative nature of this review requires a qualitative research approach in examining the use of digital technologies and innovation by South African food and grocery retailers in response to the Covid-19 pandemic. The study adopted an explorative approach because the factors driving the high growth online retailing in the grocery and food retail sector under the Covid-19 pandemic are still emerging, not yet clearly defined. This is done through a review the 2020 annual reports of the top five South African food and grocery retailers, and news reports of current changes to their operations to meet the demand for online shopping and home deliveries. These retailers include Shoprite, Spar, Pick n Pay, Massmart, and Woolworths, and their annual reports are publicly available. These retailers not only dominate the South African landscape; they all also feature in Deloitte's global 250 retailer list (Deloitte, 2020) indicating the size, scale, and sophistication of their operations. This makes them reasonable targets for this study, aiming to get some understanding of the extent to which digital technologies and innovation have been used by the food and grocery retail in South African in response to the Covid-19 pandemic and how this might change the sector. The annual reports studied are summarised in Table 2.

TABLE 2
SUMMARY OF REPORTS REVIEWED

Retailer	Report
Shoprite Holdings	Integrated Annual Report, September 2020
Woolworths Holdings	Good Business Journey Report, Decenber 2020
Pick n Pay	Integrated Annual Report, Febrary 2021
Massmart (Powered by Walmart)	Integrated Annual Report, December 2020
The Spar Group Ltd	Integrated Annual Report, December 2020

The analysis is carried out within the unique context of the local retail industry. The analyses of the reports focused on their use of digital technologies, improvements to their websites for e-commerce, and innovation process and adjustment meat to their traditional operations necessitated by the Covid-19 pandemic, as well as the initial outcomes of their innovations and plan of action for the future (if any). The details of these issues are summarised and presented in Table 3 to highlight the evolving pandemic-led digital transformation of the food and grocery retail sector in South Africa.

TABLE 3
EVIDENCE FROM GROCERY AND SUPERMARKET RETAILERS

Grocery and supermar-ket Retail	Covid-19-led response and Digital transformation initiative
Shoprite Group	- Checkers Sixty60 Shopping App - The roll-out of Sixty60 was brought forward to assist with the growing customer demand for home deliveries. - Shoprite's virtual grocery voucher - New digital shopping channel: Sixty60 ordering and delivery app launched in 2020. - Adoption of innovative methods of payment providing more secure, immediate, and safe transaction options: introduced QR code payments. - Investment in and development of IT infrastructure: integrated all channels, brands, and products into one seamless data process. - Use of data analytics: optimised marketing spend with a targeted online and more personalised marketing approach. - Launch of digital customer-facing channels and rewards platform. - Shoprite digital business unit launched (ShopriteX) - Checkers Rush launched (a cashless and checkout-free store concept) - Launched new-look online-shopping Site for House & Home - Launched new-look online-shopping Site for OK brand
Woolworths Food	- Strategy to become a digital organisation - Woollies People App (for employees) and Woollies shopping App - Training via digital channels, and developing new digital skills - Increased online shopping capacity - Rolled Click-and-collect services, with the promise that customers will never have to leave their car. Instead, staff will deliver orders straight to the boot, at specially designated parking bays. - Enhanced online delivery capacity with additional delivery slots, and dark stores created to cope with increased demand for online shopping and home deliveries - Collaboration with platform retailers, like One cart. - Our range of physical stores, e-commerce delivery, and digital services form a strong foundation for the Omni-channel shopping experience that is fast becoming the retail norm. - Use future-fit channels for marketing and online shopping has reduced marketing waste.

Pick n Pay Stores	- ASAP Mobile App launched - Expanded digital shopping platform to meet accelerated online demand – The purchase of on-demand app Bottles and the launch of online clothing sales - Sustained investment in digital innovation - Online customers tripled; 700% growth in on-demand online service expected - Encourage customers to e-mail or WhatsApp their orders for safe collection or delivery - Rolled out Click-and-Collect services across more stores - Increased our online capacity and reach with our Bottles on-demand delivery app - Ongoing investment and innovation in an integrated online retail platform and digital infrastructure - A fully digital partnership with TymeBank - Develop further as a forward-looking omnichannel retailer. - South Africa has historically been viewed as slow in waking up to the potential of online grocery sales. - The past year has brought the future closer and has shown very clearly that the grocery retailer of the coming decade must be an omnichannel retailer - Pick n Pay is as strong in the digital world as it is in its physical footprint. - Pick n Pay extended its Click-n-Collect offer, and repositioned its one-hour liquor delivery partnership with Bottles into an on-demand essential grocery service. - Pick n Pay has led online grocery retail in South Africa for more than a decade - Pick n Pay will also integrate its various shopping channels into a new website
The Spar Group	- Relaunched the SPAR website to support stores with their online offering. - We launched SPAR Drive, a click-and-collect initiative with shopping delivered to customers' cars. - We also introduced Coolomat, an initiative that allows customers to receive their shopping at a chilled automatic redemption machine in the parking lot. - Spar embarks on a worldwide digital transformation strategy in partnership with Naveo Commerce, an end-to-end e-commerce system provider. - Spar's digital transformation project is aimed at helping it meet evolving consumer expectations and needs as part of the brand's - Better Together strategy. - Spar is possibly unique in offering an online grocery offer under a single brand in 30 countries worldwide. - Partnership with Naveo allows us to significantly build on our capability by transforming our e-commerce proposition with over 13,500 stores worldwide.

| Massmart / Walmart | - Digital transformation work in progress |
	- Massmart digital learning platform was successfully launched in November 2020
	- Digitalisation is encompassed in its Omni-channel and e-commerce strategy
	- Partner with companies who could help us meet customer demand.
	- Partners such as One Cart, Uber Eats, and our internal delivery company, WumDrop,
	- Opportunity for us to improve our ability to get products to our customers when they want them, with every aspect of the transaction executed perfectly.
	- We still have much work to do in using digitalisation to enhance our e-commerce customer relationships, financial services relationships and our customer service.
	- Rolled out digital food safety audits for our Rest of Africa stores that were not accessible due to Covid-19 travel restrictions.
	- Significantly ramped up our e-commerce offering as part of our efforts to keep our customers safe during Covid-19.
	- Our online sales grew by 58.6% year-on-year and our Gross Merchandising Value (GMV) topped R1 billion for the first time in our history
	- Massmart's e-commerce sites had the second-highest share of retail website traffic in South African during 2020.
	- The sudden increase in volumes during the lockdown at times challenged our ability to deliver against our service commitments
	- During the lockdown period initially, our e-commerce sites couldn't handle the volume of online shoppers.
	- We responded rapidly strengthening our foundational competencies and enhancing our last-mile delivery capability
	- Our new Vodapay Super App partnership with Vodacom is an exciting step forward accelerating our online presence

Source: Authors' summary, compiled from Company annual reports and websites (Shoprite Holdings Limited, 2020; The Spar Group Limited, 2020; Woolworths Holdings Limited, 2020; Pick n Pay, 2021; Massmart, 2020)

SUMMARY OF RESULTS

Since the beginning of the Covid-19 global pandemic, grocery and supermarket retailers quickly adapted digital technologies, developed and implemented in-house applications to manage the increase in online shopping demand. Table 3 presents a summary of the innovations, initiatives, and technologies utilised by the top five major players in the South Africa grocery and supermarket retail sector.

Evidence from Table 3 points to the fact that all the food and grocery retailers reviewed have and or considering digital technologies to enhance online sales and stay competitive. In Figure 1, we present keywords and phrases based on the count of their occurrence across the five retail reports. This is indicative of how much attention the retailers are paying to the impact of Covid-19 and the use of digital technology and innovation in response. More details on the use of these keywords phrases are highlighted in Table 3. Common themes emerging from the review of their annual reports include expanded e-commerce websites, use of digital technologies, App development and or use, recognition and preparation for an Omni-channel future, opportunities for click-and-collect, collaborations with platforms and delivery companies, and the establishment of digital business units or new formats. These emerging and issues and themes are discussed next.

FIGURE 1
KEYWORD/PHRASE COUNT ACROSS THE FIVE RETAILER REPORTS
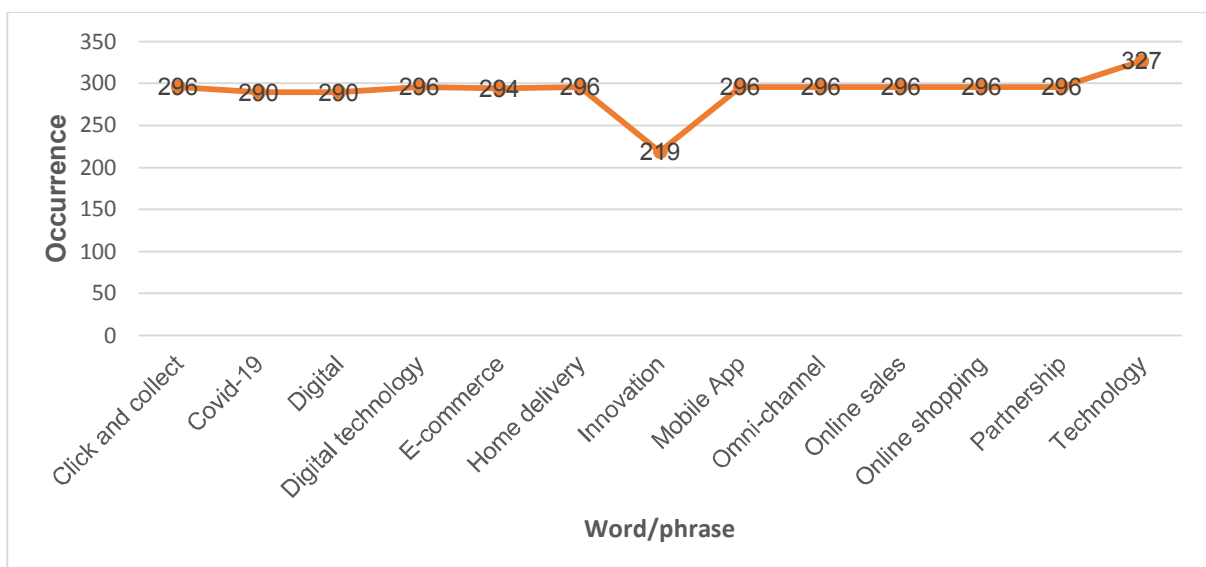
Source: Authors' Compilation

KEY INSIGHT AND DISCUSSION

This section provides synthesis and discussion drawing from the evidence presented in Table 3, Table 4, and the literature. It is structured based on themes established from the evidence in Table 3 including: expansion of e-commerce and online sales, investment in infrastructure, strategic partnership and collaboration, and the digital transforton of the food retail sector. Quotations are also drawn from Table 3 to support claims.

The retailers' adoption occurred at different levels in line with Rogers's (2003) categories of innovation adopters. While they are all embracing digital technologies as presented in Table 3 and Table 4, Spar and Massmart appear to be innovators when it comes to technologies like Mobile Apps because they are have not adopted this technology (cf Rogers, 1995, 2003) . In the same vein, the rest of the retailers [Shoprite, Woolworths and Pick n Pay] are early adopters in this regard, having already launched their own mobile Apps. Moreover, all the retailers were running fullsteam click-and-collect programmes, pushing them to reach an early majority stage of adoption with this innovation.

The rate of the adoption of technology and innovation was driven by the Covid-19 pandemic, which influenced lifestyle changes among customers, demand for technology, and competitors' innovativeness, as outlined by Shankar et at. (2021). The speed at which the adoption of technology and innovation is occurring among the retailers brings changes in the structure and functioning of the food and grocery retail market in South Africa, reflecting the kind of social change contemplated in the diffusion of innovations theory (Rogers, 2003). It also further highlights the desperation that came with the Covid-19 pandemic as a driver of adoption and the rate of adoption might lead to a late majority stage of adoption sooner, as the "new normal" in retailing persists.

EXPANSION OF E-COMMERCE AND ONLINE SALES

Driven by the pandemic, all the five retailers have considered e-commerce options as a good alternative to reaching their customers while keeping them safe. This has occurred in varying degrees across the five retailers. Although the Spar group has provided e-commerce services elsewhere in Europe, they have not provided that option to their South African consumers during the pandemic in 2020, placing it in the innovator category as per the diffusion theory. This might change with Spar's move to provide more e-commerce options globally in "*partnership with Naveo Commerce, an end-to-end e-commerce system provider*" [Spar Group]. Spar's late consideration of e-commerce options appears to be in response to competitive pressure emerging from especially Shoprite, Pick n Pay, and Woolworths, as Massmart has a more general merchandise orientation.

The rest of the retailers (Pick n Pay, Shoprite, Massmart/Walmart and Woolworths), some of whom have had experience and e-commerce infrastructure prior to the Covid-19 pandemic, have intensified their online offering aided by their adoption of digital technologies. With high growth in online sales 2020, these retailers are poised to invest move in their e-commerce and digital retail infrastructure. For example, Pick n Pay forecasted a 700% growth in online sales in 2020, while Massmart grew online sales by 58.6% year on year [Pick n Pay]. Another general observation during the review of the retailers' reports was the innovative initiatives taken by a majority of these retailers to enhance their operations and contribute to the online sales recorded. These include opportunities for customers to e-mail their orders and collect them later, use WhatsApp messaging to place their food and grocery orders, and collect later via drive-through. The alternative delivery modes provided are in line with what Hood et al. (2020) refer to as localised infrastructure to support the particular context.

INVESTMENT IN INFRASTRUCTURE

The demand for click-and-collect and home deliveries from food and grocery shoppers, as recorded globally (Goddard, 2020), have also forced the South African retailers in this sector to invest in more digital infrastructure in order to cope with this demand locally. As Massmart reports, "*Massmart's e-commerce sites had the second-highest share of retail website traffic in South African during 2020*", and "*the sudden increase in volumes during the lockdown challenged our ability to deliver against our service commitments at times*", as "*during the lockdown period initially our e-commerce sites couldn't handle the volume of online shoppers*". [Massmart] The sudden rise in demand in online purchase has indeed posed a challenge to food and grocery retailers, especially those who had not previously prioritised electronic and digital channels in their operations. As observed by Accenture (2019), in the South African context, most retailers in the category had online presents only as a me-too strategy and did not reinvest the gains from online sales to grow the platforms. It also points to how comfortable these major retailers were pre-Covid-19 in respect of their sales and profit from the physical stores.

The sudden Covid-19 shock, therefore, presented a forced opportunity to upgrade their systems in innovative ways. All five retailers had to increase their online capability by immediately upgrading their websites, and rolling out click-and-collect opportunities. Spar relaunched its website and introduced Spar drive for click-and-collect options, Massmart indicates that "*we significantly ramped up our e-commerce offering as part of our efforts to keep our customers safe during Covid-19, and enhancing our last mile deliver capability*". [Massmart]. Pick n Pay talks about an "*ongoing investment and innovation in an integrated online retail platform and digital infrastructure*" [Pick n Pay], while Shoprite and Woolworths report on new and futuristic channels; "*customer-facing channels*" [Shoprite].

Further to this, Shoprite, Pick n Pay and Woolworths have all developed their mobile Apps as part of their digital transformation process and for a more digital shopping engagement with their customers. In hinting at its strategy to become a digital organisation, Woolworths introduced two mobile Apps; the Woollies People App (for employees) and Woollies shopping App for engaging with customers. Pick n Pay's ASAP App and Bottles on-demand App are both making customers' lives easier, while the Checkers brand of Shoprite ensures that customers get their food grocery deliveries within 60 minutes through its sixty60 mobile App. All these are Covid-19-led innovations that are set to revolutionise the South African food and grocery retail environment. Interestingly, Shoprite, the largest food retailer in Africa, is showing market leadership by establishing a digital business unit (ShopriteX) and launching a new retail format through its Checkers brand called Checkers Rush. Checkers rush is a cashless and checkout-free store concept similar to Amazon Go. This is an indication of the new retail revolution in South Africa, and the scramble for digitally savvy customers in the middle and the upper classes.

STRATEGIC PARTNERSHIPS AND COLLABORATIONS

Interestingly, there appears to be several partnerships and collaboration arrangements emerging from the reports across the board. These collaborative arrangements mostly occur around technology, innovation, and home delivery of products or the last mile. While Shoprite reports collaborations within its supply chain network to bring improved efficiencies and lower prices to customers, its new business unit (ShopriteX) is said to be the collaboration hub and engine to drive innovation by bringing data analytics, digital technologies, and talent together to shape the path for its digital transformation. Shoprite appears to be positioning itself to respond to the logistical and operational challenges of the online offering, and how they influence price and customer behaviour (Siawsolit & Gaukler, 2021; Vaz de Magalhaes, 2021).

The rest of the reports highlight partnerships and collaborations with players in customer-facing technologies. For example, Spar "*embarks on worldwide digital transformation strategy in partnership with Naveo Commerce, an end-to-end e-commerce system provider*", an effort which will allow them to provide "*an online grocery offering under a single brand in 30 countries worldwide*". This initiative will have some competitive benefits for Spar's operations in South Africa as one of the later comers to the online business. Similarly, Massmart is leveraging its partnership with One Cart (a local grocery delivery platform that allows shoppers to shop from multiple stores), Uber Eats (food delivery service provider), and its own internal delivery company, WumDrop to meet the rising home delivery demand. Another partnership arrangement forged by Massmart is with Vodapay Super App, which allows for customers to pay for their orders in a conveniently way. The availability of these partners and technology providers corresponds with Rogers's (2003) assertion of how innovation is diffused through nodes, social networks, and communication channels, which act as enablers.

Such collaborations may be necessary for the South African food and grocery retail sector to widen the reach of customers by both parties (Chopra, 2016). Chopra's idea of hybrid structures could particularly assist SMEs to navigate this digital retail revolution. Moreover, these partnerships and collaborations could result in retail disintermediation in the future (cf. Shankar et al., 2021). A situation where producers will use platform retailers to bypass the major retailers like the ones studied here and market directly to the customers. Yet, this scenario could be a game-changer in an industry dominated by big players.

DIGITAL TRANSFORMATION OF THE FOOD RETAIL SECTOR

All the retailers report on their move towards digital transformation and the new future of food and grocery retailing in South Africa propelled by the Covid-19 pandemic. In the same breath, Omni-channel operations powered by digital technologies are envisaged to be the post-pandemic reality in their sector. This is an interesting turn of events for the champions of the South African retail industry, which did not take online food and grocery seriously before the pandemic (cf. Accenture, 2019).

As Pick n Pay reports, "*South Africa has historically been viewed as slow in waking up to the potential of online grocery sales; the past year has brought the future closer, and has shown very clearly that the grocery retailer of the coming decade must be an Omni-channel retailer.*"

In the same vein, "*Spar's digital transformation project is aimed at helping it meet evolving consumer expectations and needs*", just as in the case of Massmart, "*Digital transformation work in progress" and "digitisation is encompassed in our Omni-channel and e-commerce strategy*".

Woolworths believes that its "*range of physical stores, e-commerce delivery, and digital services form a strong foundation for the Omni-channel shopping experience that is fast becoming the retail norm*" [Woollworths].

It is therefore not surprising to see new formats like the Checkers Rush of the Shoprite group emerging to take advantage of the new digital food and grocery retail revolution in South Africa.

Table 4 presents a summary of the digital technologies in use by the retailers concerned. Table 4 draws from the evidence presented in Table 3, and summarises the technology and innovation used or dopted by the retailers studied.

TABLE 4
SUMMARY OF THE DIGITAL TECHNOLOGIES AND INNOVATION

Organisation	Technology and Innovation
Shoprite	Mobile App, QR code payment, Virtual shopping voucher, data analytics, Website, AI, Click-and-collect. digital business unit and campus, unmanned concept store.
Woolworths	Mobile App, click-and-collect, Dark stores. e-commerce Website, home deliveries, reduced marketing waste, special loading zones for click-and-collect drive through digital skills development.
Pick n Pay	Mobile App, Social media, E-commerce Website, home delivery, click and click, e-mail shopping, partnership with TymeBank, bottles on-demand delivery App.
Massmart	E-commerce Website, click-and-collect, home delivery, digital food safety audits, use of Vada pay, Uber eats, One cart, WumDrop.
Spar	E-commerce Website, click-and-collect, Coolomat, partnership with Naveo Commerce

Source: Compiled by Authors

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The adoption of customer-facing technologies and innovation in food and grocery retailing has been slow globally and more so in South African due to the complex nature of grocery operations. The demand for online food and grocery purchases and home deliveries driven by the Covid-19 pandemic has changed this narrative. While this article looks at how food and grocery retailers are responding to this situation and their use of digital technologies to meet their customers' needs and stay competitive, it is not exhaustive, as the situation is constantly evolving. The following research questions can be investigated further:

- How would the increased digitisation of food and grocery retailing affect food prices and the urban poor in South Africa as cheaper prices may move online?

- How would digital transformation impact retail properties (malls) in South Africa as the need for more dark stores and warehousing increases to support home deliveries?

- What are the implications of retail click-and-collect pick-up points and increased home deliveries services on urban planning and retailer development in South Africa?

- How does the digital retail transformation impact skills development of retail professional development in a country where such skills may be in short supply?

- How can retailers use their online sales platform and digital tools to minimise marketing waste and/or food waste in the food and grocery retail value chain?

CONCLUSION

The food and grocery retail sector has been slow in its preparedness to offer online shopping opportunities to their customers globally due to logistical and operational difficulties in handling fresh produce to meet customer expectations. In South Africa, major food and grocery retailers have enjoyed market dominance under generous retail spaces in the form of shopping malls and centres, where they often present as anchor stores, and the pressure to offer online options was little. The Covid-19 pandemic has disrupted this modus operandi with an urgent need to provide online shopping opportunities and home deliveries in ways that can project both staff and customers.

The response to this has seen a significant increase in retail sales, setting the country on a new trajectory towards a food and grocery retail digital transformation. We show in this review of the online activities and use of digital technologies and innovative processes in the sector that the future food and grocery retailing in South African will be a hybrid fusion of offline and online retailing facilitated by digital technologies.

Finally, while big players (Shoprite, Pick n Pay, Woolworths, Spar, and Massmart) may still dominate in the online space, leveraging their existing dynamic capabilities, the growth of pure-play and platform retailers may compete adequately. In the same vein, SMEs and independent producers can implement the use of digital tools and technologies to access and present alternative options to customers. All these scenarios require further research as outlined earlier and can present benefits to the South African food and grocery sector.

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