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Insights into the impacts of and responses to COVID-19 pandemic: The South African food retail supply chains perspective

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Background: With the observed cases of the coronavirus disease 2019 (COVID-19) pandemic in South Africa, coupled with varying levels of national lockdowns, food retail supply chains in South Africa were adversely affected. The pandemic affected international travel, global logistics, supplier production and stockpiles at the supply end, which resulted in shortages at retailers and increased prices for basic food items.

Objectives: The purpose of this article was to provide insights into and a synthesis of the impact of the COVID-19 pandemic on food retail supply chain models in South Africa.

Method: A general review of both academic and grey literature (including commentaries) was studied to draw insights into the issues of food retail supply chain. This was combined with an examination of websites and annual reports of the major food retailers in South Africa to find their responses to the pandemic related to their supply chains.

Results: It was found that the investment in supply chains and local supply development and the technology by the large food retailers in the country have paid off in the ways that they have been able to respond to and contain the shocks of the pandemic and point to the local versus the international when thinking about new supply chain models for the post-COVID-19 world.

Conclusion: The insights drawn from this article may be useful in building more resilient food retail supply chains in the South African context. This article charts a way for more focused analyses using empirical data to thresh out more nuanced insights that will benefit the food retail supply chain and create a more resilient food system in South Africa.

Keywords: food retailing; supply chain; COVID-19 implications; post-Covid-19; response challenges, South Africa.

Introduction

Coronavirus disease 2019 (COVID-19) is a global pandemic that has affected all countries of the world. Africa has not been left out of the impact of the pandemic. South Africa has the second largest economy in Africa according to the World Bank. The World Bank has also classified South Africa as a newly industrialised country, with the 33rd largest economy in the world (South Africa World Bank 2021; Waugh 2000). According to the Food and Agriculture Organization Corporate Statistical Database (FAOSTAT), South Africa is one of the world's largest producers of grapefruit, cereals, green maize, chicory roots, maize, castor oil seed, pears, fiber crops and dairy products (FAOSTAT 2008; Matebeni 2019). With this, it can be said that food production and management had been progressive in South Africa before the advent of the global COVID-19 pandemic.

Globally speaking, the COVID-19 pandemic has had and is still having different impacts and effects on food supply, food retail and food processing. The global hunger pandemic is another scourge that accompanies COVID-19 (Moseley & Battersby 2020). This is a form of food insecurity. It has been established that the global pandemic has been a major cause of disruptions in the global food supply chain and malnutrition, especially in developing countries (Mishra, Bruno & Zilberman 2021). In Africa, the food supply chain, food security, processing and management have been affected by the current COVID-19 pandemic (Aday & Aday 2020; Chari et al. 2022; Meyer et al. 2022). The effects include limited financial reserves; difficulties in paying staff, a decrease in purchasing powers, inadequate staff or difficulty with staff getting to work;

Note: Special Collection: Impact of COVID-19 on the transport and logistics management.

closed retail or sales outlets; and lost contracts especially within small and medium enterprises (SMEs) (Nordhagen et al. 2021). As a result of the related strict lockdowns implemented in many countries in Africa, there was the disruption of manufacturing and logistics activities except for essential products and services.

This affected the demand and supply of various products (including food) because of restrictions imposed on retailers (Singh et al. 2020). A recent study on the implications of the pandemic on the bean value chain in some selected sub-Saharan African countries revealed that there were dire impacts in Southern Africa (Nchanji et al. 2021). The impacts that vary across the countries studied include high price for hired labour, higher price for inputs, low demand in the market, fertiliser unavailability, low price in the market and difficulties in transporting the harvest to market, to mention but a few (Nchanji et al. 2021). Furthermore, the challenges associated with the production and distribution of food affected the food consumption patterns of different households. Nchanji et al. (2021) reported that peri-urban and farmers' bean consumption was reduced in Southern Africa compared to other regions.

In South Africa, food production and distribution were progressive before the advent of the pandemic. However, with the observed pandemic cases in South Africa, coupled with the varying levels of national lockdowns (Table 1), food retail and supply chains in South Africa were affected. The effect was because of the implications of COVID-19 regulations on the agricultural sector for food availability; movement restrictions of workers; panic buying resulting in variations in consumer demand; and lockdown regulations, which placed restrictions on ports, food production and trade policies, thereby resulting in transportation disruption and financial pressures in the food supply chain (Meyer et al. 2022; Mthembu, Mkhize & Arthur 2022; Panwar, Pinkse & De Marchi 2022).

There is limited evidence as to what has been said about the impact of and response to COVID-19 by South African retailers, especially in terms of digital distribution or delivery, logistics and supply chain challenges. As such, this review aims to highlight insights into the impacts of and responses to the COVID-19 pandemic within the South African food retail supply chain. For this study, the retail supply chain is viewed as a:

> [C]ombination of processes, functions, activities, relationships, and pathways along which products, services, information, and financial transactions move into and between retail enterprises from the original producer to the ultimate end-users or consumers. (Murphy & Knemeyer 2018:97)

The remainder of the article is structured as follows: The next section discusses the South African food retail context, followed by discussion of the impacts of COVID-19 pandemic on South African food retail supply chains. Then we discuss the South African food retailers' responses to COVID-19 pandemic challenges, followed by discussion, recommendations and conclusion.

The South African food retail context

The COVID-19 pandemic has affected food production and supplies around the world. In South Africa, where food distribution is largely dependent on and controlled by supermarket chains, the impact was severe, as these supermarket chains source their produce from suppliers all over the world, costing them millions of rands in response to consumer demand. For example, Shoprite, the largest food retailer in Africa, sources products from 41 countries, operates 28 distribution centres and distributes to more than 2000 stores in 16 countries (Shoprite Holdings Limited 2020). The pandemic affected international travel and global logistics, as well as supplier production and stockpiles at the supply end, which resulted in shortages at retailers and increased prices for basic food items (Organisation for Economic Co-operation and Development [OECD] 2020b). South Africa was one of the few countries in the world with the strictest lockdown regulations, including a total ban on the sale and distribution of alcohol and tobacco products. These lockdown regulations were overly focused

TABLE 1: COVID-19 lockdown levels implemented by South Africa in 2020.

Level 5: From 26 March to 31 April 2020	Level 4: From 1 to 31 May 2020	Level 3 From 1 June to 17 August 2020	Level 2: From 18 August to 20 September 2020	Level 1 Since 21 September to 28 December 2020
Objective				
Drastic measures to contain the spread of the virus.	Extreme precautions to limit community transmission and outbreaks, while allowing some activity to resume.	Restrictions on many activities, including at workplaces and socially, to address a high risk of transmission.	Physical distancing and restrictions on leisure and social activities to prevent the resurgence of the virus.	Most normal activity can resume, with precautions and health guidelines followed at all times. Population prepared for an increase in alert levels if necessary.
Sectors permitted				
Only essential services as per existing regulations.	All essential services, plus a limited number of sectors with a low rate of transmission and economic or social value.	A wider range of sectors permitted with low to moderate risk of transmission that can be effectively mitigated.	Most sectors permitted with limitations remaining where the risk of transmission is high.	All economic sectors permitted.
Retail permitted				
Only essential goods, including food, medical products, cleaning and hygiene products, fuel, and winter goods, such as blankets and heaters.	Only essential goods, including food, medical products, cleaning and hygiene products, fuel, and winter goods, such as blankets and heaters.	All retail permitted at levels 3 as well as clothing stores and hardware stores.	All retail permitted. Restaurants and fast foods outlets may open for delivery and take-away.	All retail permitted. Restaurants may open, with stringent social distancing measures.

Source: Adapted from Schotte, S. & Zizzamia, R., 2021, *The livelihood impacts of COVID-19 in urban South Africa: A view from below,* WIDER Working Paper Series wp-2021-56, World Institute for Development Economic Research (UNU-WIDER), viewed 20 August 2021, from https://www.wider.unu.edu/sites/default/files/Publications/Working-paper/PDF/wp2021-56-livelihood-impacts-COVID-19-urban-South-Africa.pdf

on saving the health systems, almost to the neglect of the food system. This presented serious disruptions to the food system leading to increased food prices and limited access to food by poor communities. As reported by the World Economic Forum (2021a), broken chains between farmers and markets because of domestic restrictions and import delays have hindered production and supply in African countries. The impact of this will be felt in the food systems on the continent.

The closure of restaurants, bars and other food outlets also meant that people had to stock up on food and other essential items for their use at home. This also contributed to a rise in consumer demand, requiring food retailers to adjust their operations to meet the demands and at a reasonable cost. All these issues posed significant challenges to the supply and distribution of food retail in South Africa. Retailers faced challenges such as food, supply chain delays, stock shortages, crowd control and the implementation of safety protocols (Accenture 2020). The hard lockdown affected the livelihoods of communities, thus increasing the number of people who could not afford food (Burgos & Ivanov 2021). Poorer communities rely on the informal food and retail sector for both access to food and livelihoods because of the restrictions of hard lockdown rituals, further highlighting the deep inequality in South Africa (Friedman 2020).

In assessing the impact of COVID-19 on food supply chains in developing countries (Asia and Africa), Reardon, Bellemare and Zilberman (2020:78) hypothesised, amongst other things, that the postfarm aspect of the supply chain (midstream and downstream) will feel the overwhelming effect of the pandemic and subsequent restrictions. Reardon et al. (2020) further described midstream activities to include players such as wholesale, logistics and processing and downstream activities to include retail and foodservice enterprises. Interestingly, Reardon et al. also posited that when it comes to the impact on the downstream side of the chain, SMEs are likely going to be the most affected because of their space limitations, labour intensity and less capacity to control the crowd in compliance with the COVID-19 regulations. Larger supermarket chains and other foodservice outlets can adhere to the requirements mentioned and, therefore, may weather the storm better. This appears to be the case in the South African context, where the food retail industry is largely controlled by supermarket chains. For example, 70% of the food and consumer goods sector in South Africa is controlled by large and formal retailers (Masojada 2019).

The impacts of COVID-19 pandemic on South African food retail supply chains

Although some of the retail organisations were granted permission to operate during the COVID-19 lockdown, the distribution of essential products and services was regarded as an unfavourable business condition because of governmental regulations and directions regarding hygienic workplace conditions and the potential exposure of employees to COVID-19, as well as adherence to COVID-19 Occupational Health and Safety Measures (Government Notice 479 on 29 April 2020), for example, the need for payment and delivery options based on reducing risks of transmission, the implementation of collection protocols to ensure social distancing when collecting sanitised goods from a warehouse or depot for delivery, and the provision of adequate sanitizers and face masks. To take control of the risk and take advantage of the opportunities within the external market environment presented by COVID-19, a new flexible and viable retail distribution strategy amongst retailers in South Africa has been implemented (Ivanov & Dolgui 2021). Therefore, the objective of the present article is to investigate how these retailers respond to the impact of COVID-19 on business survival, resilience and responsiveness (Ivanov & Dolgui 2021). The success of retail organisations during and after COVID-19 depends on the ability to strategise effective unique supply chain distribution solutions to satisfy both walk-in customers and online customers.

Balancing local and international sourcing

A recent study on the South African supermarket supplier development programmes reported that there has been an increase in local supplier development by major retailers and supermarkets before COVID-19 (Das Nair & Landani 2020). The South African supermarket supplier development programmes paid off for both the local small suppliers and the supermarkets themselves during the COVID-19 pandemic. Whilst the suppliers enjoyed the support from the major supermarkets to keep their businesses afloat, the supermarkets were able to use their supplies to obviate some of the disruptions to the global supply chain and also in part to fulfil a corporate social responsibility role when it was needed the most.

Perhaps it was the retailers' supplier development initiative that led to an increase in sourcing products from local suppliers during the strict lockdown in South Africa. It is argued that a return to local sourcing for food products is sustainable in South Africa, as the country produces enough food to feed the entire population, but the draconian way in which lockdown regulations were implemented seems to have resulted in artificial food shortages (Viljeon 2020). This argument further highlights the position of the OECD (2020b:1) that 'the greatest risk to food security is not the availability of food, but the access to it by consumers'. In addition, an increase in demand for food products, panic buying and empty shelves was observed across South Africa.

Distribution in food retail supply chain models

Because of the COVID-19 pandemic, food retail distribution channels and supply chain strategies are faced with diverse competitive challenges, opportunities and distribution uncertainties more than ever before (Benedek et al. 2022; Chenarides, Manfredo & Richards 2021; Yadav et al. 2021). International supply networks have become more vulnerable

because of the nature, scope and spread of COVID-19 worldwide, which has also increased both humanitarian and economic crises simultaneously (Ivanov 2020; Yu & Aviso 2020). The announcement of the COVID-19 outbreak from being an epidemic to a pandemic disease in January 2020 has disrupted both economic activities and all business sector operations within South Africa and globally as the confirmed cases and death rates increased (Sarkar et al. 2020; Scafetta 2020). The unexpected and unavoidable disruption amidst COVID-19 was further strengthened by lockdown measures, such as limits on public gatherings, and the closure of schools, stores and restaurants, imposed by governments to fight against the spread of the pandemic.

Globally, the lockdown led to travel restrictions and border closures. As such, the production, imports and exports of certain products and commodities became almost impossible, making the import and export of essential food supplies more vulnerable as COVID-19 disruptions continued. The shutdown of almost all operations of the existing organisation, resulting in a shortage of supply and demand, was mainly affected by the limitation of global cargo shipping (Inoue & Todo 2020). Although cargo services were allowed in major ports around the world, batch services were disrupted, and 14-day quarantine periods were imposed on shipments from high-risk areas including China (Stoitsis 2020). This situation created a bottleneck in the food supply chain, resulting in extended storage time and food safety issues (Stoitsis 2020).

It is also reported that labour shortages and mobility have affected the necessary inspections of food products to meet trade requirements (OECD 2020a). The OECD report maintains that there is no reason for the COVID-19 pandemic to lead to a food crisis, but the kind of lockdown regulations enforced by countries appears to be causing the food crisis, as agricultural sectors have been allowed to operate, but travel, retail logistics and distribution were disrupted. This would naturally result in inaccessibility problems and waste.

It also caused productivity problems and delays in the supply chain to the detriment of small players who do not have the capacity and financial muscle to weather the storm by investing in systems and technology (Vilakazi & Lindani 2021). The pandemic led to food wastage in farms around the world because of restrictions on travel, logistics and low levels of food processing and storage (Chenarides et al. 2021; FAO 2021). This resulted in a lack of access by vulnerable communities. In South Africa, the government has maintained that there is enough food to eat, even under strict lockdown. This is further highlighted by Viljeon (2020), who regarded food shortages in South Africa under lockdown as self-inflicted and artificial. What is clear is that, globally, the restrictions affected the distribution of food, especially in the SME informal sectors (Reaedon, Mallebare & Zilberman 2020).

The COVID-19 pandemic and the mismatch between supply and demand

The South African food and retailing systems constitute all elements of production, transportation, processing, manufacturing, retailing, distribution, consumption, food waste and their corresponding impacts on proper nutrition, good health and well-being, and the environment (Climate Smart Agricultural Development 2018). Despite the global restrictions on the travel ban, production and organisational operation, as well as social restrictions, the role of the food supply chain in global trade remains essential (Mollenkopf, Ozanne & Stolze 2021). This is evident because of the ability of retail organisations to cope with or adjust effectively to sudden and shocking changes in demand. Over the years, retail organisations have gained increasing control over the supply chain through collaborative efforts that improve efficient and effective product flow and information within the food supply chain. However, owing to the presence of mass production specialisation and interdependency amongst different economic regions to trade and exchange goods and services, retail international collaboration has been noted by scholars and practitioners alike as strategic for competitive performance (Gawankar, Gunasekaran & Kamble 2020; León-Bravo et al. 2017; Sanchez Rodrigues, Harris & Mason 2015).

However, the dependency of South African retail organisations on the international supply of some essential food items has been affected by the outbreak of the pandemic. International food supplies and consumption of most essential food products in South Africa, such as rice, wheat and palm oil, that are 100% dependent on international supplies continued during the COVID-19 lockdown. However, disruption of the global supply chain and logistics was perceived as the main reason for the shortage of food product imports into South Africa (Ntombela 2020). The reason is attributed to the degree of import and export ban or restrictions by the partner countries.

To combat the anticipated global supply chain and logistics disruption effect on the South African economy, a shift towards focusing on increasing local production and supplies of maize meal to substitute rice and wheat in the event of a shortage was strategised for 2020–2021, which amounted to 16 million tons compared to 9 million tons of production per year (Ginindza 2020). This may imply that the outbreak of the pandemic has enabled countries to invest more in the inherent production and supply capabilities regionally for effective and efficient distribution of essential food items during and after the pandemic. Globally, food retailers were able to effectively, through an efficient supply chain network, improve operational flexibility and inventory replenishment, and to enhance customer satisfaction more conveniently and affordably. As such, the thinking around COVID-19 for organisations is based on the redesigning of innovative measures for adaptation, responsiveness, survival and growth (CDE 2020).

South African food retailers' responses to COVID-19 pandemic challenges

South African food retail organisations such as Shoprite, Pick n Pay, Spar and Woolworths are essential contributors

to the South African economy, social stability and sustainability. The performance of the retail sector, especially during COVID-19 economic disruptions, is the stronghold of economic efficiency and growth viability (Hobbs 2020). As such, the ability of an individual economy to sustainably supply, manufacture and distribute essential food items from the point of origin through to the point of consumption during the pandemic is considered very important for the economy (Aday & Aday 2020; Mollenkopf et al. 2021).

As retailers fight to respond to the COVID-19 pandemic in terms of balancing supply and demand, as well as ensuring effective and efficient inventory management, it was necessary to embrace significant resilient strategies within the retail value chain. Some of the prominent resilient strategies amongst South African retailers are as follows:

- Enhancing replenishment through investment in supply chain visibility to guide against bullwhip effect.
- Building stronger supply chain collaborations for collective impact and to stay up-to-date with international trends.
- Innovation in online sales and distribution innovation (e.g. the integration and implementation of 'pick and collect' for online buying).
- Integration of necessary software like ERP (e.g. the introduction of Pick n Pay Perspex Screens system at till points).
- Click and collect distribution model also known as buy online, pick-up in store (BOPIS).
- Contingency risk management implementation plan.
- Process monitoring and investment in people skills and training as well as effective communication to both stakeholders and shareholders.
- Other flexible operational strategies introduced by South African retailers are screening, updating and educating staff and consumers on COVID-19-related issues to combat infection; social distancing of floor aisles to ensure adherence to the COVID-19 government rules (Dalin-Kaptzan 2020).

Most notable is the click and collect system, an omnichannel online fulfilment distribution model implemented by South African retailers during the coronavirus pandemic to deliver their products to customers (Gielens, Gijsbrechts & Geyskens 2020). Here, the customer places an order online and the order is delivered to the nearest physical store or post office convenient for pick up by the customers at any time to ensure social distancing and enhance customer relationships. As online demand increases, food retailers are implementing more innovative avenues around the 'click and collect' system. For example, Woolworths South Africa launched contactless drive-through services, in which customers order online and collect orders without leaving their car. In this process:

> Customers simply arrive at the Woolworths store during the chosen collection window, and Woolworth's assistants greet and welcome the customer at the allocated Click & Collect parking bays and then bring the groceries to the customer's car boot. (Business Tech 2020)

Therefore, this implies that strategic flexibility, convenience and affordability were the main objectives of the resilience of the retail during the COVID-19 pandemic for retailers in the food supply chain in South Africa.

Postpandemic revival of supply chain models

The current and emerging literature on the revival of supply chain models for the post-COVID-19 area are summarised in Table 2. Key highlights of this emerging body of knowledge point to the need for resilient supply chain strategies and pandemic preparedness (Burgos & Ivanov 2021; Sharma et al. 2021). Furthermore, they reveal the need for digitisation of supply chain models that make use of data to ensure efficient and effective reposes to the disruptive postpandemic world (Ivanov & Dolgui 2021).

Methodology

This review paper uses a qualitative research approach to explore and reflect on the impact of the global pandemic of COVID-19 on supply chain models in food retail, with a specific focus on the context of South Africa. In this process, we review the relevant and evolving academic and gray literature on the impact of COVID-19 on food retail supply chain models and postpandemic scenarios. In addition, we reviewed the annual reports of the major food retailers in South Africa for indicators of the practical impact of the global pandemic on their supply chain models. The retailers studied in this article include Shoprite, Pick n Pay, Woolworths and Spar. This group of retailers were selected from the Deloitte's Global Powers of Retailing top 250 list (Deloitte 2021). We also reaffirm the postpandemic scenarios. Content analysis is then applied where we sieve through the 2020 reports for COVID-19 impact and changes to their supply chains. Summaries of these issues are presented in Table 3 to inform the arguments raised in this article.

Ethical considerations

This article followed all ethical standards for research without direct contact with human or animal subjects.

Results

Table 3 highlights some of the ways in which the major food retailers in South Africa responded to the impact of the pandemic to safeguard their supply chains.

Discussion

The South African economy was already on a downward trend before the COVID-19 pandemic, with a growth rate of less than 1% (StatsSA 2019). This growth trajectory presented increased poverty and joblessness amongst the ever-widening decisions between the rich and the poor. The COVID-19 pandemic and global lockdowns exacerbated these dire economic conditions in South Africa. The stringent state of national disaster and lockdown measures

TABLE 2: Summary of postpandemic literature.

Author(s) and date of publication	Postpandemic revival of supply chain models	Paradigms/methods	Findings
Ivanov and Dolgui (2021)	A digital supply chain twin for managing the disruption risks and resilience in the era of Industry 4.0	• Methodological principles of data-driven DSS and information technology for SC disruption risk management were derived using system-cybernetic analysis. • Future DSS in SC disruption risk management will extensively utilise data-driven technologies.	• The findings presented can guide a firm in properly maintaining data for model-based decision-making support. • Ignoring accurate data on supplier and route disruption probabilities, advanced supply signal recognition and real-time disruption detection can result in misleading disruption scenarios for SC design resilience and late deployment of recovery policies.
Sharma et al. (2021)	Accelerating retail supply chain performance against pandemic disruption: adopting resilient strategies to mitigate the long-term effects	• This study utilised an integrated full consistency model (FUCOM) – best–worst method (BWM) for the assessment of RSCs to enhance their business performance irrespective of pandemic disruptions.	• The current study identifies 'Collaboration Efficiency' as the main criterion for accelerating the performance of RSCs in a dynamic social environment. • Also, the study concludes that 'Order Fulfilment' and 'Digital RSCs' are the most appropriate resilient business strategies to mitigate the long-term effects.
Kayikci et al. (2021)	Smart circular supply chains to achieve SDGs for postpandemic preparedness	• Total interpretive structural modelling and Matrice d'Impacts Croises Multiplication Applique' a un Classement (MICMAC) have been applied to analyse the SCSC enablers which are supported by the natural-based resource view in Turkey's food industry.	• The results of this study show that 'governmental support' and 'top management involvement' are the enablers that have the most driving power over other enablers; however, none of them depend on any other enablers.
Burgos and Ivanov (2021)	Food retail supply chain resilience and the COVID-19 pandemic: A digital twin-based impact analysis and improvement directions	• The study examines the impact of the COVID-19 pandemic on food retail supply chains (SCs) and their resilience. • Based on real-life pandemic scenarios encountered in Germany, the study developed and used a discrete-event simulation model to examine SC operations and performance dynamics.	• The computational results show that food retail SC resilience at the upheaval times is triangulated by the pandemic intensity and associated lockdown/shutdown governmental measures, inventory-ordering dynamics in the SC and customer behaviours.
Panwar et al. (2022)	The future of global supply chains in a post-COVID-19 world	• The use of the insights from the five articles	• Investment in co-evolution of surveillance and collaboration amongst suppliers through the integration of technology. • Investment in machine learning such as artificial intelligence and robotics for faster, accurate and proactive forecasting. • Increased investments in the development of micro-supply chains. • Increased e-commerce deliveries amongst retailers.
Aday and Aday (2020)	Impact of COVID-19 on the food supply chain	• Content analyses	• The use of Supply Chain Management Data Science to solve supply chain challenges and forecasting issues. • Increase use of digital documentation and operations to effectively facilitate both logistics and supply chain processes.
Chari et al. (2022)	Pandemic outbreaks and food supply chains in developing countries: A case of COVID-19 in Zimbabwe	• Qualitative methodology and a descriptive survey	• The introduction of food aid distribution programmes by non-governmental organisations to address food insecurity that is prevalent in vulnerable communities.
Sayyida et al. (2021)	The impact of the COVID-19 pandemic on retail consumer behavior	• Quantitative methods with secondary data sources	• Increase in retailing due to increase in retail e-commerce sales.
Nudurupati, Garengo and Bititci (2020)	Impact of the changing business environment on performance measurement and management practices	• A qualitative exploratory theory-building social constructionist approach involving multiple case studies	• Findings suggest that emerging technologies enable collaborative networks creating opportunities for co-creating value whilst, at the same time, fostering innovation.
Charlebois, Juhasz and Music (2021)	Supply chain responsiveness to a (post)-pandemic grocery and food service E-commerce economy: An exploratory Canadian case study	• Quantitative descriptive data through a cross-sectional consumer survey in Canada	• The rise in e-commerce necessitates the rethinking of food retail supply chain.
Frederico (2021)	Towards a supply chain 4.0 on the post-COVID-19 pandemic: a conceptual and strategic discussion for more resilient supply chains	• Theoretical insights were provided based on the literature related to Supply Chain and Industry 4.0	• Supply Chain 4.0 is a transformational strategic orientation to be considered on the aspect of supply chain management for the postpandemic period.

FUCOM, full consistency model; BWM, best–worst method; MICMAC, Matrice d'Impacts Croises Multiplication Applique' a un Classement; SCs, supply chains; DSS, decision-support system; SC, supply chain; RSCs, Retail Supply Chains; SDGs, smart circular supply chain.

implemented in the country brought about leadership challenges in managing the spread of the virus versus livelihoods and the proverbial element of corruption. These scenarios also speak volumes about the nature and structure of the South African economy, which is highly industrialised with strong agricultural, manufacturing, financial services, mining and other service sectors.

The retailer reports reviewed in Table 3 suggest improvements needed for better supply chain models, including the building of cost-effective and efficient supply chains with elements of transparency and traceability. This is in line with arguments raised in the emerging postpandemic supply chain literature (see Ivanov & Dolgui 2021). Collaborations with suppliers on their response to

TABLE 3: Overview of how some major South African food retailers responded to the COVID-19 pandemic to safeguard their supply chains.

Number	Food retailer	Supply chain and sourcing arrangements
1	Woolworths	• Increasing expectations for transparency and traceability in the supply chain • Increasing requirements to manage third-party social and environmental risk and animal welfare in the supply chain • Balancing increasing legislative requirements for supply chain localisation with the quality, cost and availability of goods in the rest of Africa
2	Pick n Pay	• Commitment to fair, efficient and mutually beneficial business relationships • Building a cost-effective and efficient supply chain • Product innovation to meet evolving customer needs • Development of small businesses and diverse and ethical suppliers, including through more own-brand products • Pick n Pay Fast Pay – key banking partners provide competitive funding to participating suppliers for the early settlement of invoices
3	Shoprite	• Established a COVID-19 task team, chaired by the CEO, to ascertain risks and roll-out measures to ensure regulatory compliance and precautionary response initiatives • Allocated and tracked expenditure for the response • Communicated with and supported our suppliers in continued production • Consulted with regulators and government departments on an ongoing basis • Increased security measures to ensure the safe delivery of goods to stores
4	SPAR	• As consumers started to stockpile ahead of lockdowns, there were shortages within certain categories for extended periods • Collaboration between suppliers and buying teams intensified to ensure transparency around stock availability and trade deals • We implemented interventions to communicate stock availability with retailers to ensure they were serviced • Protocols were put in place to restrict direct contact with supplier teams at distribution centres • We made early account payments to help suppliers continue their operations • Our suppliers in turn offered assistance to SPAR

Source: Adapted from Company annual reports and websites, (Pick n Pay, 2021, viewed 20 August 2021, from https://www.picknpayinvestor.co.za/downloads/annual-report/2021/pick-n-pay-iar-new.pdf; Shoprite Holdings Limited, 2020, Integrated annual report 2020, viewed 20 August 2021, from https://www.shopriteholdings.co.za/content/dam/MediaPortal/documents/shoprite-holdings/integrated-report/2020/shoprite_ir_2020_ia.pdf; The Spar Group Limited, 2020, Integrated annual report 2020, viewed 20 August 2021, from https://thespargroup.com/wp-content/uploads/2020/12/SPAR_IAR_2020_Final.pdf; Woolworths Holdings Limited, 2020, The good business journey report, viewed 20 August 2021, from https://www.woolworthsholdings.co.za/wp-content/uploads/2020/09/2020_Good_Business_Journey_Report.pdf)

the restrictions and challenges of the global food supply system became important for retailers. This, of course, points to the development of more robust and resilient strategies for the postpandemic supply chain sector, as indicated by Sharma et al. (2021).

Retailers have always relied on a global supply and distribution network to source and deliver product and service costs to different locations effectively. This way of operation has had consequences for local producers and small suppliers (see Das Nair & Chisoro 2015). COVID-19 and global lockdowns have interrupted this process with restrictions on international transportation, factory shutdowns and product shortages (see Aylor et al. 2020). In reshaping supply chain models, retailers will need to reconsider and prioritise local versus international suppliers to ensure product availability, shorter distance and more control of the supply process (see WEF 2021b). According to the retailer report, the short-term consequences of rearrangement would include contract renegotiations with long-term suppliers and different payment terms. In the long term, benefits can be much greater for local economies in terms of growth, SME support and development, increased job creation and limited financial flows. Moreover, understanding value chains (especially the contribution of supply chain and logistics role players) is important. The major South African food retailers have had to design emergency responses and strategic actions as presented in Table 3 to operate safely within the regulations whilst supporting their suppliers to stay afloat.

Conclusion

This review paper highlights the importance of supply chain and logistics in the food retail sector and the impact of the COVID-19 pandemic on the sector. Relevant literature and reports from food retailers were reviewed to highlight the impact of the pandemic on food supplier models, with special attention given to the South African context. The responses of the major food retailers in South Africa were found to be in line with the emerging trends towards digitisation of supply chain models as a more resilient strategy to ensure efficient and effective reposes in the disruptive postpandemic world. Therefore, the localisation of supply chains in the context of a globalised world is essential. The South African food retail sector has benefited from investments in technologies to support its customers and suppliers. However, adjustments had to be made to existing retail supply chain models to mitigate the challenges of the South African national disaster state and lockdown regulations, as reflected in Table 3. Furthermore, this paper demonstrates that in reshaping food supply chain models for the postpandemic world, digitisation, robust and resilient strategies, balancing of local versus international suppliers and the development of small suppliers will all be important for efficient and effective food supply chain models of the future.

Further studies

As the world recovers from the COVID-19 pandemic, an empirical analysis is required to further understand and develop supply chain models and strategies for a post-COVID-19 food retail sector. This will minimise further food security crises resulting from the imbalance between production and supply.

Research limitations

As a review paper on an evolving subject, this article does not present empirical and factual results. It helps us to make sense of the impact of COVID-19 on the food retail supply chain in the South African context and how this can shape further research into the remodelling of food supply chains for the post-COVID-19 world.

Practical implications

The insights presented in this article will help policymakers understand the dynamics of the food retail supply chain and

its importance in the food ecosystem, and that any disruptions to the supply chain can cause a crisis in the food system. The study insight may further help supply chain professionals and practitioners collaborate to determine more resilient supply distribution strategies to improve the business process. The viability of a typical effective supply chain distribution system and infrastructure is needed to streamline and improve retail operations in South Africa. Because of the nature of the COVID-19 pandemic, automation of distribution planning, warehousing, order processing, transportation, materials handling and packaging are necessary for better customer service, information services, marketing or sales and finance flow. However, in reshaping supply chain models, retailers, in particular, will need to reconsider and prioritise local versus international suppliers to ensure product availability, shorter distance and more control of the supply process, etc. This also requires contract renegotiations with long-term suppliers and different payment terms.

Social implications

The general review conducted and presented in this article charts a way for more focused analysis using empirical data to gain more nuanced insights that will benefit the food retail supply chain and create a more resilient food system in South Africa.

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Competing interests

The authors have declared that no competing interests exist.

Authors' contributions

O.O. conceptualised the research collaboration objectives, writing, reviewing and editing. E.A.D. contributed significantly towards the conceptualisation, methodology and review of the article. O.O.O. contributed to the writing, review and editing of the article.

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Data availability

Data for this study are available upon request to the corresponding author.

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