

DYNAMICS OF SUPPLY CHAIN DISTRIBUTION SYSTEM IN THE APPAREL INDUSTRY

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Abstract

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Expansion into new markets creates new opportunities and dynamics which could enhance a company's growth prospects. It thus calls for scalable supply chain distribution systems in competitive marketplaces. The retail supply chain requires sustainable distribution systems to enhance cost efficiency. This study examined the influence of centralised, decentralised, or hybrid distribution systems on agile service delivery, productive human capacity and the supply chain process and technology. First, the study aimed to establish whether a centralised or decentralised supply chain distribution system supports expansion to the African marketplace. Secondly, this study assessed the challenges of inventory positioning and availability on the existing outbound and inbound product flow systems across the African continent. Thirdly, the study examined the interrelated strategic distribution centre performance level to develop the supply chain distribution value proposition model. A descriptive research design was employed using univariate and multivariate methods and data were gathered from 100 staff in an apparel company. The study found that a sound distribution centre requires efficient supply chain systems and a strong workforce. This calls for training and development of employees to improve the organisation's productivity and efficiency. The managerial implications include the need to ensure that distribution centres support sustainable product availability.

Keywords: Centralisation, Decentralisation, Distribution, Product Availability

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1. INTRODUCTION

In the retail sector, customer loyalty occurs when companies focus on customer satisfaction and service delivery; hence, it is crucial to ensure product availability. The growth in the number of distribution centres (DCs) in different regions to create a sustainable distribution system in the African marketplace is a means to achieve focused fulfilment and ensure constant product availability. This study sought to identify more efficient ways to improve distribution service

delivery in the supply chain value proposition model of African marketplaces using a South African apparel company as a case study. The pseudonym 'Greza Apparel' or 'Greza' is used to protect the company's identity. The South African retail sector's growth is underpinned by a growing middle class that has enabled retailers such as Mr Price, Woolworths, PEP Stores, Ackermans, Spree.co.za and so on to expand their target markets and locations. The availability of international brands in the country also offers fashion-forward consumers an improved shopping experience. In response to

customer demand, Spanish fashion retailer Zara has improved distribution by delivering to stores twice a week, while Swedish-based H&M has extended its footprint, and Australia's Cotton On Group has expanded to Namibia at the same time as South African retailers consolidate their investment opportunities in Africa and Australia.

This article aims to fill the research gap relating to extended supply chain networks to systematize the distribution component for improved product flows, frequencies to order fulfilment, skilled human capital supply and inventory visibility. The *bullwhip effect* on extended continental value chains has resulted in the adoption of electronic commerce (e-commerce) platforms and Internet penetration to expedite transactions, reduce costs and improve customer service. The paper focuses on the physical distribution of goods and services across extended continental supply chain networks at the right place and time, in the correct quality and quantity. Cost efficiency, speed, and the accuracy of the distribution system add value to the product or service. Against this background of research statement, the paper ascertains the retail industry's ability to achieve customer loyalty through product availability, investment in human capital, innovative information technology to mitigate the bullwhip effect and improved functionality of DCs for better product positioning. The influence of distribution systems seems to entrench on dependable delivery of the product, human capacity and productivity requirements, and in sync operable supply chain process and technology for unit-flow distribution in the company.

The research objectives were to 1) establish the extent to which a centralized or decentralized supply chain distribution system supports expansion to the African marketplace; 2) to identify the challenges in relation to inventory positioning and product availability on existing outbound and inbound product flow systems across the African continent; and 3) to examine the level of interrelated strategic DC performance to develop a supply chain distribution value proposition model for optimal distribution systems in Greza Apparel.

The African Continental Free Trade Area (AfCFTA) promotes the development of regional and continental value chains across Africa to create sustainable and competitive African marketplaces. Its main objectives are: "create a single continental market for goods and services, with free movement of business persons and investments; expand intra-Africa trade across the regional economic communities and the continent in general; enhance competitiveness and support economic transformation; promote industrial development" (Trade Law Centre for Southern Africa [TRALAC], 2022, p. 2). The AfCFTA paves the way for extended continental supply chain networks, calling for research on scalable expansion, efficient distribution systems for better inventory positioning and product availability, and continental knowledge and information sharing underpinned by supply chain technologies. The features relating to expansion to a large international market include the terms of goodwill, increased profit, competitive advantage and a large customer base. Given that Greza has

entered the African market, the quantitative study became imperative to measure levels of customer service and product delivery in the different regions. The significance of the paper ascertains that DCs are established in the best possible location and that their technological, operational, and human capacity are able to respond to market demand are among the complex tasks required to systematize supply chain distribution. The major finding of the paper indicated that a sound distribution centre requires efficient supply chain systems and a strong workforce. In the same token, the paper reflects its relevance where the African marketplace can be navigated using centralized, decentralized or hybrid supply chain distribution systems.

There is a paucity of research on distribution systems on the African continent. South Africa, Egypt, Ghana, Nigeria and Kenya are among the strong economies in Africa and their enterprises are well-placed to expand to continental marketplaces. However, the essence of the paper requires that they reduce the cost of their physical distribution logistics and supply chain operations and amalgamate their centralized and decentralized business processes to create a distribution hub. Distribution is the main bridge between manufacturers and customers for efficient and speedy product or service flow and improved customer service. Efficient customer service must be resonating with effective response time, product variety and availability, customer experience, order visibility and returnability. This paper focuses on synchronized product or service flow to enhance speed, accuracy, and competitiveness in the new marketplaces opened up by the AfCFTA. The growth in the number of DCs to ensure improved inventory positioning and sustainable distribution in the African marketplace calls for constant product availability during and after post COVID-19 pandemic.

The COVID-19 pandemic has disrupted economies across the world. It resulted in supply chain disruptions in the manufacturing sector which have had a domino effect on every other industry. Manufacturing companies cannot operate without supply chains, and when they falter, they reduce production, resulting in job losses and a downturn in economic activity. Effective inventory management is essential to ensure excellent order fulfilment and supply chain success in terms of inventory performance, strategic inventory optimization and a synchronized inventory distribution network for product availability (Yang et al., 2020). COVID-19 presented no exception disrupting the flow of material, information, and funds in supply chains in many sectors on the African continent. Lockdowns further disrupted the flow of material and product distribution while slow uptake of big data and supply chain analytics resulted in regressive information flow, causing a sharp decline in demand as well as product supply shortages (Mbhele, 2014b). Big data analysis enables the product logistics network to be transformed from a single to a diversified system, which increases feedback on products in the logistics process, improves the user experience, and opens up a modern development path for the development of the manufacturing sector. The flow of funds was

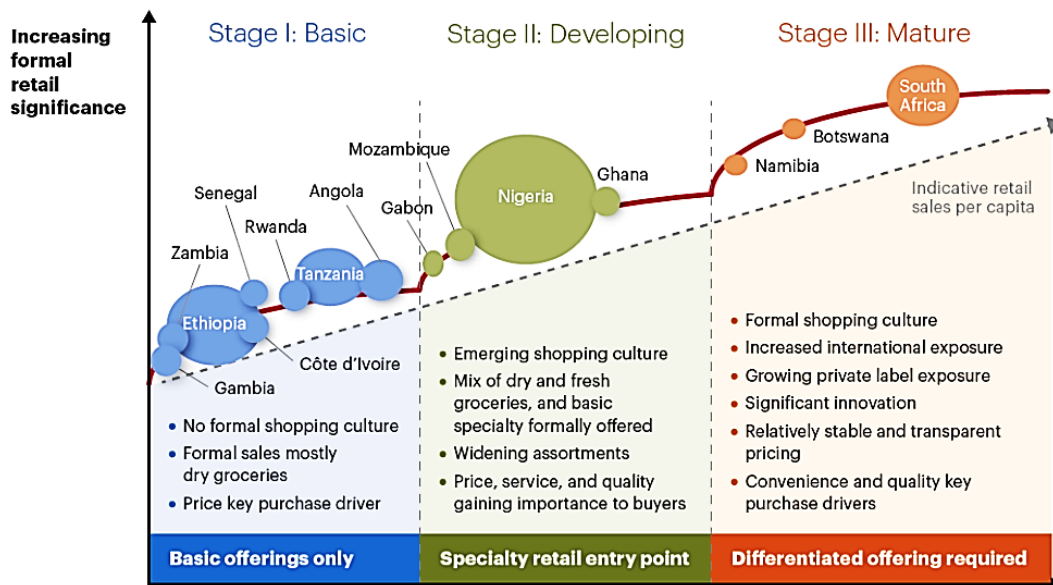
disrupted when firms refused to offer trade credit to their customers, resulting in sudden increases in many firms' working capital needs. The COVID-19 pandemic has disrupted the supply and production of goods in South Africa, adding costs and risks, and exerting pressure on the supply chain (Neboh & Mbhele, 2021). Nonetheless, some companies successfully managed their supply chains. Stoltz (2018) notes that increased theft of vehicles that deliver goods across South Africa has caused havoc. All these challenges highlight the need for multiple channels for the flow of information, products, or funds in supply chains (Mbhele, 2014b). Companies that developed multiple channels to improve efficiency when faced with day-to-day variations in demand and supply during the pandemic found that this built resilience with little additional cost.

As such, Section 1 of this paper presents a detailed description of the apparel marketplace entrenched by AfCFTA dimensions, the research problem, research objectives and the effects of the COVID-19 pandemic. The remainder of the paper is organized as follows. Section 2 presents the literature review on the retail market development, conceptual framework, product availability and positioning, the type of supply chain distribution systems and effects of innovative technology. Section 3 presents the research methodology including the data description, sampling and ethical considerations. Section 4 uses the univariate method and multivariate methods such as factor analysis. Section 5 of the paper, the empirical findings and the confirmation of the research objectives, while the last Section 6 concludes the paper and gives recommendations and future studies.

2. LITERATURE REVIEW

Distribution structures involve the spatial layout of the freight transport and storage system used to move goods between production and consumption locations. Goods can be distributed to the customer using direct transport or via one or more intermediate storage points. The efficient distribution reflects the system of activities involved in the movement of products from points of supply to points of demand via transshipment points such as warehouses. Onstein et al. (2019) note that "centralised structures may include a single distribution centre (DC) location or, sometimes, direct shipment is used" (p. 244, Figure 1). Spree.co.za, Woolworths and Mr Price use direct shipment to transport products to their private customers as the last mile in omnichannel utilisation. The authors add that "decentralised distribution structures include multiple DC locations in a so-called multi-echelon system. A multi-country system includes an international DC and a number of regional or local DCs" (p. 245). This structure is used in the continental extended supply chain by the same South African fashion retailers and fast-moving consumer goods retailers. The central DC is located in South Africa and is complemented by remote regional DCs on the continent. Fashion shipper Zara recently decided to further decentralise distribution by adding a new DC in the Netherlands (Op de Woerd, 2017). Online shipper Amazon has an extensively decentralised structure with 1,300 local DCs near European cities with new technologies and the growing amount of information available, it is easier to use more sophisticated techniques for supply chain and inventory management (Fernández et al., 2021).

Figure 1. African retail value proposition "stages"



Source: The 2015 African Retail Development Index (Moriarty et al., 2015).

In expanding to new markets, Greza needs to create a seamless retail distribution system,

customised shopping and a focused fulfilment distribution experience. These distinct market

categories include basic offerings, an emerging shopping culture without customised experiences, and differentiated offerings coupled with increased international exposure, innovation, and customer experience.

Stage 1: Basic. Little to no formal shopping exists in these markets. As such, buyers' key consideration is price. For retailers entering basic markets, the discount 'value for money' format may offer a firm proposition and opportunities for scaling and growth (Moriarty et al., 2015).

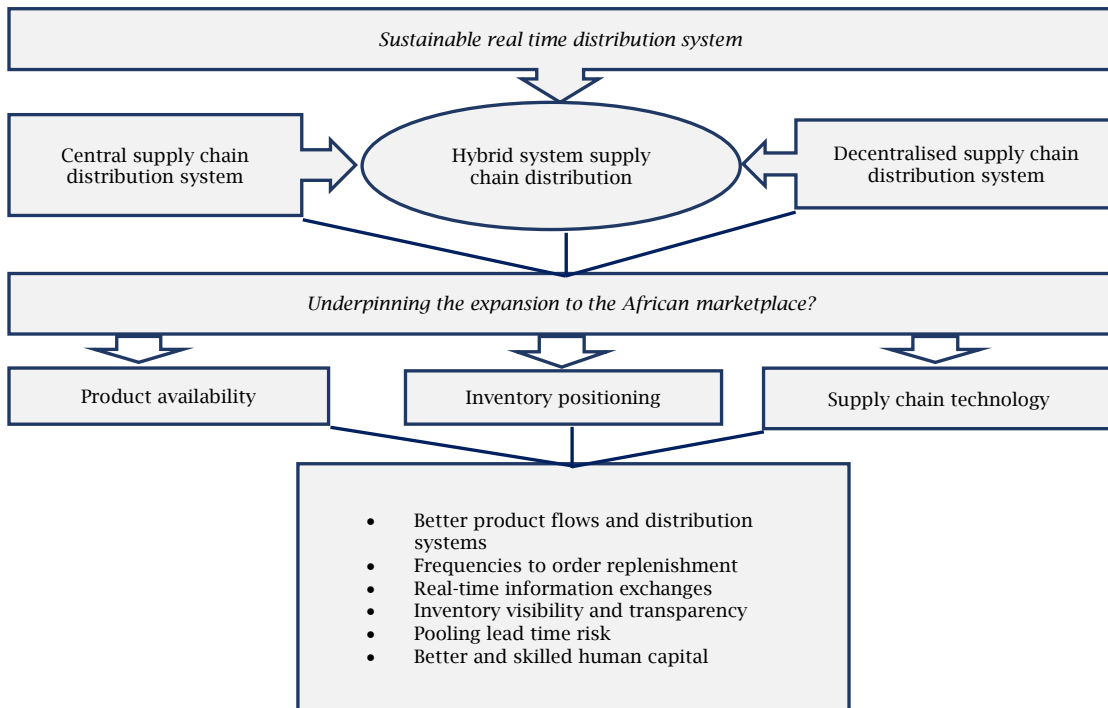
Stage 2: Developing. Mainstream retailers such as Mr Price and Woolworths may prove the most logical entry points to these retail markets in Nigeria and Ghana. Retailers can move upwards by developing more targeted or larger varieties, or downwards with smaller varieties. Both paths offer growth potential with steadily improving infrastructure (Moriarty et al., 2015).

Stage 3: Mature. These markets offer an established shopping culture, relatively high wealth levels and well-established infrastructure. Retailers have the option to move downwards to test basic versions of their current supply chain distribution systems and customer value

propositions and experiences. With more demanding consumers and stiff competition in these markets, differentiation is a key factor (Moriarty et al., 2015).

This paper focuses on the use of DC warehouses to support cross-channel, multi-channel and omnichannel supply chain distribution networks. It draws on a number of interconnected concepts, empirical research, and theories to examine supply chain distribution networks as apparel retail companies expand to African marketplaces. The framework employed is configured in a logical structure with graphical representations and narrative text to demonstrate how the ideas embedded in constructs relate to one another. The main constructs employed, including product availability, inventory positioning and supply chain technology on the underlying supply chain distribution systems are graphically represented. Figure 2 presents the conceptual framework for a sustainable real-time distribution system. The framework portrays the distribution value proposition triad, that is, the use of centralised, decentralised and hybrid supply chain distribution systems to penetrate the African marketplace.

Figure 2. Conceptual framework



Source: Designed by the researchers.

Effective management of service delivery has the potential to increase customer satisfaction through dependable and efficient quasi-real-time delivery. The paper further cogitates on product availability, inventory positioning, and supply chain technology, and the marketplace expansion intends to gain better product flow, frequencies to order replenishment, information exchange, inventory visibility, pooling lead time and skilled human capital.

2.1. Product availability

Inventory planning and management are challenging tactical and operational decisions in retail networks. Maintaining the right set and level of inventory in retail centres directly affects customer satisfaction and sales. Consumers' growing adoption of e-commerce has forced firms to efficiently manage inventory in fulfilment centres and retail stores to satisfy demand in both brick-and-mortar (B&M) stores and online channels (Derhami et al., 2021). On-demand inventory transshipment and resource

sharing have become more economical and efficient because of advances in information technology and resource-sharing platforms, digitalisation, and innovation in logistics systems such as the physical Internet (Silbermayr, 2020). The availability of the desired product or a satisfactory substitute within a delivery time acceptable to the customer must be considered to evaluate a retail centre's ability to address the demand for a product (Derhami et al., 2021). Most studies on inventory planning focus on sharing demand information in a supply chain system (Mbhele, 2014a), which minimises the impact of demand uncertainty and product availability on the supply chain (Shao, 2019). Inventory sharing in a decentralised network of dealers affords product availability where dealers respond positively to incentives for inventory sharing. Shao (2019) studied the transshipment price and incentives between the firm and decentralised retailers. Temporary stock-out and incomplete product availability are inevitable in most retailers mainly because of demand uncertainty forecast error, and inability or unwillingness to stock all products in the product portfolio (Rohaninejad et al., 2018). The proposed model could also be embedded into an optimisation model to solve the inventory planning problem with the objective of maximising product availability across a retail network (Silbermayr, 2020). Two types of systems can be considered for assortment planning in an interconnected network of retailers: 1) centralised ordering system in which the replenishment orders for nearby retail centres are determined together to maximise overall product availability in the network; and 2) decentralised ordering method in which each retail centre determines its assortment plan independently while considering product availability in the others (Derhami et al., 2021).

2.2. Inventory positioning

Inventory management has emerged as a critical factor in profitability and productivity optimisation in some industries. A supply chain is a system that involves all the facilities or entities required to transform raw materials into final products. It consists of stages like suppliers, manufacturers, distributors, wholesalers and retailers, and so on. In practice, supply chains are highly uncertain. Supplier reliability, uncertainty and poor performance in one stage can affect the whole supply chain (Islam et al., 2022). Svoboda et al. (2021) inventory model includes different supply options (multiple-sourcing, transshipment, supplier selection methods) and outlines their influence from a managerial perspective. Cárdenas-Barrón et al.'s (2018) inventory model assumes that the ending inventory level can be negative. They developed an economic order quantity model to maximise the retailer's total profit per unit of time under nonlinear holding cost and demand. Lückner et al. (2019) focused on managing disruption, simultaneously considering reserve capacity for inventory decisions and stochastic demand. They assumed zero lead time, neglecting the effects of safety stock in their mathematical model. Schmitt et al. (2017) adopted a dynamic ordering approach and found considerable performance improvement compared to the adaptive approach to mitigate

supply disruptions. Rohaninejad et al. (2018) focused on a multi-echelon supply chain where the reliability of the facilities can be improved by further investment, such as in the case of expansion to African marketplaces across regions.

Reliable suppliers can alleviate the risk of supply uncertainty to a large extent. Production managers should always consider the reliability of the supply sources when drawing up production schedules during and beyond the COVID-19 pandemic. Given that reliability decisions can impact the profit function, manufacturers should be aware of suboptimal and optimal reliable suppliers to maximise profit (Islam et al., 2022). As firms change their priorities in response to old challenges like real-time decision-making, workforce productivity, business continuity, and security risks, newer challenges introduced by the pandemic are testing their resilience as they attempt to lay a foundation for the future (Ivanov, 2020). The reality is that the market for wholesale distribution is fundamentally transforming and there is a need to maximize supply chain performance and deliver an elevated customer experience. Digital disruptors are reshaping supply chains and changing business models across the board.

2.3. Supply chain technology

The localization capabilities of the South African economy can build a globally competitive speciality around innovative and high-end fabric manufacturing for brands. Effective inventory management is fundamental to order fulfilment excellence and supply chain success in terms of inventory performance, strategic inventory optimization and a synchronized inventory distribution network for product availability (Yang et al., 2020). Among other industries, the apparel sector has been severely affected by COVID-19. Supply chain processes are undergoing restructuring, while the manufacturing sector is also embracing new technology (World Health Organization [WHO], 2020; Ivanov, 2020). Governments implemented strict rules and lockdowns to control the spread of COVID-19, and apparel companies were forced to halt production due to a lack of raw materials and customer orders. The sector also suffered from international supply chain disruptions.

The logistics distribution system is the bridge between the production and processing of products, and transportation and distribution. It provides an optimization platform for logistics distribution between regions (Cui & Xie, 2020). The product logistics mode is divided into three main modes: enterprise self-operation, third-party logistics and self-operation plus third-party logistics (Dong, 2019). It is possible to improve the delivery efficiency of product logistics through intelligent sorting, scheduling optimization and intelligent monitoring. Technical development of a logistics distribution system is an effective way to construct efficient logistics. Logistics technology is currently mainly used to combine logistics distribution with intelligence and informatization. The third-party logistics industry can optimize the transportation route, shorten transportation time, and guarantee

the quality and safety of products as much as possible through the big data of logistics (Shao, 2019).

An effective and efficient distribution system is underpinned by optimal warehouse operations design. The warehouse serves as both outbound storage for suppliers and a DC for retailers. Warehouse optimization is a hub in a logistics network where goods are temporarily stored or rerouted to a different channel in the network. According to Bowersox et al. (2020), warehousing “integrates varied aspects of logistics operations such as mixing and modification of the inventory to meet customer requirements and inventory holding” (p. 223). All functions of warehouse operations such as receiving products, storing the goods and dispatching them when required must be carried out well. Bowersox et al. (2020) note that warehouse types include DCs, consolidation terminals, breakbulk facilities, and cross docks. Order batching consolidates several orders in a batch to place the items in the storage system in a single tour, generating efficient routes and reducing the distance travelled, while picker routing plans the shortest tour to minimize travel time and distance to place all the items in a batch (Cano, 2020). Therefore, the put-away operation is associated with inbound logistics in a DC, impacting efficiency and customer satisfaction.

A DC is a warehouse facility that holds inventory from the manufacturer pending distribution to the appropriate stores (Council for Supply Chain Management Professionals [CSCMP], 2016; Gómez-Montoya et al., 2020) when it picks up and delivers goods to meet stores’ demands (Mbhele, 2014a). The main operations include receiving, put-away, order picking, sorting, cross-docking, and shipping (Bowersox et al., 2020) and performance indicators typically focus on material handling efficiency. A DC for the distribution of goods for retail stores can impact efficiency due to the use of human resources, and information and communication technologies (ICT), amongst others (Mbhele, 2013; Lambrechts et al., 2021). Therefore, this operation must be efficiently planned, executed and controlled. In a DC with a multi-level storage system, it may be necessary to use multiple pieces of material handling equipment (MHE) that can access the storage locations according to the height of the warehouse and the type of product (weight or volume).

2.4. Blended distribution ecosystems

2.4.1. Decentralised distribution model

Decentralized decision-making for a supply chain involves decisions that are usually made at the business unit level or individual units. A decentralised DC involves multiple facilities, with each treated as a separate entity, and the stock is organised to optimise and position the inventory. Decentralised warehouses ensure that the right goods are already relatively close to the customer, which enables greater delivery flexibility and shorter delivery times. It must always be known how many and which goods or materials are in which warehouse in order to be able to plan optimal transport routes and save costs; professional recording and communication of warehouse stock

and stock movements are therefore essential (Cano, 2020).

As an organisation grows, the challenges in the business environment become difficult to handle, especially managing product flow from the supplier to the customer in terms of *delivery times, cost decreases, closeness to the customer in terms of proximity* and *improved customer service*. Nevertheless, it mainly facilitates *customer service and transportation efficiency*. The growth of e-commerce has resulted in more complex logistics demands from customers and retailers are using less-used retail outlets as quasi-decentralised warehouse locations that are located closer to customers for same-day delivery and click and collect (cross-channel).

The development of omnichannel retail supply chains, where retail operations across multiple channels and echelons are streamlined and integrated has led to new operational complexities (Wollenburg et al., 2018). The value proposition allows retailers to focus on attracting and managing consumer demand while transferring inventory and order fulfilment risks and operations upstream to their suppliers (Peinkofer et al., 2019). Most research on supply chain management has explored traditional supply chain triad contexts — a manufacturer, a supplier, and a buyer or a buyer and two suppliers. In designing these services, suppliers are required to combine an appropriate mix of key service operations components, including people, facilities, equipment, technology, and processes (Peinkofer et al., 2019).

2.4.2. Centralized distribution model

In a centralised DC, a retailer or its supplier maintains a single facility or DC versus several facilities spread over an area. Supply chain decisions are centrally made at the corporate level. Each facility identifies and carries out its strategic decisions without taking into consideration other facilities’ impact on its supply chain (Simchi-Levi et al., 2008, p. 231). One of the best ways to alleviate the logistical nightmare of operating multiple DCs is to utilise a central DC. In centralised warehousing, a retailer elects to store its inventory either at a single location or a handful of large facilities dedicated to serving one region, such as the west coast of Africa serviced by Ghana and the east coast by Kenya, the south by South Africa and the north by Egypt on the African continent. The central distribution region should have primary oversight of the administration of inbound and outbound systems, frequencies to order fulfilment processes, and synchronized warehouse service, capacity and safety, and should adopt Industry 4.0 technologies and seamless workflows to maximize efficiency (Yang et al., 2020). Cui and Xie (2020) describe the centralized strategy as organized product delivery from suppliers to a hub, usually in complete load quantities rather than to each store. Retailers’ logistics costs increase with overall stock, but improved visibility of the supply chain is achieved. The benefits of centralization include lower *inventory costs, delivery precision, less tied-up capital, reduced learning costs and information sharing*.

2.4.3. Hybrid distribution model

The hybrid distribution model is a combination of the key attributes of centralised and decentralised decision-making arrangements. The use of more DCs and a centralised distribution system improves *customer services* and offers *better quality* (Mbhele, 2013). By blending centralised and decentralised supply chain methodologies, a business can enjoy some of the advantages of each while mitigating the disadvantages. Effective inventory management is fundamental to order fulfilment excellence and supply chain success in terms of inventory performance, strategic inventory optimisation and a synchronised inventory distribution network for product availability (Yang et al., 2020). Additional locations can be stocked in line with customer demand in the area in order to better serve customers (Cui & Xie, 2020) and products can be distributed to locations across the continent from the four African regions based on the volume of orders (make-to-order) or push-pull system. The efficiency of this type of supply chain is a function of the cost and effort required to move the product, and how quickly it needs to be moved. It is also possible to improve the delivery efficiency of product logistics through intelligent sorting, scheduling optimisation and intelligent monitoring (Zhang et al., 2021). One of the main challenges in the supply chain is the last mile — the final leg from the DC to the customer. According to Mbhele (2014a), it is better to keep larger quantities in one central location, and eventually distribute smaller quantities closer to the customer. This is one of the major considerations in deciding between centralised and decentralised logistics. A centralised distribution system assists in achieving a competitive advantage, but, more importantly, the use of a hybrid model can enhance *profitability* and is a *cost-effective structural arrangement* for a firm.

2.5. Service quality and human capital

Product availability entails having the right product at the right time and place in the right quantity for customers to procure. Distributing the right product mix is a critical competitive advantage for retailers as it provides a dynamic and open avenue for customers. Customers have easy access to stores that are well-positioned to secure whatever product they need. Ensuring availability is an intricate task for retailers since it entails forecasting customer demand across stores and efficiently managing other supply chain challenges (Cui & Xie, 2020). Low product availability causes stock outages while high availability ensures greater awareness of customer demand (Ivanov, 2020). When products are not available, consumers adopt a negative attitude towards the brand. However, when a product is always available, it triggers product relevance by keeping the product in the customer's mind.

The dimensions of service quality that relate to product availability include *tangibility*, *reliability* and *responsiveness* (Kang, 2020). According to Islam et al. (2022), the reliability of the supply process comprises delivery reliability in terms of delivering customers' products within a specified time,

transport reliability in delivering products on time, and reliability of logistics support infrastructure including support tools and equipment. Responsiveness has to do with the speed at which products are provided to the customer by the supply chain (Heizer et al., 2020). Finally, the tangible dimensions include the physical product being provided to the customer in the right quality and quantity with no error or spoilage. Service quality has become an important aspect of customer satisfaction, especially when entering new African marketplaces (Stevenson, 2021). Given that firms' principal objective is to maximise profits through increased sales at minimal cost, customer satisfaction is important as it promotes loyalty, recommendations, and repeat purchases.

Human capital comprises a workforce's skills. The flow of these skills is positive when the return on investment exceeds the organisation's direct and indirect costs (Goldin, 2016, p. 56). Training and development enhance employees' skills (Lai et al., 2017), thereby improving productivity and efficiency (Heizer et al., 2020). According to Ivanov (2020), although capital investment in training and development is costly, it benefits the organisation in the long run as it improves performance and promotes a positive work ethic. Skilling employees also benefit them personally as it enhances the likelihood of promotion (Stevenson, 2021). The more companies invest in their employees, the more they benefit in terms of productivity, competitiveness and profitability (Fahimullah et al., 2019). Investment in human capital can improve DC employees' productivity and efficiency, especially the merchandising team.

3. RESEARCH METHODOLOGY

The study employed a descriptive research design (Hair et al., 2011, p. 149) and a quantitative research approach that gathers numerical data. Creswell (2015, p. 4) states that quantitative research tests theories by examining the relationships among variables. Positivism, which was adopted as the research philosophy, posits that only 'facts' gathered employing scientific methods can make legitimate knowledge claims. Objectivism, which asserts that social phenomena and their meaning exist independent of social actors, was adopted as the ontological position (Saunders et al., 2012). Deductive reasoning was used for theory testing because the study commenced with an idea that was narrowed down to hypotheses to validate the original idea. Judgemental or purposive sampling was employed, with each element of the target population selected for a specific purpose. The aim was to draw on the respondents' expertise and experience in diverse African marketplaces. The questionnaire comprised Section A which solicited biographical data and posed dichotomised (Yes/No) questions, while Section B used a 5-point Likert scale to indicate levels of agreement/disagreement and neutrality with statements. Based on Sekaran and Bougie's (2019, p. 295) recommendation, a sample size of 148 was chosen from the target population of 400 staff members at Greza Apparel. The target population included logistics managers (outbound and inbound),

DC operators, supply chain and shipping staff, store managers, logistics coordinators, outbound and inbound logistics supervisors, shipping coordinators, truck drivers and systems engineers. The data were captured using the Statistical Package for the Social Sciences (SPSS) and were analysed in line with the study’s objectives. Ethical clearance was obtained from the University Research Office after securing the gatekeeper’s permission to conduct research at Greza Apparel. The respondents’ confidentiality and anonymity were protected and they signed informed consent letters to ensure the study’s integrity and trustworthiness.

4. RESULTS

The findings which emanated from the quantitative univariate, bivariate and multivariate methods were analysed in line with the study’s conceptual framework and compared with the extant literature.

The respondents were asked to select the country that would best serve Africa. Figure 3 below shows that 36% of the respondents, selected Nigeria, 35% Kenya and 23% Ghana, with Egypt – at only 6%. The events surrounding the Arabic Spring in the North African region fuelled negative attitudes towards this region despite its recovery and recent considerable growth.

Figure 3. Countries that would best serve Africa

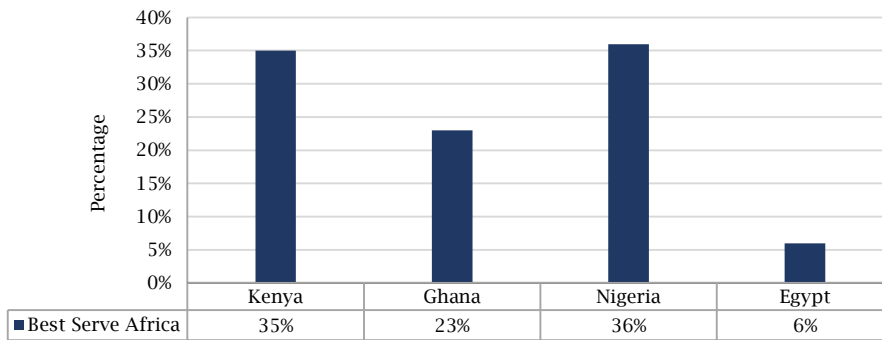


Figure 4. The current need for skills, pressure and product availability (Greza constructs)

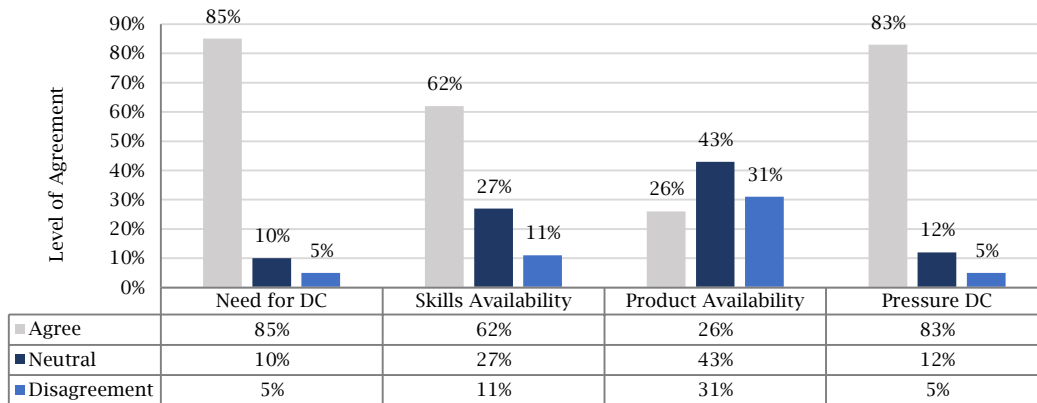


Figure 4 illustrates that 85% of the respondents believed that the company requires a DC in Africa, while 83% indicated that the establishment of DCs on the continent has the potential to mitigate pressure on the local DC. However, 43% remained neutral on the question of product availability. Furthermore, 31% disagreed that African customers are satisfied with current product availability.

The African retail proposition phases impact product availability. Nigeria and Ghana which have an emerging shopping culture are experiencing expanded product availability, while Namibia, Botswana and South Africa which have a formal shopping culture enjoy high levels of product availability embedded in efficient and unit-flow distribution systems.

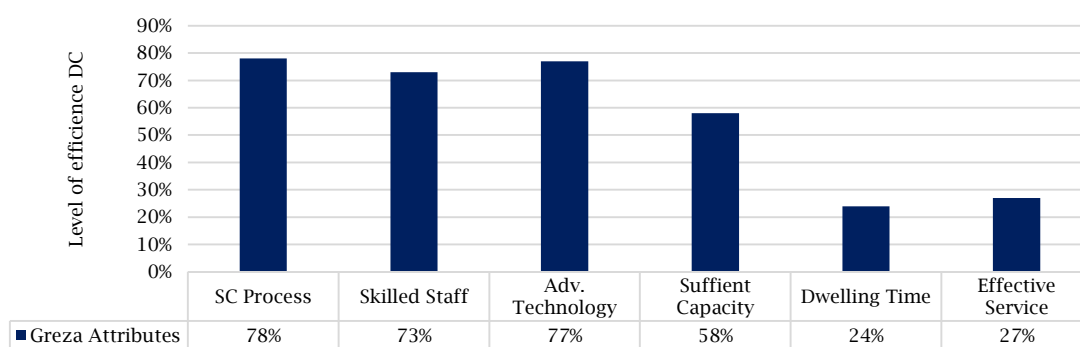
Figure 5. Attributes of an efficient distribution centre

Figure 5 reveals that the respondents were of the view that the supply chain process (78%), advanced technology (77%), and skilled staff (73%) are significant attributes of an efficient DC. Less dwelling time (24%) and the effect of customer

service (27%) are mainly dependent on the individual country's policies and business regulations. The level of investment in distribution DC systems with sufficient capacity can determine a DC's efficiency.

Table 1. Current situation at Greza Apparel — Descriptive statistics

Descriptive values	Need for DC in Africa	Skills in DC	Merchandise team	Pressure reduction	Current DC	Product delay in distribution	Product availability satisfaction
N	100	100	100	100	100	100	100
Mean	4.24	3.61	3.66	4.10	2.38	3.83	2.97
Median	4.00	4.00	4.00	4.00	2.00	4.00	3.00
Mode	5	4	4	4	2	4	3
Std. Dev.	0.822	.843	0.835	0.802	0.877	0.948	0.909
Skewness	-1.042	-0.602	-0.136	-0.792	0.734	-0.454	0.227
Kurtosis	0.764	0.240	-0.509	0.476	0.573	-0.330	-0.253
Range	3	4	3	3	4	4	4
Minimum	2	1	2	2	1	1	1
Maximum	5	5	5	5	5	5	5

Table 1 illustrates the respondents' views on the need for efficient distribution facilities and systems in Africa. It shows that reduced pressure, product delays in distribution, the need for a merchandising team and skills in the DC and the need for a DC in Africa are the five highest-ranked means on the scale. These variables can provide a value proposition and efficiency in a DC. They include some values that lie between 1.96 standard deviations of the mean. The mode values cells confirm the central point in the sample. This

indicates that 'agree' is the most frequently occurring value amongst these five variables.

Factor analysis is a statistical technique used to categorise sets of variables. It is a means to create a structure of the hidden variables in a data set. The multivariate analysis interrogated the data from the statements that employed a 5-point Likert scale in relation to the supply chain DC and systems, inventory positioning, product and skills availability and customer service delivery.

Table 2. Kaiser-Meyer-Olkin and Bartlett's test, communalities, total variance explained, rotated component matrix

KMO and Bartlett's test						
Kaiser-Meyer-Olkin measure of sampling adequacy					0.603	
Bartlett's test of sphericity					Approx. Chi-Square	65.328
					Df	21
					Sig.	0.000
Rotated component matrix						
Variables	Factor loading	Eigenvalue	% of variance	Cumulative %	Communalities extraction	
Factor 1: DC capacity supply						
Current DC availability	0.759	1.807	25.808	25.808	0.642	
Product availability	0.663	1.561	22.305	48.113	0.543	
Skills availability	0.596	1.007	14.379	62.492	0.656	
Factor 2: DC capacity demand						
Pressure reduction	0.777	0.819	11.704	74.195	0.605	
Merchandise team	0.599	0.647	9.245	83.440	0.453	
Need for distribution centre	0.587	0.628	8.968	92.409	0.765	
Factor 3: DC system delays						
Product delay in distribution	0.566	0.531	7.591	100.000	0.711	

Note: Extraction method: principal component analysis, rotation method: Varimax with Kaiser normalisation, number of items = 7.

Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were employed as statistical measures to assess the data factorability. The test produced a significant value of 0.05 or smaller (Pallant, 2011, p. 286). The result from the KMO is 0.603, and Bartlett's test is significant ($p = 0.000$); hence, the factor analysis is appropriate at 21 degrees of freedom. This means that there is a reasonable correlation between the variables. This study focussed on the components with an eigenvalue of 1 or more. Table 2 above shows that the first three components have eigenvalues above 1 (1.807, 1.561 and 1.007) and that they define a total of 62.49% of the variance. The factors were 'rotated' by presenting the pattern of loadings, making the data easier to interpret (Pallant, 2011, p. 185). Employing the Varimax rotation, component 1 explains 25.81% of the variance, component 2 explains 22.31% and component 3 explains 14.38%.

5. DISCUSSION

5.1. Distribution centre capacity supply

The first factor (current DC) has the highest variance of 25.81%. The strategies, responsibilities and role of the DC are evident in areas such as online store delivery, inbound and outbound distribution systems, reverse logistics, information technology and the integration of supply chain distribution systems. Modern DCs require that organisations have the dynamic capability to achieve successful distribution operations and networking. The proposed DC for an African marketplace is expected to be established in a good location with an effective design and operational information technology. The second highest factor (product availability satisfaction) has a variance of 22.31%. Ecklund (2010) observes that optimisation strategies are used to position the availability of products and fast delivery to achieve a competitive advantage. At the same time, cost trade-offs related to equipment, transportation, the workforce, and other miscellaneous cost variables are also optimised. The third factor (skills in the DC) has a variance of just 14.38%. Having a skilled workforce is tantamount to achieving a competitive advantage. All these factors are independent but combining them maximises the benefits and increases the firm's competitive advantage.

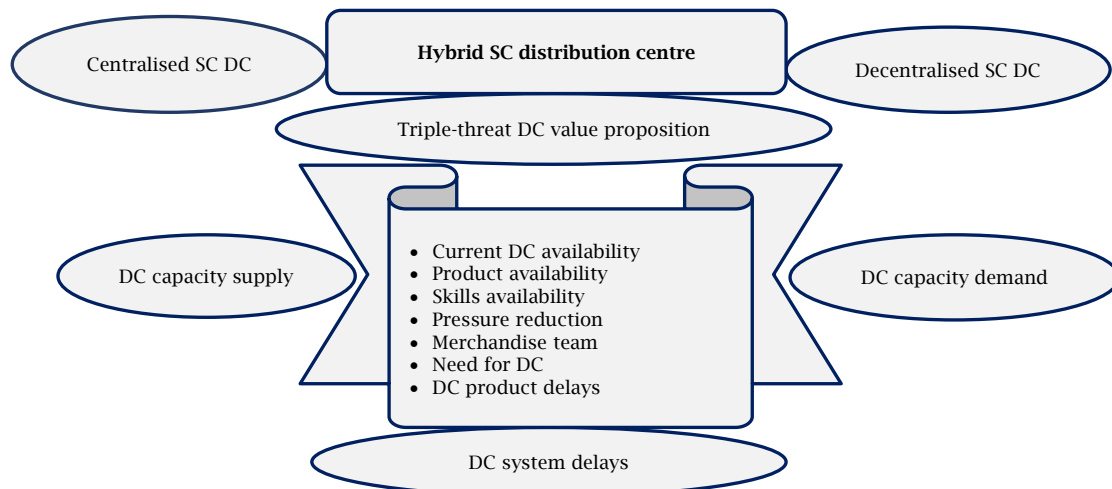
5.2. Distribution centre capacity demand

This factor refers to some of the necessary features of a DC (pressure reduction, a merchandising team and the need for a DC in Africa). The highest loading among these factors with a variance of 11.70% is pressure reduction. If the local DC is not well placed in terms of expanding the corridors to international affiliates and diverse countries, its service levels may deteriorate. Establishing DCs in other African countries will assist the local one to enhance its service performance. The second highest factor is a merchandising team with a variance of 9.25%. This indicates that the team of employees at the DC must collaborate with teams in affiliated countries to achieve efficiency. Without skilled human capacity, it will be difficult to coordinate processes despite digitisation and the adoption of technology. The need for a DC in Africa has the lowest variance of 8.99%. If there were no deficiencies in handling products, and the flow of materials and goods in the supply chain as well as complex customer demands, retailers would have no need to expand their DC across Africa. However, population growth requires that businesses do so in order to survive. Notwithstanding the fact that some businesses endure despite disruptions to their supply chain, an organisation that does not expand beyond its borders will become extinct or irrelevant.

5.3. Distribution centre system delays

The last variable that creates a variance of 7.59% delays in product distribution. When products are not provided to customers when they are requested, their value is lost. The negative impact of product unavailability is far higher than the cost of producing the goods. Every facet of the organisation is required to perform well to ensure that the DC is efficient. The figure below shows the triple-threat supply chain distribution value model including DC capacity demand, supply and systems delays that affect the expansion of a distribution footprint in Africa. It is extremely difficult to balance demand and supply in the retail supply chain as skewed consumer expectations, demand and behaviour on the underlying DC value proposition result in product delays and longer lead times.

Figure 6. Triple-threat distribution chain model



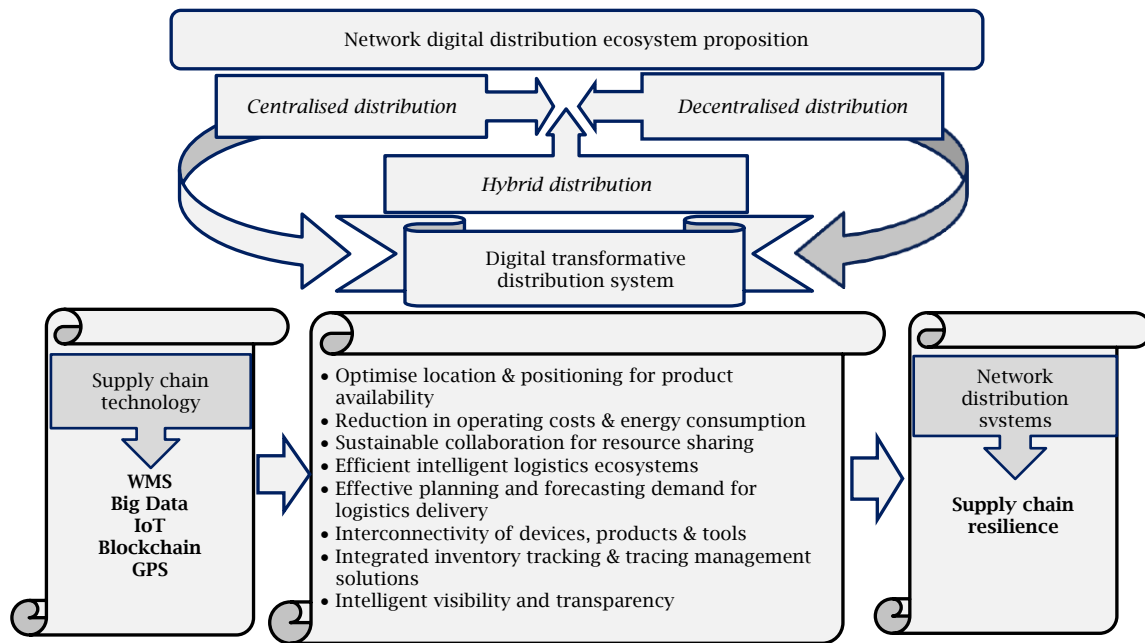
Source: Designed by the researchers.

Triple value model: Retailers need to consider how best to optimise their supply chain distribution process in the face of the triple threat of capacity demand, capacity supply and product delays to meet fast-evolving consumer demand-driven omnichannel-focused distribution systems. The study assessed the extent to which a centralised or decentralised supply chain distribution system supports expansion to the African marketplace. Many different variables were taken into consideration. The examination of centralised, decentralised or hybrid distribution systems focussed on inventory positioning and availability and developing the supply chain value proposition model. The centralised and decentralised systems were both found to be effective since organisations are establishing improved distribution structures in their business models in order to create a value proposition across the business. Through DCs, large retail chains merge deliveries from their suppliers and deliver straight to their stores or where customers are located to achieve profitable growth and improved service delivery. Control of distribution enables businesses to reduce inventory levels and enhance efficiency (Cano, 2020). In pursuing this objective, both centralised and decentralised distribution systems have the potential to assist expansion across Africa. Most retailers' networks do not have sufficient DCs in African marketplaces to cover individual customers' orders in a cost-effective manner. Greza needs to prioritise shipping costs while reconfiguring networks towards a demand-driven model on the omnichannel distribution system. Its capabilities in relation to service delivery, human capacity and the supply chain process and technology depend on the DC's capacity to fulfil the demand for and supply of unit-flows of smaller-sized and more frequent order replenishments. Although South Africa has modern retail systems, high levels of discretionary spending, and a fiercely competitive market at both local (Mr Price, Woolworths, PEP, Edcon Group) and foreign (Prada, Zara, H&M, and Cotton On) levels, Nigeria, Kenya, and other countries have a growing middle class and consumers are willing to explore organised retail formats. Increased demand for globally recognised apparel brands has led to an influx of trendy continental and international retailers in the African marketplace. In pursuing efficient fulfilment in response to fast-evolving customer demand through a demand-driven supply chain process, the paradigm shifts from inventory positioning and on-shelf product availability to demand-driven product availability that requires DC capacity supply. Furthermore, DC capacity demand calls for reduced pressure on local DC operations to improve service

delivery. Improved human capacity should be developed to align with digitisation and the adoption of technology.

The study sought to identify more efficient ways of improving service delivery in the African marketplace in order to build customer satisfaction and loyalty to a company. Most of the respondents agreed that a supply chain process, a strong management team and workforce and an efficient transportation system support efficiency and inventory positioning of DCs across the African continent. According to Gómez-Montoya et al. (2020), effective supply chain management integrates the flow of products, information, and material flow in the supply chain. Due to customers' constant demand for easy access to products, the supply chain process should not be interrupted. A strong workforce and management team is required to promote the success of retailers' DCs, while an efficient transportation system makes for an efficient distribution logistics system. Empirical studies show that changing norms in relation to customer service are at odds with conventional large regional DC networks. Greza should thus lean towards smaller, fulfilment-focused facilities informed by an omnichannel perspective to improve demand proximity. The challenges of inventory positioning on existing outbound and inbound product flow systems across the African continent call for an efficient DC to improve the total cost of fulfilment, product availability and supply chain process investment and unit-flow synchronisation for technology and delivery dependability. The level of product availability in relation to optimal distribution systems at Greza Apparel depends on current DC capacity and skills availability given labour shortages and rising wages in the DC capacity supply stream. The triple-threat supply chain distribution value proposition model established the value of adding three distribution systems for customer service performance, tentatively absorbing the challenges of inventory positioning and product availability, and suggesting the need for interrelated and integrated strategic DC performance for an African supply chain distribution value proposition in the marketplace. In conclusion, expansion into the African market has meant that the supply chain process is affected by the lead and dwelling time, negatively impacting customer satisfaction. A fully integrated supply chain could synchronise inbound and outbound logistics systems with automatic ordering and order-fulfilment systems, shared fleet vehicles and drivers, and close cooperation between managers at different companies in terms of pricing agreements, volume contracts, delivery terms and even custom product design.

Figure 7. Triple-threat distribution chain model



Source: Compiled by the researchers.

The market for logistics distribution is undergoing a fundamental transformation and there is a need to maximise supply chain performance and deliver an elevated customer experience. Digital disruptors are reshaping supply chains and changing business models across the board. Logistics distributors should thus reconfigure their processes and models by making use of data to maintain their market share and a competitive edge. The trends shaping the new digital economy, such as artificial intelligence (AI) and the Internet of Things (IoT) capitalise on digital opportunities. Companies confront competition from businesses that are aggressively expanding their operations, or disintermediation, where manufacturers decide to supply customers directly. Digital transformation facilitates greater operational flexibility and insights into customers' needs. The apparel logistics distribution systems in the digital economy offer customers a self-service experience where they can place orders, update quantities and schedule delivery at their convenience. Real-time analytics could be crucial for a wholesale distributor with many moving parts, as it is an essential tool to handle logistics in this all-hours agile manner.

Gómez-Montoya et al. (2020) describe a warehouse management system (WMS) as the information system used to pinpoint the location of the product, availability and logistical constraints (such as load capacity, volume, non-cross-contamination between products). A WMS' output is considered a known input for the picking/put-away routing problem (PRP) and it depends on the storage location allocated to each product in the regional hubs (Andjelkovic & Radosavljevic, 2018). The study observed that reduced travel time for the PRP decreases operating costs, energy consumption by the MHE in a work shift, and operating hours, supporting the achievement of sustainable warehousing. It concluded that resource sharing and pooling among logistics participants (LPs) increases

the efficiency and sustainability of logistics operations and warehousing, especially in the transportation and distribution of products that require special infrastructure (such as trucks/vehicles) (Wang et al., 2021). In addition, the rapid development of on-demand distribution in response to ever-increasing consumer demand (Yildiz & Savelsbergh, 2019) calls for the management of vehicle scheduling and facility coordination.

Big data facilitates resource sharing between enterprises and third-party logistics, and the big data model enhances the construction of e-commerce platforms' smart logistics and improves smart logistics systems' efficiency (Liu et al., 2021). Society and the system also affect intelligent logistics ecosystems' efficiency. Big data analytics in logistics underpins the organisation and coordination of distribution activities for improved selection and innovation of distribution modes. The study found that big data analytics reduce the cost of logistics delivery, improve efficiency, and meet customers' diverse delivery needs (Yu et al., 2020; Kang, 2020). Data analytical capabilities improve planning and forecasting of demand (improving customer service and reducing costs) and inform changes in workflows, such as combining shipments (Cui & Xie, 2020). In addition, the IoT allows distributors to use connected devices, products and tools equipped with sensors that can talk to each other, and collect and store data while partnering with manufacturers and retailers to access data in real-time (de Vass et al., 2020; Kaya, 2020). IoT technologies and the ability to integrate in real-time with business management solutions transform the way in which inventory is tracked and managed and allow for automation, usually through RFID (radio frequency identification) tags or barcodes that can be scanned or identified.

Global positioning system (GPS) promotes reliable, dependable and effective last-mile delivery,

resulting in an enhanced customer experience and satisfaction. Other solutions that yield similar benefits are employed by organisations to track shipments in real-time within the supply chain network, including telematics (Lee et al., 2019) and automatic identification systems (AISs) (Urciuoli, 2018) to improve third-party logistics partners' efficiency and order fulfilment for delivery on the African continent. Dzhuguryan and Deja (2021) note that a telematics system allows organisations to monitor and track various vehicle metrics or an entire fleet of vehicles, including speed, estimated time, driver behaviour, fuel level, and vehicle health. Torbacki and Kijewska (2019) concur that a technology-driven, robust vehicle tracking system enables transporters to monitor every active vehicle in their fleet in real-time. They observe that technology-driven telematics system software is able to use the historical vehicle and trip data for better route planning, enabling logistics managers to choose the most efficient route for the movement of goods.

Blockchain technology is expected to facilitate valid, effective measurement of the performance of supply chain management processes. Various stakeholders involved in supply chain management can track shipments, deliveries, and progress (Sabahi & Parast, 2020) to complete the order fulfilment embedded in improved performance of the distribution phase. Experts predict that the adoption of blockchain will promote interoperability in a business circle (Liu et al., 2021); it thus improves trust among various stakeholders. Nakano and Lau (2020) argue that adopting advanced technology like blockchain would minimise the risks involved in logistics activities to a large extent while the IoT provides intelligent visibility and transparency. An intelligent distribution system enables digitisation networks to be synchronised with and integrated into broader network planning for sustainable mobility and efficient freight distribution (Bjørngen et al., 2021). In developing economies, logistics operations confront fragmented retail channels and complex local freight regulations (Amaral & Cunha, 2020), while rural slums and shanty towns are difficult to access. A scalable framework is required for e-commerce logistics operations to synchronise the inventory management requirements of online retail, e-fulfilment and e-commerce distribution strategies, or outsourcing to third-party logistics (3PL) partners.

Appropriate location of logistics centres in four African regions would optimise the distribution mechanism, product positioning and availability and infuse digital transformation in distribution (Ivanov, 2020). Sustainable logistics distribution systems and the growth of e-commerce (Kim, 2020) call for optimal logistics centre location (Hossain, 2020) with businesses across the continent called upon to operate in new trajectories and more resilient ways during the COVID-19 era and beyond (Zhang et al., 2021). As firms change their priorities in response to old challenges like real-time decision-making, workforce productivity, business continuity, and security risks, newer challenges introduced by the pandemic are testing their resilience as they seek to lay a foundation for the future (Ivanov, 2020). Gu et al. (2021) hold the view that the application of information technology between suppliers and

customers can improve supply chain resilience and performance. Mitigation strategies are required to build redundancy and develop contingency strategies to recover the affected network of distribution systems (Zhang et al., 2021). As an intelligent system with flexible and controllable devices, the network distribution system should promote supply chain technologies and interdependence across the system and the transportation network (Xie et al., 2020).

5.4. Contextual analysis of the findings

A DC receives products or goods from suppliers for onward delivery to customers. However, some stock is still stored as inventory for replenishment when the volume of goods is reduced due to high demand in a specific store or region. The DC is divided into three core areas, namely, an inbound, outbound, and pick order area with supervisors and managers. Inbound and outbound logistics systems are combined in supply chain management, as managers seek to maximise the reliability and efficiency of distribution networks while minimising transport and storage costs. Changing consumer expectations and volatile demand call for omnichannel retailing and distribution supported by e-commerce that tracks consumer trends, in-store behaviour, store technology, and retail engineering and presentation. Smart retailers are reconfiguring their destination stores and distribution in line with consumers' destinations of choice, with streamlined convenience offerings and experiences. Retailers benefit from allowing customers to pick up their orders in-store (online orders), although other deliveries are dependent on a distribution model to allow in-store pick-up, customer door delivery, and DC docking. DCs enable the strategic location of products and services positioning closer to major markets and customers (the place utility economic principle). Companies with a supply chain department and various business units engage in a centralised, decentralised or hybrid distribution model. Practically, no supply chain can be entirely centralised or decentralised, as both approaches have their pros and cons. Blended distribution ecosystems lead to resource pooling among LPs that promotes efficient and sustainable logistics operations and synchronised warehouse distribution of products underpinned by infrastructure and efficient human capital (Yildiz & Savelsbergh, 2019; Wang et al., 2021). A customer clustering procedure is then employed to assign customers to different logistics facilities for service (Liu et al., 2021) when expanding to the African marketplace structured into the western, south-Saharan, eastern and northern regions. Wang et al. (2021) proposed a transportation resource-sharing strategy to pool lead time risk (Mbhele, 2014b). Customer clustering in four African regions would result in improved flow and functional distribution systems, pooling resources for frequencies to order replenishment and fulfilment, real-time information exchange from digital transformation, inventory visibility and transparency from an intelligent supply chain, and capable human capital. By expanding to the African marketplace, suppliers can alleviate the risk of supply uncertainty and lower product availability to a large extent by means of efficient production

schedules. As reliability can impact the profit function, manufacturers should be aware of sub-optimal reliable suppliers to maximise profit (Islam et al., 2022). Supply chain technology based on Industry 4.0 concepts establishes a blended distribution ecosystem with enhanced operability and performance to build supply chain logistics resilience in the face of disruptions and global challenges.

6. CONCLUSION

In the retail sector, it is important to enter new markets with a sound plan and strategy. Expansion poses new challenges and dynamics which could enhance a company's growth. It requires sustainable distribution systems and processes that enhance efficiency and competitiveness in the new market. Greza Apparel requires skilled DC labour, structured supply chain distribution processes for unit-flows and a team of merchandisers to mitigate the pressure of expansion and improve the frequent fulfilment-focused DC for product availability and fewer product delays.

The new set of channels has compelled retailers to simultaneously accommodate and anticipate demand and ensure availability, meet varying lead times, and minimise the costs of each channel. The DC should establish integrated physical flows of goods and operational structures across channels without sacrificing the Greza business model. The re-engineered business model would enable seamless logistics across multiple distribution channels. Elements of centralised and decentralised supply chain distribution as well as those from the hybrid distribution system should be assimilated for frequent product availability in a demand-driven supply chain, with efficient inventory positioning and supply chain processes and technology. The dynamics of the four African regions will determine issues such as cost management, dependable delivery, speed, and agility in relation to customer responsiveness, flexible, focused fulfilment, and quality customer service and experiences. The distribution value proposition for Greza aims to achieve improved product flow, frequencies to order fulfilment, improved and more skilled human capital and inventory visibility.

Entering a new market requires a company to understand the new environment and potential consumers. In order to attract new customers, their

needs need to be taken into account from the production of goods and services until the product is delivered. Products requested by customers must be made available when they are needed to avoid losing loyal customers to competitors. This study focussed on Greza's use of improved supply chain distribution systems that incorporate unit-flow synchronisation and frequent product availability to provide better customer service and expand to other African marketplaces. Its findings highlight the need to prioritise human capital and skills as service quality is key in linking product availability to customer satisfaction. Investment is required in human capital and technology to enhance the company's sustainability. While costly, training and development will enhance employee productivity and efficiency and benefit the organisation in the long run.

It is important to ensure that the research instrument used to measure the variables is able to provide relevant and accurate information. The consistency, as well as stability of a measuring instrument, is critical to subdue bias across time and selected items. The internal consistency of reliability indicated a Cronbach alpha value of 0.70, which indicates that the scale is indeed reliable. The result from the KMO is 0.603, and Bartlett's test is significant ($p = 0.000$); hence, the factor analysis is appropriate at 21 degrees of freedom. Validity tests how well the instrument measures the concept it is intended to measure. SPSS software 20.0 was used to aid the analysis of the data. To enhance content and face validity, the thematic instrument was pre-tested for suitability with key industry practitioners and academics. Careful selection of the sample enabled the inclusion of respondents that satisfied criterion validity.

The study's limitations are that it covers a single case in the retail apparel business and did not employ probability sampling to recruit more managers operating in African marketplaces. Future studies should focus on multiple cases while contextualising the distribution constructs in the underlying fourth industrial revolution as a cyber-physical space. DCs and warehouses that employ cyber-physical technologies should be interrogated for integration of computation, networking, and physical processes for the African continent, controlled and monitored by computer-based algorithms.

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