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## Article

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# Investment ability: a catalyst for omni-channel supply chain integration

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## ABSTRACT

Digital devices have revolutionized customer shopping behavior, giving rise to omni-channel retailing. Omni-channel retailing seamlessly integrates physical and digital channels, touchpoints, and supply chain operations. Owing to the rapidly evolving technology landscape, retailers struggle to discern the right investment approach to digitally transform their supply chains. Despite the widespread assumption that investment in supply chain integration (SCI) is vital for omni-channel retailing, empirical studies investigating the underlying mechanisms behind this process are limited. This research seeks to understand how and why investment ability catalyzes omni-channel SCI. Utilizing a two-phase abductive qualitative research design, Phase 1 involved 17 semi-structured interviews with senior managers from nine large South African omni-channel retailers. In Phase 2, content analysis of 40 integrated annual reports (IARs) from omni-channel retailers was conducted. This study identifies two crucial investment trade-off decisions that drive omni-channel SCI: financial and human resources. This demonstrates that strategically aligned investment ability fosters scalability and agility, playing a catalytic role in omni-channel SCI. The findings contribute valuable insights into omni-channel retailing and supply chain literature, providing practical guidance for managers navigating the complexities of investing in omni-channel SCI initiatives. These investment guidelines could accelerate the digital transformation and SCI processes for omni-channel retailers.

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## SUBJECTS

Business, Management and Accounting; Strategic Management; Retail Sector; Supply Chain Management

## Introduction

The proliferation of digital devices and services has fundamentally altered customers' shopping behavior and led to an increase in omni-channel retailing (Song & Song, 2021). Omni-channel retailing is defined as a 'direct-to-consumer (D2C) business model in which all channels, ranging from online, mobile, telephonic, mail order, self-service, and physical retail establishments, are aligned in terms of service delivery to create a seamless shopping experience for customers' (Weber, 2022). Omni-channel retailing requires retailers to transform completely, moving away from managing processes in silos towards offering fully integrated and seamless shopping experiences across all retailers' physical and digital channels, touchpoints (i.e. direct and ongoing engagements physically and/or digitally), and supply chain processes (Gao & Huang, 2021; Ürgüplü & Hüseyinoğlu, 2021). Accordingly, to succeed in the modern retail environment, the retail supply chain must undergo a process of large-scale digital transformation (Leu & Masri, 2021). Digital transformation can be viewed as a strategic response to emerging digital technology trends and disruptions (Magistretti et al., 2021), this response involves significant industrial and operational changes driven by the implementation of new digital technologies (Nankoomar & Quilling, 2023).

Omni-channel supply chain integration (SCI) is regarded as a strategic imperative due to its ability to harmonize a retailer's operations with the evolving demands of contemporary consumers (Larke et al., 2018). As global marketplaces change, high levels of integration within the supply chain are

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required to ensure that all physical and digital channels and touchpoints are aligned and deliver a consistent message (Ishfaq et al., 2022). However, research has shown that omni-channel retailers still inadvertently structure their supply chains based on one dominant channel, either physical or digital (Kim & Chun, 2018; von Briel, 2018). Consequently, retailers are not yet benefitting from the synergetic advantages that come with omni-channel SCI, such as reaching new customers (Kollmann et al., 2012). As such, retailers must undertake substantial digital transformation initiatives (Hübner et al., 2016). Digital transformation initiatives, such as those required to facilitate omni-channel SCI, require appropriate financial investments in human resources, physical and digital channels, mobile applications, social media platforms, advanced information technology, and logistics services (Ürgüplü & Hüseyinoğlu, 2021).

Investment ability, in the context of omni-channel retail supply chains, involves intricate decisions that retailers must make concerning financial, technological, and organizational resources (Zhai et al., 2023). Moreover, it underscores a retailer's awareness and assessment of the risks associated with adopting new technologies and processes and their ability to channel investment in response to dynamic operational environments (Özkanlısoy & Akkartal, 2021). Accordingly, investment ability requires strategic foresight and forward-thinking, whereby retailers anticipate future trends and align their investments with long-term strategic goals (Zhang et al., 2023). This includes staying abreast of emerging technologies, market dynamics, and consumer preferences to make investments that contribute to sustained competitiveness in the evolving retail landscape (Piotrowicz & Cuthbertson, 2018).

Despite the apparent centrality of investment ability in facilitating digital transformation, several challenges can hinder retailers' ability to invest in the resources necessary to support the digital transformation process (Xu et al., 2023). First, implementing the technology and infrastructure required for digital transformation, such as omni-channel SCI, can be expensive (Mosquera et al., 2018). Second, the complexity of omni-channel SCI requires significant investment in human resources (Matarazzo et al., 2021). Retailers must integrate multiple systems and processes across different channels, which requires considerable organizational and technological capabilities, as well as time, energy, and effort from personnel (Cocco & Demoulin, 2022). Finally, the most notable challenge is the need for continuous investment to maintain and improve omni-channel SCI initiatives (Hu & Zhou, 2022). As technology and customer expectations evolve, retailers must continue investing in new capabilities and systems to remain competitive.

Accordingly, proficiency in making investment decisions that facilitate retailers' digital transformation process is of paramount importance. However, investments in digital transformation still present retailers with a conundrum (Harish et al., 2023). On the one hand, omni-channel SCI usually starts by detecting a new integration opportunity that requires significant investment (de Aro & Perez, 2021). On the other hand, top management often demands an immediate return on any investment, which is difficult to achieve during the early stages of the digital transformation process (Nagula & Liu, 2020).

Despite some recognition of the significance of investment ability in omni-channel SCI by previous authors, scholarly literature has not comprehensively explored this topic. For example, the findings of Mishra et al. (2023) and Barbosa and Casais (2022) highlight investment in digital infrastructure and information technology as crucial tools in overcoming barriers to integrating omni-channel operations across channels. However, these authors took a narrow perspective by only considering omni-channel logistics (Mishra et al., 2023) instead of end-to-end omni-channel supply chain processes, as done in the current study. Additionally, the data from these studies were drawn from small samples (four retailers) (Barbosa & Casais, 2022). Cocco and Demoulin (2022) underscored the importance of investment ability in the expansion or integration of additional channels and touchpoints to create seamless shopping experiences but did not provide detailed findings on the different investment decisions needed to facilitate omni-channel SCI. Hübner et al. (2016) noted the vital role of investment in decisions surrounding order fulfillment and distribution channel selection but did not further articulate how these decisions would ultimately impact omni-channel SCI, while Guan et al. (2023) and Weber (2022) underlined the necessity of top management readiness to invest as a key capability facilitating omni-channel operations. However, these studies primarily presented investment ability as a finding rather than a dedicated area of examination. In contrast, this paper situates investment ability at the heart of the investigation by aiming to answer the research question: *'How does investment ability steer the facilitation of omni-channel*

SCI?’ by seeking to understand *how* and *why* investment ability catalyzes omni-channel SCI. The following research objectives were set to answer the research question:

*RO1:* To investigate the role of investment ability as a catalyst for omni-channel SCI.

*RO2:* To examine the impact of investment ability on catalyzing omni-channel SCI.

This research contributes to the academic discourse by investigating an underexplored nexus in the field of omni-channel supply chain management - the interplay between investment ability and decision-making when pursuing investment opportunities to facilitate omni-channel SCI. With a targeted audience encompassing large retail chains and policymakers, this research provides insights for directing investments optimally to fuel the highest levels of omni-channel SCI, thus promoting a more streamlined and customer-oriented omni-channel supply chain.

The remainder of this paper is organized as follows. The next section provides a broad overview of the literature on investment ability and omni-channel SCI. It should be emphasized that this research followed an abductive approach that included an iterative literature review. Thus, the structure of this paper does not follow a generic qualitative design; while the literature review section offers a broad overview of the relevant literature, the findings section adds to the literature discussion by integrating select literature findings with outcomes derived from the data analysis, consistent with the tenets of abductive methodologies. A discussion of the two-phase qualitative research methodology follows the literature review section. Finally, the findings of this study are presented. The paper concludes with a summary of managerial recommendations, limitations, and directions for future research.

## Literature review

### *Omni-channel retailing*

The retail industry has undergone significant transformations in recent years because of technological advancements and shifts in consumer behavior (Hosseini et al., 2018; Shen et al., 2018). Shopping through various physical and digital channels is no longer novel, but has become ubiquitous for both customers and retailers (Mahadevan & Joshi, 2022). This led to the emergence of omni-channel retailing. The primary objective of omni-channel retailing is to blur the boundaries between traditional channels and touchpoints, enabling customers to have the optimum mix of satisfying experiences and frictionless shopping activities (Lynch & Barnes, 2020). However, transitioning from multi- or cross-channel retailing necessitates a comprehensive network redesign, shifting away from rigid, linear processes to flexible, multidirectional networks that integrate various centralized, decentralized, and outsourced operations (Kembro et al., 2018).

Channels in omni-channel retailing encompass various avenues customers use to make purchases, whether physical (the brick-and-mortar store) or digital (the retailer’s website and mobile application) (Hajdas et al., 2022). On the other hand, touchpoints are instances of engagement between customers and retailers that extend beyond direct transactions to foster an ongoing shopping journey. These touchpoints include social media platforms, showrooms, customer review websites, blogs, live chats, and product review platforms (Mosquera et al., 2018). The level of integration between these channels and touchpoints differentiates omni-channel retailing from previous types of retailing, such as multi-channel retailing, since modern customers expect to be able to move between all channels and touchpoints seamlessly, irrespective of how they choose to interact with the retailer (Lehrer & Trenz, 2022).

Cocco and Demoulin (2022) argue that there is a lack of understanding about the optimal channel integration for omni-channel retailers. The authors reason that the need for more clarity raises considerable concerns for retailers, primarily because of the substantial investments required for adopting effective omni-channel integration strategies. Mrutzek-Hartmann et al. (2022) found that, particularly in developing countries, the effective management of financial resources is critical for coping with demand fluctuations, rising inflation rates, and overall economic instability. They found that retailers who enjoyed financial stability during times of disruption or change were better equipped to navigate uncertainties and respond to changing retail environments.

### ***Investment ability***

Investment plays an essential role in the digital transformation of supply chains, enabling organizations to gain a competitive advantage by using resources more efficiently and increasing the quality of decision-making (Özkanlısoy & Akkartal, 2021). Investment ability involves a retailer's ability to strategically allocate financial, technological, and organizational resources to facilitate effective omni-channel initiatives (Oka et al., 2017). Financial investment requires retailers to have the financial capacity to allocate funds towards infrastructure, technology, and process enhancement. This involves assessing available capital, budgeting for technology upgrades, and continually enhancing operational processes to ensure effectiveness (Ishfaq et al., 2022). Technological investment encompasses the readiness and proficiency of retailers to adopt and integrate advanced technologies that streamline and optimize the retail supply chain (Zhang, Xu & Ma, 2023). This includes implementing data analytics, AI-driven systems, inventory management tools, and other digital solutions to enhance omni-channel supply chain processes (Ishfaq et al., 2022). Investment ability is also concerned with retailers' ability to consider the possibility of cost overruns (Zhai et al., 2023). During the digital transformation process, initial estimates for implementing new technologies may not align with actual costs, leading to unexpected expenses related to software customization, training, and infrastructure upgrades, which can result in overspending. Consequently, for retailers to have superior investment ability, they would need a thorough understanding of the effective management of the risks associated with investments that facilitate omni-channel retailing while considering emerging market trends, technologies, and consumer behaviors. Additionally, retailers need a clear and forward-thinking vision that aligns investments with long-term digital transformation objectives (Kristoffersen et al., 2021), allowing them to make proactive and strategic investment decisions aligned with their goals (Zhai et al., 2023).

### ***Digital transformation and omni-channel supply chain integration (SCI)***

The term 'integration' has its origins in Latin and refers to the 'restoring of a whole' (Kotzab et al., 2023). SCI is commonly categorized as either internal, which occurs within organizational functions, or external, which involves interactions between customers and suppliers (Perdana et al., 2019). While the concept of SCI is easily comprehensible (Autry & Moon, 2016) its implementation presents significant challenges for organizations (Ambe et al., 2022). Often, lower-level decision-makers are tasked with the execution of SCI without possessing the necessary knowledge, skills, motivation, incentives, or organizational structures to effectively carry out the integration process (Tsanos & Zografos, 2016; Turkulainen et al., 2017). Scholars emphasize the importance of organizations developing proficiency in internal integration before venturing into external integration (Ambe et al., 2022; Van Weele, 2018; Wisner et al., 2019). Accordingly, this study focuses internal SCI. Internal SCI entails the ability of an organization to harmonize diverse organizational functions, enabling it to operate as a cohesive unit and generate optimal value from its operations. Weber (2022) explains that internal SCI creates infrastructure and guidelines for cross-functional information processing and joint decision-making. The outcome is enhanced collaboration between functional areas, aligning goals, and improving organizational performance (Ambe et al., 2022). To achieve internal SCI, functional barriers must be eliminated, and cooperation between internal organizational functions (e.g. marketing, purchasing, and operations) must be fostered (Liu, Liu & Gu, 2021).

In the pursuit of internal omni-channel SCI, three domains are integrated: front-end (consumer-facing) operations, back-end fulfillment, and last-mile distribution. Integrated front-end operations allow customers to move seamlessly between different channels offered by a retailer (Weber, 2022). Back-end fulfillment involves integrating various order fulfillment methods, including in-store or warehouse picking (Hübner et al., 2016). Last-mile distribution, an expensive yet essential part of the omni-channel process, includes different delivery modes, such as click-and-collect or home delivery (Lim et al., 2018). The integration of these three domains adds a 'layer of complexity' to the supply chain (Song et al., 2019) because retailers not only need to be innovative in all three domains, but they also need to align their strategic omni-channel and supply chain strategy with investment decisions across all three domains (Harish et al., 2023).



### ***Supply chain strategies***

Supply chain strategies (SCSs) are pivotal to the success of contemporary organizations (Oubrahim et al., 2023). Although many SCSs can be distinguished, they are mostly divided into two broad categories: cost-efficient (lean) and responsive (agile) supply chain strategies (Qi et al., 2017). Lean SCSs focus on efficiency, cost and waste reduction through streamlined, predictable operations. In contrast, agile SCSs emphasize flexibility and the ability to swiftly respond to market changes in supply and demand, especially under volatile conditions. Previous research has found a strong symbiotic relationship between supply chain agility and SCI (Irfan et al., 2019; Siagian et al., 2021), with supply chain agility propelling an organization's SCI endeavors, and in turn, successful SCI often leading to enhanced supply chain agility (Shah et al., 2020). Ramos et al. (2023) discovered that only organizations that have achieved both SCI and supply chain agility can attain superior supply chain performance. In line with this, the academic discourse on SCSs in the context of omni-channel retailing is also predominantly inclined towards responsive or agile SCSs (Kruh & Freedman, 2016; Yadav et al., 2019). McKinsey and Company (2016) contended that only supply chains that are agile, adaptable, and responsive can support the creative exploration required in omni-channel retailing. Although trade-offs among speed, stability, and resources remain, these authors argued that finding the right balance has a considerable impact on the success of organizations in an omni-channel environment. Trabucco and De Giovanni (2021) suggest that the shift to omni-channel retailing involves strategic investment decisions, such as investing in advanced technologies, enhancing logistics networks, or training employees to manage the new system interface. Therefore, a retailer's investment ability, or the lack thereof, significantly impacts strategic decision-making in omni-channel SCI.

### ***Omni-channel retailing in developing countries***

Omni-channel retailing holds immense promise for developing countries, offering a seamless integration of online and offline shopping experiences (Hartenzenberg, 2023). However, its successful implementation requires substantial investment in infrastructure, technology, and education (Botha et al., 2023). In regions like Africa, where internet penetration is rapidly increasing, e-commerce sites such as Nigeria's Jumia, often dubbed the 'Amazon of Africa', exemplify the potential for omni-channel success (Jumia, 2019). Jumia has rapidly expanded across Africa, including South Africa, Tanzania, Egypt, and Ivory Coast, by strategically leveraging technology and logistics. Their success is a compelling example for other businesses in Africa looking to capitalize on the continent's expanding digital infrastructure and consumer market (Harvard Business School, 2023). However, retailers in developing countries still face many challenges, including limited access to reliable internet, inadequate logistics networks, and a lack of digital literacy among consumers and retailers (Weber & Badenhorst-Weiss, 2018). Investment in building robust digital ecosystems, last-mile delivery solutions, and digital skills training programs are imperative to unlock the full potential of omni-channel retailing in developing economies (Ngalenkulu, 2018). In South Africa, an emblem of broader trends across the African continent, the e-commerce industry has been experiencing exponential growth, resulting in more retailers embracing the digital market (Kibuacha, 2021). One major driver behind this expansion is the increasing internet penetration rate, with nearly 80 per cent of South Africans using the internet in 2022, projected to grow by ten percentage points by 2027 (van der Merwe, 2024). Similarly, the number of e-commerce users in South Africa has increased significantly, with approximately 27 million registered users in 2022, expected to rise to 37.9 million by 2027, according to Statista's Digital Market Outlook estimates (Statista, 2024). Accordingly, the projected surge in e-commerce users in South Africa presents compelling reasons for South African retailers to upscale investment in omni-channel retailing. Embracing omni-channel strategies taps into a rapidly expanding market and provides a competitive edge by offering seamless shopping experiences tailored to evolving consumer preferences. Therefore, the techno-fertile South African landscape has prepared the way for omni-channel retailers in their drive to integrate their supply chains.

Next, the empirical part of the study focuses on findings regarding the facilitating role of investment ability in the SCI process.

## Research and methodology

### Research design

This study followed an exploratory, multi-phased, qualitative research design, including a document analysis and semi-structured interviews. Using different data collection methods in qualitative studies is essential for increasing trustworthiness (Shenton, 2004; Subedi, 2023). The rationale for employing this research methodology was in response to a call from previous authors (Murfield et al., 2017; Sorkun et al., 2020) suggesting that current quantitative studies lack comprehensive insight into the phenomenon under investigation. Given the scarcity of academic research on the impact of investment ability on omni-channel SCI, this study adopted an abductive, multi-method approach to theory development. Following an abductive approach, the researcher moved back and forth between inductive (semi-structured interviews) and deductive (document) analyses and literature to explore explanations for the research findings (Janiszewski & van Osselaer, 2022). Employing a multi-method research design signifies an interactive and iterative approach to the research process (Saunders et al., 2020). Accordingly, in line with the recursive nature of abductive, multi-method research (Conaty, 2021), an iterative literature review was conducted. This approach involves constantly revisiting and updating the literature throughout the study (Creswell, 2012; Melnikovas, 2020). Unlike a one-time linear review at the onset of a study, an iterative literature review enables researchers to refine their understanding of the literature in response to emerging findings from data analysis (Cassell et al., 2018; Janiszewski & van Osselaer, 2022; Themelis et al., 2023). Integrating the iterative literature review with findings enhances the interpretation of the results, contributing to the development of plausible explanations and enhancing the overall rigor of the research.

### Sampling

This study focuses on omni-channel retailers in South Africa as a unit of analysis. Before commencing with the data collection, ethical clearance was secured from the Department of Applied Management's Research Ethics Review Committee (DAM-RERC) (reference number: [2020\_CEMS\_DAM\_017]). Participants were asked to provide both written and oral informed consent. Prior to the interviews, participants were requested to provide written informed consent by signing an information sheet outlining the study's purpose and emphasizing voluntary participation. Furthermore, oral consent was sought before recording the virtual interviews. To ensure anonymity, each retailer and participant was assigned pseudonyms.

The identification of retailers and the recruitment of participants involved several sampling cycles. Table 1 summarizes the sampling process.

### Phase 1: interviews

In Phase 1 of the data collection and analysis, semi-structured interviews were conducted with 17 expert participants from nine large retailers across all major retail categories in South Africa. As outlined in Table 1, purposive expert and snowball sampling were implemented to identify and select participants (Hosseini et al., 2017; Hübner et al., 2016; Rai et al., 2019; Reyes & Giachetti, 2010). Furthermore, all participants occupy management positions, with most serving in executive roles within their respective organizations, directly involved in logistics, supply chain management, operations, and retail innovations. In their managerial capacity, these individuals are responsible for strategic decision-making, investment planning, and operational execution, providing valuable insights into their organizations' investment ability and strategic direction. The final sample size was determined by data saturation (Braun & Clarke, 2021b; Francis et al., 2010). A semi-structured interview protocol was used to conduct virtual interviews with participants via Microsoft Teams. The interviews were recorded with the participants' consent. Interviews lasted 50 minutes on average. A total of 854 minutes (14.2h) of interview audio were transcribed. Thematic analysis (TA) was applied to identify, analyze, and interpret patterns of meaning (themes) within the data (Clarke & Braun, 2017). This study followed a reflexive TA approach, developing themes from codes and focusing on implicit or latent meanings within the data (Braun & Clarke, 2021a). ATLAS.ti was used to analyze the data, following the six sequential steps of reflexive TA, as outlined by Braun and Clarke (2006). These steps include



**Table 1.** Sampling methods employed.

| Sampling method   | Retailer selection   | Participant selection  | Document selection  |
|-------------------|--|--|---|
| Step 1            | Purposive homogeneous sampling<br>The researchers obtained a list of all registered organizations from the Johannesburg Stock Exchange (JSE) in South Africa in 2020.  | Purposive expert and snowball sampling<br>The list of 13 JSE-registered omni-channel retailers served as the initial selection point.<br>Subsequently, expert sampling was implemented to discern individuals occupying pertinent positions (refer to Table 2) within these retailers. The criteria for expert selection included top managerial level, 10+ years of experience, and direct involvement in omni-channel supply chain operations. | Purposive homogeneous sampling<br>All Integrated Annual Reports (IARs) of the 13 JSE-registered omni-channel retailers (refer to retailer selection) were downloaded.   |
| Step 2            | Various exclusion criteria were applied to the list, such as excluding organizations not directly involved in retailing, e.g. mining companies. Ultimately, the list of 388 JSE registered organizations was narrowed down to 13 omni-channel retailers. | Following the expert sampling procedure, snowball sampling was subsequently employed. Those experts who consented to participate in the study (Step 1 of participant selection) were invited to suggest additional participants to the researchers.  | To improve the manageability of the data, only retailers with 5+ years of omni-channel experience were analyzed. The list was narrowed down to 8 retailers. In Table 3, retailers included in the document analysis are indicated with an asterisk (*). |
| Final sample size | 13 retailers   | 17 expert participants   | 40 Integrated Annual Reports (IARs).  |

Source: Authors.

**Table 2.** Participants' profiles.

|                | Job title                                   | Retailer   | Years of experience | Duration of interview (min) |
|----------------|---|------------|---------------------|-----------------------------|
| P1             | Head of Logistics and Supply Chain          | Retailer A | 15                  | 69.05                       |
| P2             | Head of Logistics and Facilities Management | Retailer E | 23                  | 32.32                       |
| P3             | Head of Logistics and E-fulfillment         | Retailer E | 25                  | 95.37                       |
| P4             | Head of Logistics                           | Retailer H | 21                  | 48.01                       |
| P5             | Head of Transport and Engineering Logistics | Retailer E | 24                  | 36.12                       |
| P6             | VP of Supply Chain & eCommerce Operations   | Retailer B | 17                  | 58.20                       |
| P7             | Operations Business Development Manager     | Retailer D | 23                  | 38.01                       |
| P8             | Head of Retail Innovations                  | Retailer D | 25                  | 32.12                       |
| P9             | Brand Manager - Africa                      | Retailer F | 18                  | 39.15                       |
| P10            | Head of Africa Supply Chain                 | Retailer F | 20                  | 46.27                       |
| P11            | Director of Retail Operations               | Retailer A | 28                  | 45.45                       |
| P12            | Chief Operations Officer                    | Retailer B | 32                  | 43.00                       |
| P13            | Managing Director                           | Retailer D | 26                  | 46.54                       |
| P14            | CEO   | Retailer G | 30                  | 57.06                       |
| P15            | GM: Retail and Supply Chain Operations      | Retailer I | 16                  | 48.11                       |
| P16            | Head of Online Operations                   | Retailer A | 30                  | 84.59                       |
| P17            | Head of Supply Chain Optimization           | Retailer C | 13                  | 34.24                       |
| <b>Average</b> |   |            | <b>22.7</b>         | <b>50.21</b>                |

Source: Authors.

familiarization with the data, generating initial codes, searching for themes, defining and naming themes, and producing the report. Table 2 lists the participants' details, while Table 3 summarizes the participating retailers' information, both anonymized as per the confidentiality agreement with the participants.

### Phase 2: document analysis

In Phase 2, purposive homogeneous sampling was used to select documents (Table 1). Saunders et al. (2020) define homogeneous sampling as a purposive sampling method that focuses on selecting similar cases within a specific subgroup. As indicated in Table 1, the researcher obtained a list of all JSE-registered organizations in 2020. The list underwent refinement through the application of exclusion criteria, including the removal of irrelevant sectors (mining, oil, and gas) and retailers not self-identifying as omni-channel retailers. Ultimately, the researchers analyzed 40 omni-channel retailers' IARs for the preceding five years (2016–2020). The purpose of an IAR is to provide a comprehensive narrative of an organization by contextualizing the performance, business model, and strategy regarding the organization's financial, social, and environmental factors (Roman et al., 2019). The reports were consulted to gather unique information that could not be obtained using other qualitative data collection methods. The IARs were analyzed using ATLAS.ti, a qualitative data analysis software.

**Table 3.** Retailers' profiles.

| Pseudonym   | Main Retail category(s)  | Number of sub-brands owned by the retailer | Geographic operations (including South Africa) | Turnover (in 2020)     | Store footprint | Number of employees |
|-------------|--|--|--|------------------------|-----------------|---------------------|
| Retailer A* | Fashion<br>Homeware<br>Groceries                                   | 8  | 14   | ± R78 bn               | ± 1500          | ± 45 000            |
| Retailer B* | Groceries<br>Liquor<br>Electrical appliances<br>Building materials | 8  | 13   | ± R94 bn               | ± 450           | ± 51 000            |
| Retailer C  | Fashion<br>Homeware  | 6  | 3  | Not publicly available | ± 300           | ± 3 000             |
| Retailer D* | Fashion<br>Homeware and furniture                                  | 5  | 10   | ± R23 bn               | ± 1400          | ± 20 000            |
| Retailer E* | Fashion<br>Homeware and furniture                                  | 21   | 32   | ± R38 bn               | ± 2700          | ± 23 000            |
| Retailer F  | Fashion<br>Stationery  | 8  | 20   | Not publicly available | ±170            | ± 22 000            |
| Retailer G* | Building materials and DIY   | 8  | 9  | ± R9 bn                | ± 200           | ± 2 700             |
| Retailer H* | Pharmaceutical<br>Fashion  | 5  | 5  | ± R34 bn               | ± 900           | ± 15 600            |
| Retailer I* | Groceries<br>Liquor<br>Homeware and furniture<br>Pharmaceutical    | 13   | 15   | ± R160 bn              | ± 2400          | ± 140 000           |
| Retailer J* | Homeware   | 1  | 3  | ± R3 bn                | ±43             | ± 2 000             |

Source: Based on individual retailers' Integrated Annual Reports of 2020.

Retailers with an asterisk (\*) were included in both the interview and document analysis.

Two cycles of summative content analysis were conducted on the IARs, which involved extracting meaning from specific words (Hsieh & Shannon, 2005) and determining code significance using word frequency counts (Assarroudi et al., 2018). Cycle 1 involved generating a wordlist from all IAR data. The wordlist initially contained more than 70,000 words. Following Friedman et al.'s (2019) process, the initial word list was refined and recoded extensively to eliminate synonyms, inflated terms, and grammar and spelling differences (e.g. customers and consumers). This process resulted in 87 relevant keywords for omni-channel SCI. For this study, the list was further refined to only consider relevant keywords based on the analysis and findings of Phase 1 of the data analysis. Annexure A outlines the wordlist, including the 42 words and the frequency distributions of the words included in the analysis. In Cycle 2, a deductive manual and automatic coding process were employed, applying the 'text search' function of ATLAS.ti to code relevant data sections based on Cycle 1 keywords. Deductive coding aids the researcher by focusing the coding process on factors that are known to be important (Linneberg & Korsgaard, 2019). After conducting a 'text search', the results for each keyword were manually reviewed and coded for further analysis.

After completing Phases 1 and 2 of the data collection and analysis, the document analysis results were compared and triangulated with themes, sub-themes, and codes from the interview data. Triangulation requires researchers to examine similarities, differences, and anomalies across different data sources or methods to validate the findings, enhance the credibility of the research, and provide a more comprehensive and nuanced understanding of the phenomenon under investigation (Vivek et al., 2023). Accordingly, the triangulation process entailed a detailed comparison of the findings from Phases 1 and 2 to report similarities, differences, and anomalies across different data sources.

### Trustworthiness

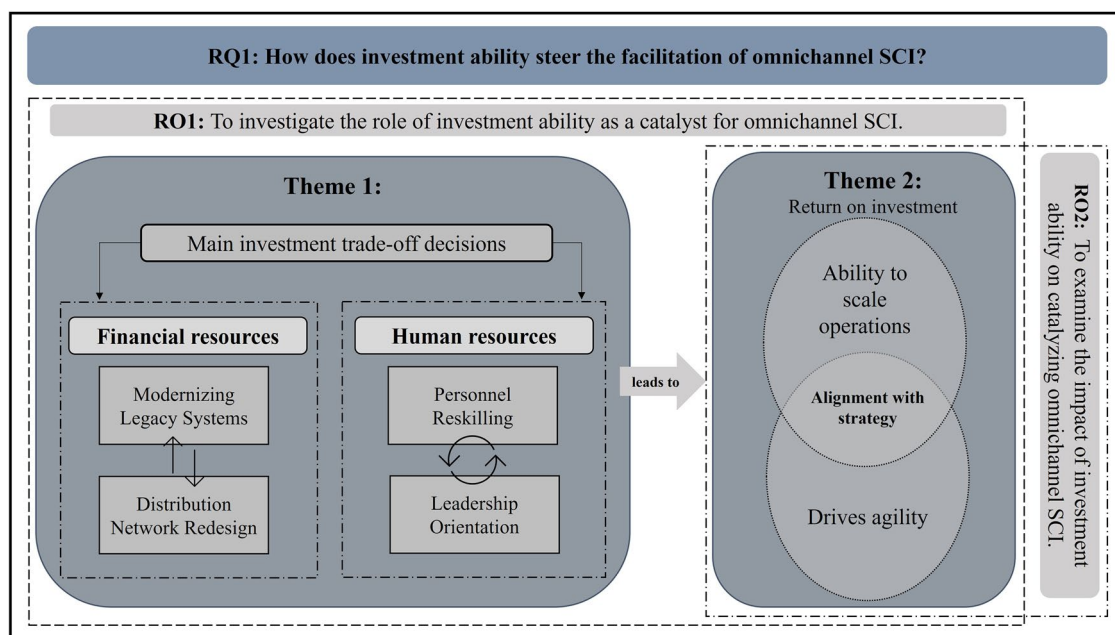
The study was guided by four trustworthiness criteria: credibility, dependability, confirmability, and transferability. Credibility pertains to the extent to which study findings accurately reflect the genuine perspectives and experiences of the participants (Korstjens & Moser, 2018). To ensure credibility, triangulation involved selecting participants from multiple retailers and analyzing documents across various retailers and years. This ensured that the identified themes were not confined to the context of a specific retailer or year (Subedi, 2023). Additionally, the researchers established 'expert criteria' during participant selection to ensure the inclusion of knowledgeable participants in the study (Lundberg et al., 2019). Dependability assesses whether the study findings would remain consistent

if replicated in a comparable context (Morse, 2015). Dependability was achieved by providing a comprehensive and detailed description of the phenomena, participants, and methods used to ensure a thorough description of the research process (Creswell & Creswell, 2017). Confirmability refers to the degree of confidence that other researchers can verify or support the results of a study (Forero et al., 2018). A comprehensive description of the methodological process is provided to safeguard against any undue influence from the researchers. Additionally, professional touch typists transcribed audio recordings of interviews, the researcher subsequently validated the transcripts for accuracy. This meticulous process ensured that the interviews were transcribed in full without any additions or omissions, thereby confirming the accuracy of the data (Saunders et al., 2020). Transferability refers to the extent to which the conclusions of one study can be applied to other settings or circumstances (Groat & Wang, 2013). Transferability was ensured through detailed descriptions of the background and methodology of the study. A chain of evidence was established by incorporating verbatim quotes from participants, enabling readers to trace the origin of their findings (Korstjens & Moser, 2018).

### Findings and discussions

The analysis below identifies and discusses two themes constructed from the data: main investment trade-off decisions (Theme 1) and return on investment (Theme 2). Figure 1 illustrates the link between the themes, research questions (RQ), and research objectives (ROs). Each theme is discussed below, and relevant evidence from the data supplements this discussion.

Based on Figure 1, Theme 1 focuses on two investment trade-off decisions: financial and human resources. The findings reveal that financial resource investment requires retailers to modernize legacy systems and/or redesign their distribution networks. As the two-way arrows indicate, trade-off decisions between these two areas in an omni-channel supply chain require retailers to prioritize one area over the other. However, the results reveal that investment in human resources, specifically leadership orientation, can simultaneously enhance personnel skills (as illustrated by the circling arrows). Figure 1 also shows that making strategic investment decisions leads to a return on investment in terms of scalability and agility, but this outcome depends on the level of alignment between investment trade-offs and supply chain strategies.



**Figure 1.** Visual Illustration of the link between Themes, RQ, and ROs.  
Source: Authors.

### **Theme 1: main investment-trade off decisions**

The importance of investment as an antecedent to digital transformation has been underscored by previous studies (Guan et al., 2023; Zhang et al., 2023). Theme 1's findings support the existing literature by elucidating the necessity for retailers to navigate numerous investment trade-off decisions, particularly those concerning financial and human resource investment. Throughout the interviews, participants underscored the challenges they encountered in making pivotal trade-off decisions, in particular, discerning the appropriate timing for scaling particular channels and supply chain processes and subsequently determining the optimal allocation of investments once the decision to initiate the scaling process has been made. Participants also emphasized the necessity of proactive investments in digital transformation capabilities, including redirecting traditional capital towards digital and online assets, as an essential strategy for successfully adapting to the changing retail landscape. The following quote supports this.

... we've been struggling with picking out when do we see that tipping point where we will be able to go to scaling, and if you get to scaling what are the right investments to make into fulfillment and distribution... traditional retailers, definitely have to make proactive investments into their capabilities... redirecting traditional capital from traditional investments into digital assets, into online assets is a no-brainer (P1, Head of Logistics and Supply Chain, 15 years of experience).

However, the literature and further data analysis revealed that simply redirecting investment from traditional retail operations to omni-channel operations is not an easy task, as most retailers' operational systems are predominantly structured to support their legacy operations, such as the brick-and-mortar store (Jocevski et al., 2019). These legacy systems hinder retailers from fully capitalizing on the advantages of omni-channel SCI.

...one that's really difficult for us is we come from a legacy of federated [systems]... whereas pure play retailers have architected their tech from being online from the beginning as opposed to trying to convert offline onto online... (P12, Chief Operations Office, 32 years of experience).

The findings show that retailers adept at optimizing investment decisions for omni-channel SCI will likely secure a competitive advantage in the omni-channel retail sector. However, a strategic response in the form of substantial investments in online and digital capabilities, guided by customer data analytics, is required to obtain this competitive advantage. The findings highlight retailers' acute cognizance of the integral role that investment plays in digital transformation.

[Part of our response to digital disruption] is to focus on the delivery of a seamless, consistent offering on one integrated ecosystem across online and in-store. This requires significant investment in online and digital, and investment in customer data analytics to inform business decisions. (Retailer A, IAR 2020).

The results of Theme 1 revealed that omni-channel SCI requires investment trade-offs in two broad areas: financial resources and human resources.

### **Financial resource investment**

The growth of omni-channel retailing has led to increased complexities in managing retailers' financial resources for retailers (Mrutzek-Hartmann et al., 2022). Two critical areas that necessitate financial investment for SCI are modernizing legacy systems and redesigning the distribution network. The evidence suggests that strategic financial resource allocation facilitates omni-channel SCI and empowers retailers to make well-informed decisions regarding investment prioritization in either area (as indicated by the two-way arrows in Figure 1). Through this process, retailers can ascertain the most advantageous allocation of resources, thereby optimizing their SCI benefits.

### **Modernizing legacy systems**

In omni-channel retailing, a retailer's IT infrastructure functions as the central nervous system, interconnecting all organizational operations and channels (Montecchi et al., 2021; Siagian et al., 2021; Song & Song, 2021). Transitioning from a siloed IT infrastructure, characterized by restricted interconnectivity

among channels and touchpoints, to an integrated cross-channel system is imperative for successful omni-channel retailing (Lorenzo-Romero et al., 2020; Shi et al., 2020). The findings of this study substantiate the literature by highlighting that investing in IT systems plays a pivotal role in optimizing omni-channel SCI to foster collaboration and transparency through efficient information gathering and dissemination among stakeholders.

we need to invest in systems that do integration well, where you have one set of data in the center that your customers see, that your call center sees, that the warehouse sees...and that sounds like a simple, logical thing to do but that isn't really in place for big corporates like us... that's a big expense! (P2, Head of Logistics and Facilities Management, 23 years of experience).

Participants highlighted the need for careful but continued investment in IT modernization, given the leaner profit margins of online sales relative to traditional in-store transactions. The data revealed the dual challenges of navigating the modernization of legacy systems and justifying significant investments in omni-channel SCI despite the critical importance of such investments for long-term competitiveness.

A complicated legacy environment has made it challenging to capitalize on modern architectures and toolsets available to enhance competitiveness in the modern retail landscape. (Retailer D, IAR 2020).

but the [investment] numbers are large, the numbers are scary for people that see it as only half a percent of your turnover, even five percent sometimes isn't worth spending the money, but it is building the foundational systems and structures because if you don't have it you are going to fall short (P5, Head of Transport and Engineering Logistics, 24 years of experience).

Consequently, the findings revealed that conducting a comprehensive trade-off assessment is fundamental in reconciling the system prerequisites of omni-channel SCI with the investment needed. Participants conveyed that the unpredictable and dynamic landscape of omni-channel retail renders the determination of the optimal level of investment a considerable challenge:

... the kind of cautious sort of finance voice is saying don't spend too much on building muscle that you don't need. So, if you're gonna build bigger systems, try and keep it in balance. So, there's always that sort of tension of trying to react and grow big quickly versus the cost involved to do that. (P16, Head of Online Operations, 30 years of experience).

While investing in system modernization is a prerequisite for omni-channel SCI, participants equally emphasized the importance of redesigning their distribution networks to facilitate efficient omni-channel operations.

### ***Distribution network redesign***

Omni-channel retailing requires a distribution network with two key functions: inventory and logistics management (Rai et al., 2018). In the context of inventory management, previous studies have demonstrated that investment capability empowers retailers to streamline their inventory by adopting inventory pooling (Arslan et al., 2021; Yang & Zhang, 2020). This strategy involves consolidating inventories from diverse sources, such as geographic sites and distribution channels. Inventory pooling offers numerous benefits, such as increased stock availability (Hübner et al., 2015), safety stock reduction (Kembro et al., 2018), improved customer service (Wollenburg et al., 2018), and decreased operational costs related to inventory location (Melacini et al., 2018). However, not all inventory categories are equal. Participants highlighted the significant disparities between determining the most cost-efficient inventory-picking model for online grocery retailing and other retailing categories such as fashion or homeware. For example, trade-off decisions across these categories are concerned with reconciling the historical reliance on store picking with the risks of high product substitution rates, adapting a minimal safety stock model, and determining the optimal stock pool configuration to effectively meet the demands of online fulfillment.

... for a long time [we] held onto picking from stores, knowing the risks or the trade-offs there is that I might have to substitute your favorite milk... We don't really build our model on having lots of safety stock... so, it can be quite tricky putting an online fulfillment model on top of that because then you have to forecast for the online sale... [we are] also toying with when do we create a separate pool of stock where we've got the

catalog width and depth to enable us to scale our level of supply for that online demand? (P1, Head of Logistics and Supply Chain, 15 years of experience).

Furthermore, this study supports the findings of Song and Song (2021) by highlighting that investment ability is crucial for breaking down organizational silos, especially those arising from distinct physical and digital inventory management systems and distribution channels. The participants revealed that specific investments in inventory management can generate SCI opportunities and boost customer service. However, the participants exhibited conflicting views on the role of inventory pooling in promoting SCI integration. Some participants asserted that inventory pooling enhances omni-channel operations by improving stock availability across all channels. Others contend that separating inventory results in superior inventory accuracy and supports overall fulfillment performance. Nevertheless, the data suggest that retailers should make deliberate investments and strategic decisions to facilitate omni-channel SCI. This includes optimizing stock allocation, leveraging technology for virtual inventory management, and ensuring accuracy in order fulfillment.

... we now talk about one pool of stock, meaning we need to trade that stock where it's needed the most... we reserve a certain amount of stock, which is almost allocated virtually to our online store, making sure that all of the stock that the customer sees when they're shopping online is actually available to them... (P9, Brand Manager – Africa, 18 years of experience).

We invested into a separate pool of stock ... it gives us the accuracy we needed (P1, Head of Logistics and Supply Chain, 15 years of experience).

From the perspective of logistics management, the literature has observed that logistics networks are one of the most complex and challenging to control in an omni-channel environment (Kembro et al., 2018; Saghiri et al., 2017). In omni-channel retailing, last-mile delivery is often the only physical touch-point the retailer has with a customer and can significantly impact the customer's perception of the retailer and the omni-channel offering (Weber & Badenhorst-Weiss, 2018). While the brick-and-mortar store was traditionally the end-point of the transaction between a retailer and a customer, digital channels have placed logistics at the center of the omni-channel process (Rai, Verlinde, & Macharis, 2019). Success in omni-channel retailing depends not only on whether the customer accepts the service, but also on whether retailers have an appropriate, scalable, and cost-efficient fulfillment and delivery model (Hübner et al., 2016).

In line with previous findings, the participants of this study also emphasized the importance of logistics network redesign for a seamless omni-channel shopping experience. They noted that although customer-facing operations are vital, competitors can easily replicate them. However, back-end operations, which are less visible to competitors, can offer a competitive advantage. The participants stressed the need for investment in integrated logistics networks to minimize delays and identify cost-saving and scaling opportunities.

What they [competitors] don't see is the background which talks to your system, logistics, and suppliers... Because if you're more efficient in the back-office, that's where value is at... (P14, CEO, 30 years of experience).

The importance of last-mile distribution in omni-channel operations is well-established in scholarly literature (Cotarelo et al., 2021). However, it is crucial to recognize that this supply chain stage is known for its substantial economic demand. Empirical research reveals that retailers often offer responsive delivery services at high costs to boost sales; however, this strategy poses challenges in effectively covering expenses, thereby impacting their financial sustainability (Allen et al., 2018). The participants highlighted the challenge of identifying cost-effective last-mile solutions as they grapple with understanding various cost drivers in the omni-channel process:

I think there's a financial element that people don't understand... What causes the cost to move around compared to bricks-and-mortar versus online? 'Cause those two models are very different, they've got different cost drivers. (P5, Head of Transport and Engineering Logistics, 24 years of experience).

Furthermore, the findings underscored that omni-channel SCI necessitates balancing the costs of creating seamless and efficient processes and the investments required to support them. The dynamic and



evolving landscape of omni-channel retailing further complicates these decisions, as the pandemic-driven growth in online retail has obscured growth statistics related to the actual versus projected expansion of online channels.

... currently the debate is around our dark store, do we build it for three years or do we build it for five years? This is where the tension is... to be able to right-size those decisions to make the best possible investments... (P16, Head of Online Operations, 30 years of experience).

In conclusion, the modernization of IT systems serves as the backbone for catalyzing omni-channel SCI, necessitating strategic investment allocations despite the challenges posed by cost implications and transitioning from legacy systems. Similarly, optimizing distribution networks, particularly in inventory management and logistics, has emerged as a critical facilitator of omni-channel SCI, requiring a careful balance between efficiency, cost-effectiveness, and adaptability. In essence, these findings underscore the imperative for retailers to cautiously navigate financial decisions and prioritize investments that align with both immediate operational needs and long-term competitiveness in a dynamic omni-channel environment.

### ***Human resource investment***

Investing in human resources is essential for omni-channel SCI. It allows organizations to assign staff effectively and build the required capabilities to operate a seamless omni-channel supply chain. Analysis of the data revealed two important aspects of human resource investment: i.e. personnel reskilling and leadership orientation. Unlike the trade-off decisions required in financial resource investments, the evidence suggests that successful omni-channel SCI initiatives are facilitated by investing concurrently in leadership orientation and personnel reskilling (as illustrated by the circling arrows in [Figure 1](#)). By fostering an agile and adaptable workforce, organizations can overcome resistance to change and drive successful strategy implementation.

### ***Personnel reskilling***

Omni-channel retailing requires retailers to fully digitize their operations (Öztürk & Okumuş, 2018). Creating a collaborative culture with strong employee support for change is crucial for successful digital transformation (Oka et al., 2017). Randhawa et al. (2021) emphasized that achieving employee buy-in entails extensive investment in upskilling the workforce. Such investments ensure personnel possess the skills to operate efficiently in the transformed business environment. The results of this study corroborate the observations described in the literature. The participants acknowledged the importance of training and skill development, highlighting the need for ongoing upskilling in their IARs.

We constantly invest in our people by providing them with learning and knowledge-sharing opportunities to upskill themselves. (Retailer B, IAR 2018).

During the interviews, participants explained that it is not merely upskilling that is needed but also reskilling, emphasizing the challenge that omni-channel retailers face in recruiting individuals with expertise in managing end-to-end supply chain processes. This finding contributes to existing knowledge, as prior studies have yet to highlight the significance of investing in developing end-to-end supply chain capabilities to facilitate omni-channel SCI. During the interviews, participants emphasized that the success of digital transformation efforts hinges on the quality and skills of the workforce, stressing that investing in training and hiring skilled individuals with the necessary end-to-end supply chain skills to drive and sustain the digital transformation journey is a vital part of the operational design process to facilitate omni-channel SCI.

I think a big part of our transformations is redesigning what retail looks like towards more digitally-enabled organizations... that calls for quite big reskilling of people... our profile of people are gonna change, for example, how to reskill a buyer to work with machine learning is a big capability we need... (P1, Head of Logistics and Supply Chain, 15 years of experience).

...you're always reliant on people and the success of anything is how well you invest in training the people, what caliber of people you have in your business... (P3, Head of Logistics and E-fulfillment, 25 years of experience).

Participants elaborated by stating that it is not just about bringing the right people into the organization, but ensuring that they truly grasp the unique nature of omni-channel retailing. Participants stressed the importance of not merely imposing a corporate mindset but cultivating a deep understanding of the distinct skills and nuances essential for catalyzing omni-channel SCI:

employing the right people is quite an important... But it's very easy to bring them in and kind of corporatize them ... [we have to] understand it [omni-channel retailing] is unique, there's unique specific requirements, a unique set of skills required... (P1, Head of Logistics and Supply Chain, 15 years of experience).

Participants explained that investment in human capital should not be considered only from the perspective of lower-level employees. Developing and nurturing leaders who can effectively drive the organization towards an omni-channel mindset while fostering a culture of continuous integration and adaptability is a vital ingredient in facilitating omni-channel SCI.

### **Leadership orientation**

According to Autry and Moon (2016), top management must recognize that personnel respond to cues from decision-makers above them; therefore, organizational leadership should consistently convey the importance of integration and ensure that everyone acts accordingly (Srinivasan et al., 2021). Support for this argument could also be found during the interviews and the analysis of IARs.

The role of company executive is to get the whole business pulling on the oars that are important to the business... to make sure that the mission is understood and important elements in delivering that mission are clearly articulated... this creates a subculture inside the organization around driving omni-channel excellence and serving customers. (P6, VP of Supply Chain & eCommerce Operation, 17 years of experience).

Our ability to outperform is highly dependent on the experience, technical skills, leadership abilities, and attitude of our associates, who work together as a high-performing team and embrace our unique culture. (Retailer A, IAR 2020).

During the interviews, participants emphasized the importance of leaders' abilities and innovation capabilities in facilitating omni-channel SCI. They explained that leadership impacts omni-channel SCI by advocating for investment in new channel developments and involving lower-level employees in problem-solving. The results showed that leadership priorities should include scaling omni-channel operations and creating opportunities to improve collaboration among internal organizational functions.

...leadership shifts towards facilitating our innovation is quite important. Because part of this is recognizing that our leaders facilitate our innovation and grow our innovation capability from inside. (P1, Head of Logistics and Supply Chain, 15 years of experience).

However, some participants suggested that senior managers, despite their experience, may lack a comprehensive understanding of omni-channel supply chain operations. This could imply potential challenges or gaps in strategic decision-making related to the investments needed to facilitate omni-channel SCI.

The reality is that seniors making decisions are not equipped and they don't understand the supply chain... (P3, Head of Logistics and E-fulfillment, 25 years of experience).

In conclusion, the ability to invest dictates *how* omni-channel SCI is managed in two key areas: financial and human resources. Financially, retailers need to invest in modernizing legacy systems and redesigning their distribution networks to support the integration of physical and digital channels and touchpoints. However, investment in these areas must be carefully evaluated to reconcile the system prerequisites with the required investment. Additionally, investment in human resources is pivotal in facilitating omni-channel SCI, including reskilling personnel and cultivating leadership oriented towards innovation and collaboration. Overall, retailers who possess exceptional skills in making investment trade-off decisions in terms of both financial and human resources are poised to gain a competitive advantage, that is a higher return on investment over their peers in the omni-channel retail industry.

## **Theme 2: return on investment (ROI)**

Achieving a return on investment (ROI) in omni-channel retailing is a complex and multifaceted endeavor that necessitates retailers to carefully balance investments, operational scaling, and agility within their supply chains (Zhai et al., 2023). Success in a competitive environment, such as omni-channel retailing, is contingent upon delivering a seamless and consistent shopping experience to customers across various digital and physical channels. During the interviews, participants emphasized the importance of a retailer's ability to respond quickly to changes and unlock investments to seize opportunities. However, participants elaborated on a careful evaluation process to secure investments for omni-channel supply chain operations:

...don't lose sight of the ability to invest. If the business can turn on investment in a particular channel, the cash reserves or the cash flow to inject money quickly in a direction, that makes a huge difference... (P16, Head of Online Operations, 30 years of experience).

We have a very strong culture of writing a comprehensive business case for investment. Those business cases go with very rigorous financial projections, the investment has gotta stack up to the return, and there is very strict set of hurdles that we've got to get over before we get that level of investment, we get challenged at every turn ... (P16, Head of Online Operations, 30 years of experience).

These quotes provide a broad introduction to Theme 2's findings. Theme 2's findings highlight *why* investment capability catalyzes omni-channel SCI. This catalysis occurs through two mechanisms: scaling operations and increasing agility. However, it is essential to note that the effectiveness of investment ability in facilitating omni-channel SCI hinges on the congruence of all investment decisions with the organization's strategic objectives.

### **Ability to scale operations**

Retailers' competitiveness in the ever-changing omni-channel landscape depends on their capacity to strategically plan, proactively invest, and adaptively scale operations in response to emerging channels or touchpoints (Hajdas et al., 2022). This study enriches the current academic discussions by highlighting two ways investment capability drives omni-channel SCI: it enhances a retailer's capacity to expand omni-channel operations and ensures a balanced approach to investing in growth while avoiding over-investing. First, participants highlighted how the COVID-19 pandemic demonstrated the importance of investment ability in facilitating omni-channel SCI. Retailers who could invest in new or expanded digital channels were better equipped to meet the surge in demand for these channels driven by rapidly changing consumer behavior.

[the pandemic] transformed the business...we leaped forward four years in the forecast. What that did do was it changed the investment priority, and also showed to what extent we were at risk of being unable to scale (P16, Head of Online Operations, 30 years of experience).

Accordingly, the ability to invest in times of uncertainty and disruption keeps retailers competitive. This was also found in the retailer's IARs, where they indicated that their legacy operations were not suited for fully-fed omni-channel operations and that investment was required to scale operations:

[The pandemic]... has changed your organization's view of omni-channel's role in being competitive... there will be more investment in online sales and structures... (P2, Head of Logistics and Facilities Management, 23 years of experience).

Our IT systems and architecture [is] no longer appropriate in an environment of ever-increasing scale...Capital expenditure will be invested in retail information technology systems and infrastructure to support the increased scale of the business by improving efficiencies in the distribution centers and across the supply chain. (Retailer H, IAR 2020).

Second, the participants recognized the vital role of investment in seizing new opportunities. They stressed the importance of carefully balancing investments in expanding channels and touchpoints, without overextending resources. These findings align with those of Zhai et al. (2023), who found that digital transformation initiatives improved information accessibility and decision-making processes in the

organization, reducing the risk of overinvestment by fostering rational and informed management decisions. Furthermore, participants noted that before the pandemic, South Africa's online retail growth was sluggish, but they experienced a remarkable upswing in sales amid the pandemic, with participating retailers documenting online growth rates ranging from 18% (Retailer G, IAR 2020) to 368% (Retailer I, IAR 2020). However, this rapid shift in demand makes long-term channel expansion planning challenging, as it is not yet clear if the growth in online sales will remain:

...it's brought the investment horizon closer, more urgent. It's also exposed our weakness. (P16, Head of Online Operations, 30 years of experience).

Accordingly, the extent of investment required to expand omni-channel operations is unclear, and overinvestment can have adverse effects on a retailer's long-term profitability:

... if you look at our capital investment as a business, by far we've been investing into physical stores... but picking the point at which you start saying, no, we're seeing a structural shift, let's shift more of our capital into online channels, that's been quite hard to predict. (P1, Head of Logistics and Supply Chain, 15 years of experience).

The importance of balancing investment opportunities as part of the omni-channel SCI process is a novel finding and might be significant within the context of South Africa as a developing country. While previous researchers have underscored the importance of investment in expanding retailers' channel offerings (Eriksson et al., 2022; Marchet et al., 2018), most studies do not explicitly warn against overinvestment. Therefore, retailers in developing countries, such as South Africa, where omni-channel retailing services may not be as widely adopted as in more developed regions, must distinguish between investment opportunities to achieve sustainable growth without overinvesting and hindering operations. The following quote exemplifies:

what makes South Africa a lot different to other countries... they can throw all their money into tech and building the right stack because they just know that's the future... in South Africa you know that's the future, you just don't know when is that future gonna happen ... (P15, GM: Retail and Supply Chain Operations, 16 years of experience).

In summary, the data show that effective investment facilitates omni-channel SCI, but requires strategic considerations to prevent overinvestment risks. This balance is even more crucial for South African retailers given the uncertain trajectory of online retail growth and the imperative to optimize resources for sustainable expansion. The findings emphasize the need for nuanced investment strategies aligning with evolving market demands, ensuring agility and long-term profitability in omni-channel operations.

### ***Drives agility***

As the retail environment continues to undergo transformative shifts, the need for agile, flexible, and responsive supply chain strategies has never been more crucial (Yadav et al., 2019). The findings reveal the intricate relationship between supply chain agility, investment ability, and omni-channel SCI, and how retailers navigate the imperative to align investment decisions with both organizational and supply chain strategies. The analysis of the IARs and participant interviews underscored retailers' awareness of the significance of allocating resources towards agile competencies to navigate dynamic and fluctuating operational contexts effectively.

There is no doubt that many aspects of the business will be permanently changed [due to the impact of the COVID-19 pandemic], but strong, agile companies will have a unique opportunity to outperform if they are focused and execute properly. (Retailer D, IAR 2020).

...we can all be strategic, and we can plot things out ten years ahead and make big investments. [But], do you have the ability to be agile when it calls for it? Can you redesign something overnight and implement something next week? (P1, Head of Logistics and Supply Chain, 15 years of experience).

A closer examination of the codes related to agility revealed that participants emphasized two key capabilities arising from agile practices: flexibility and responsiveness. This finding is consistent with

much previous research on supply chain agility, which identified flexibility and responsiveness as pre-requisites for agility (Aslam & Azhar, 2018; Irfan et al., 2019; Negri et al., 2021; Shukor et al., 2021). Flexibility in omni-channel supply chains enables retailers to tailor delivery times, integrate channel offerings, and provide an extensive and innovative product catalog. Some participants echoed this sentiment, noting that rigid organizational standard operating practices (SOPs) can hinder their pursuit of flexible opportunities despite having the necessary capabilities to identify them. During the interviews, the participants alluded to the fact that flexibility is required when new market opportunities are recognized.

You've got a certain resource amount, and you then go for certain targets... let's say another priority comes in, you will drop that priority in because it's now more important than something else that was in that bucket and you kinda move that forward. (P11, Director of Retail Operations, 28 years of experience).

Flexibility is closely associated with supply chain responsiveness (Pereira & Frazzon, 2021). The literature suggests various strategies for enhancing responsiveness, such as time-based competition (Rockson et al., 2017), business process reengineering (Adivar et al., 2019), and investing in technologies that improve supply chain visibility and transparency (Montecchi et al., 2021). Integrating physical, financial, and information flows supports supply chain responsiveness, resulting in improved operational and competitive performance (Rajaguru & Matanda, 2019). The outcomes of this research supplement the current literature by elucidating that the strategic allocation of investments, aimed at adapting and aligning SOPs with omni-channel SCI initiatives, is imperative in catalyzing omni-channel SCI:

you want is to be as fast and as agile as possible... with the best intentions in the world, you're not gonna win the omni-channel retailing game if you're picking and packing off a piece of paper... you have to optimize your returns processes, leveraging data, leveraging technology, simplify, to speed up which all requires investment... the absence of those things is really a significant hindrance. (P6, VP of Supply Chain & eCommerce Operations, 17 years of experience).

However, interviewees expressed difficulty in keeping pace with the rapid technological advancements in the omni-channel landscape, as different stakeholders in the business may disagree on the best way to channel investment:

...we took a really long time to agree on what model we want to put in place for same-day delivery... and customers were quite negative about the fact that we didn't have that service. (P11, Director of Retail Operations, 28 years of experience).

Furthermore, participants emphasized that agility and responsiveness necessitate extensive cross-functional SCI, as eliminating barriers and bureaucracy promotes higher responsiveness levels.

... what holds us back right now is that we cannot evolve fast enough... you end up with this long, stretched-out development plan... it's about removing the barriers to implementation, that's the key thing. (P16, Head of Online Operations, 30 years of experience)

As Figure 1 indicates, the data reveals that ROI can only be realized when investment decisions are aligned with organizational and supply chain strategies. Participants revealed that aligned strategic objectives will lead to higher investment in omni-channel initiatives, which will ultimately lead to higher levels of omni-channel SCI:

It's far easier to kind of diffuse conflicting priorities if we're all equally aligned around a common mission... (P6, VP of Supply Chain & eCommerce Operation, 17 years of experience).

...not everyone does want an omni-channel approach. So, at your leadership level, you've got to have a stated intention to have an omni-channel future and to see that as the future of your business. (P16, Head of Online Operations, 30 years of experience).

The findings of Theme 2 reveal the intricacies involved in attaining ROI in omni-channel retailing, underscoring the significance of investment capability and scalability for achieving omni-channel SCI. Moreover, the findings highlight the pivotal role of agility in molding supply chain flexibility and agility, empowering retailers to rapidly adjust to a dynamic retail environment.

## Conclusion

This study aimed to investigate the complex yet essential role of investment capability in catalyzing omni-channel SCI. It set out to address two ROs. First, the role of investment ability as a catalyst for omni-channel SCI was investigated. In addressing the first research question, the study findings shed light on the pivotal trade-off decisions faced by retailers. Notably, the findings underscore retailers' need to navigate various investment trade-offs, especially in financial and human resource investments, to operate effectively in the complex landscape of omni-channel retailing. Regarding financial resource investment, the study reveals that modernizing legacy systems and redesigning distribution networks are critical areas that require substantial investment to facilitate omni-channel SCI. On the other hand, human resource investment emerges as playing an equally essential role in omni-channel SCI. The findings underscore the significance of investing in personnel reskilling and leadership orientation to foster an agile and adaptable workforce. This includes upskilling and reskilling the workforce to ensure they possess the necessary skills for operating in the transformed business environment, and cultivating leadership that fosters innovation and collaboration. By investing in these areas, organizations can overcome resistance to change and effectively implement omni-channel SCI initiatives.

The second RO aimed to examine the impact of investment ability on catalyzing omni-channel SCI. The study findings reveal how investment capability drives various aspects of omni-channel operations. Specifically, investment ability enhances retailers' capacity to scale operations and adapt to changing market dynamics. The study highlights the role of investment in facilitating rapid adaptation to emerging channels or touchpoints, as evidenced by retailers' responses to the COVID-19 pandemic. Furthermore, the findings show how investment ability drives supply chain agility by enabling retailers to strategically plan, proactively invest, and adaptively scale operations. Flexibility and responsiveness emerge as key capabilities arising from agile practices, allowing retailers to tailor their operations and respond quickly to market changes. Finally, the findings show that aligned investment decisions with organizational and supply chain strategies are essential for realizing ROI and achieving higher levels of omni-channel SCI.

This study addressed the research question: 'How does investment ability steer the facilitation of omni-channel SCI?' By achieving the outlined research objectives, the research question can be answered as follows: Investment ability plays a critical role in steering the facilitation of omni-channel SCI by enabling retailers to navigate crucial trade-off decisions and strategically allocate resources. Through investments in both financial and human resources, retailers can effectively address the complexities of omni-channel retailing and adapt to the evolving landscape. Additionally, investment ability facilitates scalability and agility, allowing retailers to adapt to changing market dynamics and seize SCI opportunities. In essence, investment ability guides the strategic direction of omni-channel SCI initiatives, ensuring alignment with organizational goals and driving competitive advantage. Accordingly, the research solves the problem of understanding how investment capability drives the facilitation of omni-channel SCI by illuminating crucial trade-off decisions faced by retailers and demonstrating the impact of investment on scalability, agility, and alignment with organizational strategies.

This study offers valuable insights into the complex interplay between investments and broader strategies of retail organizations. From a practical standpoint, the results reveal that managers should carefully assess and balance investment trade-offs between financial and human resources, considering the specific needs and goals of their omni-channel supply chain. Prioritization is essential in the context of financial resource allocation. Conversely, for human resource investment, an approach characterized by the division of investment between training and leadership development may be the most advantageous. These trade-off decisions are poised to accelerate omni-channel SCI initiatives by enhancing scaling capabilities and expediting responsiveness to emerging opportunities. In terms of managerial implications, the findings revealed that the capacity of investment ability to steer omni-channel SCI initiatives depends on how well investment trade-offs align with broader organizational and supply chain strategies. Managers are urged to cultivate a holistic approach, ensuring that investment decisions align with organizational and supply chain goals. This alignment is instrumental in realizing the desired outcomes of scalability and agility in omni-channel operations.

This study had certain limitations that provide opportunities for future research. First, data was collected during the COVID-19 pandemic period. As a result, during the interviews, participants



strongly focused on the impact of the pandemic on operations, which may have exaggerated participants' focus on investment ability given the significant pandemic-related investments made over this period. Had data gained from interviews been collected pre-pandemic or even post-pandemic, the emphasis on omni-channel investment might have been less pronounced. Future research could explore how retail organizations adapt their investment strategies in response to different disruptive events by comparing pre- and post-event data to assess the changing imperatives of investment. This would provide insights into the dynamic nature of investment decisions. Second, the data were obtained solely from large retailers in South Africa, a developing country. This may limit the applicability of the findings beyond the South African context. Future research could broaden the scope by including retailers from various geographical locations and sizes to assess the generalizability of the findings to other contexts. Such a comparative analysis would enhance the understanding of regional investment strategies and contribute to a more comprehensive understanding of the global retail supply chain dynamics. Finally, this study did not compare the level of success of different investment strategies in achieving omni-channel SCI, such as prioritizing financial resources investment over human resources investment. Future research could investigate the comparative effectiveness of these investment strategies, thereby providing valuable insights for retailers seeking to optimize their omni-channel SCI initiatives.

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## Authors' contributions

All authors have read and agreed to the submitted version of the manuscript. A.N. Weber conducted the research as part of her PhD degree. J.O. Cilliers acted as the supervisor of the research and assisted with the conceptualization of the manuscript.

## Disclosure statement

In the preparation of this work, the author(s) used ChatGPT to enhance readability and language, as English is not the first language of either author. This tool was not used to interpret the data or draw scientific conclusions. After using this tool, the author(s) reviewed and edited the content as required and took full responsibility for the content of the publication.

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### Informed consent statement

Informed consent was obtained from all the subjects involved in the study.

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### Data availability statement

The data that support the findings of this study are available from the corresponding author, A.N. Weber, upon reasonable request. The data are not publicly available due to restrictions.

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## Appendix A. Keywords based on the document analysis

|     | Words             | 2016 | 2017 | 2018 | 2019 | 2020 | Total |
|-----|-------------------|------|------|------|------|------|-------|
| 1.  | operations        | 1083 | 932  | 977  | 1085 | 967  | 5044  |
| 2.  | strategy          | 834  | 954  | 945  | 1190 | 929  | 4852  |
| 3.  | resources         | 653  | 616  | 693  | 773  | 795  | 3530  |
| 4.  | supply chain      | 381  | 545  | 612  | 635  | 691  | 2864  |
| 5.  | governance        | 418  | 554  | 579  | 601  | 500  | 2652  |
| 6.  | knowledge         | 373  | 508  | 590  | 654  | 460  | 2585  |
| 7.  | process           | 310  | 382  | 446  | 492  | 437  | 2067  |
| 8.  | omni-channel      | 234  | 254  | 427  | 456  | 505  | 1876  |
| 9.  | change            | 223  | 278  | 441  | 476  | 427  | 1845  |
| 10. | systems           | 262  | 285  | 328  | 312  | 236  | 1423  |
| 11. | channels          | 140  | 254  | 301  | 293  | 282  | 1270  |
| 12. | skills            | 183  | 242  | 258  | 308  | 246  | 1237  |
| 13. | future-fit        | 197  | 135  | 218  | 285  | 247  | 1082  |
| 14. | training          | 186  | 199  | 238  | 222  | 182  | 1027  |
| 15. | capabilities      | 158  | 183  | 212  | 246  | 200  | 999   |
| 16. | leadership        | 128  | 167  | 222  | 231  | 195  | 943   |
| 17. | digital           | 39   | 71   | 288  | 356  | 173  | 927   |
| 18. | competitive       | 70   | 123  | 212  | 200  | 179  | 784   |
| 19. | talent            | 115  | 166  | 162  | 167  | 121  | 731   |
| 20. | expansion         | 107  | 145  | 174  | 157  | 124  | 707   |
| 21. | seamlessly        | 73   | 126  | 164  | 163  | 124  | 650   |
| 22. | innovate          | 108  | 122  | 137  | 141  | 92   | 600   |
| 23. | website           | 77   | 97   | 100  | 125  | 115  | 514   |
| 24. | e-commerce        | 54   | 101  | 124  | 97   | 127  | 503   |
| 25. | mobile            | 66   | 78   | 97   | 99   | 66   | 406   |
| 26. | satisfaction      | 51   | 77   | 75   | 76   | 100  | 379   |
| 27. | integrate         | 82   | 69   | 58   | 62   | 44   | 315   |
| 28. | convenience       | 8    | 58   | 78   | 93   | 62   | 299   |
| 29. | differentiate     | 13   | 50   | 70   | 72   | 58   | 263   |
| 30. | collaborate       | 22   | 47   | 48   | 62   | 45   | 224   |
| 31. | bricks-and-mortar | 26   | 53   | 59   | 70   | 9    | 217   |
| 32. | disruption        | 3    | 6    | 20   | 23   | 44   | 96    |
| 33. | adapt             | 4    | 13   | 17   | 23   | 24   | 81    |
| 34. | legacy            | 9    | 14   | 16   | 17   | 11   | 67    |
| 35. | market-leading    | 6    | 14   | 17   | 21   |      | 58    |
| 36. | intelligence      | 17   | 12   | 8    | 12   | 8    | 57    |
| 37. | dynamic           | 4    | 5    | 9    | 13   | 15   | 46    |
| 38. | value-creating    | 4    | 5    | 4    | 10   |      | 23    |
| 39. | fast-growing      | 3    | 5    | 5    | 4    |      | 17    |
| 40. | touchpoints       | 2    | 2    | 3    | 6    | 4    | 17    |
| 41. | fast-changing     | 1    |      |      | 3    |      | 4     |
| 42. | cross-functional  |      |      |      | 2    |      | 2     |