The Role of Information-Sharing on Supply Chain Resilience: A Study in the South African Retail Industry

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ABSTRACT

Background: Retail firms are operating in an increasingly tumultuous global economy, with extended supply chains and ever-increasing customer demand. Retail firms also face heightened vulnerability towards disruptions and disasters that could bring their supply chain to a complete standstill. Building a resilient supply chain and being able to share critical information, is essential to a retail firm's survival and success.

Objectives: The purpose of this study is to investigate the role of information-sharing on supply chain resilience (SCRES), within buyer-supplier relationships in the South African retail industry. More specifically, the role of information-sharing on the pillars of SCRES, namely, flexibility, visibility, velocity and efficiency, were investigated.

Method: A generic qualitative research design was implemented. Data were collected by conducting 13 semi-structured interviews with both buyer and supplier firms operating in the South African retail industry.

Results: The study's findings indicate that the antecedents of resilience can be achieved through the sharing of accurate and timely information. The results suggest that retail firms acknowledge the urgency of building resilient supply chains to enable them to mitigate the impact of an extremely disruptive economic business environment. Retail firms with close and open customer and supplier relationships achieved a higher degree of information-sharing and faster response times to disruptions and market fluctuations. Retail firms that share information can foresee and respond to disruptive events better, and before they become catastrophic, providing them with a competitive advantage.

Keywords: Supply chain resilience, disruptions management, information-sharing, qualitative research, South Africa, retail industry

INTRODUCTION

Elizabeth Edwards, former American attorney and best-selling author was quoted saying: "Resilience is accepting your new reality, even if it's less good than the one you had before. You can fight it, you can scream about what you've lost, or you can accept it and try to put together something good." Similarly, every day, retail firms are faced with

potential disruptions which can potentially disrupt their capability to perform effectively (Gölgeci & Kuivalainen 2020, 63). As such, many retail firms have acknowledged the urgency of building a resilient supply chain to enable them to mitigate the impact of an extremely disruptive economic or environmental event (Sabahi & Parast 2019, 2; Ambulkar, Blackhurst & Grawe 2015, 111).

Supply chain disruptions and disasters may originate externally or from internally within the firm (Ivanov, Sokolov & Dolgui, 2014:2155). However, the extent of the supply chain disaster and the vulnerability can increase as retail firms attempt to erroneously or reactively respond to the disruptions (Ekanayake, Shen, Kumaraswamy & Owusu 2020, 1; Kembro & Selviaridis 2015, 4). Even though disruptions in supply chains can be catastrophic, it remains under-researched, as most retail firms only focus on developing practices to eliminate supply chain interruptions, however, despite their best endeavours, not every supply chain disruption can be planned for nor eliminated (Melnyk, Closs, Griffis, Zobel & Macdonald 2014, 37). The COVID-19 pandemic has affected the global economy, unlike any other disruptive event in recent years.

However, even though COVID-19 is perhaps an unparalleled example, it has clearly shown the significance that in cases of extraordinary disruptive events, SCRES to disruptions needs to be considered at the scale of survivability or viability to avoid supply chain and market collapses and the severe need for additional SCRES research, practices and strategies (Ivanov & Dolgui 2020, 1). Tukamuhabwa, Stevenson, Busby, and Zorzini (2015, 5600) posit that SCRES is based on four 'pillars', namely, flexibility, visibility, velocity and efficiency.

Concomitantly, all of these antecedents share one critical element, information-sharing (IS) (Colicchia, Creazza, Noè & Strozzi 2019, 5, Mandal, Sarathy, Korasiga, Bhattacharya & Dastidar, 2016, 548). Without IS capabilities between supply chain partners retail firms will not be able to cope with supply chain disasters and disruptions (Wong, Lirn, Yang & Shang 2019, 2). According to Meyer, Niemann, Uys and Beetge (2019, 1), South African retail firms are even more vulnerable to disasters and disruptions due to its unique socio-economic factors such as a high degree of labour unrests, strikes and inflexible labour policies, high unemployment rates and intense market competition.

Furthermore, the South African retail sector ranks as the sixth-largest sector that contributes to economic growth and employment in South Africa (Jacobs 2018, 3). As such, managing retail sales is crucial as retailers face extreme competition through globalisation and potential internal and external vulnerabilities (Aye, Balcilar, Gupta & Majumdar 2015, 66). Additionally, South African consumers are becoming more informed and sensitive to their consumption behaviour and the environmental effects thereof, forcing retail firms to seek more sustainable and resilient ways of conducting business (Dos Santos, Svensson & Padin 2013, 104). Therefore, in line with the above, the purpose of this qualitative study was to explore how IS influences SCRES of retail firms in the South African retail industry, by investigating SCRES and its underlying mechanisms namely, flexibility, visibility, velocity and efficiency. The following research questions guided the study:

- How does IS increase the flexibility of SCRES?
- How does IS increase the visibility of SCRES?
- How does IS increase the velocity of SCRES?
- How does IS increase the efficiency of SCRES?

This study makes specific theoretical and managerial contributions. Firstly, after a review of extant literature, the role of IS in SCRES has not been investigated in a South African retail context. Secondly, Xu, Zhang, Feng & Yang (2020, 1-19) conducted a comprehensive bibliometric analysis on supply chain disruption risks based on 1 310 publications published between 1999 and 2019 and indicated future research should build new perspectives from a contextual and methodological perspective. This study responds to this call of Xu et al. (2020, 15) as well as Dubey, Gunasekaran, Childe, Fosso Wamba, Roubaud and Foropon (2019, 13) as it was conducted in a developing country perspective and employed a qualitative methodology to gain a more in-depth insight into the phenomenon of SCRES. Furthermore, this study may add insights to South African retail managerial practices by presenting a better understanding of how IS benefits SCRES. This could lead to better decision-making by practitioners and, ultimately, improve firm performance and profitability.

LITERATURE REVIEW

INFORMATION-SHARING AND THE SOUTH AFRICAN RETAIL INDUSTRY

Retailers usually have strong intimate relationships with their suppliers due to the importance of on-time deliveries and supply chain efficiencies (das Nair 2018, 320). The South African retail industry consists of many retail firms with many different types of stores and retail offerings (Jacobs 2018, 10). The network view of supply chains can explain interdependencies as well as the difficulties inherent in sharing information across multiple supply chain tiers in retail supply chains (Kembro 2015, 456). IS between supply chain partners allows them to understand one another better, reducing the risk of miscommunication, misinterpretation of agreements and the dangers of using inaccurate information (Wu, Chuang & Hsu 2014, 125).

Instant benefits of IS include improved forecasts and the reduction of inventory levels (Kembro & Selviaridis 2015, 455). Continuous IS with supply chain partners has potential benefits, including better-coordinated processes and superior supply chain planning (Kembro & Selviaridis 2015, 455). Improved IS leads to faster response times, encourages flexibility and agility, lowers costs and reduces the bullwhip effect (Panahifar, Byrne, Salam & Heavey 2018, 360). The bullwhip effect explains how upstream partners are unable to forecast demand correctly, as they base their forecasts on inaccurate, dated and incomplete information, resulting in non-optimal production and supply decisions (Kembro & Selviaridis 2015, 456). To mitigate shortages in supply, supply chain members are forced to keep higher levels of inventory, thereby reducing their profit margins (Wu et al. 2014, 122).

Past research has shown that the sharing of information across the various levels in a supply chain could bring about improved decision making among managers (Kembro & Selviaridis 2015, 456; Wu et al. 2014, 122). However, this holds significant challenges for retail firms as it requires high levels of commitment and trust between the supply chain members (Soosay & Hyland 2015, 613). Retail firms actively participating in a high trust relationship are more willing to share information and experience in collaborative practices (Meyer, Niemann & Kotzé 2017, 1; Wu et al. 2014, 124). Online IS helps coordinate the material, information and financial flows between supply chain members but may be challenging to implement (Kembro & Selviaridis 2015; Wu et al. 2014, 123). The quality of information is a significant concern as inaccurate information has no value (Kembro 2015, 457). Other barriers include the risk of only one partner benefitting from the sharing of confidential information and the risk of devaluing knowledge when sharing it with partners that do not possess the required capabilities (Kembro 2015, 457). IS and effective communication, before the occurrence of an unfortunate event, can be seen as a proactive strategy in achieving resilience (Tukamuhabwa et al. 2015, 5601).

SUPPLY CHAIN RESILIENCE

SCRES is defined as the ability of retail firms to quickly adapt to and recover from shocks and other stressful events such as droughts, violence, natural disasters and conflicts (Gligor, Esmark & Holcomb 2015, 71; Scholten & Schilder 2015, 471). Akkermans and Wassenhove (2018, 64) drew a parallel between ecological tsunamis and supply chain tsunamis. Tsunamis are specifically used to illustrate that supply chain disruptions occur over an extended period as a consequence of a series of events and should not be considered as isolated incidents. Resilience, as a resultant research topic, is of growing importance due to an increase in supply chain complexity and disruptions originating from global sourcing, operations and lean supply chain practices (Botes, Niemann & Kotzé 2017, 184). As mentioned, Tukamuhabwa et al. (2015, 5600) postulate that SCRES is based on four 'pillars', namely, flexibility, visibility, velocity and efficiency which will be discussed in the subsequent sections.

Flexibility

The ability to adapt and respond quickly and effectively is of great importance for today's international supply chains, challenged with extensive complexity (Tiwari, Tiwari & Samuel 2015, 768). According to Tiwari et al. (2015, 771), a supply chain can be described as flexible "if it can ensure smooth undisrupted supply of the products from the supplier to the end-user under all risks and uncertainties in the environments, with the least variation in the difference between the demand and supply at every demand-supply node, and without much penalty or impact on the SC

resources and the costs incurred". Flexibility enables retail firms to deal with high levels of uncertainty by adapting to disruptions in the supply chain as well as enabling the coordination of processes among firms and provides support to them in managing uncertainty (Scholten, Sharkey Scott & Fynes 2014, 215). Supply chain flexibility is increased through collaboration and can be related to a firm's systems, their products and their processes. Flexibility can be created through various practices, including adjourning work to a future date to cope with a disruption in supply, recruiting various suppliers, cross-training staff, deploying multi-purpose equipment and making use of temporary staff or employment agencies (Tukamuhabwa et al. 2015, 5604).

Several trade-offs relative to flexibility exist, including cost, uncertainty, controllability and efficiency (Tiwari et al. 2015, 781). Fiksel, Polyviou, Croxton & Pettit (2015, 85) and Rajesh (2016, 42) identified flexibility, particularly flexibility in sourcing, manufacturing and order fulfilment, as one of the necessary capabilities that a firm must have to be resilient. Flexible firms have a multi-skilled workforce that can modify their delivery schedules and operations to produce different types of products, thereby improving their ability to adapt to unforeseen events (Scholten & Schilder 2015, 472).

Visibility

Given the speed at which information and communication technologies and cloud-based computing are developing, visibility is becoming mandatory for firms striving for prosperity (Handfield & Linton 2017, 81). Visibility is defined as the capability with which a firm can establish how materials and information flow through the entire supply chain, from the primary supplier to the end customer (Handfield & Linton 2017, 81). Additionally, visibility refers to the ability to see the end-to-end pipeline by having access to key operational and managerial information and relates to the capability of the central firm to access and share information related to supply chain partners' strategies and operations (Caridi, Moretto, Perego & Tumino 2014, 2).

The sharing of timely and accurate information between buyers and suppliers is essential in creating visibility in a supply chain (Botes et al. 2017, 191). Moreover, visibility signifies that important information is readily available to the individuals that need it, whether inside or outside the firm, for supervising, controlling and altering the supply chain strategy and operations (Caridi et al. 2014, 2). Nooraie and Parast (2015, 192) posit that by permitting complete visibility in an integrated supply chain network, any factors which may lead to disruptions in the supply chain can be identified and resolved before they reach a critical stage. Visibility also enables an improvement in the timing and quality of decisions as possible interruptions are identified and addressed, from various perspectives early on (Tukamuhabwa et al. 2015, 5605).

Velocity

According to Botes et al. (2017, 185), velocity is the speed in which a firm's supply chain reacts to a disruption. Velocity emphasises the need for supply chain's to be efficient in their response to, and recovery from, unfortunate events (Scholten & Schilder 2015, 472). Given the inverse relationship between capital and inventory, velocity is considered an asset, since inventory moves towards the end market at a greater pace and capital becomes available sooner (Handfield & Linton 2017, 81). Other benefits of velocity include higher-income resulting in higher profits and a reduction in product obsolescence (Handfield & Linton 2017, 81). Véronneau and Roy (2014, 359) introduced a concept called security at the source, which is fundamental in increasing supply chain velocity.

Firms must implement screening security to prevent bottlenecks and inefficiencies that may impair supply chain efficiency and velocity (Véronneau & Roy 2014, 360). According to Hofmann (2017, 5110), velocity is the ability of a firm to process information at high speed. When firms take advantage of real-time information, they will be able to recognise and respond to changes in patterns and events and implement viable strategies (Hofmann 2017, 5110). When information is made available from both the buyer and the supplier, it possesses velocity and variety capabilities (Kaur & Singh 2018, 301). These velocity capabilities include the ability of data to adapt to real-time situations and respond to newly occurring events (Kaur & Singh 2018, 304). Utilising this available data effectively leads to a resilient and sustainable supply chain (Kaur & Singh 2018, 301).

Efficiency

Uncertainty is one of the greatest challenges faced by today's modern supply chains; therefore, it is necessary to view and understand it from both a flexible and efficient perspective (Ivanov et al. 2014, 21). When production or delivery information is shared across the supply chain, it enables enhanced coordination of resources, roles and activities, thereby boosting operational efficiency (Wu et al. 2014, 124). There is a direct link between agility and efficiency as agile supply chains can respond to disruptions in a cost-efficient manner, thereby increasing efficiency (Gligor et al. 2015, 73). IS between supply members enable improved efficiency by improving the firm's processes, lowering inventory levels, increasing throughput and reducing manufacturing costs (Wu et al. 2014, 124-125).

To balance efficiency in a firm, safety stock is required to act as a buffer when disruptions occur (Scholten et al. 2014, 214). The high level of complexity involved when firms distribute information, money or materials, is a key source of supply chain disruptions and reduces supply chain efficiency (Bode 2015, 215). Firms tend to focus more on increasing efficiency and responsiveness to mitigate supply chain disruptions, but they fail to consider supply risk (Bode 2015, 215). Their focus is on the solution and not the root cause of the problem. However, firms should design their supply chains in a way that will reduce the frequency of disruptions and, at the same time, increase efficiency and responsiveness (Bode 2015, 224).

METHODOLOGY

GENERAL DESCRIPTION OF THE PROPOSED RESEARCH DESIGN

A generic qualitative research design was used for this study. It is described as the collection of individuals' own experiences and perceptions of events (Kahlke 2014, 39). A qualitative research approach was adopted as the researchers draw concepts and insight from data as opposed to using data to test a preconceived hypothesis (Taylor, Bogdan & DeVault, 2015, 7). As such, the researchers were able to deduce results based on a full understanding of the context in which disruptions took place, along with a thorough understanding of how managers made use of information to mitigate and prevent the unfortunate consequences of such disruptions. The participants' opinions and sentiments were collected through 13 semi-structured interviews, and the interview guide was modified during the data collection process.

SAMPLING DESIGN

South African retail firms were the unit of analysis. Homogeneous sampling was used to identify the retail firms as the retail firms had to have similar characteristics in terms of their businesses and experiences. Additionally, purposive sampling techniques (Roy 2015, 244) were used to identify the supply chain managers from the respective retail firms. The chosen participants adhered to the following eligibility criteria: (1) The firm had to operate in South Africa and (2) it had to be in the retail industry. The individual participants' inclusion criteria were as follow: (1) Have at least five years' experience in the supply chain industry and (2) had to be present during a supply chain disruption that took place in their firm. These inclusion criteria were made to ensure that rich and accurate data of the research questions could be gathered. A profile of the study participants is provided in Table 1.

TABLE 1:
A PROFILE OF THE STUDY'S PARTICIPANTS

Pseudonym	Position	Firm	Length of interview (minutes)
P1	Human Resource and Sales Director	F1	28
P2	Senior Buyer and Office Manager	F2	20
P3	Technical Sales Representative	F3	18
P4	DC Manager	F4	59
P5	Logistics Executive	F5	25
P6	Procurement Manager	F6	35
P7	Chief Operating Officer	F7	44
P8	Director	F8	14
P9	Head of Division of Non-Edible	F9	23
P10	National Operational Manager	F10	21
P11	Managing Director	F11	28
P12	Debtor and Sales Manager	F12	16
P13	Financial Manager	F13	17
The average duration of interviews (min)			26.76

Source: Authors' own compilation

DATA COLLECTION

13 semi-structured interviews were the primary source of data, collected for this research study. Ten interviews were face-to-face, and three were conducted telephonically due to geographical constraints. The discussion guide was deliberately open-ended to ensure that the participant gave answers based on their interpretation and to safeguard against a situation in which participants were restricted or guided by the interviewer (Alshenqeeti 2014, 39). The interviews were transcribed by the researchers and verified for accuracy by listening to the audio recordings. A pre-test was conducted before the primary data collection. No significant changes needed to be made to the discussion guide. The pre-test participant complied with the inclusion criteria previously identified and was used as part of the main study. Interview duration varied between 13 and 59 minutes, depending on the level of detail with which the participants answered the questions.

DATA ANALYSIS

The raw data were analysed using the thematic approach as it is a well-known and utilised approach when analysing qualitative data (Nowell, Norris, White & Moules 2017, 2). Thematic analysis is used to "identify, analyse, organise, describe and report themes" found in the data collected (Castleberry & Nolen 2018, 808). Priori codes were identified, based on the study's research questions, to build a master code list that guided the data analysis. This research utilised a computer-assisted qualitative data analysis (CAQDAS) software package called Atlas.ti (version 8) to efficiently analyse the large amounts of data from the interviews. Atlas.ti is specifically developed to generate and manage codes as well as identify the relationship between codes and themes. All researchers were involved in the data coding process, thereby enhancing the trustworthiness of the research study since the researchers constantly re-evaluated the perspectives and thought processes of one another.

ETHICAL CONSIDERATIONS

This study was approved by the Research Ethics Committee of the Faculty of the Economic and Management Sciences at a South African university. Before each interview, each study participant signed the consent form in which they acknowledged that they were aware that their participation was voluntary, anonymous, confidential and could be terminated at any time. In the case of the three telephone interviews, the participants were emailed the consent form, which they printed, signed, scanned and sent back. Pseudonyms were assigned to each participant and firm to ensure further anonymity and confidentiality in the study.

TRUSTWORTHINESS

Trustworthiness is defined as the degree to which the study results are a true representation of the real-life experience of the participants to the specific topic under investigation (Curtin & Fossey 2007, 88) and is described by four trustworthiness criteria namely credibility, transferability, dependability and confirmability. Credibility refers to the extent to which the results of the study are representative of what the participants "think, feel and do" (Lietz & Zayas 2010, 191). To ensure credibility, peer briefings and member checks were conducted in which the participants were asked probing questions (Bloomberg & Volpe 2018, 162). Transferability refers to the extent to which the results of a research study can be valuable or meaningful to researchers in countries and industries other than the country and industry in which it was originally conducted (Connelly 2016, 435-436).

For transferability, the researchers made sure to select the retail firms based on the inclusion criteria and documented them in detail (Polit & Beck 2012, 585). Dependability refers to the reliability of the data, along with the changing circumstances in which the research study is conducted (Connelly 2016, 435). For dependability, all the records, transcriptions and correspondence were kept safe as well as independent researchers who peer-reviewed the data (Lietz & Zayas 2010, 195). Confirmability relates to removing any preconceptions, experiences, perceptions, opinions and motivations of the researchers, thereby ensuring that the results only reflect the participants' point of

view (Shenton 2004, 72). The researchers made sure to adhere to confirmability through research reflexivity, open-ended questions, and complete transcriptions (Connelly 2016, 435).

FINDINGS

Four main themes (based on the pillars) of SCRES were used to guide the study. The sub-themes and the frequency of the codes identified during data analysis are presented in Table 2.

TABLE 2
FREQUENCY TABLE OF THE MAIN THEMES, SUB-THEMES AND CODES

Participants	Flexibility			Visibility			Velocity		Efficiency	
	Demand measures	Order fluctuations	Disruption response	Quality measures	Suppliers capabilities	Tracking flows	Response times	Disruption recovery time	Financial impact	Safety stock
P1	x	x	-	-	-	x	x	x	-	x
P2	x	-	x	-	-	x	x	x	-	-
P3	x	-	x	-	-	x	x	x	x	-
P4	x	x	x	-	x	x	x	x	x	x
P5	x	x	-	x	x	x	x	x	x	x
P6	x	x	x	x	x	x	x	-	-	x
P7	-	x	x	x	x	x	x	x	x	-
P8	x	-	-	x	x	x	-	x	-	x
P9	x	x	-	x	x	x	x	-	x	-
P10	x	x	-	x	x	x	x	x	x	-
P11	x	x	x	x	x	x	x	x	-	x
P12	x	x	x	-	-	x	x	-	-	-
P13	-	x	x	-	-	-	x	x	x	-
Total	11	10	8	7	8	12	12	10	7	6

Source: Authors' own compilation

SUPPLY CHAIN RESILIENCE

Flexibility

The three main indicators of flexibility in retail firms were identified as demand measures, order fluctuations and disruption responses.

Eleven of the 13 participants indicated that they have demand measures to anticipate and stay up to date with customer requirements and needs, which increases flexibility. This strengthens the literature stating that a supply chain is flexible when it can ensure the undisrupted flow of materials, information and financials, with least variation between demand and supply when uncertainties occur (Tiwari et al. 2015, 771).

"…we have got continuous product research… we're continuously looking for new suppliers. We continuously looking for the latest technology. We spend a lot of time prototyping things and we ask our suppliers to create new concepts and to come up with new concepts of products for us, so we do that to keep up to date. And then also with customers, customer visits are very vital when we go on-site to customers and then we will look at their challenges…" (P11, Female, Managing Director).

Ten of the 13 participants stated that they have processes in place to manage significant order fluctuations to maintain operational flexibility. This agrees with the literature which states that flexibility in sourcing, operations and order fulfilment is essential to create SCRES (Rajesh 2016, 42).

"…we have our fixed monthly work and then peaks, and things come in the form of shutdowns." (P13, Male, Financial Manager).

"… we then notify our supplier we have had a big upswing in this, we've also told them they need to keep a certain amount of stock on the floor for us, in case of these things, so that we can accommodate… we work closely with our suppliers and/or customers, it is not an arms-length relationship, it's close, because of situations like this." (P4, Male, DC Manager).

Eight of the 13 participants gave examples of how they responded to disruptions that took place in their firm and illustrated that, in accordance with the literature, operational flexibility such as the ability to modify delivery schedules and operations enabled them to respond to these disruptions effectively (Scholten & Schilder 2015, 472). Three of the 8 participants also said that it was essential to keep their customers and suppliers updated to maintain control of the situation.

"We're like oh we had load shedding, and they go what's load shedding and we're like well, the power goes off for a while. So, we try and explain the situation, but we say to them on a positive note your stuff is being built at night and we are on track… Remember my supplier have to tell me once a week what's happening, how it's running, if it's not running, if it's standing still… Your supplier, same as me, as I am the supplier of the client, I have to tell my client once a week. So, every Friday, you get a progress report from me." (P2, Female, Senior Buyer and Office Manager).

FIGURE 1
THEME 1 FINDINGS
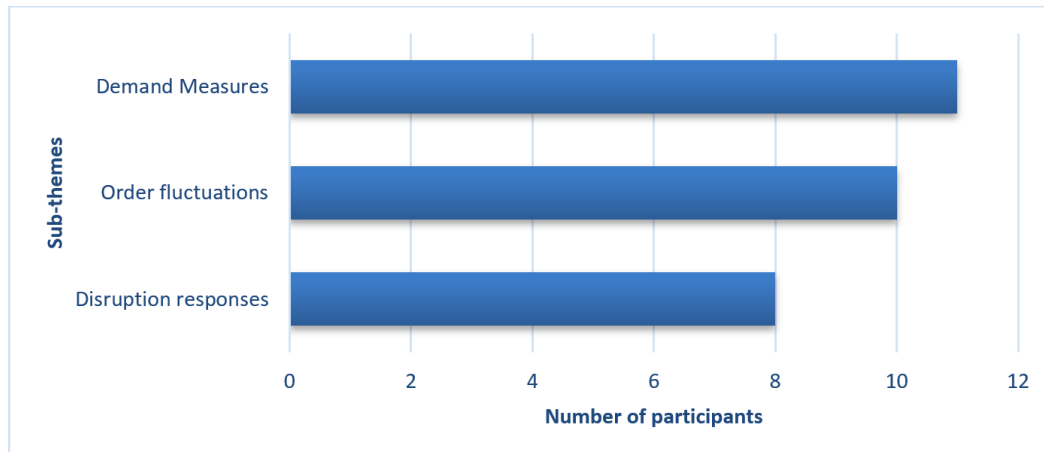
Visibility

Three factors that indicate visibility in retail firms were identified as quality measures implemented, visibility in suppliers' capabilities and tracking supply chain flows.

Seven of the 13 participants have implemented quality measures in their operations to identify any defects and improve on the existing quality of materials and finished products. This is in line with the literature that indicates that visibility in operations enables the identification of possible interruptions early on before it becomes a significant disruption (Tukamuhabwa et al. 2015, 5605).

"Our boxes were shrinking, and our guys were taping it up before waiting for it to set. You can't tell that straight away, that will only happen after 3 or 4 days and it will shrink. ... So those are things that you change every day … we got the technical guys involved with the chemical and we did a few shots and that is how we found out what the problem was. So that is how it was eliminated." (P8, Female, Director).

Two of the 13 participants indicated that they do not have enough insight into their supplier's abilities and operational performance. Six of the 13 participants indicated that they have visibility in their supplier's capabilities to respond quickly when demand fluctuates, or disruptions occur. This agrees with the literature, which indicates that visibility is created when retail firms share information related to their supply chain partner's strategies, operations and capabilities (Botes et al. 2017, 191).

"We do have visibility from a relationship side, they will tell you what they can do, and they will update you each week as to what they think they can produce." (P6, Male, Procurement Manager).

"We've got regular meetings; check-in meetings, so we know exactly where they stand. So, if they've got issues, I know about the issues and we can plan ahead." (P10, Male, National Operational Manager).

"It's all relevant hey, some better than others. Some customers we've got are absolutely useless, but it's normally the smaller, smaller guys." (P7, Male, Chief Operating Officer).

Two of the 13 participants indicated that they have complete traceability of their raw materials from suppliers to the finished product to their customer. Ten participants indicated that they have efficient tracking systems in place within their retail firms to track their products, but two of these ten retail firms stated that they have no visibility of the products when they leave the warehouse to go to the customers. One participant said that they did not have visibility of the materials when they come from suppliers or when they leave to go to customers due to the lack of traceability systems. Comparing this to the literature, we can see that most of these retail firms do not have complete visibility in their supply chains and this could influence their ability to respond more quickly to disruptions (Botes et al. 2017, 191).

"No, everything by us is traceable, so, I mean from a medicine perspective we do batch traceability; so, you check it from start to finish. And with us working in the pharma industry, I must know what Aspen gave to me; I must know how it goes to the end customer. So, it all has a batch number; it can follow the same chain back again. So, there's a lot of visibility." (P10, Male, National Operational Manager).

"So, we have no tracking of where those products go. We can track it if they give us a batch code, back to the story I gave you just now." (P7, Male, Chief Operating Officer).

FIGURE 2
THEME 2 FINDINGS
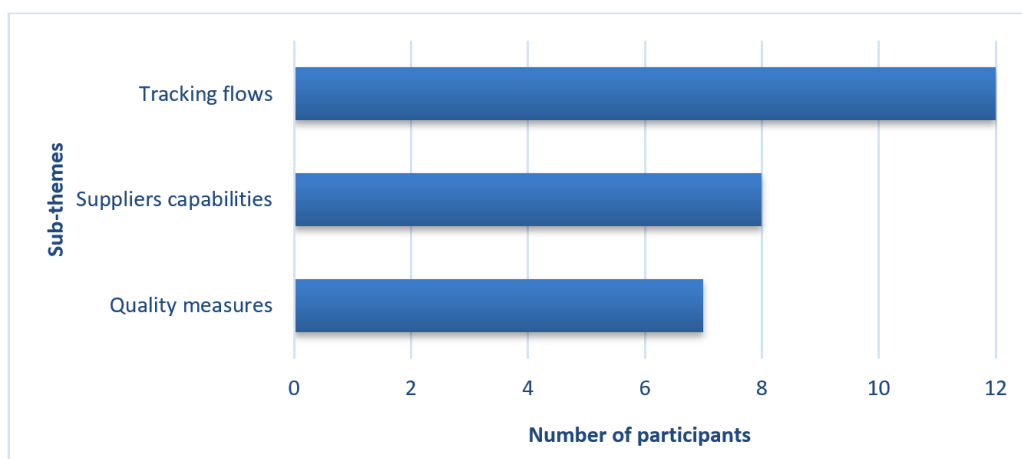
Velocity

The degree of the velocity of the participating retail firms was measured through their average customer response times and the recovery time from the worst disruptions that they had experienced.

Two of the 13 participants indicated that their response times could improve, especially in fresh produce. Two of the 13 participants were not sure whether they have good response times compared to their competitors or not,

indicating that they do not monitor their competitor's response times. Eight of the 13 participants stated that their average customer response times was good compared to others in the industry, on average 24 hours to a week, but it also depends on the size of their orders and where their customers and suppliers are located. According to the literature, velocity is indicated by shorter response times and is an asset as inventory is turned into capital sooner, and it reduces product obsolescence (Handfield & Linton 2017, 81).

"I think we can improve. I do believe that one of the biggest challenges at the moment is how do we get our systems to assist us with making processes quicker; how we then try and shave off time from that." (P5, Male, Logistics Executive).

"…and I find that in the market our response times are good, our service is good, and that is the only way that we can keep our doors open for 25 years." (P1, Male, Human Resource and Sales Director).

Five of the 13 participants indicated that they recovered relatively quickly from major supply chain disruptions that occurred in their businesses. The retail firms had different responses to such disruptions. Two retailers switched to alternative suppliers, whereas another supplier decided to remain loyal to their existing supplier, given the good relationship they had spent years building with them. Three of the 13 participants said that it took them a long time to recover from the disruptions; while two of the 13 participants indicated that they are still busy recovering, especially in terms of rebuilding trust and cash flow. We can thus say that, as per the literature, many retail firms (especially suppliers) do not have a high degree of velocity in terms of recovering from the negative effects that disruptions have on their business (Scholten & Schilder 2015, 472).

"Security is a big problem; crime is a big problem in South Africa…" (P11, Female, Managing Director).

"… there's a level of trust that's been broken down between the various parties that must be rebuilt." (P5, Male, Logistics Executive).

FIGURE 3
THEME 3 FINDINGS
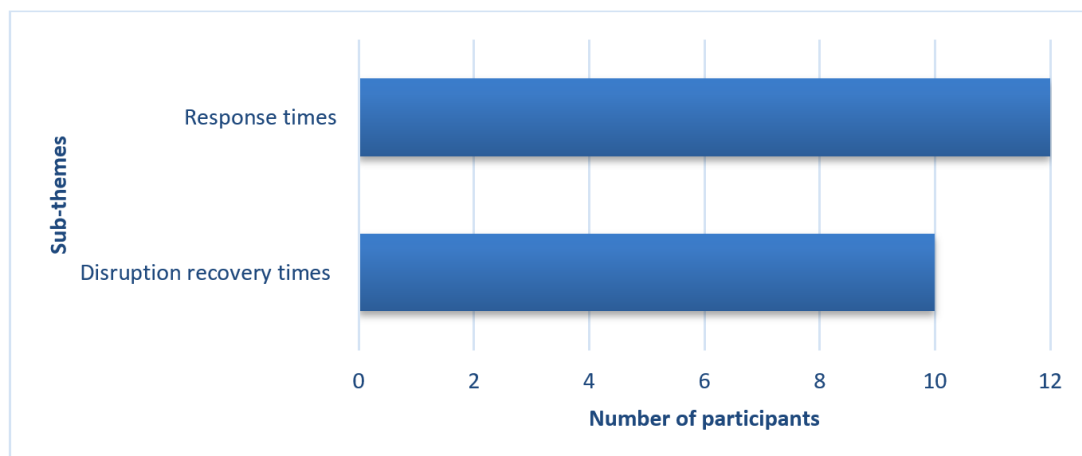
Efficiency

The financial impact of responding to disruptions and safety stock was observed as indicators of the participating retail firms' level of efficiency.

Four of the 13 participants indicated that the disruptions they had to respond to resulted in big financial losses. Three of the 13 participants did not incur major costs when responding to the disruptions. This is in line with the literature and is an indicator of efficiency since agile supply chains can respond to supply chain disruptions cost-efficiently (Gligor et al. 2015, 73).

"…we minimise the disruption at retail. So, we hire extra people; we brought in people from admin into the logistics, the picking, the consolidation of orders and we then do everything we can to minimise the disruption, for example, the situation like a strike." (P5, Male, Logistics Executive).

Six of the 13 participants keep safety stock as a backup in case of disruptions. This is an indicator of efficiency and correlates with the literature in which inventory has to be balanced strategically to ensure the right amount of safety stock is available to act as a buffer when supply chain disruptions occur (Scholten et al., 2014, 214).

"Also, we keep quite a bit of stock…safety stock…yeah we had time to fill up as we depleted our own stock." (P1, Male, Human Resource and Sales Director).

FIGURE 4
THEME 4 FINDINGS
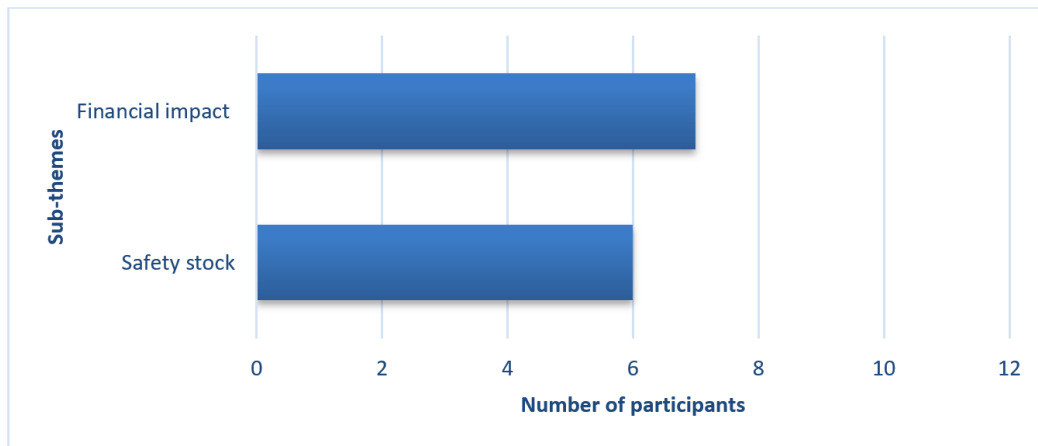
CONCLUSION

SUMMARY OF FINDINGS

The purpose of this study was to determine how information sharing influences SCRES and more specifically, the pillars of SCRES, namely: flexibility, visibility, velocity and efficiency. The first research question aimed to determine how IS increases the flexibility of SCRES. The findings show that retail firms do have measures in place to obtain customer information to stay up to date with customer requirements. They have processes in place to manage fluctuations by keeping safety stock and working closely with suppliers so they can accommodate them when they suddenly require more stock. The participants also indicated that it is vital to update and communicate with customers and suppliers regularly to maintain control during disruptions. This is in line with the extant literature, which states that flexibility enables the supply partners to coordinate their processes and provide support to one another during disruptions, thereby increasing SCRES.

The second research question aimed to determine how IS increases the visibility of SCRES. The findings show that most retail firms share information regarding their capabilities and shortcomings with their supply chain partners. However, most retail firms do not have complete traceability of their materials from the raw supplier to the end-user. Their visibility is limited to the materials within the control of their firm. Some of the retail firms measure the quality of their products and materials to identify problems early on and reduce operational disruptions. This correlates with the literature in which IS among supply chain partners facilitates visibility and improves cooperation in building a resilient supply chain, thereby effectively increasing resilience.

The third research question aimed to establish how IS increases the velocity of SCRES. In the findings, most of the retail firms have good relationships with their customers and suppliers. These retail firms also have sufficient average response times to customer orders, and more than half of the participants could recover quickly from the major disruptions that took place in their supply chain. This indicates that, because of the IS between their supply chain partners, they respond better to disruptions. This is in line with the literature in which information that is made available between supply chain partners allows retail firms to adapt to real-time events quickly leading to a resilient and sustainable supply chain.

The fourth and final research question aimed to determine how IS increases the efficiency of SCRES. Some of the participants incurred significant financial losses during disruptions, but almost half of the participants indicated that

they had safety stock to act as a buffer during their respective disruptions. They were able to maintain their inventory levels, even when their suppliers could not supply the required materials. This correlates with the literature in which IS and collaborative activities between supply partners allow retail firms to be cost-efficient by having just enough safety stock and still respond to disruptions promptly, thereby increasing SCRES.

THEORETICAL IMPLICATIONS

It is evident in the literature that disruptions can affect businesses in several ways and retail firms need to improve their resilience. However, particularly in a South African context, certain disruptive events tend to occur more often than others. This study emphasises the need for managers to study and evaluate past disruptive occurrences to prepare better for reoccurring events. By sharing information, retail firms can create a more resilient supply chain. This correlates with the literature as SCRES competencies (flexibility, visibility, velocity and efficiency) cannot be developed without the sharing of critical information among supply chain members.

MANAGERIAL RECOMMENDATIONS

Given the high levels of competition, managers in the retail industry should heed special attention to responding to disruptions quickly and effectively. This will enable them to counteract competitors by recovering to the same or better state faster than their competitors can. The impact of COVID-19 should be a severe warning and lesson to managers to augment their SCRES capabilities. Managers should prioritise the understanding and acknowledgement of the value inherited in sharing the right type of information with the right people, in a timely and accurate manner. Managers should spend additional time and resources on strengthening their retail firms SCRES pillars to be able to proactively and efficiently respond to any disruptions.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The researchers conducted this research study in the South African retail industry alone; the findings may, therefore, only apply to this specific industry and regional context. To determine whether the findings of this study can be generalised, future studies could be conducted in other industries within the South African context as well as in other developing countries. The study could also be replicated from a different research methodology such as a quantitative data collection method to include a greater scope of responses, testing the generalisation of the findings over a greater context. This will hold significant value for managers who are interested in knowing the effect of being able to respond effectively to disruptions but, more importantly, how to initiate strategies and action plans from a practical point of view within their retail firms. The researchers also noticed a lack of knowledge of information barriers. Many participants could not identify such barriers within their retail firms. It may be valuable, therefore, if future researchers could design a mechanism or tool to support managers in identifying factors that prevent information exchange.

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