

Information sharing in African perishable agri-food supply chains: a systematic literature review and research agenda

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Abstract

Purpose – The aim of this paper is to provide a review of state-of-the-art literature on information sharing in the context of African perishable agri-food supply chains (AFSCs). In doing so, the authors hope to stimulate further research and advance both theory and practice on African perishable AFSCs, which is a relevant, but under-investigated context.

Design/methodology/approach – The authors' systematic literature review covers a period of 21 years (2000–2021). After providing the bibliometric and methodological insights related to this sample of literature, the authors provide a detailed analysis and discussion of the key aspects of information sharing in African perishable AFSCs, based on a review framework grounded in the information sharing literature.

Findings – The authors' review revealed that information sharing in African AFSCs is still in its nascent stage. Findings are based on four themes of (1) why share information (mainly to gain market access), (2) what information is shared (price and market information) (3) how it is shared (still traditional communication, with limited adoption of digital technologies?) and (4) antecedents, drivers and barriers (technology adoption and socio-economic background of Africans).

Research limitations/implications – This paper outlines a research agenda for advancing the theory on information sharing in AFSCs. Furthermore, the review highlights the importance of context, supply chain structure, relationships, product characteristics and culture in studying AFSCs.

Originality/value – A review on information sharing in African perishable AFSCs does not appear to exist in operations and supply chain management (O&SCM) and agribusiness journals.

Keywords Supply chain management, Information sharing, Literature review, Agri-food, Africa

Paper type Literature review

1. Introduction

The potential benefits of information sharing have been extensively debated in the supply chain management (SCM) literature (Bailey and Francis, 2008; Kembro and Selviaridis, 2015; Premus and Sanders, 2008; Raweewan and Ferrell Jr, 2018). Such benefits include reductions in inventory levels (Lee and Whang, 2000) and improved decision making and better planning (Premus and Sanders, 2008; Sahin and Robinson, 2002), all of which could potentially lead to improvements in supply chain performance and supply chain resilience (Doetzer and Pflaum, 2021; Hsu *et al.*, 2008). However, most studies have focused on the benefits of information sharing in manufacturing and consumer product industries (Biggemann, 2012; Childerhouse *et al.*, 2003; Kembro and Selviaridis, 2015; Paulraj and Chen, 2007).



The AFSC, herein are the processes from production to delivery of agri-fresh produce from the farmer to the consumer (Shukla and Jharkharia, 2013). The AFSC has several key characteristics including: 1) short-life cycles, 2) time-sensitive prices, 3) high product differentiation due to domination by decentralized small to medium upstream producers and 4) seasonality effects (Bourlakis *et al.*, 2014; Kumar *et al.*, 2020; Nakandala *et al.*, 2017a; Orr *et al.*, 2018). These characteristics highlight the causes of information obstacles within AFSCs.

Few reviews have looked at information sharing in AFSC (see Kamble *et al.*, 2020; Lusiantoro *et al.*, 2018; Nakandala *et al.*, 2017b; Zhong *et al.*, 2017) and two gaps emerge. First, most studies of information sharing in AFSC have focused primarily on fruits, flowers and vegetables (Aggarwal and Srivastava, 2016; Anastasiadis and Poole, 2015; Tsolakis *et al.*, 2014). This has led to a limited understanding of information sharing of other perishable products.

Second, there is still limited understanding of these supply chains in emerging economies. Information sharing studies in AFSCs are primarily focused on developed economies (Banasik *et al.*, 2019; Gelderman *et al.*, 2020). While there has been an increase in studies in other emerging economies such as India (Aggarwal and Srivastava, 2016; Li *et al.*, 2017), more studies are needed (Fritz and Silva, 2018).

Recently, Lwesya and Achanta (2022) highlighted the inadequacy of studies focused on African AFSCs in general. The African context is relevant for the following two reasons: First, Africa is heavily dependent on agriculture, and it is a key driver of economic development, employment creation and food security (Kaneene *et al.*, 2015). Second, despite their importance, the AFSCs are currently facing challenges related to environmental concerns, information exchange, technology development, social issues and market access (Kabbiri *et al.*, 2018; Mercer, 2011; Ortmann and King, 2010).

To improve information sharing in the African AFSCs, and in emerging economies generally, it is important to explore, review and analyze the existing research in a critical and structured manner to identify the gaps and limitations of the available literature. Therefore, this study seeks to answer the following research questions by conducting a systematic literature review over a period of 21 years (2000–2021) in international peer-reviewed journals.

RQ1. What is the state-of-the-art of information sharing in AFSCs in Africa?

RQ2. What are the gaps and opportunities arising from existing literature of African AFSCs?

The purpose of the paper is to highlight information sharing in the African context and relate to existing theory.

The rest of the paper is structured as follows: section one introduces information sharing from a supply chain perspective to provide a comprehensive review framework. Section two discusses the systematic literature review on African AFSCs. We then discuss the findings in section three, and we conclude in section four with a research agenda to stimulate future research in the African supply chain context.

2. Background

2.1 Definition of information sharing

Information sharing is an important facet of supply chain management. The study adopts two definitions by Mentzer *et al.* (2001) and Hsu *et al.* (2008). Mentzer *et al.* (2001) defined information sharing as the willingness to make strategic and tactical data available to other members of the supply chain while Hsu *et al.* (2008) defined it as the extent to which crucial and/or proprietary information are available to the members of the supply chain.

2.2 Summary of the literature

There has been a number of reviews in information sharing showing tremendous growth in interest of information sharing research. For instance, in their review, [Sahin and Robinson \(2002\)](#) discuss information sharing with partial or full information in order to enhance coordination in supply chains. [Montoya-Torres and Ortiz-Vargas \(2014\)](#) incorporated collaboration in their information sharing review with emphasis on dyadic structure. We base our study on the review by [Kembro and Selviaridis \(2015\)](#), to construct the review framework for our study in the African context (as shown in [Figure 1](#)). We adopt the following four main dimensions identified in the review to inform our study.

- (1) The benefits expected when sharing information across the supply chain.
- (2) What type of information to share with whom (actor in the supply chain).
- (3) How to share information.
- (4) Antecedents, barriers and drivers.

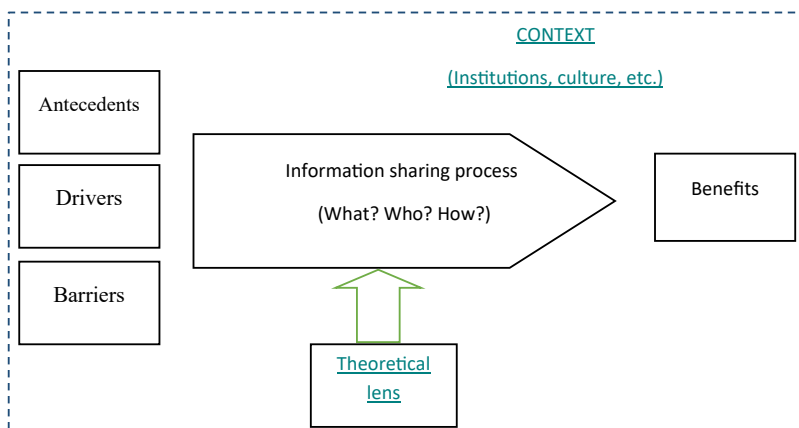
The paper adopts a two-phase approach. First, we review the information sharing literature using these four dimensions. In addition, we build from these dimensions and incorporate contextual factors. Secondly, we identify new emerging opportunities from the reviewed literature.

2.3 Information sharing benefits

Generally, implementing information sharing in supply chains successfully has potential benefits. In the context of AFSCs, through information sharing supply chains are able to respond quickly to new market opportunities and improve food safety and product quality ([Anastasiadis and Poole, 2015](#); [Tsolakis et al., 2014](#)). Despite these potential benefits, implementing information sharing is still a challenge because of various risks and costs and the focus seems to be on dyadic supply chains.

2.4 Information sharing process

Generally, studies in information sharing explore the types of information that should be shared (“what”), the role of specific supply chain actors (“who” is sharing information and “with whom”), and “how” information should be shared ([Kembro and Näslund, 2014](#)).



Source(s): Kembro and Näslund (2014)

Figure 1.
Literature review
framework

What – There are three types of information that can be shared: operational, tactical and strategic (Ahumada and Villalobos, 2009; Handayati *et al.*, 2015; Kembro and Selviaridis, 2015). Operational information is typically sales data, or demand information. Tactical information sharing is when actors share quarterly plans and forecasts. Finally, in strategic information sharing, actors share marketing strategies and one-year plans (Kembro and Selviaridis, 2015). Generally, most information sharing studies in AFSCs focus on operational information in both developed and developing regions, thus overlooking the implications of sharing tactical and strategic information (Tsolakis *et al.*, 2014).

Who–For a focal actor, the supply chain is usually divided into two main sections, i.e. characterized by interactions with suppliers (upstream section) and interactions with customers (downstream section). The number of different actors in these directions can have varying effects on information sharing within the supply chain. Table 1 draws from Kembro and Näslund (2014) to define the different types of units of analysis (the direction and the number of actors) generally considered in information sharing research from a supply chain perspective.

How–There are two methods generally used in information sharing: traditional methods and advanced communication methods (Carr and Kaynak, 2007). Traditional methods involve the use of telephone, written and face-to-face contact, while advanced methods include electronic data interchange (EDI) and recent technological advances such as the Internet of things (Barbieri *et al.*, 2021; Witkowski, 2017). The most frequently used advanced methods are barcoding and RFID (radio frequency identification), which capture data in food supply chains (Hu *et al.*, 2013; Trienekens *et al.*, 2012).

2.5 Antecedents, drivers and barriers to information sharing

Hsu *et al.* (2008) defined antecedents as the factors that must be in place to facilitate effective information sharing, e.g.e.g. information quality and information infrastructure. Drivers are the reasons that a firm adopts and develops information sharing practices (Giunipero *et al.*, 2012). While benefits are about outcomes, drivers are about the reasons to push towards information sharing.

Barriers are factors that hinder the adoption of information sharing practices by actors in the supply chain (Kembro *et al.*, 2014). Kembro *et al.* (2017) highlighted six barriers to information sharing in multi-tier supply chains: information utilization, technology utilization,

Unit of analysis	Definition	No. of firms
Dyad upstream (US)	Information sharing between the focal company and its suppliers	2
Dyad downstream (DS)	Information sharing between the focal company and its customers	2
Dyadic	Information sharing between buyer and supplier (without differentiating upstream and downstream relationships, i.e. no specific focal company in the relationship)	2
Dyad two-way	Information sharing between buyer and supplier (added because both parties were used to collect data)	2
Triadic	Information sharing between suppliers – focal company –customers (without differentiating upstream and downstream relationships)	3
Extended	Information sharing between more than three parties along the supply chain	>3

Source (s): Kembro and Näslund (2014)

Table 1.
Definitions of unit of analysis

power structure, culture, business processes and legal processes. Antecedents can become barriers if they are difficult to implement, especially in multi-tier supply chains (Kembro *et al.*, 2017). Most studies within AFSCs have tended to focus on drivers and antecedents (Bailey and Francis, 2008; Yigitbasioglu, 2010).

3. Literature review methodology

The literature review process was performed using the recommendations provided by Durach *et al.* (2017). They suggest six major steps for doing a systematic literature review within the SCM setting.

Step one: Define the purpose of the review.

The purpose of the study was to identify information sharing literature in African AFSCs. The theoretical framework that formed the basis of the review is based on Kembro and Selviaridis (2015). This was used to analyze and synthesize existing literature. The framework clarifies the scope, study context and definition of constructs.

Step two: Identifying the key inclusion and exclusion criteria.

This focuses on the content and quality of the studies. First, the article must be written in English. English is a dominant language in studies in SCM. Secondly, the search included papers from 2000 to 2021. Literature suggests that 2000 was the beginning of emergence of information sharing and agri-food supply chain studies (Kembro and Näslund, 2014; Routroy and Behera, 2017) while 2021 was the year of data collection. Thirdly, the search only included peer-review journals because of the high academic standards (Denyer and Tranfield, 2009). Finally, we focused the literature review on empirical research studies in African AFSCs because they capture contextual aspects and identify real challenges to information sharing (Kembro and Näslund, 2014). The three types of empirical research we focused on were: empirical qualitative, empirical quantitative and mathematical modeling (Durach *et al.*, 2017).

Step three: Retrieving sample of relevant literature.

We first conducted a keyword search on major databases (i.e. Web of Knowledge, SpringerLink, EBSCO, Wiley, Emerald Insight, Taylor and Francis and Elsevier Science Direct). The databases were chosen since they are large databases of business research and make it possible to perform searches simultaneously on different sources using search strings (Milian *et al.*, 2019). The keywords used were “AFSCs” OR “food supply chains” OR “perishable supply chains” AND “Africa”. In some cases, the actual country names were used after searching using the term “Africa”, e.g. “Kenya”. The search also included different combinations of the following keywords: (data, information, knowledge); (flow, share, transfer, exchange); (supply chain, supply network, supply channel, value chain and logistics) as used by Kembro and Näslund (2014). The results were filtered to articles published in peer-reviewed journals.

Step four: Select pertinent and exclude irrelevant literature.

Firstly, amongst the papers we retrieved, we added both the papers cited in the extant literature and subsequent papers gotten after citation searches and included them in our review. The search process resulted in 191 articles. Secondly, amongst the papers we identified, we filtered them to focus on perishable items alone (i.e. fruits, vegetables, horticulture and perishable animal products like milk and fish.). This process reduced the articles to 133. Thirdly, papers were checked for content that focused on supply chain issues. The papers were rejected or selected after checking the content. A review of each document’s article title, abstract and keywords resulted in a final total of 102 articles. We then conducted

an in-depth evaluation of the full text and excluded 49 articles because information flow was not central to the study. This led to a final sample of 53 papers. The distribution of identified articles and the journals and years are in the online [appendix](#).

Step five: Synthesize literature.

53 papers were entered into an Excel spreadsheet to perform a structured coding process. The spreadsheet contained a summary of each paper that included general information (i.e. title, author, journal and year) and the main features of the article, such as research method and unit of analysis. Using the recommendations of [Durach et al. \(2017\)](#), an analysis and synthesis of 53 articles was done. The articles were synthesized in the following steps as part of our review framework.

- *Study context*: Given the differences in supply chains in Africa and the developed economies, the context was defined as the type of agri-food produce studied in each article.
- *Research methods*: We classified each paper based on the research methods adopted in the papers.
- *Unit of analysis*: Following the approach recommended by [Kembro and Näslund \(2014\)](#), we analyzed the unit of analysis considered in each retrieved paper (see [Table 1](#) for the different units of analysis).
- *Data sources*: This refers to the specific supply chain tier/s data was collected from. For each article, the AFSC actor who provided the data was recorded.
- *Aspects of information sharing*: using the review framework previously described in information sharing section.

Step 6: Report the findings.

The final step presents the findings and their relation to each other, to develop the basis for our discussion and research agenda.

4. Findings

We discuss the major findings based on the information sharing process (i.e. The framework in [Figure 1](#)). [Table 2](#) below reveals major findings.

4.1 Benefits

Interestingly, we found that studies tend to highlight the more traditional benefits of information sharing. The major benefits were divided into local market access (seven articles) and export market access (four articles).

Local Market Access: Generally, studies show that information sharing is primarily used to enhance market access ([Ogotu et al., 2014](#)). Because supply chains tend to be fragmented, market access is important to help farmers overcome the high levels of unequal power and information asymmetry that they typically face. Farmers in Africa may access three market channels: supermarkets, large scale agri businesses and spot markets. Spot markets are mostly green grocers, national fresh produce and informal markets (i.e. hawkers) ([Louw et al., 2008](#)). Furthermore, access to spot markets requires that farmers acquire information from downstream supply chain actors.

Information sharing aspect	No. of articles	Literature
How	12	Aker and Ksoll (2016); Alhassan and Kwakwa (2012); de Sousa Jabbour <i>et al.</i> (2017); Furuoholt and Matotay (2011); Kabbiri <i>et al.</i> (2018); Minkoua Nzie <i>et al.</i> (2018); Mwakaje (2010); Ogunniyi and Ojebuyi (2016); Salia <i>et al.</i> (2011); Tadesse and Bahiigwa (2015); Temba <i>et al.</i> (2016); Van der Merwe <i>et al.</i> (2017)
What	11	Benard <i>et al.</i> (2018); Fassinou Hotegni <i>et al.</i> (2014); Henson and Reardon (2005); Hou <i>et al.</i> (2015); Karing’u <i>et al.</i> (2020); Mwambi <i>et al.</i> (2016); Neeliah <i>et al.</i> (2012); Ochieng <i>et al.</i> (2017); Tadesse <i>et al.</i> (2017); Tshiuza <i>et al.</i> (2001); Warsanga (2014)
Two or more	9	Abdulai and Birachi (2009); Arinloye <i>et al.</i> (2015); Chikuni and Kilima (2019); Elly and Silayo (2013); Kleemann (2016); Lwoga <i>et al.</i> (2011); Mapiye <i>et al.</i> (2020); Msoffe and Ngulube (2016); Ouma <i>et al.</i> (2010)
Who	7	Abebe <i>et al.</i> (2013a); Baumüller (2015); Brhane <i>et al.</i> (2017); Isaya <i>et al.</i> (2018); Msoffe and Ngulube (2016b); Nguetti <i>et al.</i> (2018); Phiri <i>et al.</i> (2019)
Antecedents (drivers and barriers)	7	Abebe <i>et al.</i> (2013a); Aleke <i>et al.</i> (2011); Ayalew and Abebe (2018); Henson <i>et al.</i> (2011); Kassa <i>et al.</i> (2017); Muriithi <i>et al.</i> (2011); Poole <i>et al.</i> (2003)
Why	7	Bernard <i>et al.</i> (2017); Fischer and Qaim (2012); Kariuki <i>et al.</i> (2012); Lemma <i>et al.</i> (2015); Muto and Yamano (2009); Oladele (2011); Ogutu <i>et al.</i> (2014)
Total	53	

Source (s): Authors own work

Table 2.
Major papers in findings

Export market access: Studies on export market access have tended to focus on the role of Global GAP (formerly EurepGAP) certification on African AFSCs (Henson *et al.*, 2011; Kariuki *et al.*, 2012; Kleemann, 2016). For instance, Kariuki *et al.* (2012) found that specification information through Global GAP standards (which requires maintenance in pesticides application and assessment of on and off farm handling practices) enhances market access.

4.2 What information is shared and with whom

We found that there are three types of information important in AFSCs, especially downstream: *Price, market and product specification.* We review them in the following two paragraphs.

Price and Market Information: We found that price and market information was usually shared together for small scale farmers (Komarek and Ahmadi-Esfahani, 2012). Market information is the location of the markets from the producer while price information fluctuates based on how far the market is from the producer (Karing’u *et al.*, 2020). The closer the producer is to the market, the lower the prices for the agri-foods and vice versa.

Product specification: Product specification was important when dealing with export market and local market (supermarkets and large agri-businesses). Farmers seek quantity information in kilograms and quality standards information so that they can export their produce (Henson *et al.*, 2011; Karing’u *et al.*, 2020; Muriithi *et al.*, 2011). Product specifications also reduced rejection rates by supermarkets and large agri-businesses (Ochieng *et al.*, 2017).

We found that the information shared was linked to what information was needed and from whom (Elly and Silayo, 2013; Lwoga *et al.*, 2011). This affected the source and utilization of the information. To map information needs, we looked at the data source in the studies. We found that most of the studies gathered data from one actor of the supply chain—the

individual farmers (households). These studies imply that a single focal actor's perspective was used to analyze the supply chain. This aligns with the findings of [Kembro and Näslund \(2014\)](#), suggesting that supply chain perspective continues to be limited. The major focus on farmers was because the studies are interested in alleviating their challenges. Further, farmers are crucial in enhancing food security. The major information needs of the farmers were productivity, access to farm inputs and market access ([Isaya et al., 2018](#); [Silvestri et al., 2021](#)). Since most information needs were examined from the farmers' perspective, the need was dependent on the location (country/region) and the specific agri-food ([Msoffe and Ngulube, 2016](#)). Specifically, the needs were affected by the country/region's development, agricultural activities (e.g. planting and harvesting) and agro-ecological conditions (e.g. altitude above sea level and annual rainfall) ([Lwoga et al., 2011](#)).

Data collected from exporting firms was the second highest single source gathered from one actor, see online [appendix](#). The major information needs of exporting firms were certification information shared between them and the buyer economies.

Who: We found that in Africa, a more interesting picture emerges. Specifically, it seems that there is a mix of information sources by either supply chain actors or members out of the supply chain boundary and sometimes both. Further, there isn't a clear definition of roles and responsibilities in information sharing that is unique to African context and culture. [Msoffe and Ngulube \(2016\)](#) found that information was mostly sourced from neighbors, extension officers and researchers. We build on the literature by suggesting that certain sources of information carry more significance to the end user than others when moving upstream. [Abdulai and Birachi \(2009\)](#) concluded that information from traders increased use of both verbal and written contracts.

4.3 How information is shared

Our key finding on how information is shared is that the traditional information sharing methods are still predominant. The most common traditional methods are mobile phones and face-to-face communication. The mobile phone is easily utilized in African AFSCs ([Aker and Ksoll, 2016](#); [Tadesse and Bahigwa, 2015](#)). While most papers highlight the importance of mobile phone use for information access among farmers, relative to other actors, e.g. traders, farmers are underutilizing this technology ([Kabbiri et al., 2018](#)). The second commonly used traditional information sharing method was face-to-face communication. [Elly and Silayo \(2013\)](#) found that most face-to-face information shared was through interpersonal communication and social gatherings.

4.4 Antecedents, barriers and drivers

In our review, the antecedents, barriers and drivers commonly considered were information and communication technology (ICT) and knowledge transfer issues. *Antecedents* mostly focused on ICT adoption. For instance, [Aleke et al. \(2011\)](#) finds that the factors that affect ICT adoption are the tribe and culture; the impact of social networks; the use, rate and context of ICT introduction; and the dissemination of information.

A frequently mentioned *driver* was collective action. Collective action is an intermediate organization governance that allows members (i.e. small scale farmers) connected through inter-business interactions to gain access to markets efficiently, e.g. farmers cooperatives ([Lamprinopoulou et al., 2006](#)). Because of the fragmented nature of African AFSCs, collective action is best way to market especially the farther away the farmer is from the market, as it does not require farmers to spend time seeking price and market information individually ([Abdul-Rahaman and Abdulai, 2020](#)).

Another key *driver* was the socio-economic status (i.e. education level, age, marital status) of the supply chain actors. We found that the most important predictor of using mobile phone

and face to face communication was socio-economic status. Specifically, a reason the more advanced technologies have not been fully embraced could be the education level of the actors. Most actors in the studies had only primary school level education (Elly and Silayo, 2013; Lwoga *et al.*, 2011).

The major *barriers* were related to relationships. Following the previously presented framework, we considered six units of analysis. In our review, dyadic relationships, primarily between a farmer and an actor upstream or downstream, were predominant, see online appendix. Studies on dyadic relationships tend to focus on improvements to the existing relationships because of their importance for market access. The buyer-supplier relationships between, for example, producer and trader is crucial in production and marketing of agri-foods. We also found that the unit of analysis of the supply chain affected how information was shared. The dyad enhances interpersonal communication between buyer and supplier, and mobile phone is a convenient way of sharing information within dyads.

Finally, the studies highlighted that there was a lack of relationship factors (e.g. trust and commitment). In sub-Saharan Africa there was typically weak enforcement of contracts between large retailers and agribusinesses and farmers because of lack of trust (Kleemann, 2016). Additionally, there is a lack of trust between supply chain actors because of lack of specification transparency (Ochieng *et al.*, 2017).

5. Implications to information sharing

5.1 Theoretical implications

The following sections highlight the implications summarized in a research agenda. Our findings have implications both for the general information sharing literature and literature on information sharing in AFSCs.

1. Context

There is a clear need for defining context and its influence on information sharing in supply chains (Yigitbasioglu, 2010). A number of studies highlight the importance of information sharing in different sectors and contexts in order to verify if the findings are similar (Capó-Vicedo *et al.*, 2011; Caridi *et al.*, 2010). The differences of the environment of the supply chain and the specific use of the information have an effect on studies on information sharing (Vanpoucke *et al.*, 2009). Incorporating the context allows for verifiability of findings of similar studies in other contexts (Karing'u *et al.*, 2020; Odongo *et al.*, 2017). This is because different contexts have different dynamics, for example, regulatory and behavioral differences (Ferdous and Ikeda, 2018; Ortega and Tschirley, 2017). For example, China introduced food safety laws in order to enhance food safety after various food poisoning scandals (Ortega *et al.*, 2012).

Given that prior work has highlighted the implications of context, understanding the African context enables practitioners and academics to understand the facets crucial to enhancing supply chain performance in Africa. African supply chain actors have different information needs. This difference in needs highlights the contextual differences between AFSCs in Africa and developed economies.

Future studies, especially quantitative, should incorporate theories like stakeholder theory or complexity theory to test relationships between information sharing and specific outcomes that are unique to the African context. Extant literature on the benefits of information sharing in the AFSC allows for multiple perspectives, for example, information reducing business risks and costs (Jraisat *et al.*, 2013) and improving strategic performance (Clements *et al.*, 2008; Rejeb *et al.*, 2021). Therefore, the specific outcomes in African AFSCs could be, for example, enhanced sustainability performance (e.g. enhanced food safety and reduction in food waste). This will give the information sharing research a more holistic lens on supply chain issues.

2. Supply chain structure

Our findings suggest that it is vital to underline key differences between emerging and developed AFSCs (Anastasiadis and Poole, 2015). African AFSCs are configured differently compared to developed economies. In developed economies there are more formal supply chains and fewer actors in the supply chain (Fischer, 2013). In emerging economies, informal supply chains are less transparent, more dependent on actors downstream and are farther away from markets (small scale farms are mostly in rural areas) (Arinloye *et al.*, 2015). There are more actors in African supply chain, specifically traders who are not in developed supply chains.

The differences we highlighted illustrate that it is crucial to understand the structure of supply chains and information sharing practices in the African AFSCs. Extant literature concludes that there are three important types of information that other actors of the AFSCs share with farmers: price, specifications and forecast demand (Nakandala *et al.*, 2017b). The sharing of specifications (especially in local markets) and forecast demand information has rarely been addressed in Africa because there is often no existing market for the farmers. Secondly, well-structured supply chains are usually shorter with less fragmentation. Thirdly, formal export-oriented AFSCs are different compared to informal local ones because they share all three types of information.

Crucially, understanding supply chain structure and information sharing could enhance traceability. Traceability reduces fragmentation between the many actors by enhancing supply chain efficiency (Dabbene *et al.*, 2014); can ensure food safety and quality (Hong *et al.*, 2011); and improves inventory management (Alfaro and Rábade, 2009). Therefore, future research can qualitatively explore the supply chain structure either as a barrier or antecedent to information sharing to help both academics and practitioners understand how to enhance it.

3. Relationships

More supply chains in emerging economies are moving from a spot market, with no or few relationships, to more modern supply chains with network coordination and long term commitments (Anastasiadis and Poole, 2015). Crucially, this transition means understanding how actors respond to actions of other actors, both in the physical and support supply chain. Carter *et al.* (2015) stated that the dichotomy between physical and support supply chains provides a better understanding of a supply chain. While the physical supply chain allows for movement of physical goods, the support supply chain (e.g. government and banks) supports the physical supply chain through dissemination of knowledge and finance. There is growing importance of the relationship between support actors and main actors in the overall supply chain.

It is important to understand the relationships and interdependencies among the supply chain actors to enhance supply chain performance. The performance outcome of supply chain actors depends on the nature of exchange patterns (Kataike *et al.*, 2019). Most actors prefer investment in long term business relationships and avoid transactional relationships, as seen in spot markets (Anastasiadis and Poole, 2015). In order to facilitate long term relationships, factors such as trust (Ji *et al.*, 2020) and power (Odongo *et al.*, 2017) must be in place. It is interesting to note that in Africa there is mistrust amongst certain supply chain actors. For example, farmers are unhappy with the level of integrity of the traders and traders are unsatisfied with farmers' produce causing mistrust (Owot *et al.*, 2022).

Relationships become more complicated as the unit of analysis moves from dyadic to extended and as more actors are added to the supply chain. There is limited but growing research on triadic and extended supply chain (Kembro and Näslund, 2014), despite the growing focus on multi-tier levels of analysis among SCM practitioners (Formentini and Romano, 2016; Govindan *et al.*, 2021).

Future research in Africa and other emerging economies should qualitatively explore information sharing and the relationship building factors in multi-tier supply chains, such as power and information sharing. Further, existing theoretical perspectives could be applied because they can explain and predict complex phenomena like information sharing (Carter and Rogers, 2008; Kembro *et al.*, 2014). For example, resource dependency theory could be used to study power imbalances between the supply chain actors and its effect on information sharing.

4. Product

As each agri-food has its own characteristics, studying the specific product is very important (Routroy and Behera, 2017; Shukla and Jharkharia, 2013). For example, red meat producers in sub-Saharan Africa are mostly pastoralists and not commercial farms as is typical in developed economies (Roba *et al.*, 2018). Moreover, specific products are of varying relevance depending on the region of study. In other words, different economies both produce and consume different agri-foods. For example, Asia is the largest producers of citrus fruits (Liao *et al.*, 2020) and Kenya has one of the highest consumption of milk per capita (Nderitu and Ndiritu, 2018).

Therefore, the more important the product is to the region, the more the supply chain actors attempt to enhance supply chain performance. In addition, consumers may be more aware about the food safety surrounding that product and demand varying levels of quality from the crucial supply chains (Ortega and Tschirley, 2017).

Future studies should draw from existing O&SCM theories to study all aspects of information sharing for different agri-food products. In our review, to our knowledge, we could not find any empirical study on information sharing in African AFSCs in top O&SCM journals, highlighting that more work is needed on these topics in operations and supply chain research. For example, incorporating social capital theory to study social connections between the actors to understand information sharing in a specific chain could bring new insights.

5. Culture

Our review highlights that more attention should be paid to the role of national culture. Supply chain actors tend to have common values when they come from the same culture. Extant literature shows that culture affects adoption of SCM practices, e.g. supply chain integration (Durach *et al.*, 2017; Durach and Wiengarten, 2020) and shapes communication styles (Lockström *et al.*, 2010).

Thus, academics need to understand African culture because it influences buyer-supplier relationships. Africans (like Chinese guanxi) have a more collectivist culture, which can enhance social and interpersonal communications (Kauppi *et al.*, 2018). Therefore, future qualitative studies should explore culture as an antecedent to information sharing in African AFSCs. Future quantitative studies could study the moderating effect of culture on information sharing and supply chain performance.

6. Technology adoption

Finally, we illustrate that the literature should focus on understanding how the adoption of various technologies can enhance information sharing in emerging economies. The type of technology adopted in information sharing is dependent on how the technology is used. Our review indicated that the most important uses of technology were social communication and sharing information. Mobile phones currently allow actors both to communicate information (i.e. checking on each other and families) and share information on supply chains.

Information sharing is more structured in formal supply chains and as such they tend to use more advanced information sharing techniques (Carr and Kaynak, 2007; Hsu *et al.*, 2008).

As supply chains are more fragmented in Africa, it is crucial to understand what technology might be effective in overcoming these barriers. Supply chains embrace more advanced technology as they move from less structured to more structured. Future research should study the application and effectiveness of such technologies within African supply chains. In developed economies, RFID enhances traceability in AFSCs particularly when processing/storage temperature comes into play (Costa *et al.*, 2013).

Consequently, future research could explore how traditional methods can be used effectively to enhance supply chain efficiency in AFSCs. Quantitative research (e.g. statistical analysis) can test relationships between mobile phones and factors like shelf-life reduction, quality monitoring and sustainability. Similar studies already exist on advanced methods (Gandino *et al.*, 2007, 2009).

5.2 Limitations and managerial implications

The paper has three key limitations. First, the review was based on a keyword search, which limits the results. All the research papers having the searched keywords may not have been reviewed. Second, the search was on perishable agri-foods and didn't extend to non-perishable e.g. maize which form a significant percentage of produce in Africa. Finally, the conclusions are drawn by considering peer-reviewed journal articles and excluded literature such as industry reports. However, this confirms the need for further studies to investigate information sharing in Africa.

Additionally, the study offers practical implications for managers by illustrating the differences in information sharing practices in the African context. This will allow for African practitioners to utilize information to make decisions within the uncertain environment they are in. The themes discussed above can help practitioners have a holistic view of information sharing.

Practitioners and supply chain actors must define the outcomes they would like to derive in the supply chain and assess whether information sharing could support it. For example, information sharing could reduce the fragmented nature of the supply chain based on the product and the region. Having multiple perspectives on the outcomes will enable actors downstream to collaborate and define the optimal benefit of the entire supply chain.

Supply chain actors and decision makers need to recognize the importance of national culture. The national culture in African economies will enable practitioners to match information sharing and the information needs to enhance performance. The understanding of the African world view will help expand our understanding of information sharing practices.

Supply chain practitioners should understand why traditional technologies tend to be adopted and determine ways to support the use of these technologies to enhance supply chain performance. As more producers move toward hubs and cooperatives, supporting the use of traditional methods of information sharing will help ensure high quality information is shared frequently. An example of this is the increased use of the mobile app WhatsApp to share supply chain information in real time as internet connectivity improves within the continent.

Lastly, the relationships between supply chain actors should be embraced by practitioners as they seek to navigate the challenges of information sharing in African AFSCs. Managers need to pay attention to existing relationships in order to enhance information sharing in an accurate, reliable and timely manner.

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Appendix

The supplementary material for this article can be found online.

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