Intermediate short food supply chains: a systematic review

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Abstract

Purpose – Intermediate short food supply chains (SFSC) have been presented as a possible solution to unsustainable global food supply chains. There is currently a knowledge gap about intermediate SFSC. Thus, this review synthesizes the available literature to identify prominent themes and their main considerations.

Design/methodology/approach – This research is based on a systematic literature review including peer-reviewed journal articles until December 2021. Inductive data coding resulted in the identification of four themes related to intermediate SFSC.

Findings – The identified themes illustrate the complex landscape intermediate SFSCs operate in and focus on the key relationships within these supply chains. The established relationships have implications for the governance of intermediate SFSCs. The organization of intermediate SFSCs affects numerous sustainability indicators.

Research limitations/implications – Future research should focus on the position intermediate SFSCs have in food systems and the roles intermediaries have in intermediate SFSCs. There is furthermore an opportunity for researchers to investigate different types of intermediaries and explore the factors influencing them.

Originality/value – Creating sustainable food supply chains is one of the major societal challenges of today. The current state of the art suggests that intermediate SFSCs could play an important role in achieving this. So far, this area is underdeveloped and this review highlights knowledge gaps in the literature and suggestions for a future research agenda are proposed.

Keywords Food systems, Food supply chain, Alternative, Short, Intermediary, Relationships, Governance, Sustainability

Paper type Research paper

1. Introduction

The desire to create a more sustainable food supply chain is a prominent topic in both research and practice. This has resulted in that many different types of sustainable solutions have been introduced in the literature. One of the solutions in the transformation of the global food supply chains focuses on creating new social initiatives grouped under the term alternative food networks (AFNs) (Cleveland *et al.*, 2014; Corsi *et al.*, 2018). There is no unified

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definition of AFN in the literature. Instead various definitions coexist where it is possible to distinguish common criteria (Tregear, 2011). According to Corsi *et al.* (2018) one of the first specific criteria to define a specific type of AFN is the length of the chain, or the number of intermediaries involved. Recognizing the local origin of food, is furthermore considered as a part of the alternative food movement (Renting *et al.*, 2003; Brunori *et al.*, 2016; Corsi *et al.*, 2018).

One type of AFN being discussed in the literature is the short food supply chain (SFSC). The main idea of SFSCs is the direct or closest possible relationship between the producer and the consumer, rather than solely an exchange of a product. The relationship involves the construction of knowledge, value and meaning about the product and its origin, production and consumption (Maciejczak, 2014). Marsden *et al.* (2000) propose three main types: Direct-to-consumer SFSCs, where consumers buy a product directly from the producer, allowing for authenticity and trust via personal interactions; Proximate intermediate SFSCs, where products are sold close to where they are produced and consumers are aware of the "local" nature of goods at retail level; and spatially extended intermediate SFSCs, where production and point of sale or not necessarily local, but information about the place of production, as well as the producer, is communicated to consumers. These SFSCs may create sustainability in the food system by their focus on economic sustainability, where the producers get more value for their products, social sustainability, where producers develop socially embedded relationships and environmental sustainability often calculated by shorter food miles and environmentally friendly production methods (Malak-Rawlikowska *et al.*, 2019). As the first form excludes all forms of intermediaries, the latter two include the involvement of intermediaries.

Direct-to-consumer relations have previously been regarded as a favourable solution to unsustainable global food supply chains. However, the disadvantages of direct-to-consumer supply chains are many; being in control of sales adds labor and marketing costs, limits scalability and may result in unreliable turnover for producers and limited supply for customers (Cembalo *et al.*, 2015). This is especially the case when customers are businesses in need of a high amount of produce, such as hotels, restaurants and catering (HoReCa), as well as public institutions such as schools and hospitals (Lehtinen, 2012; Cembalo *et al.*, 2015). Producers often provide insufficient attention to marketing strategy based on the characteristics of their territorial brands (Sellitto *et al.*, 2018). Neither do direct-to-consumer SFSCs address the interdependencies within the agri-food systems meaning food is largely processed, distributed and provided by intermediaries (Lamine, 2015).

Due to these disadvantages of direct-to-consumer SFSCs, researchers have changed their focus to intermediate SFSCs as a possible solution to create sustainable food systems. In fact, research recognizes an overall increase in sales through all types of SFSCs. However, sales via intermediate SFSCs make out the largest volume sold and market share compared to other direct SFSCs, where the number of producers might be relatively higher, the volume of sold produce and market share is low (Malak-Rawlikowska *et al.*, 2019; Plakias *et al.*, 2020). This is the result of producers in a specific region working together with intermediary organizations to provide the customer with a more diverse supply of products, therefore fulfilling customer drivers to purchase locally produced products (Galli and Brunori, 2013; Kneafsey *et al.*, 2013; Dimitri and Gardner, 2019; Golob and Kronegger, 2019; Cicatiello, 2020).

Even if research recognizes the importance of intermediate SFSCs, there is a lack of research specifically discussing this type of AFN. Research with regards to AFNs discusses a wide range of topics such as the different definitions and approaches that are used to define AFNs (Corsi *et al.*, 2018) and the sustainability dimensions of AFNs (Michel-Villarreal *et al.*, 2019), without going deeper into the specific types of AFNs, neither do they talk specifically about intermediate SFSCs. One systematic literature review (SLR) that did look closer into intermediate SFSCs was conducted by Dimitri and Gardner (2019) and discussed the farmer's

use of intermediated marketing channels from a farmer's perspective, while comparing the motivation of direct versus intermediated marketing channels. It furthermore had a sole focus on the US market, providing therefore a limited picture of intermediate SFSCs. An in-depth understanding of intermediate SFSCs could be seen as an important direction both for research and practice to provide an alternative to direct-to-consumer and global food supply chains.

A first step to fill this gap and understand the current state of the art in this field is by identifying prominent themes in the existing literature and investigates their main considerations. Based on that future, research directions can be proposed. Therefore, this review aims to synthesize the available literature with the purpose of providing the reader with an overview of prominent themes and their main considerations within intermediate SFSC literature. With that purpose, the following research questions have been designed:

(1) What are the prominent themes in the intermediate SFSC literature?

(2) What are the main considerations being discussed in these themes?

The remainder of the paper is structured as follows: in section 2 the authors explain the research methodology including a descriptive analysis of the selected journal articles, under section 3 a thematic analysis based on the content of the articles has been conducted resulting in four themes. Finally, section 4 provides conclusions and suggests future research directions.

2. Research methodology

As this paper focuses on food supply chains, within the supply chain management (SCM) discipline, this systematic literature review follows the six-step SLR methodology presented by Durach *et al.* (2017) (Table 1):

(1) Formulate the research question

(2) Determine the inclusion/exclusion criteria

(3) Retrieve the baseline sample of potentially relevant articles

(4) Apply the inclusion/exclusion criteria from step 2

(5) Synthesize the articles

(6) Report the results of the SLR

To answer the research questions, two researchers have worked closely together to provide a holistic overview of prominent themes and their main considerations within intermediate SFSC literature. This review addresses four prominent themes that have been identified from the sample and discussed in the content analysis. While other organizing themes exist, these were selected for their contribution to the understanding of the current state of the art of intermediate SFSCs and to expose future research directions. The contribution of this research comes at a time when scholars are increasingly focusing on intermediate SFSCs as a sustainable food supply chain solution, ensuring the timeliness and relevance of this research direction (Durach *et al.*, 2017).

2.1 Select keywords, determine and apply inclusion/exclusion criteria

To retrieve relevant articles related to intermediate SFSCs that can be subjected to review, the researchers selected relevant keywords after an initial scope of the literature. These keywords were adapted to fit the research questions and objectives. To include local or short

Step 1: Formulate a research question

- This review aims to synthesize the available literature with the purpose of providing the reader with an overview of prominent themes and their main considerations within intermediate SFSC literature. Research questions include

(1) What are the prominent themes in the intermediate SFSC literature?
(2) What are the main considerations being discussed in these themes?

Step 2: Determine inclusion and exclusion criteria

- An initial scope of the literature led to the selection of keywords "food supply chain", "food system" and "food network" as well as "local", "short" and "alternative" as well as "intermediate", "indirect", "mediated" and "middlemen"
- Purpose to include local or short food supply chains but exclude research regarding global or conventional food chains. As well as ensure a focus on intermediaries
- Sample has been limited to peer-reviewed journal articles in English
- Ensure relevance by selecting articles that include keywords that appear in title, abstract or keywords of articles
- Articles should have a discussion around intermediaries, even if not main focus

Step 3: Retrieve a baseline sample of articles

- Online databases Scopus and Web of Science have been used
- Keywords included in search string: (TITLE-ABS-KEY ("food supply chain*" OR "food system*" OR "food network*") AND TITLE-ABS-KEY ("local" OR "short" OR "alternative") AND TITLE-ABS-KEY ("intermed*" OR "indir*" OR "mediat*" OR "middlem*")
- Results Scopus: 190 articles
- Results WoS: 233
- Database alert set to inform researchers about potentially new relevant articles

Step 4: Apply the inclusion and exclusion criteria from step 2

- Remove duplicate articles and title and abstract assessment: 81 articles selected
- After full text assessment, focusing on the discussion around intermediaries in SFSCs, as described under step 2: 35 articles selected, final sample
- Database alert did not add any more articles to this sample during the time of writing

Step 5: Synthesize the articles

- Quantitative elements: year of publication, countries investigated, use of methodologies
- Qualitative elements: extracting themes from sample by using a thematic coding structure

Step 6: Report the results of the SLR

- Descriptive analysis explaining research context (Tranfield *et al.*, 2003)
- Thematic analysis generating findings by identifying and comparing differences and consensus in the different articles (Tranfield *et al.*, 2003)

Table 1.
Completion of the six-step SLR-methodology

food supply chains and to exclude research regarding global or conventional food chains, the authors created a search string including the keywords "food supply chain", "food system" or "food network" and "short", "local" or "alternative". Since these terms are not unique to this field and lead to a large variety of academic literature, they were combined with different synonyms and wordings. Finally, the keyword "intermediate", combined with different synonyms and wordings has been added to the search string. The different search themes and connecting words were linked together with the Boolean operator AND, to one search string. Inclusion criteria included articles discussing specific intermediate SFSCs, articles that mainly focus on direct-to-consumer SFSCs have been excluded. Even if the article does not solely focus on intermediaries, it should at least have a discussion around it as part of their results.

For this review, the authors retrieved articles from the Web of Science and Scopus databases. Both these online databases are considered among the largest and most widely used databases for bibliometric analysis and comprise a large number of scientific journals, books and conference proceedings which are selected through a thorough process of content selection followed by continuous re-evaluations (Singh *et al.*, 2021). Inclusion criteria from these databases included journal articles published in English, in peer-reviewed journals until

December 2021. This resulted in 190 results in Scopus and 233 in Web of Science. The authors removed all the duplicate articles and read the remaining abstracts using the same inclusion/exclusion criteria as mentioned before ensuring empirical relevant articles, leading to a selection of 81 articles. These 81 articles were read in their entirety to ensure a clear focus on intermediate SFSCs leading to a final selection of 35 articles that are included in this review. To ensure inclusion-criteria bias and selector bias, which are essential in SLRs (Durach *et al.*, 2017), the authors have individually applied the criteria when selecting articles and had continuous discussions around the relevance of certain articles.

2.2 Synthesizing and reporting

To synthesize and report the results, Durach *et al.* (2017) follow the recommendations of Tranfield *et al.* (2003) who adapted the previous SLR guidelines to the social sciences and management field. Tranfield *et al.* (2003) propose a descriptive analysis to explain the research context, followed by a thematic analysis where findings are generated by identifying and comparing differences and consensus in the different articles.

In accordance with this description, for the descriptive analysis, the main formal characteristics of each article were individually analysed (Tranfield *et al.*, 2003). This included the year of publication and the distribution across time, to investigate the development of interest in the topic. It included furthermore an analysis of the main journals in which the articles were published, to investigate the main subject fields in which the research topic appears. Finally, the research methods were analysed to determine the inductive and deductive approaches of the existing research, which tells us more about the maturity of the research field. As per Durach *et al.*'s (2017) suggestion, no selection of articles has been made based on their method. They state that all methods worthy of analyzing as an SLR in SCM can benefit from both empirical qualitative and empirical quantitative studies and from modeling research (Durach *et al.*, 2017).

The thematic analysis was conducted by analysing the content to identify prominent themes that contribute to answering the research questions (Tranfield *et al.*, 2003). Articles were synthesized using a qualitative coding structure focusing on terms such as "intermediary", "middleman" and "mediator" to ensure the article's focus on intermediaries in food supply chains. To ensure the focus was not on conventional food systems avoiding research that mainly targets global food supply chains, the authors looked for keywords such as "local food systems" or "local food supply chains" and "short food supply chains" and "alternative food systems" or "alternative food supply chains". The authors did not have any predefined themes in mind. Instead, authors made notes in an excel file of the key discussion points of the selected articles, from this file, four key themes emerged (inductive coding).

3. Research context

Even though research regarding SFSCs has been around for some time now, one can observe an increase in publications regarding intermediate SFSCs from 2014 and onwards, illustrating an increased interest in the field. The articles in the study sample have been published in 22 different scientific journals. Most subject fields of these journals include Social Sciences, Agricultural and Biological Sciences and Environmental Sciences.

The research methods of the articles were analyzed, identifying six different research methods. Qualitative research methods presented a clear preference in the articles (17), consisting of case studies (13) as well as interviews (4). Indicating the novelty of the research field by conducting inductive exploratory research (Gioia *et al.*, 2013). Around one-third of the articles (12) used quantitative methods including surveys and datasets. A minority of the articles preferred mixed methods (3) where the researchers combined qualitative and

quantitative methods, as well as multi methods (2) where researchers used multiple qualitative methods such as archival research, observation and semi-structured interviews. Only one article used the Delphi technique as a research method, a method suitable where no historical data exist or where these data are inappropriate when new influencing factors are expected (Shon and Swatman, 1998).

The review did not limit research based on geographical location. From the sample, with regards to single country studies, most published articles (11) had a focus on the US market, with France (5) and the UK (4) in second and third place. Five articles focused on multiple countries around the world, with a mix between developing and developed markets. European and North American markets are by far the most researched in this research field, with 25 articles of 35 total.

4. Findings

The thematic analysis of the included articles emerged into four themes, discussing the place of intermediate SFSCs in food supply chains, relationships within intermediate SFSCs, governance of intermediate SFSCs and finally the role of intermediate SFSCs in obtaining sustainability (Table 2). These themes are presented in full below.

4.1 Place of intermediate SFSCs in food supply chains

A SFSC can be conceived either as a physical distance or as a cognitive distance, based on the number of actors involved in linking production and consumption (Loconto *et al.*, 2018). In the variety of intermediate SFSCs, there are relatively new chains versus older established chains, producer versus intermediary chains and differences in terms of commercial versus more idealistic business orientations. There are furthermore differences within businesses, where the use of local resources is determined by the size, motivation and location of the individual producers (Maye and Ilbery, 2006).

Themes	Sources
Place of intermediate SFSC in food systems	(Benedek *et al.*, 2018; Brekken *et al.*, 2017; Brunori *et al.*, 2016; Chiffoleau *et al.*, 2016; Christensen *et al.*, 2019; Engelseth, 2016; Farmer and Betz, 2016; Ilbery *et al.*, 2004; Le Velly and Dufeu, 2016; Le Velly *et al.*, 2021; Leung, 2021; Loconto *et al.*, 2018; Malak-Rawlikowska *et al.*, 2019; Maye and Ilbery, 2006; Pesci and Brinkley, 2021; Plakias *et al.*, 2020; Stephens and Barbier, 2021)
Relationships within intermediate SFSC	(Badraoui *et al.*, 2020; Brunori *et al.*, 2016; Engelseth, 2016; Furman and Papavasiliou, 2018; Hingley *et al.*, 2010; Kraus *et al.*, 2014; Lamine, 2015; Le Velly and Dufeu, 2016; Le Velly *et al.*, 2021; Leung, 2021; Loconto *et al.*, 2018; Martinez, 2016; Maye and Ilbery, 2006; Mejía and García-Díaz, 2018; Pesci and Brinkley, 2021)
Governance of intermediate SFSC	(Badraoui *et al.*, 2020; Benedek *et al.*, 2018; Brekken *et al.*, 2017; Brunori *et al.*, 2016; Chiffoleau *et al.*, 2016; Ciliberti *et al.*, 2020; Lamine, 2015; Levidow and Psarikidou, 2011; Loconto *et al.*, 2018; Malak-Rawlikowska *et al.*, 2019; Mejía and García-Díaz, 2018; Rosol and Barbosa, 2021; Rysin and Dunning, 2016)
Role of intermediate SFSC in obtaining sustainability	(Benedek *et al.*, 2018; Brunori *et al.*, 2016; Furman and Papavasiliou, 2018; Kraus *et al.*, 2014; Lamine, 2015; Le Velly and Dufeu, 2016; Le Velly *et al.*, 2021; Levidow and Psarikidou, 2011; Loconto *et al.*, 2018; Malak-Rawlikowska *et al.*, 2019; Martinez, 2016; Mejía and García-Díaz, 2018; Plakias *et al.*, 2020; Pesci and Brinkley, 2021; Peterson *et al.*, 2022; Rosol and Barbosa, 2021; Rysin and Dunning, 2016; Zhang *et al.*, 2019)

Table 2.
Themes in articles reviewed

Many local producers do not take part in only one food chain but choose a hybrid form in which food chains combine global and alternative food chains when it comes to policies (Chiffoleau *et al.*, 2016; Ciliberti *et al.*, 2020), strategies (Filippini *et al.*, 2016), production processes (Trabalzi, 2007) and, distribution channels and technologies (Le Velly and Dufeu, 2016; Stephens and Barbier, 2021). Brunori *et al.* (2016) speak of a local-global continuum in which you can find actors who participate in a plurality of configurations. Within alternative food chains producers of local food use either direct-to-consumer SFSCs or intermediate SFSCs, using intermediaries (Engelseth, 2016). A SFSC usually comprises two characteristics namely, a reduction in the number of intermediaries and a reduction in the number of food miles covered. Often the literature describes SFSCs as including a maximum of 0–1 intermediary (Ilbery *et al.*, 2004; Chiffoleau *et al.*, 2016; Le Velly and Dufeu, 2016), grouping direct sales with sales via retailers such as shops and restaurants (Chiffoleau *et al.*, 2016). This leads to the literature treating direct and short chains as synonymous, merging direct sales into the same analytical category as mediated sales through a store, restaurant, food hubs or other middlemen (Rogers and Fraszczak, 2014).

Practically, in the creation of more sustainable supply chains, individual producers participate simultaneously in multiple global and alternative chains, creating a mix of supply chains (Loconto *et al.*, 2018; Malak-Rawlikowska *et al.*, 2019). This combination of global and alternative food chains are classified by some as "hybrid" food supply chains (Brunori *et al.*, 2016; Le Velly and Dufeu, 2016). Participating in multiple supply chains can be seen as a risk-sharing and diversification strategy of producers (Benedek *et al.*, 2018; Loconto *et al.*, 2018). It benefits producers by creating the possibility to choose from a complex market offer that would satisfy different consumers' expectations and societal needs. By selecting different chains, producers can mitigate risks concerning their (perishable) supply (Le Velly and Dufeu, 2016; Malak-Rawlikowska *et al.*, 2019).

The producer's choice of supply chain depends on multiple factors including, individual's history, heritage and size of production (Farmer and Betz, 2016), their type of products (Maye and Ilbery, 2006) and the extensiveness of their production process and distance to end consumer (Estevez *et al.*, 2018). When there is a large difference in size and numbers between producers and processors or retailers, producers tend to use intermediary organizations, such as cooperatives, wholesalers and importers, which help with consistent availability, facilitating communication, food safety assurance and issues of quality control (Christensen *et al.*, 2019). Cooperatives play a key role in facilitating the access to the market of small producers (Brunori *et al.*, 2016). Collaboration with intermediaries is furthermore desired in facilitating the access to market of small producers (Brunori *et al.*, 2016), especially when the network of producers is isolated and fragmented from the point of sale (Mejía and García-Díaz, 2018). Despite this advantage, some research shows that smaller producers are more inclined to use direct supply chains, while larger producers are more dependent on the use of distributors and therewith choose intermediate supply chains (Brekken *et al.*, 2017).

Intermediate SFSCs fulfill an important place in food systems. Intermediaries in SFSCs can create sustainability in supply chains by better connecting existing supply and demand, even when producers and consumers are isolated and fragmented, as well as creating supply and demand in new markets (Le Velly *et al.*, 2021; Pesci and Brinkley, 2021). The latter is the case for specialty products as well as agro-ecological products (Maye and Ilbery, 2006; Loconto *et al.*, 2018; Pesci and Brinkley, 2021). Intermediaries can generate consumer interest for different types-as well as sustainable products and motivate producers to grow specific products (Pesci and Brinkley, 2021). They function as actors creating and developing local networks, bringing together stakeholders in the region who support the market (Kraus *et al.*, 2014; Loconto *et al.*, 2018). They are needed to scale up local markets, as well as expanding

markets beyond the capabilities of individual producers, while at the same time maintaining proximity with consumers in wider markets (Levidow and Psarikidou, 2011).

To increase competitiveness in food systems, intermediaries can function as providers of a range of services within intermediate SFSCs (Loconto *et al.*, 2018). Examples of services could be packing, distributing, or shipping local products to consumers through traditional supermarket channels, restaurants, or institutions. They can be brand responsible for the marketing and promotion of specific products of associated stakeholders (Kraus *et al.*, 2014; Pesci and Brinkley, 2021). Resulting in moving higher volumes of local food along the supply chain, while allowing producers to spend more time managing the farm and scaling up production (Martinez, 2016). In intermediate chains actors share commitment to social, environmental and/or economic values. They are dedicated to providing high quality, regional food to consumers. The wide variety of functions intermediaries can fulfil in SFSCs is interesting for mid-scale producers, who often are too big to sell via direct-to-consumer SFSCs but too small to be competitive on their own compared to industrialized large-scale producers (Chiffoleau *et al.*, 2016).

4.2 Relationships in intermediate SFSCs

The interdependencies between actors within the food systems, including short food supply chains, should be observed (Lamine, 2015). How local producers interact in the supply chain with other actors, can affect the overall effectiveness of local food supply. This involves both vertical and horizontal integration, where local food suppliers have responsibilities for products as well as service offering (Engelseth, 2016). SFSCs can be seen as hybrid collectives combining humans and non-humans, meaning other organizations and forms of governance including policymakers, affecting these supply chains (Le Velly and Dufeu, 2016). Mediations in the supply chain are not solely influenced by professionals, but also by consumers and volunteer coordinators (Le Velly and Dufeu, 2016; Leung, 2021; Schoolman *et al.*, 2021).

SFSCs are functioning because of market devices such as charters, contracts, customer satisfaction surveys, actions, checks, Internet sites and so on (Le Velly and Dufeu, 2016). These devices cannot all function by focusing on local or alternative actors but could use functions from global food supply chains thus leading to hybrid food supply chains (Brunori *et al.*, 2016; Le Velly and Dufeu, 2016). Some discuss a form of embedded markets, where a new market is created within an existing dominant market, as a response to a variety of market failures. For example, where the market does not efficiently allocate goods and services between producers and consumers. Within these markets, different actors are working together in horizontal relationships operating within their own organizational structures (Maye and Ilbery, 2006; Loconto *et al.*, 2018). Collaborative supply chains can work together in a diversity of fields. In the context of logistics, horizontal collaborations are developed to compensate for the lack of distribution systems for moving local food into mainstream markets (Martinez, 2016; Badraoui *et al.*, 2020). In these collaborative supply chains, trust and commitment influence relationship specific investments in land, buildings, equipment and human resources. Sharing resources such as production and storage facilities, sharing information and diversifying tasks result in a positive performance for the supply chain and help expand local food sales (Martinez, 2016; Badraoui *et al.*, 2020).

The relations between groups of stakeholders are different depending on the actors involved. Relations between retailers and processors are mostly modular meaning they exchange products based on pre-designed specifications (Brunori *et al.*, 2016; Le Velly and Dufeu, 2016). Relations between producers and intermediaries or processors, as well as direct relations between producers and consumers are relational, resulting in frequent and intense interaction (Brunori *et al.*, 2016) and are therewith build around verbally based relation (Maye and Ilbery, 2006). Close personal relationships are reasons for repeating an economic

transaction (Pesci and Brinkley, 2021) and contractual agreements between producer and their customers (both business as well as private) could create security for the producer and supplier (Hingley *et al.*, 2010; Le Velly and Dufeu, 2016). The personal relationships of producers with customers, especially when prioritizing civic engagement, can lead to the creation of new markets by connecting to new community groups, food businesses and entities such as schools and creating interest in buying local food (Schoolman *et al.*, 2021). In some cases, relationships can also be captive, when a buyer imposes standards on small producers (Brunori *et al.*, 2016), this could be the case with institutional buyers such as local schools (Christensen *et al.*, 2019). As well in supply chains with unpredictable outputs and highly perishable merchandise that requires strict observance of the chain and rapid consumption (Le Velly and Dufeu, 2016). The relationship conditions of local food supply chains could be simple, involving only a few levels of actors, i.e. producers, intermediary and customer or consumer. However, in the larger field of local food aggregation, relationships might become more complicated as intermediaries may buy from other intermediaries, while larger-scale, institutional buyers lack the ability (and potentially the interest) to connect directly with producers (Furman and Papavasiliou, 2018). Since SFSCs are formed through direct market connections, the survival of central intermediaries is dependent on their connections with all stakeholders (Pesci and Brinkley, 2021). Moreover, the social embeddedness of intermediate SFSCs is important for the development of sustainable food systems and the long-term survival of all stakeholders (Pesci and Brinkley, 2021; Schoolman *et al.*, 2021).

The promotion of food, the creation of relationships as well as the level of collaboration intensity relies on the level of trust between all stakeholders. The higher the trust and commitment the more likely dependence on the relationship arises (Kraus *et al.*, 2014; Badraoui *et al.*, 2020; Leung, 2021). Trust can be obtained through certification of food (Kraus *et al.*, 2014; Leung, 2021). However,certification alone is not enough to establish trust and create an effective supply chain. Commitment, reliability, personal connections and transparency among the different stakeholders is key in establishing trust, creating good collaborations resulting into an effective supply chain (Kraus *et al.*, 2014; Brunori *et al.*, 2016; Engelseth, 2016; Badraoui *et al.*, 2020; Leung, 2021). Positive experiences in collaborations between all stakeholders enable the sustainability of these social connections reinforcing the sense of trust in these relationships. When trust has been established, it leads to economic transactions reinforced through continuity, even in times of crisis (Pesci and Brinkley, 2021).

4.3 Governance of intermediate SFSCs

As previously mentioned, in intermediate SFSCs the interdependencies between actors in the supply chain should be observed. High levels of collaboration in which information exchanges and coordination is required in successful governance of the supply chain (Lamine, 2015). Both internal governance and external governance can be identified. Internal governance focuses on transactions between firms within the chain, while extended governance refers to the distribution of duties and rights between the firms and stakeholders in a broader sense, including civil society and institutions (Brunori *et al.*, 2016). Public administrations and civil society organizations set the regulatory context, enforce quality controls and can apply pressure on producers to increase their sustainability performance (Brunori *et al.*, 2016).

Intermediate SFSCs and global supply chains have different governance structures (Benedek *et al.*, 2018). Governance structures refers to the way transactions are organized within the supply chain (Benedek *et al.*, 2018), as well as the way it regulates the stability of material and information flows (Brunori *et al.*, 2016). The need to decrease transaction costs leads to adapted governance structures from a continuum with vertical integration and spot

markets, where producers participate short-term and non-contractual and coordination is mainly based on prices, as the two extremes (Brunori *et al.*, 2016; Benedek *et al.*, 2018). Within food systems, generally the longer the supply chain the higher the vertical integration (Benedek *et al.*, 2018) and the shorter the supply chain the more horizontal integration and governance structure is (Badraoui *et al.*, 2020). SFSCs tend to have short term, non-contractual participation while global supply chains require contractional participation (Brunori *et al.*, 2016; Benedek *et al.*, 2018). Education level of producers, investment plans and preference for supply chains with or without contractual commitments affect government structure. Lower educated producers tend to choose global supply chains with vertical integration (Benedek *et al.*, 2018). Long term contractual commitment was the main reason for producers to take part in global supply chains as it promises stability and the purchase of larger quantities at a time (Malak-Rawlikowska *et al.*, 2019). Small producers are more inclined to take part in horizontal integrated governance structures, while larger producers tend to use distributors in more vertical coordinated governance structures (Brekken *et al.*, 2017). Where there is a large difference in size and numbers between producers and processors or retailers, governance is often enforced through intermediary organizations (Brunori *et al.*, 2016). These intermediary organizations play a key role in facilitating the access to the market of small producers (Brunori *et al.*, 2016; Benedek *et al.*, 2018). In SFSCs the different types of governance structures should however not be regarded as a single homogeneous governance structure (Benedek *et al.*, 2018).

Functioning internal governance in intermediate SFSCs allows retailers to procure from producers directly, regroup different supplies and thus offer a wide range of produce that they knew the origin of and about which they were able to explain the methods of production to consumers (Chiffoleau *et al.*, 2016). To ensure the satisfaction of the local consumers, actors in intermediate SFSCs should organize governance and management teams including both internal and external supply chain actors, including local policy makers as well as producers and consumers (Chiffoleau *et al.*, 2016). By collaboration between stakeholders, greater control over marketing and distribution can be realized in the supply chain (Rosol and Barbosa, 2021). Successful governance structures ensure fair distribution of costs and benefits among all involved stakeholders. It furthermore facilitates access to external resources while preserving the product identity and local resources (Brunori *et al.*, 2016; Badraoui *et al.*, 2020).

Different stakeholders can be involved in the governance of intermediate SFSCs. The literature identifies consumer driven, producer driven, or external intermediary driven intermediate SFSCs. Overall, the driving actor is responsible for leadership tasks including organizing the supply chain collectively and democratically. It is responsible for collaboration processes, seeking to create networks between producers and customers as well as facilitating knowledge exchange and a facilitator of creation of markets (Levidow and Psarikidou, 2011; Loconto *et al.*, 2018; Rosol and Barbosa, 2021). In the case of consumer driven intermediate SFSCs the governance of the supply chain is initiated and executed by a group of individual consumers. They connect producers to customers by certification and forms of memberships and require a high level of involvement in daily operations from consumers (Loconto *et al.*, 2018; Leung, 2021).

Producer driven intermediate SFSCs tend to have a strong horizontal collaboration where producers exchange products and information as well as resources including joint usage of production- and distribution capacity (Badraoui *et al.*, 2020). The collaboration allows producers to navigate the complex regular context set by public administrations and civil society and decrease the uncertainty faced in this institutional context (Ciliberti *et al.*, 2020). As well as strengthen the individual producers' weak position, compared to industrial producers, in the supply chain, especially when production is specialized and investments are high (Hingley *et al.*, 2010; Engelseth, 2016; Ciliberti *et al.*, 2020). Despite the intensity of these

collaborations, producers maintain their autonomy and competition persists among partners (Ciliberti *et al.*, 2020).

Even though previous forms of governance may show great potential, keeping control of the supply chain in the hands of either a group of producers or consumers can be held back by channel and network disconnection (Hingley *et al.*, 2010). External intermediaries can fulfill an important role in SFSCs not only as market intermediaries, where they actively organize the market exchanges and provide a physical market space, but also as service providers within the supply chain (Loconto *et al.*, 2018). If organized well, external intermediaries can differ from global supply chains, where they are social enterprises with social objectives such as conserving farmland, supporting local producers and improving low income community access to local fresh foods (Rysin and Dunning, 2016).

The level of involvement of intermediaries in SFSCs can differ. In simple forms of governance an intermediary, including non-governmental organizations, individuals, or producers, are responsible for governance of the supply chain. These stakeholders are mainly responsible for setting up a physical market space where products can be exchanged. Other service functions might be provided, but the main purpose is providing space for product exchange. To encourage product diversification the intermediary connects different producers to the market (Chiffoleau *et al.*, 2016; Benedek *et al.*, 2018; Loconto *et al.*, 2018). More advanced forms of intermediate SFSCs could include forms where the intermediary can play an important role in ensuring consistent availability of products, as well as aggregation of products, facilitating communication and collaboration between different stakeholders in the supply chain, marketing through various channels, food safety assurance and quality control and associated administrative and accounting functions (Rysin and Dunning, 2016; Christensen *et al.*, 2019).

4.4 Role of intermediaries in obtaining sustainability in intermediate SFSCs

The sustainability and resilience of agri-food systems are often discussed by either sustainable development, focusing on interactions between agriculture and the environment, or by relocalization, i.e. by closer connecting producers to consumers. The sustainability indicators in the sample focusing on intermediates in SFSCs are mostly discussed from an economic, social and environmental perspective. From the sample, one article focuses on progress towards sustainability in a holistic manner (Brunori *et al.*, 2016) and only one article focused on measuring sustainability performance indicators (Malak-Rawlikowska *et al.*, 2019). To encourage and enforce sustainability of SFSCs and the realization of sustainable development goals, extended governance assumes a key role. Public administrations and civil society organizations develop policy instruments, enforce quality controls and can exert pressure on firms to focus on sustainability performance. They can furthermore identify how support for SFSCs may be targeted to further reduce their environmental impact (Brunori *et al.*, 2016; Malak-Rawlikowska *et al.*, 2019).

4.4.1 Role of intermediaries in obtaining economic sustainability in intermediate SFSCs. Of all the SFSCs, intermediate SFSCs are good for the highest turnover and market volume, resulting in 66% of all the sales through SFSCs (Malak-Rawlikowska *et al.*, 2019; Plakias *et al.*, 2020). The main economic motivations for producers to take part in SFSCs are to be able to have control over their pricing and being able to ask for higher prices for their produce (Levidow and Psarikidou, 2011; Benedek *et al.*, 2018; Furman and Papavasiliou, 2018; Malak-Rawlikowska *et al.*, 2019; Rosol and Barbosa, 2021).

Actors involved in the creation of SFSCs have several challenges to overcome to ensure the economic sustainability of the value chain, i.e. regulations, competences within the value chain and access to financing. Collaborations by using intermediaries can lead to

intensification of the value chain through different collaboration schemes (Kraus *et al.*, 2014) and increase the access to financing (Jarzebowski *et al.*, 2020). Intermediaries can influence traded quantities and prices that are dependent on factors such as transportation costs and the individual producers' ability to manage market alternatives (Mejía and García-Díaz, 2018). By working with intermediaries, producers can enable market devices such as contracts, financial transactions and on-line functions necessary to make their supply chain function (Le Velly and Dufeu, 2016). Intermediaries in SFSCs furthermore ensure timely payments to local producers (Peterson *et al.*, 2022). By participating in intermediate SFSCs a stability in price fluctuations is accomplished, this leads to an increase in profit attributed to productivity advantage and farm size expansion rather than as a result of price premiums or cost savings (Zhang *et al.*, 2019).

The lack of distribution systems for moving local foods into mainstream markets, as well as the high perishability of certain food products has increased the need for collaborative supply chains to market local food. Here intermediaries play a role in facilitating distribution for local producers by using global distribution channels (Le Velly and Dufeu, 2016; Martinez, 2016; Mejía and García-Díaz, 2018).

In direct-to-consumer SFSCs, producers who focus on environmentally more sustainable production methods can be more economically viable, partly through these direct sales which gain higher prices, especially for quality products (Levidow and Psarikidou, 2011). However, without the involvement of any intermediaries the producer is responsible for production, processing and marketing, resulting in overall productivity decrease. These sustainable production methods replacing external inputs with local resources and producers' skills, as well as the need for development of closer relations with consumers has led to the need for intermediaries to expand local markets, beyond the capability of individual producers (Levidow and Psarikidou, 2011; Rosol and Barbosa, 2021).

Intermediaries can create demand in the market and connect existing supply and demand, while maintaining proximity with consumers in wider markets. They also create hybrid markets, something in between global and direct-to-consumer chains, as a necessary means to reach more consumers (Levidow and Psarikidou, 2011). By acting as an agent between global and direct-to-consumer chains, intermediaries are able to bridge the scale differences between small and midsize producers, as well as the volume and product standardization requirements of grocery stores, institutional organizations and restaurants, allowing local producers access to a larger market (Rysin and Dunning, 2016). Depending on the complexity of the market, an intermediary could organize the market exchanges, production and training services, as well as educational and research programs, for all actors involved in the value chain. Here socio-cultural exchange is a part of the value of the market (Loconto *et al.*, 2018).

4.4.2 Role of intermediaries in obtaining social sustainability in intermediate SFSCs. Socially embedded relationships are higher in direct-to-consumer SFSCs compared to intermediate SFSCs (Malak-Rawlikowska *et al.*, 2019). However, socially embedded relationships in the intermediate SFSCs tend to involve joint problem solving arrangements that allow for easier exchange of feedback, the development of innovative solutions and faster processes of problem correction in the chain (Pesci and Brinkley, 2021). These advantages play an important role in influencing the self-assessment of bargaining position in the chain which affects the position in the chain, the extent to which different actors can influence decisions, the level of trust towards all chain participants as well as relations to other producers and to customers (Malak-Rawlikowska *et al.*, 2019).

The labor-to-production ratio in SFSCs reflects the number of hours worked in respective chains in sales and distribution processes that include preparing products for transportation, loading, transporting and selling by producers. In all SFSCs the ratio is much higher compared to global food chains. In direct-to-consumer SFSCs, products are usually individually packed for final consumers which requires much more time for preparation

of delivery, in addition producers are responsible for sales to the final consumer. Also, in case of direct-to-consumer SFSCs where the final customers come to the producer themselves, thus not involving transportation by the producer, servicing the customer may also be producers' time consuming. In intermediate SFSCs these functions are taken over by the intermediary, thus allowing the producers to focus on the production processes (Malak-Rawlikowska *et al.*, 2019). Generally, SFSCs benefit gender equality in agri-food systems, where a greater engagement of women in sales through SFSCs may be noticed (Malak-Rawlikowska *et al.*, 2019).

4.4.3 Role of intermediaries in obtaining environmental sustainability in intermediate SFSCs. Local food production and SFSCs are generally linked to environmental sustainability alternatives to the global food supply chains. The environmental sustainability in intermediate SFSCs can be investigated by looking into sustainable farming practices or measured in food miles and carbon footprint (Lamine, 2015; Sellitto *et al.*, 2018; Malak-Rawlikowska *et al.*, 2019; Schoolman *et al.*, 2021). However, when it comes to production methods, unless producers are focused on organic food production and landscape conservation (Kraus *et al.*, 2014), previous research does not show a clear link between local food and sustainable farming practices (Sellitto *et al.*, 2018; Schoolman *et al.*, 2021). Food miles is an indicator used to measure the distance that food travels from where it was produced, to the end-consumer (Malak-Rawlikowska *et al.*, 2019). On average food miles for direct-to-consumer SFSCs were more than three times greater compared to global food chains, due to the relative low volume each consumer purchases at a direct-to-consumer SFSCs, compared to the high volumes moved in global distribution systems (Malak-Rawlikowska *et al.*, 2019). The environmental sustainability indicator carbon footprint (CFP) expresses the amount of CO2eq emitted to the atmosphere as an equivalent of greenhouse gases (GHP) calculated per 1 kg of the product (Malak-Rawlikowska *et al.*, 2019). Like relations for food miles per kilogram of products, the value of carbon footprint for SFSCs is larger than for global food chains, although the difference between CFP is much less. This is because, while consumers contribute to food miles, they drive small cars that consume relatively less fuel, so their contribution to CFP for short chains is less significant (Malak-Rawlikowska *et al.*, 2019). In both cases of food miles and CFP sales via intermediate SFSCs provides a solution by coordinating sales and distribution channels (Levidow and Psarikidou, 2011; Malak-Rawlikowska *et al.*, 2019; Rosol and Barbosa, 2021).

5. Conclusion and future research directions

Shortening the supply chain by creating direct-to-consumer SFSCs has been presented as a solution to create sustainable food supply chains. Still, these types of supply chains overlook the interdependencies in food supply chains and the fluctuating demand, as well as the fragmentations and isolations of both consumers and producers in the landscape. Collaborations with intermediaries in SFSCs are desired for overcoming these barriers and facilitating the access to market for small and medium-sized producers. A change in focus from direct-to-consumer to intermediate SFSCs can be observed after 2014. Around this time, the increase in purchases at intermediate SFSCs led to an increase in interest in this topic by academics, illustrated by the increased number of published articles. However, our review shows fragmentation in the literature with a wide variety of considerations as well as journal outlets. Nevertheless, we were able to identify four relevant themes providing a holistic overview of the intermediate SFSC literature: the place of intermediate SFSCs in food supply chains, relationships in intermediate SFSCs, governance in intermediate SFSCs and the role of intermediate SFSCs in obtaining sustainability in the supply chain.

According to the literature, one of the main purposes of SFSCs is to link production and consumption more closely, by creating durable relationships between producers and

customers or consumers. Intermediate SFSCs have been presented as a solution to overcome the limitations of direct-to-consumer SFSCs. They provide solutions in different scenarios where food is perishable and food networks are fragmented and where producers lack the capability of accessing and controlling the market successfully, due to their size, products, financial status, or educational background. The intermediaries involved in SFSCs often share the same commitment to sustainability factors as producers, customers and consumers in these types of chains.

However, even though literature recognizes both direct-to-consumer and intermediate SFSCs as separate entities, these types are often being discussed in the same category, grouping together direct-to-consumer sales with sales via intermediaries. This overlooks the unique position intermediaries have in intermediate SFSCs and the function they can fulfill in SFSCs. Future research directions should focus more on this position intermediate SFSCs have in the overall food supply chain and highlight strengths and weaknesses which could guide practitioners in the development of these types of supply chains. Furthermore, the diversity of intermediate SFSCs is an underexplored area. There is an opportunity for researchers to look deeper into different types of intermediate SFSCs and explore the success factors influencing them. The outcome of this research could help practitioners and policy makers to develop suitable types of SFSCs in a specific region.

Literature illustrates the complex landscape, involving many direct and indirect stakeholders, intermediate SFSCs operate in. The mediations in these supply chains are influenced by both human actors, as well as by non-human actors. The relationships with these stakeholders are often non-contractual and based on trust. The success and existence of intermediaries in SFSCs are dependent on these relationships. The specific role of intermediaries in the SFSCs and the interpersonal relationships between the stakeholders in the supply chain, also affect the supply chain governance. Generally, the shorter the supply chain the more horizontal integration and governance structure, where large producers take part in contractual vertical integrated supply chains and small producers in non-contractual horizontally integrated supply chains. Challenges in supply chain governance can occur by channel and network disconnections. Here intermediaries can fulfill an important role in creating and maintaining markets and providing services to all network stakeholders.

Currently, the way in which the intermediate SFSCs relationships are created and by whom they are initiated remains underdeveloped in the literature. It would be valuable to understand to what extent intermediaries act as network creators. Research should focus on the drivers and barriers creating regional, national and international intermediate SFSCs, where close personal relations between actors remain. It should furthermore focus on understanding how relationships and trust can be created and maintained in an intermediate SFSC network where food is being distributed outside of the region of origin or even imported and exported (spatially extended).

Literature discusses sustainability in SFSCs by looking into environmental, economic and social sustainability factors. There is however no clear consensus on whether a direct-to-consumer or intermediate SFSC is the more sustainable option, as both have different favorable sustainability indicators and neither of them ensure sustainable production methods. In the case of direct-to-consumer SFSCs, the food miles are much higher compared to global supply chains due to the low volumes moved, here intermediaries provide a solution by aggregating or assembling products from different producers and then selling further to consumers, reducing overall food miles.

Regarding economic sustainability, the literature suggests intermediate SFSCs as a solution for local producers to scale up their production, but it is unclear how they can be scaled up and most of all, who is responsible for doing it. Producers often lack the time, skill, or resources to make the necessary changes and fear losing their autonomy if the responsibility shifts to third-party actors. Here, close collaboration with intermediaries

holding the same values and commitment will contribute to expansion in wider markets beyond the capability of individual producers.

Social sustainability in the research sample is mainly presented through the social embeddedness of relationships in the supply chain. Other perspectives of social sustainability such as labor conditions, accessibility to market for minority groups and more, are underexplored by the current literature. Future research should focus more on the sustainability indicators and to what extent intermediate SFSCs create sustainability in the food supply chain. It is even essential to compare these chains with other SFSCs and global food supply chains to reach valuable conclusions.

Overall, the research sample has some geographical limitations as most of the literature focused on European and Northern American countries. With other regions being underrepresented, this could be a reason for the one-sided results presented in the themes. Research should be conducted in different countries with different prerequisites to obtain a more complete overview of the themes related to intermediate SFSCs. Finally, there is a lack of comparison between the different types of SFSCs and the comparison to global food supply chains would provide the literature with valuable recommendations.

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