



Utrecht University

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**TASKFORCE!
KORTE
KETEN**

SUSTAINABLE FOOD TRANSITION THROUGH COLLABORATIVE SHORT FOOD SUPPLY CHAINS

**A STRATEGIC COLLECTIVE
SYSTEM BUILDING APPROACH
FOR STRENGTHENING THE
INNOVATION ECOSYSTEM OF
SHORT FOOD SUPPLY CHAINS
IN THE NETHERLANDS**

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Executive Summary

The global food industry is arguably unsustainable and damaging for the environment. Considering the estimated increase in global population and urbanization in coming decades, it is clear that the food system requires structural reforms. Collaborative short food supply chains (SFSCs) are proposed as a possible solution by governments, academics and entrepreneurs.

This research focusses on a strategic collective system building approach that enables a sustainable transition of the food system. In order to create positive social, environmental and economic impact, scientist argue that sectors should move beyond competing on sustainability standards and towards more collaborative process approach. The Taskforce Korte Keten (TKK) aims to do this by implementing the Gain transition model, which is based on network formation and strategic niche management by using gamification principles. Since the approach of the Gain transition model is new, flexible, collaborative and different from the conventional models, it is a challenge for SFSC companies to collaborate and implement such a strategic sustainability innovation. The objective of this research is to understand the market transformation of the SFSC sector in terms of strategic collective system building, and find out how the TKK can implement the Gain transition model in a credible manner.

First this research provides insights on how to facilitate the coordination of national collaboration between SFSC actors, by visualising the SFSC landscape within the Netherlands through a structural system analysis including relevant actors, institutions and networks. The actor analysis is presented within an [interactive map](#) to create a clear overview of relevant actors for collaboration. Furthermore, empirical data showed that the SFSC sector is currently moving towards the market transformation phase of institutionalization and adoption of a sustainability strategy. In addition, the TKK established a network of SFSC actors and retrieved a mandate of the ministry of Agriculture, nature and food safety to act and implement the Gain transition model to support the development of the SFSC sector.

Subsequently, through the collection of empirical evidence via 21 interviews, 13 collective system building activities are presented for the credible implementation of the Gain transition model. These activities are divided over four cluster. First the cluster of *coordination activities* need to be focussed on. In the beginning of collaborations the focus should be on informal mechanisms of coordination. Through creating a shared vision, defining common goals, and system orchestration, it is important to communicate this within the network. Second the cluster of the *technological optimization and development* of a Blockchain platform, facilitating the exchange and development of knowledge and data on SFSC products and services based on the Sustainable Development Goals themes. Furthermore, this exchanging network among SFSC initiatives can facilitate the co-creation of products and services, and the sharing of consumer information, in order to improve the competitive advantage of SFSCs within the food system. Third the cluster on collective activities to improve *the market creation* of SFSCs can occur through collaboration with the government for enabling legislations and retrieving financial and network support, creating transparency within the food system and executing the niche market approach. The last cluster of collective activities is related to diffusing the SFSC values within the society through community building, to *support socio-cultural changes*. Referring to the activities of changing the education system, consumer behaviour and the political agenda.

To conclude, these strategic collective system building activities function as a guideline for the TKK and collaborating parties to launch and implement the GAIN transition model. In order to implement this model in a credible manner more collaboration among short food supply chain actors is needed within the SFSC sector. The national entity TKK shows to be a promising vehicle to accomplish the orchestration of these collective system building activities, in this way support the formation of a strong SFSC ecosystem.

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1. Intro:

Due to the unsustainable character of the global industrial food industry, it has been argued that a transition towards more sustainable and city region-oriented food economies is needed (Wiskerke, 2015). The realization of local food systems and short food supply chains (SFSCs) has been proposed as a promising agricultural approach to deal with these challenges (Kneasfey et al., 2013). According to Wiskerke (2015), a city region-oriented food system “[...] is the most appropriate level of scale to develop and implement an integrated and comprehensive solution for a future proof urban food system” (p. 15). SFSCs and decentralized food networks “would democratize the food industry by dispersing small food hubs across the globe, bringing food production to regional communities. Minimizing the gap between consumers and producers is a critical step towards an environmentally and economically sustainable food system” (McNamara, 2016).

There are a multiple trends within the SFSC field, varying from specialty stores at the farm, recreational local food concepts, farmer markets and care farms (van der Schans, 2018). According to counting of NLTO, there are over 3.000 farmers selling their local products to consumers, varying from a stand at the farm to professional specialty stores (NLTO, n.d.). One specific trend within the SFSC field is the emergence of regional food hubs, organizations that serve as a marketplace for local food networks, connecting farmers and consumers in a city region. According to Visser et al. (2017), it is important to combine city functions to food production and the crux is to form regional wholesalers that distribute locally grown food. Two notable examples of regional wholesalers for the metropolitan area of Utrecht in the Netherlands are Local2Local and Willem & Drees (Haenen et al., 2018). In total, the Netherlands is home to a few dozen regional food hubs, each serving locally grown food to customers in specific city-regions.

To prevent any confusion one working definition for SFSCs will be defined, since there are many definition within the literature of SFSCs. Starting with the working definition that is applied for SFSCs by the European Agricultural Fund for Rural Development (EAFRD), which is formulated as follows:

“A short supply chain means 'a supply chain involving a limited number of economic operators, committed to cooperation, local economic development, and close geographical and social relations between producers, processors and consumers’” (EAFRD, 2013).

Even though this definition includes many aspects of SFSCs, the retail, logistics and distribution of locally grown foods in short supply chains is missing. The concept of ‘local food system’ by Kneasfey et al. (2013) provides some guidance, being defined “as those where the production, processing, trade and consumption of food occur in a defined reduced geographical area (depending on the sources and reflections, of about 20 to 100 km radius)” (Kneasfey et al., 2013, p. 12). This definition is very similar to the idea of ‘city regions’ as food system, as described by the RUAF Foundation (Haenen et al, 2018). Moreover, it has been argued that the transition towards shorter supply chains in the agrifood system is built upon two premises; re-localisation and re-connection of food economies (Kneasfey et al., 2013). In other words, reducing the physical distance from farm to plate and the number of intermediaries in the supply chain, as well as traceability of food to connect the consumer and producer, strengthening the economic and social relationship (Augère-Granier, 2016). Other terminologies to achieve the goal of shorter food chains include local food systems, decentralized food networks, city farming, regional food economies, alternative food networks, and direct sales strategies. Concluding, the following definition will be used when referred to SFSC within this research:

“Short food chains are used as a means for making the connection between farmers and citizens, between city and rural areas. They stand for a fair price for the farmer, healthy and accessible food for citizens, an agricultural system that is in balance with the ecology and guarantees and creates employment, supporting the transition towards a circular and sustainable food system”.

In recent years, it has become clear that there is a need for national collaboration among short food supply chain actors in the Netherlands, for instance by connecting regional food hubs to distribute locally grown produce more effectively. Realizing the need for a national collaborative environment for local food distribution, previous named examples are founding partners of a project called ‘Taskforce Korte Keten’ (TKK). This initiative has flowed out of the ‘Transitiecoalitie Voedsel’ (TcV), a growing coalition of more than 150 front runners in the Dutch agriculture, food, nature, and health sectors, working together to transition towards a sustainable food system. The TKK is an initiative which attempts to connect regional food hubs and other SFSC stakeholders, enabling collaborative SFSCs on a national level.

The project started in July 2018 and is now in the development phase, since the first regional meetings have been realised and various short chain farmers and initiatives have registered for specific collaboration programs. There are still many aspects needed to be investigated or set-up to accelerate the process of collaboration and formation of an SFSC ecosystem. For these reasons this research focusses on a strategic collective system building approach that enables a sustainable transition of the food system. The Taskforce Korte Keten (TKK) aims to do this by implementing the Gain transition model, which is based on network formation and strategic niche management by using gamification principles. To clarify, gamification principles are certain processes learned from successful game designs, which can be used for influencing behaviour and increasing engagement. Since the approach of the Gain transition model is new, flexible, collaborative and different from the conventional models, it is a challenge for SFSC companies to collaborate and implement such a strategic sustainability innovation. The objective of this research is to understand the market transformation of the SFSC sector in terms of strategic collective system building, in order to find out how the TKK can implement the Gain transition model in a credible manner. The main research question can now be formulated:

In what way can a national entity facilitate the collaborative efforts among SFSC actors to strengthen the innovation ecosystem?

In order to successfully facilitate collaboration between SFSC actors, it is useful to have an overview of these SFSC initiatives, so that linkages can be made. Hence sub-question one is formulated to support the main research question: *How is the innovation ecosystem of SFSCs shaped within the Netherlands?* Furthermore, to give strategic advice on market transformation phases, the various phases of the SFSC sector will be elaborated upon. Therefore, formulated in sub-question two: *How can the market transformation phases of the SFSC sector be described through strategic collective system building?* Finally, to give advice on the findings the last sub-question entails: *What strategic collective system building activities are needed to implement the Gain transition model in a credible manner?*

2. Theory

2.1 Innovation systems and transition theory

Within the transition literature sectors (e.g. food production, energy supply) are conceptualised as socio-technical systems. These systems consist of multiple interrelated and dependent networks of actors. In this research area sustainability challenges have become the main focus for the socio-technical transitions, which are long-term transformation processes that shift socio-technical systems towards sustainable ways of production and consumption (Musiolik et al., 2012). In connection to the multi-level perspective, SNM views transitions from three domains; the landscape, regime, and niche. The macro-level socio-technical landscape is “an exogenous environment beyond the direct influence of niche and regime actors” (Schot & Geels, 2008, p. 545). It contains deep cultural patterns, macro-economics and macro-political developments. Changes in this level occur slowly, over several decades. Next, a patchwork of regimes represents the meso-level, which consist of relatively stable, large-scale systems such as the dominant food, transport, or energy industries. These socio-technical systems also refer to social routines and belief systems as well as regulative rules and normative roles. Summarily, the regime can be seen as the dominant environment in relation to market conditions, societal perception, and governmental regulations. In this thesis, the socio-technical system is considered to be one regime, namely the agri-food incumbency. It is common knowledge that many socio-technical systems are currently unsustainably organized, such as the energy and food industries. Sustainable innovations aim to change this status-quo. However, these innovations are often confronted with resistance and disadvantageous selection environments because these novelties are commonly not yet technologically and/or economically competitive with existing technologies in the socio-technical system. Hence, sustainable innovations are known as ‘hopeful monstrosities’, since they are perceived as promising technologies, yet need to progress performance and affordability, quite a challenge in a normal free market environment (Geels & Schot, 2007, Grin et al., 2010). Widespread diffusion of this innovation is therefore not likely without some special regulations in a protective niche (Schot & Geels, 2008; Smith & Raven, 2012, Vezzoli et al., 2008). This is why the last multi-level perspective domain, the micro-level of niches, is essential for the adoption of sustainable technologies, and the focus of this thesis.

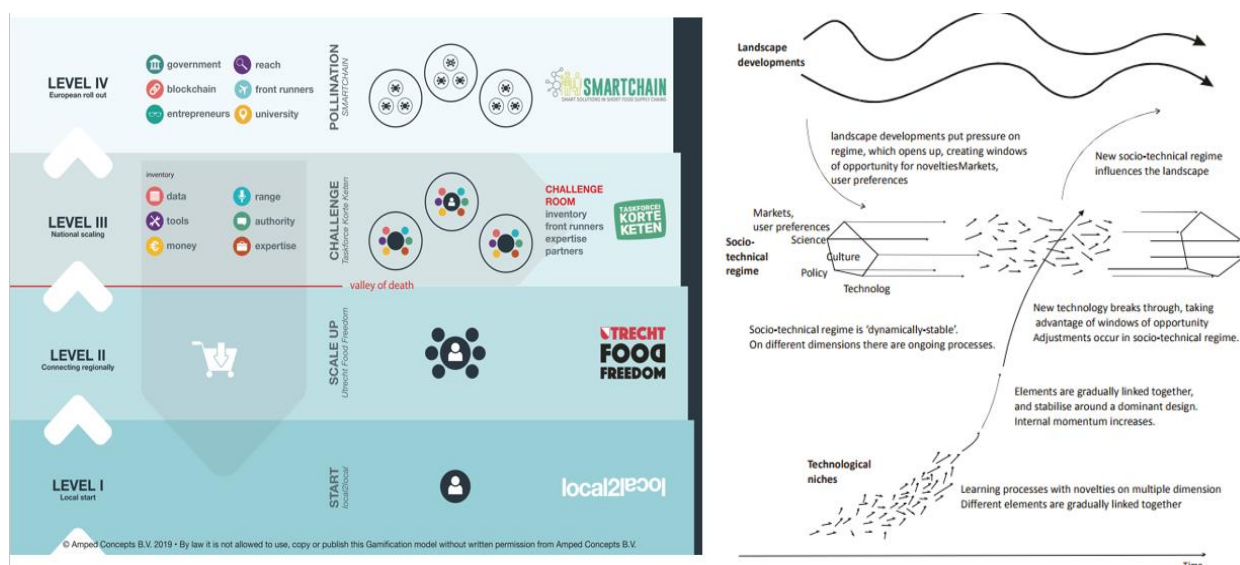


Figure 1 Gain transition model by Amped (left), Multi-level perspective model (right)

Part of the transition literature is the strategic niche management (SNM) literature which divides the socio-technical system in three levels: the landscape, socio-technical regime and niche level (Schot & Geels, 2008). Additionally, the SNM uses the niche market perspective in the context of evolving sustainable technologies to create societal transitions (Kemp, Schot, & Hoogma, 1998; Schot & Geels, 2008). These SNM levels (right in figure 1) are similar to the levels within the Gain transition model created by Amped (left in figure 1). SNM literature aims to explain and steer sustainable technologies to achieve societal transitions by focusing on creating protective niches. Via shielding, nurturing and empowering processes, the niche can be protected from the dominant environment, allowing the innovation to mature and challenge the socio-technical regime. By creating shared visions, sharing experiences, and forming actor networks among stakeholders, successful niche development can occur (figure 2).

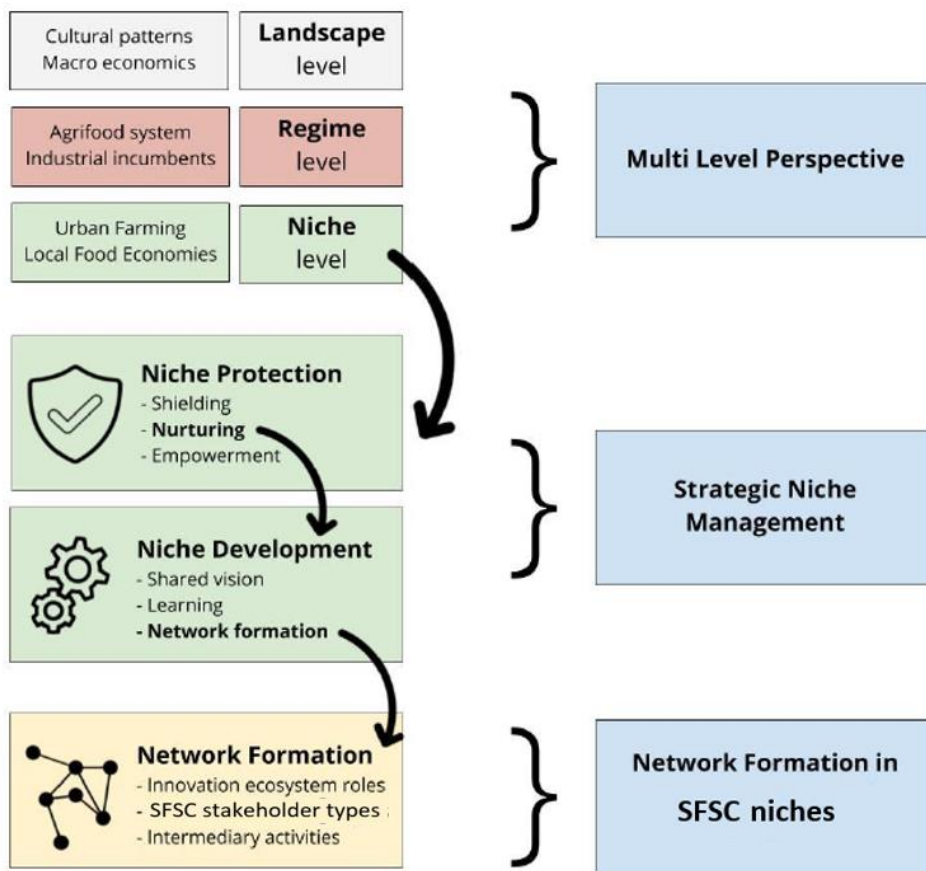


Figure 2 Unpacking network formation processes through SNM's niche protection literature. Nurturing can be seen as niche development, of which network formation is the main focus in this research (created by Menno van Ginkel)

Having consulted SNM literature to provide a brief overview of protected spaces and key elements for successful niche development, next section will extend further on the need to form networks and realize collaborative relationships among niche actors. Since SFSC niches require a multidisciplinary team of stakeholders (Milicic et al., 2017; Goddek et al., 2015; Freisinger et al., 2015), gaining insights in the creation and arrangement of these innovation ecosystems is valuable as it can contribute to develop the emerging market niche.

It is well known that a diverse, collaborative actor network is required to stimulate the diffusion of an innovation (Caniëls & Romijn, 2008; Dedehayir et al., 2016; Moore, 1996). Planko (2018) has provided an overview of various approaches for system building in relation to strategic management literature. This list includes the business ecosystem perspective, which argues that “an individual business is

merely a part of the business ecosystem it operates in; the health of the business ecosystem determines the success of the individual firm” (Planko, 2018, p. 45). However, Planko (2018) states that literature about the establishment of a thriving business ecosystem is lacking. Dedehayir et al. (2016) have conducted research towards the genesis of *innovation ecosystems*, defined as actor networks characterised by a diverse set of stakeholders that collaboratively work towards innovations. Understanding the genesis of these collaborative ecosystems is important for the involved stakeholders, as the formation of these networks may fail to come into existence due to a lack of resources, activities and favourable conditions (Dedehayir et al., 2016). Dedehayir and Seppänen (2015) argue that the ecosystem's creation phase is marked by two sub-phases: invention and start-up. During the invention sub-phase, the innovation is discovered, tested and premieres the first demonstration of the technology's operation, while in the start-up sub-phase the technology shows its first commercial application. Respectively, these phases are similar to the technological and market niche phases found in SNM, illustrating the compatibility of the innovation ecosystem concepts. The literature regarding innovation ecosystems is a valuable addition to SNM, because it provides more concrete insights to the underlying processes that enable network formation in niche development.

Dedehayir et al. (2016) present an overview of several key roles for stakeholders in an innovation ecosystem, grouped together in four separate classifications. First, leadership roles, which are indispensable for genesis, ensures ecosystem governance, the creation of partnerships, and the distribution of value. Second, direct value creation roles, which refers to stakeholders that collectively deliver, assemble and use key components, products or services. Third, value creation support roles, which can provide fundamental knowledge or are specialized in forming connections between stakeholders to help realize the ecosystem. Last, entrepreneurial ecosystem roles, which facilitate and support the creation of ventures in the ecosystem. Each category contains several specific role

Leadership	Ecosystem leader <i>ecosystem gov. forging part. platform man. value man.</i>	decipher roles attract & link partners build platform	coordinate interactions create collaboration open platform decipher bases of value	orchestrate resource flows stimulate complementarity orchestrate complementors create & capture value
	Dominator			integrate actors
Direct Value Creation	Supplier			supply components
	Assembler			assemble components
	Complementor			provide complementarities
	User	define need	provide ideas	purchase and use
Value Support	Expert	generate knowledge	provide expertise	transfer technology
	Champion		build connections	provide access to markets
Entrep. Ecosystem	Entrepreneur	co-locate	set-up network	
	Sponsor	give resources	co-develop offering	link to other actors
	Regulator	provide favorable conditions		
<div>Preparation Formation Operation</div>				

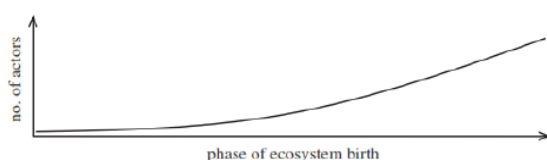


Figure 3 Innovation ecosystem genesis roles (Dedehayir, 2016)

SFSC in the Netherlands is already formed, the roles that contribute to the operation of the innovation ecosystem (leader, dominator, supplier, assembler, complementor, user, expert, champion and sponsor) have an explicit focus in this thesis.

typologies, which various stakeholders can enact over time. For instance, the important role of ecosystem leader is commonly occupied by universities or governments in the early stages of ecosystem formation, when the emerging niche is characterized by uncertainty and technological infancy that can prevent private stakeholders from investing efforts in the ecosystem. In time, when market opportunities are more developed and less risky, this role might transition to another actor.

Within figure 3 the various groups and roles are presented, as well their contribution in various phases of the innovation ecosystem formation process. Since the innovation ecosystem of

2.2 Market transformation and collective system building activities

The process of going beyond using standards as a means to become more sustainable and towards a more collaborative approach towards sustainability is described by Simons (2015) in his market transformation model for systemic change in the agricultural sector. He observed that markets that are in a state in which negative feedback loops of failing market and governments exist, perform certain action-reaction patterns (Simons, 2015). To overcome these negative feedback loops, he designed a market transformation process with four phases that subsequently improve the sustainability outcomes of a market (see Figure 4)(Simons, 2015):

- **1. Awareness and project phase:** A crisis or innovation will raise general awareness about the sustainability issues in the sector and creates room for first responses by the sector. Companies react by implementing small projects individually;
- **2. First mover and competition phase:** First movers gain a competitive advantage by implementing sustainability strategies. Other companies follow and standards are being implemented, after which a competition on standards emerges;
- **3. Critical mass and institutionalization phase:** The impact of standards and individual strategies are minimal and companies join in non-competitive collaboration on neutral ground. The interconnectedness, 'connectability' and trust increases and a clear vision and roles and responsibilities are laid out. Also, government joins in (see capitol illustration in Figure 4);
- **4. Level playing field phase:** From collaboration to legislation and making the new strategies the industry norms. Government will codify the input of the industry, laggards will need to follow. This is not an end phase, as the process will start over again with a new innovation or crisis that triggers change.

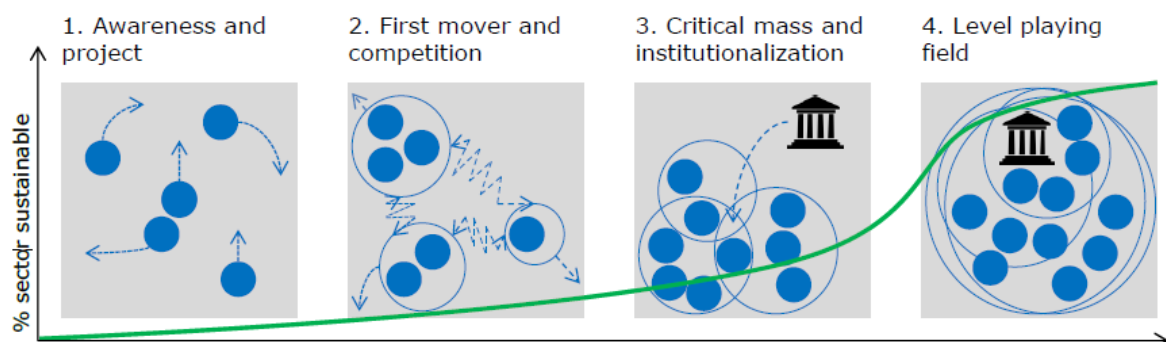


Figure 4 The market transformation curve with four distinct phases (Simons, 2015)

While going through these phases, the level of sustainability increases, known as the market transformation curve (Simons, 2015). Phase 3, as described by Simons (2015), of moving beyond standards and going towards more collaboration and institutionalization is also found in strategic management literature. According to strategic management literature, companies collaborate in networks or clusters to compete with other technologies and need to invest in changing the business ecosystem in which they operate (Planko et al., 2015). According to van de Ven's theory on 'entrepreneurial infrastructure' (1993), companies should develop their own strategy, but also need to collaborate with other actors in the global value chain in order to build an infrastructure that fosters a fast diffusion of the technology. This includes market consumption, institutional arrangements, resource endowments and proprietary activities (van de Ven, 1993). Through this collaboration, the technology is more likely to become successful (van de Ven, 1993, 2005).

Strategic management literature is mostly firm – and therefore micro – focused. Planko et al. (2015) argue that as strategic management literature does not offer insights into building the supportive external environment, it needs to be complemented with insights from innovation studies. They argue that firms need to collaborate in order to change the business ecosystem or the meso/macro level of

the system. According to Geels (2002), this includes changes in society such as user practices, industrial networks and regulation. In order to describe sustainable socio-technical change, namely “a structural re-orientation of economic activity towards sustainability” (Hekkert & Negro, 2009, p. 584), an innovation systems approach can be used (Hekkert & Negro, 2009). Innovation systems can be defined through Freeman’s (1987) definition as: “...networks of institutions, public or private, whose activities and interactions initiate, import, modify, and diffuse new technologies” (recited from Hekkert & Negro, 2009, p. 585). Innovation systems comprise of a number of agents, relations and institutions, see Appendix II for the structural analysis framework.

To describe sustainable socio-technical change systems that focus on the development, diffusion and implementation of a particular technology, technological innovation systems (TIS) literature can be used (Bergek, Jacobsson, Carlsson, Lindmark, & Rickne, 2008; Hekkert, Suurs, Negro, Kuhlmann, & Smits, 2007). This approach also takes into account the dynamics in an innovation system (Hekkert et al., 2007). TIS can be defined as: “a network or networks of agents interacting in a specific technology area under a particular institutional infrastructure to generate, diffuse, and utilise technology” (Carlsson & Stankiewicz, 1991, p. 94). Within TIS literature the process of changing a business environment is explained in the term system building, defined as “the deliberate creation or modification of broader institutional or organizational structures in a technological innovation system carried out by innovative actors. It includes the creation or reconfiguration of value chains as well as the creation of a supportive environment for an emerging technology in a more general way.” (Musiolik, Markard, & Hekkert, 2012, p. 1035). The technological innovation systems literature offers many practical examples and frameworks of various technological innovation systems.

By combining technological innovation systems literature and strategic management literature, Planko et al. (2015) were able to build a strategy framework that enables entrepreneurs to effectively change the business environment so that their innovation will become successful. According to Planko et al. (2015), this co-creation of a business ecosystem can be strategic and is thus formulated as strategic collective system building (SCSB), defined as “the strategic activity of networks of entrepreneurs and entrepreneurial managers to build up a supportive environment and infrastructure for their innovative sustainability technology” (Planko et al., 2015, p. 4).

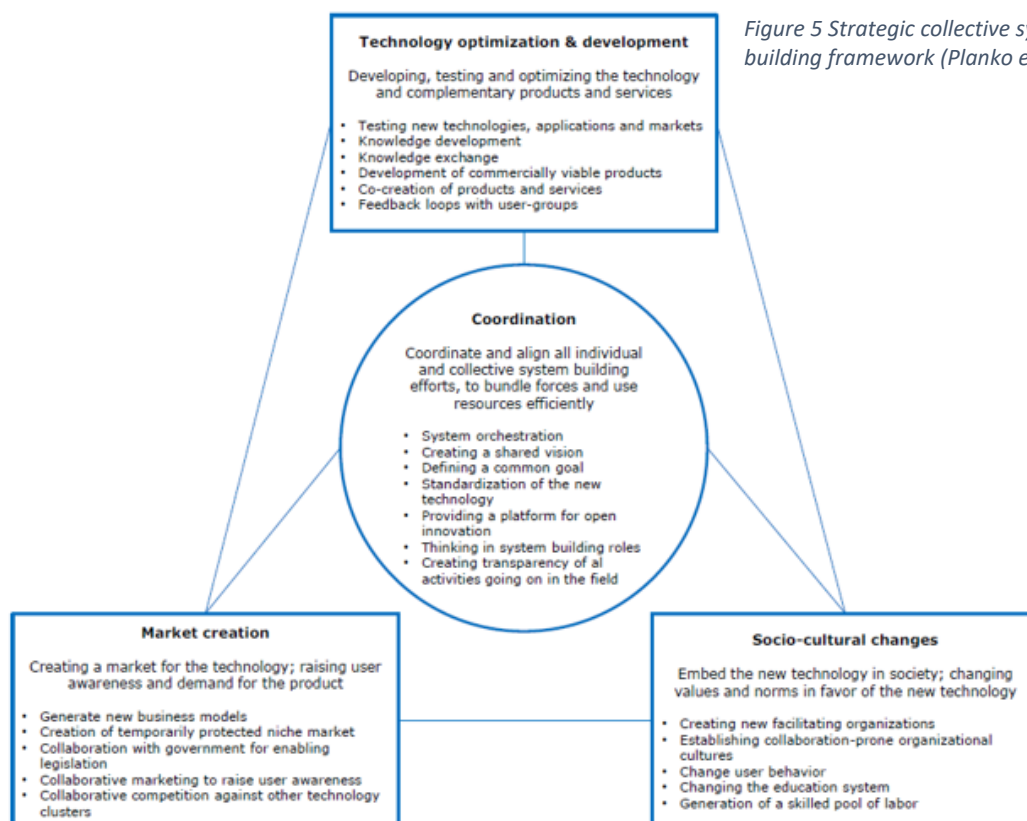


Figure 5 Strategic collective system building framework (Planko et al., 2015)

The development of a strategic collective system is comparable to the development within the SFSC system that is currently moving towards more collaboration in the sector through the work of Taskforce Korte Keten (TKK). Therefore, the strategy framework of Planko et al. (2015) might be of use for the development of a credible implementation strategy for the TKK. The strategy framework of Planko et al. consists of four clusters, namely coordination, technology optimization & development, socio-cultural changes and market creation (see Figure 5). Within these four clusters, several activities to strategically build a collective system are described. Among others, a shared vision and common goal were found to be an important step within strategic collective system building. According to Planko et al. (2015, p. 10), “ideally, system-building entrepreneurs should align their company goals towards the achievement of this common goal”. Another activity that Planko et al. (2015) found is the need of collaborative marketing to create user awareness. They argue that “This first marketing phase can be conducted collaboratively by innovation system actors. This enables them to combine their resources and achieve higher leverage effects” (2015, p. 8). This need for collaboration is one of the themes covered within the program of TKK.

2.3 Integrated theoretical framework

This research is aimed at creating a sustainable transition within the food system, by creating a market transformation with the use of a sustainable transition model, named the Gain transition model. The basis of the theoretical framework is formed by the Multilevel perspective, which explains the various system levels that influence the development of sustainable transitions. The micro level within this MLP can be influenced by SNM, the aim of this literature is to explain and steer sustainable innovations to achieve societal transitions by focusing on creating protective niches. Via shielding, nurturing and empowering processes, the niche can be protected from the dominant environment, allowing the innovation to mature and challenge the socio-technical regime. One important SNM aim is the formation of networks, by creating shared visions, sharing experiences, and forming actor networks among stakeholders, successful niche development can occur. The formation of networks can be analysed by using the innovation ecosystems genesis model by Dedehayir et al. (2016). The literature regarding these innovation ecosystems is a valuable addition to SNM, because it provides more concrete insights to the underlying processes that enable network formation in niche development. This literature gives valuable insights for this research, since the Taskforce Korte Keten is establishing a network within the ecosystem of short food supply chains to create a sustainable transition within the food system. In order to build such collaboration within these networks, strategic collective system building will become relevant. Although empirical sustainability literature is focused on transforming the market in such way that it will increase the impact of a sustainability strategy, rather than the successfulness of a new sustainable technology in SNM and TIS literature, all types of literature focus on collaborative or collective action and changing the environment in which companies are operating. Also, all three describe the development of a shared vision, knowledge sharing, co-creation and collaboration as being needed to change the business ecosystem to become more successful or to become more sustainable.

The theoretical framework helps to answer the research question. First by using the structural analysis framework from the innovation system literature and the network formation roles of the innovation ecosystems to holistically describe the SFSC system. This gives a better understanding of the dynamics in the system, through creating a holistic perspective of the actors, networks and institutions within the SFSC system. Second, by using concepts of the market transformation literature and the system analysis the market transformation phases can be described. This gives a better understanding of the problem context. Finally, system building activities found within the data are used to see how this SFSC innovation ecosystem can be supported through the facilitation of collaboration between innovation system actors, directing the credible implementation of the Gain transition model.

3. Method

This section will present what data was used, how it was gathered and analysed and by what means the findings were translated into conclusions and advice. It also describes and substantiates the chosen methods regarding the interpretation of data.

3.1 Desktop research:

The SFSC innovation system of the Netherlands is analysed through a desk research. Followed by a description of the various market transformation phases the SFSC went through in the past years. Furthermore, the interviews on the collective system building activities realised by SFSC actors were analysed to determine possible opportunities for the development of a stronger innovation ecosystem. Determining the missing collective efforts taken by SFSC actors will be translated into a advice for the TKK to support the formation of a strong innovation ecosystem.

3.1.1 Structural analysis

The SFSC innovation system of the Netherlands is analysed based on the structural analysis framework defined by Hekkert et al. (2007). This structural analysis provides insights into the actors, institutions and networks forming the innovation system (See Appendix II). To analyses the actors present within this system the five categories defined by Hekkert et al. (2011) serve as a guideline. This analysis is complemented by a social network analysis of the TKK leaders LinkedIn datasets, which is analysed based on the innovation ecosystem roles defined by Dedehyir et al., (2016) and complemented the actor segment of the structural analysis. Furthermore, the interviews with SFSC initiatives and experts within the field filled information gaps and verified findings on the networks and institutions part.

3.1.2 Phase of market transformation

For analysing the phase of development for the SFSC innovation system, the characteristics of local and national projects of SFSC parties within the Netherlands are being evaluated. This assessment will be done by assessing the nature of collaborations within the SFSC system. Subsequently, this information will be reviewed in light of the market transformation phases created by Simons (2015).

Table 1 Market transformation phases which will be applied on the SFSC sector (based on Simons, 2015)

Phase	Description
1. Awareness and projects	A crisis or innovation will raise general awareness about the sustainability issues in the sector and creates room for first responses by the sector. Companies react by implementing small projects individually
2. First movers and competition	First movers gain a competitive advantage by implementing sustainability strategies. Other companies follow and standards are being implemented, after which a competition on standards emerges
3. Critical mass and institutionalisation	The impact of standards and individual strategies are minimal and companies join in non-competitive collaboration on neutral ground. The interconnectedness, 'connectability' and trust increases and a clear vision and roles and responsibilities are laid out. Also, government joins in (see capitol illustration in Figure 4)
4. Level playing field	From collaboration to legislation and making the new strategies the industry norms. Government will codify the input of the industry, laggards will need to follow. This is not an end phase, as the process will start over again with a new innovation or crisis that triggers change.

3.2 Interviews

The process for selecting relevant interviewees started with a LinkedIn databases analysis of the TKK task leaders. The mutual contacts with the most links within database were ordered based on the innovation ecosystem roles by Dedeheyir et al. (2016), to create a first overview of influential actors within the SFSC system. Afterward, the qualitative data collection via 21 semi-structured interviews (see table 3), with various SFSC actors in the Netherlands. Within these interviews the topics described in table 2 formed the structure. Since these task leaders are the frontrunners within this SFSC sector, their network knowledge and expertise is very wide-ranging. Therefore, the first interviews were conducted with the task leaders to get a decent understanding of the most influential actors within this system. The following step included interviews with 8 regional SFSC initiatives, to understand what collective system building activities are implemented and significant from the practitioner perspective. Additionally, their network perspectives on SFSC actors were included in the research. Lastly, several supporting parties were interviewed to gain new insights on the SFSC system, including; political, financial, network, research and education supporting actors. These parties have a certain outlook on the meso-level processes, due to their network- and level of expertise.

Table 2 Questions and conversation topics for the semi-structured interviews. Questions in green refer to data collection regarding the opinions and barriers of SFSC, questions in yellow refer to data collection for collective system building processes.

Questions
In what way is your business connected with short food supply chains?
What are according to you the greatest barriers for short food supply chains?
What are according to you the representing norms and values for short food supply chains?
What collective system building activities are currently realised by short food supply actors within the innovation ecosystem? <ul style="list-style-type: none"> - Coordination: system-building roles, shared vision, standardisation, transparency. - Market creation: new business models, protected niche market, government and legislation, collaborative marketing, collaborative competition against existing power structures. - Socio-cultural changes: new facilitating organizations, stimulating collaborative organizational cultures, changing education and user behaviour, creating skilled labour pool. - Technology Development & Optimization: testing new process or service technologies, knowledge development and exchange, feedback loops with users, co-creation of new products.
What actors are present within the innovation ecosystem of SFSC in the Netherlands? (Leaders, suppliers, assemblers, complementor, research, education, network support, financial support and political/ regulatory support).
What could you do to improve the collaboration between SFSC actors, with the aim to strengthen the ecosystem?

The data collected for this research has been collected through mapping the innovation system of SFSCs in the Netherlands, interviews and participatory observations (see appendix V). With this data a structural analysis of the SFSC innovation system is created and resulted in a SFSC actor map of the Netherlands. Through the combination of various data sources, a more holistic view of the innovation system and collaborative short food chains in the Netherlands can be gained.

Table 3 An overview of the interviewed SFSC actors within the Netherlands

Organization	Actor type	interviewee code	Notes
Willem&Drees	SFSC initiative	SF1	TKK core team
Atlantis Handelshuis	SFSC initiative	SF2	TKK core team
Lelystadseboer	SFSC initiative	SF4	
Boeren van Amstel	SFSC initiative	SF5	
Oregional	SFSC initiative	SF6	
Boerschappen	SFSC initiative	SF7	
Flevo Food Netwerk	SFSC initiative/ Network support	SF8	
De Proefschuur	SFSC initiative	SF9	
landwinkel	SFSC initiative	SF10	
Rechtstreex	SFSC initiative	SF11	
WUR en LEI	Research	RE1	TKK core team
ZLTO / Transitie Coalitie Voedsel	Network support	NS1	TKK core team
Taskforce multifunctionele landbouw	Network support	NS2	
Provincie Gelderland	Political support	PS1	
Provincie Limburg	Political support	PS2	
Regiebureau POP	Political support	PS3	
Stichting DOEN	Financial support	FS1	
The Plant	Complementor	CP1	
Stichting Erkend Streekproduct	Complementor	CP2	
Geodan /HAS Hogeschool	Complementor/ Education	ED1	
Flevo Food campus	Education	ED2	

All the interviews were transcribed in Word and analysed using NVivo. To analyse the data, coding was used “whereby data are broken down into component parts which are given names” (Bryman, 2008, p. 542). Specifically open coding was used, which includes defining concepts that are later grouped and categorized (Bryman, 2008). The concepts of the theoretical framework served as sensitizing concepts (Bryman, 2008). As explanation building is an iterative process (Saunders et al., 2009), the categories of analysis were subject to change. Therefore, next to predefined codes from literature on strategic collective system building and market transformation, concepts derived from the empirical data were added. Activities that were found to be important for strategic collective system building in the SFSC sector, but did not exist in the strategy framework yet, were added as new concepts. The coding led to a fragmentation of the data, in which all the fragments could be related to strategic collective system building, market transformation or newly added concepts that could subsequently be analysed.

The analysis consisted of two parts. To find an answer to the first research question, namely to find how the market transformation of the SFSC sector can be described through strategic collective system building, first, the market transformation of the dairy sector was analysed and described. Subsequently, the market transformation of the SFSC sector was explained through the strategic collective system building framework. This framework is applicable to technological innovation, however, was compared to the strategic innovation of the Gain transition model for SFSC to collectively work towards a sustainable food system through the expansion of SFSCs. Therefore, the theoretical framework was validated through the SFSC sector, as to whether or not similar system building

activities were found in the data. Second, in order to find an answer to the second research question, namely to find how the SFSC sector can implement the Gain transition model in a credible manner, the newly added concepts were compared with literature and the existing strategy framework in order to either categorize them within one of the existing strategic collective system building clusters or devote them to a new strategic collective system building cluster. The results are presented in a narrative way.

4. Results

The key findings and outcomes of the research are presented in this chapter. Starting with the structural analysis of the SFSC innovation system. This structural analysis will be visualised within an interactive map, including all the actors of the system based on the structural analysis actors (see figure 7). Then, the phase of development of this innovation system will be explained. Furthermore, the most common barriers mentioned by SFSC initiatives and experts during the interviews are compiled to understand the most pressing forces. Lastly, the qualitative data and identified collective system building activities from 21 interviews are discussed.

4.1 Structural analysis of the SFSC Innovation system

Within this paragraph the structure of the Dutch innovation system of SFSC is mapped. This analysis brings insights into the various actors, institutions and networks of the SFSC innovation system.

4.1.1 Actors:

This paragraph gives an explanatory overview of various SFSC actors types, all contributing to the development of the short food supply chain innovation system. Starting with the supply related companies (supplier, assembler, complementor), demanding parties (users), the research and educational organisations (experts), the financial and network supporting organisations (sponsors, champions) and finally the regulating parties (regulators). As a result, the specific companies and organisations representing the various actor types are presented in an interactive map (click on map below).



Figure 7 An overview of the SFSC actors within the Netherlands, including all the actor types described above.
Link: <https://drive.google.com/open?id=1DV9xMAeyhu0BitAhWJhbnL4lPs03Hwc&usp=sharing>

Supply

Within this segment there are several categories of companies, first the **suppliers** themselves being the farmers that supply local produce, often processing it into shelf products. These local producers often fulfil a dual role by selling their products at the farm, online, on markets or even in a specialty store with products of other local suppliers. Moreover, there are other channels for the sales of local products i.e. farmer markets and halls, total concepts with stores including catering and other activities around the farms, online web shops and food boxes or retail via supermarkets, the catering industry and healthcare institutions (Monteny, 2015).

Furthermore, the **assemblers** refer to the parties that form regional collaborations between various suppliers through collaborating and selling their products collectively via platforms or farmer initiatives. Often these parties fulfil the role of wholesalers, by collecting, storing and distributing the local products. These parties are the frontrunners and offer products and services to support the growth of SFSC.

Finally, the supply segment ends with the **complementors** which meet the consumer specifications by creating complementary offerings. For example, app developers that create an ordering app for consumer to make the purchase process of local products easier. New development in within this segment are companies that try to incorporate Blockchain technology to create a transparent food supply chain system.

Demand

The demand for fresh and local food products is rising As previously discussed, there are various sales channels forming the demand of local products, the green consumers form one segment. Followed by business to business channels, these parties mostly consist of hotels, restaurants, corporate catering, healthcare institutions and municipalities. According to market research 5% of the food market segment consists of local products (ABN AMRO, 2018; Menkveld, 2017; van der Schans, 2018). The catering industry is also part of the demand side, providing extra service for the consumers. The largest catering companies within the Netherlands are: Sodexo, Albron, Compas Group, Vermaat, Paresto, Hutten Catering, Koninklijke van den Boer groep and Appèl (Misset Horeca, 2017). These parties have a very influential position within the current food sector, ordering large amount of food supplies to run their businesses. Furthermore, on the demand side the B2B types includes larger retail parties that fund as wholesalers, few examples of these firms include: Makro, Ahold&Delhaize, Jumbo, Lidl, Aldi, Sligro, Hanos, Hema and Marqt. These parties are seen as the competition of SFSC initiatives, and shape the current socio-technical regime.

The demand of international parties does not correspond with the values of SFSC on the re-location and re-connection with local food economies, these parties will not support the transition of the current food system towards a more local oriented system. However, multinational firms that are located in the Netherlands are Unilever, Lidl, Aldi, Wessanen, Nestlé and Danone. These parties do have a very influential position being part of the socio-technical regime and creating the standards within the current food system.

Research

These parties conduct research, provide expertise, generate knowledge and consultancy. Furthermore, education via research project, workshops or events is gained. Some examples within this category are Universities, research centres, technology institutes, design labs or consultancy bureaus.

Educational organisations

The contribution of knowledge development can be seen in other educational organisations, which are more focussed on the practical knowledge development and provide a skilled pool of workforces. Some examples of educational organisations are Higher Agricultural Schools, Higher Hospitality schools or Food innovation campuses.

Supporting organisations

Within this segment there are two ways of supporting the innovation system by **sponsoring** or network creation which is done by so called **champions**. Whereas, most of the SFSC initiatives are running on subsidies, others run on their own venture capital. Furthermore, other financial supporting organisations are banks, foundations, semi-public organisations, strategic partners or accelerator programs. Hence, the network supporting parties try to connect various actors and are dedicated to creating collaboration to provide access to markets. Examples of these types are branch organizations, associations, network organisations or innovations hubs.

Political, policy and institutions

These organisations influence **laws and regulations** to support the development of the innovation system, by providing favourable policies and economic conditions. The organisations representing this category include ministries, governmental institutions, provinces, municipalities and policy & public administration.

4.1.2 Institutions:

¢ *Hard: rules, laws, regulations, instructions*

When looking at the laws and regulations of SFSC two main pillars can be defined, one focussing on agricultural practices and the other on food retail practices. For the agricultural practices the various certification processes for Biological, regional or local production methods are most relevant for SFSCs. Whereas, the food retailers have to oblige various food safety guidelines and protocols.

The food safety guidelines and protocols linked with SFSC are often hygiene regulations and product liabilities. For the processing and transportation of food products a food safety plan is mandatory, these plans are based on the HACCP hygiene protocols. Additionally, municipalities often set protocols for building codes, coolants, waste processing and transport restrictions (Rabobank, 2019). When an organisation has taken the right measures and ensure food safety in their supply chain, they are certified with BRC Food and IFS Food standards (Normec, 2019). According to some SFSC parties these guidelines are too strict for SFSC, since these protocols are set for large and long distribution processes of supermarkets. Whereas, SFSC initiatives often directly bring their local products to the consumer which results in very short distribution processes and lower multiplication of bacteria (interview SF7). Eventually, the Dutch Food and Consumer Product Safety Authority check if companies carry out the food and safety protocols.

Another influential law that supports the institutional environment of SFSC is the environmental code. With this law certain spatial planning trajectories of regions are guided, the decision power of these trajectories now lies with the municipalities. However, there are new developments within this section of the environmental law that could change the dynamics within the spatial planning trajectories. In 2021 there will be an environment and planning law. The implementation of this law will create more room for input from individuals, due to the elimination of detailed permits and introduction of more general rules (Rijksoverheid, 2019). These developments are interesting for the SFSC innovation system, giving an opportunity for actors to take collaborative action by giving input for the environmental and spatial planning of certain areas to re-connect and re-locate local food economies.

The most guiding methods for agricultural practices are determined within food label certification schemes. The various labels that are most often used by SFSC parties are EKO, Milieukeur, Demeter, the EU organic label with a SKAL certification, Protected Designation of Origin (PDO), Protected Geographical Indication (PGI), Traditional Specialty Guaranteed (TSG). Which are all certificates audited by a third party, based on the production methods and environmental factors resulting in these certified products. Moreover, there are independent labels for regional products e.g. Streek product Nederland, Erkend Frysk streekproduct and Lekker Utrechts. These organisations created an independent label for regional products by setting certain criteria focussing on local resourcing, processing and added value creation by producing in a socially responsible way, with added value for the region and the region's own cultural landscape (SPN, 2019).



Figure 8 Examples of ecolabels within the food sector

However, sustainability standards are growing in numbers with already over 450 ecolabels in use, many challenges are associated with the use of these standards and certifications. Among others, cost of use, effectiveness and impact, customer confusion, greenwashing and lack of brand advantage are thought to be barriers of certification (ISEAL, 2010; Steering Committee of the State-of-Knowledge Assessment of Standards and Certification, 2012). Also, Watanatada and Mak (2011) argue that certification and labelling face limits to scale. According to their research, it will not be possible to certify everything and at every factory or farm (Watanatada & Mak, 2011). They even argue that it is time to rethink the 'classic' sustainability label and move towards a more flexible, collaborative model for influencing sustainability outcomes. This includes stronger supplier-buyer relations, the use of brands to show sustainability, the use of national regulation and partnerships (Watanatada & Mak, 2011). This transition from sustainability labels towards more flexible and collaborative models correspond with the values of SFSCs, through re-locating and re-connection the food economies (Kneasfey et al., 2013).

Furthermore, when looking at new developments within food and agricultural policies some policy innovations are gaining ground. Starting with the true cost pricing of food by including the externalities in the price the consumer pays. With externalities being environmental costs e.g. CO₂ emissions, along the food chain from farmer to consumer, according to the polluter pays principle. Resulting in less transport (CO₂ miles) and fair competition for organic farmers which will be paying less externalities. This will possibly lead to higher prices, which will incentivise consumers to waste less food. The changes in consumer behaviour possibly realised by these policies will send a message to farmers to change their production. However, this effort needs to be realised by creating synergy between consumers, producers, retailers and other food companies to support the transition towards a healthy, safe, authentic and sustainable food system (Fresco & Poppe, 2016).

¢ *Soft: customs, common habits, routines, established practices, traditions, ways of conduct, norms, expectations*

Within this section the soft institutions of SFSCs are elaborated on, to give an view on the social aspects that are accompanied with the SFSCs. These soft institutions are formed within different social groups that have their own norms and values, as for many cultures which have their own traditions and habits. These factors form the way people make daily choices, for this instance on food and dietary choices.

Starting with studies that have shown consumers like to buy local foods for a range of reasons, including environmental concerns, health reasons, perception that local foods are high quality, the enjoyment of shopping at local outlets, and in order to support local farmers, economies and communities (Kirwan 2004; Seyfang 2008; Kneafsey et al. 2008). In a study by Eurobarometer (2011) a survey of 26,713 EU citizens showed 90% of respondents agreed that buying local food is beneficial and that the EU should promote their availability. However, over half of the interviewees found that local products are hard to identify. Whilst in every Member State except the Netherlands (47%), more than half the respondents regard the geographical origin of food products as important, there are significant differences between levels of importance in individual Member States. The vast majority of respondents in Greece (90%) and Italy (88%) consider origin to be important, while in the United Kingdom (52%) and Belgium (56%) these proportions are substantially lower (Eprs, 2016). These examples give an overview of the attitudes towards SFSC by consumers in Europa and the Netherlands.

Within the Dutch society there are many societal groups, all with different norms and values which lead to various routines and habits. According to decennium worth of empirical research by Motivaction 8 different social environments can be described within the Dutch society (Motivaction, 2019). These societal segments share the same norms and values which form a certain lifestyle and consumption pattern. When looking at the consumption of local products three aspects are important: tradition, price, sustainability and the service level to receive local products. According to the motivation typologies sustainable societal segments are the traditional citizens, cosmopolitans and post-materialists. Motivaction grouped the 8 different social environments into 5 sustainability groups. The sustainable groups with green consumption patterns are grouped as dutiful citizens (13%) and the responsible feeling group (22%), see appendix I for a visualisation. The dutiful citizens highly value their traditions and have conservative and economical consumption patterns, this combined with feeling responsible for future generations result in sustainable consumption patterns. Additionally, this social segment is very locally oriented due to the fact they feel their impact on the global level is too small. Followed by the responsible feeling group who believe in a collaborative approach towards sustainable practices, with everyone bearing their own responsibility. These citizens are aware of local and global developments considering sustainability, and are willing to achieve a balanced sustainable lifestyle. These norms and values correspond with SFSC and therefore these citizens will be likely to buy local products.

One critical aspect which is hard for SFSCs to transform is the expectance of high service levels due to the standards set by supermarkets and online delivery services. For example, the opening times of shops, the offered product range, online ordering and delivery services are great challenges for SFSCs to compete with according interviewee SF1. Nonetheless, the demand of local products is rising because consumers associate local products with higher quality, nutrition and sustainability (Menkveld, 2017). Hence, consumers want higher quality food but are often not willing to pay a higher price for these products. This contradictory attitude could be maintained in the less personal market relations of the long food chains, but is not often seen within SFSCs. This is due to the long term relation the SFSC consumer creates with the producer (van der Schans, 2018). Therefore, the re-connection between the consumer and the producer forms a critical basis to build supportive soft institutions for SFSCs.

4.1.3 Interactions:

⚡ At level of networks

A conceptual framework that is widely recognized and utilized within the Dutch food transition is called the Gain transition model, as illustrated by figure 1. Within the SFSC movement in the Netherlands, this model has been utilized to explain the various network levels of the sustainable food transition and short food supply chains. Level 1 refers to a layer of individual actors, for instance local food producers and entrepreneurs. By collaborating together with several partners, a local food system can be formed. Level 2 refers to organizations that enable the connection of individual entities and local actors in a regional network, such as Local2Local in the city region of Utrecht. Level 3 includes initiatives that aim to facilitate collaboration among these local food systems on a national scale. Lastly, Level 4 refers to European coordination among EU member states, for instance through funding and research of the Smartchain Horizon2020 programme (European Commission, 2018), linkages to the Sustainable Development Goals (SDGs), and European targets regarding carbon emissions and climate change. The model is a useful tool to analyse four network levels of SFSCs; local, regional, national and European. By facilitating collaboration and collective system building among network actors, a collaborative SFSC system may become a reality.

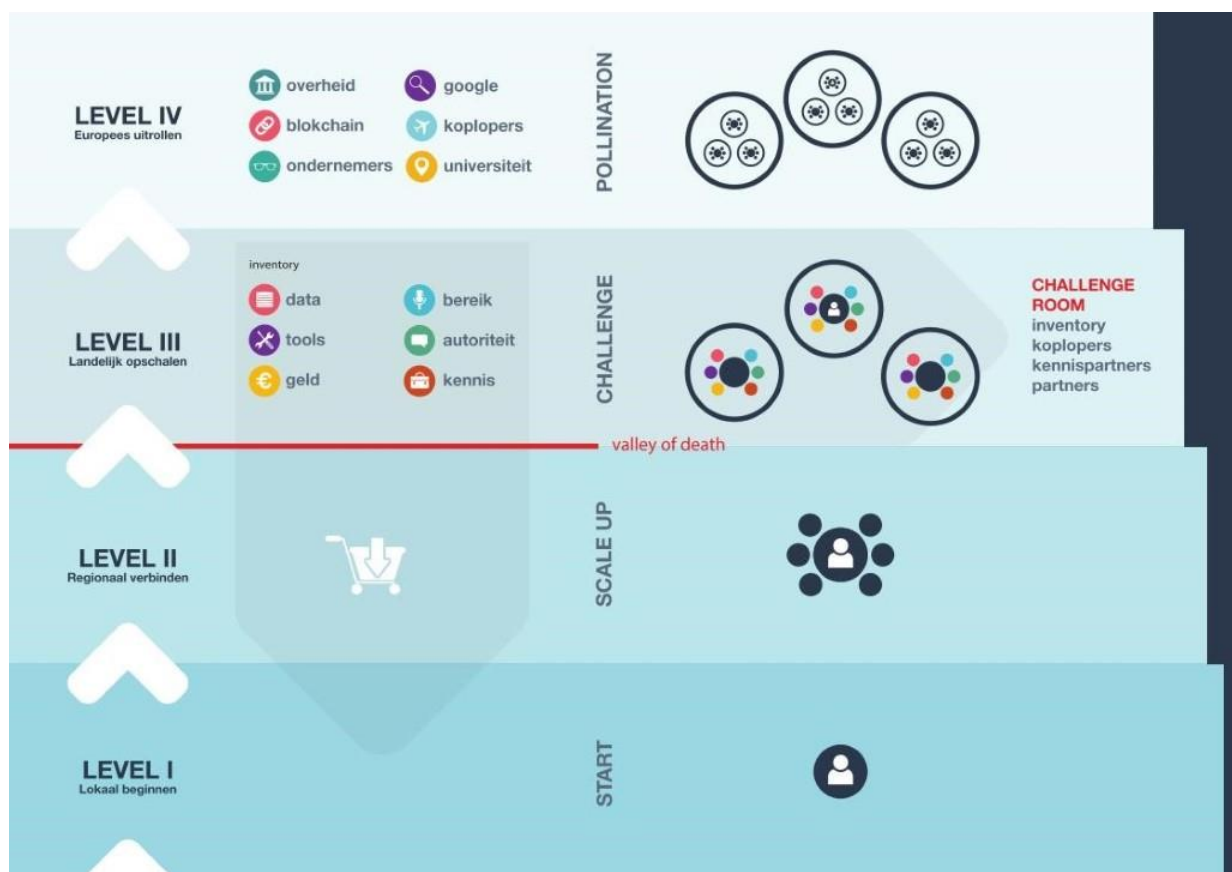


Figure 9 : The Gain transition model (Taskforce Korte Keten, 2018a; 2018b)

€ At level of individual contacts

Within the SFSCs networks there is a high level of interaction at the level of individual contact, due to the characteristics of SFSC the producer and consumer are closely bound. The core aim of SFSC reaches beyond the reduction of transport distances, more importantly it results in trustworthiness of the consumers towards the producers. Correspondingly, the higher transparency of the short food chains, consumer feedback and social cohesion are the foundation of this trust.

The combined network range of the TKK leaders based on their LinkedIn database consist of 15.000 contacts. When analysing the mutual contacts of the TKK leaders (blue bars) and the official members that supported the TKK at the launch by signing a general agreement (orange bar), it can be seen that the following innovation ecosystem roles are less represented; users, regulators and sponsoring parties (see figure 9 below).

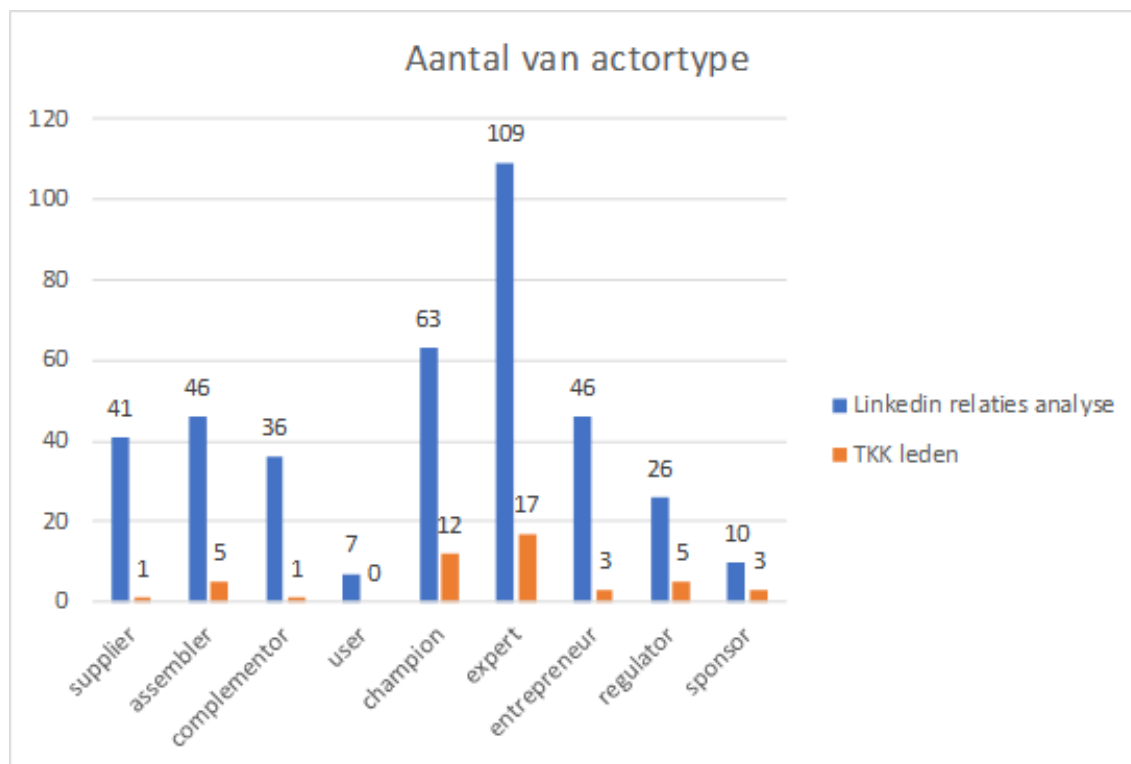


Figure 10 Overview of social network analysis based on innovation ecosystem roles. Blue bars refer to LinkedIn database analysis of TKK members, right bars refer to the social network analysis of TKK supporting members.

2.1.1 Infrastructure:

€ Physical: artefacts, instruments, machines, roads, buildings, networks, bridges, harbours

The infrastructure within the Netherlands is well developed, due to the export model forming the Dutch market. Starting with the position of the Netherlands with a large European hinterland, combined with highly developed infrastructural systems and large mainports as harbours and airports. These large-scale infrastructures are in the hands of incumbent firms, being the purchasing offices and supermarket organisations, which dominate the food supply chain in the Netherlands (PBL, 2012). This highly developed infrastructure is focussed on large scale practises, which forms challenges for SFSC within the organisation of their logistics and distribution.

When looking at the infrastructures for the SFSC several limitations are noticed. According to an analysis by the European Commission 4 key weaknesses of SFSC were identified: 1) Limited production volume, making it difficult to meet demand from larger customers, such as public organizations; 2) Limited ability to expand due to higher production, processing and transport expenses; 3) Limited

resources for marketing and communication; 4) Limited human resources, resulting in over-reliance on key individuals (Augère-Granier, 2016). These key weaknesses correspond with a research on several SFSCs in the Netherlands conducted by Stichting Urgenda, which identified the following barriers: 1) limited knowledge of the market; 2) limited logistical expertise and resources; 3) lack of marketing and communication resources; 4) High competition of service level (Arkenbout & Prause, 2014). Many companies like Picnic, food solutions, Ubereats and even AH are developing distribution facilities to improve their service level. The SFSC parties have difficulty in investing and organising such logistical practises and in this way can't compete with the level of other delivery services. The combination of these challenges asks for a collaborative approach to organise some of these aspects collectively for solving these challenges.

¢ *Knowledge: knowledge, expertise, know-how, strategic information*

The so called "Golden Triangle" forms the basis of knowledge development, by creating synergy between research, business and education the most fruitful generation of knowledge, expertise, know-how and strategic information can be gained (Prepelita-Raileanu, 2010; Wright, 2014). This generation of knowledge and expertise support the competitive advantage of a nation. Therefore, many trajectories are created to try and gain this knowledge. Within this segment various programs, projects and platforms working on the knowledge development for SFSC are being discussed.

Starting with the European knowledge programs conducting or supporting research for the development of SFSCs. The Agricultural European Innovation Partnership (EIP-Agri) contributes to the Europe 2020 strategy for smart and sustainable growth. It was launched in 2012 and aims at fostering competitive and sustainable farming and forestry that achieves 'more and better from less'. In 2015, the European Commission launched the EIP-AGRI Focus. Group on Short Food Supply Chains to conduct research on the way to 'stimulate growth of short food supply chains in Europe, both in terms of numbers of producers involved and volumes traded, to increase farm income'. A group of 20 experts analysed the different SFSC in Europe and concluded that collaborative SFSC offers the most potential for scaling up. This type of food system, where several farmers, organisations or individuals agree to work together, offers many benefits, such as an improved product range for consumers, resource sharing amongst producers and processors, increased negotiating power, reduced competition between small producers, and mutual support (Eprs, 2016). Their final report identifies possible solutions to the technical, organisational and financial barriers to the scaling up of SFSC.

As described in the financial infrastructure many thematic networks on the development of knowledge and innovation are formed within the Horizon 2020 program e.g. SKIN, Smartchain, Climate KIC and EIT Food. Furthermore, regional knowledge networks formed within the Netherlands. In which specific knowledge and innovations are gained through collaborations between Universities, business and top sector businesses e.g. Foodvalley, Future Food Network, Wageningen University & Research and Utrecht Science Park. Sometimes these institutes organise certain Hackatons, where SFSCs challenges are solved within a competition through an open innovation approach. The team with the best solutions wins the competition, through this approach the combination of strategic knowledge and expertise is generated with low research costs. An example is FarmhackNL, that focussed on solving the application possibilities for Blockchain to create a transparent system for SFSC products. Moreover, from an educational perspective various Universities of Applied Science support the synergy within the golden triangle. Universities of Applied sciences which are contributing to the development of knowledge and expertise for SFSCs are mainly; HAS Hogeschool, van Hall Larenstein, Flevocampus, Groene Campus and Haagse Hotelschool.

The know-how and strategic information is present within the short chain initiatives and consultancy bureaus. The experiences of SFSC initiatives are not widely nor in a structured way diffused by the

various parties. The Taskforce Korte Keten facilitates the collaboration between experienced parties, in order to share strategic information and work coherently towards collaborative solutions to tackle certain barriers within the SFSC system. This can be seen as an evolving knowledge infrastructure. Finally, few consultancy firms within the agri- foodsector are attributing their knowledge to support SFSC organisations in consolidating their strategic decisions and management models e.g. Diverzio, Fair treep, Derk Pullen Advies, Amped and Compazz.

€ *Financial: subsidies, fin programs, grants etc.*

This section discusses the various financial structures that influence the development of SFSC in the Netherlands. There are a few types of financial supporting streams for SFSC initiatives e.g. subsidies, venture capital, foundations or accelerator programs.

Starting with European subsidy streams via the Horizon 2020 program, which aims to support knowledge and innovation development to secure Europe's global competitiveness. This programs budget of almost EUR 80 billion will be utilised to coupling innovation and research to create a single market for knowledge, innovation and research (European commission, 2019). Within this program two innovation programs are funded by the H2020 program, and are relevant for the development of SFSC. Starting with Smartchain which is a 3 year during project which aims to "to further support the development of collaborative short food supply chains and promote a more favourable framework for sustainable, local, healthier and ethically produced food in Europe" (Smartchain, 2019). This is realised by the work of 9 collaborations hubs, which analyse the different types of SFSC, determine the aspects that influence rural development and sustainable food production and develop policy and business recommendations. This is all in line with the development of innovations, knowledge and collaborations which make the sharing of information and solutions possible (Eufic, 2019).

Within this Horizon 2020 program, the European Institute for Innovation and Technology aims to create collaboration between companies, educational institutes and research. These knowledge and innovation communities are named KICs. The Climate KIC community focusses on challenges within climate change (RVO, IenW, EU wijzer, & NKWK, 2018). Within this community the Climate Agricultural Booster is set up to help the agricultural sector innovate for climate- neutral and climate-resilient agriculture (EIT Climate-KIC, 2019). Additionally, the EIT Food community follows the same method with the vision to "put Europe at the centre of a global revolution in food innovation and production, and its value in society. EIT Food will engage consumers in the change process, improve nutrition and make the food system more resource-efficient, secure, transparent and trusted" (EIT institute, 2019). In this way, the creation of innovation and knowledge sharing within SFSC can be funded by these projects, which makes these communities interesting financial supporting parties.

The agricultural subsidies allocation by the European parliament is organised with the Common Agricultural Policy (CAP), which aims to maintain food security and supporting farmers in Europe. The total budget consists of EUR 408.31 billion, which is divided amongst two pillars for national or regional rural development programmes. The first pillar is meant for market measures and direct payments with EUR 308.73 billion. The second pillar is for rural development and contains a budget of EUR 99.58 billion (European Commission, 2016). Respectively, the rural development budget of pilot 2 in the Netherlands is used to support the export model of the agricultural system (named POP3), by investing in efficiency increase and agricultural innovation developments. Remarkably only the Netherlands, Ireland and Denmark use this budget to fund innovation within the agricultural sector to increase the production and suppress the negative effects of the export model. Whereas, Sweden and Austria use these budgets to support the development of SFSC, by investing in the local distribution infrastructure and creation of local food apps (van der Schans, 2018). According to the expert of the agricultural economic institute (RE1), there now is a noticeable change in the mindset for the allocation of these

Pilot 2 budgets towards SFSC, and these new developments should be included in the coalition agreement.

The rural development office supports the Provinces with the execution of the rural development programs (POP 3). This program consists of five branches; 1) Strengthen agricultural business structure 2) Collaborate for innovation 3) Improve environment and climate 4) Water management and water quality 5) Stimulate local developments (LEADER). The collaboration for innovation and the LEADER are most relevant financial supports for SFSC developments. The POP 3 subsidies are further allocated by Provinces, as mentioned above these subsidies are mostly allocated towards innovation projects to increase efficiency within agricultural practices. However, the Province of Gelderland, Limburg and Noord-Brabant allocate larger amounts of POP3 budget to the development of SFSC according to an interview with PS3 of Regio bureau POP. Moreover, according to the food coordinator of the Gelderland Province (PS1), the Province joined the Green City deal Voedsel op de stedelijke agenda. In which 12 cities, 3 ministries and the Province agreed to support the sustainable food transition by supporting local food policies (City deal voedsel, 2019). For example, changing the sustainable purchasing policies of the County Hall Province towards local oriented products. These sustainable purchasing policies need to focus more on the food aspect according to multiple interviewees (SF2, PS1, RE1). Finally, within the governmental organisation the municipalities often only have the resources to address a food coordinator. These coordinators sometimes organise events to bring SFSC producers together and let them share knowledge. However, these municipalities are not capable of allocating funding for the development of SFSC initiatives or projects.

Besides governmental institutions which have the ability to allocate subsidies for the development of SFSC, there are private organisations that allocate money within the agricultural sector. Starting with some accelerator programs that invest in companies with capabilities to support sustainable transitions and create competitiveness within certain regions. Some examples are; the Brabantse Ontwikkelings Maatschappij (BOM), REWIN West-Brabant, Oost NV, I-fund and Innovation Quarter, these organisations are driven by top sector companies. Another accelerator program is initiated by Impact Hub Amsterdam and is funded by Stichting DOEN, which supports initiatives that have positive environmental, social or cultural impact. This foundation is funded by three large lotteries in the Netherlands; the Nationale Postcode Lotterij, the Vrienden Lotterij and the Bankgiro Lotterij.

Many subsidies for local and regional SFSC initiatives are spent on similar achievements, such as knowledge generation, developing online tools, data collection and analysis, or marketing. This approach of stimulating innovation in SFSCs can be considered a waste of resources, as the wheel is constantly reinvented, and most of the initiatives receiving governmental funding usually do not exist longer than a few years (RE1, ED1, ED2). For these reasons, a 'Valley of Death' is often present when regional initiatives attempt to survive without subsidies or aim to scale up to have a national impact in the sustainable food transition.

Lastly, Banks within the Netherlands with a focus on sustainability are Triodos and ASN. However, for SFSC parties the Rabobank is the most interesting party, due to their origin in the agricultural sector their greatest interests and investments lie within this sector. However, according to many interviews with SFSC initiatives the retrieval of a bank loan is difficult, bankers argue the targeting of a smaller market segment with unproven novel business models result in a high-risk investment. Within the interviews the barrier of financial access is mentioned multiple times. The collective effort of requesting a subsidy or loan could increase the likelihood of retrieving financial access.

4.2 Market transformation phases within the SFSC sector

This section describes the market transformation of the SFSC sector. The transformation of the SFSC system is described through the four market transformations defined in the theoretical framework (see section 2.2), namely the awareness and project phase, the first mover and competition phase, the critical mass and institutionalization phase and the level playing field phase.

4.2.1 Awareness and project phase

Due to the unsustainable character of the global industrial food industry, it has been argued that a transition towards more sustainable and city region-oriented food economies is needed (Wiskerke, 2015). The realization of local food systems and short food supply chains (SFSCs) has been proposed as a promising agricultural approach to deal with these challenges (Kneasfey et al., 2013). According to Wiskerke (2015), a city region-oriented food system “[...] is the most appropriate level of scale to develop and implement an integrated and comprehensive solution for a future proof urban food system” (p. 15). SFSCs and decentralized food networks “would democratize the food industry by dispersing small food hubs across the globe, bringing food production to regional communities. Minimizing the gap between consumers and producers is a critical step towards an environmentally and economically sustainable food system” (McNamara, 2016).

The change in consumer perception of food products -due to food scandals and GMO practises- on the one hand and the pressure on the income of farmers -due to the modernisation and mechanisation of the agro-food sector- on the other, certainly contributed to this (Renting et al., 2003, Ilbery and Maye, 2005, Sonnino and Marsden, 2006). Also in the Netherlands one could notice this development brought about by different stakeholders. For example, farmers started selling their products directly through different channels and initiatives were taken by organizations in the retail, foodservice or wholesale sector which strive to source more locally and/or increase the availability of regional foods. While the interest in SFSCs and provision of local food was growing, SFSC were not studied and project developments occurred organically.

From the observations that awareness on the sustainability issues within the food industry sector grew, after which companies started projects to reduce the environmental impact of their activities, it can be concluded that the SFSC sector fully entered the first phase of market transformation, the awareness and project phase.

4.2.2 First mover and competition phase

One of the trends within the SFSC field is the emergence of regional food hubs, organizations that serve as a marketplace for local food networks, connecting farmers and consumers in a city region. According to Visser et al. (2017), it is important to combine city functions to food production and the crux is to form regional wholesalers that distribute locally grown food. Two notable examples of regional wholesalers for the metropolitan area of Utrecht in the Netherlands are Local2Local and Willem & Drees (Haenen et al., 2018). In total, the Netherlands is home to a few dozen regional food hubs, each serving locally grown food to customers in specific city-regions.

In recent years, it has become clear that there is a need for national collaboration among short food supply chain actors in the Netherlands, for instance by connecting regional food hubs to distribute locally grown produce more effectively. Realizing the need for a national collaborative environment for local food distribution, both Local2Local and Willem & Dress, among others, are founding partners of a project called ‘Taskforce Korte Keten’ (TKK). This initiative has flowed out of the ‘Transitiecoalitie Voedsel’ (TcV), a growing coalition of more than 150 front runners in the Dutch agriculture, food, nature, and health sectors, working together to transition towards a sustainable food system. The TKK is an initiative which attempts to connect regional food hubs and other SFSC stakeholders, enabling

collaborative SFSCs on a national level. The kick-off event for the Taskforce took place in July 2018, hence it can be argued that this project is in the development phase, the facilitation of collaboration among SFSC actors is currently being established.

With the introduction of regional collaborative SFSCs as a sustainability strategy, the competition within the standards and values of the SFSC and Long food supply chains start to emerge. Due to the momentum created by the SFSC on the values accompanied with these local and regional food systems, the Long food supply chains uses this momentum by trying to sell local products. The competition between those standards within the food systems, indicates the food sector moved into the first mover and competition phase, in which also the first arguments appeared against this competition on standards and accompanied values.

4.2.3 Critical mass and institutionalization phase of the SFSC sector

To stimulate the transition towards short food supply chains and regional food systems, the European Union and its member states have developed legal frameworks, policies, and incentives over the past years (Augère-Granier, 2016; Goodman et al., 2012; Kneasfey et al., 2013). The Netherlands, an agricultural powerhouse and the world's second largest food exporter by value (Viviano, 2017), also has governmental and entrepreneurial support to realize short food supply chains and decentralized food systems for the sustainable food transition (Haenen et al., 2018). In particular the promise of collaborative short food supply chains, in which actors work together in regional or national networks, is an active point on political agendas (EITAGRI, 2015).

Additionally, Carola Schouten the Minister of Agriculture, nature and food safety (LNV) wrote a vision for the agricultural sector within the Netherlands. With the aim to work towards a circular agricultural system, through collaboration within the agricultural sector and a focus on sustainable agricultural practices (Ministerie van LNV, 2018). Besides, a mandate was granted by the minister to support the implementation of the Gain transition model based on gaining benefits through network formation and niche management by using gamification principles. To clarify, gamification principles are certain processes learned from successful game designs, which can be used for influencing behaviour and increasing engagement. This support on an European and national level by multiple governmental organisations lays out a vision for the agricultural sector, supporting the creation of non-competitive collaborations. Clearly, transitioning the SFSC sector towards the critical mass and institutionalization phase.

4.2.4 The Gain transition model as a tool to work towards Level playing field phase

The level playing field will be reached when collaborations transition into legislations, and the new strategies make the industry norms. Within this phase, the government will codify the input of the industry and laggards need to follow. The first step towards this phase includes the collaborations formed within the Smartchain thematic network project, the introduction of the Gain transition model will contribute to higher levels of collaboration. If all consortium members states organise their regional initiatives well and create a level 3 playing field, the following level 4 will be reached. This level includes the changes of institutions on a European level, and create possibilities to collaboratively change legislations and strategies for the agricultural sector. However, first the Smartchain consortium member states need to organise their national collaboration of SFSC before this level playing field phase will be reached.

4.3 Strategic collective system building within the SFSC ecosystem

In order to strengthen the innovation ecosystem of SFSCs within the Netherlands and get a smooth market transformation towards achieving a critical mass and institutionalization, the collaboration between actors must be done in a credible manner. In order to do so, this section focuses on the strategic collective system building activities within the SFSC system. First, section 4.2.1 describes the presence and importance of collaboration through strategic collective system building. Subsequently, in line with the strategic collective system building framework, section 4.2.2 presents and explains the system building activities found through the interviews, document review and observations.

4.3.1 Presence and importance of strategic collective system building in practice

The interviewees were asked what barriers are mostly experienced within SFSCs, an overview in table 4 shows that these barriers can be divided in four categories; operational, market, organisational and regulatory barriers. The most discussed barriers are infrastructure, service level and scale, marketing and communication, financial access, laws and regulations and most mentioned lack of collaboration. The barriers within infrastructure, financial access and laws and regulations can be confirmed within the structural analysis. By summarizing these barriers mentioned by the interviewees it can be seen that the need for collective system building activities offer possible solutions.

Barriers	Stated by interviewees	Collective system building activities to tackle barriers
Operational		Technology development and optimization
Infrastructure	6	Co-creation of products and services,
Product and process development	2	Knowledge development, knowledge exchange
Service level and scale	11	Feedbackloops, testing new market applications, development of CVP, (standardisation)
Market barriers		Market creation
Lack of consumer awareness	2	Creating transparency, changing user behaviour
Marketing and communication	5	Collaborative marketing, niche market approach, business models, collaborate with competition
Organisational barriers		Coordination
Financial access	8	system orchestration, system building roles
Lack of collaboration and trust	12	Shared vision, common goals, communication of values and best practices, open platform innovation
Skills and expertise and knowledge	3	skilled labour forces, changing education
Regulatory barriers		Socio-cultural changes
Political barriers	3	Changing political agenda, creating facilitating organisations,
Laws and regulations	6	Collaboration with government
Policies	3	Creating a shared vision, defining common goals,

Table 4 Overview barriers for SFSCs and relevant collective system building activities to overcome these barriers

The analysis of the data revealed that all SFSC actors were aware that they need to collaborate in order to create a transition within the current food system. They agreed that this requires transparency within the value chain, alignment between SFSC initiatives and commitment. Also, as SFSC actors are operating in a competitive environment, collaboration is difficult and often only said in words, rather than in practice. However, most of the collaboration is voluntary, all parties agree upon the fact that owning something collectively will create most positive social, environmental and economic impact. Within the Gain transition model (see also Appendix IV) community building on various levels and stakeholder engagement is mentioned as key to build trust in the commitment and activities of the sector. Also, it was mentioned in the literature that stakeholder engagement is a growing source of solutions and innovations (EIP-Agri, 2015; Arkenbout & Prause, 2014; Epr, 2016; Fresco & Poppe, 2016). Even the European Smartchain consortium agreed that the GAIN transition model, based on a multiple level approach by collectively building a stronger ecosystem, will be the leading strategy framework to implement in all the consortium member states.

4.3.2 System building activities found in the SFSC sector

This section presents and explains the system building activities found in the empirical data. The system building activities are presented through their associated strategic collective system building clusters, namely technology development & optimization, socio-cultural changes, market creation and coordination. Table 4 gives an overview of the different system building activities found in the empirical data that are in line with the strategic collective system building framework by Planko et al., 2016. Moreover, new system building activities specifically mentioned by SFSC actors are added.

Table 5 Overview of system building activities found in the data

Collective system building activities	Stated by interviewees	Found in documents	Seen in observations
Innovation and knowledge development			
Co-creation of products and services	X	X	
development of CVP			
Feedback loops with consumers	X		X
knowledge development	X	X	
knowledge exchange	X	X	X
testing new market applications			
Market creation			
Collaboration with government	X	X	
Improve legislation	X		
Organisational support from government (NEW)	X		
collaborative competition		X	
collaborative marketing			X
Creating transparantie to improve market position	X		X
Generate new business models			
Niche market approach	X		X
Social-cultural			
changing education system	X		
changing user behaviour	X		X
Creating new facilitating organisations		X	
Changing political agenda (NEW)	X	X	X
Skilled labour forces			
Establishing collaboration- prone organizational cultures			
Coordination			
creating a shared vision	X	X	X
defining common goals	X		X
Communication of best practices (NEW)	X		X
Providing a open innovation platform	X		X
Standardisation			
System building roles		X	
System orchestration		X	X

4.3.2.1 Technology development and optimization

The technology developments within SFSCs refer to innovations that focus on optimizing the ordering processes, logistics and services. The most mentioned collective activities are knowledge development and exchange, followed by key aspects within SFSC being the continuous feedback loops with consumers and the co-creation of products and services.

Most of the interviewees mentioned the *knowledge development* as an important collective activity, since the SFSC initiatives are often frontrunners and contribute to knowledge development when simultaneously running a business. Additionally, almost all actors participate within research programs or innovation platforms. Often in collaboration with Universities conducting research on the topics towards sustainable food systems, this includes research on agricultural practices, sustainable retail services and community building. Also, various masterclasses and other innovation programmes are financed by Provinces and municipalities which contribute to the collective knowledge development for SFSC's (PS1, RE1, PS3, CP2, SF2). However, one interviewee was sceptical about all these innovations and mentioned the extra margins accompanied with every intermediary party which results in less margins for the farmers and contradicts the aim for giving the farmer a fair product price (PS1).

The *exchange of knowledge* between SFSC parties seems to be a sensitive subject, since many initiatives struggled during the first development phases of the businesses, they expect something in return for their efforts of gaining this specific knowledge. Often when knowledge is shared among parties it is an one way, therefore it is important to have mutual benefits when sharing knowledge and expertise (SF4, SF9, SF10, SF11, RE1, NS2). However, many interviewees agreed that the exchange of knowledge is crucial to create a transition within the current food system. The need for a platform to share this knowledge is brought up multiple times, remarkably there is no consensus amongst the interviewees which organisation should facilitate this platform. Multiple parties are mentioned e.g. Taskforce Korte Keten, Provinces, LTO Nederland or SFSC frontrunner initiatives themselves (RE1, SF1, SF9, FS1, PS3, CP2, PS2).

Furthermore, the *co-creation of products and services* are mostly realised within existing collaborations of SFSC initiatives or farmer collectives. All interviewees agreed that there is a lot of potential impact to create within the food sector when co-creation of product and services is realised between the SFSC initiatives. However, there is little co-creation between different SFSC initiatives, only one example within the Veluwe region in which CP2 manages an out roll of a SFSC collective for a sister organisation by using the same back office. The *testing of new applications, technologies and markets* is only mentioned by five interviewees by testing it themselves. However, it is not commonly seen as an activity for the interviewees to carry this out in a collaborative manner.

Finally, one of the key activities mentioned by the interviewees is the continuous *feedback loops from consumers*, SF11 sees the SFSCs as "*a continuous interaction between consumer and producer*". This frequent contact with consumers is often mentioned as one of the unique values of SFSCs, which support the continuous feedback from the consumer (SF1, SF6, SF7, SF9, SF10, SF11, SF8, NS1). However, the initiatives which focus on the B2B mention that often the feedback loops with their customers are less intensive (SF2, SF6, CP2). Overall, the feedback from consumers is abundant within SFSCs, remarkably this valuable information is not shared or seen as an collective activity.

4.3.2.2 Social cultural changes

System building activities to create socio-cultural changes were often mentioned by interviewees or found in documents and observations. The activity of *changing user behaviour* is mentioned most often as very important by the interviewees and in observations. As explained within the market transformation section, the creation of communities which support the transition towards a sustainable food system is crucial. Almost all interviewees acknowledged that re-connection the consumer with the local producers being one of the most important means of SFSCs. Multiple ways are utilised to change the behaviour of consumers and facilitate this re-connection between farmer and consumer through e.g. farm excursions and events, storytelling about the local farmers or creating information platforms,. According to interviewee CP2, SFSCs are applicable for various trends within the food, varying from sustainability, transparency, circularity or nutritional food.

Moreover, in the literature there is a wide variety of values representing SFSCs. Therefore, the interviewees were asked to describe the most representing values of SFSC's according to them. The values mentioned are combined in one comprehensive definition; Short food chains are used as a means for making the connection between farmers and citizens, between city and rural areas. They stand for a fair price for the farmer, healthy and accessible food for citizens, an agricultural system that is in balance with the ecology and guarantees and creates employment, resulting in a circular and sustainable food system. Conformingly, the minister of LNV writes in her vision report towards circular agriculture that short chains help to reduce waste, create a fairer price for producers and brings farmers and citizens closer together. Due to the transparency within SFSC the consumers know where their food comes from and therefore have respect for producer and their products, in this way short chains can contribute to sustainable agriculture (Ministerie van LNV, 2018). These efforts of *changing the political agenda* are not yet included in the strategic framework by Planko et al., 2016. However, to create socio-cultural changes and support the sustainable transition of the current food system this activity is seen as an important collective activity.

However, to communicate these values towards consumers there is a need for *facilitating organisations*, this is according to the majority of the interviewees lacking for SFSCs. According to experts (FS1, CP2, RE1), within the biological or circular food sector certain values are much more included in various policy visions compared to the SFSC sector. Which results in more formations of alliances, branch organizations or cooperation clubs that try to pursue a common vision. This contributes to the diffusion of communicating certain values towards consumers. Correspondingly, some experts (RE1, NS1, PS2) mentioned the need for political support to improve the communication of these values and create social-cultural changes. The *establishment of collaboration-prone organisational cultures* has not been mentioned as an collective effort by the interviewees.

Lastly, there is a urgent need in *changing the educational system* to educate the next generation in contributing to the creation of a sustainable food system and short food supply chain system. More than half of the interviewees mentioned the need of change within the educational system. First focussing on the primary and secondary schools, where children need to be educated on the importance of nutrition and the food system. Followed by the lack of courses and educational programmes at Universities of Applied Sciences which focus on sustainable agricultural practices, nutritional diets and healthy, local and seasonal catering practices. The need for change within the last mentioned educational courses and programmes is linked to the creation of *available skilled labour forces*, which is remarkably not specifically mentioned as a collective effort for SFSCs.

4.3.2.3 Market creation

The creation of a good market position is one of the topics which is thoroughly discussed during the interviews. Within this segment the activities on collaboration with competition, government and the niche market approach are mainly elaborated upon. Starting with the *niche market approach*, almost all interviewees stated that the SFSC sector is still a niche market within the food system. Also most interviewees see growing opportunities and the ability to challenge the current regime within the food system. This consists of the long food supply chains, including the supermarkets and online delivery platforms. Meeting the needs of consumers that are used to the service level of these parties, seems to be the most challenging aspects. The creation of a niche market that challenges the current regime is clearly seen as a collective activity by the interviewees to create a better market position.

To realise this market transition within the food system, parties need to collaborate on multiple levels. The *collaboration with competition* is a highly discussed topic, divided in collaborations with other SFSC initiatives or collaboration with the competition referred as long food supply chains. Half of the interviewees see the collaboration with other SFSCs as an important collective system building activity, due to the common values shared with these parties and the possible mutual benefits resulting from these collaborations. The interviewees (RE1, NS2, ED1, PS2) see the possibility to work with the LFSC to create a bigger impact, by creating a hybrid collaboration in which the infrastructure and expertise of the LFSCs is utilised and the values of SFSC are pursued. However, this strategy is accompanied with the risk of cannibalising their exclusive value proposition. The *collaborative marketing* is not often realised according to the interviewees, but has the potential to improve the market position of SFSC within the Netherlands. One example of collaborative marketing by Willem&Drees is the collaboration with the Triodos Bank which targets similar consumer segments, collaborative marketing in this way enlarges the impact of SFSCs. The interviewees (NS2, SF1, SF2, SF5, SF8, PS3 and CP2) agree that collaborative marketing would improve the market position of SFSCs.

However, the *collaboration with governmental organisations* is seen as a very important activity. The government supports SFSCs within two areas, on improving certain rules and legislations and secondly a new activity gained from the interviews (RE1, SF2, SF6, NS2, PS3, PS1, CP2) is supporting in the actual developments of SFSC initiatives, through organisational and financial support by the government. The problems mentioned within laws and regulations are mainly about the misfit due to the large scale of the current food system, as a result of the export model of the Dutch agricultural sector and large scale practices by supermarkets. These laws and regulations create barriers for small scale SFSC parties, accompanied with the high costs of the control protocols which are irrelevant for SFSCs (SF7, SF11, CP2). In some cases the government loosens the rules and regulations or give financial support (PS1, PS3). Additionally, the sustainable procurement policies for governmental organisations are mentioned as an opportunity for SFSCs to gain governmental support fulfilling all the sustainability criteria. This opportunity could be addressed by all SFSC parties as a collective activity in retrieving the application for governmental and semi-governmental organisations to supply the company catering through SFSCs (NS1, CP2, RE1).

The *generation of new business models* is mentioned by half of the interviewees, an expert (PS3) stated “Every short chain initiative should determine very well what their market is, and which consumer segment it is aimed at. All require a completely different approach, based on that you have to set up your concept. Some started too quickly without good market research and experience difficulties afterwards”. According to ED2 “The parties which focus on the Business to Business have more certainty and structure which forms the basis of long term relationships, than when focussing on the business to consumer segment”. Additionally, one frontrunner initiative (SF7) clearly describes “We can’t compete with the incumbents, what we can do is build a business case that is entirely based on

SFSC values. By giving the farmer a fair price so he has financial stability and provide food that feeds people instead of filling them". The generation of new business models can be seen as a proof of successful SFSC business cases, which indicates higher viability and provides proof to convince investors.

Finally, the *creation of transparency* within the food chains is mentioned by more than half of the interviewees as an important collective system building activity. These interviewees state that transparency is a key requirement within the SFSC. Promising developments within the transparency of the foodsystem and true cost pricing in the field of food will contribute to the market transition according to (PS2) *"True cost accounting is very interesting, it is not just about the food miles or how many intermediate parties are in the short chain. That is an aspect, it is also about soil and biodiversity and that being translated into the price and converted to the system of the polluter pays principle. Now it is done through taxation, resulting in the decline of nature. I hope that we will get fairer and more transparent prices in that sense. And to attach value to nature and biodiversity, which is already happening with CO2. This is also happening now for fertile soils, but it is still in its infancy"*. The creation of transparency is agreed upon as an important collective activity for SFSC actors, to support a sustainable transition within the food system.

4.3.2.4 Coordination

The coordination and alignment of all individual and collective system building efforts within the SFSC system is still in the development phase. The interviewees agreed that there is a need for system orchestration, the creation of a shared vision and clear communication within the SFSC ecosystem. Also, the communication within the coordination of the ecosystem is mentioned as a new collective activity. However, there is no consensus among the interviewees which organisation or coalition is facilitating the coordination of the ecosystem.

Starting with the *system orchestration*, remarkably the SFSC initiatives all state that there is no clear orchestration of the system (SF4, SF6, SF7, SF9, SF10, SF11, CP2). However, according to multiple interviewees there is a start of system orchestration being made by the Taskforce Korte Keten (SF1, SF6, SF7, NS2, FS1, PS3, CP2), as mentioned by SF6 *"I would like to see how the Taskforce is going to orchestrate this, it is about how we will make choices to positively change the food system"*. Which corresponds with opinions on the next collective activity, being the creation of a *shared vision and setting common goals*. More than half of the interviewees agreed that a shared vision among SFSC actors would improve the coordination and effective use of efforts and resources. However, according to these interviewees there is no specific vision defined. The organisations that are mentioned for the creation of this shared vision are Ministry of LNV, Provinces and Taskforce korte keten (SF6, SF9, PS2, PS3, CP1). Within this vision it is important to include the shared values of SFSCs as mentioned within the social-cultural change paragraph, phrased by SF6 *"The short chain is a means to achieve that vision. Defining the goal is important, where do we want to be in 10 years. Where the social forces lie concerning our food system and the consequences that the current food system has for the health of people and the environment"*. Additionally, interviewees (SF2, SF11, PS2, PS3, RE1) state the importance of communicating this shared vision within the SFSC ecosystem and towards consumers. The creation of a shared vision and orchestration of the ecosystem is seen as an important collective system building activity, now is the momentum for a certain party or coalitions to take on this task. The division of various *system building roles* have not been mentioned often, interviewees (NS1, SF10) state this happens organically and is difficult to coordinate.

Additionally, few interviewees mentioned the need of communication between SFSC actors to support effective coordination. This relates to the creation of an open innovation platform, in which exchange of knowledge, information and also determination of common goals can be facilitated. According to

network supporting interviewee NS1 “There is no degree of organization or cooperation, this would increase the impact of certain platforms”. However, platform creator CP1 launched an online collaboration platform for local food chains. The creation of an open platform is marginally been mentioned by the interviewees, and not really seen as a collective system building activity.

Lastly, more than half of the interviewees state that *the standardisation* of SFSCs is in contradiction with the unique value proposition of local products. When these products will be standardised in a way, this will lead to less authenticity and move towards the current supermarket models (SF10, SF11, CP2). However, some do think it is important to standardise within their own organisation, and when these SFSC values are maintained that this level of standardisation could facilitate the coordination between SFSC initiatives and support the market transformation due to the higher demand that can be met (SF2, SF7, PS1, NS1, FS1).

To conclude, the findings showed which of the system building activities described within the strategic collective system building framework are present in the SFSC system and specifically within the case study of Taskforce Korte Keten implementing the Gain transition model, based on gamification principles. As can be seen in Table 4, most of the system building activities appear to be important for the implementation of strategic collective system building. However, additional system building activities seem to be relevant for the SFSC system, namely organisational support from governments and changing the political agenda to enforce socio-cultural changes, which will be discussed in the following section.

5. Conclusion and discussion

The aim of this research was to understand how the innovation ecosystem of short food supply chains (SFSC) within the Netherlands can be strengthened through collective system building efforts, subsequently, to find out how the transforming food supply chain sector can implement a process approach towards the standardisation of sustainable short food supply chains in a credible manner. Understanding the market transformation of the SFSC sector by performing a case study to find out what is needed for a credible implementation of the GAIN transition model by the Taskforce Korte Keten to validate and refine the current literature on strategic collective system building. By this means, it gave insight into the credible implementation of a GAIN transition model approach towards a local and sustainable food system.

The theoretical framework uses the lens of the Multilevel perspective and market transformations to explain the sustainable transition of a socio-technical system through the formation of strong ecosystems by combining literature on strategic niche management, innovation ecosystem genesis and strategic collective system building. Although empirical sustainability literature is focused on transforming the market in such way that it will increase the impact of a sustainability strategy, rather than the successfulness of a new technology as in the SNM and TIS literature, all the literature streams focus on collaborative or collective action and changing the environment in which companies are operating. Also, all three describe the development of a shared vision, knowledge sharing, co-creation and collaboration as being needed to change the ecosystem to become more successful or to become more sustainable. Therefore, these literature streams give valuable insights for the Taskforce Korte Keten on forming a network within the ecosystem of short food supply chains to support a sustainable transition of the food system. In order to build such collaboration within these networks, strategic collective system building and strategic niche management will become relevant.

First, in order to understand the SFSC ecosystem a structural system analysis has been conducted to analyse the relevant actors, institutions and networks (see figure 5 for interactive map). This provides insights in the Dutch SFSC socio-technical system and possible collaboration opportunities with mutual benefits in the collective network. Furthermore, to understand the transformation of the SFSC sector the various market transformation phases of the SFSC sector are elaborated upon. Finally, to find out what is needed in order to implement the GAIN transition model in a credible manner through strategic collective system building, 21 interviews with SFSC actors were conducted, and observations were made during the internship and TKK meetings at the central office of the TKK at Fort t'Hemeltje in Houten.

Empirical data showed that the SFSC sector is currently moving from a phase of competing on standards towards the institutionalization and adoption of a sustainability strategy by a large part of the SFSC sector, phase 3 of the market transformation theory by Simons (2015). Although the SFSC sector is not characterized by many sustainability standards, interviewees argued that in order to tackle the sustainability issues in the SFSC sector, it should move beyond competing on standards and other initiatives, and instead should aim to collaborate and change the food system towards a sustainable short food supply chain system. The SFSC sector is supported by the circular agricultural system vision of the ministry of Agriculture, nature and food safety. The TKK established a network of SFSC actors and now with the supporting mandate of the minister acts upon the need for collaboration and organisation by introducing the GAIN transition model based on network formation and niche management by using gamification principles. Through the facilitation of collaborations by the TKK with key SFSC actors, it aims to demonstrate the mutual benefits of collaboration and work towards a sustainable SFSC system. Document review, interviews and observations showed that TKK and its actors agree that in order to create a transition within the food system SFSC actors need to collaborate.

According to the qualitative data collection several strategic collective system building activities are needed to create a stronger SFSC ecosystem. The strategic collective system building activities found in the case study correspond with 13 of the 23 system building activities from the strategic collective system building framework (see table 5), which are elaborated upon in the recommendations. Furthermore, the empirical findings showed that in order to strengthen the SFSC ecosystem several additional activities are needed. Therefore, this research proposes new activities by refining the strategic collective system building framework by Planko et al. (2015), suggesting:

- Within the collaboration with governments the financial and facilitating support for the development of SFSC should be included;
- Within the coordination cluster changing the political agenda is an important collective activity;
- Within the coordination cluster include communication of common goals, visions and developments within the SFSC sector.

Some limitations of this research should be noted, starting with the actor assessment within the structural analysis. This actor analysis entails the most mentioned actors within the SFSC sector during the interviews, observations and the TKK database. However, according to interviewees within the educational system many researches have been conducted on analysing the SFSC sector, for future research it can be useful to collect and analyse previous researches focussing on SFSCs within the Netherlands. Educational institutes as Universities of Applied sciences HAS, Aeres, ROC, van Hall Larenstein and Flevo food Campus conducted researches on SFSCs according to the interviewees. Moreover, the actor types of consumers and local farmers are not included within the interviewee sample. Yet, the 21 interviewees have many feedback loops with their consumers and much customer knowledge and experience within the field, also the interviewees have close contact with their producers. Further research could include the insights of these actor types to better understand what strategic collective system building activities are needed for successful socio-cultural changes, market creation and technological optimization and development.

The literature on strategic collective system building appeared to be very relevant for the research. However, it must be noted that the framework particularly gives a good overview of the activities needed to build a strategic collective system. It does not provide guidelines on how to implement the system building activities. For future research some suggestions can be made on how to implement the additional system building activities, including communicative strategies for enhancing the basic processes relevant to innovation support (Leeuwis & Aarts, 2011) and different modes of governance that could be used within networks (Kenis & Provan, 2007). Furthermore, collaboration with competitors brings benefits, but also many risks. Further research can investigate how firms deal with the dilemma of competition versus collaboration when establishing an innovation ecosystem to implement a new sustainable technology or innovation in society. Planko et al. (2018) identified benefits, risks and enablers of collaboration with competitors from the coopetition literature, and provided a systematic overview. Although this research has several limitations, it also provides interesting topics for future research based on the outcomes of this study.

6. Advice

This research provides a strategy framework for collaborating SFSC actors that want to implement a strategic sustainability innovation while creating positive social, environmental and economic impact. In order to build a strong ecosystem within the SFSC sector with various actors collaboration is crucial. The TKK established a network of SFSC actors and now with the supporting mandate of the minister acts upon the need for collaboration and organisation by introducing the GAIN transition model based on network formation and niche management by using gamification principles. Therefore, this research is aimed to find what is needed to implement the GAIN transition model in a credible manner to be able to demonstrate sustainable short food supply chains. In summary, based on extensive research, it is recommended to the SFSC sector and Taskforce Korte Keten in particular to execute the following strategic activities:

1. Ensure commitment, willingness, and the availability of resources for the collaboration on SFSCs by all actors;
2. Focus on the coordination activities as a supportive role with a focus on:
 - Creating a shared vision, and common goals
 - National system orchestration
 - Providing a platform for knowledge sharing and creation
 - Thinking in system building roles
 - Creating transparency through regional sharing of data, verification and traceability.
 - Clearly communicate all individual and collective system building efforts
3. Optimization and development of the GAIN transition model through:
 - Development of knowledge through Blockchain principles based on SDG tickets
 - Knowledge exchange by facilitating exchanging networks to share collective data and expertise among TKK members
4. Creating a favourable market position for SFSC through collaboration with the government for enabling legislations and retrieving financial and network support, creating transparency within the food system and executing the niche market approach;
5. Creating socio-cultural changes through changing the consumer behaviour, education system and the political agenda;

This recommendation shows in order for the GAIN transition model to be implemented in a credible manner, several collective activities are needed. These do not only include system building activities from the strategic collective system building framework by Planko et al. (2015), but also include additional activities.

One of the first preconditions found in the interviews was the need for commitment, willingness and the availability of resources for the collaboration. The commitment and willingness can be guaranteed through the multileveled network building strategy, starting with local collaborations moving towards regional alliances and consolidating these alliances in a national entity, in this case the Taskforce Korte Keten. However, it appeared from the interviews with the various actors that the coordination of this ecosystem is lacking. This is why it is recommended to first put focus on the system building activities concerning the coordination cluster. Whereas, in the beginning of collaborations the focus could be on more informal mechanisms of coordination, including creation of a shared vision, defining a common goal and system orchestration. Starting with clearly defining the concept of SFSC and the shared values and vision regarding local food systems. Among SFSC parties similar terms are used with conflicting meaning, mainly regarding the means of production in terms of traditional agriculture versus biological and organic. Using the language of the SDGs may help to create uniform communications among network actors and consumers of local products. An important communication channel to share these

values to a range of SFSC actors is via the TKK website, which at this time does not present a shared vision, goals or a clear conception of short food supply chains.

Another important part of the GAIN transition model is related to the development and optimization of this model. When focussing on the technological development and optimization of the GAIN transition model the following collective activities need to be realised to effectively build this part of the transition model. The basis for the development of knowledge within this model lies within the implementation of Blockchain platforms, facilitating the creation of knowledge and data on SFSC products and services based on the Sustainable Development Goals themes. Correspondingly, the sharing of this data, knowledge and expertise can be facilitated through an exchanging network among TKK members. Furthermore, the network could be used as an instrument to co-create new services or products, this combined with a collective database of SFSC consumer feedback information would complete the collective technological development and optimization of SFSCs within the Netherlands.

Within the GAIN transition model the creation of a favourable business market will be facilitated by demand steered gamification mechanisms. The collective activities supporting this market creation include the collaboration with the government to enable supporting legislations. Additionally, it has been mentioned by multiple interviewees to use governmental support on a financial and network level. Moreover, the sustainable procurement policies for semi- and governmental organisations are mentioned as a window of opportunity empowering the sustainable values and criteria of SFSC to retrieve these contracts. Furthermore, the creation of transparency to improve the market position is seen as one of the most promising collective activities by the interviewees. Accordingly, the lack of transparency within the food system facilitates an unfair division of the market power. By creating transparency within the food chains, the SFSC parties force the market to move towards a transparent state. This activity can be supported by the use of the previous mentioned Blockchain platforms, creating a compatible and comparable system which facilitates the creation of transparency on products and services. Often radical innovations that facilitate a disruptive change within socio-technical systems start within a niche. The niche market approach is therefore an important strategic collective activity to create a sustainable transition within the current food system. It is recommended to keep analysing the developments and network formations processes as presented in this research with the use of the structural analysis. To preserve the protective niches, by enabling certain policies and regulations in supporting the sustainable transition of the food system.

The last important process within the GAIN transition model is related to the creation of community steered agriculture, via community building will the SFSCs values be shared and spread within society to support socio-cultural changes. The activities of changing the education system, consumer behaviour and the political agenda are important collective activities to support the sustainable transition within society towards a short food supply chain and sustainable food system. The changing of consumer behaviour could be achieved by empowering the current SFSC consumer by including them in the decision processes of SFSC initiatives or create a progressive consumer panel for the TKK. Changing the education system can be achieved by continuous collaboration with Universities of Applied Sciences, through research and developing more knowledge for SFSCs.

To conclude, the these strategic collective system building activities will function as a guideline for the TKK and collaborating parties to launch and implement the GAIN transition model to support the transition towards a short food supply chain and sustainable food system. In order to implement this model in a credible manner more collaboration among short food supply chain actors is needed. The national entity TKK shows to be a promising vehicle to accomplish the orchestration of these collective system building activities, in this way support the formation of a strong SFSC ecosystem.

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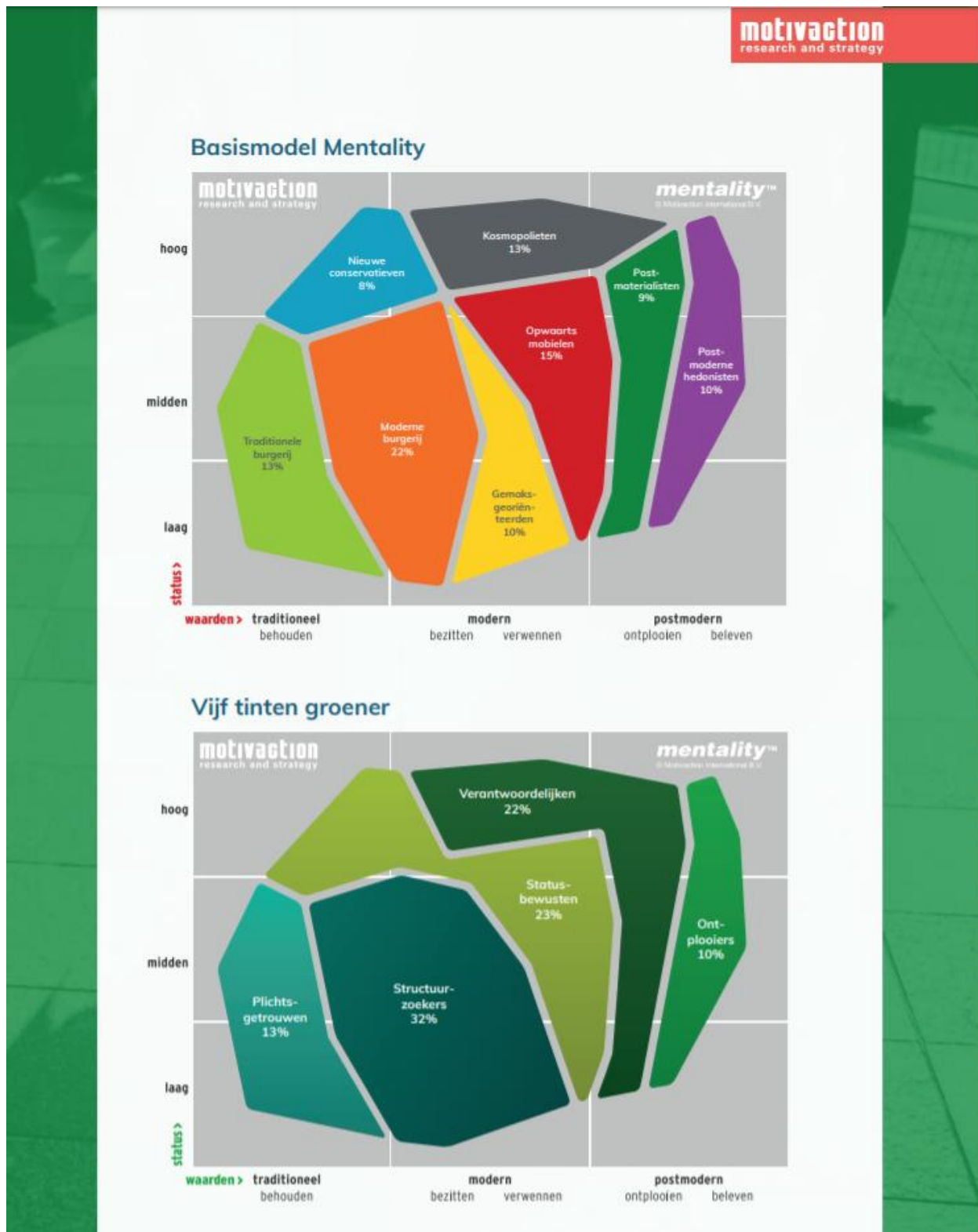
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Appendix I Mentality model by Motivaction



Appendix II Structural analysis framework

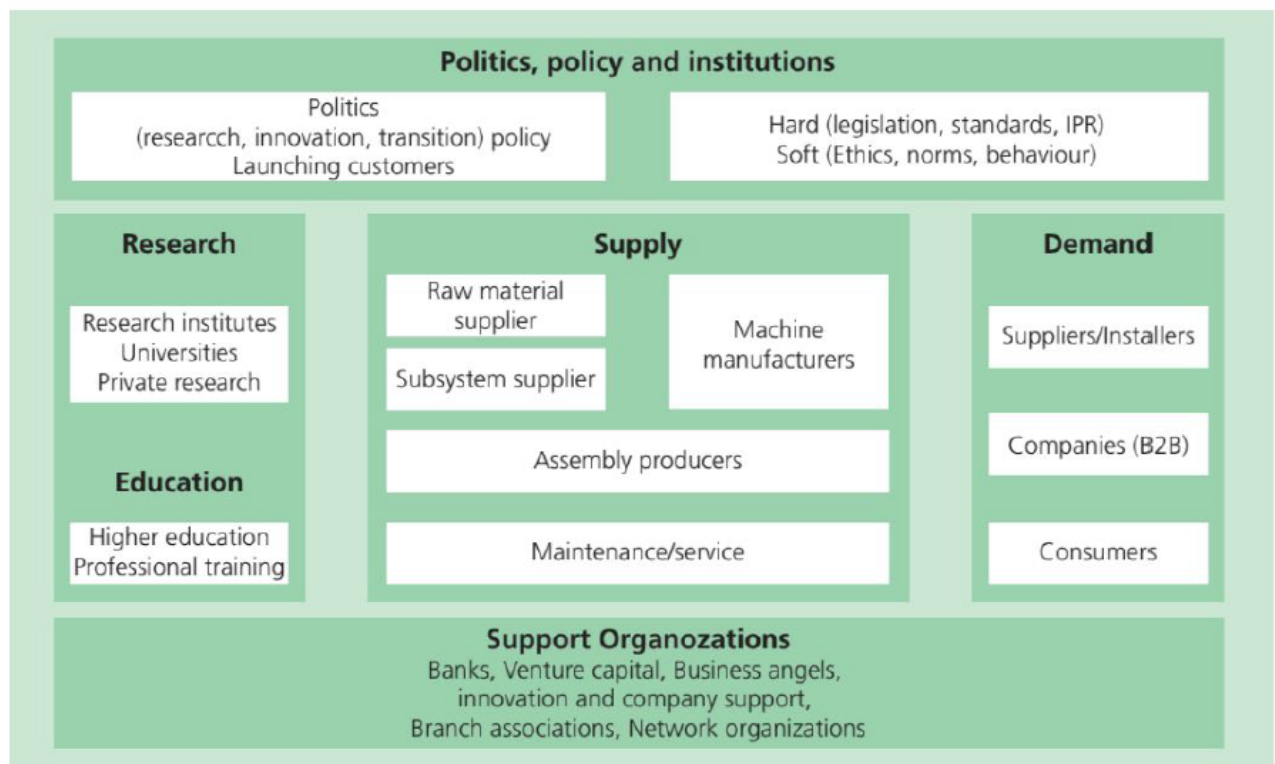


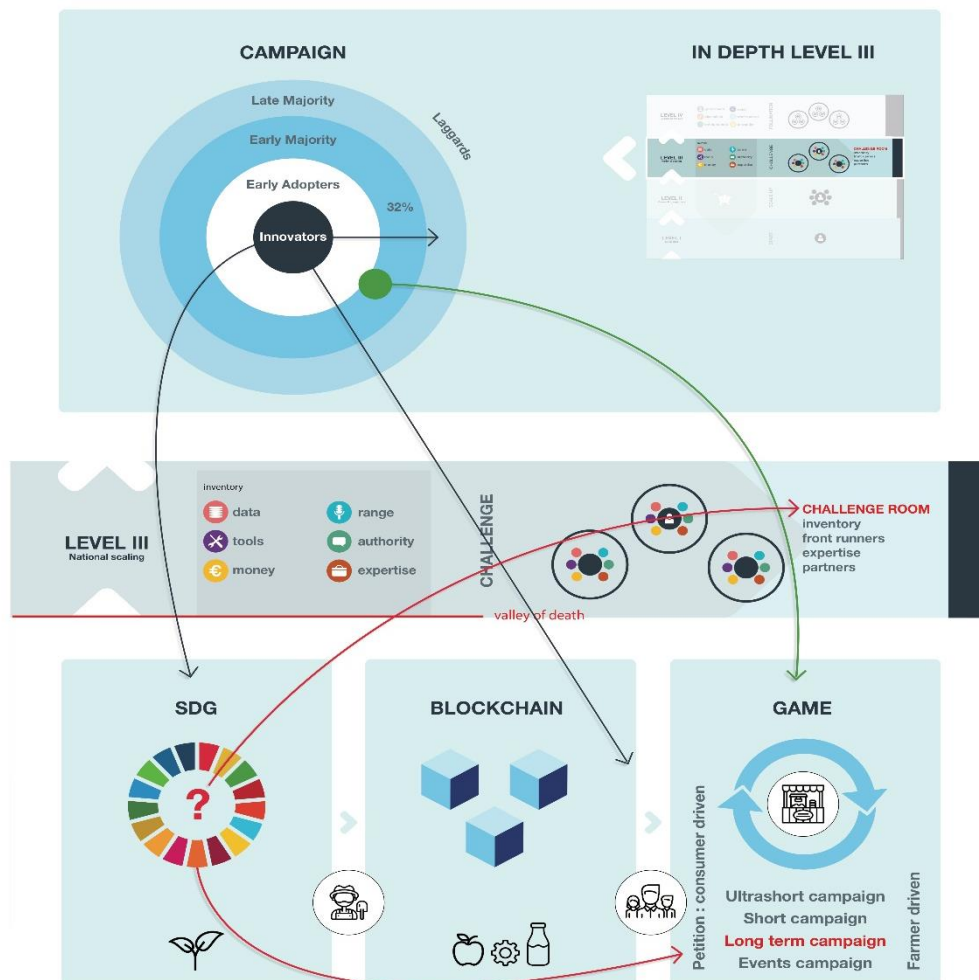
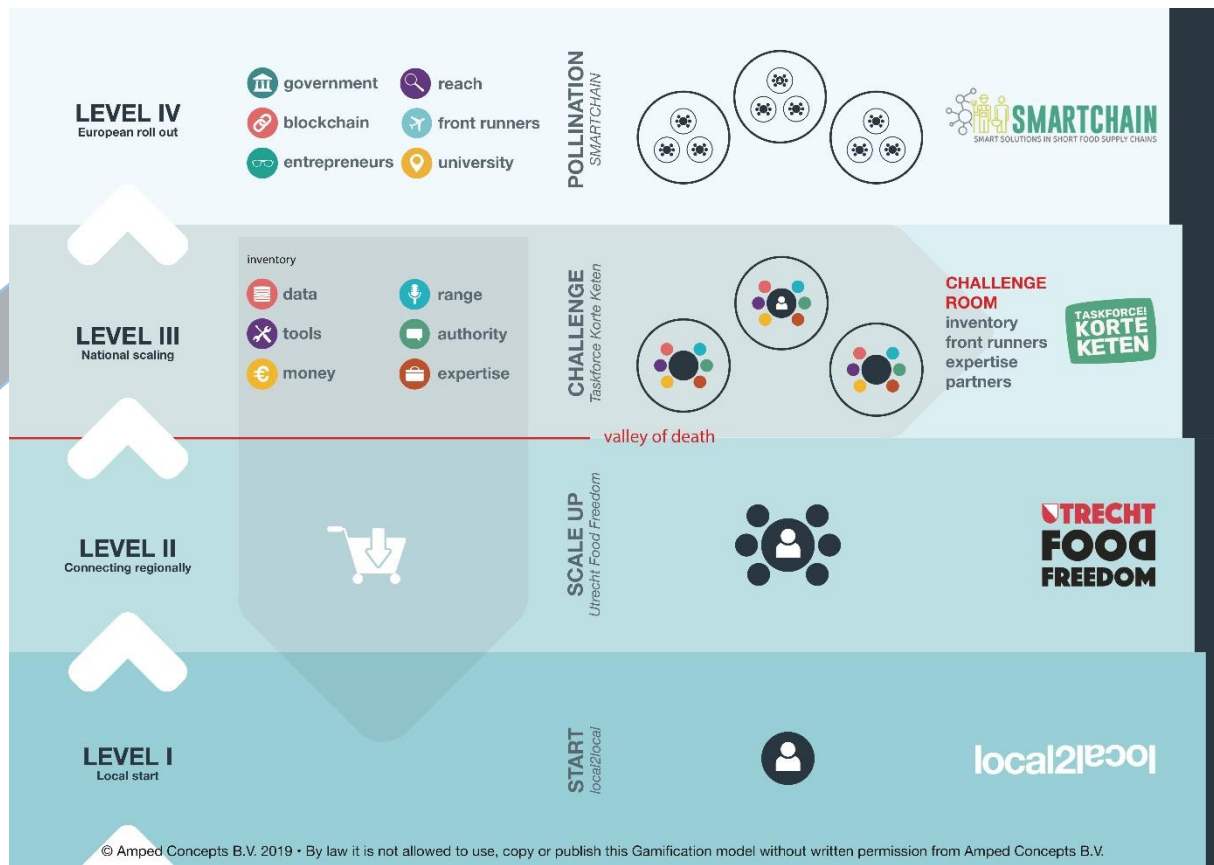
Figure A.I.: Structure of an Innovation System (adopted from Hekkert et al., 2007).

Appendix III SFSC innovation system actor map



Link: <https://drive.google.com/open?id=1DV9xMAeyhu0BitAhWJhabnL4IPs03Hwc&usp=sharing>

Appendix IV Gain transition model by Amped



Appendix V Observation overview

Category	Activity	Date	Activity	Attendees	Notes
Internal meeting	Introduction meeting	4-2-2019	Kick-off internship	Company supervisor	Explanation of system transition model designed for short supply chains
Internal meeting	Taskforce Korte Keten Meeting	6-2-2019	Meeting for the next phase of the TKK	TKK taskleaders	Discuss what the activities of the next phase will entail (after kicking off the TKK officially last year)
Internal meeting	Meeting Local2Local	12-2-2019	Discussing collaboration forms	HKU students, Groentetas, Local2Local	Defining a new distribution strategy for local fruit and vegetables offered by groentetas at the HKU locations
Internal event	Visit of client	18-2-2019	Media content for new client	Zorgboerderij Rijsweerd	Experiencing the importance of personal connection within the short supply chain network, including the collaboration with less abled patients as social inclusion aspect.
Internal document	Document phase 2 TKK	19-2-2019	Documentation	-	Insights in the planning for the next phase of the development of the TKK ecosystem
Internal meeting	Taskforce Korte Keten Meeting	20-2-2019	Next phase of TKK	TKK taskleaders, foodcabinet	Defining the communication strategy and the website lay-out through an interactive session
Internal document	Network database	12-3-2019	Network analysis	TKK taskleaders	Received the collective LinkedIn contacts of all TKK taskleaders for a social network analysis and ecosystem analysis
Internal meeting	Meeting taskleader	13-3-2019	Interview	Drees Peter van den Bosch	Discussing the business ecosystem of Willem&Drees and the overall innovation ecosystem of short supply chains in the Netherlands. Finally defining the aim of the regional meetings of short supply chains of Zuid-Holland and Utrecht
Internal meeting	Meeting taskleader	15-3-2019	Interview	Mike Venekamp	Discussing the business ecosystem of Atlantis Handelshuis and the overall innovation ecosystem of short supply chains in the Netherlands. Finally defining the aim of regional meetings of short supply chain parties within the Province of Noord-Hollandj
External meeting	Meeting	28-3-2019	Meeting	Menno van Ginkel	Expert in Blockchain and short food supply chains. Gained insights in the previous network analysis of TKK and research on short supply chains in the Netherlands conducted by Menno van Ginkel
External event	Foodprint Region	28-3-2019	Event	Rabobank, Schuttelaars and Partners, Universiteit Utrecht, Municipality Utrecht, Utrecht Province	Network event with the focus on new Business model innovations for the Food sector
Internal meeting	Taskforce Korte Keten Meeting	2-4-2019	Communication strategy	TKK taskleaders	Defining the communication strategy for the regional gatherings of short supply chain parties and the website lay-out results were presented
Internal meeting	Meeting Jan Willem van der Schans	14-4-2019	Meeting	Jan Willem van der Schans	Meeting about collective system building within SFSCs
Internal document	SFSC landscape database for Smartchain	29-4-2019	Documentation	n.t.	Received the invitation list of the Regional events for TKK, plus data from interviewees
Event	TKK region event Gelderland, Overijssel	13-5-2019	Network event	SFSC initiatives	Elaboration of the next phase within the TKK program in collectively creating shared value and collaborations
Event	TKK region event Brabant, Limburg	20-5-2019	Network event	SFSC initiatives	Elaboration of the next phase within the TKK program in collectively creating shared value and collaborations
Event	TKK region event Noord-holland, Utrecht, Flevoland	23-5-2019	Network event	SFSC initiatives	Elaboration of the next phase within the TKK program in collectively creating shared value and collaborations
event	Nieuwe boeren familie middag	24-5-2019	Network event	farmers, government and businesses	Network event with the focus on creating new partnerships and connections between farmers, government and businesses
internal meeting	Taskforce Korte Keten Meeting	13-6-2019	Meeting	TKK taskleaders	Defining next program rounds for challenge rooms with short chain initiatives