

1 General introduction

Driven by the productivity paradigm of the green revolution, today's agri-food systems¹ have seen substantial increases in food productivity over the past decades (Gaitán-Cremaschi et al., 2019; Qaim, 2017). This has resulted in a corporate food regime (McMichael, 2009) determined to provide cheap food in large quantities to many people. It is generally assumed to have achieved this goal, despite 3.1 billion people still not being able to afford a healthy diet in the year 2020 (FAO, 2022). These achievements are paralleled by substantial failures in environmental and social sustainable production practices and addressing them becomes more urgent by the day. Shortcomings can, for example, be seen in the lack of climate adaptation across agri-food systems and their failure in addressing the double burden of malnutrition (Herrero et al., 2021; Reardon et al., 2021). Therefore today's agri-food systems, just as the economic system in general, is in urgent need of transferring to a more sustainable trajectory (Herrero et al., 2021). What is required is a revolution of agri-food systems, leading to an agri-food regime, characterized by environmental and social sustainability paradigms. This requires the shared effort of all actors present in the agri-food system while the path to success is laid out in the sustainable development goals (SDGs) (Barrett et al., 2020; United Nations, 2022). Deeply integrated into the SDGs as well as current research frameworks that discuss sustainable development pathways of agri-food systems, e.g. bundling innovation (Barrett et al., 2022; Meynard et al., 2017) or food system approach (Gaitán-Cremaschi et al., 2019), is the awareness that successful transition requires a merge of socio-technical innovations (Barrett et al., 2020, p. 974; Gaitán-Cremaschi et al., 2019).² Such innovation emergence can help attenuate trade-offs and externalities that oftentimes parallel individual agri-food system innovations. Thereby, it can increase the implementation of innovations supportive of SDG targets on a wider scale (Barrett et al., 2022). An example for such an approach is provided by the European Union's Farm to Fork Strategy which aims at facilitating innovation in many different parts of the agri-food system while simultaneously trying to merge these innovations into a shared sustainable strategy (EEB, 2020; European Commission, 2020; Riccaboni et al., 2021). Agricultural food supply chains (AFSC), a key component of agri-food systems (Gaitán-Cremaschi et al., 2019), describe an important contributor in reaching SDG targets (Djekic et al., 2021; Herrero et al., 2021) which is why they place at the heart of many sustainable driven policy interventions such as the European Farm to Fork Strategy (European Commission, 2020; Riccaboni et al., 2021). In particular, AFSC are assumed to have a large contribution to reaching the SDG 2 – Zero hunger and SDG 12 – Sustainable consumption and production (Djekic et al., 2021). Moreover, their contribution to other SDGs such as poverty alleviation (SDG 1) or promotion of global sustainable partnerships (SDG 17) is expected to be high. These contributions can be traced back to the many different actors present within AFSC as well as the different types of

¹ In line with (Barrett et al., 2022, p. 1) we favor the description "agri-food".

² Innovation bundles facilitate sustainability in agri-food system by developing "socio-technological innovation bundles" (Barrett, Benton, et al., 2020, p. 974), combining "novel science and engineering with "softer" institutional, policy and sociocultural innovations" (Barrett, 2021, p. 423). This is not to be confused with the bundling of product attributes that has also been discussed in the context of agri-food systems such as AFSC (Zilberman et al., 2022). Furthermore, with regard to the SDGs other innovation types such as "environmental innovations" are oftentimes brought forward. Yet, these innovations must be considered a combination of prior technological or social innovations.

innovations present within AFSC such as technological innovation (e.g. digitalization) and social innovation (e.g. sustainable consumer trends). Thus, AFSC describe one component of agri-food system where the merge of different innovation types takes place regularly. Resulting AFSC innovations can provide a high potential to modernize the current food regime in line with SDG targets (e.g. increased climate smart agriculture production) and possibly lead to the emergence of new agri-food regimes, too (Barrett et al., 2022; Gaitán-Cremaschi et al., 2019).

Among the many AFSC actors, it is consumers and primary producers that seem to have a particularly large effect on reaching SDG targets (Djekic et al., 2021; Terlau et al., 2019; United Nations, 2022, p. 19 ff.). Regarding consumers, this happens as their consumption patterns influence multiple SDG targets simultaneously, such as SDGs that influence individual wellbeing, e.g. SDG 3 – Good health and wellbeing, as well as SDGs that provide more generic benefits to all AFSC actors, e.g. SDG 13 – Climate action (Djekic et al., 2021). Two developments appear to have a particularly large impact on whether and how consumers contribute to the described SDGs. Firstly, consumers' rising awareness of the importance of sustainable food consumption. This development is highly noticeable among current food consumption trends such as the increasing demand for food products that contain social sustainability labels in high-income countries (Fiedler et al., 2020; Globescan, 2017). Consumers' request for sustainable production practices can substantially support AFSC SDG contribution and has been, for example, identified as one reason behind the recently introduced supply chain due diligence law in Germany (Zamfir, 2020). Secondly, digital innovation developments have not only improved traceability and transparency of food products to consumers (Galvez et al., 2018; Prause et al., 2021), but also intensified food related information exchange. Among consumers, especially the information exchange through social media platforms can lead to rising awareness of the importance of sustainable consumption practices and the emergence of sustainable food consumption trends (Bedard & Tolmie, 2018; Choudhary et al., 2019; Southey, 2019). Thus, in line with the discussed perspective on merging innovations (Barrett et al., 2022; Gaitán-Cremaschi et al., 2019) there is rising awareness that not only social or technological innovations foster sustainable consumption practices, but also that there seems to be a reinforcing relationship between innovations from both fields, imposing a shared influence on sustainable food consumption patterns (Bedard & Tolmie, 2018; Elghannam et al., 2018). Nonetheless, there are still a number of insufficiently understood barriers to the wider adoption of sustainable food consumption practices and, given the novelty of current digitalization trends, their impact on sustainable food consumption practices is also still poorly understood (Elghannam et al., 2020; Hemmerling et al., 2016; Moon et al., 2017). Studying these research gaps could help design policy interventions that support the further development of sustainable consumption patterns and thereby enhance AFSC contribution to reaching the SDGs.

Primary producers, thus farmers, describe a key contributor towards fulfilling multiple SDG targets by providing large quantities of high-quality food (SDG 12) with the ability to establish social (SDG 5) and environmental (SDG 13) sustainable production practices (Abraham & Pingali, 2020, p. 177; Djekic et

al., 2021; Terlau et al., 2019). Yet, how farmers integrate different SDG led policy interventions into their subsequent decision process remains difficult to answer. This emerges from the circumstance that many SDGs not only target enhanced economic farm profitability (e.g. SDG 2 – Zero hunger) thus, follow a profit driven decision process of farmers, but also incentivize a change in the socio-cultural farm structure (e.g. SDG 8 – Decent work and economic growth). Socio-cultural elements constitute the socio-cultural context that farming as a profession is deeply embedded in. To many farmers, farming as a profession is not simply a source of income but a way of life. Therefore, aspects such as maintaining a family tradition, maintaining stewardship of their land but also receiving social acceptance by their wider community for their farming practice describe important decision determinants outside profit-based considerations (Fitz-Koch et al., 2018, 2019; Rose et al., 2018; Vik & McElwee, 2011). Changes that farmers induce to their socio-cultural environment when implementing SDG led technological or policy interventions, describe an important determinant of their decision process. For example, small-holders in India are found to refrain from the adoption of technological innovations (e.g. climate resilient plants) if the associated changes in their socio-cultural environment are considered to not be acceptable (Maertens, 2017). How these socio-cultural dynamics influence farmers' decision-making processes, remains very little understood (Barrett, 2004; Fitz-Koch et al., 2018, 2019). What is missing is a closer examination of how socio-cultural dynamics can be conceptually integrated into the decision-making process of farmers. Furthermore, an initial analysis of their degree of influence within the larger decision-making process of farmers is required (Barrett, 2004; Fitz-Koch et al., 2018; Maertens, 2017; Rose et al., 2018). Learning about the influence of socio-cultural elements in the decision process of farmers could not only highlight the importance of socio-cultural elements in meeting SDG targets, but also improve the general understanding of the factors that influence farmer's strategic decisions outside profit-based motives (Fitz-Koch et al., 2018) as well as organization and dynamics of AFSC (Cantor et al., 2022; Howe & Jin, 2022).

What is common to both, sustainable food consumption patterns and farmer's strategy application, is the influence that social network dynamics impose. Among consumers, this results from the exchange of food and trend related information, possibly accelerated by current digital innovations. Among farmers, shared socio-cultural characteristics emerge from social network dynamics (Barrett, 2004), while social acceptance of farming practices is mostly obtained through an exchange with other social network peers. Yet, in both cases, the behavioral outcomes resulting from prior social network influence and their effect on AFSCs contribution in achieving SDG targets, require further analysis. This dissertation contributes to this firstly by analyzing characteristics of current consumer trends that show a strong receptiveness to social interaction, sustainability motives and digital innovation. Furthermore, this dissertation analyses implications of observed consumer trend characteristics on the formation of possibly more sustainable AFSC. The aim is to develop 'hands-on' practical implications for the private sector and policy makers to support sustainable consumption practices. Furthermore, it introduces novel research frameworks with the ability to incorporate social and technological innovations into consumer's

food consumption motives. The second major contribution of this dissertation is an analysis of the influence that the information exchange of socio-cultural elements among social network members imposes on farmer's strategy application within AFSC. It sets out to improve our understanding on how socio-cultural elements can be integrated into current theories on the organization of AFSC and entrepreneurial behavior. Furthermore, it investigates the degree of influence that socio-cultural elements impose on the strategic decision process of farmers.

The remaining chapter is structured as follows: First, background information on the theoretical perspective of food supply chain networks (FSCN) is provided. This is necessary as this dissertation focuses on the outcomes of consumer's and farmer's social-network dynamics which take place within FSCN. Part I takes the market for fruits and vegetables in Germany as case under research. This chapter provides a generic perspective on current consumer trends and challenges to farm management as well as their interactions within one agri-food system. Part two provides a detailed elaboration of the existing research gaps regarding consumer sustainable consumption trends. Part three outlines prevailing research gaps among theories on supply chain organization and farmers' entrepreneurship with respect to the integration of socio-cultural elements. Lastly, in part four, the outline of this dissertation is briefly presented.

1.1 Background – Food supply chain networks

AFSC describe highly complex structures which are characterized by spatial distance, high dynamics and complex interactions of its different agents, including primary producers, suppliers, distributors, retailers and consumers (Trienekens, 2011; Trienekens et al., 2012; Yu & Nagurney, 2012). In the past, analysis of (agri-food) supply chains was fragmented into three different strings of research, namely governance structures (GS), supply chain analysis (SCA)³ and network analysis (NA) (Bijman et al., 2006, p. 15; Otter, 2014, p. 1). GS can be subdivided into the contingency theory approach (Lawrence & Lorsch, 1967) and theories related to new institutional economics, most prominently transaction cost theory (Williamson, 2010), agency theory (Eisenhardt, 1989) and property rights theory (Chaddad & Iliopoulos, 2013). They find application today for analyzing the influence of AFSC contingencies on AFSC organization and performance (Adetoyinbo, 2020, p. 38; Sonntag et al., 2016) while some theories, such as the agency theory, still find little application (Fayezi et al., 2012). SCA investigates interactions between firms of different supply chain tiers (Bijman et al., 2006, p. 15) and thereby applies a strong vertical supply chain perspective (Otter, 2014, p. 1). Essentially, it is customer driven and thrives to organize product movement efficiently across multiple supply chain tiers (Trienekens, 2011). The perspective offered by SCA is used today, for example, in AFSC resilience analysis to observe the changing interactions of agents at different tiers of the supply chain in response to external shocks (Voorn et al., 2020). NA focuses on the networks that firms are embedded in (Borgatti & Li, 2009). It thereby applies a strong horizontal perspective that focuses on firm interactions home to the same supply

³ This has sometimes also been described as Supply Chain Management (SCM) (Bijman et al., 2006)

chain tier (Bijman et al., 2006, p. 15). Research that applied NA emphasizes the importance of the network structure, such as firms position within different network types and linkages to other network members which can be subdivided into strong ties with close interaction and weak ties with looser interaction. Furthermore, linkages to other social network members can also be subdivided into hard ties (e.g. exchange of physical resources) and soft ties (e.g. information exchange, existing friendships) (Borgatti & Li, 2009).⁴ In comparison to SCA, NA does not investigate dynamics along the whole supply chain while, in difference to GF, it considers economic *and* socio-cultural firm interactions (Bijman et al., 2006, p. 15; Borgatti & Li, 2009). Regarding AFSC research the influence that social-network dynamics impose on the behavior of individual agents has been observed across all supply chain tiers, e.g. consumer product choices (Berger et al., 2019; Ellison, 2014), retailers AFSC engagement (Trivette, 2019) and farmers' strategy application (Fitz-Koch et al., 2019; Herforth, 2015).

To account for the rising complexity of (agri-food) supply chains SCA and NA were merged by Lazzarini et al. (2001) into the generic netchain approach that incorporates horizontal within tier and vertical between tier firm supply chain interactions. The netchain approach considers firms to engage in multiple horizontal networks while also, these networks are arranged sequentially based on vertical connections between firms that belong to different supply chain tiers (Lazzarini et al., 2001; Bijman et al., 2006, p. 16; Mesquita & Lazzarini, 2008). From this, research's perspective of food supply chain networks (FSCN) emerged that describe highly dynamic multi-tier network type chains within the agri-food system (Gaitán-Cremaschi et al., 2019). Since its introduction, the netchain approach has found empirical validation by analyzing the organization and performance of export orientated food supply chains (Otter et al., 2014) as well as non-exporting food supply chains (Adetoyinbo, 2020, p. 38). It has also shown receptiveness to dynamics that underpin described consumer food consumption patterns as the richness of communication tools used by supply chain agents is shown to impose an influence on FSCN organization (Theuvsen, 2004). In the case of farmers, socio-cultural elements such as social embeddedness (Nijhoff-Savvaki et al., 2012) and socio-cultural elements (Hofstede, 2003) have been successfully integrated into the netchain perspective, too. Thus, the netchain approach provides a good starting point to analyze outcomes of social network dynamics among consumers and farmers within AFSCN. The additional vertical perspective also allows for a projection on how within supply chain tier dynamics influence overall AFSC organization.

1.2 Part I – Food consumption and farm dynamics within the German agri-food system of fruits and vegetables

This chapter sets out to provide an example on how consumer food consumption trends and farmers' entrepreneurial behavior take place within one agri-food systems. It also highlights interactions between consumer's FSCN dynamics and farmer's FSCN dynamics. For this reason, the German market for fruits and vegetables is taken as case under research. This market can be considered a good representation of

⁴ For an extensive elaboration on NA in the supply chain management literature see Borgatti & Li (2009).

the challenges and dynamics observed among consumers and producers in many of today's agri-food systems. On the one hand, sustainable led consumer trends that have been observed in the larger literature (e.g. superfood consumption trend) are also present in the German market (BfR, 2020; FruitGrower-News, 2018; Gläßer, 2021). On the other hand, German fruit and vegetable farmers are challenged by an increasingly unpredictable business environment, similar to that faced by farmers in other agri-food systems. Farmers in Germany have to adapt ever more quickly to new consumer trends and the associated demands on agriculture, as well as to policy interventions that call for more sustainable production practices. In addition, the effects of climate change require an accelerated adjustment of their food production strategies to severe weather events such as prolonged droughts and substantial temperature fluctuations (Knoop & Otter, 2019; Wellner et al., 2017). With regard to the organization of AFSC the German market for fruits and vegetables can also be considered representative for developments that take place among AFSCs in many agri-food systems. As an example, the German market for fruits and vegetables has shown receptibility to the formation of short food supply chains that also has been observed in other agri-food systems (Loiseau et al., 2020; Renting et al., 2003).

The first part of this dissertation offers the following analysis of the German market for fruits and vegetables:

This chapter contains two studies, study I.I “*The German fruit and vegetable market in the year 2019*” and the study I.II “*The German fruit and vegetable market in the year 2020*”. In respect to the time period under consideration, both studies analyze the influence that weather and market contingencies imposed on the availability of fruits and vegetables in the German market while also changes in area under cultivation and consumer demand for different fruit and vegetable products are documented. In addition, study I.I provides a generic investigation of current developments and challenges across different tiers of the German fruit and vegetable supply chain. For this purpose, open-end interviews with experts from the production, trading and processing industry were conducted. Study I.II conducts additional analysis on changing fruit consumption patterns in Germany during the SARS-CoV-2 pandemic. It draws on two consumer surveys that were conducted before and during implementation of the first SARS-CoV-2 related curfew in Germany. Results are obtained through mean comparison.

1.3 Part II – Social and technical innovations in food consumption

Today's consumers, who can be considered part of one shared FSCN, require food products to fulfill a multitude of different sustainability led quality criteria simultaneously (Petrescu et al., 2020). This has given rise to the importance of sustainable food labels that verify sustainable production practices and lead to a large number of different sustainability focus food labels being present within the current food market.⁵ For example, up to 460 different ecologically focused food labels are projected to exist globally today (Morrison, 2021). Yet, sustainable consumption is also challenged by the resulting complexity of

⁵ Grunert et al. (2014) differentiate sustainable food labels into labels that target environmental or ethical sustainability. The latter is termed in the following as social sustainable food label.

the labeling landscape. Challenges arise as it becomes increasingly difficult for consumers to identify sustainability contributions of different food labels, thus to integrate them into their food purchasing process effectively (Moon et al., 2017; Willoughby & Gore, 2018, p. 86). Despite this development, consumer demand for food products with a sustainability label has mostly been analyzed through the lens of consumers' willingness to pay necessary price premiums. An absence in consumption was linked to internal consumer characteristics which has highlighted, among others, the importance of sustainability awareness (Konuk, 2019), trust in food labels (Eberhardt et al., 2020; Moon et al., 2017; Shih-Tse Wang & Chen, 2019) or perceived effectiveness (Willoughby & Gore, 2018). While the importance of these influencing factors is certainly justified, the complexity of the labeling landscape itself is increasingly seen as a major, yet under-researched, barrier to sustainable food consumption (Bäthge, 2018). Particularly, how consumer's knowledge of sustainable labels as well as their inability to differentiate between these labels influences their subsequent food purchasing decision requires closer analysis (Eberhardt et al., 2020; Moon et al., 2017). Yet, such analysis is missing so far. Findings would contribute to an improved understanding on how the existing labeling landscape can be designed in accordance with existing consumer capabilities to improve the influence of sustainable labels on sustainable food consumption.

Among some consumers, the existence of many sustainability led quality criteria (e.g. sustainable food labels, health benefits etc.) describes an important determinant of their food quality perception and corresponding food consumption decision. Moreover, a novel food consumption trend seems to emerge among these consumers. This trend evolves around the principal of consumers utilizing sustainable food attributes for the purpose of displaying sustainable awareness to social network peers that also can serve as a mechanism to display "social distinction" (Leal & Arellano, 2012; Oude Groeniger et al., 2017; Pampel et al., 2010). Mostly, this seems to result from the price premium that parallels sustainability attributes which some consumers have expressed to perceive as a luxury food characteristic (Hartmann et al., 2016; Schneider et al., 2015). So far, there is little understanding on the type of consumers that utilize sustainable food attributes for social comparable motives (Hartmann et al., 2017; Oude Groeniger et al., 2017) while corresponding food product categories, outside traditional luxury food products, have rarely been identified (Oude Groeniger et al., 2017). Gaining a deeper understanding on the type of consumer that utilize sustainability labels for social comparative motives can improve current understanding of the motives behind sustainable consumption and help target consumer groups receptive to sustainable consumption behavior more effectively.

Social media platforms are increasingly projected as important tools to the formation of short food supply chains (Elghannam et al., 2018, 2020). They can help producers to engage with consumers directly by offering low-cost marketing opportunities as of which producers have recently shown growing reliance on marketing and selling their food products through social-media platforms (Coates et al., 2020; FruitGrowerNews, 2018; Hemmerling et al., 2016). To consumers, social media platforms describe a tool through which they can exchange food related information and food related activities. Furthermore,

consumers have expressed willingness to engage in short food supply chains by purchasing food products through social-media platforms (Elghannam et al., 2018; Giampietri et al., 2016). Yet, there is little conceptual understanding of how the technological innovation of social-media marketing fits to different social innovations such as consumers' rising intention to compare sustainable food consumption patterns with social-network members. Furthermore, whether this provides scope to the formation of short food supply chains as not been analyzed either. For example, consumers might value the evitable sustainability premium that short food supply chains provide as an important consumption motive. Learning about this could provide a better understanding on the potential of social media platforms as a marketing tool to current sustainable led food consumption trends and investigate if their marketing potential provides scope for the formation of short food supply chains.

The second part of this dissertation addresses the identified research gaps as follows: The influence that consumer's knowledge and confusion impose on their purchasing intention of fruit products that contain sustainable food labels is addressed in study II.I "*How do consumers' knowledge and confusion influence purchasing behavior of fruit products with a social sustainability label in high income countries?*". To this end, a novel consumer comprehension framework that accounts for multiple types of consumer knowledge and confusion has been developed and integrated into a larger empirical framework. By taking German consumers as case under research, partial least square analysis is conducted to observe the influence of consumer's knowledge of and confusion over social labels on their purchasing intention of fruit products that contain social labels.

Characteristics of consumer groups that show intention to utilize sustainable food attributes for social comparative and luxury motives are analyzed in study II.II "*Who are the Superfoodies? New Healthy Luxury Food Products and Social Media Marketing Potential in Germany*". Superfood consumption in Germany is taken as case under research while the identification of different consumer segments takes place through factor and hierarchical cluster analysis.

Study II.III titles "*Can new healthy luxury food products accelerate short food supply chain formation via social media marketing in high-income countries?*". It investigates the influence of social media marketing on consumer's quality perception of superfoods while also discussing implications for the formation of short food supply chains. For this purpose, media richness theory (Brunelle, 2009; Daft & Lengel, 1986) is integrated into the food quality guidance model (Steenkamp, 1989; van Trijp & Steenkamp, 2005). The resulting framework is applied to the case of superfood consumers in Germany and analyzed through partial least square analysis.

1.4 Part III – Farmers complex business interactions in food supply chain networks

Social network dynamics underpin FSCN interactions and, in the case of farmers, can influence their strategic decision process, such as their decision to participate in different AFSC (Abdul-Rahaman & Abdulai, 2020; Benali et al., 2017; Dannenberg, 2012; Hansen & Trifković, 2014; Herforth, 2015). This

happens as social network dynamics reduce information asymmetries among social-network members (Barrett et al., 2012; Chaudhuri et al., 2021; Maertens & Barrett, 2013; Matuschke & Qaim, 2009; Wollni & Andersson, 2014). For example, due to the density of international food certifications schemes, smallholders oftentimes rely on information from social-network peers that already comply with a given certification before entering supply chains with similar certification requirements (Dannenbergh, 2012). Most of the existing research that analyzes the influence of social network information on farmer's decision process has applied a structural social network analysis or focused on the exchange of purely business related information (Banerjee et al., 2013; Maertens, 2017; Mozumdar et al., 2019). The former have linked individual farmers through "weak" and "strong" social ties with more or less progressive farmers around them or identified the farmers' degree of "centrality" within their social network (Borgatti & Li, 2009; Zhang et al., 2020). The latter assumed that, based on a not further defined social network structure, farmers acquire business related information (e.g. information on the profitability of different supply chains and entry requirements) which then influences their strategic decision process (e.g. technology adoption, supply chain participation). For some time this has provoked novel insights and benefited our understanding of how FSCN dynamics among farmers influence their participation in different AFSC (Herforth, 2015; Maertens & Barrett, 2013). At the same time, this also narrowed the perspective of the importance of farmers' social networks to that of a supplier of mainly business related information (Maertens, 2017). Furthermore, farmers' strategic decision process has been reduced to one in which contingencies arise mainly from their business environment (Henderson & Isaac, 2017; Ross & Westgren, 2009; Troost & Berger, 2015). What most of this research seems to have missed is the circumstance that farmers and ultimately humans, are social characters (Barrett, 2004; Fitz-Koch et al., 2018; Hofstede, 2019; Maslow, 1943). Therefore, socio-cultural elements such as farmer's own identity, which oftentimes exists through multiple layers (e.g. norms and values) (Barrett, 2004; Hofstede, 2019), and different social group identities such as farming culture (e.g. farming as a family tradition) also influence their strategy. As mentioned, their influence, at times, might nudge farmers to foresee profitable business opportunities for social reasons (Brandth & Haugen, 2011; Fitz-Koch et al., 2018, 2019; Maertens, 2017; Rose et al., 2018). Yet, their influence on farmers' strategic behavior and with that on FSCN dynamics and AFSC organization remains understudied (Barrett et al., 2022; Cantor et al., 2022; Fitz-Koch et al., 2018, 2019; Howe & Jin, 2022).

In supply chain literature, multiplex relationships introduce the assumption that the exchange of business related information and socio-cultural information takes place simultaneously among social network agents (Borgatti & Li, 2009; Cantor et al., 2022; Howe & Jin, 2022). In the case of farmers this means business-related information is exchanged via their business relationships while an exchange of socio-cultural information takes place through personal relationships.

This concept, for example, has proven fruitful when investigating AFSC resilience (Voorn et al., 2020). Yet, for analyzing FSCN dynamics and farmers' strategic behavior within these networks, the concept of multiplex relationships has not sufficiently been integrated into existing theories. Regarding FSCN,

the netchain approach (Lazzarini et al., 2001) has received much attention (see this chapter's background section). In addition, it has been further conceptualized through the introduction of lateral agents recently (Adetoyinbo, 2020, p. 38). Nevertheless, the currently existing conceptualization of horizontal netchain interactions does not sufficiently reflect the depth of interactions that is suggested by multiplex relationships. While the netchain approach postulates that an information exchange via business and personal relationships takes place (Lazzarini et al., 2001), it does not consider this exchange to take place simultaneously. Consequently, there is a lack of depth in the consideration of horizontal netchain interactions, as the influence of business and personal relationships on vertical supply chain organization can currently only be studied separately.

Regarding the latter, farmers' strategic behavior is oftentimes viewed through the lens of entrepreneurial theory (Gartner, 1988; Manyise & Dentoni, 2021). Research on entrepreneurship is rich with a variety of theories, including theories that incorporate personal relationship dynamics (Hagen, 1963; Weber, 1904). To us, the most promising theory among them is the "Withdrawal of status respect theory" of Everett E. Hagen (1963). Essentially, this theory builds on the concept of status-power theory (Kemper, 2006, 2011)⁶ which postulates that the underpinning motive to all human activity is their thrive to receive social acceptance. In the theory of Hagen (1963), entrepreneurial activity is aimed at receiving social-status premiums or to regain social-status entrepreneurial activity. Expressed differently, entrepreneurial activity is sparked by agent's thrive for social-status gain. While this theory includes an important element of personal relationship dynamics, namely status-power relationships (Kemper, 2006, 2011), it shows an insufficient receptiveness to the broader field of socio-cultural elements that prevail within personal relationships. For one, Hofstede and Liu (2020) point out that within strongly hierarchical organized society's individuals with lower social status are more willing to regard their status as a natural development, thus are more likely to accept social-status loss. In such cases entrepreneurial activity could still be sparked but would unlikely result from prior social-status loss. Second, many theories on entrepreneurship show little receptiveness to other socio-cultural elements, e.g. cultural background, personal preferences. Yet, the importance of these socio-cultural elements to human behavior in general (Hofstede, 2019) and farmer's strategic behavior in specific (Barrett, 2004; Fitz-Koch et al., 2018; Maertens, 2017) is substantial. Hence, among the different strings of entrepreneurial theory, even the ones with a finer inclination towards socio-cultural dimensions do not incorporate personal relationship dynamics to the necessary degree. In addition, the simultaneous influence that multiplex relationships suggest, namely the influence of business and personal relationships, seems insufficiently integrated into current theories on entrepreneurship.

The third part of this dissertation addresses the identified research gaps as follows: Study III.I titles "*Integrating multiplex relationship dynamics into farmers' strategic decisions within food supply chain*"

⁶ Status-power theory is defined by (Kemper, 2011) as "Relational activity occurs in two main forms [...] either one can comply voluntarily or one can be coerced into involuntary compliance. The former broadly covers what I call status and the latter power"