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Article — Published Version

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Business and Society Review

Provided in Cooperation with:

John Wiley & Sons

Suggested Citation: Royer, Susanne; Simon, Maike (2023) : Small but powerful—local value chains and sustainability-oriented approaches in the agri-food sector, Business and Society Review, ISSN 1467-8594, Wiley, Hoboken, NJ, Vol. 128, Iss. 2, pp. 331-366, <https://doi.org/10.1111/basr.12315>

This Version is available at:

<https://hdl.handle.net/10419/287997>

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Small but powerful—local value chains and sustainability-oriented approaches in the agri-food sector

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Abstract

Regional and local value creation is seen as one solution for reducing the environmental impact of the agri-food system. The point of reference for this research is the powerless position of small actors in agri-food chains. This paper gives insights into the motivation of small-scale producers in developed countries to exit national and export markets and to opt for a sustainability orientation. Specifically, we explore how the powerlessness of small actors in global value chains may fuel the formation of regional and local value chains. Through a regional case study, we map the dairy value system and identify three different value chain structures in the Northern German dairy industry. Then, we illustrate how some small (organic) raw milk producers have changed their position in the value chain and bargaining strength by following different upgrading strategies. Their increase in bargaining power comes with efficiency losses and

An earlier version of this paper with preliminary findings and a broader approach has been accepted for presentation at the ANZAM 2021 conference held in December 2021 in Perth/Australia under the title “Small, sustainable but powerful—On the transformation of value chains in the dairy industry in Northern Germany”. Thanks go to the co-authors of that version, Luisa Klomburg and Hanna Siebke, for their contributions. A further developed version has been accepted for presentation at the Nordic Workshop on Interorganizational Research held in April 2022 in Kolding/Denmark. Thanks go to the workshop participants for their constructive feedback.

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increased risk. Implications for small-scale producers and society are discussed and brought together in a framework that demonstrates the drivers and challenges for sustainability-oriented small-scale agricultural producers to achieve a stable and competitive position within the market.

KEYWORDS

dairy industry, sustainability, upgrading strategies, value chain

1 | INTRODUCTION

“Industrial agriculture” has a highly negative impact on the environment (George et al., 2021, p. 1001). Possibilities for small farmers to be profitable in alternative sustainability-oriented forms are, however, under-researched (Ahearn et al., 2018, p. 471). Even though it has been shown that local does not necessarily mean more sustainable (Forsell & Lankoski, 2015; Kiss et al., 2019; Schmitt et al., 2016, 2018; Stein & Santini, 2021), one avenue for enhancing sustainable development strategies in the agri-food system may lie in local value creation. This research aims to investigate the phenomenon of regional and local agri-food value chain formation. Specifically, we focus on the role of small-scale sustainability-oriented players. In our understanding, these are characterized by a sustainable development strategy in terms of “not merely seek[ing] to do less environmental damage but, rather, to actually produce in a way that can be maintained indefinitely into the future” (Hart & Dowell, 2011, p. 1466).

In the last decade, overproduction and a saturated domestic market have led to a strong export orientation of the German dairy industry (Bundesanstalt für Landwirtschaft und Ernährung [BLE], 2021). Raw milk prices are highly volatile as demand for dairy products is influenced by EU and world market developments. Examples are Russia’s import ban on agricultural products in 2014 (European Commission [EC], n.d.), the significant drop in milk prices due to the weak international demand in 2016, the European drought in 2018 that led to lower forage yields and quality (Landesportal Schleswig-Holstein [Landesportal SH], n.d.-b), and the surging demand and exploding costs for farmers and dairies, which have pushed prices in 2022 (Zinke, 2022). The number of dairy farms has been decreasing for years (BLE, 2021) and the industry is going through consolidation (Lehmann et al., 2016). Retailers serving consumers with dairy products have been concentrating, and dairies have responded to the market pressures by mergers over the past decades (Bundeskartellamt, 2022; Grau & Hockmann, 2018).

In sum, the dairy value chain as a part of the German agri-food ecosystem includes globally successful dairies and retailers (Grau & Hockmann, 2018; Schoof et al., 2020). It “is characterized by power and information asymmetries, which influence the price-making decision to the disadvantage of the farmers” (Lehmann et al., 2016, p. 54). In this challenging business environment, small-scale dairy farmers perceive their chain role as “unjust” (Lehmann et al., 2016, p. 67). These observations make the dairy industry a relevant context to investigate, and therefore, we explore the case of the Northern German dairy industry in this paper.

Next, we review the literature on different types of value chains and the role of small players and sustainability concerns in these chains, combined with elaborating our conceptual

framework for the investigation of the Northern German dairy value (chain) system. Then, the case-based research strategy is explained and justified. Building on this fundament, the case is introduced and the findings are presented and discussed before conclusions are outlined.

2 | LITERATURE REVIEW AND CONCEPTUAL FUNDAMENT

Value chains can be defined as a systematic approach to describe and categorize value-adding activities (Porter, 1986, p. 13). Different configurations of the value chain can be conceptualized (Stabell & Fjeldstad, 1998), and in different industry contexts, different forms of value chains can be identified (Buciuni & Pisano, 2021; Gereffi et al., 2005). Analyzing value chains is not limited to one firm, but firm-internal chains are embedded into supplier and buyer value chains (Porter, 1985).

Following this understanding, in a typical dairy value chain, necessary inputs go into the cow milk production, followed by the first processing stage, including the production of fresh milk products, butter, cheese, industrial milk, condensed milk products, or milk products in powder form. Milk processing stage II includes the production of baby food, chocolate, ice cream etc. (BLE, 2021). In addition, dairies provide intermediate and end products for the processing industry (BLE, 2021, p. 7). Value-adding activities around branding, marketing, and distribution follow before products are sold to final customers (see Figure 1).

The (bargaining) power of smaller players in value chains is usually limited. However, smaller players—for example, by better exploiting new digital possibilities—may improve their power position (Berti & Mulligan, 2016; Strange & Zucchella, 2017). In a conventional dairy value chain, the bargaining power of (upstream) farmers can be characterized as low while the bargaining power of (downstream) retailers is high. The market power of conventional dairy farms, due to their small size and homogenous product is low, and differentiation advantages are difficult to achieve. The perishable nature of milk and dairy products makes logistics and storage central in all value chain activities (BLE, 2021, p. 7).

So far, regional and local value chains are often investigated with a focus on developing countries and sectors, such as agriculture and apparel (Krishnan, 2018; Lie et al., 2012; Ncube et al., 2017; Pasquali et al., 2021). The COVID-19 pandemic recently gave a push toward regionalization of value chains in developed countries (Pla-Barber et al., 2021), when these were affected by shortages of medical equipment and supplies. This may lead to “regional supply chains (or near-sourcing), along with other preferred suppliers, [...] [as] an important mechanism for diversifying risk in the future” (Gereffi, 2020, p. 297). New technologies, such as 3D-printing, may push the regionalization of value creation (Rehberg & Ponte, 2018). Pla-Barber et al. (2021, p. 207) see research opportunities in this increasing relevance of value chains regionalization.

Sustainability is a topic of high relevance in the strategy field (Cantele & Zardini, 2018; Danso et al., 2019; George et al., 2021; Hart et al., 2016; Husgafvel et al., 2018; Roxas



FIGURE 1 The dairy value chain. Source: Own compilation.

et al., 2017; Walsh & Dodds, 2017). That is reflected in research on (global) value chains (Connell et al., 2018; Sarkis, 2021) and the regionalization/domestication of value chains (Gong et al., 2022; Kamakura, 2022). Consumers are increasingly interested in sustainably produced food and often perceive local production as positive (Korhonen et al., 2017).

This gives organic milk producers a somewhat better position than their conventional counterparts. Organically produced milk may contribute to environmental sustainability (due to stricter environmental regulations). The organic milk sector is growing in the majority of EU countries, and the share of organic milk cows in herds is increasing EU wide, with Poland and Estonia being exceptions to this trend (EC, 2021). The growing organic milk market and the time-intensive switching process from conventional to organic production lead to better prices in this market niche. Due to the specific rules for organic milk production, organic milk producers can be regarded as environmentally sustainable players. Transparency is essential in order to send out credible signals, necessary to convince consumers that the “credence good” (Darby & Karni, 1973) milk is produced in an environmentally sustainable fashion.

Regional value chains here are understood as linking actors in one region characterized by common overarching regulations, such as it is the case in the EU (Pasquali et al., 2021, p. 370), and also on the level of one country. Local value chains are regarded as connecting “local supply with local demand” (Lie et al., 2012, p. 57). Ahearn et al. (2018) take the growing popularity of local food chains in the U.S. market as a point of reference for a quantitative study of financial firm performance of farms embedded in local value chains. They highlight that research is still scarce regarding “the farm-level analysis of farmers who produce for local food markets” (Ahearn et al., 2018, p. 471).

The competitiveness of small farms is the focus of a study by Berti and Mulligan (2016), who investigate “the creation of new supply chains” (Berti & Mulligan, 2016, p. 2) with a focus on “regional and local food hubs” (Berti & Mulligan, 2016, p. 2). They identify the “reconstruction of regional and local agri-food systems” (Berti & Mulligan, 2016, p. 22) as one avenue toward competitiveness of small farms and identify a lack of research in this area for the European context (Berti & Mulligan, 2016, p. 24).

To address the research deficit outlined so far, our first research question is: How can the phenomenon of regional and local agri-food value chain formation be illustrated for the Northern German dairy value system?

Global value chain analysis has been frequently used to identify governance structures (Gereffi, 2019; Gereffi et al., 2005). Governance in this literature is understood as “non-market coordination of economic activity” (Gereffi et al., 2001, p. 4) and analyzed in global value chains where certain actors can influence other actors, providing diverse value-adding activities (Gereffi et al., 2001). In the reasoning of the global value chain literature, actors create governance structures with “consequences for the access of developing country firms to international markets and the range of activities these firms can undertake” (Gereffi et al., 2001, p. 4). Buyer-driven value chains, such as those dominated by large grocery retailers, are discussed on a global scale in this literature (Gereffi, 2020, p. 289). The global value chain literature has a focus on “how the international production networks of firms were organized and controlled, and how the uneven distribution of gains from globalization could be accessed by firms, states, and other social actors in developing economies” (Gereffi, 2019, p. 240).

The literature on global value chains is one point of reference here: We link into Lee et al.’s (2012) investigation of the relationship between value chain structure and food safety that shows how global value chain analysis “provides a conceptual framework to capture the diverse conditions of small-scale producers in the contemporary agrifood industry” (Lee et al., 2012, p. 12326). Their analysis of governance structures in value chains especially draws attention to

the distribution of power, with a focus on small farmers in developing countries, where the so-called lead firms exert bargaining power on suppliers (Lee et al., 2012).

The global value chain literature suggests that involved actors may strengthen their own bargaining positions along four economic upgrading strategies (Gereffi et al., 2001, p. 5): product or process upgrading, as well as intra- or inter-chain upgrading. Thus, there are upgrading possibilities through the improvement of products or processes, the inclusion of new functions in a value chain a company is already embedded into, and/or through changing to a new value chain (Pla-Barber et al., 2021, p. 205).

Upgrading strategies are interesting for our investigation, specifically when coming in the form of environmental upgrading in terms of “the process by which economic actors move towards a production system that avoids or reduces the environmental damage from their products, processes or managerial systems” (Marchi et al., 2013, p. 65). All above mentioned economic upgrading strategies may include environmental upgrading processes (Marchi et al., 2013, p. 66). Building on Orsato’s (2009) four general types of competitive environmental strategy, Marchi et al. (2013) suggest the following: Economic product upgrading can include the environmental product upgrading strategy of eco-branding, while inter-sectoral upgrading can imply an environmental cost leadership. Economic process upgrading may occur in the form of eco-efficiency, while functional upgrading can lead to a (sustainability-oriented) differentiation strategy beyond compliance leadership (p. 63 and 66).

Dairy farmers may upgrade their product from conventional to organic milk or create more efficient milk production processes with smart farming technology. Forward integration into dairy processing would be an example of intra-chain upgrading. Inter-chain-upgrading can happen in the form of tourism-related activities on the farm. Environmental upgrading is connected to these different upgrading strategies. Changing to organic milk from conventional milk for instance reflects an environmental product upgrade. The upgrading strategies summarized in Table 1 form the conceptual fundament of our research. Building on this, a second research question is posited: Which upgrading strategies do small-scale sustainability-oriented players in the investigated agri-food value chains use?

In this research, new local value chains, initiated by upgrading initiatives of actors frustrated by their powerless chain positions, are of interest, next to changes in established chains.

TABLE 1 Upgrading strategies.

Types of upgrading	Economic upgrading	Environmental upgrading
<i>Process</i>	“transforming inputs into outputs more efficiently by reorganizing production systems or using superior technology”	May range from <i>eco-efficiency</i> in terms of saving cost through more environmental-friendly actions such as saving waste or energy to a more comprehensive differentiation strategy <i>beyond compliance leadership</i> .
<i>Functional</i>	“acquiring new, superior functions in the chain [...] to increase the skill content of activities”	
<i>Product</i>	“moving into more sophisticated product lines with increased unit values”	May range from <i>eco-branding</i> in order to ask premium prices toward <i>environmental cost leadership</i> coming with more radical change of the products/services or the sector of activity.
<i>Intersectoral</i>	“using the competence acquired in a particular chain to move into new sectors”	

Source: Rows 1 and 2 adapted from Gereffi (2019, p. 241), who builds on Humphrey and Schmitz (2002) and Gereffi et al. (2001); row 3 adapted from Marchi et al. (2013, 63;66), who build on Orsato’s (2009) competitive environmental strategies.

We adapt considerations and findings from the field of global value chains to dairy value chains that have been investigated to some extent recently (Grau & Hockmann, 2018; Lehmann et al., 2016; Popp & Nowack, 2020; Schoof et al., 2020). Lehmann et al.'s (2016) study is one of the few investigations of the German dairy value chain (undertaking a case study in the federal state of Lower Saxony). This study is a point of reference since it turns its attention to power distribution between actors and power imbalance in conventional dairy chains. Thereby, it helps to better understand the motivations of small companies to upgrade. This leads to our third question: What are the drivers and challenges for small-scale producers, with regard to entering local/regional sustainability-oriented niche markets?

3 | METHODOLOGY

This research is part of a broader project, investigating the value creation of sustainability-oriented small firms in the agri-food sector. During the data collection process via interviews, we became increasingly aware of the particular challenges of the regional dairy market. Therefore, this paper focuses on the dairy industry in Schleswig–Holstein and aims to explore the influence of the farmers' situation and recent market developments on the Northern German dairy value system by giving answers to the posited research questions.

Schleswig–Holstein is the most northern and fifth smallest federal state of Germany (Statistisches Bundesamt, 2021). It is the fourth largest milk producer among the 16 German federal states (Bundesinformationszentrum Landwirtschaft [BZL], 2021a), and dairy farming is its most important agricultural sector (Landesportal SH, n.d.-a). In the recent past, the EU agricultural sector was characterized by liberalization. Decreasing direct payments led to increasing uncertainties and more dependency on market and environmental developments for farmers (Popp & Nowack, 2020). This is also evident in Schleswig–Holstein.

A case study allows for an in-depth investigation of contemporary phenomena especially if the aim is explanatory in nature and “how” and “why” questions are addressed (Yin, 2018). A case study is suitable due to the strength of qualitative research to “get closer to the actor's perspective” (Denzin & Lincoln, 2011, p. 9). Our research strategy has allowed for an in-depth investigation of the contemporary role of producers in dairy value chains in Schleswig–Holstein as a real-life context (Yin, 2018).

Following Yin (2018), this case study contains both qualitative and quantitative data. To get insights into the actors engaged in the Schleswig–Holstein dairy value system, we made use of available secondary data, such as business and industry reports, and statistics provided by responsible ministries and government agencies. These publicly available data helped to better understand the overall development of the dairy market and formed the fundament for the identification and illustration of two different value chains in the investigated region. However, it became clear that regional and local value chains around smaller sustainability-oriented actors were not sufficiently reflected in these data. To also map these, interviews with owner-managers and senior managers of value chain actors constitute the main source of data.

Our data collection process with regard to the smaller sustainability-oriented actors followed a purposive sampling approach with the aim of identifying information-rich cases (Patton, 2009, p. 230; Siggelkow, 2007, pp. 20–21). It consisted of two main phases: First, we selected two companies with high regional visibility (a dairy farm and a delivery service for organic products). We identified both through much attention from local media (e.g., the dairy farm received a regional sustainability award during the data collection period). A snowball

sampling approach followed (Patton, 2009, pp. 237–238): Based on our interviews, we identified other actors involved in value creation, whom we gradually interviewed as well. This gave us the opportunity to fully map this third value chain, which, due to its comparatively small processed milk volumes, is hardly recorded in statistical data surveys. In the course of data collection, our attention was drawn to competitors and cooperation partners whom we interviewed to increase the internal validity of our results.

This approach gave us insight into the underlying motivation (the “why”) and ways (the “how”) of the formation of local/regional value chains. In total, we used material from 13 interviews with small dairy producers, their suppliers, buyers, and cooperation partners. Interviews were conducted in German, which was the interviewees’ native language, via video call, telephone, or face-to-face in April and May 2021. The relevant parts of the material used for this paper have been translated into English. All interviews were recorded and lasted between 48 and 105 min (see Appendix 1). Additionally, we used secondary data (such as social media channels, company websites, annual business reports, industry reports, and statistical databases from different institutions) for data triangulation to strengthen the validity of our study (Yin, 2010, pp. 78–82). All publicly available data sources were disclosed.

To answer our first research question, we put the findings into context by mapping the regional dairy value system with its different value chain structures based on the collected data. We uploaded and coded interview transcripts and other documents (e.g., transcribed excerpts from interviews on YouTube and company websites) using MAXQDA 2020 as qualitative data analysis software. In this way, we created a database that facilitates replication of the case study (Gibbert & Ruigrok, 2010, p. 715).

To answer our second research question, we based our coding on our conceptual fundament (Miles & Huberman, 1994). More precisely, we systematically coded our data referring to the upgrading strategies categories (see Table 1 again). Using the conceptual fundament established from the literature can be regarded as improving the reliability of our study (Wrona & Gunnesch, 2016, p. 740). We coded the data material regarding value chain structures (using the following codes: power position, development toward disintegration, development toward integration, value chain disruption and change, and regionalization), and sustainability-related, as well as other valuable assets on the firm-level, the interorganizational level, and the local level (using the following codes: core competencies, valuable firm-internal sustainability resources, valuable firm-internal other resources, valuable inter-organizational other resources, valuable local sustainability resources, and valuable local other resources), see Appendix 2 for the list of codes sorted according to Mayring and Fenzl (2019, p. 639). This helped to come to a better understanding of how small sustainability-oriented players in the sector contribute to sustainable development while successfully staying in the marketplace. Although the nature of the research is deductive in terms of building on a conceptual foundation, we have allowed codes to emerge from the data (e.g., Kuckartz, 2016, p. 95). Finally, addressing our third research question, we sought a finer understanding of the drivers and challenges of small producers in pursuing different upgrading strategies.

4 | CASE OF THE SCHLESWIG–HOLSTEIN DAIRY INDUSTRY

Even though the German dairy industry is generally highly dependent on exports to the EU and third countries (BLE, 2021, p. 27), despite the COVID-19 pandemic, farmers in Schleswig–

Holstein/Hamburg[‡] delivered 2.98 million tons of conventional cow's milk to German dairy companies in 2020, an increase of 1.7% compared to 2019. The delivery of organic cow's milk even rose by 4.3% to 44,164 tons (Bundesinformationszentrum Landwirtschaft [BZL], 2021a). This shows that the organic milk trend of previous years continues (BLE, 2021, p. 14) and influences the milk prices paid by dairies. Prices for organically produced milk were higher and less volatile compared to those of conventionally produced milk, which, in addition, have been rather falling for years (see Figure 2).

Dairy farmers are greatly affected by the high volatility of milk prices paid by German dairies, which are influenced by the EU and world market developments. For instance, in 2016, the weak demand on the international markets led to a significant drop in milk prices, while in 2022, after Russia invaded Ukraine, surging demand and exploding costs of farmers and dairies increased prices immensely (Zinke, 2022). As a consequence, the German dairy industry is characterized by structural change. For many years, the number of dairy cow farms has been falling, in Schleswig–Holstein from 5260 in 2010 to 3591 in 2020 (Statistisches Bundesamt, 2011, 2021). At the same time, milk production has increased: The average milk yield per cow has risen, as well as the number of cows, which increased to an average of 103.3 cows per dairy cow husbandry in Schleswig–Holstein (Statistisches Bundesamt, 2021), as compared to the German average of 68 dairy cows (BLE, 2021, p. 1). Figure 3 shows this development.

Of the total Schleswig–Holstein milk production in 2018, 98% was delivered to dairies in Schleswig–Holstein and three neighboring federal states; the remaining 2% included feeding milk, losses, and direct marketing to consumers (Landesportal SH, n.d.-c). Structural changes took and are still taking place in the dairies but to a much lesser extent than in German dairy farms (BLE, 2021, p. 11; Ministerium für Energiewende, Landwirtschaft, Umwelt, Natur und Digitalisierung Schleswig–Holstein [MELUND SH], 2020). The German milk processing industry is highly concentrated. In 2019, of 145 dairies in Germany (BLE, 2021, p. 11), 20 were located in Schleswig–Holstein (Landesportal SH, n.d.-a). In 2022, we could still identify 15 stage I dairies in Schleswig–Holstein.

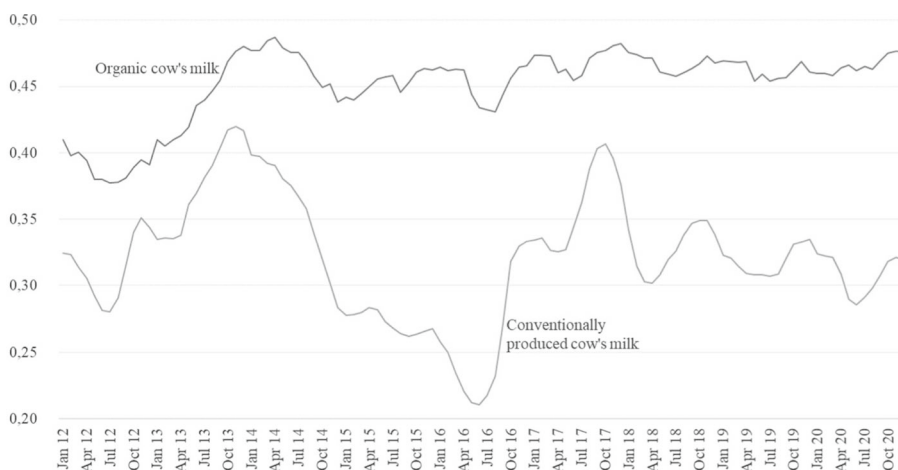


FIGURE 2 Prices of conventionally produced cow's milk and organic cow's milk paid by dairies in Schleswig–Holstein/Hamburg between January 2012 and December 2020 (in Eurocent per liter). *Source:* Own compilation based on data from Bundesinformationszentrum Landwirtschaft (BZL) (2021b).

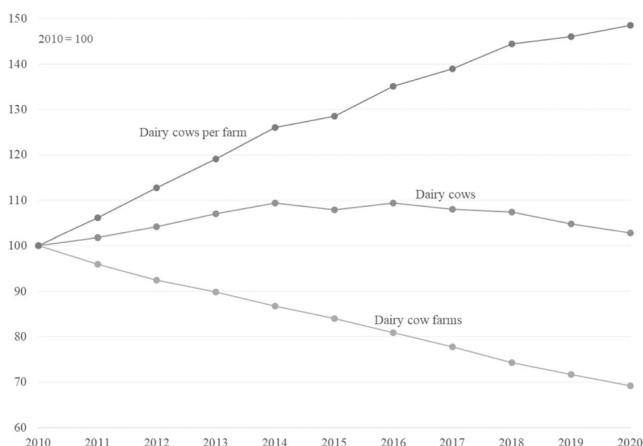


FIGURE 3 Development of dairy cow husbandry in Schleswig-Holstein from 2010. *Source:* Own compilation based on data from the Federal Statistical Office of Germany (Destatis).

In 2016, the Federal Cartel Office initiated administrative proceedings to review the delivery conditions for raw milk imposed by dairies on farmers (Bundeskartellamt, 2017). The resulting status report indicated that competition was almost non-existent regarding milk collection. Long contract durations and notice periods bound milk producers to dairies, making it difficult for them to react to competition. As a result, switching rates between dairies were very low (Bundeskartellamt, 2017). The preceding led to recent changes of supply conditions within the sector that are expected to fuel competition (Bundeskartellamt, 2018). Periods of notice are reduced, and new types of contracts, as for example, fixed price contracts, are being offered (Bundeskartellamt, 2018).

Retailers serving consumers with dairy products have been concentrating over the past years. Together, EDEKA, REWE, Aldi, and the Schwarz group control 85% of the German grocery retail market (Bundeskartellamt, 2022; Grau & Hockmann, 2018). This development is further pushed by partial backward integration of the German retail sector with own brands (such as REWE's Beste Wahl [translated: REWE's Best Choice] that is also used to brand dairy products such as cheese), as well as own food production activities (e.g., the discounter Lidl, part of the Schwarz group, with its own chocolate and ice cream production).

In summary, the German dairy industry is a challenging business environment for dairy farmers. Not only retailers but also large dairies are globally successful (Grau & Hockmann, 2018; Schoof et al., 2020) and have a high power toward their fragmented and locally active cow milk suppliers. In general, the industry has been consolidating over the recent past (Lehmann et al., 2016): The retail and the dairy sector have become quite concentrated markets. A decrease in numbers of existing actors has been observed on the level of the dairy farms. Due to the still fragmented nature of that part of the value chain, consolidation did not increase the bargaining power of the remaining players.

Figure 4 maps the dairy value system in Schleswig-Holstein. The generic value-adding activities, as elaborated in Figure 1, are further broken down to reflect dairy value chain constellations in Schleswig-Holstein. Three value chain structures can be differentiated with regard to the distribution of power between actors.

Type 1 stands for value chains driven by powerful buyers and consists of two groups sketched at the bottom of Figure 4. In the first group, a large company processes huge amounts

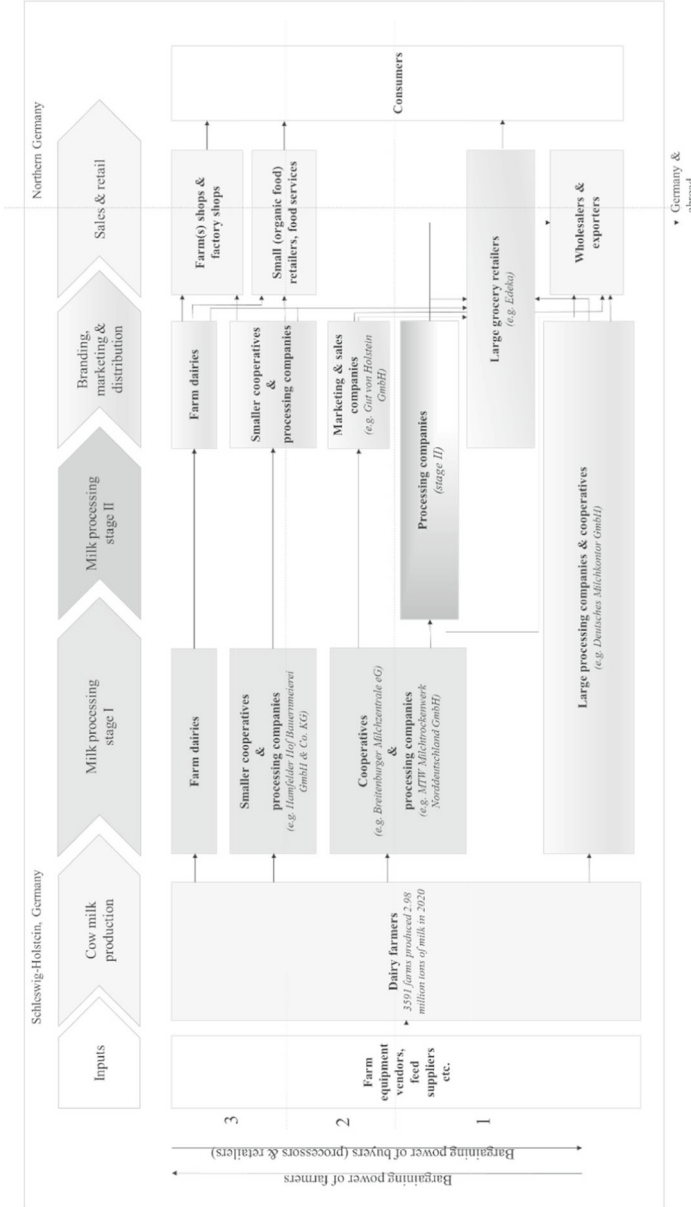


FIGURE 4 The dairy value system in Schleswig-Holstein/Germany. *Source:* Own compilation based on case study data and BLE (2021). Milk processing stage I includes the production of fresh milk products, butter, cheese, industrial milk, condensed milk products, and milk products in powder form (BLE, 2021). Milk processing stage II includes the production of baby food, chocolate, ice cream, margarine and other food industries, and pet food (BLE, 2021). Stage II processing companies are not necessarily located in the case study area.

of raw milk and is integrated into branding, marketing, and distribution activities of dairy products, of which a substantial portion is exported. In the second group, smaller cooperatives supply stage II processing companies with stage I non-branded dairy products. In our case study region, this latter group consists of five, mainly small, cooperatives. Depending on the case, these buyers produce both private-label products and brands.

Dairy farmers are embedded in this type of value chain as small suppliers dependent on large dairies and processing companies (Gereffi et al., 2005). Retailers are highly concentrated, impacting the bargaining position of dairy farms and processing companies negatively. We call this type *retail-driven dairy chains* to stress the powerful position of retailers. Only strong brands can exert power over retailers. Products falling within this category are distributed to national and international markets. In this conventional dairy value chain, farmers are not in a position to charge a price that they see as adequate. The price is determined by the world market reflecting the nature of the value chain.

Type 2 (depicted in the middle of Figure 4) includes a larger number of (mostly medium-sized) processing companies and cooperatives that process raw milk and dairies forward-integrated into (B2B & B2C) branding, marketing, and distribution. We call this type *processor-and-retail-driven dairy chains* to underline the more powerful position of the processing companies. This constellation is by far the largest in Schleswig–Holstein in terms of number of stage I milk processing companies, as half of the dairies located in the case study area belong to this group of medium-sized collaborators. It is the largest in terms of processed milk volumes. An example is the joint forward integration of seven dairies creating a strong regional umbrella brand. Another example is a joint venture for manufacturing milk powders for the processing industry of four producers' cooperatives, of which three are located in Schleswig–Holstein. Especially the establishment of regional dairy brands such as “Gut von Holstein” (translated: Manor of Holstein) influences the bargaining power of retailers, which is assumed to be high but is lower compared to the Type 1 constellation. Again, a considerable portion of products is exported to international markets. The bargaining power of the farmers is as low as in the retail-driven dairy chain described before.

Type 3 (reflected in the top segment of Figure 4) is most interesting for us since here small sustainability-oriented actors play a crucial role. Two sub-groups fall under this category: Single dairy farms that have forward integrated on their own and sustainability-oriented farmers joining together to form small cooperatives and producers' communities to forward-integrate. While the degree of bargaining power of retailers is decreasing, the power of farmers in this group is increasing. As opposed to the Type 2 constellation, not dairies, but milk producers are actively engaged in changing power positions. In terms of processed milk volumes, the group of small organic producers is, though increasing (Bundeskartellamt, 2017), by far the smallest of the three. We call this type as *farmer-initiated dairy chains*, and we are interested in two constellations: (a) integrated single dairy farms and (b) the role of single dairy farms in integrated cooperatives and producers' communities.

5 | FINDINGS: UPGRADING STRATEGIES IN THE SCHLESWIG–HOLSTEIN DAIRY INDUSTRY

Next, upgrading trajectories of dairy farmers are overviewed. Then the role of small sustainability-oriented actors in the farmer-initiated dairy chains is examined.

5.1 | General upgrading trajectories for dairy farms

Dairy farmers sticking to conventional cow milk production basically seem to have two strategic options: They may grow their business by having more cows to realize economies of scale and increase their efficiency. This could be described as a process-upgrading strategy to realize cost advantages by increasing the share of value capture due to lower production costs. This process-upgrading strategy does not increase their bargaining power. The small actors are in fact growing but are still within the group of players that is the most fragmented in the value chain. The other option for conventional dairy farmers is to completely leave the market and stop operations to escape their powerless position.

For sustainability-oriented dairy farmers other upgrading options exist: This may involve a change, a process toward organic farming, as well as a product upgrade enabling them to ask for higher prices when selling organic milk and dairy products (“eco-branding” in Marchi et al.’s (2013) terminology, see Table 1 again). This process upgrading usually does not imply efficiency increases (“eco-efficiency” in Marchi et al.’s [2013] terminology, Table 1)—rather the opposite is the case, due to the more resource-intensive (in terms of land, time etc.) organic milk production. Here we observe a way out of low shares in value capture but less of a way out of a dependent position in the value chain.

Another possibility for sustainability-oriented dairy farmers lies in integrating into new tasks along the value chain (i.e., functional upgrading), possibly leading to a more comprehensive differentiation strategy (“beyond compliance leadership” in Marchi et al.’s [2013] terminology). Small farmers can establish a dairy to process milk and start selling their produce in their farm shops and/or online. Due to the establishment of this new integrated value chain, they are in a more powerful position and—provided they are able to gain sufficient demand for their produce—can capture the value they create. Here, differentiation advantages and vertical integration go hand in hand.

What conventional farmers’ process-upgrading and organic farmers’ product and functional upgrading have in common is that all of them involve high strategic intent and substantial investments, are very capital intensive, and come with a high risk. This explains why a relatively large share of dairy farmers chose the exit option and have quit their farms in the recent past (see Figure 3 again). Product and functional upgrading of organic farms can be combined. However, switching to organic milk production and realizing economies of scale by having more cows (i.e., process upgrading) seem to be incompatible. Rather the opposite can be observed in terms of efficiency disadvantages of organic milk producers.

5.2 | Sustainability-oriented integration of single dairy farms

In farmer-initiated dairy chains (Type 3), as one subgroup, we have identified single dairy farms that forward integrated to different extents (see the top of Figure 4 again).[§] After changing the value chain structure, they actively operated a dairy (stage I) and integrated online branding and marketing activities and/or a farm shop to sell (mainly organic) dairy products locally. Their radius of activities was local in terms of a small region served.

The first case illustrating this, the MEIER farm, is a farm in family ownership for more than 120 years. It has developed over four generations into a modern dairy farm with 70 cows and is characterized by a high degree of vertical integration and close linkages with local and regional partners to control the value chain. Since the mid-1990s, this family has been increasingly

committed to a sustainable farming concept. In 2006, their dairy was established to pasteurize and bottle fresh milk, which since then has been directly marketed under their brand within a radius of 20 km. A farm shop and an online shop were set up. Cooperation partners, such as regional organic food suppliers, retailers, and regional marketing initiatives, complemented the integrated model. Meanwhile, 32 employees (full-time and part-time) work in different operations. The MEIER farm has been certified organic for its dairy products since 2017 and its beef since 2019. Operating the dairy farm and the dairy, the MEIER family wanted to keep and gain further control of production:

“And I think that had its origins in a very difficult milk market at the time. That we just didn’t get enough money for our milk and had to think about whether to build a new barn and keep 200-300 cows - like most farms did then - or do we go our own way and make sure that we get the price we need” (Interview # A1, 16-04-21).

The MEIER family developed its own distribution channels to prepare for a sustainable and successful future without being dependent on subsidies and supported by the desire to create jobs for family members (and the community). Valuable capabilities have been developed, especially in the area of marketing with a focus on direct customer contact and social media activities. Social media such as Instagram and Facebook have helped to market products. In 2021, someone was employed exclusively to manage these channels.

The interview material reflects that uncertainties in a challenging milk market were the drivers to forward integration and close regional cooperation. Taking the decision for sustainable development, the actors reflected the traditional business model and came up with visions for the future, building on a more holistic, circular approach. This included the establishment of clean energy production, re-usable packages, and additional fruit and vegetable growing, as well as starting an agroforestry project to reduce the environmental footprint of the other agricultural activities. Using social media and being open to interviews to local press and broadcasters has helped to create a local reputation.

The MELKER farm developed in a similar way as the MEIER farm and argues along the same lines:

“[...] when the milk price was so low in 2015/16. We got 21 cents for a liter of milk for three months. [...] I definitely wanted to make a change and that was not possible within the previous model [...] There is no room for negotiation or design, you can look for another dairy or you can [...] simply expand the size of the farm. [...] then we would have had to keep 400-500 cows, [...] and that was not what convinced me and my wife, I’ll say. So, then you invest a large amount to produce the milk even cheaper so that it can then be sold on the world market. That is not our belief. This is high quality food and it only has to be traded as such; that is the challenge now” (Interview # A3, 07-05-21).

In 2021, the MELKER farm had been operated by different generations of one family for 150 years. In 2018, the decision was made to forward integrate, reflecting the farmers’ motivation to get out of the powerless position in the conventional value chain. Forward integration included milk processing and the establishment of a farm shop with its own and third party

(organic) products. In addition, the MELKER family decided to have an online shop and offer a delivery service. Eleven employees (full-time and part-time) work in the operations. The farmers perceive their position as more powerful now:

“I have calculated what I need for my product and I offer that to them [the retailers]. And then they can decide whether they want it or not. And then every retailer has to decide how much margin to put on it. I think that’s the only way to do it. And that’s the good thing; sales to individual families have already developed well in the past two years, so we’re not under so much pressure in the negotiation” (Interview # A3, 07–05-21).

The BAUER farm, another small dairy farm, has switched from conventional to organic dairy farming and backward integrated into the production of pasture for the cows:

“Now [after being certified as organic] we keep all our grain, which then goes to the cows. We produce mash ourselves. In the grain area we have our own crop sequence. [...] All the grain is stored and dried and once in a month the mobile grinding and mixing machine comes and we then assort our own mixture” (Interview # A4, 03–05-21).

The BAUER farm also forward integrated. Marketing their produce was limited by the scarcity of potential customers in the direct neighborhood. The farm is operated by a married couple employing two part-time staff and an apprentice. In this constellation, the organic produce and forward integration were exploitable to a lesser extent. The product upgrade led to better prices for the milk and a better value capture position, but backward and partial forward integration were not sufficient to overcome the dependency on retailers:

“In the organic sector you really have a better position with regard to the suppliers, as well as with regard to the buyers [...]. And still you cannot store the milk somewhere and say that now, just for a month, you will not supply milk. We just can’t. It is fresh every day and then it has to be sold. Thus, retail still has the market power” (Interview # A4, 03–05-21).

In this case, to a certain degree, process upgrading implies lower costs for fertilizers and energy consumption. On the other hand, switching to organic farming came with high investment costs and a decrease in yields. However, by upgrading to organic dairy produce, the farmer saw an increase in societal and community esteem for his work:

“And with regard to organic milk, our dairy can say: Now, this is what we need or we must have that and that then is okay. There one has a different market power, that is the case when something is scarce, for that produce you can then also ask a higher price. Well, oneself as a farmer – since I am now working following organic principles, it is much more fun, I have to say, since the products are valued and this is also compensated” (Interview # A4, 03–05-21).

5.3 | The role of single dairy farms in dairy cooperatives and producers' communities

In the farmer-initiated dairy value chain (Type 3), we also identified small cooperatives and producers' communities which forward integrated into milk processing, branding, marketing, and distribution activities. Regional products are marketed under small umbrella brands and are sold at farm shops or are regionally distributed to small organic food retailers and supermarkets. Sustainability-oriented dairy farmers join forces and come into a position of building up regional value chains instead of local ones. We will illustrate this with two cases.

In the first case, three farmers founded their brand in 2011 with “De Öko Melkburen” (meaning *The Ecological Dairy Farmers* in the regional low German language). The brand name highlights the Northern German origin and sends the signal to the consumers that an ecological product from the region is being sold. In 2014, De Öko Melkburen took over the dairy that had produced the brand since 2012 and set up a cooperative which today is owned by 318 local consumers and farmers. One of the dairy managers summarizes the evolution:

“Farmers joined forces to process and market their milk and, since 2014 with this new structure, also integrated consumers [...]. So to speak, the farmers want to get their milk processed in a reasonable way and get an adequate milk price and the consumers are willing to pay a bit more for quality” (Interview # B2, 12–05–21).

The dairy has 20 (full-time and part-time) employees. The milk production volume in 2020 has reached about four million kilograms of which ca. 350,000 kg are organically produced, and markets itself as “*the last of its kind*” on its homepage. From the perspective of the founding dairy farmers, it again becomes obvious that lack of power and independence led to a high degree of discontent with the conventional value chain structure:

“we are the fourth generation to run the farm. [...] The initial spark for the founding of our De Öko Melkburen GmbH ten years ago was, yes, again a merger in the dairy industry, i.e., our dairy at that time merged again with a large group. And we had already seen it two or three times, and the promises that were made were never kept. In other words, we farmers did not get more money in the end, on the contrary [...] and regional added value was destroyed. And then we [...] said, we will no longer go along with it, we will do something ourselves now, we want to determine for ourselves what happens to our milk. How it is marketed. And of course, we also want some of the margin that is made in retail, because we simply need it on our farms” (De Öko Melkburen, 2020, 0:18–0:21; 1:22–2:12).

A relatively new member of the *De Öko Melkburen* cooperative is the farm GEMEINSCHAFT that over the last decades integrated forward and backward, as well as horizontally in a range of farming and distribution activities, to include milk production next to other animals and plants. A farm shop and a bakery are operated. In addition, six persons with disabilities are cared for on the farm. Almost 40 people work there:

“[...] this is a closed loop business, since we are saying on an area X [...] we can feed one cow or three small calves or 16 pigs and these animals then also make so much manure that we can fertilize the land with that. And then certain quantities go out as

milk, cereal in the form of bread, or meat [...] and we try to prevent buying anything [...] If all goes well, we have some spare seeds which we throw into the earth and the sun does the rest. That in fact is exaggerated, we obviously buy diesel for the tractor” (Interview #B1, 13–04-21). The reasoning can be summarized by the following statement: “and now just do not only watch out for the money but the many legs the farm is built on” (Interview #B1, 13–04-21).

The approach of De Öko Melkburen thus attracted other sustainability-oriented farmers to join, which beforehand had developed as the small farms described above. The sustainability orientation is the core with regard to potential partners. With more partners joining, scale economies, especially with regard to marketing, can be realized. Further, the produce can be distributed and sold within a larger radius. The milk of De Öko Melkburen is sold in Schleswig–Holstein and the neighboring federal state Hamburg and parts of Lower Saxony.

Hamfelder Hof is the second dairy farm cooperative to illustrate how dairy farmers may escape from conventional value chains. They started direct marketing of raw milk by affiliated farms in 1990 and have operated as an organic milk producers' organization for about 25 years. In 2013, 23 farms founded the farming community that currently consists of 36 farms. The own dairy was established in 2015. The organic milk volume processed in 2020 was between 17 and 18 million liters (Hamfelder Hof Bauernmeierei & Co, n.d.). The produce is marketed and distributed in the whole of Northern Germany. Again, the lack of power and independence led to discontent as reflected in testimonials posted online by affiliated farms:

“[...] In 2009 we switched to management according to the Bioland guidelines. The desire to operate ecologically was borne and supported by all generations of the family. The last impetus for the changeover was the milk crisis in 2008/2009, when the prices for conventional milk plummeted and the costs for milk production were nowhere near being covered. The beauty of being a farmer is independence” (Testimonial # 01).

“The first written mention of our farm comes from the 16th century - it has been in the family for at least that long. [...] We had been thinking about conversion for many years. It bothered us more and more that the work that we put into the production of our products was simply not appreciated on the customer side in terms of price. In 2016, we finally switched the farm to management according to the Bioland guidelines” (Testimonial # 02).

“The farm has been in the family since the 17th century. As early as 1989 we switched to organic farming according to the Bioland guidelines. [...]. We also no longer wanted to be at the mercy of the price dictates when it came to the sale of milk and grain. As an individual farmer, you had no way of influencing the selling price” (Testimonial # 03).

The Hamfelder Hof affiliated dairy farmers profit from economies of scale in marketing and distribution. Even though the size of the dairy is rather small (when compared to the dairies in the Type 1 and Type 2 chains), the Hamfelder Hof dairy sells in the whole of Northern Germany, so that economies of scale in milk processing are realized. The bargaining power of the producers' community in the organic sector has further allowed for substantial price increases in the recent past.

5.4 | Summary of findings

Changing power constellations are observable in dairy value chains with decreasing power of farmers during the last decades (Lehmann et al., 2016). At the same time, environmental, economic, social, and institutional challenges such as higher environmental production standards and societal debates about animal welfare, volatile and decreasing milk prices, structural changes, and regulation (Popp & Nowack, 2020) are putting pressure on farmers. Therefore, farmers are searching for ways out of their dependency and their unattractive position in the value chain.

The upgrading avenues followed by the single farmers integrating into further value-adding activities, in summary, can be seen in *product upgrading* in terms of localized eco-branding. By switching to organic dairy products, the MEIER, MELKER, and BAUER farms are aiming for differentiation advantages. By upgrading the products from conventional to organic, the investigated actors perceive that they make a more useful contribution to society and that they are more respected and self-determined but not economically independent.

We did not observe *process upgrading* in order to realize economies of scale on the small farms integrating on their own. The opposite was the case with the investigated players, de-automating processes rather than automating them and decreasing the number of cows rather than increasing it. Where we identified process upgrading was in the area that Hart (1995) calls “pollution prevention” and that fits under the label “eco-efficiency” as suggested by Marchi et al. (2013): These players reduced energy consumption and stopped using chemical fertilizers and thereby saved costs. Other process changes such as turning toward a more circular approach or investing in agroforestry projects increased costs but fostered the reputation for sustainability orientation in the eyes of customers from the region.

The investigated small players have forward integrated into processing and distributing their products following a *functional upgrading* logic. They established a local value chain in which they are in a powerful position. To get out of the dependent position, they decided to “*integrate into direct product marketing. Namely to build their own dairy, make products and directly sell them via a delivery service*” (Interview #A1, 16–04–21). The long-term aim lies in becoming independent and coming into a powerful position along the (local) value chain (“*the dream actually is to directly market the largest share of what is produced on the farm independently and then one has the largest part of the value chain virtually in ones’ own business*”, Interview #A3, 07–05–21).

In sum, these players upgrade their product and communicate to their local customers via social media and local press coverage. They are successful in creating a relatively high willingness to pay within a small group of loyal local customers. The customer structure is mainly characterized by consumers and to a small extent by regional retailers, cafés, or kindergartens. The location is crucial since potential customers living nearby are a necessary condition to successfully integrate into further value-adding activities that demand interaction with the end consumers.

What can be detected in this investigated small players’ behavior is that they try to move away from a too high degree of specialization into dairy products. To make the farm shops and delivery services more attractive, some increase their product range by buying additional products from partners. Other advantages stem from value-creating activities added to the new local value chains established via integration: The MEIER and MELKER families as well as other farms in the case study region start to or plan to include other animals (e.g., hens to produce eggs) or plants (e.g., vegetables and herbs) on their farms. These activities go further toward establishing their own energy supplies (sometimes extended to neighbors) and starting

agroforestry projects as well as opening farm kindergartens or offering events for tourists and locals. This may be regarded as *intersectoral upgrading*.

The small actors in the cooperatives and producers' communities use *product upgrading* to organic milk (that may be called "regionalized eco-branding"). These players are committed to sustainability and rely on horizontal and vertical cooperation. They see a high relevance in having a certificate like Bioland to credibly signal their organic attitude and activities. Bioland is the largest organic farming association in Germany. The association certifies farmers as organic following strict ecological criteria (Bund Ökologische Lebensmittelwirtschaft e. V [BÖLW], n.d.).

Milk production processes are not upgraded in a different way from those elaborated for the small independent players. *Process upgrading* can be observed in terms of bundling the produce. Economies of scale can be realized regarding milk processing as well as distribution and marketing activities. This implies more power against retailers and makes it possible to sell the produce not only via own channels but also via established retail channels to a larger extent, as well as within a larger region. Thus, higher efficiency can be achieved. However, due to organic farming principles, the output per hectare is lower, regardless of how many dairy farmers join a cooperative or producers' community.

Functional upgrading for this group is reflected in forward integration. More actors make up the value chain and have to balance their power positions via their cooperative arrangement and deal with intra- as well as inter-value chain competition. Due to bundling forces, the bargaining power against retailers increases. This has to do with the niche market the products are sold in. In these markets, customers want such products so that retailers of different sizes list them, and the customers are willing to pay a higher price for certain brands. Increasingly, supermarkets include regional and organic produce, since a growing customer group wants to buy these. *De Öko Melkburen*, for instance, motivate anybody interested in buying their produce to contact their local supermarket and ask for a list of the dairy products of the *De Öko Melburen* (n.d.).

Intersectoral upgrading, as an approach more oriented toward a circular economy and new products that are added, is something that we can find on the level of the associated farms but less on the level of the small cooperatives or producers' communities. These concentrate on the production, distribution, and marketing of dairy products. Linking into such a cooperative arrangement is an option for small actors who beforehand have integrated forward and horizontally on their own. While intersectoral upgrading fits well with regard to increasing sustainability, it is less useful regarding the realization of specialization and scale economies.

Table 2 summarizes the identified upgrading strategies.

Regarding the overall findings, it was especially interesting for us to see how well some small players were able to capture value from social media use and from building up loyal local customer bases. These activities even led to the creation of new social media-/marketing-related jobs in the businesses after being started often as an extra activity of (young) family members. Social media played such a relevant role, not only for the single farms following an integration approach but also for the larger cooperatives and producers' communities, which used these channels extensively. Another interesting insight was that societal esteem coming with more sustainability orientation was important for the dairy farmers and was appreciated also when actors could not escape their powerless position. Finally, it became obvious that organic certifications play a more relevant role for small players embedded into a cooperative or producers' community than for those integrating along the chain on their own.

TABLE 2 Upgrading strategies in our case study.

Types of upgrading	Upgrading in the context of regional agri-food ecosystems in the developed world	Type of advantage in our focus	Relevance in the investigated cases
<i>Process</i>	<i>Process upgrading</i> in our context would mean to change the organization of value-adding activities in a way that enables the realization of efficiency gains.	Cost advantages in terms of eco-efficiency (coming with extra-costs for sustainable farming processes)	MEIER/MELKER/BAUER FARM (energy savings via pollution preventions, otherwise difficulties to achieve economies of scale) SMALL DAIRY COOPERATIVES (energy savings via pollution preventions, produce bundling and limited economies of scale regarding milk processing and distribution into diverse channels)
<i>Functional</i>	<i>Functional upgrading</i> in our context may lead to the establishment of new value chains due to the sheer non-existence of attractive forward or backward integration in the existing value chain structure.	Power advantages seem to play a core role here	MEIER FARM (backward, forward, lateral); MELKER FARM (backward, forward); BAUER FARM (backward, forward on a low level) SMALL DAIRY COOPERATIVES (forward; more actors have to balance out their power positions)
<i>Product</i>	<i>Product upgrading</i> in our context would mean to come up with a product that makes it possible to increase the willingness of buyers to pay for their own produce in the value chain, a player is embedded into or in a newly created one.	Differentiation advantages following an eco-branding approach	MEIER FARM (local/partly organic); MELKER FARM (local); BAUER FARM (local/organic) SMALL DAIRY COOPERATIVES (organic; high relevance of certification)
<i>Intersectoral</i>	<i>Intersectoral upgrading</i> in our context means to upgrade into third chains that may be newly developed and allow for the realization of scope economies.	Synergy advantages are core here and partly imply cost saving; however, this also works in the direction of a differentiation strategy <i>beyond compliance leadership</i>	MEIER FARM (aiming at circular business); MELKER FARM (adding new products to sell) SMALL DAIRY COOPERATIVES—only on the level of the participating farms

Source: Own table, row 1 from Gereffi (2019, p. 241), who builds on Humphrey and Schmitz (2002) and Gereffi et al. (2001), rows 2 and 3 adapted to our research and inspired by Marchi et al. (2013, 63;66), and row 4 reflecting the case-based findings of our study.

6 | DISCUSSION

Being more aware and gaining additional knowledge of the value chain structure in the dairy industry may be a first step toward changing the situation from the perspective of the farmers (Lehmann et al., 2016). One strategic direction is to scale and become larger and a more efficient player. Popp and Nowack (2020) suggest this to be the main strategic direction on the basis of a case study of the Northwest German dairy system. Another direction can be the decision for a sustainability-oriented business model. In the Schleswig–Holstein agri-food ecosystem, we observed that this may go hand in hand with a forward integration of dairy farms into milk processing activities and B2B and B2C sales activities. Here, we identified two patterns: Single players that build up their own local value chains, and those small players that join cooperative activities of players building up regional value chains.

Based on the mapping exercise (see Figure 4 again) and case data, this paper helps to explain local and regional value chain formation. Table 3 outlines the drivers that motivate small dairy farms to establish sustainability-oriented businesses on different levels and summarizes the challenges they face.

The chain of arguments leading to the framework depicted in Table 3 can be sketched as follows: Dairy farms perceive their powerless chain position as “unjust” and feel incapable of action. This increases their motivation to upgrade. Often, the local organic niche market is an attractive segment for these initiatives which are further fostered by recent market, policy, and societal changes. For the small farm operations, upgrading strategies were very much driven by personal experiences. The small players involved are family firms that gathered valuable idiosyncratic knowledge over generations, often with a long history and the wish to hand over a future-proof farm to the next generation.

Popp and Nowack (2020, p. 15) suggest that, “synergy effects through common interests and knowledge transfer through cooperation—e.g., among farms, dairy, and consumers—seem to play an important role and still offer a lot of potential for dairy systems.” This is reflected in the dairy acquisition of *De Öko Melkburen* as a cooperative of dairy farmers and consumers. Sustainability-oriented small players decide to join cooperative initiatives that fit with their business models. The necessary human and financial capital to forward integrate independently may make a cooperative approach involving other producers and distributors more attractive for them.

Building on Popp and Nowack’s (2020) suggestion and our findings, the crucial role of consumers of agricultural products has to be considered for further research—this leads to the question of how actors in the agri-food ecosystem can create a willingness to pay for more expensive food from sustainability-oriented farms. Based on a recent survey of German dairies, Schoof et al. (2020) suggest that consumers are ready to pay more for sustainable produce in this sector and that their willingness to pay for dairy products thus may be raised. Our case example, Hamfelder Hof in 2021 started the initiative to charge its customers 20 Eurocents more per liter milk. They communicated the price increase proactively by printing on the milk containers “It is risky but we risk it anyway.” It remains to be seen, though, what effect general milk price increases will have here (Zinke, 2022).

All in all, complex strategic questions are raised to be answered not only by society but also by businesses in the agri-food ecosystem. The challenge lies in becoming economically sustainable in terms of capturing value (due to a good bargaining position in the value chain) and sustainable in an environmental sense. The latter may form the base for potential differentiation advantage. Establishing trust is central—milk or other agricultural products are typical

TABLE 3 Framework of drivers and challenges for sustainability-oriented small players in the dairy sector of Schleswig-Holstein.

Level:	DRIVERS	CHALLENGES for small-scale players ...	
		to establish local value chains	as part of a cooperative or producers' community to establish a regional value chain
Firm	<ul style="list-style-type: none"> • Low income of dairy farms • Vision of a sustainable development for their own activities • Wish to reduce their own ecological footprint • Wish to hand down a 'future proof-farm' to the next generation 	<ul style="list-style-type: none"> • Very high investment and risk • Higher cost for organic than conventional agriculture • Need for new knowledge and competences in organic farming and operating other value chain activities including distribution and marketing • High dependence on motivated and capable successors to take over the complex business 	<ul style="list-style-type: none"> • Moderately high investment and risk • Higher cost for organic than conventional agriculture • Need for new knowledge and competences in organic farming • Certain dependence on motivated and capable successors to take over the organic dairy farm that, however, may be easier sold than an integrated more complex business
Value chain	<ul style="list-style-type: none"> • Discontent with the powerless position ("unjust" position, no control, no independence) • No room for negotiation or implementing their own ideas (no entrepreneurial space) • Wish to develop away from a too high degree of specialization into dairy products, toward circular approach 	<ul style="list-style-type: none"> • Hardly any scaling potential in local value chains • Competitive pressure to be shouldered alone • Inter-value chain competition • Value chain management on firm level • Need for knowledge and skills in non-related sectors, loss of specialization advantage 	<ul style="list-style-type: none"> • Less scaling possibilities than in conventional value chains • Competitive pressure cushioned by somewhat larger community • Inter- and intra-value chain competition • Value chain management on cooperative/ community level • Entrepreneurial space limited by cooperative entity (the larger the cooperative, the more limitations)
Society/ market	<ul style="list-style-type: none"> • Uncertainties in a challenging milk market—low milk price • Low esteem/recognition for conventional dairy farmers • Wish to buy sustainably produced milk and milk products • Spread of social media in all parts of the society 	<ul style="list-style-type: none"> • Need for a sufficient number of customers who in the long run are willing to pay premium prices • Very high relevance of local reputation • Moderate relevance of certified eco-label • Need to operate in an attractive location to 	<ul style="list-style-type: none"> • Need for a sufficient number of customers who are willing to pay premium prices • High relevance of regional reputation • High relevance of certified eco-label • Need to organize the logistics to bring the milk

(Continues)

TABLE 3 (Continued)

Level:	DRIVERS	CHALLENGES for small-scale players ...	
		to establish local value chains	as part of a cooperative or producers' community to establish a regional value chain
	creates possibilities for direct customer contact	<p>which sufficient customers have access</p> <ul style="list-style-type: none"> • Time-consuming need to continuously stay in touch with consumers via social media 	<p>to the further processing stages</p> <ul style="list-style-type: none"> • Still a niche market and increasing competition for organic milk and dairy products in all retailers • Certain scale economies regarding social media use but disadvantages regarding national competitors

Source: Own compilation.

credence goods (Darby & Karni, 1973). It is hard to tell under which circumstances they have been produced by looking at them and usually also by consuming them. Thus, establishing a reputation and branding the produce in a credible fashion is core. We found that social media use enables smaller actors to establish a local reputation and thereby at least to neutralize the marketing-related scale economies of larger competitors, highlighting the impact of easy to access digital tools with regard to local marketing capabilities. The larger cooperative entities selling their products in larger regions rely more on organic seals and certification processes in addition to using social media (such as YouTube or Instagram).

For the members of small cooperatives or producers' communities, certification plays a more crucial role than for the single farmers operating in a small community and providing transparency for their customers, due to the close connection to them personally and via social media. The cooperatives cannot rely only on that mechanism but have to put more effort into building up a reputation as a sustainable player by standardized quality seals and institutionalized control mechanisms. That is relevant for the smaller independent players as well but much less central due to their embeddedness in a small community or neighborhood. This exerts social control on the sustainable business practices and thereby forces the farmers to act upon their principles. In the case of the MEIER farm, the latter, for instance, is reflected in the perception that—even though the farm is organic certified—the local reputation and the lived transparency are more relevant for the competitiveness than the certifications (discussion with the farmer at on-site visit, October 31, 2021). The local approach chosen here becomes obvious. It is quite successful locally but has the limitation that scaling beyond a small local area seems to be impossible. The difference between the two approaches is reflected in the local radius of distribution activities of the small independent players, compared with the regional distribution radius of the small cooperatives and producers' communities.

Both may be ways out of the communication dilemma regarding sustainable products: Some players invest massively in “greenwashing” their produce while others have difficulty in sending the message that they are actually living up to a sustainable behavior, leading to an exacerbating “friction” in communication” (George et al., 2021, p. 1006).

From a local value chain management perspective, it is highly relevant and interesting to come to a better understanding of scaling possibilities based on the described developments in the organic sector. The concern is that small, sustainability-oriented organic farmers are not efficient with regard to large parts of their processes. They produce less quantity of milk and milk products using the same amount of resources. Efficiency gains though may stem from establishing the capability of “pollution prevention” (Hart, 1995). Continuously improving used equipment and technology can make pollution prevention possible and lead to certain cost advantages. For instance, when a company is able to reduce energy consumption, it prevents pollution but at the same time can save cost. Here no trade-off between economic and ecological sustainability occurs. However, cost advantage in terms of offering the product at the lowest price in the whole market is not a realistic scenario. The question is, how more process upgrading may be included in the operations to increase efficiency without harming sustainability orientation.

From a global value chain management perspective, it is relevant to further investigate how relationship(s) of the first tier/second tier with organic farmers can be designed to increase satisfaction and guarantee high food quality. The larger the sustainability-oriented dairy cooperatives or producers' communities become, the more the resulting structures may resemble those of conventional dairy value chains. Cooperatives of farmers and consumers seem to be a fruitful avenue toward a better bargaining position of dairy farms in the value chain in the first place. However, a balanced-out relationship between the members is limited by constraints in terms of functioning social control and personal relationships, which are only possible up to a certain size.

We got the impression that some farmers are intrinsically motivated to switch to more sustainable operations—showing a shared vision of sustainable value in the sense of Hart (1995, p. 992)—even though in many cases so far, they cannot capture that part of the value created that would make these activities economically attractive, as, for instance, the BAUER farm case suggests. However, the higher recognition of sustainability-oriented farming in society seemed to at least partly balance the perception of an “unjust” position and own incapacity of action.

Actors in the agri-food ecosystem are confronted with a lot of uncertainties in a challenging market. Therefore, some actors hesitate to switch to more sustainability and rather wait to see how the public support landscape develops while others exit the market. All in all, those players who are motivated by the belief that they are following the right path when changing to sustainable operations build their investments on the expectation that consumers (as well as society as a whole) will go on appreciating sustainability. So far, when looking at the share of organic produce in the area of dairy products in our case study region, it is increasing but still at a rather low level (Bundesinformationszentrum Landwirtschaft [BZL], 2021a). This raises the question of how high the willingness to pay may be on the side of the consumers (Khan et al., 2022), while at the same time, milk alternatives such as oat milk become increasingly popular.

7 | CONCLUDING REMARKS AND OUTLOOK

In this research, the Northern German dairy industry was analyzed and mapped to identify the underlying value chain structures. The effect of value chain structures on the upgrading trajectories of dairy farmers was then assessed. Small-scale agri-food producers, who are dissatisfied with their value chain position, are motivated to choose sustainability-orientation processes by exiting from national and export markets. The prevailing power imbalance in the value chain, supported by structural change, economic uncertainty, and recent developments toward sustainability in the industry, can explain cases of dairy farms upgrading and following different strategic paths.

The core findings in a framework that systematizes drivers and challenges for sustainability-oriented small players to reach stable and competitive positions were then outlined.

When exploring agri-food value chains in Schleswig–Holstein, next to changing the processes and structures to sustainability-oriented farming, direct marketing is one avenue to increase bargaining power and set the price. The integration into processing and sales activities is one way out of the locked-in supplier situation. As a consequence, dairy farms are vertically forward integrated into processing, marketing, and distribution and have built ties with local/regional partners. Some small players, instead of choosing this approach (or in combination with it), strove for more independence in the value chain by linking into sustainability-oriented small cooperatives or producers' communities.

The upgrading strategies provided a useful framework for the investigation of sustainability-oriented value chain structures in the Schleswig–Holstein dairy industry. There are limitations to the study in terms of only providing broad concepts which are employed to show the “blurring boundaries in real world patterns of upgrading” (Gereffi, 2019, p. 243). Especially in the field of agriculture, “it may be difficult to distinguish process and product upgrading because the introduction of specific processes is inherently linked to new categories of products, such as organic, fair trade, and sustainable food” (Gereffi, 2019, p. 243 with reference to Ponte & Ewert, 2009). In addition, sustainability-oriented upgrading in the outlined cases was limited to the environmental dimension.

Social upgrading is not considered here. It may take the perspective of the affected human beings into account by explicitly considering that upgrading can lead to better work for individuals and more generally create better working conditions (Barrientos et al., 2011, p. 324). Providing good working conditions for employees and families (i.e., social upgrading) may come with the changes illustrated in our cases, but these were not regarded as being essential to the analysis. There may exist trade-offs among economic, social, and environmental upgrading activities (Barrientos et al., 2011; Marchi & Alford, 2022). Investigating these trade-offs would be a valuable avenue for future research.

The research was confined to one German federal state and thus on a small part of a developed country. Further micro-investigations of other German federal states could complement the findings. There is scope for international comparative research, with Matacena and Corvo (2020) evaluating differences in alternative food networks in the North-West of England as compared to such networks in Lombardy in Italy.

Avenues for future research also lie in investigating family firms' characteristics and their role regarding sustainability. In that context, it may be interesting to find out if this is a feature of certain market places as compared to others. Ahearn et al. (2018, p. 484) highlight that U.S. farms embedded in local food chains often were operated by families new to farming, while the cases in this research are of dairy farms in a region where farms are often handed down from one generation to the next.

Bringing together the pragmatic implications, the research suggested that functional upgrading (with farmers integrating into processing and distribution activities) or product upgrading (with farmers shifting to organic produce) is in many cases only possible in combination with temporary downgrading: The transformation from conventional to organic production often means less income in the short run and a higher workload through new unknown processes and high long-term investments. Here, public policy is essential to support the transformation since a development toward greater sustainability is a relevant aim of society.

In conclusion, we have identified three dairy value chains in the investigated agri-food ecosystem: retail-driven, processor-and-retail-driven, and farmer-initiated. From our in-depth

investigation of the farmer-initiated dairy chain structures in which small sustainability-oriented players played a central role, it was possible to better understand how sustainability-oriented players transformed the power constellations and value capture possibilities in the agri-food ecosystem they are embedded into, and where the limitations of these business models lie.

The major challenge of the sustainability-oriented players in the sector lies in establishing a sufficient base of loyal customers and keeping them as customers. An own dairy as well as a farm shop and online distribution requires the support of a critical mass of customers using the established structures in proximity to the operations. For the investigated actors, this worked out very well in the recent past with increasing sustainability orientation that, for the investigated region, got an extra push during the COVID-19 pandemic, when many shops (as well as restaurants) had to close and people started to cook more at home, as well as thinking about a healthy diet. However, it is problematic if this increase in demand for organic products will hold in times of global disruption such as the war in Ukraine, energy and climate disruption, and financial disruption.

ACKNOWLEDGEMENTS

Open Access funding enabled and organized by Projekt DEAL.

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ENDNOTES

* In some statistics, Schleswig–Holstein and the neighboring federal state Hamburg are put together. Since Hamburg is a large metropolitan area, here not too many farmers are active. In 2020, 18 dairy farms are operated in Hamburg as compared to 3591 in Schleswig–Holstein (Statistisches Bundesamt, 2021).

§ Exemplary cases are used to illustrate this group of actors. The names of the single dairy farms are fictional where they are written in capital letters to safeguard the anonymity of the interview partners.

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How to cite this article: Royer, S., & Simon, M. (2023). Small but powerful—local value chains and sustainability-oriented approaches in the agri-food sector. *Business and Society Review*, 128(2), 331–366. <https://doi.org/10.1111/basr.12315>

APPENDIX 1: THE FARMER-INITIATED VALUE CHAINS (TYPE 3A AND TYPE 3B): INTERVIEW INFORMATION, INTERVIEWEES, AND POSITIONS IN THE DAIRY VALUE CHAIN

A: Sustainability-oriented dairy farms											
No.	Date	Value chain position 0-1-2-3-4-5	Relationship to focal firm	No. of employees (in 2021)			Turnover p.a. (FY 2020, in € mio)			Interviewee	Duration (in min)
				≤9	>9-49	>49-249	≤2	>2-10	>10-50		
#A1	16 April 2021	1,2,4,5	MEIER farm	X			X			Owner-manager and successor (third and fourth generation)	58
#A2	21 April 2021	1,2,4,5	MEIER farm	X			X			Successor (fourth generation)	65
#A3	07 May 2021	1,2,4,5	MELKER farm	X			X			Owner-manager	52
#A4	03 May 2021	1	BAUER farm	X			X			Owner-manager	92
#A5	10 May 2021	5	Supplier (local manufacturer) and buyer (retailer)	X			N/A			Co-founder and owner-manager	55
#A6 (=B2)	12 May 2021	2,4,5	Buyer (cooperative)	X			X			Co-founder and owner-manager	70
#A7	17 May 2021	-	Cooperation partner (butcher)	X			X			Owner-manager	48
#A8	19 May 2021	4	Cooperation partner (marketer)	X			X			Office manager of the association	48
#A9	20 May 2021	5	Supplier (wholesaler)		X			X		Head of organization and development	50
#A10	13 April 2021	5	Supplier (wholesaler)		X			X		Sales and procurement manager	48
#A11	27 May 2021	5	Buyer (retailer)		X			N/A		Owner-manager (second generation)	105
#A12	01 April 2021	5	Buyer (delivery service)	X			X			Co-founder and owner-manager	67
B: Sustainability-Oriented Dairy Cooperatives and Producers' Communities											
#B1	13 April 2021	1	GEMEINSCHAFT farm	X			X			Owner-manager	105
#B2 (=A6)	12 May 2021	2,4,5	Processor (cooperative)	X			X			Co-founder & owner-manager	70

Source: Own compilation based on case study data. The categories "no. of employees" and "turnover p.a." are based on the EU commission's definition of micro, small, and medium-sized enterprises in the EU Recommendation 2003/361.

APPENDIX 2: CODES

Category	Definition	Anchor example	Coding rules
Category – Value chain structure	Power position indicates the possibilities of an actor in a value chain to put through their own postulations in (price) bargaining processes.	<p>“There is very little negotiation, (...). We say what we need and that’s what we get. Whoever tells us you are too expensive, we tell them: Yes, then buy your milk somewhere else.”</p> <p>“And I think that has its origins in a very difficult milk market at the time. That we just did not get enough money for our milk and had to think about whether building a new barn and keep 200–300 cows—like most farms did then—or do we go our own way and make sure that we get the price we need.”</p> <p>“In the past, the dairy did a lot of business with wholesalers. Now we have basically turned that around: We make a good product and we also want to sell that at a high price in the market and we have to work with partners that appreciate this attitude. Usually, wholesalers—who process large quantities—do not do that. They almost all the time go via price.”</p>	All statements made about an actor’s power position in the value chain are bundled in this category.
Development toward disintegration	Disintegration means that activities along the value chain are increasingly	“And we also have bought-in products, so we don’t just have the products that we make ourselves, but we also have bought-	All statements indicating that the range of activities carried out in one’s own company has decreased or that this is

(Continues)

Category	Definition	Anchor example	Coding rules
Development toward integration	<p>distributed among different actors who contribute to value creation.</p> <p>Complete integration is when all value creation activities are taking place in one organization.</p>	<p>in products like cereals, juices, teas, coffees, jams, honey, eggs. All that kind of stuff, just to offer, not a full range, but a wider range.”</p> <p>“What we outsource is the butchery. And the cheese dairy. So, we have a friendly cheese dairy in [village name]. That's where we take our milk and pick up the finished cheese after it's ripened.”</p> <p>“integrate into direct product marketing. Namely to build their own dairy, make products and directly sell them via a delivery service.”</p> <p>“the whole forage production is actually in our hands except for some machine work, which we give to contractors”</p> <p>“So, we don't outsource anything in production.”</p> <p>“we can definitely imagine making new products, there are also initial ideas already there. So, we actually want to increase our added value by expanding the products.”</p>	<p>planned for the future and about value creation activities not carried out in the own company are included in this category.</p> <p>All statements indicating that the range of activities carried out in one's own company has increased or that this is planned for the future and about value creation activities carried out in the own company are included in this category.</p>
Value chain disruption and change	<p>Value chain disruptions/changes mean friction losses (e.g., delivery bottlenecks) or positive developments (e.g., gaining new customers) at the interfaces of the company's own value chains to other value chains.</p>	<p>“in March 2020 alone, we had 91 new customers who registered via the online store and wanted to be supplied. And that continued in principle. We got 433 new customers in 2020, of which ... 43% bailed out, but that is somehow completely normal. And in 2019 we had just below that, so 398, so that's still a lot as well.”</p> <p>“We also need plastic lids for the milk bottles, of course. There were already</p>	<p>All statements reflecting changes or disruptions in value chain structures due to the COVID-19 pandemic are sorted in this category.</p>

Category	Definition	Anchor example	Coding rules
		<p>delivery problems, also partly with the fruit preparations. That they just came later, but not so much later. And we actually got all the goods we needed.”</p> <p>“So, we suddenly got a lot more milk, which is already difficult for us as a small dairy when you have to deal with such fluctuating milk quantities. (...) in the trade we have lost the wholesale completely, that has been a slump of about 30% for us.”</p>	
Regionalization	<p>Regionalization refers to cooperation with actors in the immediate neighborhood, that is, the choice of suppliers and buyers who are in local proximity to the company.</p>	<p>“We get the ducks and geese from [a farm shop nearby]. The lambs we get from a friendly organic farm from [a village], which is around the corner from us. [...] There we focus already on regionality and on quality. So that’s important to us.”</p> <p>“Actually, we are very limited to the [city nearby] area. So, we sell quite a lot directly - that is, to end customers. Which we have now also found, which is a huge advantage in the pandemic.”</p> <p>“our suppliers are all from Schleswig-Holstein and most of them are around [the village we are located in]”</p>	<p>All statements referring to regional suppliers, buyers, and cooperation partners are put in this category.</p>
Category – Resources and capabilities at different levels (intra-organizational, inter-organizational, and locational)	<p>The central bundle of resources/capabilities of an actor with relevance for its competitive position.</p>	<p>“That it’s a family business. That we create trust. That we produce good products that also include sustainability and are also BIO. THAT is what I would say is the core competence and that we are honest.”</p>	<p>Statements reflecting assets that form a central basis for successful value creation are sorted in this category.</p>

(Continues)

Category	Definition	Anchor example	Coding rules
Valuable firm-internal sustainability resources	Company-owned resources focused on sustainable development.	<p>“The dairy cattle and the pasture farming. And then also somehow to be able to do everything a little bit and not to be very dependent on external parties. (...) Pasture management, the possibility of our pastures.”</p> <p>“That we have produced these artisan dairy products from well-produced milk, which is just special.”</p> <p>“This is going in very specific directions now also through my presence in the company and really being integrated in the company, that we are now really getting <i>somewhere</i> in terms of sustainability”.</p> <p>“97% of our products are BIO products. Not necessarily BIO products, but made with BIO spices and by and large green label, so we say we only process pure spices and no additives.”</p> <p>“(…) our philosophy is right. Our history is right, which we depict. So the treatment of the animals - not only our own animals, but also the treatment of the slaughter cattle.”</p>	Statements suggesting that environmental and social impacts are reduced through corporate actions are sorted in this category.
Valuable firm-internal other resources	All other firm-internal resources relevant in the competitive environment.	<p>“We talk about what we do. Out loud, too. We're also in the press, we get noticed.”</p> <p>“The knowledge definitely. [...] Then the brand name.”</p>	Statements about further firm-internal resources that play a role regarding competitiveness are sorted in this category.
Valuable inter-organizational sustainability resources	Resources focused on sustainable development that have been jointly developed or are jointly used with cooperation partners.	<p>“we now got a new bag machine - bag filling machine - (...). And now we are working together with [company name]. They have developed a milk carton that does not use</p>	Statements suggesting that environmental and social impacts are reduced through cooperative actions are sorted in this category.

Category	Definition	Anchor example	Coding rules
Valuable inter-organizational other resources	Further relational resources.	<p>any oil at all. There is still a plastic coating, but it's made from [...] a (...) product that is a by-product of wood production.”</p> <p>“We are involved in regional marketing in the form of FEINHEIMISCH.”</p> <p>“Then I just remembered that with agroforestry system, there will also be some research work on us[...] research project, I'll call it. They'll be looking at many different levels to see how our areas are changing because of the trees.”</p> <p>“we have a strong brand that is definitely very well known around here and yes that helped us take over the business WITH the consumers together. AND then just our strong backup through all of our members. That definitely helped us as well.”</p> <p>“The ordering of the packaging for the milk and dairy products is a cooperation. We got together with various direct milk marketers and place a bulk order through us. And then the others pick it up from us, so the prices are a little bit lower.”</p> <p>“And then we definitely work together with the - quite classically - with the local companies here who do the heating for us and who weld the pipes for us and so on. We work with them, of course.”</p> <p>“For us, sustainability is, let's say, a statement that we make. And in the course of this, we are also striving for CO₂ neutrality in our operations, where we are</p>	<p>Statements about further inter-organizational resources that play a role regarding competitiveness are sorted in this category.</p> <p>Statements suggesting that environmental and social impacts are reduced on the regional/location level are sorted in this category.</p>
Valuable local sustainability resources	Local resources focused on sustainable development of the region.		

(Continues)

Category	Definition	Anchor example	Coding rules
Valuable local other resources	Further local resources.	<p>already working towards this. That means that our refrigeration system is currently being redesigned so that we use the new and currently good or better refrigerant. The old one, [NAME], will soon no longer be affordable. But that is also political will [..], it's so expensive, so that in the end you force the companies to change over.”</p> <p>“And then the big country road that goes right past our farm, it's not disadvantageous there either.”</p> <p>“the traffic infrastructure is very favorable for our farm”</p> <p>“The immediate help [by the government in times of COVID] was VERY helpful.”</p>	<p>Statements about further local resources that play a role regarding competitiveness are sorted in this category.</p>

Table sorted following Mayring and Fenzl (2019), p. 639, who refer to Ulich et al. (1985). DeepL Translate (see <https://www.deepl.com/de/translator>) has been used to facilitate the translation of this table from the German to this English version—the coding was undertaken on the basis of the original German language version.