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Three-Fold Embedding: Farm Development in Relation to Its Socio-Material Context

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Abstract: Understanding heterogeneity in farm development strategies is important in order to design effective policies and support programs to increase the sustainability of agriculture in relation to its socio-material context. Using a unique case study of 102 dairy farmers in The Netherlands, all operating in a highly similar socio-material context, this paper studies the differences in the relation of farms with the socio-material context. To this end, the concept of three-fold embedding is developed and tested using the ideal-typical characteristics of three patterns of farm development that were identified in the case study: (1) maximising total milk production; (2) optimising milk production using mainly on-farm resources; and (3) diversified on-farm production. Three-fold embedding was conceptualised in relation to the following dimensions: (1) value chain relations; (2) socio-cultural relations; and (3) natural resource relations, while using a scale ranging from a Close to a Stretched set of relations. The concept of three-fold embedding proves to be useful to identify in a non-normative and non-binary manner meaningful differences between patterns of farm development. These differences relate to differences in opportunity identification and strategic decision-making. The concept supports a relational perspective in studying farm strategy development using a sociology of entrepreneurship approach.

Keywords: farm development; dairy farm; embeddedness; strategy; perception; heterogeneity

1. Introduction

Diversity or heterogeneity in farming is, as many studies have shown over the past 25 years [1–5], one of the main features of farm development. Heterogeneity in farming is likely to affect the pathways in farm development strategies towards more sustainable food production systems. This paper aims to increase the understanding of this heterogeneity by studying the relation between farm development strategies and the socio-material context. Diversity cannot be explained in full by 'external' structural factors such as 'markets', 'technology', or 'nature' [1,5,6]. Farmers make decisions about the everyday management of their farm as well as strategic decisions about farm development. The practices resulting from these strategic decisions in turn affect the perceived opportunities and new strategic decisions. In this iterative process of strategic decision-making in farm development, the farmer tries to anticipate and balance the effect of developments in the context of the farm with the needs and aims of the family farm. In farm development, the farmer both reacts to and enacts the context, whilst adapting to changes and perceived threats and opportunities [7–9]. The decisions made by the farmer will structure farming practices and the relation between the farm and its context. The resulting farm development path in turn affects farming practices and the farm's context, and is therefore likely to affect the perceived opportunities for further farm development and future strategic decisions.

The context of the farm is shaped by social (e.g., policies, values, markets) as well as material (e.g., soil, climate, topography) factors. These factors are in many ways interwoven, as they co-evolve. Due to the interaction and co-evolution of social and natural ordering processes, the social and material are seamlessly interwoven into the socio-material context [10] of the family farm. In decision-making on farm strategies, the family farm is inherently intertwined with pre-existing socio-material structures; the farmer does not and cannot make strategic decisions as on a blank canvas. The existing socio-material context both enables and restricts farm development, as it offers opportunities as well as limitations [5]. In other words, there is 'room for manoeuvre' to act within the socio-material context. The farmer influences and thus enacts the socio-material context and thereby the room for manoeuvre for farm development.

A farmer's perception of the room for manoeuvre for farm development is likely to affect the strategic decision-making of the farmer for the development of the farm. Studying and analysing differences between individual farmers in their perceptions is, however, difficult, as the perceptions are affected by the socio-material context in which farmers operate [11,12]. To better understand diversity in practices and in perceptions of opportunities, we have conducted a unique case study of a dairy farming region (Kampereiland in The Netherlands), in which all 102 dairy farmers operate in the same, or at least in a very similar, socio-material context. This allows for an in-depth empirical study of differences found between dairy farmers in their perception of opportunities. Studies of strategic decision-making in small businesses have revealed that the business owners' perception of opportunities is more decisive in the selection of a strategy than the formal analyses of opportunities [13,14]. For this reason, a better understanding of differences in the perception of opportunities is relevant. The way a business is embedded in its context is an important aspect in the identification of opportunities [15,16], and is, therefore, likely to also be important for the perception of opportunities. This paper develops a three-fold embedding perspective, based on Hess [17], in order to advance a contextualized understanding of entrepreneurship in family farms, thereby building on a growing number of studies that combine sociology and entrepreneurship research [18–21].

In the next section, we elaborate on the theoretical background of both farm development and the embedding of farming in the socio-material context. Next, the methodology section describes the context of the case study, the collection of the data, and the operationalisation of embedding. This is followed by the results, in which the differences found are described and analysed. Finally, the results are discussed and the conclusions of this study are drawn.

1.1. Theoretical Background

The modernisation of agriculture has resulted in significantly higher production levels, as production is no longer limited by the local availability of resources nor by logistics in reaching markets. This has led to the development of spatially extended food supply chains, but also to a more distant relation between the location of food production and the location of food consumption. This process is described as disconnecting (production and consumption have become separated, through physical distance), dis-embedding (the place of production is losing its influence on the quality and nature of products), and dis-entwining (production and supply chains become more and more specialized and separated) [22]. Alternative farm strategies have been developed over the past decades that emphasize the localness of food and the multi-functionality of farms. These farm strategies create value based on the characteristics of the farm and its local rural context, which leads to new value chains, such as farmers' markets, and new business opportunities, such as green care, education, and tourism [4,23], that contribute to the viability of farms [24]. This underlines that there are different strategies that farm families can implement in relation to the socio-material context of the farm. Which farm strategy to pursue is an important question in the decision-making process of farmers. Studying this decision-making process needs to be done in an integral way, as farming is embedded in a context shaped by interrelated social and material factors [16,18,25], which constitutes a 'Room for Manoeuvre' (RfM) for farm development within which the farmer develops a strategy.

This RfM is by definition perceived and therefore subjective. A farmer can (attempt to) actively enlarge the RfM by developing and implementing new strategies.

1.2. Three-Fold Embedding

The concept of embeddedness originates from the inclusion of the social dimension in the study of economic activity. Granovetter [26] is widely acknowledged for revitalizing the concept in the field of economic sociology as the incorporation of social relations into economic action [27]. In the literature, the concept of embeddedness is approached from different angles and perspectives, often focusing on a specific aspect of the embeddedness of economic activity in its context. For example, Jack and Anderson [28] focus specifically on the meaning of an individual's ties to the local social structure to explain differences in economic activities. Looking at the literature on food networks, embeddedness is used to theorize the development of alternative food networks [29–31]. Embeddedness is here used to study the social dimension and the ecological and cultural relationships of a food system in the territorial context of food production [32]. The embeddedness of food production is then seen as 'the re-placement' of food and food production in its local context in response to the 'dis-embedding' forces of conventional food networks [33]. Focusing on a specific aspect of embeddedness introduces the risk of a binary division, for example between 'good' local-embedded and 'bad' global dis-embedded food systems [32]. Embeddedness then easily becomes a normative characteristic, as it is seen as a 'unique, distinguishing, almost magical' attribute of alternative food strategies [34]. To avoid using embeddedness in a normative and binary approach, embeddedness can best be viewed as a dynamic process that can vary and is subject to management choices [32,35]. The dynamic process approach places the emphasis on the agency of an actor in making choices in relation to the context in which the actor operates. Resulting from a study on the different uses of embeddedness in the literature, Hess [17] states that a reconnection to the original meaning of embeddedness is needed: 'the social relationships between both economic and non-economic actors', or plainly stated: 'who is embedded in what'. This view focuses on the extent of the embeddedness using a scale as opposed to a binary approach.

Hess extracts three general dimensions to be used in the study of embeddedness: (1) Societal embeddedness, which signifies the importance of where an actor comes from, considering the societal (i.e., cultural, political, etc.) background; (2) Network embeddedness, which describes the network of actors a person or organisation is involved in; and (3) Territorial embeddedness, which considers the extent to which an actor is 'anchored' in particular territories or places [17]. The combination of the three dimensions creates a three-dimensional embeddedness perspective, and offers a symmetrical, non-binary approach to the study of differences in the embedding of farms. For further use in this paper, the verb 'embedding' is preferred over the noun 'embeddedness', as the embedding of a farm in the relations with the socio-material context is an active and evolving process, and not a static state of being. The three dimensions as described by Hess are used in this paper to study the embedding of the different patterns of farm development found in the case study. The three dimensions are carefully re-conceptualised in the context of dairy farming to ensure a clear and meaningful understanding of each dimension. The societal embedding is re-conceptualised as the socio-cultural relations of the farmer, asking how farmers view themselves as a farmer and with which values, norms, and 'culture' of farming a farmer identifies him or herself. The network embedding is re-conceptualised as the value chain relations, asking which value chain the farm is a part of or linked to, or which networks or spheres of influence affect farm development. The territorial embedding is re-conceptualised as the resource relations of the farm, asking about the origin of the resources for farm production. This raises the question of how to create a measure for the embedding for each of the dimensions. This will be further explained in the methodology section.

2. Materials and Methods

2.1. The Case Study Context

Studying differences in the embedding of farms presents a challenge, as there are generally notable differences in the socio-material context in which farms operate. Secondly, in case the differences in the socio-material context of a number of farms is limited, it is challenging to find a case study with sufficient respondents. The Kampereiland case study offers a combination of a highly similar context for all dairy farmers in the case study area and a total population size of 102, which allows for a quantitative and qualitative study of differences between farm(er)s. Kampereiland ('the island of Kampen') is a typical Dutch river delta landscape influenced by centuries of farming (see Figure 1 for the geographical location). The town of Kampen has owned the islands in the river delta since 1363. Kampereiland has approximately 4000 ha of agricultural land and 800 ha of water, roads, and nature areas. The main activity is dairy farming (102 of the total of 108 farms). The culture and identity of Kampereiland has been influenced by its history as an island, even though the town of Kampen is less than 10 km away. The 600 people have good social connections with an active community centre, a church, a primary school, a quarterly journal, various social and leisure groups, and a yearly harvest festival. The case study area became part of a National Landscape (2005) due to its characteristic Dutch river delta landscape, which has been influenced by centuries of farming, and the former coastal areas bordering Kampereiland were designated as Natura 2000 nature reserves (2011). The policies and legislation concerning Natura 2000 and the National Landscape limit the possibility of scale enlargement. Scale enlargement and specialisation has been and still largely is the predominant strategy in Dutch dairy farming in response to the abolition of the European Milk Quota system in 2015 [36]. The change in European Union (EU) dairy market policies has increased price volatility, while the accessibility of capital for investment has decreased due to the financial crisis. Dairy farming in Kampereiland is also affected by national and supranational legislation on environment, animal health, and animal welfare. Dairy farms in Kampereiland were until the 1980s known for their larger than average size and high economic return; however, farm income in Kampereiland decreased compared to dairy farms outside the area [37–39].

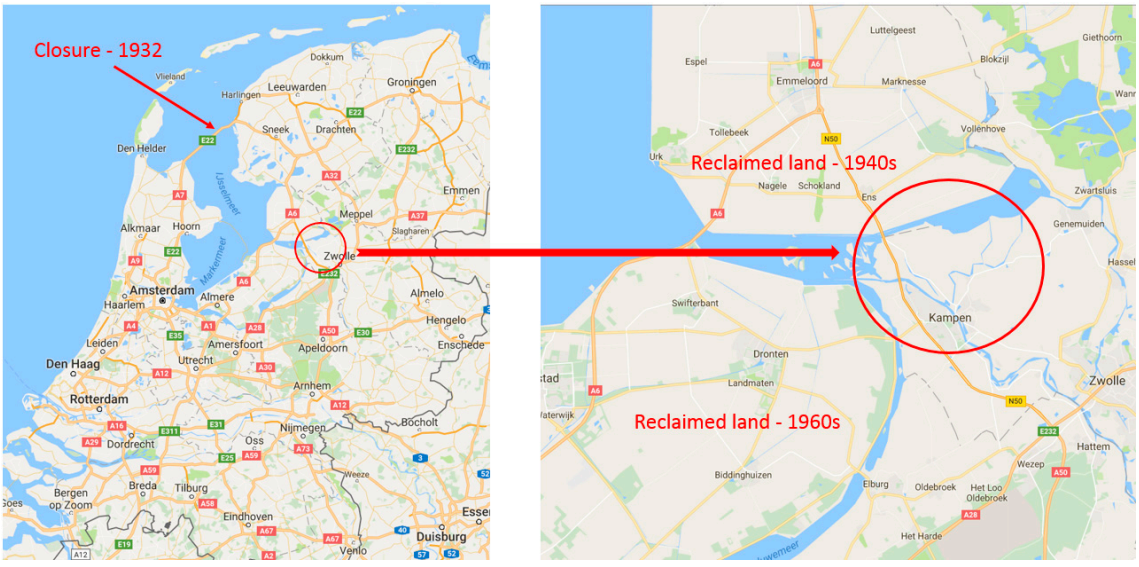

Figure 1. Location of Kampereiland in The Netherlands (in the circle).

All farms are tenant farms and the town of Kampen acts as the lessor. The lessor's policy is to take care of the 'heritage of our fathers' using four guiding principles: (1) retain the property of Kampereiland, (2) obtain a reasonable financial return, (3) maintain nature and landscape values,

and (4) conduct a loyal tenancy policy. The number of farms increased to 170 in the 1950s, when around 60 farms in the city of Kampen were outsourced to Kampereiland, followed by a gradual decrease of the active farms to 108 in 2012 (of which 102 are dairy farms). In 2012, a farm had on average around 45 ha in use, including land owned or rented outside Kampereiland. The tenancy situation affects the land market in Kampereiland, as there is no free land market. To buy land, the farmer needs to go to neighbouring areas (5+ km). The economy of the farms in Kampereiland strongly relies on dairy farming, though farm income is often supplemented by an off-farm job by the farmer or a family member. There were no organic dairy farms at the time of the survey, and around 10 farmers are engaged in the diversification of activities as on-farm income sources. The milk is delivered to (inter) nationally operating dairy organisations, mostly cooperatives.

2.2. Data Collection and Processing

This paper is part of a larger study on differences in farmers' perception of opportunities for farm development [40] that was possible due to the characteristics of the Kampereiland case study. Based on the exploratory phase, a survey was designed in order to identify possible differences in the perception of opportunities for farm development, the 'perceived Room for Manoeuvre' (pRfM). The construct pRfM is defined in this study as 'the opportunities perceived as viable in order to obtain a (substantial part of) business income'. In the survey, 79 dairy farmers (out of in total 102 farmers addressed) indicated on a 5-point Likert scale the perceived viability for a list of 15 opportunities for farm development to generate a substantial part of farm income (for a detailed description of methodology see [41,42]). This list of opportunities was created in the exploratory phase using the literature and interviews with farmers and stakeholders of farm development in the Kampereiland area. The respondents indicated their perception for each of the 15 opportunities based on their own situation, the so-called first-person opportunity [43]. The 23 non-respondents in the case study were assessed by local experts as not being different from the respondents. The data were statistically analysed using a two-stage cluster analysis, leading to four clusters of farmers that represent coherent and consistent patterns of farm development that were validated as meaningful by stakeholders [41]. In the next step of the study, it was found that the personal views and preferences of the farmer are the most influential drivers to explain the differences between farmers [42]. In the present paper, the third and final step is described: this step aims to study the three-fold embedding of the different patterns of farm development using the ideal-typical farm practices of the patterns. Ideal-types are a coherent theoretical concept that is 'formed from characteristics and elements of the given phenomena but it is not meant to correspond to all of the characteristics of any one specific case' [44]. Ideal-types can help to identify patterns of variance [45] and to give meaning to the patterns found. The ideal-typical farm practices of each pattern were determined using information from three sources: (1) the average score of the farmers for the 15 opportunities that were presented in the survey, (2) the average production characteristics of the farmers, and (3) interviews with 15 dairy farmers and 16 stakeholders of dairy farm development on the characteristics of the patterns of farm development. The dairy farmers were selected at random from all four clusters, and the stakeholders were selected from different professional backgrounds (advisory, farm supply, veterinary, the lessor and farmers' organisations). The interviews were recorded and transcribed for further analysis.

2.3. The Scale Used to Measure Embedding in the Set of Relations

Using the ideal-typical characteristics of the different patterns, the extent of the three-fold embedding was determined for the patterns of farm development. Each farm has its own way of embedding in the three dimensions as a result of the manner of using the available resources of a social, cultural, human, and natural character [46]. To estimate the extent of the embedding, a scale was used ranging from a 'Close' set of relations to a 'Stretched' set of relations.

These terms—'Close' and 'Stretched'—have been selected to avoid a geographical connotation. Geographical or spatial distance is to a certain degree represented in all sets of relations; however, the primary

characterisation of the relation is not based on physical distance. 'Close' and 'Stretched' are as such not normative or binary views, and are positioned on the far ends of the scale for each of the three dimensions. The positioning on the scale between 'Close' and 'Stretched' was based on the informed judgment of the researcher using data from interviews with 15 farmers and 16 stakeholders of farm development. In these interviews, the primary question concerned how one type of farm differs from other types of farms. The position on the scale between Close and Stretched resembles a slider on a sound-mixing panel. The combined positioning for the three dimensions of embedding represents the overall embedding of the farm(er) at a given moment in time. The positioning of the slider does not represent an exact and calculated positioning on a clearly defined scale; the position represents a range that respects the variation in the characteristics of the farms that are all regarded as part of the same pattern of farm development. In Figure 2, an example is given of how the sliders could be visualised, where the actual position of the slider in this figure is random.

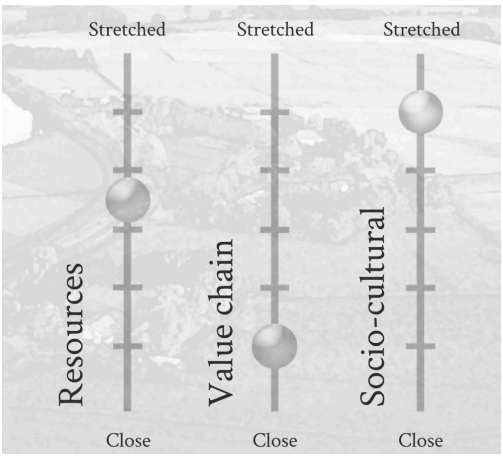

Figure 2. Visualisation of the three-fold embedding of a farm (positioning on the scales is random).

To determine the positioning of the embedding, the following guidelines were used. For the Socio-cultural relations of the farm(er), the networks of the farm family is an important aspect. First, is the farm family primarily connected to the regional agriculture-based networks (Close) or does the farm family have active relations with networks outside its own (rural) region and outside the familiar agricultural networks (Stretched)? Secondly, attachment to the land in use and to the immediate surroundings of the farm, both physical and social: does the farmer 'belong' to this location (Close) or could the farmer easily move to another farm in a different location (Stretched)? How does the farmer position himself as caretaker of the farm and its land (Close) or as manager of an economic activity (Stretched)? For the Value chain relations of the farm: what is the status of the relation of the farm to market outlets for its product? Are the products part of a globalized value chain where products are marketed anywhere in or outside of Europe (Stretched) or is it a value chain where products are marketed using a brand linked to the farm or the region (Close)? Is the farm(er) primarily connected to a value chain network that views the on-farm produced milk as raw material for further processing in either dairy or non-dairy products (Stretched) or is the farm primarily connected to a value chain network that views the on-farm produced milk as the basis for dairy products that can be linked to its origin (Close)? For the Resources relations of the farm: where do the resources come from (mainly feed and fertilizer)? Is it primarily based on the agro-ecological view of self-sufficiency in producing feed, using only limited farm-external resources (Close), or is it primarily based on the agro-industrial view of selecting a mix of resources for production out of all available resources (Stretched)?

3. Results

3.1. Ideal-Typical Characteristics of the Clusters

The two-stage cluster analysis resulted in four clusters representing different consistent and coherent patterns of farm development. These four patterns were labelled Milk Max, Milk Balance, Milk Plus, and End Milk [41].

1. Milk Max (29 of 79 farms): farms aiming for maximisation of total farm milk production within economic parameters using high levels of input to create a high output. Their view on dairy farming is primarily technical and financial.
2. Milk Balance (21 farms): farms aiming for optimisation of total farm milk production within the limits of feed produced on their own land, where limited additional inputs are used to optimise milk production. Production costs are kept relatively low.
3. Milk Plus (21 farms): farmers who are open to other sources of income from on-farm activities (e.g., care, recreation, and nature) alongside a Milk Balance strategy. The farm is based on a relatively extensive production that reduces pressure on operational management and in turn allows for time and energy to be spent on other activities.
4. End Milk (8 farms): farms aiming to end milk production in the coming years, either due to retirement without a successor or due to the economic situation of the farm. Farmers often aim to continue to live in the farmhouse while the land is used by other farmers, and farm facilities are taken out of (dairy) production. The pattern End Milk is not used for further analysis of embedding due to the low number of farms in the pattern in combination with the diversity of motivations to end production.

Table 1 presents the average production characteristics of the four patterns. Milk Max shows the highest production per cow, per ha, and per farm, which corresponds to an intensive dairy production using high external inputs as by-products and concentrates. The characteristics of Milk Balance show production levels that optimise production per cow, per ha, and per farm based on internal roughage production with additional concentrates. For Milk Plus, the production levels are clearly lower per cow and per ha, yet total production per farm is relatively high. The relatively extensive mode of organizing production on Milk Plus farms allows for time and energy to be spent on other activities. In interviews with farmers and stakeholders in dairy farming, the clusters proved to be coherent in their characteristics, consistent over a longer period of time, and meaningful in the practice of dairy farming.

Table 1. Production characteristics of patterns in dairy farming on Kampereiland (year 2012, ×1000 kg).

Pattern [1]	Milk/Cow	Milk/ha	Milk/Farm
Milk Max	9.0	17.9	893
Milk Balance	8.3	14.1	543
Milk Plus	7.5	11.9	622
End Milk	7.2	10.7	410

[1] The patterns are based on [41].

The next section focuses on the three-fold embedding for the ideal-typical farm characteristics of the patterns that aim to continue dairy farming: Milk Max, Milk Balance, and Milk Plus. The results are illustrated by quotes taken from interviews with farmers and stakeholders related to dairy farming on Kampereiland. The quotes are presented in three tables for each ideal-typical farm and were translated into English, using terminology that is as close as possible to its meaning in Dutch. In the tables, the quotes are divided into three sources: 'Self' for farmers describing their own characteristics, 'Other farmers' when speaking of farmers other than their own ideal-typical farm type,

and 'Stakeholders' for stakeholders of dairy farming. Parts of the table were left out in the case that there were no relevant quotes by this particular group. The combined results for all three ideal-types and all three dimensions of embedding are summarized in the final table (Table 11).

3.2. Three-Fold Embedding of Milk Max

3.2.1. Value Chain Relations

The Milk Max farm is primarily focused on producing dairy as a commodity product for the dairy industry, as shown by the quotes in Table 2. It is organized with the aim of producing as much milk as possible within legal boundaries and economic constraints. To this end, the Milk Max farmer aims to enlarge the size of the farm for reasons of cost efficiency. This translates into a position located on the Stretched end of the scale.

Table 2. Quotes on value chain relations for the Milk Max farm development strategy.

Milk Max: Value Chain Relations	
Self	We want to focus fully on production and to minimize side activities (f13)
Other Farmers	They see it as a challenge, going to the max. When you give them the choice for less or more cows with the same financial profit, they opt for the higher number of cows. It is also a competition in their network to be on top of the lists (f34)
	Their decisions are based on economy, their aim for the farm is to earn money and they love to continuously develop their farm (f41)
	The larger the farm, the more easy it is to deal with investments, you need numbers (f26)
	When foreign capital is to the max, you need to maximise production, it has to be repaid (f26)
Stakeholders	They are well connected to advisory services, but they do follow their own plan and goals (s13)
	The farmers actively look for new techniques to lower the costs (s4)
	When a farmer has maximised external capital, the production needs to be maximum as well (s7)

3.2.2. Socio-Cultural Relations

The Milk Max farm is seen as an enterprise and the farmer as entrepreneur and business owner, as the quotes in Table 3 clearly indicate. The farmer gets satisfaction from a well-managed, smoothly running farm operation. The farmer takes pride in how they farm and represents this as their active choice. The farm and the farm family are not always actively connected; persons in the farm family may view the farm as something they do not engage with. The farmer is interested in general business networks, and makes frequent use of advisory organisations in the field of business management. The position on the scale is on the far end of the Stretched side.

Table 3. Quotes on socio-cultural relations for the Milk Max farm development strategy.

Milk Max: Socio-Cultural Relations	
Self	We need to separate the farm and the family, the time that the whole family needed to support the farm needs to be over (f12)
	We should be going away more, when you look at this wharf here nearby, they fly all over the world (f12)
Other Farmers	These farmers are really good managers, they need to be good in quick decision-making (f26)
	There is also an element of showing off what real farming is like (f31)
	The larger farmers are no longer interested in local organisations, they can still be found on boards, but then as a paid board member (f24)
Stakeholders	When I am called to calve a cow, I can find the cow in the stable and I can call the farmer when needed; in Milk Balance farms the family would come to watch (s11)
	They are not easy-going farmers who like to chat, they do have time, but only in the evenings (s2)

3.2.3. Natural Resources Relations

The Milk Max farmer looks at natural resources from an economic perspective. Deciding which resources to use is the result of economic calculation in which cost efficiency prevails. The local surroundings are seen primarily through the lens of usefulness for production. The Milk Max position is towards the Stretched end of the scale. As the farm does not rely entirely on external resources by using feed and fodder from its own land, it is not positioned on the far end of the scale. Table 4 presents the quotes related to this farm development strategy.

Table 4. Quotes on natural resources relations to the Milk Max farm development strategy.

	Milk Max: Natural Resources Relations
Self	We have always milked to the max, we scrape together the feed we can get to have enough, a more extensive approach just would not fit (f13)
	As much milk as possible using concentrates and by-products (f11)
	Farmland birds programs? We only participate when it is economically feasible (f14)

3.3. Three-Fold Embedding of Milk Balance

3.3.1. Value Chain Relations

The Milk Balance farm is focused on the conventional dairy value chain. As with the Milk Max farm, milk is viewed as a commodity. However, unlike the Milk Max farm, the Milk Balance farm is characterized by a production system based on (relatively) low external inputs. Farm income is not actively maximised; it is seen more as the result of decisions made than as the primary goal of the farm. Participating in a value-added dairy supply chain (e.g., organic dairy) is an option that Milk Balance farmers would consider. They are critical of the trend towards both scale enlargement and diversification of the farm. The Milk Balance farmer does not believe in other on-farm income sources. He hesitates partly because of the investments that are needed, and partly because of how it will affect the farm's business activities. The position on the scale is towards the Stretched side, though not as outspoken, and thus less of an active choice compared to the Milk Max farm. It is a position that has evolved over time. Table 5 presents quotes derived from the interviews.

Table 5. Quotes on value chain relations for the Milk Balance farm development strategy.

	Milk Balance: Value Chain Relations
Self	We could become part of a separate dairy value chain, but we would not be the ones to initiate a new value chain (f21)
	The media wants to convince us that big farmers are the entrepreneurs with beautiful new farms; I believe that it is more of a feat to get yourself an income from 60 cows (f23)
	Diversification like regional products is not what I like, it takes away the attention that I need for my cows. Society may ask for it, but as long as we can farm the way we want we will do so (f21)
	Like green care or energy production, well, you need to invest first and wait and see if it will give a profit (f25)
Other Farmers	Milk Balance farmers are first of all farmers. They like to do a good job in producing milk by focusing on internal feed production and low production costs (s12)
	Milk Balance farmers are less focused on the financial results, much less than Milk Max farmers. These farmers do not strive for a bigger farm, it is not their preference (s11)
	These farmers invest less capital, they try to keep costs low (s13)

3.3.2. Socio-Cultural Relations

For Milk Balance farmers, dairy farming is a way of life that is rooted in the local culture. The farmer gets satisfaction from being part of the farming culture and from working on the land and

with the animals. The farmer tends to farm the way he is accustomed to. The farm family is an integral part of the farm business. Milk Balance farmers are open to contributing to societal goals, such as sustaining landscape and protecting nature, as long as it does not negatively interfere with the farm's operation. The position is quite outspokenly on the Close end of the scale. Table 6 presents the quotes.

Table 6. Quotes on socio-cultural relations for the Milk Balance farm development strategy.

	Milk Balance: Socio-Cultural Relations
Self	Farmers may very well be too much farmyard-oriented, there are too many of those still around (f25)
	I was born and raised on this farm, my great-grandfather started here, my grandfather was born here, we have been here since 1890 (f22)
	I farm the way I want to farm, no matter what other people say, my family is very involved, they enjoy it and love to help, that is very rewarding (f24)
	Working with people from nature organisations was not a success, I cannot get along with them, even though I still try to protect farmland birds (f23)
Other Farmers	These people are working based on an ideology, the connection with family, looking more at sustainability, their way of farming is more value-based (s10)
Stakeholders	I do believe that farmers who are more oriented to craftsmanship in farming enjoy farming more (s4)

3.3.3. Natural Resources Relations

The Milk Balance farmers lean more towards the low external input side of resource use. The farm and its natural environment constitute the basis for production. The farm itself is the primary resource for production, and the farmer attempts to optimise within the resources available. The amount of inputs needed to maintain the productivity of the farm is one of the indicators for successful farming: the fewer inputs needed, the better. Additional resources are used, but with the aim of optimising production rather than maximising as in the case of the Milk Max strategy. Nature and landscape are perceived as a constraint on production rather than as a resource. Nevertheless, nature and landscape are as such greatly appreciated. The Milk Balance farmer does feel connected to and a part of his surroundings; the farm belongs there, and is part of the agricultural heritage of the region. The surroundings are basically seen as being 'outside the farm', as a separate world that may negatively affect the farm. Farmers have been confronted, quite often by surprise, with nature and landscape preservation policies that have reined in farming and farm development. The position on the scale is toward Close. However, as additional off-farm resources are used, the position is not fully on the Close side. The quotes are presented in Table 7.

Table 7. Quotes on natural resource relations for the Milk Balance farm development strategy.

	Milk Balance: Natural Resources Relations
Self	I have as many cows as my land can handle, I would even prefer to have less cows per ha but some legal limitations mean that I need to have more cows than I would prefer to have (f34)
	Patience, patience, give the land its time, farmers give too much priority to working fast (f31)
	To turn some agricultural land into water retention areas is fine in itself, but then you will see that those nature people will turn it into a nature preserve over time (f33)
Other Farmers	Farming skills are very important, some farmers can harvest twice as much from one ha as other farmers (f41)

3.4. Three-Fold Embedding of Milk Plus

3.4.1. Value Chain Relations

The Milk Plus farm is part of more than one value chain, although dairy production is still is the primary source of income. Alongside dairy farming, the farmer operates a value chain of products and services directly serving clients. This value chain is based on the unique characteristics of the farm

and the appeal of the rural setting to primarily urban consumers. This type of farm requires skills and entrepreneurial competencies different from those needed for the Milk Max and Milk Balance farms, which are usually only embedded in a dairy value chain. The success of the farm cannot be measured according to the same production characteristics as for Milk Balance or Milk Max due to the diversity of economic activities. The approach to dairy farming resembles Milk Balance, with a preference for relatively low external inputs and its natural setting as a basis for production. The position on the scale is towards the Close end. As products may be part of a national marketing system, it is not necessarily on the far end towards Close. Table 8 presents the quotes derived from the interviews.

Table 8. Quotes on value chain relations for the Milk Plus farm development strategy.

	Milk Plus: Value Chain Relations
Self	We are surprised how farmers cannot see the chances and opportunities in the society around them (f33)
	Milk Max and Milk Plus in some ways resemble each other, they both have entrepreneurial competencies, the one sees opportunities in the surroundings and the other sees the production potential of his farm (f33)
Other Farmers	Those farmers really dare to take entrepreneurial risks, they are not just continuing their farm activity (f14)
Stakeholders	In the nineties I talked with farmers about choosing to opt for an off-farm job or to start a bed-and-breakfast (B&B) on the farm; they decided to do the B&B as it increased the activity on the farm. Now it is an adequate income. The diversification, you see the effect of more activity on the farm (s12)
	This is the real entrepreneurship as you need to react to societal developments (s12)

3.4.2. Socio-Cultural Relations

The Milk Plus farmer perceives the farm as more than a production location; it is as also a source of well-being for (the local) society. Being appreciated and valued for efforts to re-establish the link between countryside and city, between farmer and urban dweller, is important for the Milk Plus farmer. Hence, the Milk Plus farmer is very motivated to contribute to regional development and to undertake activities that add value to society. Earning a decent income is important, but is not the primary goal of the Milk Plus farmer. The farm is a family business. The farmer is part of socio-cultural networks outside the realm of agriculture. The position for socio-cultural relations is a mix of Close and Stretched. The farm actively seeks relations outside of the traditional regional and agriculture-based networks (Stretched), and at the same time the connection to the local community is strong (Close). Table 9 presents the quotes related to socio-cultural relations.

Table 9. Quotes on socio-cultural relations for the Milk Plus farm development strategy.

	Milk Plus: Socio-Cultural Relations
Self	We do not need to get the last drop of every cow, we cherish the social contacts. As a farmer it is easy to be isolated on the farm; it is good to see other things (f31)
	I indeed prefer a farm that enables me to give room to my idealism than a farm that delivers a high income. Contact with people, all the stories you hear. That gives insights as well (f34)
	We have both worked in other occupations and we have seen that there are other worlds. The contact with other people made us aware of the value of farm life (f33)
	A network outside agriculture helps you to stay creative, they say things that make you think (f31)
Other Farmers	On these farms you often see that family is actively involved in running and developing the farm (f14)
	The family is really part of the farm and they work on and talk about the farm (f15)
Stakeholders	These farmers find other things in the world more important than just farming (s2)
	Sometimes you see farmers that are maybe too social, they give too much of themselves (s10)
	You often see that the partner of the farmer worked in, for example, health care, and then develops 'green health care' on the farm (s12)
	You need inspiration as well—are you open to it—is it part of the farmer's character? (s4)

3.4.3. Natural Resources Relations

The primary resource base for dairy farming is local, and in this regard the Milk Plus strategy resembles that of the Milk Balance farmers. In addition, the farmers see and seize an alternative use of resources in the region; the farm itself, the farming lifestyle, and the rural context are all seen as resources. The Milk Plus farmers like to see a farm that is well-embedded in a landscape and that connects farming to nature and landscape. The farmer actively explores ways to connect the farm to its surroundings. The farmer is willing to cooperate with other stakeholders, and may even take the lead in activities such as sustaining landscape or preserving natural resources. The position on the scale is towards Close. However, as additional resources are used for the optimisation of production, the Milk Balance farm is not positioned at the far end of the scale towards Close. The quotes are presented in Table 10.

Table 10. Quotes on natural resources relations for the Milk Plus farm development strategy.

	Milk Plus: Natural Resources Relations
Self	We think this part of the polder has potential for nature and farmland birds (f31)
	We had plans to rent out small boats as well, but we were not allowed to organise a location on the water side for the boats (f31)
Stakeholders	This farmer uses his farmyard for other purposes other than milk production, such as green health care. They make use of the buildings and farmyard and the competencies of the farmer and his partner (s12)
	Regional production is of course a business, but for the farmers it has value that cannot be expressed in money; it is a sense of belonging to the location (s3)

In Table 11, the results of this study are summarized for each cluster. The extent of the embedding for each of the three dimensions is visualized by positioning a horizontal 'slider' on the scale ranging from Close to Stretched. The selected position of the slider is based on an informed judgment by the researcher on the basis of the research findings. For Milk Max, the three sliders are most oriented towards Stretched; for Milk Plus, the sliders are most oriented towards Close, and for Milk Balance, the position of the three sliders shows the biggest difference. Both Milk Max and Milk Plus seem to be based on a more explicit reasoning of the farmer about his positioning on all three dimensions compared to the Milk Balance farmer. For Milk Balance, the positioning on natural resources relations is explicit; for the other dimensions, the positioning has an implicit character. The difference between the clusters Milk Plus and Milk Balance is the positioning for value chain and for socio-cultural relations.

Regarding the value chain, the Milk Balance farmer is implicitly oriented towards the conventional dairy value chain that has a Stretched character, whereas Milk Plus is explicitly oriented towards local relations and networks, meaning it has a Close character. For socio-cultural relations, the Milk Balance farmer is implicitly oriented towards the local, traditional networks (Close), whereas the Milk Plus farmer is explicitly focused on networks outside agriculture as well as in other regions or parts of society (Stretched). This difference in the orientation for socio-cultural relations could be the key to understanding the difference in personal views and preferences between the Milk Balance and Milk Plus farmers. The findings will be discussed in the following section in light of our research question.

Table 11. Extent of three-fold embedding for the three ideal-typical patterns of dairy farming.

	Milk Max	Milk Balance	Milk Plus
Value Chain Relations	- Focus on producing dairy as a commodity for the for dairy industry - Explicit agro-productivist view, farm is production unit, focus on benefits from scale and intensit - (Pro-)active in relation to organisations in the value chain, network oriented - Explicitly refers to his position in value chain as an active choice **Close** [(1)] **Stretched** < - - - - - - - - - - - - - - **XXXXXX** - - >	- Focus on dairy as commodity, possibly part of value-added chain (e.g., organic) - Implicit agro-ecology view, farm is production unit, focus on benefits from optimising land assets - Passive in relation to organisations in value chain, farm internal oriented - Implicitly refers to current value chain as 'the normal thing to do' **Close** **Stretched** <- - - - - - - - - - - **XXXXXX** - - - – >	- Focus on multiple value chains: 'normal' dairy plus an extra on-farm activity - Explicit agro-societal view, farm is a unit with multiple functions, focus on multiple use of assets - (Pro-)active in relation to broader set of networks - Explicitly refers to added value the farm has to offer **Close** **Stretched** < - - - - **XXXXXX** - - - - - - - - - - >
Socio-Cultural Relations	- Orientation as dairy farmer running a business - Farm and family not necessarily linked; less lifestyle farming - Focus on (agri-)business networks, local relations are personal rather than farm-related - Explicitly refers to the socio-cultural relations using a rational approach **Close** **Stretched** < - - - - - - - - - - - - - - **XXXXXX** - - >	- Orientation as dairy farmer as a way of life strongly based in local culture - Farm and family are connected; lifestyle farming - Focus on agricultural networks, mainly local or supplier related - Implicitly refers to 'traditional farming' in the socio-cultural context **Close** **Stretched** <- - - - - - - - - - - **XXXXXX** - - - – >	- Orientation on offering multiple services for society - Farm and family are connected; the farm is seen as a family business - Focus in- and outside agriculture; interest in (developing) local and supra-local networks - Explicitly refers to farm as active connector in socio-cultural relations **Close** **Stretched** < - - - - **XXXXXX** - - - - - - - - - - >
Resource Relations	- Deciding which resources to use is an active choice; based on an economic calculation aiming to maximise output - Local nature and landscape is seen as potential constraint for development - Origin of resources is of secondary importance - Explicitly evaluates resources based upon economic added value to maximise a cost-effective production **Close** **Stretched** < - - - - - - - - - - - - - - **XXXXXX** - - >	- Deciding which resources to use is an active choice; feed from own land with added concentrated feed - Local nature and landscape is valued, yet seen as possible constraint - Resource base is primarily local; additional resources to optimise - Explicitly evaluates resources as part of the cycle of nature **Close** **Stretched** <- - - - - - - - - - - **XXXXXX** - - - – >	- Deciding which resources to use is a passive choice; feed from own land with added concentrated feed - Local nature and landscape is valued as added value in the context of the farm - Local resources as marketing value; additional resources to optimise - Explicitly refers to the farm and context as a resource; intangible assets are valued as resources **Close** **Stretched** < - - - - **XXXXXX** - - - - - - - - - - >

[(1)] Visualisation of the position of the slider between a Close and a Stretched set of relations.

4. Discussion and Conclusions

This paper studied the three-fold embedding of the three patterns of farm development that were found in a case study of dairy farmers that is unique in the fact that all dairy farmers operate in a socio-material context that is similar for all of them. The aim of the paper is to enhance our understanding of the heterogeneity of farm development in relation to the embedding of the farm in the socio-material context. The patterns were found to differ in the extent of their embedding for

the three dimensions. In this section, we will discuss the methodology and the findings and draw our conclusions.

4.1. The Methodology

Kampereiland as a case-study area has specific characteristics due to its proximity to nature areas, its history, and all farmers being tenant farmers. This situation influences the challenges farmers face in developing their farm. However, challenges for farmers on Kampereiland are in themselves not unique, since dairy farmers all over The Netherlands as well as in other European countries face equal difficulties [47]. The uniqueness of the case study lies in the similar socio-material context for all dairy farmers, which allows us to study differences between farmers' perceptions and strategies. This study did not explore and analyse the nature of the actual relation between the context and the perceived Room for Manoeuvre (pRfM) of the farmer, but focused instead on understanding the differences found between farmers in their pRfM. Undertaking this study in an area where all farmers face the same socio-material conditions allowed us to focus on differences in farmers' preferences, perceptions, and strategies, without having to question to what extent these differences were influenced by different socio-material contexts. The different patterns that were found on the basis of differences in the pRfM were acknowledged by farming experts as valid for Dutch dairy farming in general. In other regions, the percentage of farmers that form part of a specific pattern may very well be different; alternatively, a sub-pattern might be identified as a separate pattern. This means that in practice, the results of this study cannot be copied without first being adapted to the specifics of other regions. From a theoretical perspective, there is however no decisive argument against the general validity of the results.

A second question is whether the use of ideal-types is suitable, as most farm(er)s will depart to some extent from the ideal-typical farm(er). In using ideal-typical farmers, the focus is placed on a specific set of characteristics. In reality, a mixture of characteristics and motivations will be found, as was the case with the Kampereiland case study. The aim of this study is, however, to establish recognizable and meaningful patterns of variance in empirical observations that are in themselves complex and diffuse [44]. The use of ideal-types proved a useful tool for this purpose of studying patterns of variance [45]. The findings of this study need to be interpreted as a study on differences between various development patterns of farmers. The results are not to be interpreted as a description of specific farmers with a fixed set of characteristics.

4.2. The Findings

This study shows that farmers' perceptions of options for (future) farm development are related to the embedding of the farmer and farm practices in the socio-material context that makes them an important aspect of studying heterogeneity in farm development. The socio-material characteristics of a farm result from and reflect how the farm is embedded in a set of heterogeneous relations. Heterogeneity in farm development is well documented in the literature on farming styles [5,6,48] and in relation to resilience of farms [24,49]. Heterogeneity in farm development cannot be reduced to 'external' structural forces such as 'markets' or 'nature' impacting on farming, even when these are mediated by capable farmers into their everyday farming practices and decision-making. The socio-cultural embedding of farmers, their shared values and norms, and how they see themselves as farmers, or like to be seen, do matter significantly in explaining different farm development strategies, and result in different patterns of farm development. The embedding in the socio-material context differs for the different patterns of farm development. The combination of socio-cultural embedding, value chain embedding, and natural resources embedding does matter for the development of the farm. This three-fold embedding of farming offers a new perspective on different patterns of farm development; more specifically, on the coherent strategic and operational decisions that farmers make. When looking at the differences in embedding found in this study, it is clear that embedding is indeed better served by viewing it as gradual and not as binary in nature. This also implies that the verb 'embedding' is more suitable than the noun 'embeddedness'. Metaphorically speaking, farmers

vary in how the 'sliders' of their 'mixing panel' are positioned, as they differ in their relation with the value chain(s), socio-cultural networks, and the use of (natural) resources. This positioning is not necessarily the result of a conscious and explicit decision, and is very much intertwined in a vast range of influences as is well described in the literature on farmer autonomy and farm strategy (see e.g., [49–51]). Strategic decision-making in farm development is a continuous process, and is an interaction between intentions, the perception of opportunities, and developments in the socio-material context of the farm. Farmers do so according to their views, capacities, and their perceptions of options for farm development, while taking into account the dynamic setting in which they operate. This perspective offers the possibility for a more symmetrical analysis of different forms of embedding, and highlights the differences between farmers in a way that is represented as gradual rather than as binary. This helps to overcome the dichotomy of being either (locally) embedded or (locally) dis-embedded. The results show to what extent farmers differ in their three-fold embedding on a scale between a Close and a Stretched set of relations. The three ideal-typical farms differ in the rationale presented by farmers and stakeholders when asked to describe the characteristics of the three patterns of farm development. The findings show that no strict boundaries can be drawn in the demarcation of farm development strategies. Although different forms of embedding may result in similar visible farm characteristics, they do reflect different rationales. Both Milk Max and Milk Plus are explicit in the positioning for all three dimensions. For Milk Balance, however, the positioning is only explicit in terms of the use of resources; this positioning is in line with their emphasis on optimising the on-farm available resources, and a focus on the craftsmanship of dairy farming. Milk Balance is more implicit in the way it relates to the value chain and socio-cultural aspects. Its positioning in these dimensions is not as explicitly articulated as it is for Milk Balance farmers, for whom it is quite 'obvious' or 'self-evident' how to run a dairy farm. However, an explicit reasoning does not necessarily mean that farmers' perception of options for farm development is voluntary or that it reflects the most preferred farm development strategy. Past decisions and investments do shape current perceptions, preferences, and decision-making. In other words, there is path-dependency in the way the farm and the farmer is embedded in the value chain, in socio-cultural networks, and in the natural resources needed for production and reproduction. The findings do show that farmers who perceive a Milk Max or Milk Plus strategy as viable appear to be more explicit and more pro-active in their positioning in value chains than a farmer with a Milk Balance strategy. This indicates a more pro-active approach towards creating room for manoeuvre for farm development. This is likely to be in line with being active in networks outside the traditional, locally-oriented agriculture network.

4.3. Three-Fold Embedding as Analytical Tool

The three-fold embedding places the focus on the different sets of relations of which farming is a part, and within which it is embedded. It thus takes a relational approach to farming and farm development [51]. In this relational perspective, strategic decision-making is viewed as the embedding of farm practices in the socio-material context. In this view, strategic decision-making is an iterative process of embedding farm practices in the different sets of socio-material relations of the farm. The nature of the relation of a family farm to the value chain context, the socio-cultural context, and the natural resources context is strongly connected to farmers' perception of opportunities for farm development, their perceived room for manoeuvre. The embedding of the farm (including the farmer as a person) at a given moment in time is the result of decisions and developments in the past. This specific embedding affects the networks of and influences on the farmer, thus affecting farmers' perception of the opportunities for farm development. This perception of the opportunities, in turn, affects the strategic decision-making process. Hence, embedding is an iterative process. The way and extent to which the farm is embedded in the three sets of relations affects the perceived room for manoeuvre for farm development, which in turn affects strategic decision-making. Strategic decisions lead to a specific embedding of farm practices that can be viewed as the three-fold embedding of the farm. Figure 3 depicts the iterative nature of strategic decision-making in relation to three-fold

embedding and opportunity identification (see [40] for a more elaborate discussion in this relation and the framework).

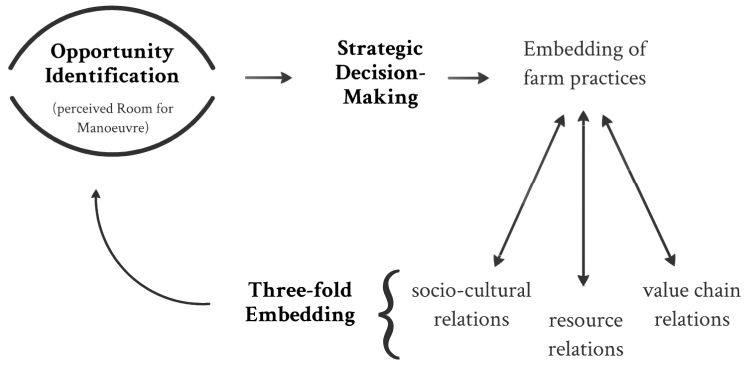

Figure 3. The iterative nature of the three-fold embedding, opportunity identification and strategic decision-making.

Three-fold embedding offers a promising perspective in studying how an entrepreneurial agent relates his/her business activities to the socio-material context and how the business owner co-constructs the operational context, being the business as well as its embedding in the wider context. This relation is a topic of growing interest in the literature on the topics of sociology of entrepreneurship, strategic decision-making, and business development in relation to its context [16,19,52]. A sociology of entrepreneurship approach creates the possibility to study the differences in the perceived room for manoeuvre in relation to differences in farm development as a response to various pressures on farm development, e.g., protection of landscape or nature values. The broad range of influences and pressures on farm development [9] makes it difficult for a farmer to fully pursue his personal desires. Identifying opportunities and the process of strategic decision-making requires entrepreneurial skills of farmers. Especially, diversifying production (Milk Plus) is not a straightforward and easy decision, and the motives for diversifying are complex and include non-economic aspects such as the farmers' skills and motives [53,54]. Three-fold embedding offers an avenue for further research on these motives for diversifying, and offers a relational approach in the categorisation of farm development. The concept three-fold embedding needs further development and study on aspects such as the scale used for the sliders. A next step in the research can focus on the agency of the farmer in creating room for manoeuvre for farm development. Does the farmer create the favourable conditions in line with the mission, strategy, and goals, or does the farmer perceive the local socio-material conditions as a given situation within which the mission, strategy, and goals have to be defined and realised? Whether farmers are able or not to enlarge their room for manoeuvre is of interest for both farm and regional development, especially in regions with nature and landscape values as amenities. The development of a farm, and the developments of different farms, in such a region affects the local surroundings and thus the valued assets of the region. The ability to identify different opportunities for farm development is cited in the literature as vital for adaptation to changes in the socio-material context [8,9], an ability that is influenced by the three-fold embedding of the farm. To support farm development in the adaption to changes in the socio-material context, it is vital to acknowledge the differences in strategies for farm development. Different strategies will have different pathways in creating more sustainable food production pathways. A better understanding of the differences in the embedding of farming practices in value chains, socio-cultural relations, and natural resources supports a better understanding of these different pathways. This is in turn important knowledge for the development of policies and support programs towards more sustainable food production systems.

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